

**DRAFT**  
**Environmental Impact Report**  
**The Ranch Project**  
**City of Antioch, Contra Costa County, California**  
**State Clearinghouse Number 2019060012**

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## ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius (Centigrade)
°F	degrees Fahrenheit
µg/m <sup>3</sup>	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACP	Alternative Compliance Plan
ADA	Americans with Disabilities Act
ADT	average daily traffic
af	acre-foot
AFY	acre-feet per year
AIA	Airport Influence Area
AIC	Archaeological Information Center
AICUZ	Air Installation Compatibility Use Zone
AIRFA	American Indian Religious Freedom Act
ALS	advanced life support
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APCD	Air Pollution Control District
APD	Antioch Police Department
APE	Area of Potential Effect
APN	Assessor's Parcel Number
AQMD	Air Quality Management District
AR	Age Restricted
ARB	California Air Resources Board
ARPA	Archaeological Resources Protection Act
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measures
ASCT	Adaptive Signal Control Technologies
AUSD	Antioch Unified School District
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit

BCDC	Bay Conservation and Development Commission
BCE	before Common Era
bgs	below ground surface
BIOS	Biogeographic Information and Observation System
BLS	basic life support
BMP	Best Management Practice
BP	Before Present
BRA	Biological Resources Assessment
BTU	British Thermal Unit
BVOC	biogenic volatile organic compound
CAAQS	California Ambient Air Quality Standards
CA FID	California Facility Inventory Database
CAL FIRE	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
Cal/OSHA	California Occupational Health and Safety Administration
CalEEMod	California Emissions Estimator Model
Cal/EPA	California Environmental Protection Agency
CAL FID	California Facility Inventory Database
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CASQA	California Stormwater Quality Association
CBC	California Building Standards Code
CBSC	California Building Standards Commission
CCCTA	Contra Costa County Transportation Agency
CCCWP	Contra Costa Clean Water Program
CCR	California Code of Regulations
CCTS	Central California Taxonomic System
CCWD	Contra Costa Water District
CDF	California Department of Finance
CDFW	California Department of Fish and Wildlife
CE	Common Era
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFC	chlorofluorocarbon
CFD	Community Facilities District
CFR	Code of Federal Regulations

CH <sub>4</sub>	methane
CHL	California Historical Landmarks List
CIP	Capital Improvement Program
CMA	congestion management agency
CMP	Congestion Management Plan
CNDDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO <sub>2</sub> e	carbon dioxide equivalent
CPHI	California Points of Historical Interest
CPUC	California Public Utilities Code
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
dBA/DD	dBA per each doubling of the distance
DBH	diameter at breast height
dB SPL	decibel sound pressure level
DEIR	Draft Environmental Impact Report
DMA	drainage management area
DNL	Day-Night Level
DOGGR	California Department of Oil, Gas, and Geothermal Resources
DPM	diesel particulate matter
DTSC	California Department of Toxic Substances Control
du	dwelling unit
du/ac	dwelling unit per acre
EBRPD	East Bay Regional Park District
ECCC	East Contra Costa County
ECCC HCP/NCCP	East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan
ECRFFA	East Contra Costa Regional Fee and Financing Authority
EDD	California Employment Development Department
EIA	United States Energy Information Administration
EIR	Environmental Impact Report

**Acronyms and Abbreviations**

EMT	Emergency Medical Technicians
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
EVA	Emergency Vehicle Access
FAA	Federal Aviation Administration
FAR	floor area ratio
FCS	FirstCarbon Solutions
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
GHG	greenhouse gas
GPD	gallons per day
GWh/y	gigawatt-hours per year
GWP	global warming potential
HAZNET	Hazardous Waste Tracking System
HCD	California Department of Housing and Community Development
HCM	Highway Capacity Manual
HCP	Habitat Conservation Plan
HEPA	high-efficiency particulate air
HFC	hydrofluorocarbon
HMP	Hazard Mitigation Plan
HOA	Homeowner's Association
HOV/HOT	High Occupancy Vehicle/High Occupancy Toll
HRA	Health Risk Assessment
HRI	California Historical Resources Inventory
HSC	Health and Safety Code
HSG	Hydrologic Soil Groups
HUD	United States Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
HWCL	Hazardous Waste Control Law
Hz	hertz
ICC	International Code Council
ICLEI	Local Governments for Sustainability (formerly International Council for Local Environmental Initiatives and retains acronym)
ICM	Integrated Corridor Management
IMP	Integrated Management Practices

ITE	Institution of Transportation Engineers
LAFCo	Local Agency Formation Commission
LBP	lead-based paint
LCFS	Low Carbon Fuel Standard
L <sub>dn</sub>	day/night average sound level
LD	Low Density
LDR	Low Density Residential
LED	light emitting diode
L <sub>eq</sub>	equivalent sound level
LEV	Low Emission Vehicle
LID	Low Impact Development
LIM	Land Inventory and Monitoring
LOS	Level of Service
LRA	Local Responsibility Area
LSE	load-serving entities
LUST	leaking underground storage tank
MBTA	Migratory Bird Treaty Act
MD	Medium Density
MERV	Minimum Efficiency Reporting Value
mgd	million gallons per day
mg/l	milligrams per liter
MGPY	million gallons per year
MIR	Maximum Impacted Sensitive Receptor
MLD	most likely descendant
MLDR	Medium Low Density Residential
MLRA	Major Land Resource Area
MM	Mitigation Measure
MMI	Modified Mercalli Intensity
MMRP	Mitigation Monitoring and Reporting Program
mph	miles per hour
MS4	Municipal Separate Storm Sewer Systems
MSDS	Material Safety Data Sheets
MSL	mean sea level
MTC	Metropolitan Transportation Commission
MTS	Metropolitan Transportation System
MUMF	Mixed Use Medical Facility District
MUTCD	Manual of Uniform Traffic Control Devices
MXD	mixed-use development

**Acronyms and Abbreviations**

N <sub>2</sub> O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEHRP	National Earthquake Hazards Reduction Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NO <sub>2</sub>	nitrogen dioxide
NOC	Notice of Completion
NOP	Notice of Preparation
NO <sub>x</sub>	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTR	National Toxics Rule
NWIC	Northwest Information Center
O <sub>3</sub>	ozone
O&M	Operations and Management Plan
OAL	Office of Administrative Law
OEHHA	California Office of Environmental Health Hazard Assessment
OHWM	ordinary high water mark
ONAC	Federal Office of Noise Abatement and Control
OPR	Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PACM	presumed asbestos-containing material
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PD	Planned Development District
PDP	preliminary development plan
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric
PM <sub>x</sub>	particulate matter
ppb	parts per billion
ppm	parts per million

PPV	peak particle velocity
PQP	Public/Quasi Public
PRC	Public Resources Code
PVC	polyvinyl chloride
RCRA	Resource Conservation Recovery Act
REC	Recognized Environmental Condition
RHNA	Regional Housing Needs Allocation
RMP	Resource Management Plan
rms	root mean square
ROG	reactive organic gases
RPA	Registered Professional Archeologist
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SF <sub>6</sub>	sulfur hexafluoride
SFPUC	San Francisco Public Utilities Commission
SMP	Soil Management Plan
SO <sub>2</sub>	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SR	State Route
SRA	State Responsibility Area
SWEEP	State Water Efficiency and Enhancement Program
SWPPP	Storm Water Pollution Prevention Plan
State Water Board	California State Water Resources Control Board
TAC	toxic air contaminant
TCM	transportation control measure
TCR	Tribal Cultural Resources
TDM	Transportation Demand Management
TDS	total dissolved solids
Tg	teragram
therms/y	therms per year
TKN	Total Kjeldahl Nitrogen
TMA	Transportation Management Association
TMDL	Total Maximum Daily Load
TOD	Transit Oriented Development
TRB	Transportation Research Board
UBC	Uniform Building Code
UCMP	University of California Museum of Paleontology
UFC	Uniform Fire Code

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ULL	Urban Limit Line
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFS	United States Forest Service
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
ULL	Urban Limit Line
UWMP	Urban Water Management Plan
V/C	volume to capacity ratio
VdB	vibration in decibels
VHFHSZ	Very High Fire Hazard Severity Zone
VMТ	vehicle miles traveled
WBWG	Western Bat Working Group
WDR	Waste Discharge Requirements
WEAT	Worker Environmental Awareness Training
WEF	Wildlife Exclusion Fencing
WSA	Water Supply Assessment
WSCD	West Sand Creek District
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

## EXECUTIVE SUMMARY

### Purpose

This Draft Environmental Impact Report (Draft EIR) is prepared in accordance with the California Environmental Quality Act (CEQA) to evaluate the potential environmental impacts associated with the implementation of The Ranch Project (State Clearinghouse No. 2019060012). This document is prepared in conformance with CEQA (Public Resources Code [PRC], § 21000, *et seq.*) and the CEQA Guidelines (California Code of Regulations [CCR], Title 14, § 15000, *et seq.*).

The purpose of this Draft EIR is to inform decision makers, representatives of affected and responsible agencies, the public, and other interested parties of the potential environmental effects that may result from implementation of the proposed The Ranch Project (referred to herein as the proposed project). This Draft EIR describes potential impacts relating to a wide variety of environmental issues and methods by which these impacts can be mitigated or avoided.

### Project Summary

#### Project Location

The project site is located in the City of Antioch. The site is bound by single-family residential subdivision to the north, undeveloped land to the south, Deer Valley Road and Kaiser Permanente Antioch Medical Center to the east, and undeveloped land within the Restricted Development Area of Sand Creek, and Empire Mine Road to the west.

#### Project Description

The project proposes a master planned residential community consisting of 1,177 residential units over 253.50 acres on a 551.50-acre site, including Low Density (LD), Medium Density (MD), and Age Restricted (AR) units; a 5.00-acre Village Center consisting of commercial, office, and retail space; 3.00 acres of public services facilities, including a new fire station site and a trail staging area; approximately 22.50 acres of public parks and landscaped areas; 229.50 of open space including trails; and 38.00 acres of roadway improvements.

#### Project Objectives

The objectives of the proposed project are to:

- Develop a project consistent with the West Sand Creek Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative.
- Establish a 551.5-acre, well-planned community that incorporates the natural, historic and physical elements of the land and the surrounding uses.
- Design a land use plan with a mix of uses complementary to existing neighborhoods and in symmetry with the larger Antioch community.

- Provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.
- Provide a Village Center adjacent to Deer Valley Road and across from the Kaiser Permanente Antioch Medical Center, functioning as a hub of activity and source of sales tax revenue.
- Preserve and protect the hills and hillsides on-site as permanent open space.
- Preserve and protect the Sand Creek corridor as permanent open space and provide public access with perimeter trails and crossings.
- Provide a pedestrian-friendly community which focuses on open space, parks, and trails to facilitate resident and visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system.
- Provide a land use plan with a balance of uses and density that results in an adequate tax base, which at project build-out generates financial resources to pay for public services and infrastructure without financial burden to existing residents.
- Provide a land use plan, design standards, and guidelines consistent with the City Antioch General Plan goals and policies, that incorporate market-acceptable design features and foster an attractive, well-maintained community.
- Establish a land use and circulation system that promotes convenient mobility, completes the extension of Dallas Ranch Road to Deer Valley Road, and provides modes of transportation within a setting that is safe, accessible, and convenient for all modes of travel.
- Provide a comprehensive infrastructure system, including parks, open space, storm water quality facilities, public services, roadways, and utilities infrastructure sized to serve the project and properties to the east and south in the Sand Creek Focus Area that complements the existing Citywide infrastructure and ensures funding for the on-going maintenance needs of such infrastructure.

## Significant Unavoidable Adverse Impacts

The proposed project would result in the following significant unavoidable impacts:

- **Visual resources and views:** The proposed project would result in significant and unavoidable impacts to the existing visual character and quality of public views of the site and its surroundings.
- **Air Quality Management Plan Consistency:** The proposed project would result in significant and unavoidable impacts related to operational criteria air pollutant emissions in violation of an air quality standard.
- **Cumulative Criteria Pollutant Emissions:** The proposed project would result in operational-related air pollutants or precursors that would exceed the Bay Area Air Quality Management District (BAAQMD) thresholds of significance for both annual and daily operational emissions.
- **Greenhouse Gas Emissions Generation:** Because the availability and feasibility of carbon credits is unknown at this time and the fate of Pacific Gas and Electric (PG&E) and its

renewable resources programs is uncertain, the proposed project would result in significant and unavoidable impacts related to operational greenhouse gas (GHG) emissions.

- **Conflict with a Program Plan, Ordinance, or Policy of the Circulation System:** The proposed project would result in significant and unavoidable impacts to the circulation system under Existing Plus Project, Near Term, and Cumulative traffic conditions.
- **Conflict with a Program Plan, Ordinance, or Policy of the Circulation System:** The proposed project would result in significant an unavoidable impacts to freeways within the circulation system.
- **Vehicle Miles Traveled:** The proposed project would be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b).

## Summary of Project Alternatives

Below is a summary of the alternatives to the proposed project considered in Section 6, Alternatives, to the proposed project.

### No Project/No Build Alternative

Under the No Project Alternative, construction of the proposed 1,177-unit master planned community would not occur. The Sand Creek Focus Area would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain on-site.

### Reduced Density Alternative

Under the Reduced Density Alternative, 900 total dwelling units consisting of a maximum total of 478 single-family dwelling units and 422 age-restricted (AR) units would be constructed on approximately 253.50 acres of the 551.50-acre site. This alternative would still include the 5.00-acre village center, as well as the fire station and 10.00 acres of proposed parks instead of 20.00 acres. The total amount of open space would be approximately 239.00 acres.

### Reduced Footprint Alternative

Under the Reduced Footprint Alternative, a total of 1,177 units consisting of 543 high-density and 212 medium density single-family dwelling units and 422 AR units would be constructed, along with a commercial center, fire station, and parks on land north of Sand Creek only. All bridges across the creek would be eliminated, as would the trail staging area and the detention basin south of the creek.

### Reduced Traffic Alternative

Under the Reduced Traffic Alternative, 1,177 residential dwelling units would be constructed on 253.50 acres of the 551.50-acre site. This alternative would reduce the proposed low-density residential units from 543 to 218 and increase the proposed AR units from 422 to 747. The total

amount of open space, parks, landscaping, the village center, and fire station site would remain the same as the proposed project.

## Areas of Controversy

Pursuant to CEQA Guidelines Section 15123(b), a summary section must address areas of controversy known to the lead agency, including issues raised by agencies and the public, and it must also address issues to be resolved, including the choice among alternatives and whether or how to mitigate the significant effects.

A Notice of Preparation (NOP) for the proposed project was issued on June 11, 2019. The NOP describing the original concept for the proposed project and issues to be addressed in the Draft EIR was distributed to the State Clearinghouse, responsible agencies, and other interested parties for a 30-day public review period extending from June 11, 2019 through July 11, 2019. The NOP identified the potential for significant impacts on the environment related to the following topical areas:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions and Energy
- Hazards, Hazardous Materials, and Wildfire
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Recreation
- Transportation
- Utilities and Service Systems

## Disagreement Among Experts

This Draft EIR contains substantial evidence to support all the conclusions presented herein. It is possible that there will be disagreement among various parties regarding these conclusions, although the City of Antioch is not aware of any disputed conclusions at the time of this writing. Both the CEQA Guidelines and case law clearly provide the standards for treating disagreement among experts. Where evidence and opinions conflict on an issue concerning the environment, and the lead agency knows of these controversies in advance, the Draft EIR must acknowledge the controversies, summarize the conflicting opinions of the experts, and include sufficient information to allow the public and decision makers to make an informed judgment about the environmental consequences of the proposed project.

## Potentially Controversial Issues

Below is a list of potentially controversial issues that may be raised during the public review and hearing process of this Draft EIR:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Recreation

- Geology and Soils
- Greenhouse Gas Emissions and Energy
- Hazards, Hazardous Materials, and Wildfire
- Transportation
- Utilities and Service Systems

It is also possible that evidence will be presented during the 45-day, statutory Draft EIR public review period that may create disagreement. Decision makers would consider this evidence during the public hearing process.

In rendering a decision on a project where there is disagreement among experts, the decision makers are not obligated to select the most environmentally preferable viewpoint. Decision makers are vested with the ability to choose whatever viewpoint is preferable and need not resolve a dispute among experts. In their proceedings, decision makers must consider comments received concerning the adequacy of the Draft EIR and address any objections raised in these comments. However, decision makers are not obligated to follow any directives, recommendations, or suggestions presented in comments on the Draft EIR, and can certify the Final EIR without needing to resolve disagreements among experts.

## Public Review of the Draft EIR

Upon completion of the Draft EIR, the City of Antioch filed a Notice of Completion (NOC) with the State Office of Planning and Research to begin the public review period (PRC § 21161). Concurrent with the NOC, this Draft EIR has been distributed to responsible and trustee agencies, other affected agencies, surrounding cities, and interested parties, as well as all parties requesting a copy of the Draft EIR in accordance with Public Resources Code Section 21092(b)(3). During the public review period, the Draft EIR, including the technical appendices, is available for review at the City of Antioch offices and one alternative location. The address for each location is provided below. Additionally, the document is available for review at <https://www.antiochca.gov/community-development-department/planning-division/environmental-documents/>.

City of Antioch  
200 H Street  
Antioch, CA 94509  
Hours: Monday through Friday  
except designated holidays  
8:00 a.m.–5:00 p.m.

Antioch Library  
501 West 18<sup>th</sup> Street  
Antioch, CA 94509  
Monday and Tuesday: 12:00 p.m.–8:00 p.m.  
Wednesday and Thursday: 11:00 a.m.–6:00 p.m.  
Saturday: 12:00 p.m.–5:00 p.m.  
Closed Friday and Sunday

Agencies, organizations, and interested parties have the opportunity to comment on the Draft EIR during the 45-day public review period. Written comments on this Draft EIR should be addressed to:

Alexis Morris, Planning Manager  
City of Antioch  
200 H Street  
Antioch, CA 94509  
Phone: 925.779.7035  
Email: [amorris@ci.antioch.ca.us](mailto:amorris@ci.antioch.ca.us)

Submittal of electronic comments in Microsoft Word or Adobe PDF format is encouraged. Upon completion of the public review period, written responses to all significant environmental issues raised will be prepared and made available for review by the commenting agencies at least 10 days prior to the public hearing before the City of Antioch on the project, at which the certification of the Final EIR will be considered. Comments received and the responses to comments will be included as part of the record for consideration by decision makers for the project.

### Executive Summary Matrix

Table ES-1 below summarizes the impacts, mitigation measures, and resulting level of significance after mitigation for the relevant environmental issue areas evaluated for the proposed project. The table is intended to provide an overview; narrative discussions for the issue areas are included in the corresponding section of this Draft EIR. Table ES-1 is included in the Draft EIR as required by CEQA Guidelines Section 15123(b)(1).

**Table ES-1: Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Section 3.1—Aesthetics, Light, and Glare</b>			
<b>Impact AES-1:</b> The project would not have a substantial adverse effect on a scenic vista.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact AES-2:</b> The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a State Scenic Highway.	No Impact	No mitigation is necessary	No Impact
<b>Impact AES-3:</b> With respect to the non-urban character of the existing project site, the project would substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from publicly accessible vantage points).	Potentially Significant	No Feasible Mitigation is Available	Significant and Unavoidable
<b>Impact AES-4:</b> The project would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Cumulatively Significant (Visual Character and Views)  Less than Cumulatively Significant (Light and Glare)	No Feasible Mitigation is Possible (Visual Character and Views)  No Mitigation is Required (Light and Glare)	Cumulatively Significant and Unavoidable (Visual Character and Views)  Less than Cumulatively Significant (Light and Glare)
<b>Section 3.2—Agricultural Resources and Forestry Resources</b>			
<b>Impact AG-1:</b> The project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact AG-2:</b> The project would not conflict with existing zoning for agricultural use, or a Williamson Act contract.	No Impact	No mitigation is necessary	No Impact
<b>Impact AG-3:</b> The project would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).	No Impact	No mitigation is necessary	No Impact
<b>Impact AG-4:</b> The project would not result in the loss of forest land or conversion of forest land to non-forest use.	No Impact	No mitigation is necessary	No Impact
<b>Impact AG-5:</b> The project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses or conversion of forest land to non-forest use?	No Impact	No mitigation is necessary	No Impact
<b>Cumulative Impact</b>	No Impact	No mitigation is necessary	No Impact
<b>Section 3.3—Air Quality</b>			
<b>Impact AIR-1:</b> The project would conflict with or obstruct implementation of the applicable air quality plan.	Potentially Significant	Implement MM AIR-2a and MM AIR-2b	Significant and Unavoidable

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<p><b>Impact AIR-2:</b> The project would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard.</p>	<p>Potentially Significant</p>	<p><b>MM AIR-2a: Implement BAAQMD Best Management Practices During Construction</b></p> <p>The following Best Management Practices (BMPs), as recommended by the Bay Area Air Quality Management District (BAAQMD), shall be included in the design of the proposed project and implemented during construction:</p> <ul style="list-style-type: none"> <li>• All active construction areas shall be watered at least two times per day.</li> <li>• All exposed non-paved surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and access roads) shall be watered at least three times per day and/or non-toxic soil stabilizers shall be applied to exposed non-paved surfaces.</li> <li>• All haul trucks transporting soil, sand, or other loose material off-site shall be covered and/or shall maintain at least 2 feet of freeboard.</li> <li>• All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.</li> <li>• All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.</li> <li>• All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.</li> </ul>	<p>Significant and Unavoidable</p>

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<ul style="list-style-type: none"> <li>Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage regarding idling restrictions shall be provided for construction workers at all access points.</li> <li>All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.</li> <li>The prime construction contractor shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The City of Antioch and the construction contractor shall take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.</li> </ul> <p><b>MM AIR-2b:</b> The following measure shall be applied during construction of the proposed project to facilitate the use of low volatile organic compound (VOC) landscaping equipment during project operations:</p> <ul style="list-style-type: none"> <li>Prior to issuance of building permits,</li> </ul>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>the applicant shall prepare and submit building plans to the City of Antioch that demonstrate that all buildings meet or exceed building code standards.</p> <p>Additionally, the following measures shall be applied during both construction and operation of the proposed project to reduce reactive organic gases (ROG) emissions:</p> <ul style="list-style-type: none"> <li>• Use super-compliant architectural coatings. These coatings are defined as those with volatile organic compound VOC less than 10 grams per liter. South Coast Air Quality Management District (SCAQMD) provides a list of manufacturers that provide this type of coating.</li> <li>• Keep lids closed on all paint containers when not in use to prevent VOC emissions and excessive odors.</li> <li>• Use compliant low VOC cleaning solvents to clean paint application equipment.</li> <li>• Keep all paint and solvent laden rags in sealed containers to prevent VOC emissions.</li> </ul>	
<b>Impact AIR-3:</b> The project would not expose sensitive receptors to substantial pollutant concentrations.	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact AIR-4:</b> The project would not result in other emissions (such as those leading to odors adversely affecting a substantial number of people).	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact—Criteria Pollutants</b>	Potentially Significant	Implement MM AIR-2a and MM AIR-2b.	Significant and Unavoidable
<b>Cumulative Impact—Toxic Air Contaminants</b>	Potentially Significant	Implement MM AIR-2a and MM AIR-2b.	Significant and Unavoidable
<b>Section 3.4—Biological Resources</b>			
<b>Impact BIO-1:</b> The project could have a substantial adverse effect, either directly or through habitat modifications, on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.	Potentially Significant	<p><b>MM BIO-1a:</b> The project Applicant hired a qualified Biologist to conduct protocol surveys of the shining navarretia in the 2018-2019 and submitted them to the City for independent peer review. (See Appendix D) To the extent construction moves forward within 5 years of these surveys, they shall be deemed valid and no further surveys shall be required. However, if construction does not occur on affected areas on or before 5 years of the protocol surveys, the project Applicant shall hire a qualified Biologist to survey the project area prior to construction. All survey results shall be submitted to the City of Antioch Planning Division prior to approval of grading permits. Where populations are outside of the project footprint, qualified Biologists shall demarcate these areas for complete avoidance.</p> <p>Where shining navarretia populations are within the project footprint, this shall be considered a direct impact. If</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>the project will avoid the mapped populations, but will impact a portion of the avoidance zone, then that will be considered an indirect impact.</p> <p>The project Applicant shall have the following options to mitigate for direct and/or indirect impacts to the shining navarretia. Options one and two are listed by order of effectiveness:</p> <p><b>Option 1.</b> The project Applicant shall identify one or more existing, unprotected populations of shining navarretia in Contra Costa County (or nearest other jurisdiction) and acquire land that supports those populations. Under this Option, once the proposed mitigation area is approved by the City of Antioch Planning Division, the mitigation habitat shall be protected by a recorded conservation easement and managed in accordance with a long-term management plan, the goal of which is to maintain the shining navarretia population and its habitat. The project Applicant shall provide an endowment in favor of the conservation easement holder to fund the long-term management outlined in the long-term management plan. As this option would preserve an existing, established population, there would be no temporal loss, and no risk of failure.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>As a result, the mitigation ratio for this option would be 1:1. Alternatively, the project Applicant may purchase mitigation credits (at a 1:1 ratio) from an established mitigation bank for all directly impacted shining navarretia locations.</p> <p><b>Option 2.</b> The project Applicant shall mitigate for any direct impacts at a ratio of 3:1 (preserved habitat: impacted habitat), and for any indirect impacts at a 1:1 ratio. The ratio shall be reduced to 1.5:1 if the project Applicant chooses to develop a monitoring plan, monitor the relocated seeds/plants in accordance with that plan, and meet established success criteria for successful establishment of a new population of the impacted special-status plant. The success criterion for Option 2 would be 1:1 replacement of special-status plants by Year 5 or later following transplantation. This would require documentation of the number of plants within the proposed impact area such that the number of impacted plants could be compared to the number of established plants at the mitigation site. The monitoring plan and monitoring reports shall be submitted to the City of Antioch Planning Division for review and approval. If the success criteria are not met, additional habitat shall be set aside</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>as set forth under Option 1. As population sizes for annual plants can vary widely from year to year, population counts shall be conducted in the last 3 years of monitoring, and the highest count shall be at least equivalent to the number of impacted plants.</p> <p><b>Option 3.</b> As an alternative Options 1 and 2, the project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the shining navarretia would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1b:</b> To avoid take of crotch and western bumblebee species the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> Prior to each phase of construction, a qualified Biologist shall conduct a take avoidance survey for active bumblebee colony nesting sites. In order to maximize detection of active bee colonies, the take avoidance survey</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>shall be conducted during the spring, summer, or fall during appropriate weather (not during cool overcast, rainy, or windy days). The Biologist shall walk the entire area proposed for grading and inspect all ground squirrel burrows for bumblebee activity. The survey shall specifically target the slopes that face west to southwest as these areas are specifically utilized by western bumblebee. If any bumblebees are identified during the survey, they shall be identified to species.</p> <p>All active colonies of crotch bumblebee or western bumblebee shall be avoided and no work shall occur within 50-feet of the colony, unless pursuant to consultation with the California Department of Fish and Wildlife (CDFW) an Incidental Take Permit is obtained prior to disturbance. If a colony can be fully avoided and work will not occur within 50 feet of the colony, no mitigation shall be required.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the western bumblebee would be fully mitigated, including payment of applicable fees,</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>provided that California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1c:</b> Prior to the issuance of any grading permit, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> Consult with the United States Fish and Wildlife Service (USFWS) regarding impacts of the project on vernal pool fairy shrimp and vernal pool tadpole shrimp. The project Applicant shall obtain the appropriate take authorization (Section 7 or 10 of the Federal Endangered Species Act [FESA], as appropriate) from the USFWS prior to issuance of grading permits. The project Applicant shall comply with all terms of the endangered species permits, including any mitigation requirements, which shall be determined during consultation with USFWS.</p> <p>Mitigation may be accomplished through permittee-responsible mitigation and/or through the preservation of vernal pool fairy shrimp habitat at USFWS-approved ratios at a USFWS-approved mitigation bank. A minimum ratio of 1:1 mitigation shall be required.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>Option 2.</b> The project Applicant shall demonstrate compliance with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts on the fairy and tadpole shrimp would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and USFWS have approved the conservation plan.</p> <p><b>MM BIO-1d:</b> The project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> The elderberry shrub within the project site shall be avoided. Although there were no signs of the valley elderberry longhorn beetle, the following measures will ensure that there are no significant impacts to valley elderberry longhorn beetle:</p> <p>All elderberry shrubs (which are defined for the purposes of this section as those with stems greater than 1 inch in diameter) shall be avoided completely during project construction with a buffer of at least 20 feet, and the following avoidance and minimization measures [as outlined in the Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle shall</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>be implemented for all work within 165 feet of a shrub:</p> <ul style="list-style-type: none"> <li>- All areas to be avoided during construction activities shall be fenced and/or flagged as close to construction limits as feasible.</li> <li>- Activities that could damage or kill an elderberry shrub (e.g., trenching, paving, etc.) shall receive an avoidance area of at least 20 feet from the drip-line.</li> <li>- A qualified Biologist shall provide training for all contractors, work crews, and any on-site personnel on the status of the valley elderberry longhorn beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance, prior to the commencement of work.</li> <li>- A qualified Biologist shall monitor the work area at project appropriate intervals to assure that all avoidance and minimization measures are implemented.</li> <li>- As much as feasible, all activities within 165 feet of an elderberry shrub shall be conducted between August and February.</li> <li>- Elderberry shrubs shall not be trimmed.</li> <li>- Herbicides shall not be used within the drip-line of the shrub. Insecticides</li> </ul>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>shall not be used within 100 feet of an elderberry shrub.</p> <ul style="list-style-type: none"> <li>- Mechanical weed removal within the drip-line of the shrub shall be limited to the season when adults are not active (August–February) and shall avoid damaging the elderberry shrub.</li> </ul> <p>If either a 20-foot diameter avoidance area around the elderberry shrub is found later to not be feasible or an elderberry shrub must be removed to accommodate construction, then the project Applicant shall notify the City and implement additional mitigation measures required by the Framework after consultation with the United States Fish and Wildlife Service (USFWS).</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts on the elderberry beetle would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and USFWS have approved the conservation plan.</p> <p><b>MM BIO-1e:</b> Prior to the commencement of construction activities, the project Applicant shall implement one of the following options:</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>Option 1.</b> The project Applicant shall obtain take coverage from the United States Fish and Wildlife Service (USFWS) under Sections 7 or 10 of the Federal Endangered Species Act (FESA) for any impacts to the California tiger salamander and/or its habitat. In addition, the project Applicant shall obtain take coverage from the California Department of Fish and Wildlife (CDFW) under Section 2081 of the California Fish and Game Code for any impacts to the California tiger salamander and/or its habitat. Any required compensatory mitigation shall be determined during consultation with USFWS and CDFW and may include permittee-responsible mitigation and/or the purchase of mitigation credits from a USFWS- and CDFW-approved mitigation bank. Should consultation with the USFWS and CDFW result in required mitigation measures in conflict with the measures included here, USFWS and CDFW measures shall take precedence. A minimum ratio of 1:1 shall apply.</p> <p>The project Applicant shall preserve both aquatic habitat and upland habitat that are either known to be California tiger salamander breeding habitat and upland habitat, or which have the proper hydrology to support breeding</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>California tiger salamander, on off-site mitigation properties and within the on-site open space or as otherwise required as a result of consultation with the USFWS.</p> <p>Project activities shall occur during the dry season (May 1 through October 15) unless otherwise authorized by the CDFW and USFWS;</p> <p>Prior to the start of construction, a qualified Biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of the California tiger salamander and its habitat within the project area; an explanation of the species status and protection under State and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the project site; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel by the Biologist. The training shall provide interpretation</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work.</p> <p>Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be clearly delineated using high visibility orange fencing. The ESA fencing shall remain in place throughout the duration of the construction and shall be regularly inspected and fully maintained at all times by the project Applicant's contractor.</p> <p>A qualified Biologist shall be on-site during all activities that may result in take of California tiger salamander. The qualifications of the Biologist(s) shall be submitted to the USFWS and CDFW for review and approval at least 30 calendar days prior to the date earthmoving is initiated at the project site.</p> <p>Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>qualified Biologist. The WEF shall remain in place throughout the duration of the project phase and shall be regularly inspected and fully maintained by the project Applicant's contractor. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed and the area cleaned of debris and trash and returned to natural conditions. Exceptions to the foregoing fencing measures include work sites where the duration of work activities is very short (e.g., 3 days or less), occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities. In this case, the boundaries and access areas and sensitive habitats may be staked and flagged (as opposed to fully fenced) by the qualified Biologist prior to disturbance and species monitoring would occur during all project activities.</p> <p>If a water body is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than 5 millimeters and the intake shall be placed within a perforated bucket or other method to attenuate suction to prevent California tiger salamander from entering the pump</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>system. Pumped water shall be managed in a manner that does not degrade water quality and then upon completion released back into the water body, or at an appropriate location in a manner that does not cause erosion. No rewatering of the water body is necessary if sufficient surface or subsurface flow exists to fill it within a few days, or if work is to be completed during the time of year the water body would have dried naturally.</p> <p>When constructing a road improvement within California tiger salamander habitat, the project Applicant shall enhance or establish wildlife passage for the California tiger salamander across roads, highways, or other anthropogenic barriers. This may include upland culverts, tunnels, and other crossings designed specifically for wildlife movement, as well as making accommodations in curbs (no vertical faced curbs), median barriers, and other impediments to terrestrial wildlife movement at locations most likely to be beneficial to the California tiger salamander.</p> <p>Preconstruction surveys shall be provided to the City of Antioch Planning Division, and shall be conducted by a USFWS or CDFW approved Biologist</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>within 72 hours of the initiation of any ground disturbing activities and vegetation clearing that may result in take of the California tiger salamander. All suitable aquatic and upland habitat, including refugia habitat such as small woody debris, refuse, burrow entries, etc., shall be duly inspected. The approved Biologist(s) shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of the California tiger salamander. Where feasible and only on a case-by-case basis, rodent burrows and other ground openings suspected to contain Central California tiger salamanders that would be destroyed from project activities may be carefully excavated under supervision of the Biologist. If the California tiger salamander is observed, the approved Biologist shall implement the species observation and handling protocol outlined below.</p> <p>At least 15 days prior to initiation of ground disturbance activities the project Applicant's Biologist shall prepare and submit a Relocation Plan for the California tiger salamander for the USFWS and CDFW written approval. The plan shall include protocol to be followed should a California tiger</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>salamander be encountered during project activities. The Relocation Plan shall contain the name(s) of the approved Biologist(s) to relocate the California tiger salamander, method of relocation, a map, and description of the proposed release site(s) within 300 feet from the project, unless at a distance otherwise agreed to by the USFWS and CDFW, and written permission from the landowner to use their land as a relocation site.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the California tiger salamander would be fully mitigated, including payment of applicable fees, provided that the CDFW and USFWS have approved the conservation plan.</p> <p><b>MM BIO-1f:</b> Prior to issuance of any grading permits, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> The project Applicant shall consult with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>Wildlife (CDFW) regarding impacts to California red-legged frog from the proposed project. The project Applicant shall obtain the appropriate take authorization from the USFWS (Section 7 or 10 of the Federal Endangered Species Act [FESA]) and/or from the CDFW (Section 2081 of the California Fish and Game Code). The project Applicant shall comply with all required compensatory mitigation determined during consultation with the USFWS and CDFW, and provide proof of compliance to the City of Antioch Planning Division.</p> <p>Should consultation with the USFWS result in required mitigation measures in conflict with the measures included here, USFWS measures shall take precedence.</p> <p>Approximately 1.40 acres of California red-legged frog aquatic habitat shall be preserved on-site as part of the proposed project.</p> <p>Prior to the start of construction, a qualified Biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of the California red-legged frog and their</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>habitats within the project site; an explanation of the species status and protection under State and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the project site; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel. The training shall provide interpretation for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work.</p> <p>Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be construction activities are ongoing, and shall be regularly inspected and fully maintained at all times.</p> <p>A qualified Biologist shall be on-site during all activities that may result in take of the California red-legged frog.</p>	

Table ES-1 (cont.): Executive Summary Matrix

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>The qualifications of the Biologist(s) shall be submitted to the USFWS for review and approval at least 30 calendar days prior to the date earthmoving is initiated at the project site.</p> <p>Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the qualified Biologist prior to the start of staging or ground disturbing activities. The WEF shall remain in place throughout the duration of the project and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed and the area cleaned of debris and trash and returned to natural conditions. An exception to the foregoing fencing measures is that for work sites where the duration of work activities is very short (e.g., 3 days or less) and that occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities. In this case, the boundaries and access areas and sensitive habitats</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>may be staked and flagged (as opposed to fenced) by the qualified Biologist prior to disturbance and species monitoring would occur during all project activities at that site.</p> <p>No more than 24 hours prior to the date of initial ground disturbance, a preconstruction survey for the California red-legged frog shall be conducted by the qualified Biologist at the project site. The results shall be provided to the City of Antioch Planning Division. The survey shall consist of walking the project limits and within the project site to ascertain the possible presence of the species. The Biologist shall investigate all potential areas that could be used by the California red-legged frog for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as California ground squirrels or gophers. If any adults, subadults, juveniles, tadpoles, or eggs are found, the Biologist shall contact the USFWS to determine if moving any of the individuals is appropriate. In making this determination, the USFWS shall consider if an appropriate relocation site exists. Only USFWS-approved Biologists may capture, handle, and monitor the California red-legged frog.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>To the extent practicable, initial ground-disturbing activities shall be avoided between November 1 and March 31 because that is the time period when the California red-legged frog are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31, the project Applicant shall ensure that daily monitoring by the USFWS-approved Biologist is completed.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the California red-legged frog would be fully mitigated, including payment of applicable fees, provided that CDFW and USFWS have approved the conservation plan.</p> <p><b>MM BIO-1g:</b> Prior to initiation of construction activity, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> The project Applicant shall retain a qualified Biologist to survey all suitable aquatic habitat within the project site (including features proposed for avoidance) by sampling</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>the features thoroughly with dipnets during March or early April, when spadefoot tadpoles would be present. In addition, one nocturnal acoustic survey of all areas within 300 feet of suitable aquatic habitat shall be conducted. Acoustic surveys shall consist of walking through the area and listening for the distinctive snore-like call of this species. The results shall be provided to the City of Antioch Planning Division. Timing and methodology for the aquatic and acoustic surveys shall be based on those described in Distribution of the western spadefoot in the Northern Sacramento Valley of California, with Comments on Status and Survey Methodology. If both the aquatic survey and the nocturnal acoustic survey are negative, further mitigation is not necessary.</p> <p>If western spadefoot are observed within aquatic habitat proposed for impact, the tadpoles shall be captured by a qualified Biologist and relocated either to aquatic habitat to be avoided on-site (and implement the fencing requirement outlined below), or to an off-site open space preserve with suitable habitat in the vicinity of the project site. If western spadefoot are observed within aquatic habitats proposed for avoidance, then the project</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>Applicant shall install a keyed in silt fence along the edge of the proposed impact area within 300 feet of the occupied aquatic habitat to prevent metamorphose individuals from dispersing into the construction area.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the western spadefoot would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1h:</b> Prior to construction activities, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> Within 14 days prior to the initiation of any construction activities for each phase, a qualified Biologist shall conduct preconstruction surveys for northwestern pond turtles. The results shall be provided to the City of Antioch Planning Division. If northwestern pond turtles are found</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>prior to the initiation of, and/or during, construction activities, a qualified Biologist shall relocate them outside of the project site, subject to review and approval by the appropriate resource agencies (i.e., California Department of Fish and Wildlife [CDFW]).</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the western pond turtle would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1i:</b> Prior to construction, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> Within 14 days prior to the initiation of any construction activities for each phase of the project, a qualified Biologist shall conduct preconstruction surveys for northern California legless lizard, Alameda whipsnake, and coast horned lizard. The results shall be provided to the City of Antioch Planning Division. If Alameda</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>whipsnake is identified during the survey, it will be allowed to leave the work area on its own, subject to confirmation by a qualified Biologist. If Northern California legless lizard or coast horned lizard are found during the survey, a qualified Biologist shall relocate them to suitable habitat outside of the project site, subject to review and approval by the appropriate resource agencies (i.e., California Department of Fish and Wildlife [CDFW] and/or the United States Fish and Wildlife Service [USFWS], and the City of Antioch Planning Division).</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the lizards and whipsnake would be fully mitigated, including payment of applicable fees, provided that the CDFW and the USFWS have approved the conservation plan.</p> <p><b>MM BIO-1j: Option 1.</b> Where construction activities will occur during nesting and breeding season (typically February 15 through September 1), the project Applicant shall conduct a targeted Swainson’s hawk nest survey</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>throughout all accessible areas within 0.25 mile of the proposed construction area no later than 14 days prior to construction activities. The results shall be provided to the City of Antioch Planning Division. If active Swainson’s hawk nests are found within 0.25 mile of a construction area, construction shall cease within 0.25 mile of the nest until a qualified Biologist determines that the young have fledged, or it is determined that the nesting attempt has failed. If the project Applicant desires to work within 0.25 mile of the nest, the project Applicant shall consult with the California Department of Fish and Wildlife (CDFW) to determine if the nest buffer can be reduced. The project Applicant, the Biologist, and the CDFW shall collectively determine the nest avoidance buffer and what (if any) nest monitoring is necessary. If an active Swainson’s hawk nest is found within the project site prior to construction and is in a tree that is proposed for removal, then the project Applicant shall implement additional mitigation recommended by a qualified Biologist based on CDFW Guidelines and obtain any required permits from the CDFW. Prior to project construction, a qualified Biologist shall conduct a review of Swainson’s hawk nest data available in the California Natural Diversity Database</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>(CNDDDB) and contact the CDFW to determine if they have any additional nest data. A Biologist shall conduct a survey of these nests to determine if they are still present and provide the City with a summary of the findings. If it is determined that the project site is within 10 miles of an active Swainson's hawk nest (an active nest is defined as a nest with documented Swainson's hawk use within the past 5 years), the project Applicant shall mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures:</p> <p>Active nest identified within 1 mile of the project site: 1 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.</p> <p>Active nest identified within 5 miles (but greater than 1 mile) of the project site: 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>Active nest identified within 10 miles (but greater than 5 miles) of the project site: 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the Swainson's hawk would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1k: Option 1.</b> A targeted take avoidance burrowing owl nest survey shall be conducted of all accessible areas within 500 feet of the proposed construction area within 14 days prior to construction activities utilizing 60 foot transects as outlined in the Staff Report on Burrowing Owl Mitigation. The results shall be provided to the City of Antioch Planning Division.</p> <p>If an active burrowing owl nest burrow</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>(i.e., occupied by more than one adult owl, and/or juvenile owls are observed) is found within 250 feet of a construction area either before or during construction, no construction shall occur within 250 feet of the nest burrow until a qualified Biologist determines that the young have fledged or it is determined that the nesting attempt has failed. If the project Applicant desires to work within 250 feet of the nest burrow, the project Applicant shall consult with the California Department of Fish and Wildlife (CDFW) to determine if the nest buffer can be reduced. During the non-breeding season (late September through the end of January), the project Applicant may choose to conduct a survey for burrows or debris that represent suitable nesting habitat for burrowing owls within areas of proposed ground disturbance, exclude any burrowing owls observed, and collapse any burrows or remove the debris in accordance with the methodology outlined by the CDFW. If any nesting burrowing owl are found during the pre-construction survey, mitigation for the permanent loss of burrowing owl foraging habitat (defined as all areas of suitable habitat within 250 feet of the active burrow)</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>shall be accomplished at a 1:1 ratio. The mitigation provided shall be consistent with recommendations in the 2012 CDFW Staff Report and may be accomplished within the Swainson’s hawk foraging habitat mitigation area if burrowing owls have been documented utilizing that area, or if the Biologist, the City, and the CDFW collectively determine that the area is suitable.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the burrowing owl would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1I:</b> Prior to construction activities, the project Applicant shall implement one of the following options to reduce impacts to Swainson’s hawk and Burrowing owl:</p> <p><b>Survey Report</b>  <b>Option 1.</b> For any nesting raptor or songbird pre-construction survey conducted pursuant to Mitigation Measure (MM) BIO-2i through MM</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>BIO-2k, a report summarizing the survey(s), including those for Swainson’s hawk and burrowing owl, shall be provided to the City and the California Department of Fish and Wildlife (CDFW) within 30 days of the completed survey. The survey report shall be valid for one construction season. If no nests are found, no further mitigation is required.</p> <p>Where birds are nesting during construction and construction activities cause a nesting bird do any of the following in a way that would be considered a result of construction activities: vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, the exclusionary buffer shall be increased such that activities are far enough from the nest to stop this agitated behavior. The exclusionary buffer shall remain in place until the chicks have fledged or as otherwise determined by a qualified Biologist in consultation with the CDFW.</p> <p>Construction activities may only resume within the buffer zone after a follow-up survey by the biologist has been conducted and a report has been prepared indicating that the nest (or nests) are no longer active, and no new nests have been identified.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to nesting birds would be fully mitigated, including payment of applicable fees, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1m: Option 1.</b> A pre-construction nesting bird survey shall be conducted by a qualified Biologist on the project site and within a 500-foot radius of proposed construction areas, where access is available, no more than 3 days prior to the initiation of construction. The results shall be provided to the City of Antioch Planning Division. If there is a break in construction activity of more than 2 weeks, subsequent surveys shall be conducted.</p> <p>If active raptor nests are found, no construction activities shall take place within 500 feet of the nest until the young have fledged. If active songbird nests are found, a 100-foot no disturbance buffer shall be established. These no-disturbance buffers may be reduced if a smaller buffer is proposed by the Biologist and approved by the</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>City (and California Department of Fish and Wildlife (CDFW) if it is a tricolored blackbird nesting colony) after taking into consideration the natural history of the species of bird nesting, the proposed activity level adjacent to the nest, habituation to existing or ongoing activity, and nest concealment (are there visual or acoustic barriers between the proposed activity and the nest). A qualified Biologist shall visit the nest as needed to determine when the young have fledged the nest and are independent of the site or the nest can be left undisturbed until the end of the nesting season.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to raptors and songbirds would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1n:</b> Prior to construction activities, the project Applicant shall implement one of the following options:</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>Option 1.</b> A qualified Biologist shall conduct a bat habitat assessment of all potential roosting habitat features, including trees within the proposed development footprint. This habitat assessment shall identify all potentially suitable roosting habitat, and may be conducted up to 1 year prior to the start of construction. The results shall be provided to the City of Antioch Planning Division.</p> <p>If potential roosting habitat is identified (cavities in trees) within the areas proposed for development, the Biologist shall survey the potential roosting habitat during the active season (generally April through October or from January through March on days with temperatures in excess of 50°F (degrees Fahrenheit) to determine presence of roosting bats. These surveys are recommended to be conducted utilizing methods that are considered acceptable to the California Department of Fish and Wildlife (CDFW) and bat experts, including but not limited to evening emergence surveys, acoustic surveys, inspecting potential roosting habitat with fiber optic cameras or a combination thereof.</p> <p>If roosting bats are identified within any of the trees planned for removal, or if</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>presence is assumed, the trees shall be removed outside of pup season only on days when temperatures are in excess of 50°F. Pup season is generally during the months of May through August. Two-step tree removal shall be utilized under the supervision of the qualified Biologist. Two-step tree removal involves removal of all branches of the tree that do not provide roosting habitat on the first day, and then the next day cutting down the remaining portion of the tree.</p> <p>Additionally, all other tree removal shall be conducted from January through March on days with temperatures in excess of 50°F to avoid potential impacts to foliage-roosting bat species.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to roosting bats would be fully mitigated, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p> <p><b>MM BIO-1o: Option 1.</b> Within 48 hours prior to the initiation of any construction activities for any project phase, a</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>qualified Biologist shall conduct a preconstruction-level American badger den survey within the project site. The results shall be provided to the City of Antioch Planning Division. If American badger or burrows with American badger sign are found within the project site or Off-site Improvement Area during the preconstruction surveys, consultation with the California Department of Fish and Wildlife (CDFW) shall occur prior to the initiation of any construction activities to determine an appropriate burrow excavation and/or relocation method. If American badger burrows are not found, further measures are not necessary. All survey results shall be submitted to the City of Antioch Planning Division prior to the initiation of any construction activities or where construction has been halted for 30 days or more.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to the American badger would be fully mitigated, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>MM BIO-1p:</b> Prior to any ground-disturbing or vegetation-removal activities, the project Applicant shall implement one of the following options:</p> <p><b>Option 1.</b> The project Applicant shall hire a qualified Biologist to conduct a Worker Environmental Awareness Training (WEAT) with the construction crews. The WEAT shall include the following information: discussion of the California Endangered Species Act (CESA) and Federal Endangered Species Act (FESA), the Clean Water Act, the project permits and California Environmental Quality Act (CEQA) documentation, and associated mitigation measures; consequences and penalties for violation or noncompliance with these laws and regulations; identification of special-status wildlife, location of any avoided waters of the United States; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a special-status wildlife species.</p> <p>The WEAT shall also discuss the different habitats used by the species' different life stages and the annual timing of these life stages. A handout summarizing the WEAT information shall be provided to workers to keep</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>on-site for future reference. Upon completion of the WEAT training, workers shall sign a form stating that they attended the training, understand the information presented and will comply with the regulations discussed. Workers shall be shown designated “avoidance areas” during the WEAT training, and worker access shall be restricted to outside of those areas to minimize the potential for inadvertent environmental impacts.</p> <p><b>Option 2.</b> The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to special-status wildlife species would be fully mitigated, provided that the California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.</p>	
<p><b>Impact BIO-2:</b> The project could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.</p>	Less Than Significant	Implementation of MM BIO-3 below.	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<p><b>Impact BIO-3:</b> The project could have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool coastal, etc.) through direct removal, filling, hydrological interruption, or other means.</p>	<p>Potentially Significant</p>	<p><b>MM BIO-3:</b> Prior to the issuance of a grading permit for the project, the project Applicant shall obtain all required resource agency approvals for the project, including as follows:</p> <p>The project Applicant shall obtain for a Section 404 permit from the United States Army Corps of Engineers (USACE). Waters that will be impacted shall be replaced or rehabilitated on a “no-net-loss” basis. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods acceptable to the USACE.</p> <p>The project Applicant shall apply for and obtain a Section 401 water quality certification from the Regional Water Quality Control Board (RWQCB) and adhere to the certification conditions.</p> <p>The project Applicant shall apply for and obtain a Section 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW). The information provided will include a description of all of the activities associated with the proposed project, not just those closely associated with the drainages and/or riparian vegetation. Impacts will be outlined in the application and are expected to be in substantial conformance with the impacts to</p>	<p>Less Than Significant</p>

Table ES-1 (cont.): Executive Summary Matrix

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>biological resources outlined in this document. Impacts for each activity will be identified as temporary or permanent with a description of the proposed mitigation for the associated biological resource impacts. Information regarding project-specific drainage and hydrology changes resulting from project implementation will be provided as well as description of stormwater treatment methods. Minimization and avoidance measures shall be proposed as appropriate and may include preconstruction species surveys and reporting; protective fencing around avoided biological resources; worker environmental awareness training; seeding disturbed areas adjacent to open space areas with native seed; and installation of project-specific stormwater Best Management Practices (BMPs). Mitigation may include restoration or enhancement of resources on- or off-site, purchase of habitat mitigation credits from an agency-approved mitigation/conservation bank, purchase of off-site land approved by resource agencies for mitigation, working with a local land trust to preserve land, or any other method acceptable to the CDFW.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact BIO-4:</b> The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.	Potentially Significant	<b>MM BIO-4:</b> No permanent or temporary fencing shall be erected that will hinder migratory wildlife from utilizing the Sand Creek corridor. Utility and bridge crossings of Sand Creek shall be designed to be free spanning of the creek.	Less Than Significant
<b>Impact BIO-5:</b> The project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Potentially Significant	<p><b>MM BIO-5:</b> The project Applicant shall preserve and incorporate existing trees into the project design to the extent feasible. If any Protected Trees (i.e., indigenous trees, street trees, mature trees, and/or landmark trees) are required to be removed due to project-related activities, the removal shall be mitigated in accordance with the City of Antioch Code of Ordinances Title 9, Chapter 5, Article 12 Section 9-5.1205: Tree Preservation and Regulation by either paying the requisite fee as outlined in the City's ordinance, or through conducting on-site plantings at the ratios required by the City's Tree Ordinance.</p> <p>Efforts shall be made to save trees where feasible. This shall include the use of retaining walls, planter islands, pavers, or other techniques commonly associated with tree preservation. The Improvement Plans shall include a note and show placement of temporary construction fencing around trees to be saved: The project Applicant shall install</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>a 4-foot tall, brightly colored (typically orange), synthetic mesh material fence (or an equivalent) approved by the City at the following locations prior to any construction equipment being moved on-site or any construction activities taking place: at the limits of construction; outside the Protected Zone of all native oaks, California buckeye, or landmark trees; within 50 feet of any grading, road improvements, underground utilities, or other development activity; or as otherwise shown on the tentative subdivision map. Any encroachment within these areas, including Protected Zones of trees to be saved, shall first be approved by the City of Antioch Community Development Director. Grade cuts and fills, hardscapes, structures, and utility lines shall be located outside of the drip line of any trees being preserved. All required protective fencing shall be installed prior to the commencement of grading any particular phase.</p>	
<p><b>Impact BIO-6:</b> The project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.</p>	No Impact	No mitigation is necessary	No Impact

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Cumulative Impact</b>	Potentially Significant (as to Special-status Plant Species, Special-status Wildlife Species, Aquatic Resources)	Implementation of MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4 MM NOI-1b, MM NOI-1c, and MM NOI-1d.	Less Than Significant
<b>Section 3.5—Cultural and Tribal Cultural Resources</b>			
<b>Impact CUL-1:</b> The project could cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact CUL-2:</b> The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	Potentially Significant	<p><b>MM CUL-2: Stop Construction Upon Encountering Archeological Materials</b></p> <p>In the event that subsurface archeological features or deposits, including locally darkened soil (“midden”), that could conceal cultural deposits, animal bone, obsidian and/or mortars are discovered during earth-moving activities, all work within 100 feet of the resource shall be halted, and the Applicant shall consult with a qualified Archeologist. Representatives of the City and the qualified Archeologist shall coordinate to determine the appropriate course of action. All significant cultural materials recovered shall be subject to scientific analysis and professional museum curation.</p> <p>If a Native American site is discovered, the evaluation process shall include consultation with the appropriate Native American representatives.</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>If a Native American archeological, ethnographic, or a spiritual resource is discovered, all identification and treatment shall be conducted by qualified Archeologists who are certified by the Society of Professional Archeologists and/or meet the federal standards as stated in the Code of Federal Regulations (36 Code of Federal Regulations [CFR] Part 61), and are Native American representatives, who are approved by the local Native American community as scholars of the cultural traditions.</p> <p>In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted. If historic archeological sites are involved, all identified treatment is to be carried out by qualified historical Archeologists, who shall meet Register of Professional Archeologists or 36 Code of Regulations Part 61 requirements.</p> <p>The Applicant shall retain the services of a professional Archaeologist to educate the construction crew that will be conducting grading and excavation at the project site. The education shall consist of an introduction to the</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		geology of the project site and the kinds of archeological and/or Native American resources that may be encountered, as well as what to do in case of a discovery.	
<b>Impact CUL-3:</b> The project could disturb human remains, including those interred outside of formal cemeteries.	Potentially Significant	<p><b>MM CUL-3: Stop Construction Upon Encountering Human Remains</b></p> <p>If during the course of construction activities there is accidental discovery or recognition of any human remains, the following steps shall be taken:</p> <ol style="list-style-type: none"> <li>1. There shall be no further excavation or disturbance within 100 feet of the remains until the County Coroner is contacted to determine if the remains are Native American and if an investigation of the cause of death is required. If the coroner determines the remains to be Native American, the coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours, and the NAHC shall identify the person or persons it believes to be the most likely descendant (MLD) of the deceased Native American. The MLD may make recommendations to the landowner or the person responsible for the excavation work within 48 hours, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources</li> </ol>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>Code Section 5097.98.</p> <p>2. Where the following conditions occur, the landowner or his or her authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity either in accordance with the recommendations of the most likely descendant or on the project site in a location not subject to further subsurface disturbance:</p> <ul style="list-style-type: none"> <li>• The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 48 hours after being notified by the commission.</li> <li>• The descendant identified fails to make a recommendation.</li> <li>• The landowner or his or her authorized representative rejects the recommendation of the descendant, and mediation by the NAHC fails to provide measures acceptable to the landowner.</li> </ul>	
<p><b>Impact CUL-4:</b> The project could cause a substantial adverse change in the significance of a Tribal Cultural Resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k).</p>	Potentially Significant	Implement MM CUL-2	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact CUL-5:</b> The project would not cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.6—Geology and Soils</b>			
<p><b>Impact GEO-1:</b> The proposed project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:</p> <ul style="list-style-type: none"> <li>i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.</li> <li>ii) Strong seismic ground shaking.</li> <li>iii) Seismic-related ground failure, including liquefaction.</li> <li>iv) Landslides.</li> </ul>	Potentially Significant (ground shaking, landslides, and liquefaction)	<p><b>MM GEO-1a: Implement Project-specific Geotechnical Report Recommendations</b> Prior to issuance of any grading permits, all recommendations and specifications set forth in the project-specific Geotechnical Exploration Report prepared for the proposed project shall be reflected on the project grading and foundation plans (inclusive of seismic design parameters), subject to review and approval by the City of Antioch Engineer.</p> <p><b>MM GEO-1b: Grading and Foundation Plan Review and Construction Monitoring</b> Prior to issuance of any grading permits, the project Applicant shall retain the design geotechnical engineering firm to review the final grading and foundation plans and specifications to evaluate whether</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>recommendations have been implemented from the project-specific Geotechnical Exploration Report, and to provide additional or modified recommendations, as needed.</p> <p>Construction monitoring shall be performed by a California Registered Geologist and/or Engineer to check the validity of the assumptions made in the geotechnical investigation. Earthwork operations shall be performed under the observation of a California Registered Geologist and/or Engineer to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of the fills has been performed in accordance with recommendations and the project specifications.</p>	
<b>Impact GEO-2:</b> The proposed project could result in substantial soil erosion or the loss of topsoil.	Potentially Significant	<p><b>MM GEO-2: a. Development of a Storm Water Pollution Prevention Plan</b></p> <p>Prior to the issuance of grading permits, the project Applicant shall prepare and submit to the City Public Works Department and Central Valley Regional Water Quality Control Board (RWQCB), a Storm Water Pollution Prevention Plan (SWPPP) detailing measures to control soil erosion and waste discharges during construction. The SWPPP shall include an erosion</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		control plan, a water quality monitoring plan, a hazardous materials management plan, and post-construction Best Management Practices (BMPs).	
<b>Impact GEO-3:</b> The proposed project could be located on a geologic unit or soil that is unstable, or that could become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	Potentially Significant	Implement MM GEO-1a and GEO-1b	Less Than Significant
<b>Impact GEO-4:</b> The proposed project could be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.	Potentially Significant	Implement MM GEO-1a and GEO-1b	Less Than Significant
<b>Impact GEO-5:</b> The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	No Impact	No mitigation is necessary	No Impact
<b>Impact GEO-6:</b> The proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	Potentially Significant	<b>MM GEO-3: Preconstruction Paleontological Survey</b> Prior to any grading or excavation activities, a professional Paleontologist shall conduct a worker awareness training to inform construction personnel of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities,	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>and the property notification procedures to follow should fossils be encountered.</p> <p>If paleontological resources are discovered during earth-moving activities, the construction crew shall immediately stop work within 100 feet of the discovery and notify the Planning Department. A qualified Paleontologist shall be retained to evaluate the resource and prepare and implement a proposed mitigation plan, including curation, in accordance with the Society of Vertebrate Paleontology Guidelines.</p>	
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.7—Greenhouse Gas Emissions and Energy</b>			
<b>Impact GHG-1:</b> The project could generate direct and indirect greenhouse gas emissions that could result in a significant impact on the environment even with mitigation.	Potentially Significant	<p><b>MM GHG-1: Implement potentially feasible mitigation measures</b></p> <p>Prior to the issuance of the last certificate of occupancy (or as otherwise specifically stated), the project Applicant shall provide documentation to the City of Antioch that the proposed project has employed one or more of the following measures to reduce greenhouse gas (GHG) emissions (i.e., 1,191 metric tons of carbon dioxide equivalent per year (MT CO<sub>2</sub>e/year) to at or below 2.6 MT CO<sub>2</sub>e/year/service population by 2030:</p> <ul style="list-style-type: none"> <li>• Purchased electricity from a utility offering 100 percent renewable power for some or all of the</li> </ul>	Significant and Unavoidable

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>proposed project’s power needs.</p> <ul style="list-style-type: none"> <li>• Installed on-site solar panels to generate electricity for a portion or all of project electricity consumption.</li> <li>• Installed on-site charging units for electric vehicles consistent with parking requirements in California Green Building Standards Code (CALGreen) Section 5.106.5.2.</li> <li>• Implemented a ride sharing program for employees starting no later than 60 days after commercial operations begin.</li> <li>• Purchased voluntary carbon credits from a verified GHG emissions credit broker in an amount sufficient to offset operational GHG emissions of approximately 34,531 MT CO<sub>2</sub>e over the lifetime of the proposed project (or a reduced amount estimated based on implementation of other measures listed above). Copies of the contract(s) shall be provided to the City Planning Department.</li> </ul>	
<b>Impact GHG-2:</b> The project would not conflict with any applicable plan, policy, or regulation of an agency adopted to reduce the emissions of greenhouse gases.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact GHG-3:</b> The project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact GHG-4:</b> The project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Potentially Significant	MM GHG-1.	Less Than Significant
<b>Section 3.8—Hazards, Hazardous Materials, and Wildfire</b>			
<b>Impact HAZ-1:</b> The project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HAZ-2:</b> The project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.	Potentially Significant (construction only)	<b>MM HAZ-2a: Performance of Pre-Construction Hazardous Materials Surveys</b> Prior to the issuance of a demolition permit for each of the structures on-site, the Applicant shall hire a California Registered Asbestos Abatement Contractor to inspect, and if necessary, remove all asbestos containing materials, and conduct final clearance inspections (visual) to document the completion of the action. All demolition activities shall be completed in accordance with California Code of Regulations Title 17, Division 1, Chapter 8, Article 1. All construction work where an employee may be occupationally exposed to lead-containing paint, including demolition, must comply with Occupational and Safety Health Administration (OSHA) Regulation 29 Code of Federal	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>Regulations 1926.62, and California Occupational and Safety Health Administration (Cal/OSHA) Title 8 California Code of Regulations 1523.1.</p> <p><b>MM HAZ-2b: Agrichemical Soil Assessment</b> The Applicant shall conduct a limited agrichemical soil assessment within the areas where the two orchards were located on-site to determine if residual agrichemicals are present within on-site soils in excess of applicable limits. If found to be present in excess of applicable limits, the Applicant shall have a remedial action plan developed and implemented to ensure that all residual soils are removed to the satisfaction of the Department of Toxic Substance Control (DTSC) and City of Antioch prior the issuance of a grading permit.</p> <p><b>MM HAZ-2c: Obtain an Abandonment Permit</b> Prior to any ground disturbance activities within 50 feet of any water well or septic tank on the project site, the Applicant shall hire a licensed contractor to obtain an abandonment permit from the Contra Costa County Environmental Management Department, and properly abandon the on-site well(s) and/or septic tank, pursuant to review and approval by the City Engineer.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>MM HAZ-2d: Well Abandonment</b> Proper abandonment of Well No. 1 is required in accordance with current California Department Division of Oil, Gas, and Geothermal Resources (DOGGR) regulations to address past oil and gas exploration and production activities.</p> <p>Prior to final map approval, the Applicant shall submit to the City of Antioch Engineering Department, for review and approval, plans which show that future inhabited structures will not be located over the two abandoned oil/gas wells. The plans shall be completed in compliance with the DOGGR Construction Site Review Program, which includes guidelines and recommendations for setbacks and mitigation measures for venting systems.</p> <p>If grading is proposed proximate to the two abandoned well locations, DOGGR shall be consulted to determine if the wells will require modification in casing height. A Soil Management Plan (SMP) shall be prepared to address potential impacted soil that may be encountered during grading activities within the area of the two abandoned wells.</p> <p><b>MM HAZ-2e: Removal of Hazardous Material Containers</b> Prior to site grading, the Applicant shall cause all noted potentially hazardous material containers and tanks to be removed from the parcel.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p><b>MM HAZ-2f: Conduct a Phase II Environmental Site Assessment</b> Prior to issuance of a grading permit, the Applicant shall hire a certified Soils Engineer to prepare a Phase II Environmental Site Assessment (Phase II ESA) to address all concerns identified in the Phase I ESAs. The Applicant shall comply with all Phase II recommendations.</p> <p><b>MM HAZ-2g: Petroleum Pipeline Abandonment/Removal</b> Prior to commencement of residential construction, the Applicant shall ensure that all petroleum pipelines within the areas of the project site planned for development shall be abandoned and/or removed in accordance with applicable federal, state, and/or local standards to the satisfaction of the Contra Costa Environmental Health Department and the City Engineer. If any indicators of apparent soil contamination (soil staining, odors, debris fill material, etc.) are found at the project site associated with the petroleum pipelines, the impacted area shall be isolated from surrounding, non-impacted areas. The project environmental professional shall obtain samples of the potentially impacted soil for analysis of the contaminants of concern and comparison with applicable regulatory</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>residential screening levels (i.e., Environmental Screening Levels, California Human Health Screening Levels, Regional Screening Levels, etc.). Where the soil contaminant concentrations exceed the applicable regulatory residential screening levels, the impacted soil shall be excavated and disposed of off-site at a licensed landfill facility to the satisfaction of the Contra Costa Environmental Health Department. If soil contaminants do not exceed the applicable regulatory residential screening levels, further action is not required.</p> <p><b>MM HAZ-2h: Preparation of Safety Guidelines</b></p> <p>In the event the pipelines are abandoned and not removed, prior to commencement of grading, the construction contractor, the pipeline operator, and a representative from the City’s Engineering Department shall meet on the project site and prepare site-specific safety guidelines for construction in the field to the satisfaction of the City Engineer. The safety guidelines and field-verified location of the pipelines shall be noted on the improvement plans and be included in all construction contracts involving the project site.</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact HAZ-3:</b> The project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HAZ-4:</b> The project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HAZ-5:</b> For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would not result in a safety hazard or excessive noise for people residing or working the project area.	No Impact	No mitigation is necessary	No Impact
<b>Impact HAZ-6:</b> The project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	Potentially Significant	The Applicant shall implement MM TRANS-7. <b>MM TRANS-7:</b> Prior to recordation of the final map, the City of Antioch and Contra Costa County Fire Protection District shall review and approve the proposed emergency access points for Villages 9, 10, 11, and 12 to ensure that adequate access is provided for large emergency vehicles in accordance with the California Fire Code.	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact HAZ-7:</b> The project would not expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact WILD-1:</b> Due to slope, prevailing winds, and other factors, the project would not exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact WILD-2:</b> The project would not 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.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact WILD-3:</b> The project would not 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.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.9—Hydrology and Water Quality</b>			
<b>Impact HYD-1:</b> The proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact HYD-2:</b> The proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HYD-3:</b> The proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: i) result in substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows?	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HYD-4:</b> The proposed project could be located in a flood hazard zone, tsunami, or seiche zone, or risk release of pollutants due to project inundation.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact HYD-5:</b> The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.10—Land Use</b>			
<b>Impact LAND-1:</b> The proposed project would not physically divide an established community.	No Impact	No mitigation is necessary	No Impact
<b>Impact LAND-2:</b> 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.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.11—Noise</b>			
<b>Impact NOI-1:</b> The proposed project could generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	Potentially Significant	<b>MM NOI-1a: Construction Noise Reduction Measure</b> To reduce potential construction noise impacts, the City shall ensure that the following multi-part mitigation measure is implemented at the project site: <ul style="list-style-type: none"> <li>• The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers, which are in good condition and appropriate for the equipment.</li> <li>• The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of 5 minutes) is prohibited.</li> </ul>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<ul style="list-style-type: none"> <li>• The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.</li> <li>• At all times during project grading and construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.</li> <li>• The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.</li> <li>• The construction contractor shall designate a “noise disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g. starting too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. The construction contractor shall conspicuously post a telephone number for the disturbance coordinator at entrances to the construction site.</li> <li>• The construction contractor shall</li> </ul>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>comply with the City’s permissible hours for construction (7:00 a.m. to 6:00 p.m., or 8:00 a.m. to 5:00 p.m. if within 300 feet of occupied dwellings, Monday through Friday, and 9:00 a.m. to 5:00 p.m. on weekends and holidays).</p> <p><b>MM NOI-1b: Traffic Noise Reduction Measure</b> The proposed project shall construct a soundwall along rear yards of residential lots fronting Deer Valley Road. The soundwall shall be a minimum of 8-foot high, as measured from the finished grade of the proposed residential pads. The soundwall should be located so as to block the line of sight from rear yards for all proposed residences located within 160 feet of the centerline of Deer Valley Road.</p> <p><b>MM NOI-1c: Mechanical Equipment Noise Reduction Measure</b> To reduce potential operational stationary noise impacts from mechanical ventilation equipment at the proposed residential homes, mechanical ventilation equipment must be located a minimum of 15 feet from the boundary of the project site, or must be shielded by a noise-reducing barrier. If a noise barrier is required, the barrier shall be a minimum of 5 feet in height, extending 2 feet beyond the sides of the equipment and located</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>between the equipment and the receiving property line.</p> <p><b>MM NOI-1d: Commercial Operation Noise Reduction Measure</b>  The commercial land uses shall be designed so that on-site mechanical equipment (i.e., HVAC units, compressors, generators) and area-source operations (e.g., parking lots) are located no closer than 100 feet from the nearest residential dwelling unit or provide shielding from nearby noise sensitive land uses to meet the City's normally acceptable threshold of 60 dBA CNEL. Shielding shall have a minimum height sufficient to completely block line-of-sight between the on-site noise source and the nearest residential dwelling to meet the City's noise standards. Based on the size and placement of the HVAC units (i.e., ground level or roof top), barrier heights may range between three to six feet.</p>	
<b>Impact NOI-2:</b> The project would not result in generation of excessive groundborne vibration or groundborne noise levels.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact NOI-3:</b> The proposed project would not expose people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.	No Impact	No mitigation is necessary	No Impact

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.12—Population and Housing</b>			
<b>Impact POP-1:</b> The proposed project would not induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact POP-2:</b> The proposed project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Section 3.13—Public Services and Recreation</b>			
<b>Impact PUB-1:</b> The project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection.	Potentially Significant	Implementation of MM AQ-2a, MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4, MM CUL-1, MM CUL-2, MM CUL-3, MM GEO-1a, MM GEO-1b, MM GEO-2, and MM GEO-3, MM HAZ-2a, MM HAZ-2f, MM HAZ-2h MM NOI-1a, MM NOI-1b, MM NOI-1c, MM TRANS-1a, TRANS-1b, MM TRANS-1c, MM TRANS-2, MM TRANS-7, MM TRANS-8a, MM TRANS-8b, and MM TRANS-8c.	Less than Significant
<b>Impact PUB-2:</b> The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered	Less Than Significant	No mitigation is necessary	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection.			
<b>Impact PUB-3:</b> The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for schools.	Less Than Significant.	No mitigation is necessary	Less Than Significant.
<b>Impact PUB-4:</b> The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities, or the need for new or physically altered library facilities, the construction of which could cause significant environmental impacts.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact PUB-5:</b> The project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact PUB-6:</b> The project would include the construction of recreational facilities which could have an adverse physical effect on the environment.	Potentially Significant	Implementation of MM AQ-2a, MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4, MM CUL-1, MM CUL-2, MM CUL-3, MM GEO-1a, MM GEO-1b, MM	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		GEO-2, MM GEO-3, HAZ-2a, MM HAZ-2f, MM HAZ-2h, MM NOI-1a, and MM TRANS-1a.	
<b>Cumulative Impact</b>	Less Than Significant (fire, police, school, library facilities, increased park use, provision of park facilities)	No mitigation is necessary	Less Than Significant
<b>Section 3.14—Transportation</b>			
<b>Impact TRANS-1:</b> The project could conflict with a program plan, ordinance or policy of the circulation system under Existing Plus Project traffic conditions.	Potentially Significant	<b>MM TRANS-1a:</b> Prior to issuance of grading permits, the project Applicant shall retain a qualified transportation consultant to prepare and submit a Construction Traffic Management Plan to the City of Antioch for review and approval. The plan shall include: <ul style="list-style-type: none"> <li>• Project staging plan to maximize on-site storage of materials and equipment;</li> <li>• A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak-hours; lane closure proceedings; signs, cones, and other warning devices for drivers; and designation of construction access routes;</li> <li>• Permitted construction hours;</li> <li>• Location of construction staging;</li> <li>• Identification of parking areas for construction employees, site visitors, and inspectors, including on-site locations; and</li> <li>• Provisions for street sweeping to</li> </ul>	<b>TRANS-1a</b> —Less Than Significant <b>TRANS-1b</b> —Significant and Unavoidable (unless and until Caltrans accepts the improvements) <b>TRANS-1c</b> —Significant and Unavoidable (unless and until the City of Brentwood and Contra Costa County accepts the improvements).

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>remove construction related debris on public streets.</p> <p><b>MM TRANS-1b:</b> Prior to issuance of the first building permit, the project Applicant shall provide fees to the City of Antioch to fund the design and installation of Adaptive Signal Control Technologies (ASCT) or other traffic signal interconnect system approved by the City at the following intersections:</p> <ul style="list-style-type: none"> <li>• Slatten Ranch Road at SR-4 Westbound Ramps</li> <li>• Slatten Ranch Road/Sunset Drive at Hillcrest Avenue</li> <li>• Hillcrest Avenue at SR-4 Eastbound Ramps</li> <li>• East Tregallas Road/Larkspur Drive at Hillcrest Avenue</li> </ul> <p>In conjunction with the signal timing adjustments, the Applicant shall work with the City and Caltrans to design and install potential restriping options within the Hillcrest Avenue at SR-4 interchange area that improve vehicle and bicycle travel through the interchange area.</p> <p>The design process for these improvements shall start prior to the issuance of the 10<sup>th</sup> residential building permit for the proposed project, and installation of the traffic signal interconnect system and restriping shall</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch Engineer determines that design and installation delays are beyond the control of the project Applicant.</p> <p><b>MM TRANS-1c:</b> Prior to issuance of the 431<sup>st</sup> building permit, the project Applicant shall install a traffic signal at the intersection at Balfour Road/Deer Valley Road in conjunction with other planned improvements, including the construction of a southbound left-turn lane, as well as separate westbound left and right-turn lanes.</p>	
<b>Impact TRANS-2:</b> The project could conflict with a program plan, ordinance or policy of the circulation system under Near-term traffic conditions.	Potentially Significant	<p>Implement MM TRANS-1b, MM TRANS-1c, and:</p> <p><b>MM TRANS-2:</b> Prior to issuance of the first building permit, the project Applicant shall provide the City of Antioch with East Contra Costa Regional Fee and Financing Authority regional transportation impact fees in accordance with the latest adopted fee schedule to support improvements at the Lone Tree Way/SR-4 Eastbound ramp intersection. If the required fees would not support the necessary improvements at the intersection of Lone Tree Way and the Eastbound ramp of SR-4, then no such fees shall be required.</p>	Significant and Unavoidable (until the improvements are implemented)
<b>Impact TRANS-3:</b> The project could conflict with a program plan, ordinance or policy of	Potentially Significant	The project Applicant shall implement MM TRANS-1b, MM TRANS-1c, and MM	Significant and Unavoidable

Table ES-1 (cont.): Executive Summary Matrix

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
the circulation system under Cumulative Traffic Conditions.		<p>TRANS-2 as well as the following additional mitigation measures:</p> <p><b>MM TRANS-3a:</b> Prior to issuance of the 1,000<sup>th</sup> residential building permit, the project Applicant shall implement the following improvements to the Lone Tree Way/Davison Drive:</p> <ol style="list-style-type: none"> <li>1. The westbound approach of the Davison Drive approach shall be converted from a westbound through lane to a left-through shared lane; and</li> <li>2. If determined necessary by the City of Antioch Engineer, the project Applicant shall reconstruct the median on the south leg of the intersection to allow concurrent left-turn movements on the westbound approach.</li> </ol> <p><b>MM TRANS-3b:</b> The design process shall start prior to the issuance of the 10th residential building permit for the proposed project, and installation shall be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch City Engineer determines that design and installation delays are beyond the control of the project Applicant, the project Applicant shall fund the design and installation of Adaptive Signal Control Technologies (ASCT) or other traffic signal</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>interconnect system approved by the City at the following intersections:</p> <ul style="list-style-type: none"> <li>Deer Valley Road/Hillcrest Avenue-Davison Drive</li> <li>Hillcrest Avenue/Hillcrest Crossroads</li> </ul> <p>The ASCT system at the Deer Valley Road at Hillcrest Avenue/Davison Drive and Hillcrest Avenue at Hillcrest Crossroads shall be coordinated with the ASCT systems identified as part of Mitigation Measure (MM) TRANS-1b.</p> <p><b>MM TRANS-3c:</b> Prior to issuance of the 431<sup>st</sup> residential building permit, project Applicant shall restripe the westbound approach of Lone Tree Way at SR-4 Westbound Ramps/Jeffery Way to provide a second westbound left-turn lane (requires widening of the south leg of the intersection to provide a second southbound receiving lane, which is currently under construction). This improvement is under construction by others and shall only be required if not already in place by the time the 431<sup>st</sup> residential building permit is issued.</p> <p><b>MM TRANS-3d:</b> Prior to issuance of the first building permit, the project Applicant shall provide the City of Antioch with East Contra Costa Regional Fee and Financing Authority regional transportation impact fees in accordance with the latest adopted fee schedule to</p>	

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>support improvements at the Sand Creek Road/SR-4 Westbound Ramps intersection. If the required fees would not support the necessary improvements at the intersection, then no such fees shall be required.</p> <p><b>MM TRANS-3e:</b> Prior to the issuance of the 622<sup>nd</sup> residential building permit, the project Applicant shall have started construction on the Sand Creek Road extension from Deer Valley Road to Dallas Ranch Road as a four-lane roadway.</p> <p><b>MM TRANS-3f:</b> Prior to the issuance of the 421<sup>st</sup> residential building permit for the proposed project, the project Applicant shall have started construction on Sand Creek Road from the Kaiser Permanente Antioch Medical Center entrance roadway to the western boundary of the Dozier Libbey High School as a two-lane roadway (one lane in each direction) along the ultimate alignment, connecting to the portion of Sand Creek Road at Dozier Libbey High School to be constructed by others.</p>	
<b>Impact TRANS-4:</b> The project would conflict with a program plan, ordinance or policy of the circulation system.	Potentially Significant	Implement MM TRANS-2.	Significant and Unavoidable
<b>Impact TRANS-5:</b> The project would not be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b).	Potentially Significant	MM TRANS-1 through MM TRANS-8	Significant and Unavoidable

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Impact TRANS-6:</b> The project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact TRANS-7:</b> The project could result in inadequate emergency access.	Potentially Significant	<b>MM TRANS-7:</b> Prior to recordation of the final map, the City of Antioch and Contra Costa County Fire Protection District shall review and approve the proposed emergency access points for Villages 9, 10, 11, and 12 to ensure that adequate access is provided for large emergency vehicles in accordance with the California Fire Code.	Less Than Significant
<b>Impact TRANS-8:</b> The project would provide adequate access for public transit, bicycles, or pedestrians.	Potentially Significant	<p><b>MM TRANS-8a:</b> The project Applicant shall consult with TriDelta Transit to determine if additional transit facilities shall be provided throughout the site. If transit stop locations are identified, the project Applicant shall include those locations on the improvement plans for the requisite tentative map being processed by the City. The improvement plans shall include pedestrian passages through cul-de-sacs and other potential barriers to minimize pedestrian walking distances to any transit stops identified.</p> <p><b>MM TRANS-8b:</b> The project Applicant shall identify the bicycle circulation facilities on all final improvement plans submitted to the City. Such facilities may</p>	Less Than Significant

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		<p>include a painted buffer between the bicycle lanes and the vehicular travel way, reducing the travel lane width to 11-feet each to allow for a 7-foot wide bicycle lane and a 3-foot wide buffer between the bicycle lanes and the vehicular travel-way on the proposed arterial streets. In addition, appropriate bicycle crossing treatments shall be provided at roundabouts to be constructed as part of the proposed project.</p> <p><b>MM TRANS-8c:</b> The project Applicant shall identify pedestrian circulation facilities on all final improvement plans submitted to the City. These plans shall show primary pedestrian routes connecting neighborhood destinations and marked crosswalks at key uncontrolled pedestrian crossing locations. In addition, the plans shall demonstrate that signalized intersections provide crosswalks and pedestrian actuation. At roundabouts to be constructed as part of the project, appropriate pedestrian crossing treatments shall be provided.</p>	
<b>Cumulative Impact</b>	Potentially Significant	Implement MM TRANS-1a, MM TRANS-1b, MM TRANS-1c, MM TRANS-2, MM TRANS-3a, MM TRANS-3b, MM TRANS-3c, MM TRANS-3d, MM TRANS-3e, MM TRANS-3f, MM TRANS-7, MM TRANS-8a, MM TRANS-8b, MM TRANS-8c.	Significant and Unavoidable

**Table ES-1 (cont.): Executive Summary Matrix**

Impacts	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
<b>Section 3.15—Utilities and Service Systems</b>			
<b>Impact UTIL-1:</b> The project could require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact UTIL-2:</b> The proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact UTIL-3:</b> The project would result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact UTIL-4:</b> The project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Impact UTIL-5:</b> The project would comply with federal, State, and local management and reduction statutes and regulations related to solid waste.	Less Than Significant	No mitigation is necessary	Less Than Significant
<b>Cumulative Impact</b>	Less Than Significant	No mitigation is necessary	Less Than Significant

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## CHAPTER 1: INTRODUCTION

This Draft Environmental Impact Report (Draft EIR) for The Ranch Project (proposed project) has been prepared in accordance and in compliance with the criteria, standards, and procedures of the California Environmental Quality Act (CEQA), as amended (California Public Resources Code [PRC], § 21000, *et seq.*) and the CEQA Guidelines (California Code of Regulations [CCR], Title 14, § 15000, *et seq.*). In accordance with Sections 21067, 15367, and 15050–15053 of the CEQA Guidelines, the City of Antioch (City) is the lead agency under whose authority this document has been prepared. As an informational document, this Draft EIR is intended for use by the City and other public agency decision-makers and members of the public in understanding the potential environmental impacts of the proposed project.

### 1.1 - Project Overview

The 551.50-acre project site consists of three parcels that are largely undeveloped but contain a single-family residence and various barns and outbuildings as part of an active on-site cattle-grazing operation. The project site is located within the City of Antioch, west of Deer Valley Road, within the Sand Creek Focus Area of the City of Antioch General Plan, approximately 2.10 miles west of State Route 4. The project site is bound by Deer Valley Road and Kaiser Permanente Antioch Medical Center on the east, Empire Mine Road and undeveloped land on the west, residential development on the north, and undeveloped land on the south.

The proposed project includes the development of a master planned community, consisting of 1,177 residential units across 253.50 acres, a 5.00-acre village center with commercial, office, and retail space, 3.00 acres of public service facilities, including a new fire station site and a 1.00-acre trail staging area, 22.50 acres of public parks and landscaped areas, 230.50 acres of public open space including trails, and 38.00 acres of roadway improvements. In addition, existing on-site structures would be demolished, and the existing cattle-grazing operation would cease.

Primary vehicle access to the project site would be available via existing Deer Valley Road. Dallas Ranch Road, which currently terminates at the northern site boundary, would be extended through the site, connecting to Deer Valley Road. This roadway would be named Sand Creek Road through the project site, in light of the planned future extension of Sand Creek Road eastward to connect with State Route 4.

### 1.2 - Project Background and History

Richland Planned Communities (project Applicant), purchased The Ranch property in 2013 and 2014. After discussion with City staff, the project Applicant submitted its first preliminary development plan (PDP) in fall of 2015 for the construction of a master plan containing 1,667 residential dwelling units, including hillside estates, a number of parks, a commercial area, and the 2.00-acre fire station site. At an early Planning Commission workshop on the PDP, numerous residents opposed the project as being too dense and too impactful on hillsides and traffic. Local citizens and an environmental group led the charge to try to significantly reduce the size of the original project proposal.

A year later, in response to insights shared by Planning Commissioners and the public, the project Applicant submitted a second PDP reducing the unit count to maximum of 1,307, including optional senior housing in the plan area to help reduce impacts to noise, air and traffic, as well as a reduced number of units to be constructed on the hillsides. The revised plan was well-received by the Planning Commission and the project Applicant proceeded to submit a formal application in June 2017. The City commenced environmental review of the project and released a Draft EIR in March 2018 for public review and comment.

However, in February 2018, a local environmental group filed a Notice of Intent to circulate an initiative petition known as the “Let Antioch Voters Decide Initiative: The Sand Creek Area Protection Initiative.” Subsequently, in April 2018, a citizen’s initiative known as the “West Sand Creek Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative” (West Sand Creek Initiative) was also submitted. Both initiatives covered the same approximately 1,852-acre portion of the Sand Creek Focus Area west of Deer Valley Road.

Both initiatives obtained the requisite number of voter signatures to qualify for the ballot, and both initiatives were submitted to the City Council on July 24, 2018, for the Council’s consideration pursuant to Elections Code, Section 9215. After careful consideration, the Council unanimously voted to adopt the West Sand Creek Initiative and requested a 9212 Report on the Let Antioch Voters Decide Initiative. The Let Antioch Voters Decide Initiative was eventually adopted by the Council on August 28, 2018.

On or about October 18, 2018, two legal actions were filed against each initiative. On May 31, 2019, the trial court determined that the Let Antioch Voters Decide Initiative could not be adopted by the City Council after it had previously adopted the West Sand Creek Initiative. On November 21, 2019, the trial court invalidated the West Sand Creek Initiative on the grounds that the City Council’s approval of a development agreement was invalid and could not be severed from the remainder of the West Sand Creek Initiative.

Since then, the Applicant has revised the project for a third time to be consistent with the general plan amendment and rezoning in the Council-adopted West Sand Creek Initiative and to be generally consistent with The Reduced Footprint Alternative in the previous Draft Environmental Impact Report (DEIR). The current plan thus preserves all major hillsides and most trees on-site. It reduces the development footprint by 34.50 acres and reduces the number of buildable dwelling units to 1,177.

This Draft EIR is being prepared to study the impacts of the revised project, as well as a new general plan amendment, rezoning, development agreement, and detailed design guidelines to ensure consistent buildout throughout the project.

### **1.3 - Environmental Review Process**

An EIR is an informational document used by a lead agency (in this case, the City) when considering approval of a project. The purpose of an EIR is to provide public agencies and members of the public with detailed information regarding the environmental effects associated with implementing a project. An EIR should analyze the environmental consequences of a project, identify ways to reduce or avoid the project’s potential environmental effects, and identify alternatives to the project that

can avoid or reduce impacts. Pursuant to CEQA, State, and local government agencies must consider the environmental consequences of projects over which they have discretionary authority. This Draft EIR provides information to be used in the planning and decision-making process. It is not the purpose of an EIR to recommend approval or denial of a project.

Before approval of the project, the City, as lead agency and the decision-making entity, is required to certify that this Draft EIR has been completed in compliance with CEQA, that the information in the EIR has been considered and reflects the independent judgment of the City. Pursuant to CEQA, decision-makers must balance the benefits of a project against its unavoidable environmental consequences. If environmental impacts are identified as significant and unavoidable, the City may still approve the project if it finds that social, economic, or other benefits outweigh the unavoidable impacts. The City would then be required to state in writing the specific reasons for approving the project, based on information in the EIR and other information sources in the administrative record, in a document called a “statement of overriding considerations” (PRC § 21081; CEQA Guidelines § 15093).

In addition, the City as lead agency must adopt a Mitigation Monitoring and Reporting Program (MMRP) describing the measures that were made a condition of project approval to avoid or mitigate significant effects on the environment (PRC § 21081.6; CEQA Guidelines § 15097). The MMRP is adopted at the time of project approval and is designed to ensure compliance with the project description and EIR mitigation measures during and after project implementation. If the City decides to approve the project, it would be responsible for verifying that the MMRP for this project is implemented. The EIR will be used primarily by the City during consideration of future discretionary actions and permits, but also may be used by responsible and trustee agencies in their consideration of any future discretionary actions and permits.

This Draft EIR provides a project-level analysis of the environmental effects of the proposed project. The environmental impacts of the project are analyzed in the EIR to the degree of specificity appropriate, in accordance with CEQA Guidelines Section 15146. This document addresses the potentially significant adverse environmental impacts that may be associated with the planning, construction, or operation of the project. It also identifies appropriate and feasible mitigation measures and alternatives that may be adopted to significantly reduce or avoid these impacts.

CEQA requires that an EIR contain, at a minimum, certain specific components. These components are contained in this Draft EIR and include:

- Table of Contents
- Introduction
- Executive Summary
- Project Description
- Environmental Setting
- Environmental Impacts
- Mitigation Measures
- Cumulative Impacts
- Significant Unavoidable Adverse Impacts
- Alternatives to the Proposed Project

- Growth-inducing Impacts
- Effects Found Not To Be Significant
- Areas of Known Controversy

The City of Antioch is designated as the lead agency for the 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.” Other public agencies may use this Draft EIR in the decision-making or permit process and consider the information in this Draft EIR along with other information that may be presented during the CEQA process.

This Draft EIR was prepared by FirstCarbon Solutions (FCS), an environmental consultant. Prior to public review, it was extensively reviewed and evaluated by the City of Antioch. This Draft EIR reflects the independent judgment and analysis of the City of Antioch as required by CEQA. Lists of organizations and persons consulted and the report preparation personnel is provided in Chapter 7 of this Draft EIR.

## **1.4 - Purpose and Legal Authority**

### **1.4.1 - Notice of Preparation and Public Scoping Process**

In accordance with Sections 15063 and 15082 of the CEQA Guidelines, the City of Antioch, as lead agency, sent the Notice of Preparation (NOP) to responsible and trustee agencies and interested entities and individuals on June 11, 2019, thus beginning the formal CEQA scoping process. The purpose of the scoping process is to allow the public and government agencies to comment on the issues and provide input on the scope of the EIR. The NOP mailing list included approximately 12 federal, State, and local agencies. The scoping period began on June 11, 2019, and ended on July 11, 2019, representing the statutory 30-day public review period. The NOP is contained in Appendix A.

Pursuant to Section 15083 of the CEQA Guidelines, the City of Antioch held a public scoping meeting on June 19, 2019, starting at 6:30 p.m. at City of Antioch Council Chambers, 200 “H” Street, Antioch, CA 94509. Attendees were given an opportunity to provide comments and express concerns about the potential effects of the project. No individuals provided verbal comments on the content of the EIR at the scoping meeting.

Environmental concerns were raised in scoping comment letters received during the scoping period. Appendix A contains copies of written scoping comment letters. Eight scoping comment letters were received in response to the NOP. Scoping comments are summarized in Table 1-1, with cross-references to applicable EIR sections where comments are addressed.

**Table 1-1: Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
<b>Public Agencies</b>				
Department of Transportation (Caltrans)	Wahida Rashid, Acting District Branch Chief	July 8, 2019	<ul style="list-style-type: none"> <li>• Requests submittal of a travel demand analysis that provides a vehicle miles traveled (VMT) analysis of the proposed project.</li> <li>• Provides guidelines for the required VMT analysis.</li> <li>• Requests that the DEIR provide project related trip generation, distribution, and assignment estimates.</li> <li>• Suggests making all bicycle facilities low level traffic stress facilities.</li> <li>• States that the project would be conditioned to complete the new proposed low stressed bikeway or contribute fair share traffic impact fees towards the completion of a low stress bikeway within the project to ensure connection to Deer Valley Road and Sand Creek Road.</li> <li>• States that the project should include a robust Transportation Demand Management (TDM) Program to reduce VMT and greenhouse gas (GHG) emissions.</li> <li>• Provides measures to promote smart mobility and reduce regional VMT.</li> <li>• States that TDM programs should be documented with annual monitoring reports by an on-site TDM to demonstrate effectiveness.</li> <li>• Requests the provision of a hydrology report that examines the Sand Creek watershed.</li> <li>• States that runoff flow volumes, peaks, and durations for 2, 5, 10, 25, 50, and 100-year rainfall events should not exceed pre-project conditions.</li> <li>• States that the City of Antioch is responsible for all project mitigation.</li> </ul>	<ul style="list-style-type: none"> <li>• Section 3.14, Transportation</li> <li>• Section 3.9, Hydrology and Water Quality</li> </ul>

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
			<ul style="list-style-type: none"> <li>States that the project's financing, scheduling, implementation responsibilities and monitoring should be fully discussed for all mitigation measures prior to the submittal of an encroachment permit.</li> </ul>	
Native American Heritage Commission (NAHC)	Gayle Totton, Associate Governmental Program Analyst	July 1, 2019	<ul style="list-style-type: none"> <li>Requires a 14-day period to provide notice of completion of an application/decision to undertake a project</li> <li>Requires consultation within 30 days of receiving a Tribe's Request for Consultation before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report.</li> <li>States that alternatives for the proposed project, mitigation measures, and significant effects are mandatory of topics of consultation if requested by a tribe.</li> <li>Provides discretionary topics of consultation</li> <li>States that the location, description, and use of tribal cultural resources submitted by a California Native American tribe shall not be included in the environmental document, but published in a confidential appendix.</li> </ul>	<ul style="list-style-type: none"> <li>Section 3.5, Cultural Tribal Cultural Resources</li> <li>Section 6.0, Alternatives</li> </ul>
California Department of Fish and Wildlife (CDFW)	Gregg Erickson, Regional Manager, Bay Delta Region	July 10, 2019	<ul style="list-style-type: none"> <li>Recommends incorporation of mitigation measures outlined in attachment A from the previous EIR including survey protocol guidelines and an evaluation of project impacts to special-status species and population recovery in relation to any publicly available recovery plans into the draft EIR.</li> <li>Provides link to CDFW survey and monitoring protocols and guidelines.</li> <li>Recommends the inclusion of an analysis of the project's trails and open space impacts in terms of</li> </ul>	<ul style="list-style-type: none"> <li>Section 3.4, Biological Resources</li> <li>Section 3.9, Hydrology and Water Quality</li> </ul>

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
			<p>habitat conversion and recreation sourced impacts to fish and wildlife.</p> <ul style="list-style-type: none"> <li>• States that proposed activities may be subject to notification and CDFW may require an LSA Agreement pursuant to Section 1600 et. Seq. of the Fish and Game Code.</li> <li>• Requests submission of Notification to CDFW.</li> <li>• Recommends the DEIR include an analysis of the project's potential for increased water demands and the City's surface water diversions in relation to their impacts on special-status fisheries resources.</li> <li>• Requests inclusion of analysis of the project's impacts on current water diversion operations of the City, and with the City's proposed Brackish Water Desalination Facilities Final Impact Report.</li> <li>• Requests report of any special-status species and natural communities detected during project surveys to the California Natural Diversity Database (CNDDB).</li> </ul>	
California Department of Conservation Division of Oil, Gas, and Geothermal Resources (DOGGR)	Charlene L. Wardlow, Northern District Deputy	July 11, 2019	<ul style="list-style-type: none"> <li>• Provides a map of the two known abandoned dry holes within the project</li> <li>• Indicates that both are located within planned roadways for the project</li> <li>• Advises the developer to verify locations of all wells where development is expected to disturb the soil above the wells and to mark or note the accurate locations for future reference</li> <li>• States that for wells in roadways, care should be taken to route utilities around wells and avoid disturbing the wellheads</li> <li>• States that relevant parties should be aware of and fully understand that significant and potentially dangerous issues may be associate with development near oil and gas wells</li> </ul>	<ul style="list-style-type: none"> <li>• Section 3.8, Hazards and Hazardous Materials</li> </ul>

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
			<ul style="list-style-type: none"> <li>• Recommends that access to a well that is located on-site be maintained in the event of re-abandonment becomes necessary.</li> <li>• States that access to the wells should not be impeded.</li> <li>• States that the possibility for a well to leak oil, gas, and/or water after abandonment is present.</li> <li>• Recommends that physical access to any gas well encountered should be maintained, and abandonment of gas wells should be up to current standards.</li> <li>• Provides additional recommendations if the permitting agency, property owner, and/or developer chooses not to follow recommendation 3b.</li> <li>• Summarizes Sections 3208 and 3255 (a) (3) of the Public Resources Code.</li> <li>• Explains the definition of rig access and how it relates to the project.</li> <li>• States that if any unknown wells are discovered, DOGGR should be notified immediately to record and investigate the discovery.</li> <li>• Recommends that any wells found and any pertinent information obtained after issuance of the letter be communicated to the appropriate County recorder for inclusion in the property's title information.</li> <li>• States that no well work may be performed on any oil or gas well without written approval from DOGGR in the form of an appropriate permit.</li> </ul>	

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
<b>Local Agencies</b>				
Central Valley Regional Water Quality Control Board (Central Valley RWQCB)	Jordan Hensley, Environmental Scientist	June 27, 2019	<ul style="list-style-type: none"> <li>Provides regulatory setting regarding the local Basin Plan and Antidegradation.</li> <li>Provides guidance for permitting requirements including Construction Storm Water General Permit, Phase I and II Municipal Separate Storm Sewer System Permits, Industrial Storm Water General Permit, Clean Water Act Section 404 Permit, Clean Water Act Section 401 Permit, Water discharge requirements, dewatering permit, and requirements for regulatory compliance for commercially irrigated agriculture.</li> </ul>	<ul style="list-style-type: none"> <li>Section 3.9, Hydrology and Water Quality</li> </ul>
East Bay Regional Parks District (EBRPD)	Brian Holt, Chief of Planning/GIS	July 11, 2019	<ul style="list-style-type: none"> <li>States that the DEIR should address the location, size, general function, traffic impacts, and operation and maintenance responsibilities of the proposed trail staging area.</li> <li>States that the DEIR should include suitable measures to ensure Empire Mine Road is not reopened to public vehicular use, or thoroughly analyze any proposal to reopen the road to ensure the problems of vandalism, dumping, and illicit activity do not reoccur.</li> <li>States that the DEIR should consider the safety of all trail uses as well as slopes, views, site features, and impacts on resources.</li> <li>States that a long-term funding mechanism should be put in place to maintain and operate the trails.</li> <li>States the DEIR should consider the potential regional trail connections from Empire Mine Road through the development to the Mokelumne Coast to Crest Trail.</li> </ul>	<ul style="list-style-type: none"> <li>Section 3.13, Public Services and Recreation</li> <li>Section 3.14, Transportation</li> <li>Section 3.6, Geology and Soils</li> <li>Section 3.1, Aesthetics</li> <li>Section 3.4, Biological Resources</li> <li>Section 3.15, Utilities and Service Systems</li> </ul>

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
			<ul style="list-style-type: none"> <li>• Requests that the DEIR analyze the safety of bicyclists and pedestrians crossing Deer Valley Road, and provide safety improvements such as separated bicycle and pedestrian crossing to minimize conflict between automobiles and recreational trail users.</li> <li>• States that the DEIR will need to fully evaluate the potential for impacts on biological resources, including Mount Diablo buckwheat.</li> <li>• States that impacts to biological resources should analyze wildlife movement along wildlife corridors.</li> <li>• States that the DEIR must demonstrate and analyze how the project will mitigate biological resource impacts lacking an adopted Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) or how the project will comply with any future HCP/NCCP that Antioch may adopt.</li> <li>• States that a thorough visual analysis should be conducted.</li> <li>• References the previous EIRs findings related to significant and unavoidable impacts to visual character.</li> <li>• States concern that similar impacts will occur under the current project.</li> <li>• States that the DEIR should include specific design guidelines and development standards to explain how aesthetic impacts will be minimized.</li> <li>• States that the DEIR should include clear descriptions of all infrastructure improvements, including any off-site extension for public utilities.</li> <li>• The Park District states an interest in the off-site improvements near the water tank and unpaved road to the west of the site.</li> </ul>	

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
<b>Organizations</b>				
Earth Justice	Matt Vespa, Staff Attorney Sasan Saadat, Research and Policy Analyst	July 10, 2019	<ul style="list-style-type: none"> <li>• States that the project will have significant GHG impacts.</li> <li>• Suggests that the City should apply a net-zero emission threshold to determine the significance of GHG impacts by the project.</li> <li>• States that the City must ensure that CEQA analysis stays in step with evolving scientific knowledge and State regulatory schemes.</li> <li>• States that the Bay Area Air Quality Management District (BAAQMD) numeric threshold has not kept in step with scientific knowledge and regulatory developments and is no longer supported by substantial evidence.</li> <li>• States that alternative approaches to determining the significance of project GHG impacts may not withstand legal scrutiny and should not be used to evaluate project emissions.</li> <li>• States that Statewide per capita metric will not suffice for projects that govern only new development.</li> <li>• States that the City should apply a net-zero emissions GHG threshold to ensure a legally defensible EIR.</li> <li>• States that because the project will result in an increase in GHG emissions, the City should consider GHG impacts significant.</li> <li>• States that the DEIR must evaluate project energy use.</li> <li>• States that the project will have significant energy impacts if it requires gas connections</li> <li>• States that the DEIR should evaluate the use of high performing electric technologies to replace</li> </ul>	<ul style="list-style-type: none"> <li>• Section 3.3, Air Quality</li> <li>• Section 3.7, Greenhouse Gas Emissions and Energy</li> <li>• Section 3.12, Population and Housing</li> </ul>

**Table 1-1 (cont.): Summary of EIR Scoping Comments**

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
			<p>all gas appliances in the project’s residential and commercial buildings.</p> <ul style="list-style-type: none"> <li>• States that building electrification is more efficient than natural gas.</li> <li>• States that the project will have significant utility impacts if it requires natural gas.</li> <li>• States that building electrification is feasible and effective mitigation to reduce project GHG and energy impacts.</li> <li>• States that electrification of buildings will produce a range of important co-benefits for the economic well-being, safety, and health of the community.</li> <li>• Building electrification has the potential to lower energy bills, reduce costs of new construction, improve air quality, public safety, climate resiliency, and create new jobs.</li> <li>• States that electrification can enable greater opportunities for affordable housing.</li> <li>• States that all-electric buildings can lower utility bills, reduce the cost of construction for new housing, and shield customers from increasing costs of gas.</li> <li>• States that electrification can reduce the risks of natural gas and pipeline explosions.</li> <li>• States that electrification can improve indoor and outdoor air quality.</li> <li>• States that electrification of buildings can create new jobs.</li> </ul>	

Table 1-1 (cont.): Summary of EIR Scoping Comments

Agency/Organization	Author	Date	Comment Summary	Coverage in the DEIR
Hanson Bridgett	Andrew A. Bassak	July 11, 2019	<ul style="list-style-type: none"><li>• States that the NOP fails to identify probable environmental effects of the project in detail.</li><li>• States that it is unclear as to why the project omits agricultural and mineral resources.</li><li>• States that the City must prepare an initial study for the project.</li><li>• States clarification of entitlement and approvals is needed.</li><li>• Requests that the City hold a scoping meeting regarding the proper scope and contents of the EIR.</li></ul>	<ul style="list-style-type: none"><li>• Section 4.0, Effects Found not to be Significant</li></ul>

### 1.4.2 - Public Review

Upon completion of the public Draft EIR, the City of Antioch filed a Notice of Completion (NOC) with the State Office of Planning and Research to begin the public review period (PRC § 21161).

Concurrent with the NOC, the Draft EIR has been distributed to responsible and trustee agencies, other affected agencies, surrounding cities, and interested parties, as well as all parties requesting a copy of the Draft EIR in accordance with Public Resources Code 21092(b)(3). During the public review period, the Draft EIR, including the technical appendices, is available for review at the City of Antioch and one alternative location. The address for each location is provided below. Additionally, the document is available for review at <https://www.antiochca.gov/community-development-department/planning-division/environmental-documents/>.

City of Antioch  
200 H Street  
Antioch, CA 94509  
Hours: Monday through Friday  
except designated holidays  
8:00 a.m.–5:00 p.m.

Antioch Library  
501 West 18<sup>th</sup> Street  
Antioch, CA 94509  
Monday and Tuesday: 12:00 p.m.–8:00 p.m.  
Wednesday and Thursday: 11:00 a.m.–6:00 p.m.  
Saturday: 12:00 p.m.–5:00 p.m.  
Closed Friday and Sunday

Agencies, organizations, and interested parties have the opportunity to comment on the Draft EIR during the 45-day public review period. Written comments on the Draft EIR should be addressed to:

Alexis Morris, Planning Manager  
City of Antioch  
PO Box 5007  
Antioch, CA 94531  
Phone: 925.779.7035  
Email: [amorris@ci.antioch.ca.us](mailto:amorris@ci.antioch.ca.us)

Submittal of electronic comments in Microsoft Word or Adobe PDF format is encouraged. Upon completion of the public review period, written responses to all significant environmental issues raised will be prepared and made available for review by the commenting agencies at least 10 days prior to the public hearing before the City of Antioch City Council on the project, at which the certification of the Final EIR will also be considered. Comments received and the responses to comments will be included as part of the record for consideration by decision makers for the project.

### 1.4.3 - Environmental Issues Determined Not To Be Significant

The City has determined that Mineral Resources will not be impacted by the proposed project. An explanation of why this is the case is provided in Chapter 4, Effects Found Not To Be Significant.

### 1.4.4 - Potentially Significant Environmental Issues

The City has determined that the proposed project may have potentially significant impacts on the following resources, which have been analyzed in the following sections of this DEIR:

- Aesthetics
- Agriculture Resources
- Air Quality
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions and Energy
- Hazards, Hazardous Materials, and Wildfire
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Recreation
- Transportation
- Utilities and Service Systems

## 1.5 - Organization of the Draft EIR

This Draft EIR is organized into the following main chapters and sections:

- **Section ES: Executive Summary.** This chapter includes a summary of the proposed project and alternatives addressed in the EIR. A brief description of the areas of controversy and issues to be resolved as well as an overview of the environmental impacts, required mitigation measures, and level of significance after mitigation are also included in this chapter.
- **Chapter 1: Introduction.** This chapter provides an introduction and overview describing the purpose of the EIR; its scope and components, and its review and certification process.
- **Chapter 2: Project Description.** This chapter includes a detailed description of the project, including its location, site, and project characteristics. A discussion of the project objectives, intended uses of the EIR, responsible agencies, and approvals that are needed for the project are also provided.
- **Chapter 3: Environmental Impact Analysis.** This chapter analyzes the environmental impacts of the proposed project. Impacts are organized into major topical areas. Each topical area includes a description of the environmental setting, regulatory framework, significance criteria, methodology, specific thresholds of significance, impact analyses, mitigation measures (when applicable), and significance conclusions as well as cumulative impacts associated with the project, including the impacts of past, present, and probable future projects. The specific environmental topical sections that are addressed within Chapter 3 are as follows:
  - **Section 3.1—Aesthetics:** Addresses potential visual impacts related to intensification and the overall increase in illumination produced by the project.
  - **Section 3.2—Agriculture Resources:** Addresses the potential for conversion of Important Farmland to non-agricultural use and forest land to non-forest use.

- **Section 3.3—Air Quality:** Addresses potential air quality impacts associated with project implementation and emissions of criteria pollutants. In addition, the section also evaluates project emissions of toxic air contaminants.
  - **Section 3.4—Biological Resources:** Addresses potential impacts on habitat, vegetation, and wildlife; the potential degradation or elimination of important habitat; and impacts on listed, proposed, and candidate threatened and endangered species.
  - **Section 3.5—Cultural and Tribal Cultural Resources:** Addresses potential impacts related to historical resources, archaeological resources, burial sites, and tribal cultural resources.
  - **Section 3.6—Geology and Soils:** Addresses potential impacts related to soils and assesses the effects of project-related development in relation to geologic and seismic conditions. Also addresses potential impacts related to paleontological or unique geologic resources.
  - **Section 3.7—Greenhouse Gas Emissions and Energy:** Addresses potential project emissions of greenhouse gases and impacts related to energy usage.
  - **Section 3.8—Hazards, Hazardous Materials, and Wildfire:** Addresses potential for the presence of hazardous materials or conditions on the project site and in the project area that may have the potential to impact human health and safety and also evaluates potential impacts related to wildfire.
  - **Section 3.9—Hydrology and Water Quality:** Addresses potential impacts related to local hydrological conditions, including drainage areas and changes in flow rates.
  - **Section 3.10—Land Use and Planning:** Addresses the potential land use impacts associated with division of an established community and consistency with the City of Antioch General Plan and City of Antioch Municipal Code.
  - **Section 3.11—Noise:** Addresses the potential noise impacts during construction and at project buildout from mobile and stationary sources. The section also addresses the impact of noise generation on neighboring uses.
  - **Section 3.12—Population and Housing:** Addresses potential impacts related to provision of local housing and jobs as well as any potential housing or jobs displacement.
  - **Section 3.13—Public Services and Recreation:** Addresses potential impacts related to public services, including fire protection, law enforcement, schools, parks, recreational facilities, and library facilities.
  - **Section 3.14—Transportation:** Addresses potential impacts related to the local and regional roadway system, public transportation, bicycle, and pedestrian access.
  - **Section 3.15—Utilities and Services Systems:** Addresses the potential impacts upon service providers, including water supply, wastewater, solid waste, and energy providers.
- **Chapter 4: Effects Found Not To Be Significant.** This chapter contains analysis of the topical sections not addressed in Section 3.
  - **Chapter 5: Other CEQA Considerations.** This chapter provides a summary of significant environmental impacts, including unavoidable and growth-inducing impacts as well as significant irreversible environmental changes.
  - **Chapter 6: Alternatives to the Proposed Project.** This chapter compares the impacts of the proposed project with four land-use project alternatives: The No Project Alternative, the Reduced Traffic Alternative, the Reduced Density Alternative, and the Reduced Footprint

Alternative. An environmentally superior alternative is identified. In addition, alternatives initially considered but rejected from further consideration are discussed.

- **Chapter 7: Persons and Organizations Consulted/List of Preparers.** This chapter also contains a full list of persons and organizations that were consulted during the preparation of this Draft EIR. This chapter also contains a full list of the authors who assisted in the preparation of the EIR by name, affiliation, role/title, education, and years of related experience.
- **Appendices.** The EIR appendices include notices and other procedural documents pertinent to the EIR, as well as supporting technical materials. The following supporting materials and technical studies and analyses were prepared for the project in support of preparation of this Draft EIR:
  - NOP and EIR Public Scoping Comments (Appendix A)
  - Proposed General Plan Amendment and Development Standards (Appendix B)
  - Air Quality, Greenhouse Gas Emissions, and Energy Modeling Outputs, prepared by FirstCarbon Solutions International (Appendix C)
  - Biological Assessment Report Peer Review Responses and Final Biological Resources Assessment, prepared by ECORP Consulting, Inc. as well as Biological Assessment Report Peer Review, prepared by Live Oak Associates, Inc. as well as San Joaquin Kit Fox Survey, prepared by H.T. Harvey & Associates as well as the Biological Resources Assessment Report prepared by Madrone Ecological Consulting, LLC as well as the Special-Status Plant Survey Report for the Offsite Improvement Area prepared by Madrone Ecological Consulting, LLC (Appendix D)
  - Cultural Resources Assessment prepared by Tom Origer & Associates as well as the resource list and report list from the Northwestern Information Center (NWIC) as well as Correspondence with the NAHC and Native American Tribes (Appendix E)
  - Geotechnical Exploration Report, prepared by ENGEO, Inc. as well as the Paleontological Records Search conducted by Kenneth L. Finger (Appendix F)
  - Hazards Database Search, prepared by Envirosite and Phase I Environmental Site Assessment (Phase I ESA), prepared by ENGEO, Inc. (Appendix G)
  - Preliminary Stormwater Control Plan, prepared by Carlson, Barbee & Gibson, Inc. (Appendix H)
  - Noise Modeling Outputs, prepared by FirstCarbon Solutions (FCS) (Appendix I)
  - Public Service Letters and Responses (Appendix J)
  - Transportation Impact Study, prepared by Fehr & Peers (Appendix K)
  - Final Water Supply Assessment Report, prepared by West Yost Associates (Appendix L)

## 1.6 - Documents Incorporated by Reference

As permitted by CEQA Guidelines Section 15150, this Draft EIR has referenced several technical studies, analyses, and previously certified environmental documentation. Information from the documents, which have been incorporated by reference, has been briefly summarized in the appropriate section(s). The relationship between the incorporated part of the referenced document and the EIR has also been described. The documents and other sources that have been used in the preparation of this Draft EIR, and which are incorporated by this reference, include but are not limited to:

- City of Antioch General Plan
- City of Antioch General Plan EIR
- Antioch Municipal Code

In accordance with CEQA Guidelines Section 15150(b), the City of Antioch General Plan, and the referenced documents and other sources used in the preparation of the Draft EIR are available for review at the City of Antioch Community Development Department Planning Division at the address shown in Section 1.4.2, Public Review.

## CHAPTER 2: PROJECT DESCRIPTION

Richland Planned Communities (project Applicant), proposes to build a master planned community consisting of Low Density Residential, Medium Density Residential, Public Use, Parks, Open Space, Village Center land uses and infrastructure on a 551.50-acre site within the western Sand Creek Focus Area<sup>1</sup> in the City of Antioch, Contra Costa County.

The purpose of this Draft Environmental Impact Report (Draft EIR) is to identify potential environmental impacts of The Ranch Project (referred to herein as the proposed project) within the City of Antioch, in Contra Costa County, California. This chapter provides a detailed overview of the project site location and setting, project objectives, proposed project details, components, and construction phasing. It also describes the intended uses of the Draft EIR by agencies with permitting and approval authority over the proposed project, as well as required permits and approvals.

### 2.1 - Project Location and Setting

#### 2.1.1 - Location

##### Regional Location

The City of Antioch is located in eastern Contra Costa County (County) and is bordered to the north by the San Joaquin River Delta; to the east by the City of Brentwood and the City of Oakley; to the west by the City of Pittsburg and unincorporated portions of the County; and to the south by unincorporated portions of the County (Exhibit 2-1). The northern and central portion of the City is characterized by urban and suburban development. The southern portion of the City is characterized primarily by new residential construction and large, undeveloped parcels. Major roadway networks including State Route (SR) 4, SR-160, SR-242, and Interstate 680 (I-680), provide regional access to surrounding areas. SR-4 is an east-west, 10-lane highway that is the main point of access connecting the City of Antioch to the rest of Contra Costa County.

##### Local Setting

The project site is located within the voter-approved Urban Limit Line in the southwestern portion of the City of Antioch and bordered by an existing single-family residential subdivision to the north, undeveloped land to the south, Deer Valley Road and Kaiser Permanente Antioch Medical Center to the east, and undeveloped land and Empire Mine Road to the west (Exhibit 2-2). The project site is located in the United States Geological Survey (USGS) Antioch South 7.5' Quadrangle Township 1 North, Range 2 East, Sections 7 and 8 (Latitude 37°57'06.6" North 121°47'16.8" West). SR-4 is located approximately 2.08 miles east and 3.02 miles north of the project site.

<sup>1</sup> The Sand Creek Focus Area encompasses approximately 2,712.00 acres in the southern portion of the City and is bounded by existing residential neighborhoods on the north, Black Diamond Mines Regional Preserve on the west, the Antioch city limit and voter-approved Urban Limit Line on the south, and the City of Brentwood on the east. Both Empire Mine Road and Deer Valley Road run in a general north/south direction through the Sand Creek Focus Area, dividing it roughly into thirds.

### 2.1.2 - Existing Project Site Characteristics

The project site consists of three assessor parcels, as shown in Exhibit 2-3 and listed in Table 2-1.

**Table 2-1: Project Site Parcel Information**

Assessor's Parcel Numbers	Acreage	Addresses	Ownership
057-010-002	236.00	Antioch, CA	American Superior Land LLC and EPC Holdings, LLC
057-010-003	160.00	Antioch, CA	American Superior Land LLC and EPC Land Holdings, LLC
057-021-003	157.48	6275 Deer Valley Road Antioch, CA	American Superior Land LLC and EPC Land Holdings, LLC
Note: Acreage listed in this table was taken from the Contra Costa County Assessor's Parcel Map for the project site, which totals 553.48 acres. The project site encompasses 551.50 acres of these three assessor parcels. Source: City of Antioch 2019.			

The topography of the site is varied, ranging from relatively level areas in the eastern and central portions of the site, to moderate to steep slopes in the western portion of the site. Sand Creek, a tributary of Marsh Creek, flows west to east through the project site. The elevation on the project site ranges from approximately 220 feet above mean sea level (MSL) in the east along Deer Valley Road to 330 MSL in the western portions of the site.<sup>2</sup> The project site currently includes a cattle-grazing operation, a single-family residence, and various barns and outbuildings located on the eastern portion of the site. Historical uses of the site include grazing and limited natural gas exploration.

The project site is situated within the Sand Creek Focus Area designated by the General Plan for "Golf Course Community/Senior Housing/Open Space," "Hillside and Estate Residential," and "Public/Quasi Public." The project site is zoned as a Study District, an interim designation that is utilized until all necessary detailed land use studies are completed for a given area. The Sand Creek Focus Area contains annual grassland, and a small portion is occupied by sensitive stream and riparian communities associated with Sand Creek.<sup>3</sup> Biological site visits determined that the site consists of non-native grassland dominated by dried grasses and gumplant. In addition, oak trees can be found predominantly along the banks of Sand Creek and eucalyptus trees line the western fencerow near the ranch house structure.<sup>4</sup>

### 2.1.3 - Land Use Designation and Zoning Adopted Via Initiative

The West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative was unanimously adopted by the City Council on July 24, 2018. The West Sand Creek Initiative area included approximately 1,852 acres of land in the Sand Creek

<sup>2</sup> ENGEO Incorporated. 2018. Geotechnical Exploration. September.

<sup>3</sup> City of Antioch. 2003. City of Antioch General Plan. Section 4.0, Land Use.

<sup>4</sup> Live Oak Associates, Inc. Biological Assessment Report Peer Review. 2017.

Focus Area west of Deer Valley Road. The West Sand Creek Initiative added an overlay land use designation referred to as the “Restricted Development Area” to the General Plan to protect nearly 1,244 acres of the western portion of the Sand Creek Focus Area from future urban development and prohibit such development on ridges and major hills throughout the initiative area and along Sand Creek, including the project site. In addition, an open space corridor of up to approximately 430 feet in width was established along Sand Creek.<sup>5</sup> The West Sand Creek Initiative also added an overlay land use designation referred to as the “Limited Development Area” to the City’s General Plan to allow limited urban development on approximately 608 acres of the western portion of the Sand Creek Focus Area and rezone the project site for all for the various land uses discussed immediately below.

Although the trial court invalidated the West Sand Creek Initiative on November 21, 2019, the Restricted Development Area would have provided opportunities for low-density rural residential housing and preserved agriculture, grasslands, and open space through the following base land use designations: Rural Residential, Agriculture, and Open Space.<sup>6</sup> The Limited Development Area would have allowed a range of single-family housing types, including executive estate housing, age-restricted housing for seniors, suburban single-family detached housing for families or for seniors, as well as commercial uses, public and quasi-public uses, and substantial open space through the following base land use designations: Estate Residential, Low Density Residential, Medium Low Density Residential, Medium Density Residential, Convenience Commercial, Mixed Use, Public/Quasi Public, and Open Space (Exhibit 2-4).<sup>7</sup>

The Initiative also added a new Article 42 (including Sections 9-5.4201 through 9-5.4205) to the City’s Zoning Code to be known as the “West Sand Creek Planned Development District” (“WSC” or “West Sand Creek District”), and thereby rezoned the Limited Development Area of the project site from Study District to the West Sand Creek Planned Development District, which included special standards for development within the Limited Development Area (Exhibit 2-5).<sup>8</sup>

Notwithstanding the trial court’s November 21, 2019 invalidation of the West Sand Creek Initiative, the project proponent remains committed to the balanced approach envisioned in the initiative to protect hilly and environmentally sensitive lands from urban development and allow appropriate urban development on the flatter and less environmentally sensitive lands on its project site. The project proponent thus seeks approval of the same substantive amendments to the General Plan and Zoning Code the City Council unanimously approved in the West Sand Creek Initiative for its project site (Exhibit 2-6 and Exhibit 2-7).

#### 2.1.4 - Surrounding Land Uses

Surrounding land uses include an existing single-family, medium density residential subdivision to the north, undeveloped portions of the Sand Creek Focus Area to the south, a mixed use Medical Facility

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<sup>5</sup> City of Antioch. 2003. City of Antioch General Plan. Section 4.4.1.1, Residential Land Use Designations.

<sup>6</sup> West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative. July 24, 2018, pg. 26.

<sup>7</sup> Ibid.

<sup>8</sup> West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative. July 24, 2018, pp. 72-73.

(Kaiser Permanente Antioch Medical Center and offices) to the east, and a continuation of undeveloped Sand Creek Focus Area land to the west. Two single-family homes are located adjacent to the southeastern corner of the project site, along Deer Valley Road. SR-4 is located approximately 2.08 miles east and 3.02 miles north of the project site.

## 2.2 - Project Objectives

Pursuant to CEQA Section 15124 (b), the project description shall include a statement of project objectives. The project objectives help the lead agency develop a reasonable range of alternatives to evaluate, and also aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives presents the underlying purpose of the project and may discuss the project benefits.

The objectives of the proposed project are to:

- Develop a project consistent with the West Sand Creek Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative.
- Establish a 551.50-acre, well-planned community that incorporates the natural, historic, and physical elements of the land and the surrounding uses.
- Design a land use plan with a mix of uses complementary to existing neighborhoods and in symmetry with the larger Antioch community.
- Provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.
- Provide a Village Center adjacent to Deer Valley Road and across from the Kaiser Permanente Antioch Medical Center, functioning as a hub of activity and source of sales tax revenue.
- Preserve and protect the hills and hillsides on-site as permanent open space.
- Preserve and protect the Sand Creek corridor throughout the project site as permanent open space and provide public access with perimeter trails and crossings.
- Provide a pedestrian-friendly community that focuses on open space, parks, and trails to facilitate resident and visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system.
- Provide a land use plan with a balance of uses and density that results in an adequate tax base, which at project build-out generates financial resources to pay for public services and infrastructure without financial burden to existing residents.
- Provide a land use plan, design standards, and guidelines consistent with Antioch General Plan goals and policies, that incorporate market-acceptable design features and promotes an attractive, well-maintained community.
- Establish a land use and circulation system that promotes convenient mobility, completes the extension of Dallas Ranch Road to Deer Valley Road, and provides modes of transportation within a setting that is safe, accessible, and convenient for all modes of travel.

- Provide a comprehensive infrastructure system, including parks, open space, stormwater quality facilities, public services, roadways, and utilities infrastructure sized to serve the proposed project and properties to the east and south in the Sand Creek Focus Area that complements the existing Citywide infrastructure and ensures funding for the on-going maintenance needs of such infrastructure.

## 2.3 - Project Components

The proposed project consists of a comprehensive master planned community within the Sand Creek Focus Area to be constructed in three separate phases. The proposed project comprises a multi-generational plan, including age-restricted housing, of up to 1,177 dwelling units, as well as a Village Center, including a 2.00-acre future fire station site, extensive parks, a trail staging area, and open space. Because the West Sand Creek Initiative was invalidated by the trial court, the proposed project will now include the same general plan and zoning amendments as requested in the initiative. The project components are discussed in detail below.

### 2.3.1 - Land Uses

The proposed project includes the demolition of the existing single-family residence, various barns and outbuildings, and construction of the following primary components:<sup>9</sup>

- 1,177 single-family residential units over 253.50 acres, including Low Density (LD), Medium Density (MD), and Age Restricted (AR) housing;
- A 5-.00-acre Village Center with commercial, office, and retail space;
- 3.00 acres of public services facilities, including a new fire station site and a trail staging area;
- 22.50 acres of public parks and landscaped areas;
- 229.50 acres of public open space including trails; and
- 38.00 acres of roadway improvements.

Residential uses would cover approximately 46 percent of the project site. The Village Center and fire station would cover around 1.5 percent of the project site. The remaining approximately 52.5 percent of the project site would consist of public parks, landscaped areas, and open space areas with trails (Exhibit 2-8). Table 2-2 provides a more detailed breakdown of the project components.

**Table 2-2: Proposed Land Uses and Densities**

Land Use		Acreage	Net Density (du/ac)	Average Lot Size (sf)	Target Number of Units	Development Phase
Low Density (LD)	LD-1	18.50	3.7	8,000	68	3

<sup>9</sup> All acreages are approximate.

**Table 2-2 (cont.): Proposed Land Uses and Densities**

Land Use		Acreage	Net Density (du/ac)	Average Lot Size (sf)	Target Number of Units	Development Phase
	LD-2	18.00	3.6	7,000	65	3
	LD-3 (Conventional)	104.00	3.9	7,000	410	1B/2
Medium Density (MD)		38.00	5.6	4,200–4,500	212	1A
Age Restricted (AR)		75.00	5.6	5,000	422	3
<b>Total Residential</b>		<b>253.50</b>	<b>4.6</b>	—	<b>1,177</b>	—
Village Center (VC)		5.00	—	—	—	1A
Public Use (PQ)	Fire Station (PQ-F)	2.00	—	—	—	1A
	Trail Staging Area (PQ-S)	1.00	—	—	—	3
Parks (P)		20.00	—	—	—	All phases
Landscape (L)		2.50	—	—	—	All phases
Open Space (OS)*		229.50	—	—	—	—
Major Roadways		38.00	—	—	—	All phases
<b>Grand Total</b>		<b>551.50</b>	—	—	—	—

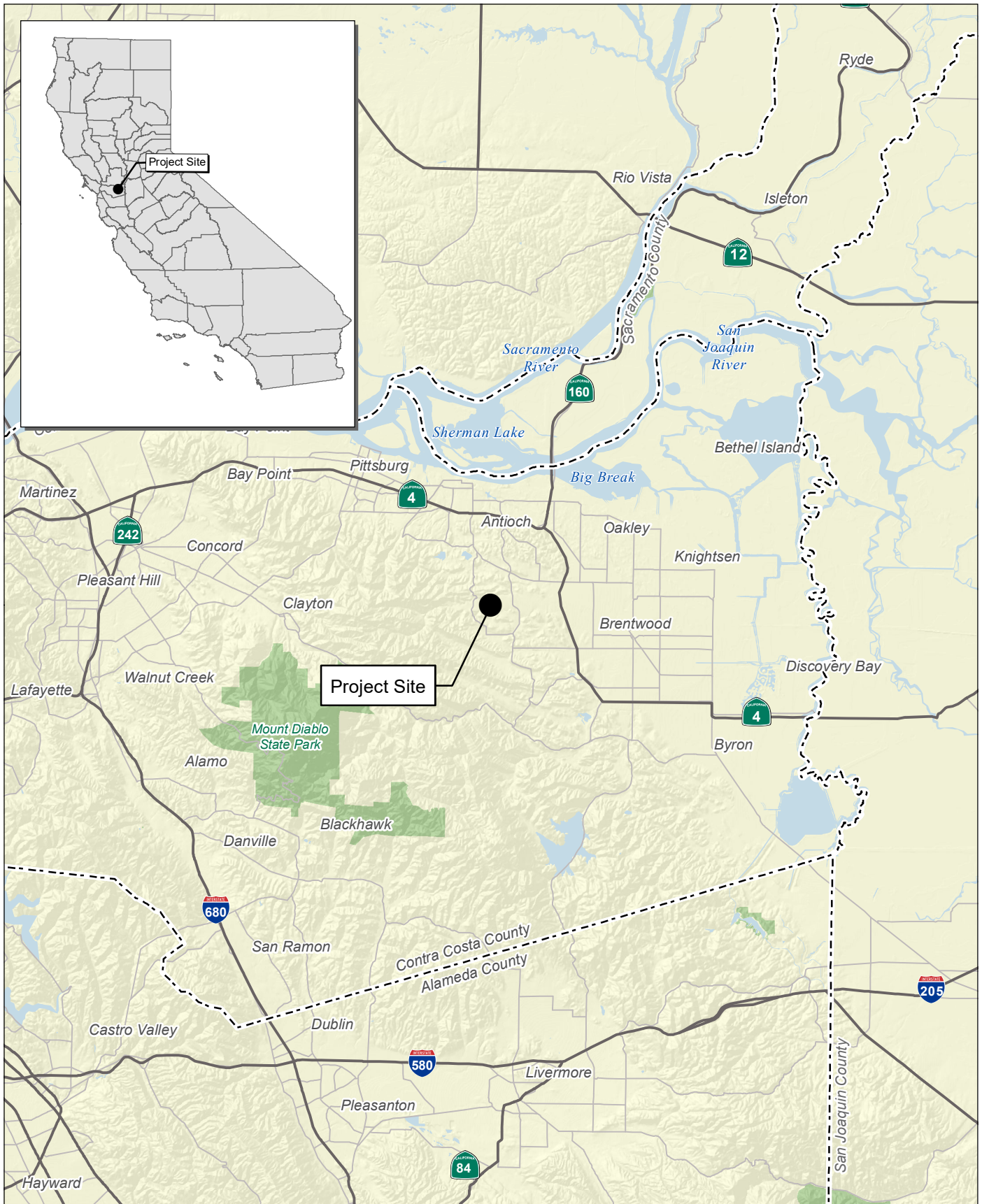
The project would be divided into two development areas—North Development Area and South Development Area—and would be constructed in three phases (Exhibit 2-9). All proposed lots would be single-family residential, and each neighborhood would include a Homeowner’s Association (HOA) subject to a declaration of Covenants, Codes, and Restrictions (CCRs). Phase 1 would include approximately 362 units consisting of low-density and medium-density housing. Phase 2 would include approximately 201 units of low-density housing, and Phase 3 would include around 614 units consisting of low-density and age-restricted housing.

### **North Development Area (North of Sand Creek)**

The North Development Area would include Medium Density (MD) development nearest to the Village Center, as well as some Low Density (LD) residential neighborhoods, the Village Center site, fire station site, and parks and open space areas (Exhibit 2-8).

### **Commercial Uses**

The 5.00-acre Village Center area would be located at the northwest corner of the Deer Valley Road and Sand Creek Road intersection, just across Deer Valley Road from the Kaiser Permanente Antioch Medical Center, and north across Sand Creek Road from the fire station. The Village Center would accommodate up to 54,000 square feet of neighborhood commercial, office, and retail space, and would provide goods and services to residents of the proposed project, as well as to surrounding neighborhoods and the Kaiser Permanente Antioch Medical Center.



Source: Census 2000 Data, The CaSIL

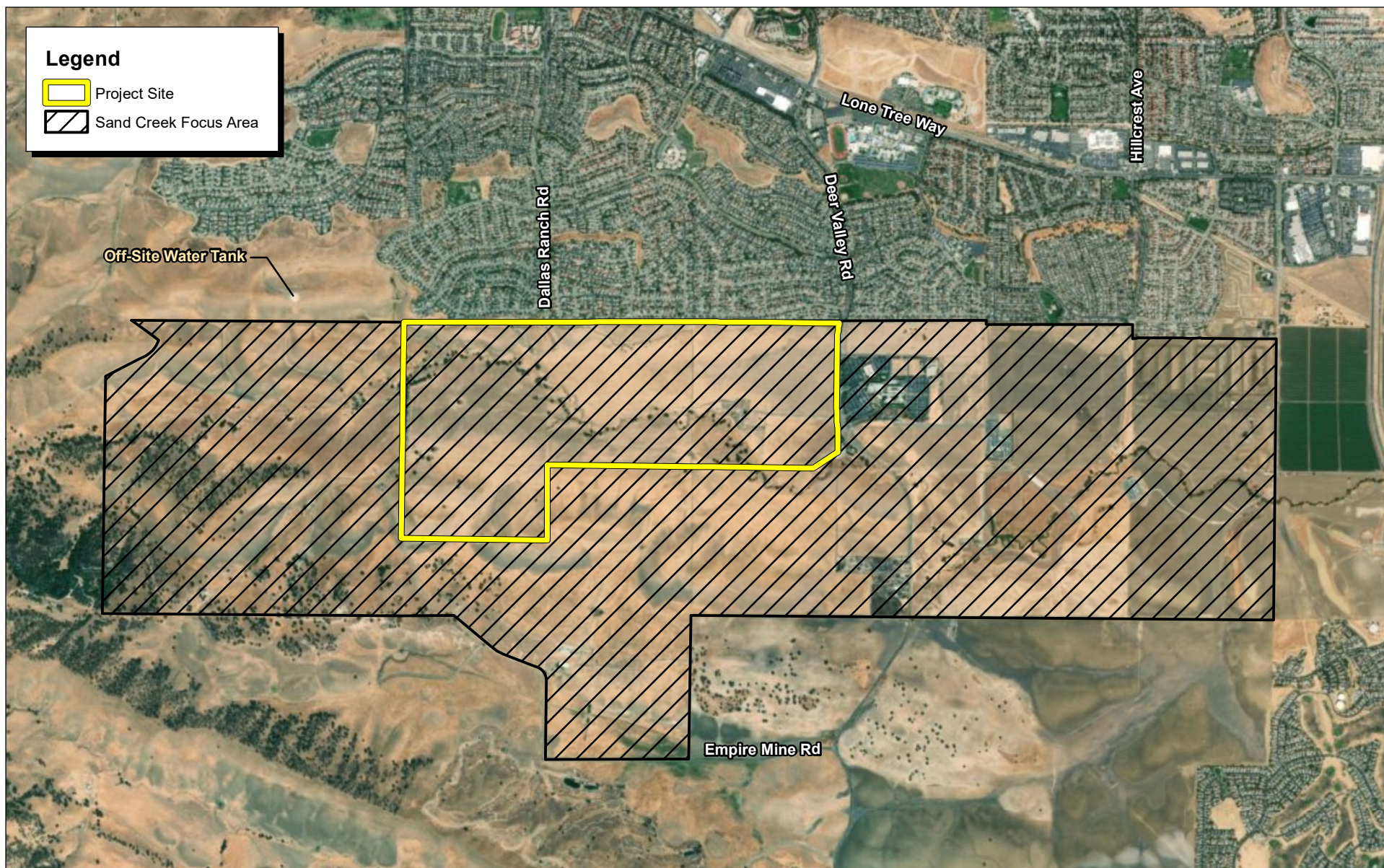
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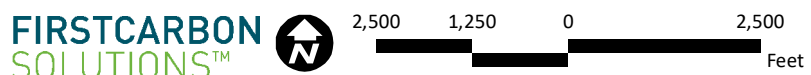
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## Exhibit 2-1 Regional Location Map

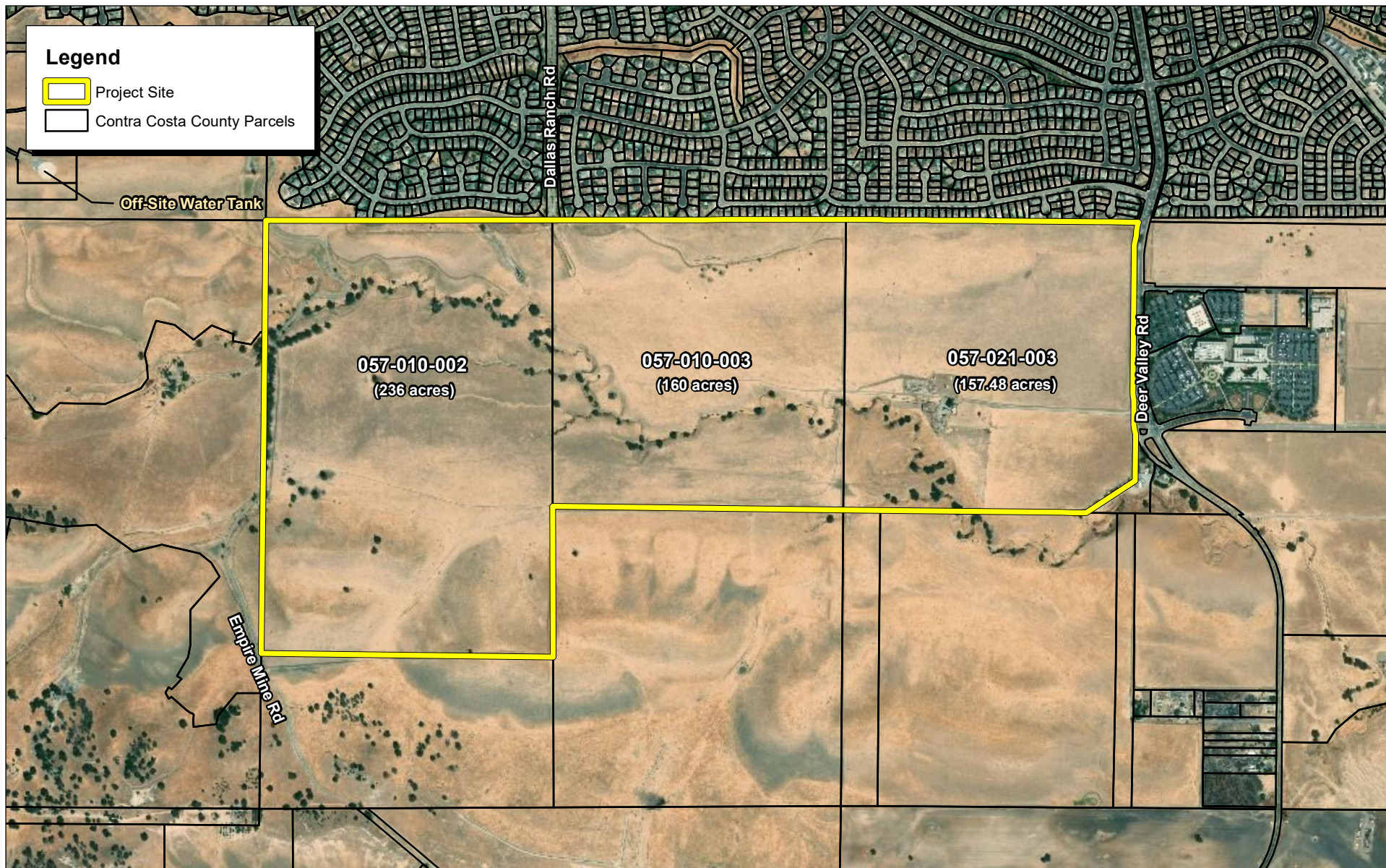
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Source: ESRI Aerial Imagery.

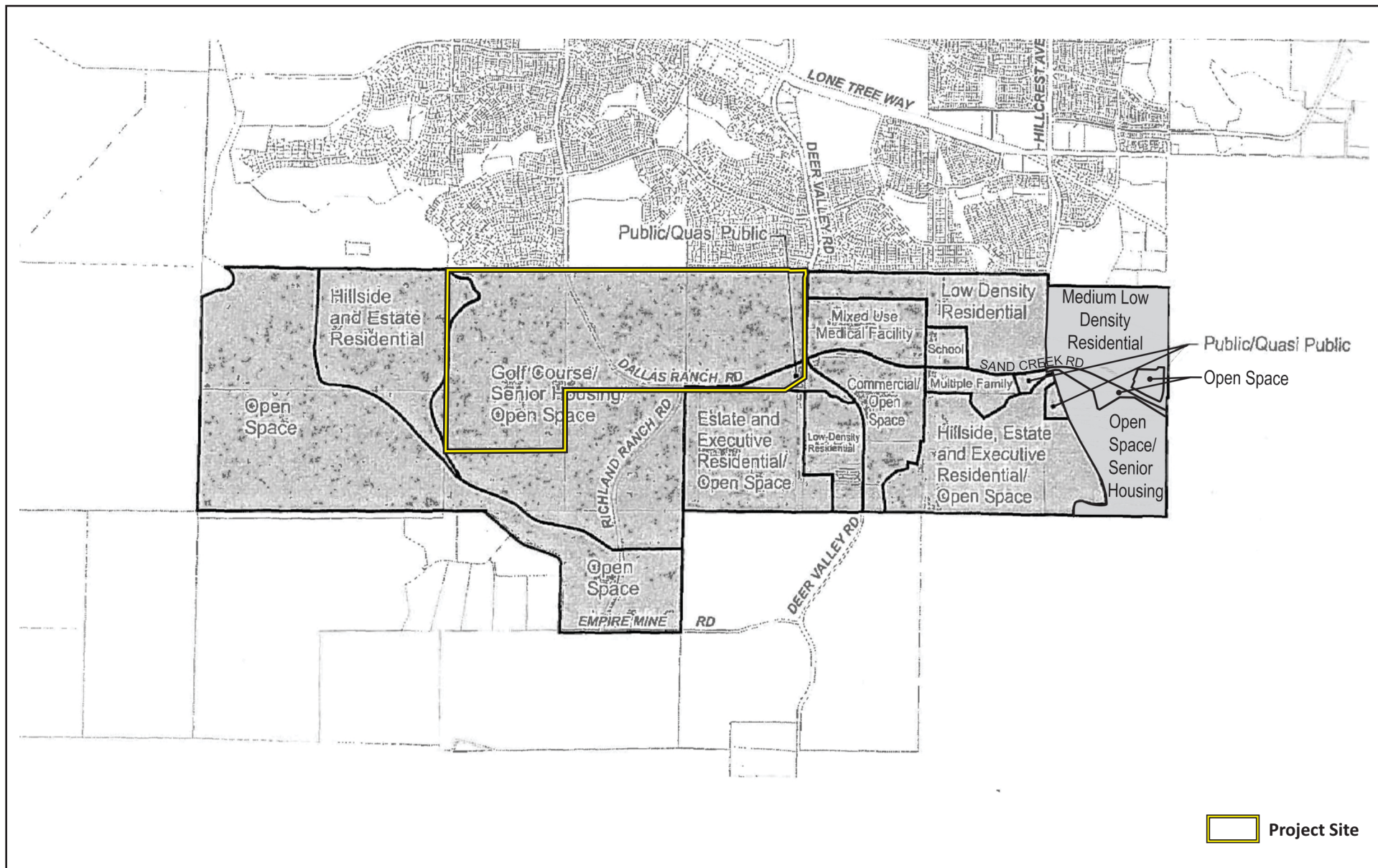


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Source: ESRI Aerial Imagery. County of Contra Costa GIS Data.

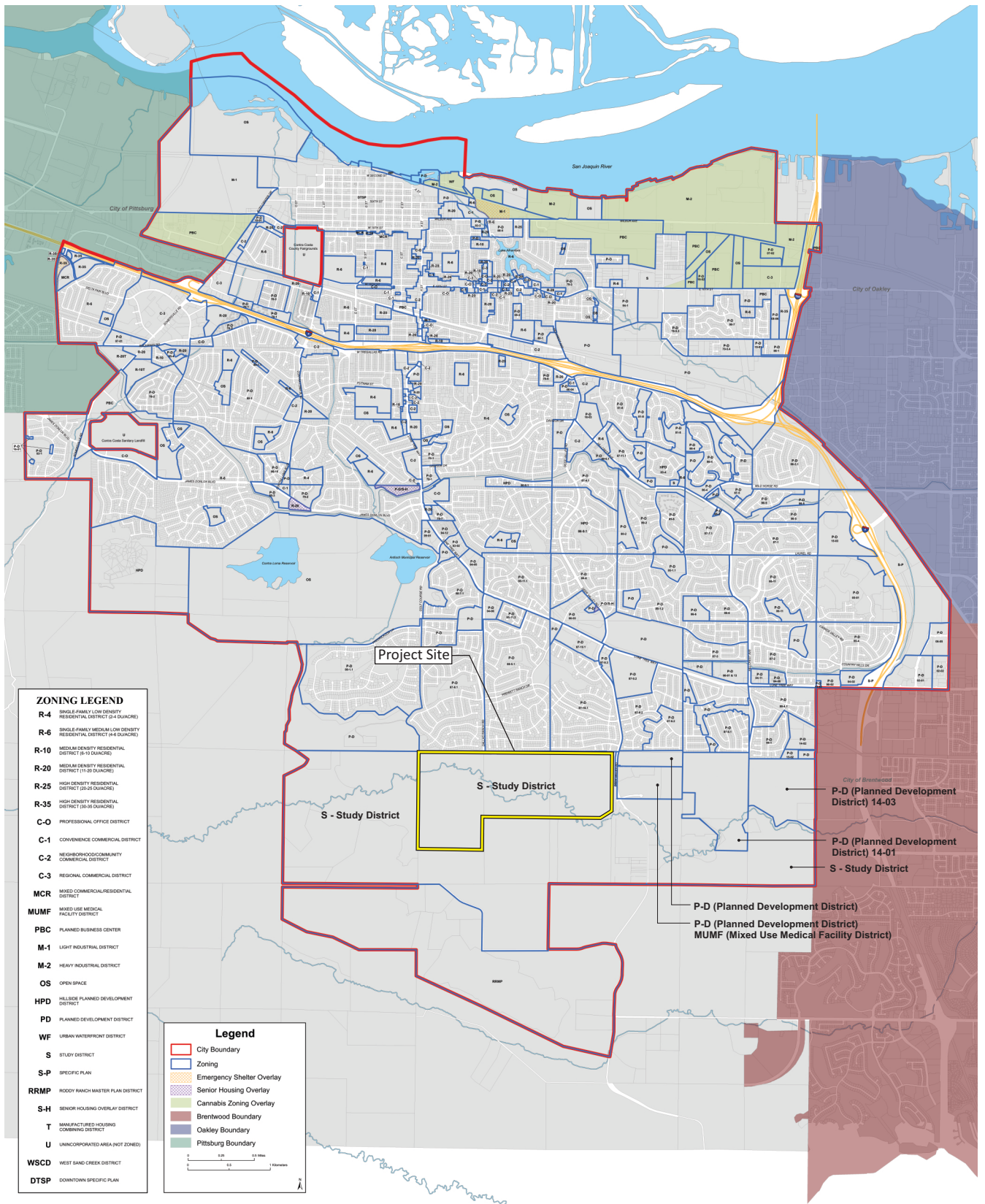
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Source: LSA, November 19, 2003, Revised by CBG Civil Engineers, November 9, 2015.



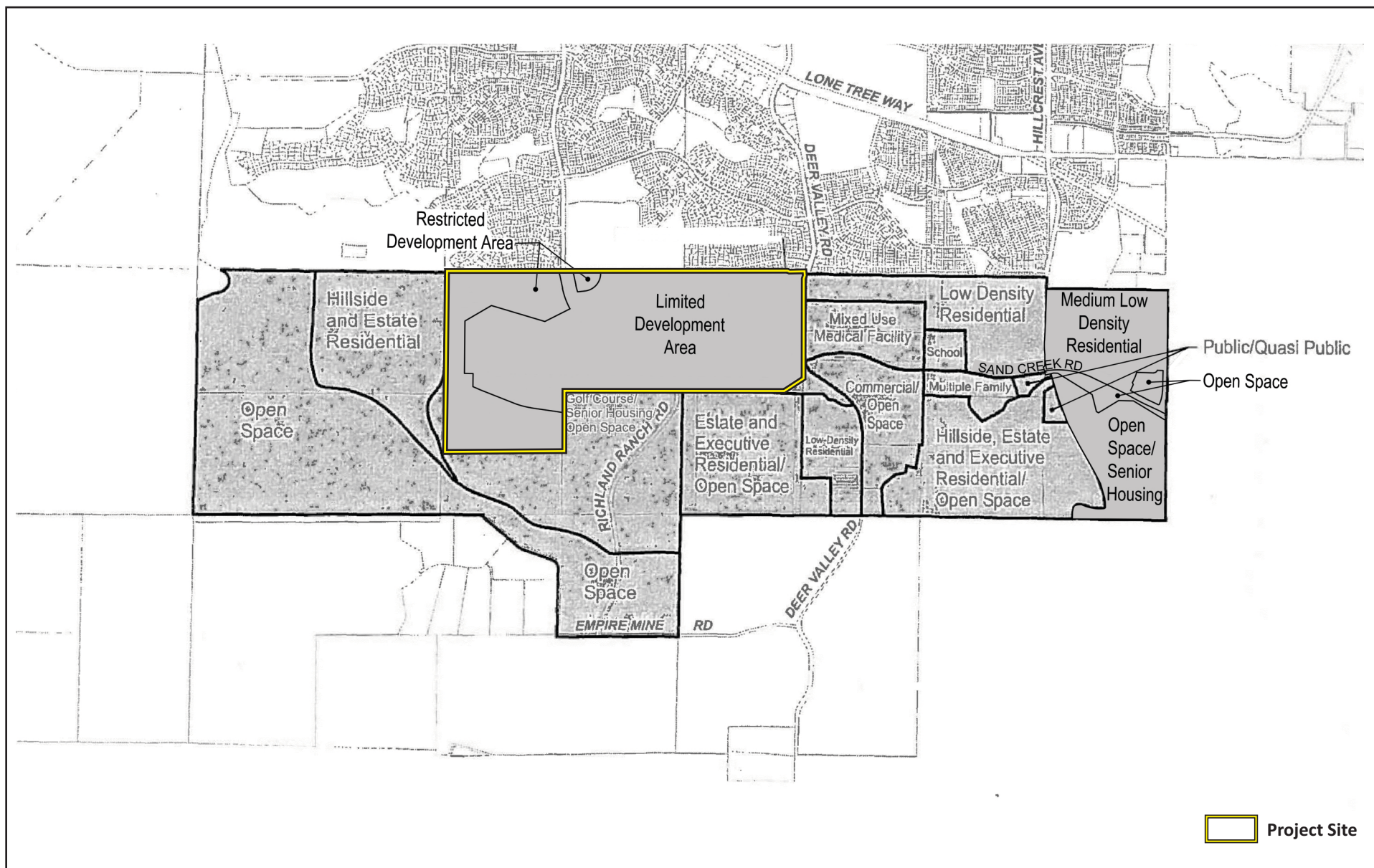
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Source: City of Antioch, February 2019.



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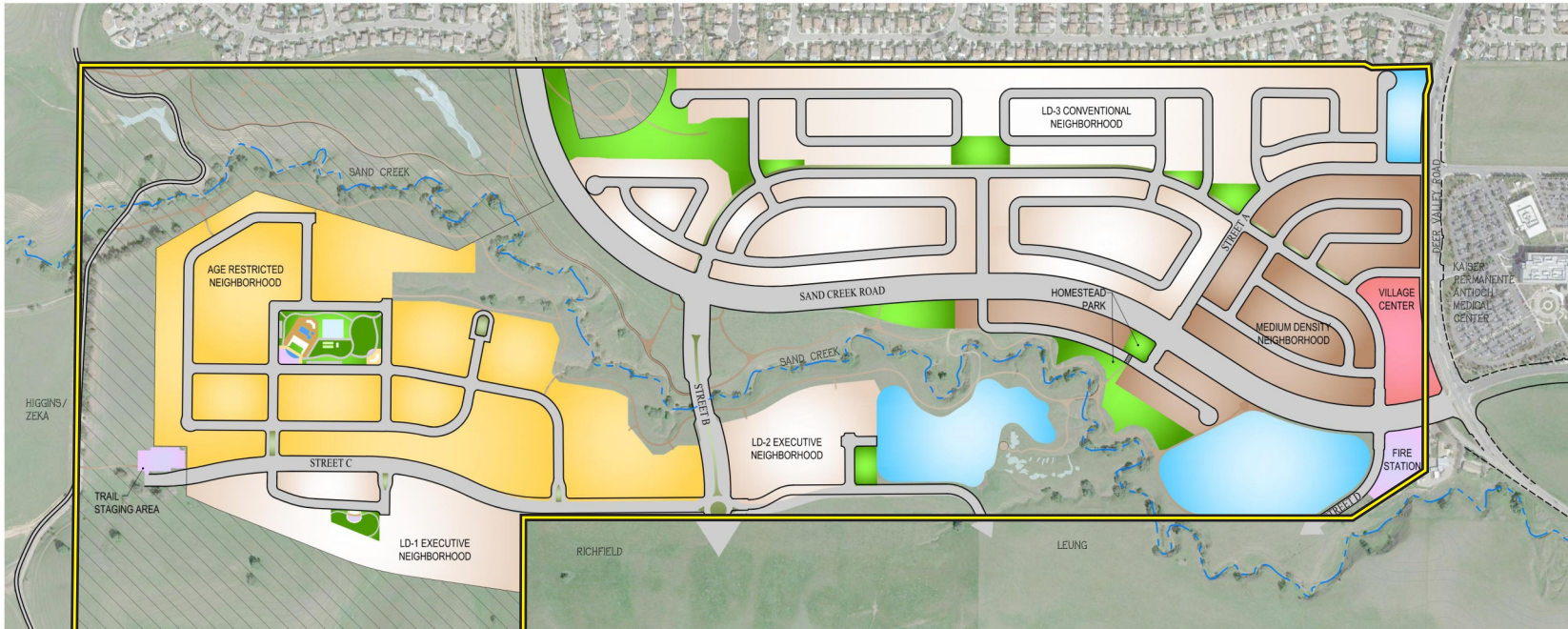
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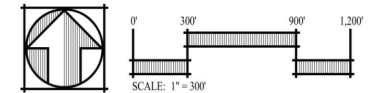


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#### PRODUCT & AREA SUMMARY

TYPE	PRODUCT OR AREA TYPE	ACREAGE	% OVERALL	% RES ACREAGE	NET DENSITY (DU/AC)	AVERAGE LOT SIZE (SF)	TARGET # UNITS	% RES UNITS
	LOW DENSITY (LD)	140.5	25.5%	55.4%	3.9		543	42.7%
	• LD-1 EXECUTIVE	18.5	3.4%	7.3%	3.7	10,000	68	5.8%
	• LD-2 EXECUTIVE	18	3.3%	7.1%	3.6	7,000	65	5.5%
	• LD-3 CONVENTIONAL	104	18.9%	41.0%	3.9	7,000*	410	31.4%
	AGE RESTRICTED (AR)	75	13.6%	29.6%	5.6	5,000	422	38.2%
	MEDIUM DENSITY (MD)	38	6.9%	15.0%	5.6	4,500	212	18.0%
	RESIDENTIAL TOTAL	253.5	46.0%	100.0%	4.6		1,177	100.0%
	VILLAGE CENTER	5	0.9%					
	PUBLIC USE (PQ)	3	0.5%					
	• FIRE STATION (PQ-F)	.2	0.4%					
	• TRAIL STAGING AREA (PQ-S)	1	0.2%					
	PARKS (P)	20	3.6%					
	LANDSCAPE (L)	2.5	0.5%					
	OPEN SPACE (OS)	229.5	41.6%					
	MAJOR ROADWAYS	38	6.9%					
	TOTAL	551.5	100%					



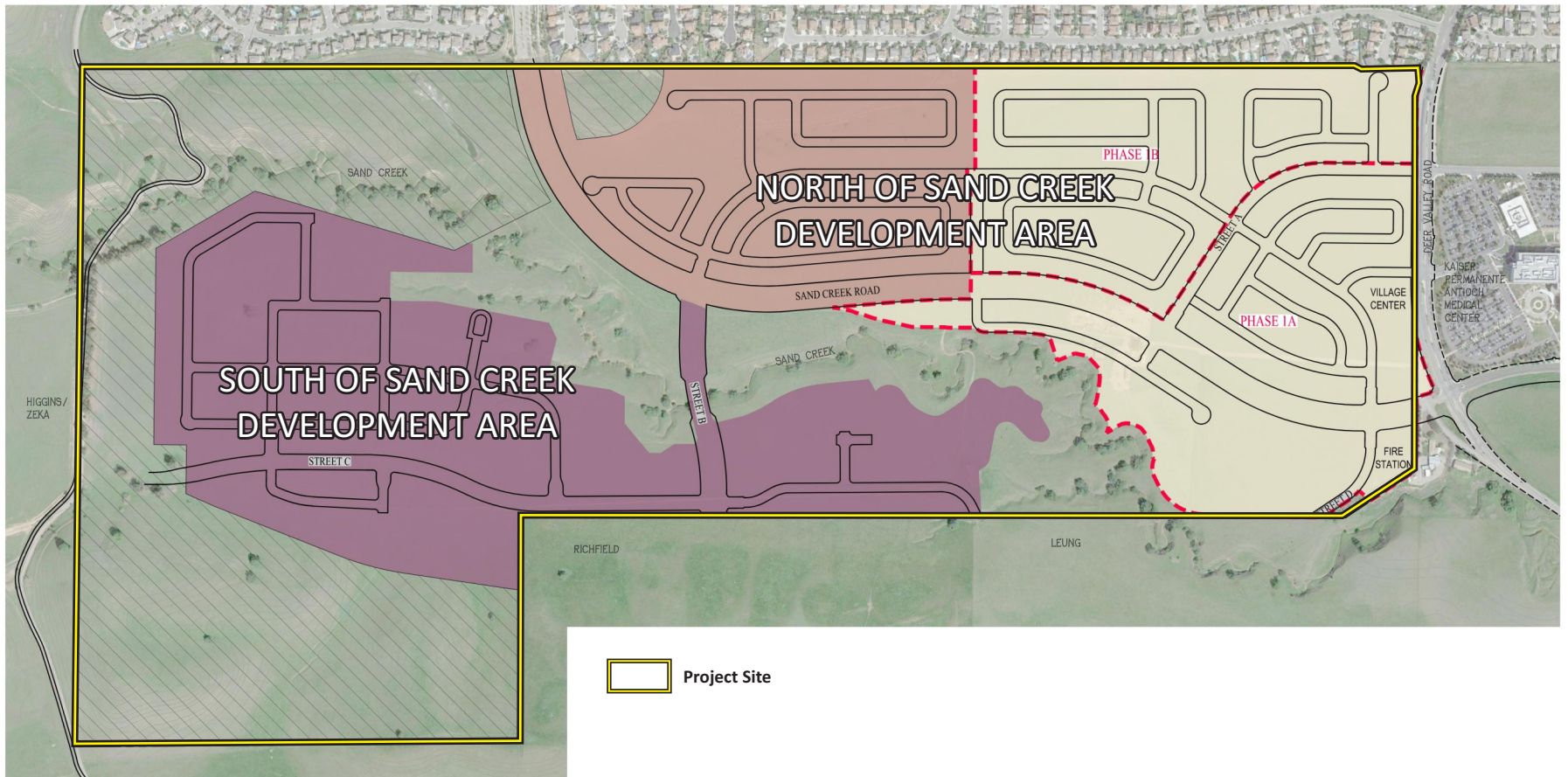
Source: CBG Civil Engineers, March 13, 2020.

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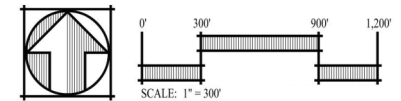
**Exhibit 2-8**  
**Site Plan**

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	PHASE 1
	PHASE 2
	PHASE 3
	PHASE 1A/1B
	PROPOSED RESTRICTED DEVELOPMENT AREA

GRADING AREA SUMMARY	
PHASE 1A	78 AC
PHASE 1B	60 AC
PHASE 2	73 AC
PHASE 3	135 AC



Source: CBG Civil Engineers, March 13, 2020.

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## Exhibit 2-9 Phasing Plan

CITY OF ANTIOCH • THE RANCH PROJECT  
ENVIRONMENTAL IMPACT REPORT

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### **Public Service Uses**

An approximately 2.00-acre fire station site would be located south of Sand Creek Road at the Street D intersection. The Applicant does not propose to construct the fire station as part of the proposed project; however, the construction and operation of the fire station is analyzed in this Draft EIR to support the future construction of this facility as planned by the Contra Costa County Fire Protection District. The station would be standard size and, in addition to personnel, would house up to four firefighting equipment vehicles (e.g., a ladder truck, a tanker truck, an ambulance).

An approximately 1.00-acre trail staging area is proposed to be located in the southwestern portion of the project site, near Empire Mine Road, to provide easy access to the existing East Bay Regional Park trail system, as well as the proposed trail system.

### **Residential Uses**

The MD neighborhoods would be located to the west of the Village Center, to the north and south of Sand Creek Road, with minimum lot sizes averaging between 4,200 and 4,500 square feet. The MD neighborhoods would have direct access or be located within close proximity to the Village Center.

The LD neighborhoods would be situated to the west of the MD neighborhood on the north side of Sand Creek Road. Lots in the LD neighborhoods would average 7,000 square feet, although lots abutting the northern boundary of the project site would have a minimum lot size of 8,000 square feet, and would include larger rear setbacks than the standard LD neighborhood lots, to provide a transition between the proposed development and the existing residential subdivision to the north.

### **Recreational Uses**

The proposed project would include an approximately 5.00-acre park (North Neighborhood Park) with a children's play area, a lawn area for active sports, and an open, landscaped area on top of a small knoll that would provide views of the surrounding area. In addition, the North Development Area would include a sidewalk with a large landscaped setback, providing linkage throughout the full length of the North Development Area. Similarly, Homestead Park would be located between the two medium-density residential areas along Sand Creek Road and be situated at the site of the existing on-site grazing operation. Homestead Park would overlook Sand Creek and provide trail access to the Sand Creek trail system for residents of the North Development Area. Proposed parks included in the project are shown in Exhibit 2-10.

### **South Development Area (south of Sand Creek)**

The South Development Area would be comprised of three distinct residential neighborhoods, including two low-density neighborhoods (LD-1 and LD-2) and an Age Restricted (AR) neighborhood, as well as a number of parks and open space areas.

### **Residential Uses**

The LD-1 neighborhood would include 18.50 acres of housing located in a small valley in the southwest portion of the project site. Lot sizes would average 8,000 square feet. Lots in the 18.00-acre LD-2 neighborhood would average 7,000 square feet and would overlook proposed detention basins along the Sand Creek corridor. The AR neighborhood would include approximately 75.00 acres of age-

restricted housing overlooking the western portion of the Sand Creek corridor. Lots would average 5,000 square feet and would be organized around a central neighborhood park, which would include a private clubhouse and a recreation center. At least two of the neighborhoods would be gated.

### **Recreational Uses**

The AR neighborhood would have a large private park (AR Community Park), which could include a clubhouse with pool, tennis courts, and bocce ball courts, as well as lawn areas and walking paths. The LD-1 and LD-2 neighborhoods would contain at least one pocket park each.

### **Open Space Uses**

The proposed project would preserve the existing Sand Creek corridor, as well as various hills and ridgelines in the northwestern and southwestern portions of the project site. The total open space, including trail areas, would comprise approximately 40 percent of the total project site. A comprehensive 6.00-mile, publicly accessible trail system would be provided along Sand Creek and throughout the project site. The trail system would connect the proposed neighborhood areas to each other and to nearby parks, ridgeline areas, trailhead staging area, and the proposed mixed-use Village Center area. Exhibit 2-10 depicts the proposed open space areas within the project site. These open space areas would be provided in addition to the passive open space and preserve areas of the project site.

### **Roadway Uses**

The project would include a total of approximately 38.00 acres of roadways, including improvements connecting Dallas Ranch Road to Sand Creek Road near Kaiser Permanente Antioch Medical Center, a secondary access point at Deer Valley Road and Wellness Way, and up to two bridges spanning across Sand Creek with up to a total of four lanes.

## **2.3.2 - Circulation and Access**

### **Vehicle**

#### ***On-site Roadway Improvements***

The proposed project would include a phased arterial roadway (Sand Creek Road) that would connect the existing terminus of Dallas Ranch Road on the northwestern portion of the project site to the existing terminus of Sand Creek Road at Deer Valley Road, immediately south of the Kaiser Permanente Antioch Medical Center. The connections at Dallas Ranch Road and Deer Valley Road would provide the primary access points to the project site.

#### ***Sand Creek Road***

In areas where development would be located on only one side of the proposed new roadway, the Sand Creek Road right-of-way would ultimately be 96 feet wide with a median, two traffic lanes (in each direction), a Class II bicycle lane, curb and gutter, and a landscape strip in each direction (Exhibit 2-11). A sidewalk and a landscaped setback would be provided on the side adjacent to the proposed development. Where Sand Creek Road would include development on both sides, the total right-of-way would increase to 112 feet to include a sidewalk on both sides. A landscape buffer would be provided on both sides of the roadway in such areas. The project Applicant would

coordinate with Tri-Delta Transit and the City to ascertain the best location for bus stops along the proposed Sand Creek Road extension and what amenities would be required. Further information regarding circulation and access along with the potential to install roundabouts along Sand Creek Road and at the Deer Valley Road intersection, as well as the potential installation of traffic signals are further discussed in Section 3.14, Transportation.

#### *Other Streets*

A secondary access point would be provided at the existing signalized intersection at Deer Valley Road and Wellness Way. Wellness Way would be extended into the project site as a two-lane street (Street A) with a center-landscaped median, terminating at Sand Creek Road. Several internal streets would also be included throughout the site.

Street B would connect to the roundabout/intersection at Sand Creek Road and extend southward to the southern boundary of the project site, terminating in a second roundabout (Exhibit 2-11). Street B would include one or two bridges across Sand Creek that would carry vehicles, bicycles, and pedestrians between the North and South Development Areas. The bridge(s) may accommodate up to four lanes and may be phased into two, two-lane bridges, or built as a single, two or four-lane bridge. If phased, the first bridge section would have one lane in each direction to accommodate development in the South Development Area. The second bridge phase would be constructed if secondary access to the south development area were not provided through Streets C and D at the time there is determined to be a need to mitigate traffic. Upon completion of both bridges, one bridge would carry southbound traffic and the other would carry northbound traffic. The bridge(s) would be constructed on top of bridge abutments located in the banks of Sand Creek to span the jurisdictional areas and ordinary high-water mark (OHWM) of Sand Creek.

Street C would extend westward from Street B towards the western site boundary. Street C would include landscaped setbacks on both sides, as well as sidewalks, a landscape strip, curbs and gutters, a bike lane, and a travel lane in each direction. Street C would also include a center median of varying width.

Street D would extend south from Sand Creek Road towards the property to the south and provide a future street connection south of Sand Creek near the fire station to allow circulation for the adjacent property, as well as an additional access point for the South Development Area of the project. It would have landscaped setbacks on both sides, as well as sidewalks, a landscape strip, curbs and gutters, a bike lane, and a travel lane in each direction.

#### *Internal Neighborhood Streets*

Typical internal local residential streets would feature two travel lanes within right-of-ways ranging from 37 to 56 feet in width (Exhibit 2-12). With the exception of private lanes/alleys, local streets would include on-street vehicle parking, either on one or both sides of the street, as well as 4 to 5-foot sidewalks on both sides of the streets. Private alleys or courts may be used to access residential units, and would be allowed to be narrower than public streets; such alleys or courts would not provide on-street parking or sidewalks.

### *Emergency Vehicle Access*

The extension of Sand Creek Road would serve as the primary Emergency Vehicle Access (EVA) route to the project site. A secondary EVA would be provided from the southern development area through Village 9 along Street C (Exhibit 2-13).

### **Off-site Roadway Improvements**

#### *Deer Valley Road*

A landscaped area would be installed between the proposed Village Center area and Deer Valley Road, along the eastern project site boundary. An additional setback would include a sidewalk, landscaping, curbs and gutters, a bicycle lane, and a new 12-foot-wide southbound traffic lane. No bus turnouts are proposed along the Deer Valley Road frontage, as two bus stops would be located along Sand Creek Road, one adjacent to the proposed Village Center area and the other adjacent to the proposed fire station site. Intersection improvements at Deer Valley Road and Sand Creek Road would either include a new roundabout or signal modification.

### **Parking**

In addition to street parking (except in private lanes/alleys), two spaces in an enclosed garage would be provided for each residential unit. If streets abutting the residential units do not include street parking, guest parking would be provided at a rate of one space per five residential units.

### **Transit**

#### **Bus**

Tri-Delta Transit provides bus services in eastern Contra Costa County, serving the communities of Brentwood, Antioch, Oakley, Concord, Discovery Bay, Bay Point, and Pittsburg. Local Routes 379, 388, and 392 would provide bus services to the project site.<sup>10</sup> The nearest bus stop to the project site for the aforementioned routes is located approximately 230 feet east of the project site across Deer Valley Road.

#### **Rail**

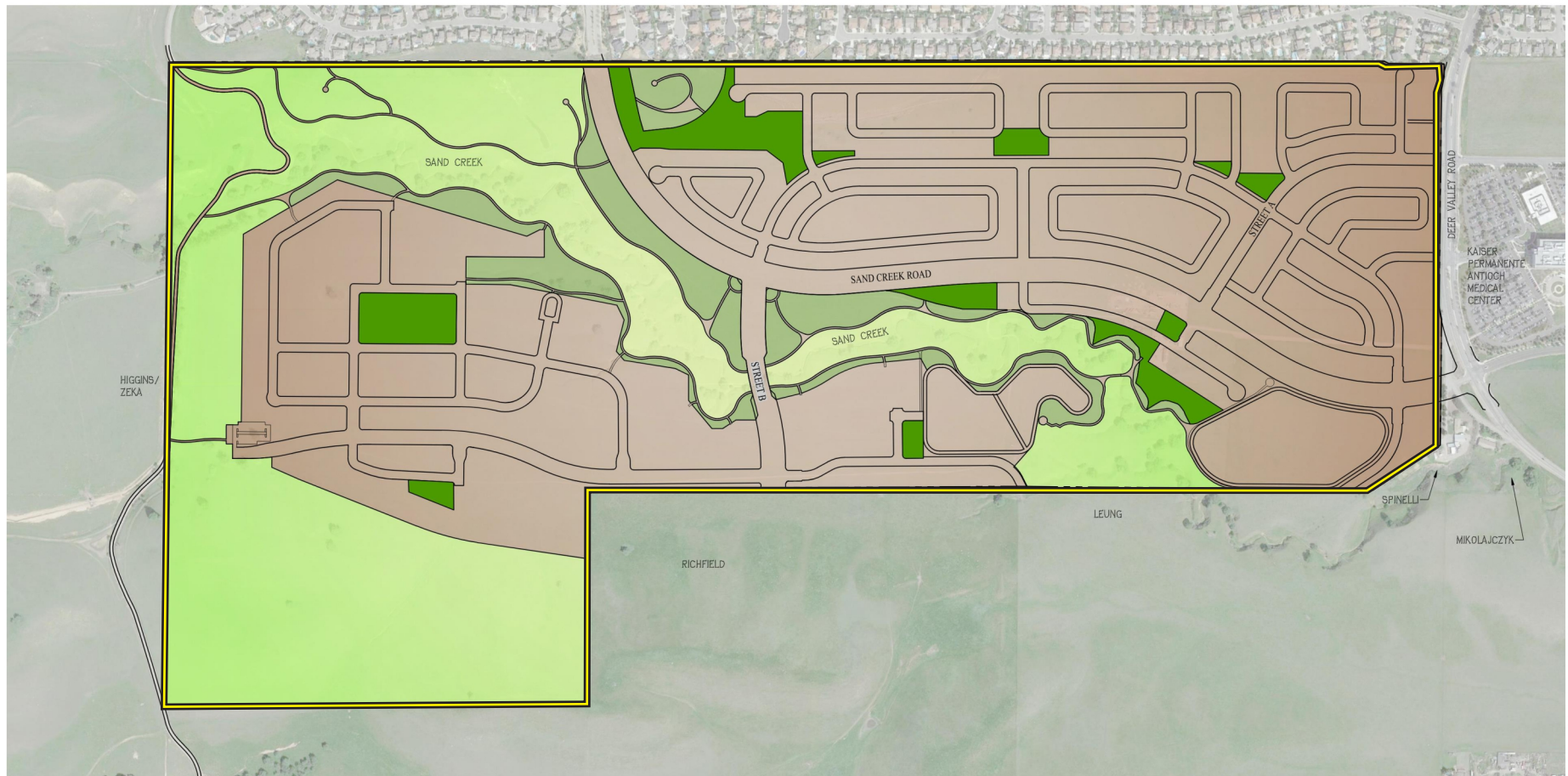
Bay Area Rapid Transit (BART) provides rail transit service within Contra Costa County and provides regional connections to Alameda, San Francisco, and San Mateo counties. The Richmond/Daly City/Millbrae Line (Orange Line) and the Antioch/San Francisco International Airport/Millbrae Line (Yellow Line) are the two train lines that serve the 12 stations within Contra Costa County. The Antioch BART Station, which is served by the Yellow Line, would serve the project site and is located approximately 3.01 miles north of the project site.

### **Bicycle and Pedestrian**

Local streets would include 4- to 5-foot-wide sidewalks on both sides. The proposed project would include the construction of a 6.00 mile off-street trail system. In addition, Class II bicycle lanes and a bicycle/pedestrian bridge would be constructed across Sand Creek near the Homestead Park site. Existing bicycle lanes run along Prewett Ranch Drive to the north, along Deer Valley Road to the east of the site, and along Sand Creek Road to the east of the site. Proposed bicycle lanes along Sand Creek Road within the project site would connect to existing lanes along Sand Creek Road.

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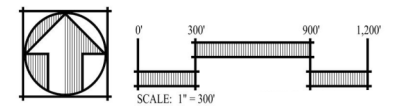
<sup>10</sup> The Tri-Delta Transit. 2019. Realtime Map. Website: <http://trideltatransit.com/realtimeMap.aspx>. Accessed May 6, 2019.



Project Site

### LEGEND

	IMPACTED (DEVELOPABLE) AREA = 341.8± AC
	ON-SITE PRESERVE = 170.1± AC
	ON-SITE PASSIVE OPEN SPACE = 39.0± AC
	PARKS = 20± AC



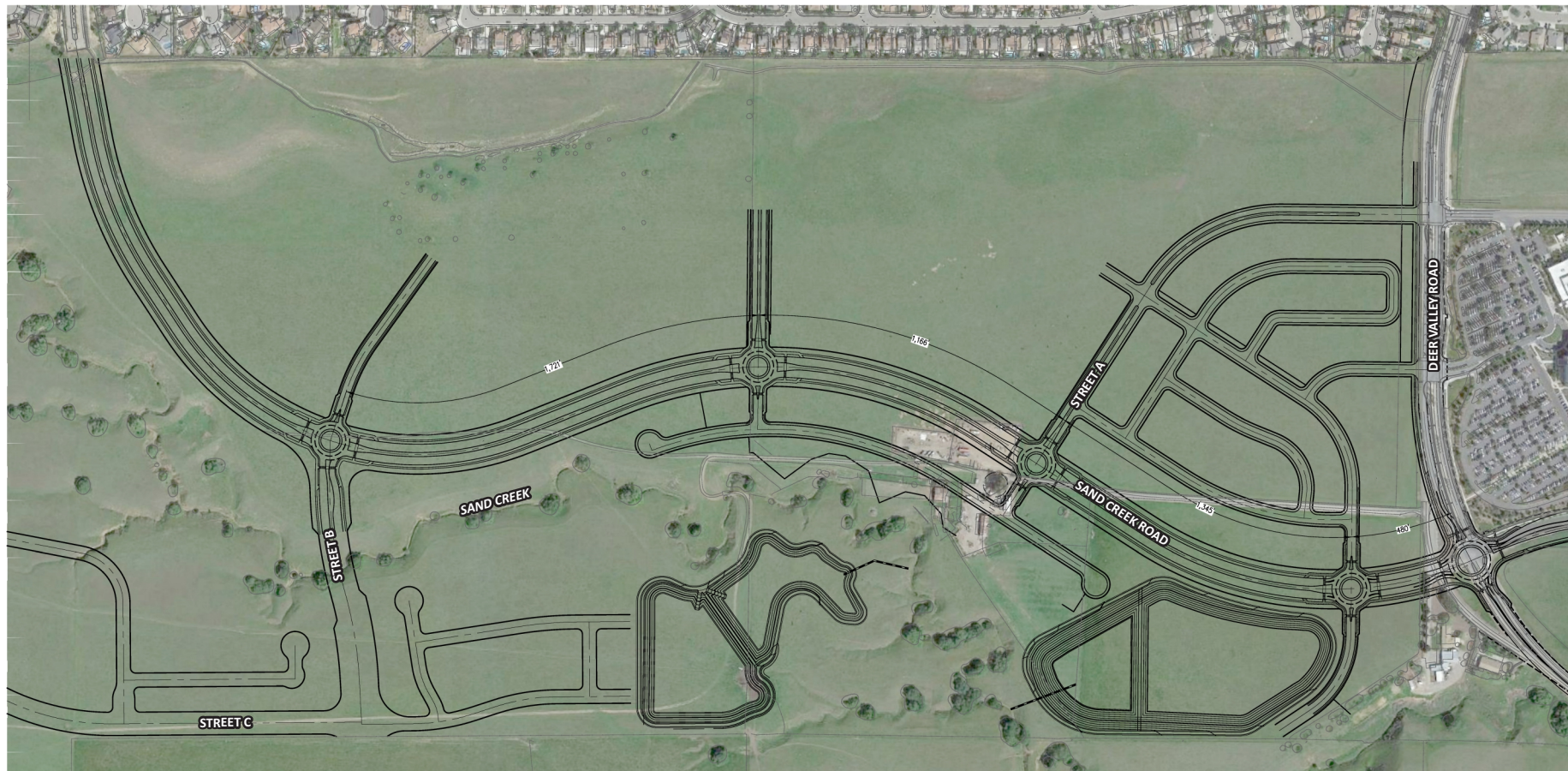
Source: CBG Civil Engineers, March 13, 2020.

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## Exhibit 2-10 On-Site Parks and Open Space

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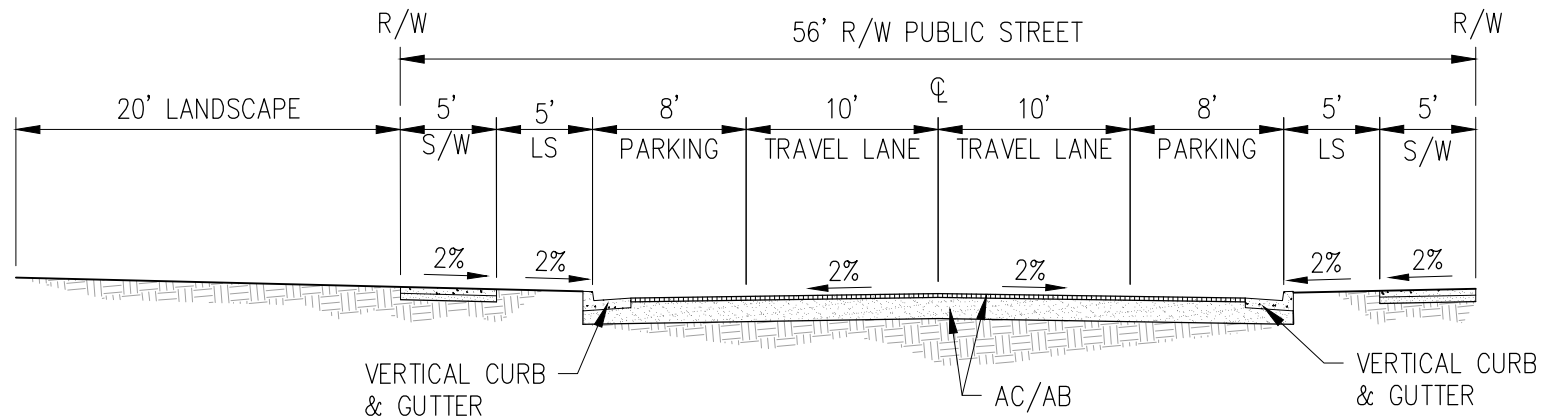
Source: CBG Civil Engineers, January 29, 2019.

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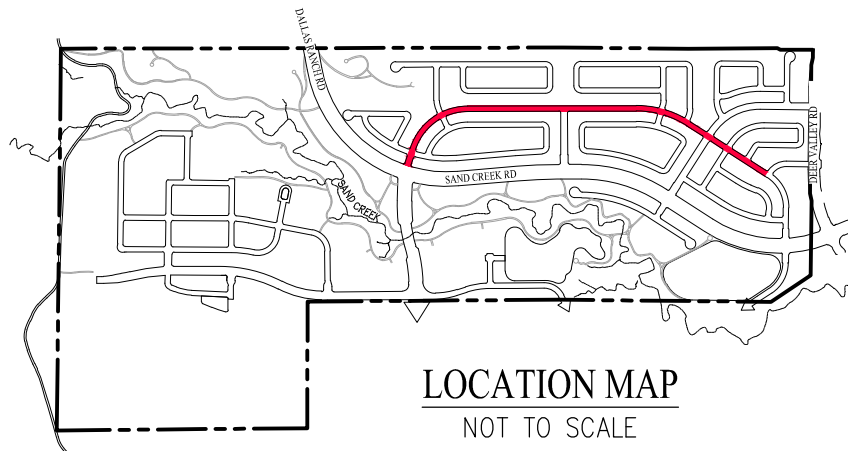


## Exhibit 2-11 Sand Creek Road Roundabouts

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**56' WIDE STREET**  
NOT TO SCALE

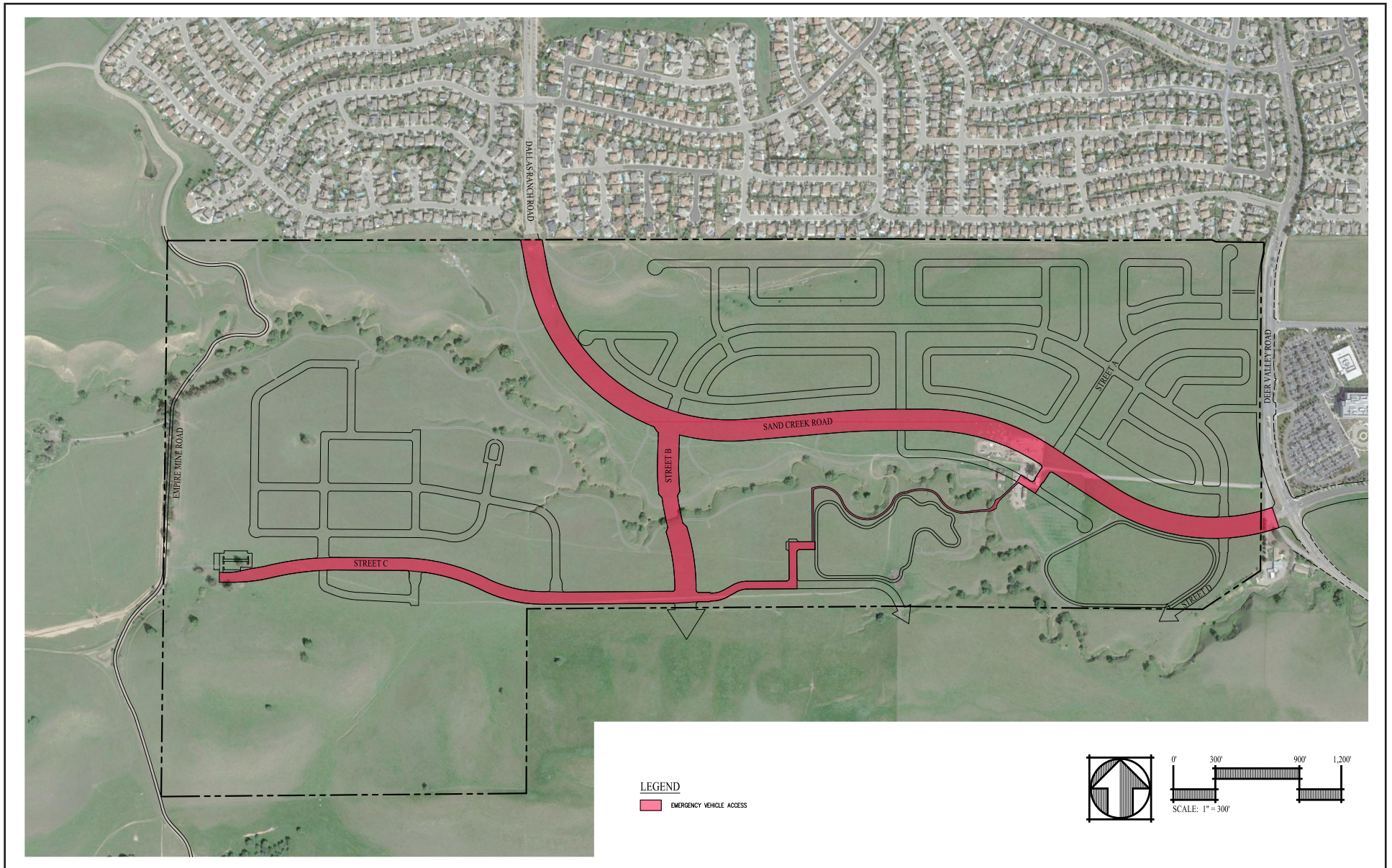


Source: CBG Civil Engineers, April 25, 2019.

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### **2.3.3 - Design, Landscaping, and Lighting**

The proposed project would include design guidelines, to ensure consistency for neighborhood and landscape design associated with future development. The proposed design guidelines would include general guidelines to address neighborhood identity, consistency with future surrounding development, and architectural design. In addition, neighborhood-specific guidelines would be provided for each of the proposed residential neighborhoods, as well as the proposed Village Center area and fire station site. The Development Standards are included herein as Appendix B.

### **2.3.4 - Infrastructure Improvements**

The proposed project would include the provision of water lines, sewer lines, and drainage facilities to serve the proposed project site.

#### **Domestic Water**

The water system for the proposed project would be designed to integrate with existing transmission mains and would complete a looped connection through the proposed project site. Additionally, a connection would be located at the existing 20-inch water main in Deer Valley Road at the future intersection with the extension of Sand Creek Road. Other major streets throughout the proposed project site would contain approximately 8- to 12-inch water lines.

#### **Stormwater Drainage and Detention**

Drainage improvements would include a combination of subsurface and surface drainage systems, including new pipe and channel conveyance systems, as well as culverts. The proposed project would include the construction of storm drainpipes in the proposed Sand Creek Road extension, as well as other streets. All stormwater runoff within the proposed project site would be treated on-site by three proposed stormwater detention basins.

The project site would be split into five drainage management areas (DMAs). Within each DMA, the project would include Integrated Management Practices (IMPs) that provide full bioretention treatment of stormwater runoff. DMAs 1, 2, and 3 would convey stormwater to a bioretention basin in the northeast corner of the project site. This detention basin would treat all stormwater runoff and discharge to the existing 36-inch storm drainpipe in Wellness Way. The existing storm drain line in Wellness Way ultimately discharges to the Upper Sand Creek basin via a twin 84-inch storm drainpipe. The northern portion of the project site north of Sand Creek (DMA 4) would drain into a bioretention basin located between Sand Creek Road and Sand Creek. This detention basin would then discharge treated stormwater into Sand Creek through a new, engineered outfall into Sand Creek.

The southern portion of the project site south of Sand Creek (DMA 5) would drain into a bioretention basin located at the eastern edge of the development south of Sand Creek. This detention basin would treat all stormwater runoff from the South Development Area, and then discharge treated stormwater through a new, engineered outfall into Sand Creek.

Each of the detention basins would provide detention, treatment, and hydromodification. In conjunction with the basins, the project design would incorporate head-of-pipe LID treatments within

individual phases and neighborhoods to provide stormwater treatment on a small scale throughout the entire project. After passing through neighborhood LID facilities, drainage would be collected into a single pipe storm drain system and mix with non-treated stormwater, prior to being routed to the detention basins. In addition to upstream LID treatment of the stormwater, the bioretention component of the basin would be sized to treat all project drainage from developed sheds.

### **Sanitary Sewer**

The proposed project would include the installation of a new sewer main, as well as a number of sewer lines throughout the proposed project site. The connection point for the sewer main would be located approximately 1.50 miles east of the project site in Heidorn Ranch Road. An off-site extension of the existing sewer line would be required to provide the proposed project with sewer service (Exhibit 2-14). All on-site and off-site sewer improvements would be constructed within the public right-of-way or within public utility easements within private roadways as needed.

### **Solid Waste and Recycling Collection**

Republic Services would provide solid waste collection, disposal, recycling, and yard waste services to the project site.<sup>11</sup>

### **Power and Telecommunications**

Electricity service to the project site would be provided by Pacific Gas and Electric (PG&E). All electricity infrastructure would be provided underground and would tie-in to existing infrastructure located at the terminus of Dallas Ranch Road and an existing substation located approximately 0.5-mile south of the existing Hillcrest Avenue/Prewett Ranch Drive intersection. Natural gas service would also be provided underground by PG&E by way of a joint trench that would accommodate all of the gas facilities within the proposed project site. An existing 4- to 6-inch transmission main runs along Deer Valley Road, and another 4- to 6-inch transmission main runs down the middle of Dallas Ranch Road. Each of these mains would be extended into the proposed project site. Additionally, a 30-inch gas line that transects a portion of the project site would be abandoned and removed by PG&E.

The proposed project site is within the Comcast and AT&T service areas. The two companies would provide data and voice communication services to all new development within the project site. Existing distribution lines would be extended to individual parcels within the project site as development occurs. All telecommunication lines would be provided underground and located within public utility easements.

## **2.3.5 - Phasing and Construction**

### **Phasing**

Project construction would occur over several years, as dictated by the economy and demand for new housing in the project area. The project would be constructed in three phases, with the infrastructure and amenities in each phase corresponding to new unit demands. Phasing is broken down into Phase 1A, Phase 1B, Phase 2, and Phase 3. Additionally, grading for each phase would

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<sup>11</sup> Republic Services. Website: <https://www.republicservices.com/locations/california/antioch/94509>. Accessed May 20, 2019.

consist of the following approximate acreages: 78.00 acres for Phase 1A; 60 acres for Phase 1B; 73 acres for Phase 2; and 135 acres for Phase 3. The project would be built out starting from east to west and north to south (Exhibit 2-9). The schedule for phasing is outlined below (Table 2-3) with typical range of home size(s) by phase (Table 2-4).

**Table 2-3: Phasing Schedule**

Phase	Start of Construction	End of Construction
Phase 1	Summer 2021	Fall 2023
Phase 2	Spring 2024	Fall 2026
Phase 3	Spring 2027	Fall 2029

**Table 2-4: Home Size by Phase**

Phase	Conventional	Executive	Age Restricted	Medium Density
Phase 1	2,200 SF–3,200 SF	—	—	2,000 SF–2,400 SF
Phase 2	2,200 SF–3,200 SF	—	—	—
Phase 3	—	2,400 SF–4,000 SF	1,800 SF–2,500 SF	—

Note:  
SF = square feet

## 2.4 - Required Actions and Approvals

### 2.4.1 - City Discretionary Actions

Discretionary approvals and permits are required by the lead agency, the City of Antioch, for implementation of the proposed project and include:

- EIR Certification by City Council.
- Amendment (map and text) to add the “Restricted Development Area” and “Limited Development Area” overlay land use designations to the General Plan for the project site.
- Amendment (map and text) to change the existing underlying General Plan land use designation of the land on the project site within the Restricted Development Area from “Golf Course Community/Senior Housing/Open Space,” “Hillside and Estate Residential,” and “Public/Quasi Public” to “Rural Residential, Agriculture, Open Space.”
- Amendment (map and text) to change the existing underlying General Plan land use designation of the land on the project site within the Limited Development Area from “Golf Course Community/Senior Housing/Open Space” and “Hillside and Estate Residential” to “Estate Residential,” “Low Density Residential,” “Medium Low Density Residential,” “Medium Density Residential,” “Convenience Commercial,” “Mixed Use,” “Public/Quasi Public,” and “Open Space.” (Appendix B)

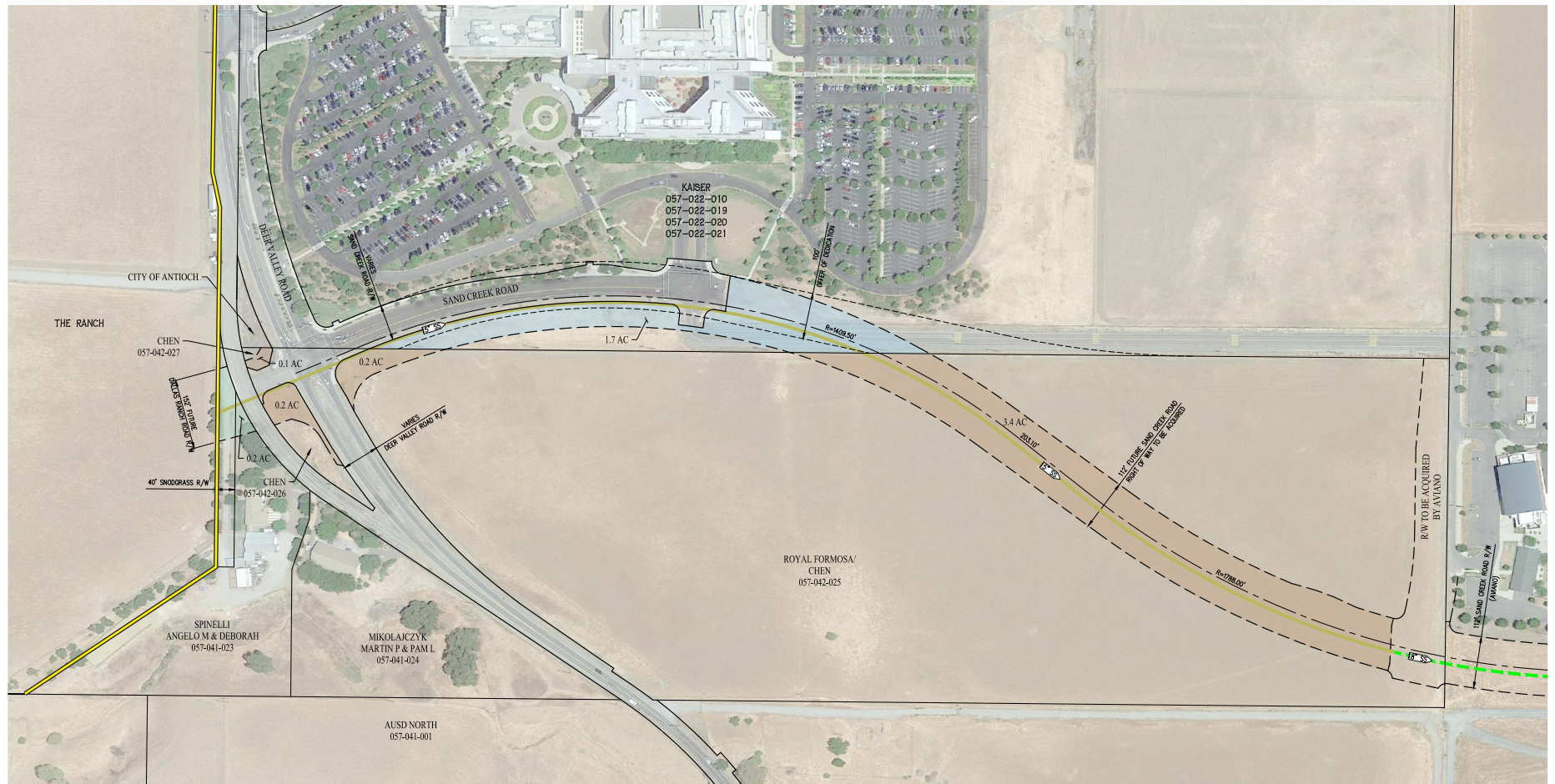
- Amendment to the zoning code (Appendix B) for the project site to update the zoning of the site from “Study District” to “Planned Development” (PD) to allow for the following land uses:
  - Single-Family Low Density (LD-1 LD-2, and LD-3);
  - Single-Family Medium Density (MD-1, MD-2, MD-3 and MD-4);
  - Age-Restricted (AR);
  - Village Center (VC);
  - Rural Residential (RR);
  - Agriculture (A);
  - Public/Quasi Public (PQP);
  - Parks (P);
  - Landscape (L); and
  - Open Space (OS)
- Master Development Plan (MDP): The MDP would supplement the development standards and outlines the layout of the proposed project.
- Design Guidelines The design guidelines would supplement the proposed development standards and serve as a checklist for design review requirements for future builders.
- Resource Management Plan: Pursuant to Section 4.4.6.7(x) of the City of Antioch General Plan, the Applicant would prepare a Resource Management Plan for City approval.
- Development Agreement: The Development Agreement provides the City with benefits the City would not otherwise be entitled to in exchange for assurances for the Applicant that the proposed project can be developed in compliance with the local rules and regulations in effect at the time of submittal by the Applicant.

In addition, the proposed project would require the following discretionary entitlements from the City of Antioch in the future:

- Large Lot Parcel Map: This map would split the project site up into up to five parcels and identify the various phases of the proposed project.
- Tentative Subdivision Map(s);
- Conditional Use Permit(s); and
- Design Review.

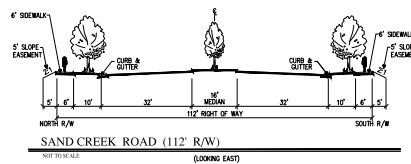
In addition, the proposed project would require the following ministerial entitlements from the City of Antioch in the future:

- Demolition permits
- Grading permits
- Building permits.



**LEGEND:**

- TO BE PURCHASED FROM KAISER - 1.7 AC
- TO BE PURCHASED FROM SPINELLI - 0.2 AC
- TO BE PURCHASED FROM CHEN - 3.9 AC
- THE RANCH PROPERTY LINE
- LOT LINE
- EXISTING RIGHT OF WAY
- FUTURE RIGHT OF WAY
- CENTERLINE
- EXISTING SANITARY SEWER TRUNK MAIN
- PROPOSED SANITARY SEWER TRUNK MAIN CONNECTION



Source: CBG Civil Engineers, February 28, 2019.

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## 2.4.2 - Other Agency Approvals

The proposed project would also require the additional approvals and/or permits from a number of local, State, and federal agencies that are Responsible and Trustee Agencies, pursuant to CEQA Guidelines Section 15381 and Section 15386, respectively: These agencies and permits may include but are not limited to:

- California Department of Fish and Wildlife (CDFW)—1602 Streambed Alteration Permit; Incidental Take Permit
- Contra Costa Water District (CCWD)—Will Serve Letter
- Bay Area Air Quality Management District (BAAQMD)—Authority to Construct
- Central Valley Regional Water Quality Control Board (Central Valley RWQCB)—401 Certification
- United States Army Corps of Engineers (USACE)—Nationwide Permit (404)
- United States Fish and Wildlife Service (USFWS)—Incidental Take Permit(s)

## 2.5 - Intended Uses of This Draft EIR

This Draft EIR is being prepared by the City of Antioch to assess the potential environmental impacts that may arise in connection with actions related to implementation of the proposed project. Pursuant to CEQA Guidelines Section 15367, the City of Antioch is the lead agency for the project and has discretionary authority over the project and project approvals. The Draft EIR is intended to address proposed public infrastructure improvements and all future development within the parameters of the proposed project. This document will also serve as a basis for soliciting comments and input from members of the public and public agencies regarding the proposed project. The Draft EIR will be circulated for a minimum of 45 days, during which period comments concerning the analysis contained in the Draft EIR should be sent to:

Alexis Morris, Planning Manager  
City of Antioch  
Community Development Department  
P.O. Box 5007  
Antioch, CA 94531-5007  
Phone: 925.779.7035  
Email: amorris@ci.antioch.ca.us

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## CHAPTER 3: ENVIRONMENTAL IMPACT ANALYSIS

### Organization of Issue Areas

This chapter sets forth the physical and regulatory environmental setting and addresses the environmental impacts of the proposed project with respect to 15 environmental resource areas. The discussions of the environmental setting describe the present physical conditions, or baseline conditions, in the project area. The baseline used for the analysis of environmental impacts under the California Environmental Quality Act (CEQA) reflects the conditions present at the time the Notice of Preparation (NOP) for this Draft Environmental Impact Report (Draft EIR) was published. The potential impacts of the proposed project are compared against the existing baseline conditions for each environmental resource.

### Environmental Topics Addressed in this Draft EIR

The proposed project is analyzed in this Draft EIR from the perspective of the following 15 environmental resource areas:

- Aesthetics
- Agricultural Resources and Forestry Resources
- Air Quality
- Biological Resources
- Cultural and Tribal Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions and Energy
- Hazards, Hazardous Materials, and Wildfire
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services and Recreation
- Transportation
- Utilities and Service Systems

### Format of the Environmental Analysis

Each resource area analyzed in this chapter includes the subsections summarized below.

#### Introduction

This subsection summarizes what will be discussed in the respective environmental topic section, states what informational documents are used as the basis for the section, and indicates what related comments, if any, were received during the EIR public scoping period.

#### Environmental Setting

This subsection describes the existing, baseline physical conditions of the project site and surroundings (e.g., existing land uses, transportation conditions, noise environment) with respect to each resource topic at the time the NOP was issued. Conditions are described in sufficient detail and breadth to allow a general understanding of the environmental impacts of the proposed project.

## Regulatory Framework

This subsection describes the relevant federal, State, and local regulatory requirements that are directly applicable to the environmental topic being analyzed.

## Impacts and Mitigation Measures

This subsection evaluates the potential for the proposed project to result in direct and indirect adverse impacts on the existing physical environment, with consideration of both short-term and long-term impacts. The analysis covers all phases of the proposed project, including construction and operation. The significance thresholds for environmental impacts are defined at the beginning of this subsection, and the discussion of the approach to the analysis explains how the significance thresholds have been applied to evaluate the impacts of the proposed project.

Indirect impacts are discussed only for those resources for which they have the potential to occur (e.g., population and housing, cultural resources, air quality, and biological resources). Both project-level and cumulative impacts are analyzed. Project-level impacts could result from actions related to implementation of the proposed project. Cumulative impacts could result from implementation of the proposed project in combination with other cumulative projects in the study area. As discussed under “Cumulative Impacts,” below, the projects listed in Table 3-1, in conjunction with the proposed project, are considered the cumulative scenario for the analysis of cumulative impacts.

Impacts are analyzed and the respective assessment and findings are included in this Draft EIR, applying the following levels of significance:

- **No Impact.** A conclusion of No Impact is reached if no potential exists for impacts or if the environmental resource does not occur in the project area or the area of potential impacts.
- **Less Than Significant.** This determination applies if the impact does not exceed the defined significance criteria or would be eliminated or reduced to a less than significant level through compliance with existing local, State, and federal laws and regulations, or through the implementation of mitigation.
- **Significant and Unavoidable.** This determination applies if the proposed project would result in an adverse impact that exceeds the established significance criteria. While feasible mitigation may be available to reduce impacts, the residual impact would be significant and unavoidable.

Impacts are defined in terms of their context and intensity. Context is related to the uniqueness of a resource; intensity refers to the severity of the impact. Where applicable, best management practices or project improvement measures, or both, are incorporated into the proposed project to limit the potential for a significant impact. Where necessary, mitigation measures are identified for significant impacts to limit the degree or lower the magnitude of the impact; rectify the impact by repairing, rehabilitating, or restoring the affected environment; or compensate for the impact by replacing or providing substitute resources or environments. These impacts conclude with a finding of Less than Significant Impact with Mitigation. Where no mitigation measures are necessary, relevant impacts are concluded to be Less than Significant or to have No Impact.

As part of the impact analysis, mitigation measures are identified, where feasible, for impacts considered significant or potentially significant consistent with CEQA Guidelines Section 15126.4, which states that an EIR “shall describe feasible measures which could minimize significant adverse impacts.” CEQA requires that mitigation measures have an essential nexus and be roughly proportional to the significant impact identified in the EIR. The Applicant is required to implement all identified mitigation measures identified in this chapter, and the lead agency (in this case, the City of Antioch) is responsible for overseeing the Applicant’s implementation of such mitigation measures.

Pursuant to CEQA Guidelines Section 15126.4, mitigation measures are not required for environmental impacts that are found not to be significant. Therefore, for resource topics where this Draft EIR finds the physical environmental impact of the proposed project to be less than significant, but for which the City of Antioch has identified measures that would further lessen the proposed project’s already less than significant impacts, these measures have been identified as “improvement measures.” The Applicant has indicated that if the proposed project were approved, it would incorporate all improvement measures identified in this Draft EIR as part of the proposed project.

Impacts are numbered and shown in bold type. The corresponding mitigation measures, where identified, are numbered and indented, and follow the impact statements. Impacts and mitigation measures are numbered consecutively within each topic and include an abbreviated reference to the impact section (e.g., “LAND” for Land Use and Planning). The following abbreviations are used for individual topics:

- Aesthetics (AES)
- Agricultural Resources and Forestry Resources (AG)
- Air Quality (AIR)
- Biological Resources (BIO)
- Cultural and Tribal Cultural Resources (CUL)
- Geology and Soils (GEO)
- Greenhouse Gas Emissions and Energy (GHG)
- Hazards, Hazardous Materials, and Wildfire (HAZ)
- Hydrology and Water Quality (HYD)
- Land Use and Planning (LAND)
- Noise (NOI)
- Population and Housing (POP)
- Public Services and Recreation (PUB)
- Transportation (TRANS)
- Utilities and Service Systems (UTIL)

## Cumulative Impacts

The discussion of cumulative impacts in this subsection analyzes the cumulative impacts of the proposed project, taken together with other past, present, and reasonably foreseeable future projects producing related impacts. The goal of this analysis is to determine whether the overall long-term impacts of all such projects would be cumulatively significant, and to determine whether the proposed project itself would cause a “cumulatively considerable” incremental contribution to any such

cumulatively significant impacts. To determine whether the overall long-term impacts of all such projects would be cumulatively significant, the analysis generally considers the following factors:

- The area in which impacts of the project would be experienced;
- The impacts of the project that are expected in the area;
- Other past, proposed, and reasonably foreseeable projects that have had or are expected to have impacts in the same area;
- The impacts or expected impacts of these other projects; and
- The overall impact that can be expected if the individual impacts from each project are allowed to accumulate.

“Cumulative impacts” refers to two or more individual impacts that, when considered together, are potentially significant, or that compound or increase other environmental impacts (CEQA Guidelines § 15355). Cumulative impacts can result from individually minor but collectively significant impacts taking place over time (40 Code of Federal Regulations [CFR] 1508.7). If the analysis determines that the potential exists for the project, taken together with other past, present, and reasonably foreseeable future projects, to result in a significant or adverse cumulative impact, the analysis then determines whether the project’s incremental contribution to any significant cumulative impact is itself significant (i.e., “cumulatively considerable”). The cumulative impact analysis for each individual resource topic is presented in each resource section of this chapter immediately after the description of the project-related impacts and identified mitigation measures.

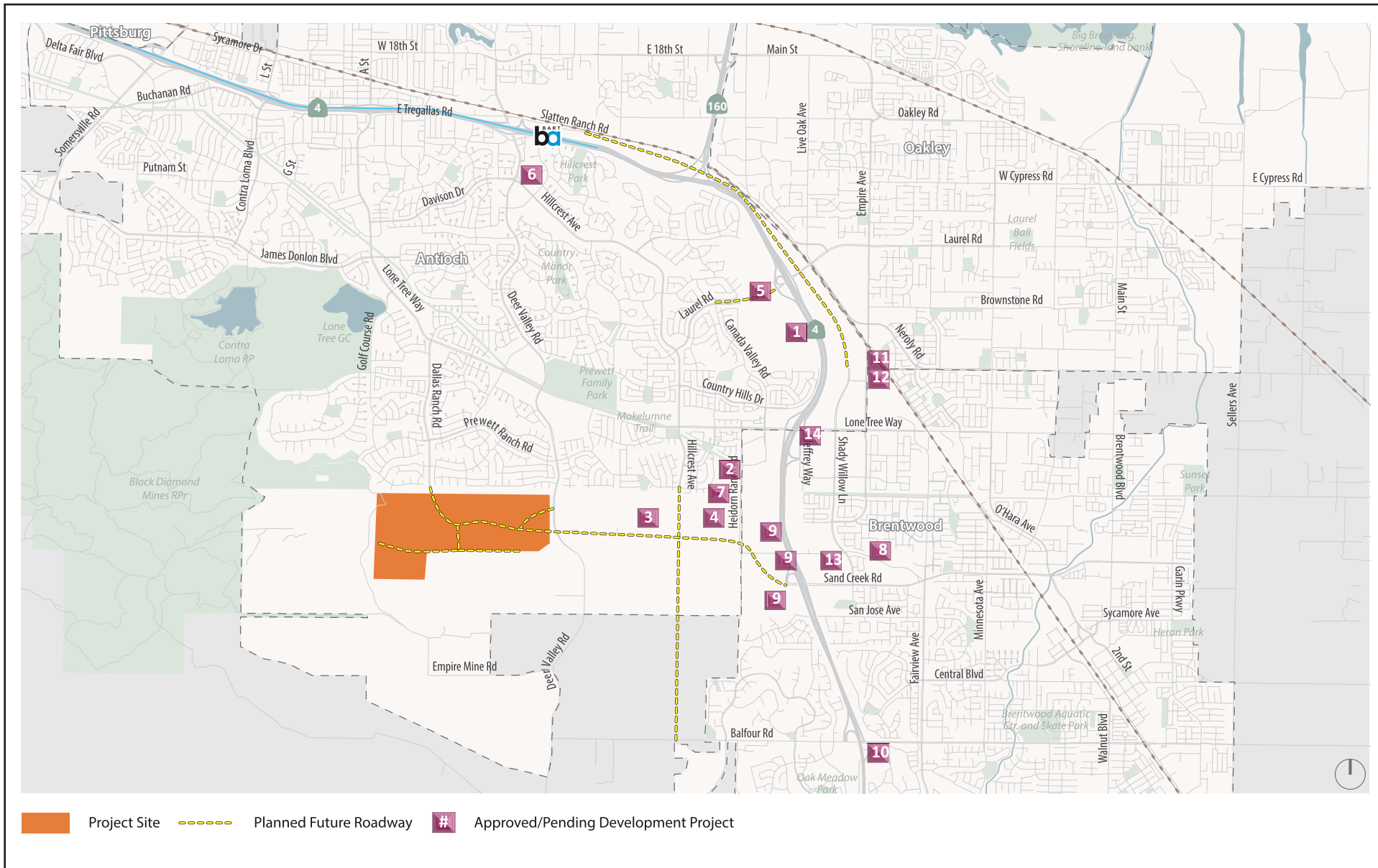
A lead agency may use a list of past, present and probable future projects or a summary of projects contained in an applicable plan to analyze a project’s cumulative impacts. For this Draft EIR, the City has elected to analyze a list of projects with the City’s jurisdiction, as well as within the City of Brentwood. Table 3-1 lists the relevant cumulative projects considered for the environmental analysis and Exhibit 3-1 shows the location of the cumulative projects.

**Table 3-1: List of Cumulative Projects**

No.	Project	Characteristics	Project Development			
			Number of Units	Square Footage or Acreage	Location	Status
City of Antioch						
1	Park Ridge	Single-family detached dwelling units	525 single-family	171 Acres	Antioch, CA	Approved, under construction
2	Heidorn Village	Single-family detached dwelling units	117 single-family	20 Acres	Antioch, CA	Approved, under construction
3	Aviano	Single-family detached dwelling units	533 single-family	189 Acres	Antioch, CA	Approved
4	Vineyard at Sand Creek	Single-family detached dwelling units	641 single-family	141 Acres	Antioch, CA	Approved, under construction

**Table 3 1: List of Cumulative Projects**

No.	Project	Characteristics	Project Development			
			Number of Units	Square Footage or Acreage	Location	Status
5	Laurel Ranch	Single-family detached dwelling units	180 single-family	54 Acres	Antioch, CA	Approved
6	Wildflower	Single-family detached dwelling units, condominiums, commercial	22 single-family, 98 condominiums	10 acres of commercial use	Antioch, CA	Approved, under construction
7	Quail Cove	Single-family detached dwelling units	32 units	5.6 Acres	Antioch, CA	Approved, awaiting construction
<b>City of Brentwood</b>						
8	Parkside Villas	Single-family detached dwelling units	37 single-family dwelling units	—	Brentwood, CA	Approved
9	Bridle Gate Residential Elementary School	Single-family detached dwelling units, elementary school	265 single-family, 700 student school	—	Brentwood, CA	Pending Pending
9	Bridle Gate Commercial	Shopping Center	n/a	150,000 square-feet shopping center	Brentwood, CA	Pending
9	The Enclave	Single-family detached dwelling units	258 apartments	—	Brentwood, CA	Pending
10	Brentwood Country Club	Detached active adult dwelling units	63 active adult	—	Brentwood, CA	Approved
11	Orfanos	Single-family detached dwelling units	160 single-family	—	Brentwood, CA	Approved
12	Alvarez Partners	Single-family dwelling units	48 single-family	—	Brentwood, CA	Approved
13	Streets of Brentwood	Apartments, retail	320 apartments	32,000 square feet of retail	Brentwood, CA	Pending
14	Shop at Lone Tree Village	Shopping center	n/a	54,000 square feet of retail	Brentwood, CA	Pending
<b>Total Units/Square footage</b>				3,299 units/236,000 square feet	—	—



Source: Fehr + Peers

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## Exhibit 3-1 Cumulative Projects Location Map

## 3.1 - Aesthetics

### 3.1.1 - Introduction

This section describes the existing aesthetics, light, and glare conditions in the project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to aesthetics that could result from implementation of the proposed project. Information included in this section is based, in part, on-site reconnaissance and photo inventory, visual simulations prepared specifically for the project and included in this section, as well as the City of Antioch General Plan and City of Antioch General Plan Environmental Impact Report (EIR). No public comments were received during the EIR scoping period related to aesthetics.

### 3.1.2 - Environmental Setting

#### Visual Character

Visual character in the California Environmental Quality Act (CEQA) context is an impartial description of the defining physical features, landscape patterns, and distinctive physical qualities within a landscape. Visual character is informed by the composition of land, vegetation, water, and structure and their relationship (or dominance) to one another, and by prominent elements of form, line, color, and texture that combine to define the composition of views. Visual character-defining resources and features within a landscape may derive from notable landforms, vegetation, land uses, building design and façade treatments, transportation facilities, overhead utility structures and lighting, historic structures or districts, or panoramic open space.

#### ***Contra Costa County***

Contra Costa County includes a variety of topographical features such as the San Francisco Bay Delta Estuary, and is within the Central Coast Range Geomorphic Province of California. The County covers a total of 805 square miles of land and water. The elevation of Contra Costa County ranges from 98 feet below sea level to 3,849 above sea level. The topography includes low lying and relatively flat coastal terrain from the San Francisco Bay Delta Estuary to major ridgelines along the Diablo Range, a subdivision of the Pacific Coast Ranges. Mount Diablo rises to an elevation of 3,849 feet above mean sea level making it the most prominent topographical feature in the County.

The physical environment of the County ranges from urban to rural with the western and central county areas characterized by urban and suburban city development, and the eastern County area characterized primarily by agricultural and open space areas.

#### ***City of Antioch***

The City of Antioch is located in eastern Contra Costa County and is bordered to the north by the San Joaquin River Delta; to the east by the City of Brentwood and the City of Oakley; to the west by the City of Pittsburg and unincorporated portions of the County; and to the south by unincorporated portions of the County. The topography includes low lying and relatively flat coastal terrain from the San Joaquin River to hills and ridgelines in the southern portion of the City. The summit of Mount Diablo is visible to the southwest of the City. The northern and central portion of the City is

characterized by urban and suburban development, and the southern portion of the City is characterized primarily by undeveloped areas.

### ***Project Site***

The project site is primarily undeveloped and located in a developing area of the City of Antioch within the Sand Creek Focus Area. The visual character of the project site is characterized by seasonal and non-native grasses, Sand Creek, and relatively flat elevation, with steeper slopes adjacent to the creek banks and in the hills in the southwestern portion of the site. Mount Diablo is located approximately 6.50 miles to the southwest of the project site. The visual character directly adjacent to the project site is composed of single-family homes and fencing to the north, the approximately 6.80 acre Kaiser Permanente Antioch Medical Center to the east, and undeveloped open space to the south and west. In addition, the project site is located adjacent to Deer Valley Road and Empire Mine Road.

### **Scenic Resources**

Scenic resources typically involve prominent, unique, and identifiable natural features in the environment (e.g., trees, rock outcroppings, islands, ridgelines, channels of water, and aesthetically appealing open space) and cultural features or resources (e.g., regional or architecturally distinctive buildings, or structures that serve as a focal point of interest).

### ***Contra Costa County***

The Open Space Element of the Contra Costa County General Plan 2025 identifies the main scenic resources within the County as the scenic ridges, hillsides, and rock outcroppings, such as Shell Ridge and Lime Ridge, as well as the San Francisco Bay Delta Estuary system.<sup>1</sup>

### ***City of Antioch***

Views of Mount Diablo, ridgelines, and the San Joaquin River from locations that are accessible to the public are important resources for the City.<sup>2</sup> The City of Antioch General Plan designates landmarks within the City because they provide prominent visual features and focal points within the City. Designated landmarks within the City include the San Joaquin River, Mount Diablo, Antioch Bridge, and other historical buildings described in the General Plan.<sup>3</sup>

### ***Project Site***

The project site does not contain any General Plan designated scenic resources. However, the project site is bound by Deer Valley Road on the east, a designated important view corridor by the Antioch General Plan, providing views of Mount Diablo.

### **Views**

Views may be generally described as panoramic views of a large geographic area for which the field of view can be wide and extend into the distance. Associated vantage points provide an orientation

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<sup>1</sup> Contra Costa County. 2005. Contra Costa County General Plan 2005–2020.

<sup>2</sup> LSA Associates. 2003. City of Antioch General Plan Update, page 5-5.

<sup>3</sup> Ibid.

from publicly accessible locations. Examples of distinctive views include urban skylines, valleys, mountain ranges, or large bodies of water.

### **Contra Costa County**

Mount Diablo is the most prominent topographical feature in the area. Shell Ridge and Lime Ridge, located in the western portion of the County, are both designated as scenic ridgeways by the Contra Costa County General Plan 2025. Intervening development, vegetation, and the flat topography of the project site obscure views of Shell Ridge, and Lime Ridge from the project site.

### **City of Antioch**

The City of Antioch General Plan designates important view corridors as public spaces and natural ridgelines and landmarks, such as Mount Diablo and distant hills, local ridgelines, the San Joaquin River, and other water bodies, as view corridors. Important view corridors to be protected include Somersville Road, Lone Tree Way, Hillcrest Avenue, State Route 4 (SR-4), SR-160, James Donlon Boulevard, Deer Valley Road, and Empire Mine Road.<sup>4</sup>

### **Project Site**

Exhibit 3.1-1 identifies and describes specific viewpoint locations near the project site that provide a representative cross-section of visual images and information about the existing aesthetic conditions of the immediate surrounding area. These locations represent publicly accessible views that may be seen by a variety of observers in the area, ranging from motorists and pedestrians traveling along local streets or Deer Valley Road, located east of the project site, to pedestrians walking along the trails in the Black Diamond Mines Regional Preserve. As summarized in Table 3.1-1, there are various publicly accessible locations in the City of Antioch and Contra Costa County area with views toward and/or through the project site.

**Table 3.1-1: Summary of Viewpoint Locations for Existing Views**

Viewpoint Location	View Description
1	Looking south from Empire Mine Road.
2	Looking west at a section of Sand Creek.
3	Looking east at an existing windmill near the former Judsonville site.
4	Looking southwest at the project site from Deer Valley Road.
5	Looking southwest at the existing on-site barn structure.
6	Looking northwest at the residential development along the northern border of the project site.
7	Looking south at the three-way intersection on Deer Valley Road.
8	Looking east at Kaiser Permanente Antioch Medical Center from the project site.
Source: FCS 2019	

<sup>4</sup> LSA Associates. 2003. City of Antioch General Plan Update, page 5-5.

*Viewpoint Location 1—Existing view from Location 1 looking south from Empire Mine Road*

This viewpoint is located on Empire Mine Road at the western boundary of the project site looking south as shown in Exhibit 3.1-2. Views from this viewpoint are of the western boundary of the project site composed of a hillside with grasses, several trees, and fencing along Empire Mine Road.

*Viewpoint Location 2—Existing view from Location 2 looking west at a section of Sand Creek*

This viewpoint is located in the northwestern portion of the project site on the bank of Sand Creek looking west across the project site as shown in Exhibit 3.1-3. Views from this viewpoint are of the western portion of the project site composed of Sand Creek, grasses, a large hill, and multiple large trees along either side of Sand Creek.

*Viewpoint Location 3—Existing view from Location 3 looking east at an existing windmill near the former Judsonville site*

This viewpoint is located in the western portion of the project site near the former Judsonville site as shown in Exhibit 3.1-4. Views from this viewpoint are of the western and central portion of the project composed of a windmill, grasses, a hill, and trees.

*Viewpoint Location 4—Existing view from Location 4 looking southwest at the project site from Deer Valley Road*

This viewpoint is located on the western side of Deer Valley Road looking west across the project site toward Mount Diablo as shown in Exhibit 3.1-5. Views from this viewpoint show rolling hills on the project site, trees, and Mount Diablo in the background.

*Viewpoint Location 5—Existing view from Location 5 looking southwest at the existing on-site barn structure*

This viewpoint is located within the eastern portion of the project site at the existing barn structure as shown in Exhibit 3.1-6. Views from this viewpoint are of the barn structure and surrounding hillsides.

*Viewpoint Location 6—Existing view from Location 6 looking northwest at the residential development along the northern border of the project site*

This viewpoint is located at the northeastern boundary of the project site looking northwest as shown in Exhibit 3.1-7. Views from this viewpoint are of grasses and vegetation on the project site and single-family homes adjacent to the north of the project site boundary.

*Viewpoint Location 7—Existing view from Location 7 looking south at the three-way intersection on Deer Valley Road*

This viewpoint is located at the intersection of Deer Valley Road and Wellness Way looking south as shown in Exhibit 3.1-8. Views from this viewpoint are of Deer Valley Road, vehicles, a portion of the Kaiser Permanente Antioch Medical Center, grasses and vegetation on the project site, and hills and ridgelines in the background.



Source: Raney Planning & Management, Inc., March 2018.

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Source: Raney Planning & Management, Inc., March 2018.

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Exhibit 3.1-2  
Existing View from Location 1  
Looking South from Empire Mine Road

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Source:

Exhibit 3.1-3

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Existing View from Location 2  
Looking West at a section of Sand Creek

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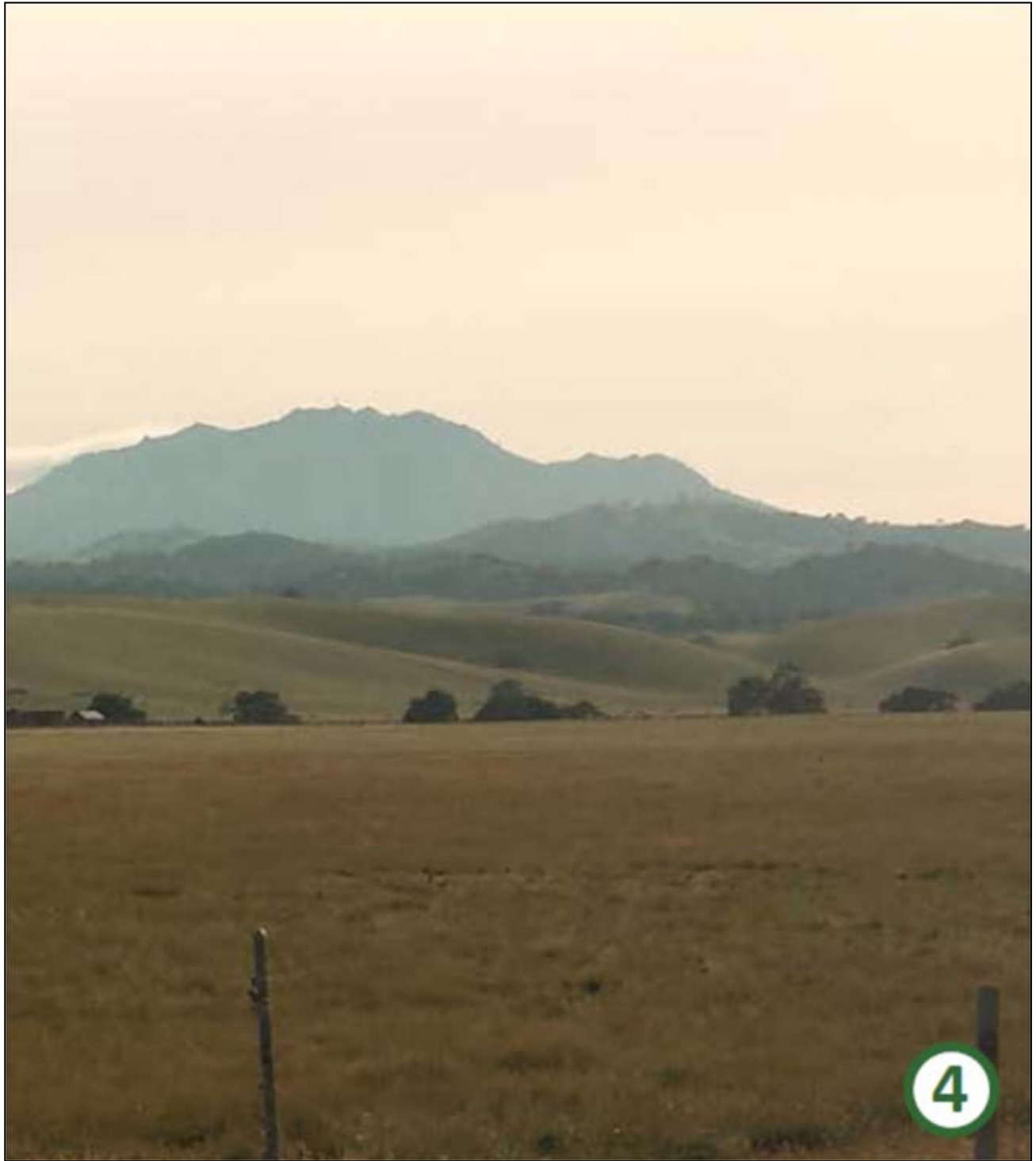
Source: Raney Planning & Management, Inc., March 2018.

Exhibit 3.1-4

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Existing View from Location 3 - Looking East at an  
Existing Windmill near the Former Judsonville site

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Source: Raney Planning & Management, Inc., March 2018.

Exhibit 3.1-5

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Existing View from Location 4 - Looking Southwest  
at the Project Site from Deer Valley Road

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Source: Raney Planning & Management, Inc., March 2018.



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Source: Raney Planning & Management, Inc., March 2018.

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Exhibit 3.1-7  
Existing View from Location 6 - Looking Northwest  
at the Residential Development Along the Northern Border

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Source: Raney Planning & Management, Inc., March 2018.

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Exhibit 3.1-8  
Existing View from Location 7 - Looking South  
at the Three-Way Intersection on Deer Valley Road

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*Viewpoint Location 8—Existing view from Location 8 looking east at Kaiser Permanente Antioch Medical Center from the project site*

This viewpoint is located on the project site's eastern boundary just south of Sand Creek Road looking east as shown in Exhibit 3.1-9. Views from this viewpoint are of the Kaiser Permanente Antioch Medical Center, Deer Valley Road, and landscaping.

### **Light and Glare**

In the context of CEQA Guidelines, light is nighttime illumination that stimulates sight and makes things visible, and glare is difficulty seeing in the presence of bright light such as direct or reflected sunlight.

### **Project Site Vicinity**

The primary sources of nighttime light in the surrounding area are from vehicle headlights traveling along Deer Valley Road as well as exterior lighting associated with the residences to the north and the Kaiser Permanente Antioch Medical Center to the east.

### **Project Site**

The project site is primarily undeveloped with the exception of existing structures, including a single-family residence and various barns and outbuildings located on the eastern portion of the site. Existing lighting on the project site is from the exterior lighting associated with the on-site structures.

## **3.1.3 - Regulatory Framework**

### **Federal**

No federal plans, policies, regulations, or laws related to aesthetics are applicable to the project.

### **State**

#### ***California Scenic Highway Program***

The State Legislature created the California Scenic Highway Program, maintained by the California Department of Transportation (Caltrans), in 1963. The purpose of the State Scenic Highway Program is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, Sections 260 through 263. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been officially designated. The status of a proposed State Scenic Highway changes from eligible to officially designated when the local governing body applies to Caltrans for scenic highway approval, adopts a Corridor Protection Program, and receives notification that the highway has been officially designated a Scenic Highway.

#### ***Title 24 of the California Code of Regulations Building Energy Efficiency Standards***

California Building Code (California Code of Regulations [CCR], Title 24)—including Title 24, Part 6—includes Section 132 of the Building Energy Efficiency Standards, which regulates lighting

characteristics, such as maximum power and brightness, shielding, and sensor controls to turn lighting on and off. Different lighting standards are set by classifying areas by lighting zone. The classification is based on population figures of the 2000 Census. Areas can be designated as LZ1 (dark), LZ2 (rural), or LZ3 (urban). Lighting requirements for dark and rural areas are stricter in order to protect the areas from new sources of light pollution and light trespass.

## Local

### ***City of Antioch General Plan***

#### *Land Use Element*

The City of Antioch General Plan Land Use Element establishes the following goals and policies related to aesthetics:

#### *General Plan Land Use Element*

- **Policy 4.4.6.7b.k:** A maximum of 4,000 dwelling units may be constructed within the Sand Creek Focus Area. Appropriate density bonuses may be granted for development of age-restricted housing for seniors; however, such density bonuses may not exceed the total maximum of 4,000 dwelling units for the Sand Creek Focus Area.
- **Policy 4.4.6.7b.l:** It is recognized that although the ultimate development yield for the Focus Area may be no higher than the 4,000 dwelling unit maximum, the actual development yield of the Sand Creek Focus Area will depend on the nature and severity of biological, geologic, and other environmental constraints present within the Focus Area, including, but not limited to constraints posed by slopes and abandoned mines present within portions of the Focus Area; on appropriate design responses to such constraints, and on General Plan policies. Such policies include, but are not limited to, identification of appropriate residential development types, public services and facilities performance standards, environmental policies aimed at protection of natural topography, substantial open space and environmental resources, policies intended to protect public health and safety, and implementation of the Resource Management Plan called for in Policy “u” below.
- **Policy 4.4.6.7b.s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the Sand Creek Focus Area east of Deer Valley Road shall be preserved in open space, exclusive of lands developed for golf course use.
- **Policy 4.4.6.7b.t:** Adequate buffer areas adjacent to the top of banks along Sand Creek to protect sensitive plant and amphibian habitats and water quality shall be provided. Adequate buffer areas shall also be provided along the edge of existing areas of permanently preserved open space adjacent to the Sand Creek Focus Area, including but not limited to the Black Diamond Mines Regional Park. Buffers established adjacent to existing open space areas shall be of an adequate width to minimize light/glare, noise, fire safety, and public safety, habitat, and public access impacts within the existing open space areas, consistent with the provisions of Section 10.5, Open Space Transitions and Buffers Policies of the General Plan.



Source: Raney Planning & Management, Inc., March 2018.

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Exhibit 3.1-9  
Existing View from Location 8 - Looking East  
at Kaiser Permanente Antioch Medical Center from the Project Site

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- **Policy 5.4.2a:** Base the City’s review of public and private projects on the following general design principles:
  - Innovative design, regardless of its style, is more important to the achievement of “quality” than the use of predetermined themes.
  - “High quality” comes from the explicit consideration of all aspects of development design. It is in the design details that “quality” is ultimately manifested.
  - Designers need to respect community goals and needs, as well as address their client’s economic objectives.
  - Individual buildings and developments are not isolated entities, but are a part of a larger district and community into which they must fit. While innovation and individual expression are sought, compatibility of design elements is also important.
  - Standardized design solutions, “corporate architecture” and “off the shelf models” cannot always be depended upon. What worked before or was accepted elsewhere may not work or be acceptable in the proposed application in Antioch.
  - Architectural styles, landscaping, and project amenities should complement surrounding development, and convey a sense of purpose, not expediency.
  - All building elevations visible to the public should be given equal attention and detail.
  - The same design solution, no matter how well done, when repeated too often or over too large an area, can become boring, lose its effectiveness, and no longer communicate “quality.”
- **Policy 5.4.2b:** Incorporate Antioch’s “Gateway to the Delta” theme and reminders of its community heritage into the design of new residential, commercial, employment-generating, and recreational development, as well as into public facilities.
  - Incorporate nautical/waterway, gateway/entry, industrial or ranching themes into the design details of new developments and community facilities, such as building architecture, signage, lighting standards, site paving and landscaping, street furniture (e.g., benches, trash enclosures, and receptacles), fencing, and placement of murals and sculpture in public locations.
  - Maintain a consistent design theme throughout each development project. Each individual development project and area within the project should portray an identifiable design theme.
  - Select tree species that are appropriate to their specific applications (e.g., providing shade, framing long-distance views of the San Joaquin River or Mount Diablo, or framing short-distance views of new development).
- **Policy 5.4.2c:** Maintain view corridors from public spaces to natural ridgelines and landmarks, such as Mount Diablo and distant hills, local ridgelines, the San Joaquin River, and other water bodies.
  - Recognizing that new development will inevitably result in some loss of existing views, as part of the City’s review of development and commercial and industrial landscape plans, minimize the loss of views from public spaces.
  - Important view corridors to be protected include Somersville Road, Lone Tree Way, Hillcrest Avenue, SR-4, SR-160, James Donlon Boulevard, Deer Valley Road, and Empire Mine Road.
- **Policy 5.4.2d:** Strengthen and emphasize community focal points, visual landmarks, and features contributing to Antioch’s identity using design concepts and standards implemented through the zoning ordinance, design guidelines and design review process, and specific plan and planned community documents.

- **Policy 5.4.2e:** Create a framework of public spaces at the neighborhood, community, and regional scale.
  - Provide for new open space opportunities throughout the City, especially in neighborhoods having minimal access to open space. This includes exploring the potential for creek corridors, bicycle and pedestrian paths, and new small open space and conservation areas.
  - Provide an open space network linked by pedestrian and bicycle paths, which preserves and enhances Antioch's significant visual and natural resources.
  - Provide sitting areas within parks and along pedestrian and bicycle paths.
  - Utilize existing creeks, such as Sand Creek, as linear parks, providing pedestrian and bicycle paths.
  - Views along utility corridors should be retained and enhanced through the use of planting materials to frame and focus views and to provide a sense of orientation.
- **Policy 5.4.2f:** Provide for consistent use of street trees to identify City streets, residential neighborhoods, commercial and employment districts, and entry points to the City.
  - Select species to enhance the pedestrian character of, and convey a distinctive and high quality visual image for the City's streets; are drought-tolerant, fire- and pest-resistant; and complement existing street trees.
  - Use changes in tree species, scale, color and spacing to differentiate the roadway types identified in the Circulation Element.
  - Use a consistent palette of street trees to distinguish Antioch from other communities, and to distinguish individual areas within the community (e.g., Rivertown, East Lone Tree, "A" Street Corridor) from each other.
  - Street trees should relate to the scale, function, and visual importance of the area in which they are located, establishing a hierarchy of street trees for entry locations, intersections, and activity centers.
    - *Major accent trees* are to be located at City and community entry locations, key intersections, and major activity centers (e.g., County East Mall, Prewett Family Park).
    - *Street trees* should be selected as a common tree for street frontages. A single species may be selected for all residential neighborhoods or different species to distinguish different neighborhoods from each other. Within residential neighborhoods, street trees should be full, providing shade and color. In commercial districts, the trees should provide shade but be more transparent at the motorist and pedestrian levels to promote views of storefronts and visual interaction of pedestrians. Within employment districts, street trees should provide shade and screening, and be used to frame views of buildings and building entries.
- **Policy 5.4.2g:** Maintain common community design elements throughout the City.
  - Provide a system of well-designed directional signage, facilitating way-finding to community features such as shopping areas, marinas, parks, and civic buildings.
  - Incorporate common design elements in community features such as roadway landscaping, streetlights, street signs, traffic lights, and community directional signage.
  - Use design variations in landscaping, street light standards, and street signs as a means of defining special design districts (e.g., Rivertown, Somersville Road, and "A" Street Corridors)
- **Policy 5.4.2o:** Design onsite lighting to improve the visual identification of adjacent structures.
  - In all projects, lighting fixtures should be attractively designed and of a low profile to complement the overall design theme of the project within which they are located.

- On-site lighting shall create a safe environment, adhering to established crime prevention standards, but shall not result in nuisance levels of light or glare on adjacent properties. Limit sources of lighting to the minimum required to ensure safe circulation and visibility.
- **Policy 5.4.2p:** Lighting should accommodate night use of streets and promote security while complying with the provision of a dark night sky. Streetscape areas that are used by pedestrians at night should be well lit. Within rural and open space areas, limit street lighting to intersections and other locations that are needed to maintain safe access (e.g., sharp curves).
- **Policy 5.4.12b:** Ensure that the design of new development proposed along a boundary between residential and non-residential uses provides sufficient protection and buffering for the residential use, while maintaining the development feasibility of the nonresidential use. The burden to provide buffers and transitions to achieve compatibility should generally be on the second use to be developed. Where there is bare ground to start from, both uses should participate in providing buffers along the boundary between them.
- **Policy 5.4.14a:** Design hillside development to be sensitive to existing terrain, views, and significant natural landforms and features.
- **Policy 5.4.14b:** Projects within hillside areas shall be designed to protect important natural features and to minimize the amount of grading. To this end, grading plans shall conform to the following guidelines.
  - *Slopes less than 25%:* Redistribution of earth over large areas may be permitted.
  - *Slopes between 25% and 35%:* Some grading may occur, but landforms need to retain their natural character. Split-level designs and clustering are encouraged as a means of avoiding the need for large padded building areas.
  - *Slopes between 35% and 50%:* Development and limited grading can occur only if it can be clearly demonstrated that safety hazards, environmental degradation, and aesthetic impacts will be avoided. Structures shall blend with the natural environment through their shape, materials and colors. Impact of traffic and roadways is to be minimized by following natural contours or using grade separations. Encouraged is the use of larger lots, variable setbacks and variable building structural techniques such as stepped or post and beam foundations are required.
- **Policy 5.4.14c:** Manufactured slopes in excess of five vertical feet (5') shall be landform graded. "Landform grading" is a contour grading method which creates artificial slopes with curves and varying slope ratios in the horizontal and vertical planes designed to simulate the appearance of surrounding natural terrain. Grading plans shall identify which slopes are to be landform graded and which are to be conventionally graded.
- **Policy 5.4.14d:** The overall project design/layout of hillside development shall adapt to the natural hillside topography and maximize view opportunities *to*, as well as *from* the development
- **Policy 5.4.14e:** Grading of ridgelines is to be avoided wherever feasible, siting structures sufficiently below ridgelines so as to preserve unobstructed views of a natural skyline. In cases where application of this performance standard would prevent construction of any structures on a lot of record, obstruction of views of a natural skyline shall be minimized through construction techniques and design, and landscaping shall be provided to soften the impact of the new structure.

- **Policy 5.4.14f:** Hillside site design should maintain an informal character with the prime determinant being the natural terrain. This can be accomplished by:
  - Utilizing variable setbacks and structure heights, innovative building techniques, and retaining walls to blend structures into the terrain, and
  - Allowing for different lot shapes and sizes.
- **Policy 5.4.14g:** Buildings should be located to preserve existing views and to allow new dwellings access to views similar to those enjoyed from existing dwellings.
- **Policy 5.4.14h:** Streets should follow the natural contours of the hillside to minimize cut and fill, permitting streets to be split into two one-way streets in steeper areas to minimize grading and blend with the terrain. Cul-de-sacs or loop roads are encouraged where necessary to fit the terrain. On street parking and sidewalks may be eliminated, subject to City approval, to reduce required grading.
- **Policy 5.4.14i:** Clustered development is encouraged as a means of preserving the natural appearance of the hillside and maximizing the amount of open space. Under this concept, dwelling units are grouped in the more level portions of the site, while steeper areas are preserved in a natural state.
- **Policy 5.4.14j:** Project design should maximize public access to canyons, overlooks, and open space areas by:
  - Providing open space easements between lots or near the end of streets or cul-de-sacs; and
  - Designating public pathways to scenic vistas.
- **Policy 5.4.14k:** Permit the use of small retaining structures when such structures can reduce grading, provided that these structures are located and limited in height so as not to be a dominant visual feature of the parcel.
  - Where retaining walls face public streets, they should be faced with materials that help blend the wall into the natural character of the terrain.
  - Large retaining walls in a uniform plane should be avoided. Break retaining walls into elements and terraces, and use landscaping to screen them from view.
- **Policy 5.4.14l:** Lot lines shall be placed at the top of slopes to facilitate maintenance by the down slope owner, who has the greater “stake” in ensuring the continued integrity of the slope.
- **Policy 5.4.14m:** The overall scale and massing of structures shall respect the natural surroundings and unique visual resources of the area by incorporating designs, which minimize bulk and mass, follow natural topography, and minimize visual intrusion on the natural landscape.
  - The overall height of a building is an important aspect of how well it fits into the existing character of the neighborhood and its hillside environment. Houses should not be excessively tall so as to dominate their surroundings or create a crowded appearance in areas of small lots. Structures should generally be stepped down hillsides and contained within a limited envelope parallel to the natural grade, rather than “jutting out” over natural slopes.
  - Building forms should be scaled to the particular environmental setting so as to complement the hillside character and avoid excessively massive forms that fail to enhance the hillside character.
  - Building facades should change plane or use overhangs as a means to create changing shadow lines to further break up massive forms.

- Wall surfaces facing towards viewshed areas should be minimized through the use of single story elements, setbacks, roof pitches, and landscaping.
- **Policy 5.4.14n:** Collective mass rooflines and elements should reflect the naturally occurring ridgeline silhouettes and topographical variation, or create an overall variety, that blends with the hillside.
- **Policy 5.4.14o:** Based upon the graphic principle that dark colors recede and light colors project, medium to dark colors which blend with the surrounding development should be used for building elevations and roof materials in view-sensitive areas.
- **Policy 10.5.1c:** In designing buffer areas, the following criteria shall be considered and provided for (when applicable) within the buffer areas to avoid or mitigate significant impacts.
  - Aesthetics: How will development affect views from adjacent open space areas? What are the sensitive land uses and resources within open space areas and how might they be affected by changes in the visual environment?
  - Light and Glare: Will a proposed development result in increased light or glare in open space areas that would impact open space uses or wildlife habitats within that open space?

### ***City of Antioch Code of Ordinances***

The Antioch Municipal Code contains lighting standards for outdoor parking areas in order to ensure new lighting does not negatively impact surrounding uses.

#### *Title 9, Chapter 5, Article 17, Section 15: Lighting*

Outdoor parking area lighting fixture heights are evaluated to determine the relationship to surrounding land uses and prevent light from shining directly onto adjacent properties.

#### *Citywide Design Guidelines*

The City of Antioch Citywide Design Guidelines contains standards for mixed, residential, commercial, and business uses as well as sign design and streetscape standards.

### **Chapter 3 Commercial**

The goals and objectives of this chapter seek to provide commercial development that is compatible with the area in size, design, and access. The chapter contains the following objectives:

- Consider the area's size and scale;
- Articulate building forms and elevations to create varied rooflines, building shapes, and patterns of shade and shadow;
- Utilize landscaping to provide project amenities and screen parking and equipment areas;
- Provide site access, parking, and circulation that is arranged in a logical and safe manner for pedestrians and vehicles; and
- Design spaces for outside equipment, trash receptacles, storage, and loading areas in the least conspicuous part of the site.

**Chapter 6 Residential**

The goals and objectives of this chapter aim to promote single-family development that is architecturally diverse while also providing a higher level of design standards than the zoning code minimum requirements. This chapter contains the following goals:

- Recognize and fulfill the different economic, social, and physical needs of residents;
- Create a human-scaled, bicycle and pedestrian-friendly environment;
- Create visual diversity and create neighborhoods with a unique sense of place; and
- Incorporate physical and pedestrian connections between neighborhoods to help create a unified community.

**Chapter 7 Sign Design Guidelines**

This chapter contains guidelines that encourage businesses to provide quality signage that adds and supports the character of the City of Antioch as well as complying with regulations contained in the Antioch Zoning Code. This chapter contains the following objectives:

- Encourage creative and well-designed signs that contribute positively to Antioch’s visual environment, expression of local character, and development of a distinctive image.
- Signs shall be compatible and integrated with the building’s architectural design and with other signs on the property.
- Recognize that businesses often depend on signs to attract customers.

**Chapter 8 Streetscape**

The goals and objectives of this chapter aim to create a unified and visually attractive environment that encourages private property upgrades and new development.<sup>5</sup> This chapter contains the following objectives:

- Establish a clear sense of arrival, through a distinct change in landscape, built areas, or special entrance features;
- Organize signage, lighting, and street furniture to give people a sense of direction and orientation;
- Create a public realm that is safe, secure, and enjoyable; Establish a high quality street furniture palette that creates interest and comfort for the public realm;
- Establish a landscape palette that sets the proper tone, is easy to maintain, and is appropriate to the locale; and
- Balance the needs of the pedestrian with vehicular and bicycle traffic.

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<sup>5</sup> City of Antioch. Citywide Design Guidelines, Chapter 8.

### 3.1.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to CEQA Guidelines, Appendix G, Environmental Checklist, to determine whether impacts to aesthetics are significant environmental effects, the following questions are analyzed and evaluated.

Except as provided in Public Resources Code Section 21099, would the project:

- a) Have a substantial adverse effect on a scenic vista?
- b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a State Scenic Highway?
- c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?
- d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

#### Approach to Analysis

This analysis provides a discussion of the visual impacts associated with the proposed project and the area surrounding the project site. Several variables affect the degree of visibility, visual contrast, and ultimately project impacts: (1) scale and size of facilities, (2) viewer types and activities, (3) distance and viewing angle, and (4) influences of adjacent scenery or land uses. Viewer response and sensitivity vary depending on viewer attitudes and expectations. Viewer sensitivity is distinguished among project viewers in identified scenic corridors and from publicly accessible recreational and plaza areas. Recreational areas and scenic corridors are considered to have relatively high sensitivity.

As part of this analysis, various areas in the project site vicinity and eastern Contra Costa County area were screened as potential viewpoint locations, based on whether the existing project site is visible from these locations and the degree to which viewers at those locations would be sensitive to proposed physical changes at the project site during the proposed construction and operational periods. A set of locations that constitute a representative cross-section of views experienced by a representative cross section of observers was chosen for the analysis. Views from these locations were photographed and are included in this Draft EIR to illustrate existing conditions. Consequently, visual change discussions were provided for these same views to facilitate project impact determinations. Project design drawings and information about height and massing were also relied upon to identify whether or when the proposed structures would result in visual impacts. The City of Antioch General Plan and Ordinance Code were also evaluated to determine applicable policies and design requirements for the project.

### ***Light and Glare***

The analysis of light and glare impacts in this section focuses on the nature and magnitude of changes in light and glare conditions of the project site and surrounding area. If the light and glare conditions of the project and the existing environment are similar, then the visual compatibility would be high. If the light and glare conditions of the project strongly contrast with the existing light and glare or applicable policies and guidelines, then light and glare compatibility would be low and significant impacts may result. Relevant urban design policies and guidelines are used to provide conclusions with regard to the significance of project- and cumulative-level light and glare impacts.

## **Impact Evaluation**

### ***Scenic Vistas***

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**Impact AES-1:        The project would not have a substantial adverse effect on a scenic vista.**

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#### ***Construction***

A significant impact would occur if the project construction would have a substantial adverse effect on a scenic vista as identified in the City Antioch General Plan. As discussed previously, the project site does not contain designated scenic resources such as Mount Diablo, the San Joaquin River, or historical buildings described in the General Plan, although the site and local roadways such as Deer Valley Road provide views towards Mount Diablo.

Construction activity would involve cranes, trucks, and other equipment that would temporarily occupy the site, but would not pose a significant obstacle for viewing scenic resources. Thus, construction activity would not adversely affect existing views of scenic vistas within the project vicinity. Therefore, temporary construction impacts related to scenic vistas would be less than significant.

#### ***Operation***

Examples of typical scenic vistas include mountain ranges, ridgelines, or bodies of water as viewed from a highway, public space, or other areas designated for the express purpose of viewing and sightseeing. In general, a project's impact to a scenic vista would occur if development of the project would substantially change or remove a scenic vista. The City of Antioch General Plan does not specifically identify any scenic vistas within the project site, although views of Mount Diablo and its prominent ridgelines are considered scenic and are available from local roadways such as Deer Valley Road. Discussion of General Plan view corridors is discussed further under Impact AES-3.

In addition, Policy 5.4.14j in the City's Hillside Design Policies specifies that projects should provide public pathways to scenic vistas in order to maximize public access to canyons, overlooks, and open space areas. The total open space and trail areas would comprise approximately 40 percent of the total project site. An approximately 6-mile publicly accessible trail system would be provided along Sand Creek and throughout the project site. The trail system would connect the proposed neighborhood areas to each other and to nearby parks, ridgeline areas, trailhead staging areas, and the proposed mixed-use Village Center area. An approximately 1-acre trail staging area is proposed to be located in the southwestern portion of the project site, near Empire Mine Road, to provide easy access to the existing East Bay Regional Park trail system, as well as the project site's proposed

trail system. As such, the proposed project would provide public pathways to scenic vistas, such as Mount Diablo and its prominent ridgelines to the west and south of the site, consistent with Policy 5.4.14j. Therefore, the proposed project would not have a substantial adverse effect on a scenic vista. Therefore, impacts would be less-than-significant.

### ***Level of Significance***

Less Than Significant

### ***Scenic Highways***

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<b>Impact AES-2:</b>	<b>The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a State Scenic Highway.</b>
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#### ***Construction***

There are no scenic resources designated by the City of Antioch General Plan on the project site. SR-4, located 1.8 miles to the east of the project site, is listed as an Eligible State Scenic Highway, but is not visible from the project site. Thus, demolition and grading during construction could not result in adverse impacts to scenic resources within a State Scenic Highway. Therefore, no temporary construction impact related to scenic resources within a State Scenic Highway would occur.

#### ***Operation***

The proposed project is not located within or near a designated or Eligible State Scenic Highway; thus, there are no scenic resources, trees, rock outcroppings, or historic buildings within a State Scenic Highway located on the project site. SR-4, located 1.8 miles to the east, is listed as an Eligible State Scenic Highway; however, the segment has not been officially designated. Furthermore, due to distance and intervening trees, development of the project site would not be visible from SR-4. Therefore, the proposed project would not damage scenic resources within a State Scenic Highway and no impact would occur.

### ***Level of Significance***

No Impact

### ***Visual Character***

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<b>Impact AES-3:</b>	<b>With respect to the non-urban character of the existing project site, the project would substantially degrade the existing visual character or quality of public views of the site and its surroundings. (Public views are those that are experienced from publicly accessible vantage points).</b>
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#### ***Construction***

Construction of the project would temporarily affect the visual character and quality of the project site. However, the project site is located adjacent to urban development such as the Kaiser Permanente Antioch Medical Center to the east and single-family homes to the north. In addition, construction activity would be temporary in nature and would not permanently degrade the existing visual character of the project site. Therefore, impacts related to construction would be less than significant.

## Operation

The project site is characterized by grassland with an existing single-family residence and various barns and outbuildings. The surrounding area has a suburban residential character. The area to the north is developed as single-family homes as is the area to the east with the Kaiser Permanente Antioch Medical Center. However, rural and undeveloped City of Antioch and Contra Costa County land is located to the south and west of the project site.

According to the Public Resources Code Section 21071,<sup>6</sup> an incorporated city is an “Urbanized Area” if it meets either of the following criteria: (1) has a population of at least 100,000 persons, and (2) has a population of less than 100,000 persons if the population of that city and not more than two contiguous incorporated cities combined equals at least 100,000 persons. According to the last census population estimate on July 1, 2018, Antioch had a population of 111,535. Out of an abundance of caution, even though the project is in an urban area as defined by CEQA, because of the rural character of the immediate site, the more stringent threshold of a non-urban area is being applied.

The City of Antioch General Plan identifies view corridors and views from these view corridors as scenic resources because they also afford publicly available views of visual landmarks, such as Mount Diablo and ridgelines. As described in 3.1.2, Environmental Setting, Deer Valley Road and Empire Mine Road are designated view corridors because they have publicly-accessible views of Mount Diablo.

As shown in Exhibit 3.1-10, visual simulations show the project’s changes to existing visual character from Dallas Ranch Road, Deer Valley Road, Empire Mine Road, and an unpaved trail at the Black Diamond Mines Regional Preserve.

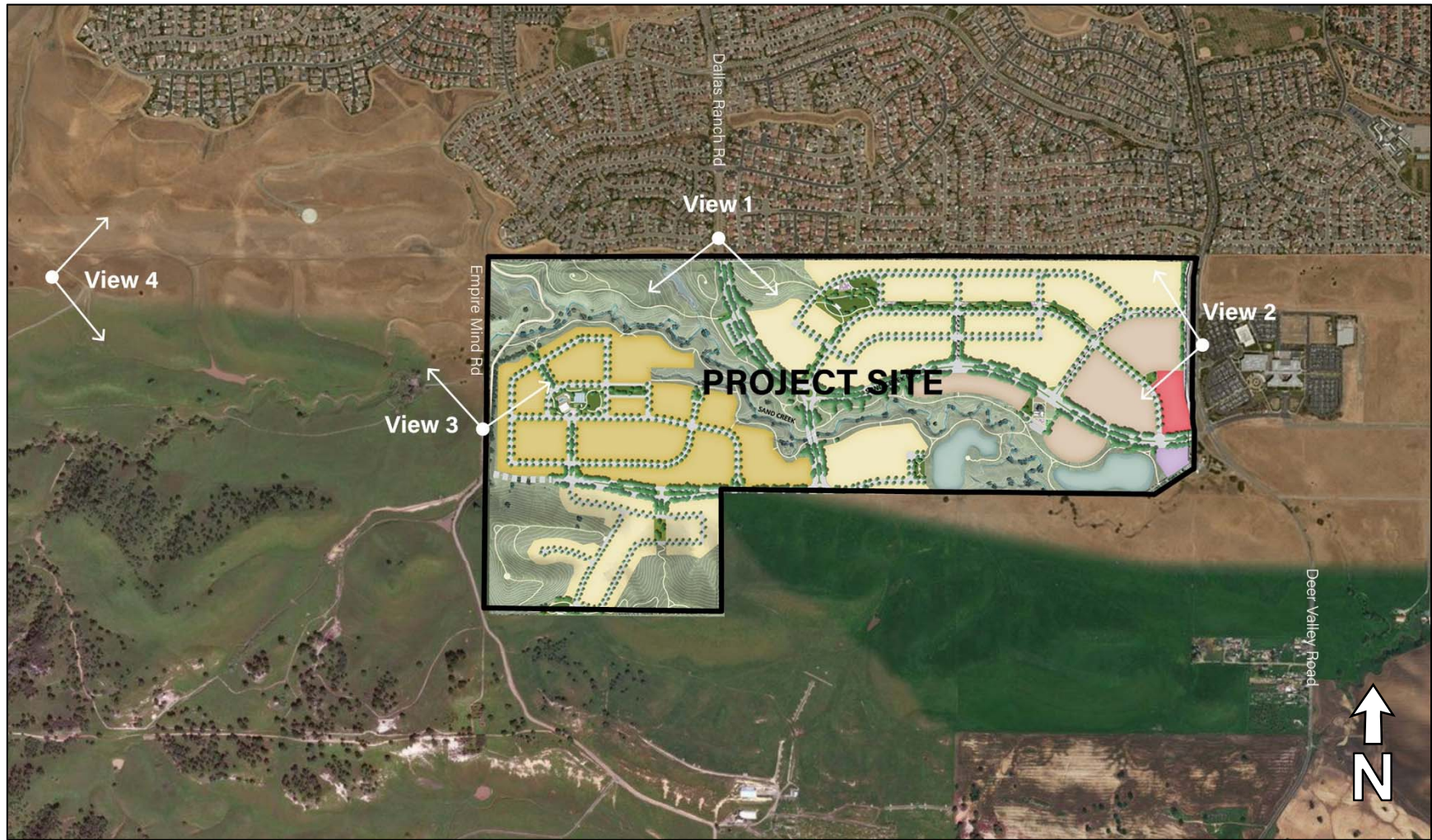
### *View of Project Site from Dallas Ranch Road (View 1)*

Exhibit 3.1-11 provides a view of the project site looking south from the existing terminus of Dallas Ranch Road, which is representative of similar public viewpoints at other neighborhood roadways to the north of the project site and existing residences to the north.

As shown in Exhibit 3.1-11, views of the proposed project would consist primarily of landscaping along the project entry. While portions of the hillsides to the south would be partially obscured by vegetation, views of the ridgeline would not be substantially affected. Views of the proposed residential buildings from this vantage point would be screened by landscaping elements and project site topography. Such landscaping elements would blend with existing vegetation in the area consistent with City of Antioch General Plan Design Policy 5.4.2a and Policy 5.4.2g in order to provide common design elements and ensure the project complements surrounding development. Notwithstanding, neighboring homeowners, hikers, and the like will experience a completely modified view of the site—it will no longer be rolling grasslands, but homes, infrastructure, etc. Even though homeowners living along the edge of the project site do not necessarily represent a large portion of the public, the City wishes to acknowledge the loss of an open space viewshed. As such, the proposed project could substantially degrade the visual character or quality of the site for hikers, travelers along Deer Valley Road, as well as abutting residents to north and south.

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<sup>6</sup> JUSTIA US Law. Public Resources Code, Division 13, Environmental Quality Chapter 2.5, Definitions, Section 21071 (2014). Website: <https://law.justia.com/codes/california/2014/code-prc/division-13/chapter-2.5/section-21071/>. Accessed December 18, 2019.



Source: Raney Planning & Management, Inc., March 2018.

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Existing



Proposed

Source: Raney Planning & Management, Inc., March 2018.

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**Exhibit 3.1-11**  
**View 1: Existing and Proposed**  
**View from Dallas Ranch Road**

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ENVIRONMENTAL IMPACT REPORT

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*View of Project Site from Deer Valley Road (View 2)*

Exhibit 3.1-12 provides a view of the project site looking west from Deer Valley Road, near the Kaiser Permanente Antioch Medical Center. As described previously, City of Antioch General Plan Policy 5.4.2c identifies Deer Valley Road as a designated view corridor because it provides views of Mount Diablo.

Existing views include the undeveloped grasslands of the project site, as well as hillsides and ridgelines located in the background, including Mount Diablo. Upon development of the proposed project, views of the site from the east would change from a rural, undeveloped landscape to a developed, residential and commercial environment. Views of the distant topographical features would be obscured by the proposed buildings and landscaping features of the project.

The project includes medium density housing, trees and other landscaping along the eastern project site boundary. The project would also include construction of a sidewalk, landscaping, curbs and gutters, a bicycle lane, and a new 12-foot wide southbound traffic lane. At the Village Center frontage on Deer Valley Road, the proposed buildings would include a 10-foot setback from the Deer Valley Road right-of-way. The landscaping elements along the site boundary would partially screen views of the on-site buildings and would enhance the aesthetic quality of the pedestrian sidewalk along the site boundary. Nonetheless, based on implementation of the above-described buildings and landscaping, the project would obscure views of distant topographical features, including Mount Diablo and the surrounding ridgelines. Thus, the proposed project could substantially degrade the visual character or quality of the site for viewers to the east of the site, which is considered a potentially significant impact.

*View Looking North Along Empire Mine Road (View 3)*

Exhibit 3.1-13 provides a view looking north along Empire Mine Road, with the project site to the east. Empire Mine Road has been closed to through traffic since 2005; however, many individuals hike along it on their way to Black Diamond Mines Regional Preserve. The rural, two-lane road along the site's western boundary is designated as a view corridor in the City of Antioch General Plan because it offers views of Mount Diablo and associated ridgelines to the west. Currently, views at this viewpoint consist of foothills to the north of the project site and a row of non-native eucalyptus trees along the eastern shoulder of the roadway. No views of Mount Diablo are visible from this north-facing viewpoint. Upon development of the proposed project, the existing trees would be retained and would help to screen the proposed single-family residences from view. As shown in the exhibit, the proposed residences would be set back a considerable distance from the roadway and would not dominate the viewshed. In addition, the project would not obstruct views of Mount Diablo and associated ridgelines to the west. The project would change a portion of the viewshed from an undeveloped rural landscape to a residential development. Although the proposed project would not substantially degrade the views of Mount Diablo, it could substantially degrade the visual character of the site for viewers travelling and/or hiking on Empire Mine Road. This would be a potentially significant impact.

*View Looking East Toward Project Site from Black Diamond Mines Regional Preserve (View 4)*

Exhibit 3.1-14 provides a view looking east toward the project site from a trail in Black Diamond Mines Regional Preserve, which is located approximately 0.9-mile west of the site. Views currently

consist of undeveloped grassland and rolling hills, as well as scattered trees. The project site, as well as the City of Antioch, are visible in the distant background. Development of the proposed project would convert portions of the project site from a rural, undeveloped environment to a residential community (with limited commercial development). As shown in the exhibit, the proposed development would not block views of a designated scenic resource.

The steep hillsides within the northwest and southwest portions of the project site are protected from development, with the exception of unpaved pedestrian and bicycle paths. The limited residential development within the southwest portion of the site would use landform grading methodology, avoiding the top 25 percent of the hilltops and matching the existing contouring of the hillsides to the maximum extent feasible. Existing trees on the hillsides in the project area would partially screen the proposed development areas.

While the proposed project would preserve scenic resources protected by City of Antioch General Plan Policy 5.4.2c. Overall, development of the proposed project would represent a significant change in the overall viewshed from the Black Diamond Mines Regional Preserve. As a result, the project could substantially degrade the visual character or quality of the site for visitors at the Black Diamond Mines Regional Preserve or other nearby public spaces. This would be considered a potentially significant impact.

#### *Conclusion*

As discussed previously, although the project is located within the City of Antioch which is an urban area as defined by CEQA, the immediate area adjacent and surrounding the project site is non-urban in nature. Development of the proposed project would represent a change in the visual character of the project site as viewed from surrounding non-urban areas. Within the portions of the site to be developed, the project would change the landscape from rural, grazing land, to a built suburban landscape with residential and commercial development that would be similar to the surrounding development to the north and east. The proposed project would substantially degrade visual resources in the area and would partially obscure views of distant topographical features, including Mount Diablo and the surrounding ridgelines, for viewers along the designated view corridor on Deer Valley Road to the east of the site, which is considered a potentially significant impact.

The proposed project would include development standards for each of the proposed land use designations within the project site. The development standards are consistent with the Design Guidelines adopted by the Initiative and establish minimum design parameters for residential development, including standards related to parking, recreational vehicle storage, driveway slopes, grading, minimum lot dimensions, setbacks, and maximum building heights.

In addition to the development standards, the project would include design guidelines that would provide guidance for neighborhood and landscape design associated with implementation of project development. The proposed design guidelines would include guiding principles to address neighborhood identity, consistency with future surrounding development, and architectural design.



Existing



Proposed

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Existing



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Existing



Proposed

## Exhibit 3.1-14

### View 4: Existing and Proposed

### View from Black Diamond Mines Regional Preserve

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Neighborhood-specific guidelines would be provided for each of the proposed residential neighborhoods, as well as the proposed Village Center area and fire station site. Specific landscape guidelines (included in the proposed design guidelines) would address the design of open space, parks, trail staging areas, and streetscapes within the proposed project site. As discussed in Section 3.10, Land Use and Planning, the proposed project would be generally consistent with the City's Hillside Design Guidelines and other applicable provisions of the General Plan related to the preservation of aesthetic resources. In order to ensure that future development within the project site is consistent with the proposed development standards and design guidelines, as well as existing applicable City standards, the project would be subject to the City's Design Review process established by Chapter 5, Article 26 of the Antioch Municipal Code.

Based on the above, even with implementation of the development standards and design guidelines, the project would substantially obstruct views of a protected scenic resource in a non-urbanized area, Mount Diablo, from a General Plan designated view corridor, Deer Valley Road, which would substantially degrade the existing visual character and quality of the site and the site's surroundings. Therefore, a significant impact would occur.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

No Feasible Mitigation is Available

***Level of Significance After Mitigation***

Significant and Unavoidable

**Light and Glare**

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<b>Impact AES-4:</b>	<b>The project would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.</b>
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***Construction/Operation***

As discussed previously, the proposed project site is primarily undeveloped. The proposed project would have a significant impact if substantial light or glare would adversely affect nighttime or daytime views, respectively, in the area. Project sources of lighting would include, but would not be limited to, headlights from cars travelling on internal roadways, streetlights, light associated with the proposed Village Center area, exterior lighting on the proposed residential buildings, and interior light spilling through windows. The most prominent sources of light would be from the stationary sources adjacent to proposed buildings and parking areas and elevated lighting sources such as street lights. The most prominent sources of light would be visible from project roadways. As such, the proposed project would create an increase of nighttime light and daytime glare, due to the increase of lighting and reflective surfaces and vehicle headlights in the area.

However, the Antioch Municipal Code has requirements for lighting and glare to reduce the impacts of glare and light trespass. Specifically, Section 9-5.1715 of the Municipal Code states that outdoor

parking area lighting fixture heights must be determined based on the relationship of the fixtures to surrounding uses, and lighting must not shine directly onto an adjacent street or property. In addition, City of Antioch General Plan Policy 5.4.2o states that lighting must not result in nuisance levels of light or glare on adjacent properties. Compliance with these provisions is reviewed prior to certificate of occupancy by City building officials.

The project's proposed design guidelines include specific standards related to lighting. For example, light fixtures must be appropriately placed and scaled to avoid light spillover or glare into surrounding areas. The City of Antioch General Plan EIR determined that the impact of new sources of light and glare could be minimized by incorporating design features and operating requirements into new developments that limit light and glare. Further, the proposed project has been designed to include significant setbacks from its western boundary, as well as from the Sand Creek corridor to minimize impacts, including light and glare, on the natural environment. Although project lighting could potentially affect migratory species, the setbacks from the undeveloped lands to the west, and from Sand Creek would maintain the function of these areas for species migration. Additionally, Mitigation Measure (MM) BIO-1a to MM BIO-1p would reduce impacts to special-status species to a less than significant level. As a result, compliance with the City of Antioch lighting specifications and Zoning Code requirements would ensure the project does not result in significant light spillage or nighttime sky impacts. Therefore, lighting and glare impacts would be less than significant.

### ***Level of Significance***

Less Than Significant

### **3.1.5 - Cumulative Impacts**

Impacts to aesthetic resources are localized and not cumulative in nature. For example, the creation of glare at one location is not worsened by glare created at another location. Rather, such effects are independent, and the determination as to whether they are adverse is specific to the project and location where they are created. Projects that block a view or affect the visual quality of a site also have localized aesthetic impacts. The impact occurs specific to a site or area and remains independent from another project elsewhere that may block a view or degrade the visual environment of a specific site.

The following discussion of cumulative impacts is based on the implementation of the proposed project in combination with other proposed and pending projects in the region. Other proposed and pending projects in the region under the cumulative context would include buildout of the City of Antioch General Plan, including the Sand Creek Focus Area, as well as development of the most recently approved land uses within the vicinity of the project area.

### **Visual Character and Views**

The development projects listed in Section 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, are mostly residential and commercial in nature. The proposed project and the projects listed in Table 3-1 propose urban development, but only Cumulative Project 3 (Aviano Adult Community Project) would be located within the same visible area, as it would be located across Deer Valley Road beyond the Kaiser Permanente Antioch Medical Center. The Aviano Adult Community Project would

develop approximately 533 residential units and would be consistent with the vision for the Sand Creek Focus Area. The City of Antioch General Plan EIR determined that as the City of Antioch continues to expand, future development could alter landforms, scenic vantage points, and the overall character of the City. The project would contribute to the cumulative change in visual character within the City of Antioch. Residential subdivisions are located to the north of the project site, and new residential subdivisions are approved to the east of the project site. In addition, agricultural land designated for development is located to the west. The City of Antioch General Plan has designated the areas south, west, and east of the project site for open space and urban development. Therefore, in terms of the change to the visual character of the project area, development on the project site is what is anticipated to occur in the project area under the General Plan. Development in the City, in addition to development on the project site, would contribute to a change in the visual character of the region.

As discussed previously, City of Antioch General Plan Policy 5.4.2c states that view corridors from public spaces to natural ridgelines and landmarks, such as Mount Diablo and distant hills, local ridgelines, and the San Joaquin River and other water bodies (such as Sand Creek), should be preserved. Specific view corridors identified in Policy 5.4.2c include Somersville Road, Lone Tree Way, Hillcrest Avenue, SR-4, SR-160, James Donlon Boulevard, Deer Valley Road, and Empire Mine Road. However, Policy 5.4.2c also recognizes that new development will inevitably result in some loss of existing views.

The project would include development standards and design guidelines that would guide future development within the project site. Per a conceptual grading plan included in the proposed design guidelines, the southwestern portion of the project site (within the proposed LD-1 neighborhood area) would be graded with a landform grading methodology, avoiding the top 25 percent of the hilltops and matching the existing contouring of the hillsides to the maximum extent feasible. The steepest slopes to the east and west of the proposed LD-1 neighborhood would be retained as open space and left in a primarily undeveloped state. Thus, the proposed project would be consistent with Policy 5.4.14a through 5.4.14f in the City's Hillside Design policies. Additional discussion of the project's consistency with the City's Hillside Design policies, as well as other applicable General Plan policies, is provided in Section 3.9, Land Use and Planning.

Given that the project site is located at a slightly lower elevation than the developed areas to the north of the site, the proposed development would not obscure views of Mount Diablo or local ridgelines from Dallas Ranch Road and residences to the north. In addition, given that Empire Mine Road is located along the site's western boundary and Mount Diablo is located to the southwest of the site, views of Mount Diablo from the roadway would not be substantially affected. However, views of Mount Diablo and other natural features from Deer Valley Road, which is designated as a scenic corridor by the City of Antioch General Plan, would be partially blocked by the proposed project (Exhibit 3.1-12).

The City of Antioch General Plan EIR addressed planned buildout of the planned Sand Creek Focus Area, which included the project site, and concluded that with implementation of policies included in the General Plan, converting vacant land to urban use would result in a less-than-significant impact with regard to scenic vistas and scenic resources. Although development on the project site would be typical of urban development anticipated to occur in the project area, the project would

involve a change to the visual character and quality of the site and surroundings from what has been anticipated specifically for the site by the City. In addition, while implementation of the proposed development standards and design guidelines would help maximize the aesthetic quality of future development within the project site, the project would still create a partial obstruction to scenic views offered from Deer Valley Road in a non-urban area, which would substantially degrade the existing visual character and quality of the site and surrounding area. Therefore, implementation of the proposed project, in addition to cumulative development in the area, would be considered cumulatively significant.

### **Light and Glare**

The proposed project would be required to comply with the City of Antioch lighting specifications to ensure the project would not result in significant light spillage or nighttime sky impacts. As a result, the proposed project would not have a significant impact on light or glare on the surrounding area. The development projects listed in Table 3-1 are mostly residential and commercial in nature. The proposed project and the projects listed in Table 3-1 propose urban development. Project 3 (Aviano Adult Community Project) would be located across Deer Valley Road and 0.5-mile to the east of the project site. The Aviano Adult Community Project would develop approximately 533 residential units and would be consistent with the vision for the Sand Creek Focus Area.

The project site and area directly surrounding the site is mostly non-urban in nature with undeveloped land and Black Diamond Mines Regional Park to the west and south. There is developed land including single-family homes to the north and the Kaiser Permanente Antioch Medical Center to the east. The project and other cumulative projects would include exterior and interior lighting. All lighting associated with the project and cumulative projects would be subject to Antioch Municipal Code Section 9-5.1715 regarding parking lot area lighting standards. In addition, all cumulative projects located in the City of Brentwood would be subject to the City of Brentwood's lighting standards contained in the Municipal Code. As such, the cumulative impact related to light and glare would be less than significant.

### ***Level of Cumulative Significance***

Cumulatively Significant (Visual Character and Views)

Less than Cumulatively Significant (Light and Glare)

### ***Mitigation Measures***

No Feasible Mitigation is Possible (Visual Character and Views)

No Mitigation is Required (Light and Glare)

### ***Level of Significance After Mitigation***

Cumulatively Significant and Unavoidable (Visual Character and Views)

Less than Cumulatively Significant (Light and Glare)

## 3.2 - Agricultural Resources and Forestry Resources

### 3.2.1 - Introduction

This section describes existing conditions related to agricultural resources and forestry resources as well as regulatory framework. Information included in this section is based on information from the City of Antioch General Plan, the California Department of Conservation, and the City of Antioch Code of Ordinances. One public comment was received during the Environmental Impact Report (EIR) scoping period related to Agricultural Resources and Forestry Resources.

- Questions why agricultural resources was omitted from the list of probable environmental effects in the NOP given the history of the property.

### 3.2.2 - Environmental Setting

#### Farmland Classifications

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) uses two systems to determine a soil's agricultural productivity: The Land Capability Classification System and the Storie Index Rating System. The "prime" soil classification of both systems indicates the presence of few to no soil limitations, which, if present, would require the application of management techniques (e.g., drainage, leveling, special fertilizing practices) to enhance production. The Farmland Mapping and Monitoring Program (FMMP), part of the Division of Land Resource Protection, California Department of Conservation, uses the information from the NRCS to create maps illustrating the types of farmland in the area.

#### Land Capability Classification System

The Land Capability Classification System takes into consideration soil limitations, the risk of damage when soils are used, and the way in which soils respond to treatment. Capability classes range from Class I soils, which have few limitations for agriculture, to Class VIII soils, which are unsuitable for agriculture. Generally, as the rating of the capability classification system increases, yields and profits are more difficult to obtain. A general description of soil classification as defined by the NRCS is provided in Table 3.2-1 below.

**Table 3.2-1: Land Capability Classification**

Class	Definition
I	Soils have slight limitations that restrict their use.
II	Soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.
III	Soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.
IV	Soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

**Table 3.2-1 (cont.): Land Capability Classification**

Class	Definition
<b>V</b>	Soils are not likely to erode but have other limitations; impractical to remove, which limits their use largely to pasture or range, woodland, or wildlife habitat.
<b>VI</b>	Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.
<b>VII</b>	Soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.
<b>VIII</b>	Soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife habitat, or water supply or to aesthetic purposes.

Note:  
 Capability subclasses are soil groups within one class. They are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.  
 Source: USDA NRCS. 1973. Soil Survey of Contra Costa County

### Storie Index Rating System

The Storie Index Rating System ranks soil characteristics according to their suitability for agriculture from Grade 1 soils (80 to 100 rating) that have few or no limitations for agricultural production, to Grade 6 soils (less than 10 rating) that are not suitable for agriculture. Under the Storie Index Rating System, soils deemed less than prime can function as prime soils when limitations such as poor drainage, slopes, or soil nutrient deficiencies are partially or entirely removed. The six grades, ranges in index rating, and definition of the grades, as defined by the NRCS, are provided below in Table 3.2-2.

**Table 3.2-2: Storie Index Rating System**

Grade	Index Rating	Definition
1—Excellent	80 through 100	Soils are well suited to intensive use for growing irrigated crops that are climatically suited to the region.
2—Good	60 through 79	Soils are good agricultural soils, although they may not be so desirable as Grade 1 because of moderately coarse, coarse, or gravelly surface soil texture; somewhat less permeable subsoil; lower plant available water holding capacity, fair fertility; less well drained conditions, or slight to moderate flood hazards, all acting separately or in combination.
3—Fair	40 through 59	Soils are only fairly well suited to general agriculture use and are limited in their use because of moderate slopes; moderate soils depths; less permeable subsoil; fine, moderately fine or gravelly surface soil textures; poor drainage; moderate flood hazards; or fair to poor fertility levels, all acting alone or in combination.

**Table 3.2-2 (cont.): Storie Index Rating System**

Grade	Index Rating	Definition
4—Poor	20 through 39	Soils are poorly suited. They are severely limited in their agricultural potential because of shallow soil depths; less permeable subsoil; steeper slope; or more clayey or gravelly surface soil texture than Grade 3 soils, as well as poor drainage; greater flood hazards; hummocky micro-relief; salinity; or poor fertility levels, all acting alone or in combination.
5—Very Poor	10 through 19	Soils are very poorly suited for agriculture, are seldom cultivated and are more commonly used for range, pasture, or woodland.
6—Non-Agriculture	Less and 10	Soils are not suited for agriculture at all due to very severe to extreme physical limitations, or because of urbanization.
Source: USDA NRCS. 1973. Soil Survey of Contra Costa County.		

## Farmland Mapping and Monitoring Program

### City of Antioch

The City of Antioch General Plan does not specifically outline agricultural resources within the City. According to the Contra Costa County Department of Conservation and Development, there is no agricultural land within the City of Antioch.<sup>1</sup>

### Project Site

The project site is located within the Sand Creek Focus Area west of Deer Valley Road in the southernmost portion of the City. The site consists of approximately 551.50 acres of undeveloped land. The entire Sand Creek Focus Area, including the project site, as well as the undeveloped land to the south and west of the site, has been planned for future urbanization since the 1988 Antioch General Plan. The Department of Conservation designates the project site as Farmland of Local Importance, as shown in Exhibit 3.2-1.<sup>2</sup> Review of topographic maps indicate that the site has been used for cattle grazing since approximately 1968.<sup>3</sup>

## Soil Classifications

### City of Antioch

As mentioned in Section 3.6, Geology and Soils, the USDA Soil Conservation Service characterizes soils in Contra Costa County as corresponding to those of Lowland and Upland Areas. Specifically, the City of Antioch is comprised of the Capay-Rincon soil association, which consists of nearly level to strong sloping, moderately well drained, and well drained clays and clay loams on valley fill.<sup>4</sup>

<sup>1</sup> Contra Costa County Department of Conservation and Development. 2016. Agricultural Preserves Map Contra Costa County, California. Website: <https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract?bidId=>. Accessed October 18, 2019.

<sup>2</sup> California Department of Conservation. California Important Farmland Finder. Website: <https://maps.conservation.ca.gov/dlrp/ciff/>. Accessed October 21, 2019.

<sup>3</sup> ENGEO, Inc. 2006. Modified Phase One Environmental Site Assessment. Sand Creek Ranch Active Adult Community. July.

<sup>4</sup> United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS). General Soil Map of Contra Costa

### Project Site

As stated in Section 3.9, Hydrology and Water Quality, project site soils are classified as Hydrologic Soil Groups (HSG) 'C' and 'A' under the NRCS HSG system. The majority of the project site is classified as HSG 'C' soils, which are composed of Capay clay (CaA), Rincon clay loam (RbA), Altamont clay (AbE), and Altamont-Fontana complex (AcF). These HSG 'C' soils have a low soil permeability and have a very low potential for water to infiltrate the soil. There is a small section of HSG 'A' soils located in the southwest corner of the southern section of the site consisting of Briones loamy sand (BdE), but this area comprises only 1.5 percent of the project site and would not be developed.<sup>5</sup> Table 3.2-3 and Exhibit 3.2-2 show the soils within the project site.

**Table 3.2-3: On-Site Land Capability Classification and Storie Index Rating**

Soil Name and Map Symbol	Land Capability Classification	Storie Index	Grade
Altamont clay (AbD)	IIIe-5(15)	38	4
Altamont clay (AbE)	IIIe-5(15)	33	4
Altamont-Fontana complex (AcF)	IVe-5(15)	24	4
Briones loamy sand (BdE)	Ve-1(15)	41	3
Capay clay (CaA)	IIIs-5(17)	45	3
Clear Lake clay (Cc)	IIIs-5(17)	25	4
Rincon clay loam (RbA)	IIIs-3(17)	90	1
<p>Note: Capability subclasses are soil groups within one class. They are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. Source: USDA Soil Conservation Service. 1977. Soil Survey of Contra Costa County.</p>			

### Soil Descriptions

The six soil types found on-site are discussed in detail below.

- Altamont clay, 9 to 15 percent slopes (AbD) is located on smooth, rolling hills. Permeability of the Altamont clay is slow. Surface runoff is slow to medium where the soil is tilled and exposed. The hazard of erosion is slight to moderate and slight in areas of range. The available water capacity is 6.5 to 10 inches, and the effective rooting depth is 40 to 60 inches. The soil is used principally for range, dryland grain, and some volunteer hay. The land capability unit is IIIe-5(15); Clayey range site.

County, California. Website: [https://www.nrcs.usda.gov/Internet/FSE\\_MANUSCRIPTS/california/CA013/0/maps/gsm.pdf](https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA013/0/maps/gsm.pdf). Accessed May 13, 2019.

<sup>5</sup> Carson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan, page 7.

- Altamont clay, 15 to 30 percent slopes (AbE) is located on rolling hills. Permeability of the Altamont clay is slow. Surface runoff is slow to medium where the soil is tilled and exposed. The hazard of erosion is slight to moderate and slight in areas of range. The available water capacity is 6.5 to 10 inches, and the effective rooting depth is 40 to 60 inches. The soil is used mainly for range, dryland grain, and some volunteer hay. The land capability unit is IIIe-5(15); Clayey range site.
- Altamont-Fontana complex, 30 to 50 percent slopes (AcF) is located on foothills in the eastern upland of Contra Costa County. Permeability of Altamont-Fontana complex is slow. When the soils are bare, surface runoff is medium to rapid and the erosion hazard is moderate to high. The available water capacity is 6.5 to 10 inches, and the effective rooting depth is 40 to 60 inches. This soil is used principally for range and dryland grain or grain hay. The land capability unit is IVe-5(15); Clayey range site.
- Briones loamy sand, 5 to 30 percent slopes (BdE) is located on uplands. Permeability of Briones loamy sand is rapid. Surface runoff is medium to rapid, and the hazard of erosion is moderate to high where the soil is tilled and exposed. The available water capacity is 1.5 to 4 inches, and the effective rooting depth is 20 to 40 inches. The soil is used mainly for range, and new areas are used for home sites. The land capability unit is Ve-1(15); Sandy range site.
- Capay clay, 0 to 2 percent slopes (CaA) is located in basins or on low benches. Permeability of Capay clay is slow. Surface runoff is very slow, and the erosion hazard is none where the soil is tilled and exposed. The available water capacity is 8.5 to 10 inches, and the effective rooting depth is more than 60 inches. The soil is used mainly for irrigated sugar beets, tomatoes, head lettuce, almonds, walnuts, apricots, and barley. The land capability unit is IIs-5(17).
- Rincon clay loam, 0 to 2 percent slopes (RbA) is formed in alluvial valley fill from sedimentary rocks. Permeability to this Rincon clay loam is slow. Surface runoff is slow, and the erosion hazard is none to slight where the soil is tilled and exposed. The available water capacity is 9 to 10 inches, and the effective rooting depth is more than 60 inches. The soil is used principally for irrigated nut crops, fruit, row crops, and forage crops. The land capability unit is IIs-3(17).

## Forest Land and Timberland

According to Public Resources Code Section 12220(g), “forest land” is land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. The site is not zoned forest land pursuant to Public Resources Code Section 12220(g), and forest land does not exist on-site. In addition, the site is not zoned for forest land (as defined by Public Resources Code [PRC] § 4526), or timberland zoned Timberland Production (as defined by Government Code § 51104[g]).

### 3.2.3 - Regulatory Framework

#### Federal

There are no federal regulations related to agricultural resources and forestry resources.

## State

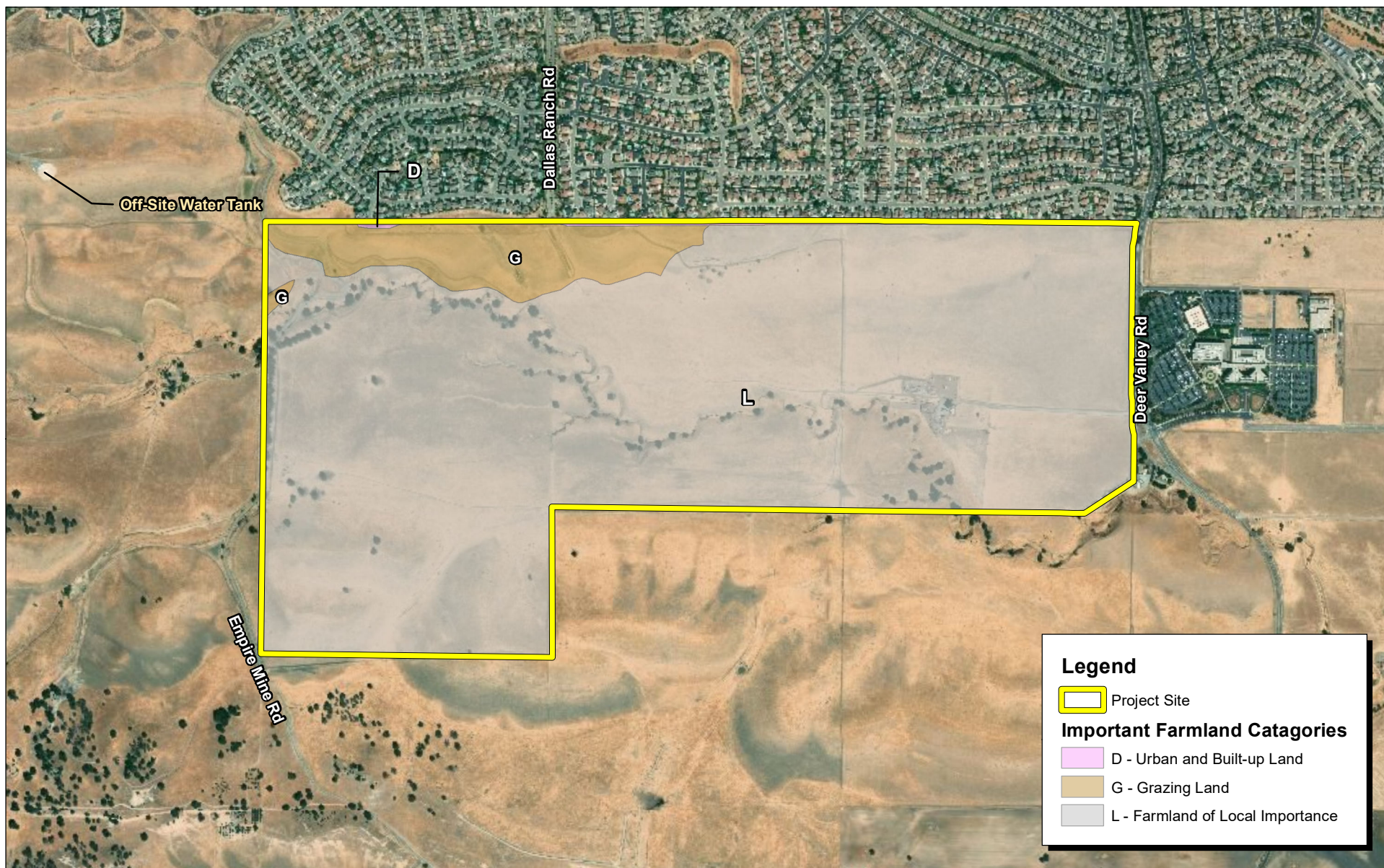
### ***Farmland Mapping and Monitoring Program***

The California Department of Conservation established the FMMP in 1982. The FMMP is a non-regulatory program and provides a consistent and impartial analysis of agricultural land use and land use changes throughout California. The FMMP produces maps and statistical data used for analyzing impacts on California's agricultural resources. For environmental review purposes under the California Environmental Quality Act (CEQA), "agricultural land" means Prime Farmland, Farmland of Statewide Importance, or Unique Farmland, as defined by the USDA land inventory and monitoring criteria, as modified for California (PRC § 21060.1). The remaining categories are used for reporting changes in land use as required for the FMMP biennial farmland conversion report. These categories are described below.

- **Prime Farmland:** Prime farmland has the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- **Unique Farmland:** Unique farmland consists of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
- **Farmland of Statewide Importance:** Farmland of statewide importance is similar to prime farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date.
- **Farmland of Local Importance:** Farmland of Local Importance is land of importance to the local economy, as defined by each county's local advisory committee and adopted by its Board of Supervisors. Farmland of Local Importance is either currently producing, or has the capability of production, but does not meet the criteria of Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. Authority to adopt or to recommend changes to the category of Farmland of Local Importance rests with the Board of Supervisors in each county.

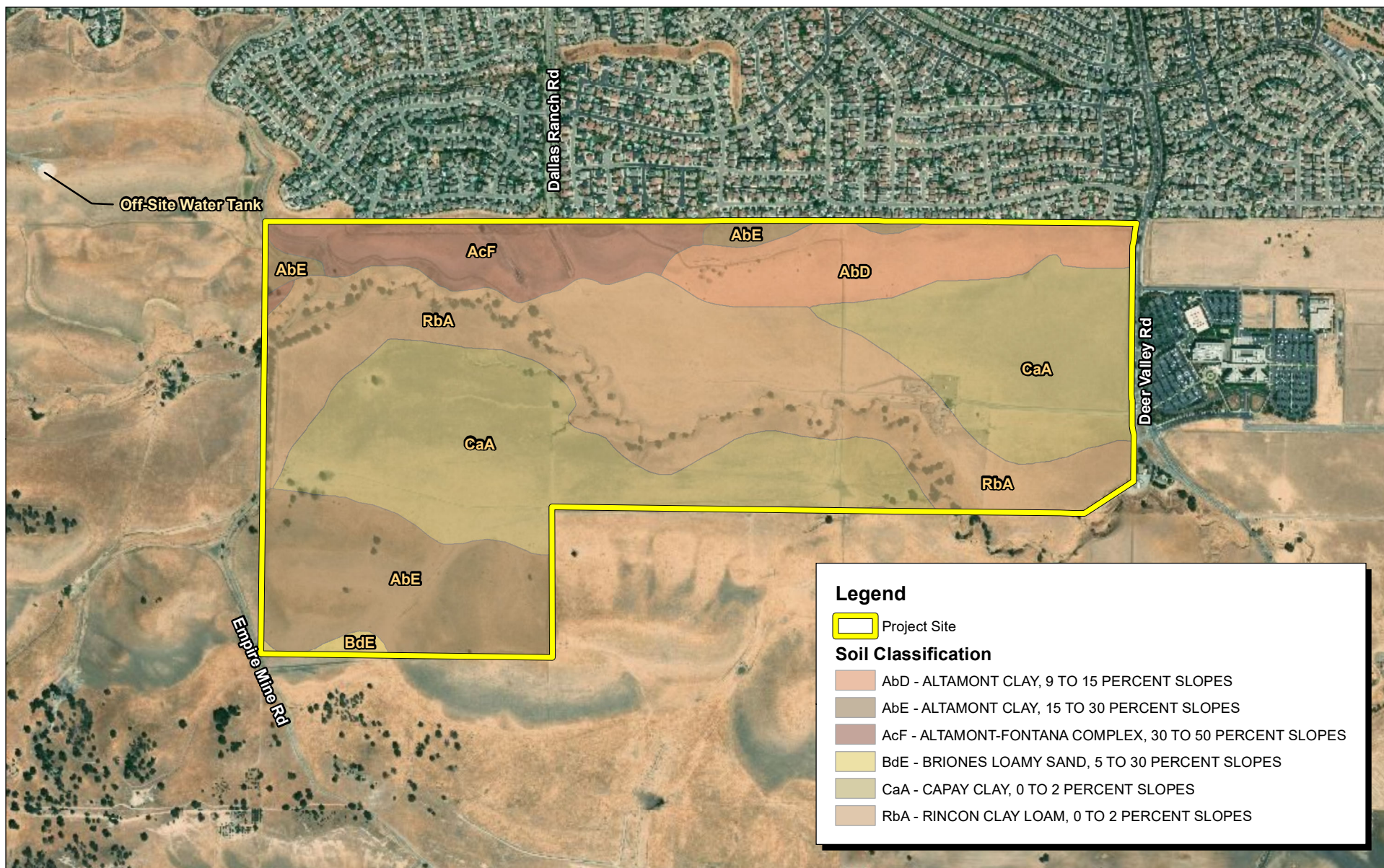
### ***California Land Conservation Act***

The California Land Conservation Act, better known as the Williamson Act, was enacted by the State Legislature in 1965 to encourage the preservation of agricultural lands. Under the provisions of the act, landowners agreeing to keep their lands under agricultural production for a minimum of 10 years receive property tax adjustments. Williamson Act contracts limit the use of the properties to agricultural, open space, and other compatible uses. Assessments of Williamson Act lands are based on agricultural value, rather than potential market value under nonagricultural uses.



Source: ESRI Aerial Imagery. County of Contra Costa FMMP GIS Data.

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Source: ESRI Aerial Imagery. County of Contra Costa Soils GIS Data.



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## Local

### **City of Antioch General Plan**

Agricultural uses are included in the “Open Space” land use designation in the Antioch General Plan. The General Plan contains policies intended would help reduce the impacts resulting from conversion of open lands to urban uses. However, none of these expressly addresses agricultural uses, forest land, or timberland.

### **Antioch Zoning Code**

Antioch’s zoning code does not contain any districts expressly established for agricultural, forest land, or timberland production.

## **3.2.4 - Impacts and Mitigation Measures**

### **Significance Criteria**

According to CEQA Guidelines Appendix G, to determine whether impacts to agriculture and forestry resources are significant environmental effects, the following questions are analyzed and evaluated. Would the project:

- a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
- b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?
- c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?
- d) Result in the loss of forest land or conversion of forest land to non-forest use?
- e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

### **Approach to Analysis**

Evaluation of potential impacts of the proposed project on agricultural resources were based on the City of Antioch General Plan; the USDA NRCS Web Soil Survey performed for the project site; the Soil Survey of Contra Costa County; the California Department of Conservation FMMP; and the Soil Candidate Listing for Prime Farmland and Farmland of Statewide Importance, Contra Costa County. The standards of significance listed above are used to delineate the significance of any potential impacts.

## Impact Evaluation

### ***Convert Farmland to Non-Agricultural Use***

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**Impact AG-1:** The project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.

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#### ***Construction/Operation***

According to the FMMP, the project site is not designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and is not designated or zoned for agricultural use. According to the Department of Conservation, the project site is designated as Farmland of Local Importance. Farmland of Local Importance are lands typically used for livestock grazing, and capable of producing dryland grain on a 2-year summer fallow or longer rotation with volunteer hay and pasture.

While the project site is currently used for grazing and contains some soils that meet the criteria for Prime Farmland and Farmland of Statewide Importance, the site is not used for agricultural production that would contribute to the local economy. Additionally, the site has been designated for future development within the City of Antioch General Plan since 1988. It is also located well-within the urban limit line. As such, the proposed project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. Impacts would be less than significant.

#### ***Level of Significance***

Less Than Significant

### ***Conflict with Existing Zoning or Williamson Act Contract***

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**Impact AG-2:** The project would not conflict with existing zoning for agricultural use, or a Williamson Act contract.

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#### ***Construction/Operation***

As outlined in the City of Antioch General Plan, the project site is designated as Hillside and Estate Residential/Golf Course/Senior Housing/Public-Quasi Public/Open Space. The site is zoned as Study District by the City of Antioch Code of Ordinances. The site is not encumbered by a Williamson Act Contract,<sup>6</sup> and is not zoned for agricultural use. Therefore, the proposed project would not conflict with existing zoning for agricultural use or a Williamson Act contract. No impact would occur.

#### ***Level of Significance***

No Impact

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<sup>6</sup> Contra Costa County Department of Conservation and Development. 2016. Agricultural Preserves Map Contra Costa County, California. Website: <https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract?bidId=>. Accessed October 22, 2019.

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### **Rezoning of Forest Land**

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**Impact AG-3:** The project would not conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g)).

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### **Construction/Operation**

The project site is designated as Hillside and Estate Residential/Golf Course/Senior Housing/Public-Quasi Public/Open Space by the City of Antioch General Plan. The site is zoned as Study District by the City of Antioch Code of Ordinances. The site is not zoned for forest land, timberland, or timberland zoned Timberland Production. As such, the proposed project would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. No impact would occur.

### **Level of Significance**

No Impact

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### **Conversion of Forest Land**

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**Impact AG-4:** The project would not result in the loss of forest land or conversion of forest land to non-forest use.

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### **Construction/Operation**

Section 12220(g) of the California Public Resources Code defines forest land as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. The project site is 551.50 acres and includes a number of native oak trees (approximately 7.00 acres of Valley Oak) mainly lining the Sand Creek corridor, as well as a windrow of non-native Eucalyptus trees (approximately 1.50 acres) along the western property boundary. The native oaks constitute 1.25 percent of the entire project site and only 0.1 percent of them would potentially be impacted by the proposed project (Exhibit 3.4-8). Because the site has well under 10 percent coverage, it is not considered forest land. While these resources are not considered forest land as defined above, the City and project Applicant value these resources.

In this vein, none of the native oak trees within the Sand Creek Corridor will be removed as part of the proposed project. As noted in Section 3.4, Biological Resources, the entire corridor will be preserved and protected in perpetuity—including the trees within it. Similarly, the entire non-native windrow of eucalyptus will remain in place. Finally, there are a few solitary oak trees scattered throughout the project site. None of these oaks are currently slated for removal, although one or two (0.1 percent total) may need to be removed in the future if it is infeasible to design infrastructure around them. See Section 3.4, Biological Resources, for a detailed discussion on trees.

Based on the foregoing, the proposed project would not result in the loss of forest land or conversion of forest land to non-forest use. No impacts would occur.

**Level of Significance**

No Impact

**Other Changes Resulting in Conversion**

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<b>Impact AG-5:</b>	<b>The project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses or conversion of forest land to non-forest use?</b>
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**Construction/Operation**

CEQA Guidelines define Farmland as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland. The proposed project would not convert any mapped Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural uses. None of the surrounding sites are farmed or in agriculture production. Beyond the neighboring sites sits the Urban Limit Line (ULL) and Roddy Ranch to the south, and the Empire Mine State Park to the west. The properties to the north and the east of the project site have been fully developed with single-family homes and a hospital, respectively. Thus, the proposed project could not involve other changes that would result in conversions of Farmland to non-agricultural use.

As discussed above, forest land does not exist within the project site, or anywhere adjacent to it. Therefore, the proposed project would not involve changes to the existing environment which, due to their location or nature, could result in the conversion of Farmland to non-agricultural uses or forest land to non-forest uses. No impacts would occur.

**Level of Significance**

No Impact

**3.2.5 - Cumulative Impacts**

The geographic scope of the cumulative agricultural and forestry resources analysis is the area immediately surrounding the project site. As previously mentioned, the project site is not designated or mapped as Farmland by the California Department of Conservation.

**Convert Farmland to Non-Agricultural Use**

The project site is not designated or mapped as Farmland. Therefore, the proposed project would not convert Farmland to non-agricultural use. In addition, the area surrounding the project site is not designated as Farmland. Projects within Table 3-1 are either located within areas designated as Farmland of Local Importance or Urban and Built Up Land—not Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Thus, no agricultural mitigation would be required to mitigate effects related to such lands. Therefore, the proposed project in conjunction with other projects would not convert Farmland to non-agricultural use and cumulative impacts would be less than significant.

**Conflict with Existing Zoning or Williamson Act Contract**

The project site is not zoned for agricultural use and is not encumbered by a Williamson Act Contract. None of the abutting properties are zoned for agricultural use or encumbered by a

Williamson Act Contract.<sup>7</sup> Therefore, the proposed project in conjunction with other projects would not conflict with existing zoning for agricultural use or Williamson Act contract land. Cumulative impacts would not occur.

### ***Conversion of Forest Land***

The project site does not contain any forest land, and is not zoned for forest use. Additionally, cumulative projects listed in Table 3-1 are not zoned for forest use, and are mainly surrounded by existing development. Therefore, the proposed project in conjunction with other projects would not result in the loss of forest land or conversion of forest land to non-forest use. Cumulative impacts would not occur.

### ***Other Changes Resulting in Conversion***

As discussed above, the project site is not Farmland and does not contain forest land. Similarly, the cumulative projects listed in Table 3-1 are not Farmland and do not contain forest land. Therefore, the proposed project in conjunction with other projects could not and would not result in the conversion of Farmland for non-agricultural uses or forest land to non-forest uses. No cumulative impacts would occur.

### **Level of Cumulative Significance**

No Impact

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<sup>7</sup> Contra Costa County Department of Conservation and Development. 2016 Agricultural Preserves Map Contra Costa County, California. Website: <https://www.contracosta.ca.gov/DocumentCenter/View/882/Map-of-Properties-Under-Contract?bidId=>. Accessed October 22, 2019.

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## 3.3 - Air Quality

### 3.3.1 - Introduction

This section describes existing air quality conditions regionally and locally as well as the relevant regulatory framework. This section also evaluates the possible impacts related to air quality that could result from implementation of the proposed project. Information included in this section is based on project-specific air quality modeling results included in Appendix C.

### 3.3.2 - Environmental Setting

#### Regional Geography and Climate

The City of Antioch is located in Contra Costa County and within the San Francisco Bay Area Air Basin (Air Basin or SFBAAB). The Air Basin is approximately 5,600 square miles in area and consists of nine counties that surround the San Francisco Bay, including all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties; the southwestern portion of Solano County; and the southern portion of Sonoma County. The San Francisco Bay Area (Bay Area) has a Mediterranean climate characterized by mild, dry summers and mild, moderately wet winters; moderate daytime onshore breezes, and moderate humidity.

A semi-permanent, high-pressure area centered over the northeastern Pacific Ocean dominates the summer climate of the West Coast. Because this high-pressure cell is persistent, storms rarely affect the California coast during the summer. Thus, the conditions that persist along the coast of California during summer are a northwest airflow and negligible precipitation. A thermal low-pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the Bay Area much of the summer.

The steady northwesterly flow around the eastern edge of the Pacific High (a high-pressure cell) exerts stress on the ocean surface along the west coast. This induces upwelling of cold water from below the surface. Upwelling produces a band of cold water off San Francisco that is approximately 80 miles wide. During July, the surface waters off San Francisco are 3 degrees Fahrenheit (°F) cooler than those off Vancouver, British Columbia, more than 900 miles to the north. Air approaching the California coast, already cool and moisture-laden from its long trajectory over the Pacific, is further cooled as it flows across this cold bank of water near the coast, thus accentuating the temperature contrast across the coastline. This cooling is often sufficient to produce condensation—a high incidence of fog and stratus clouds along the northern California coast in summer.

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the gap in the western Coast Ranges, known as the Golden Gate, and over the lower portions of the San Francisco Peninsula. Immediately to the south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more nearly from the west as they stream through the Golden Gate. This channeling of the flow through the Golden Gate<sup>1</sup> produces a jet that sweeps eastward but widens downstream, producing southwest winds at Berkeley and northwest winds at San José; a branch curves eastward through the Carquinez Straits and into the Central Valley. Wind speeds may be locally strong

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<sup>1</sup> A strait on the West Coast of North America that connects the San Francisco Bay to the Pacific Ocean.

in regions where air is channeled through a narrow opening such as the Golden Gate, the Carquinez Strait, or San Bruno Gap. For example, the average wind speed at San Francisco International Airport from 3:00 a.m. to 4:00 p.m. in July is about 20 miles per hour (mph), compared with only about 8 mph at San José and less than 7 mph at the Farallon Islands.

The sea breeze between the coast and the Central Valley<sup>2</sup> commences near the surface along the coast in late morning or early afternoon; it may first be observed only through the Golden Gate. Later in the day, the layer deepens and intensifies while spreading inland. As the breeze intensifies and deepens, it flows over the lower hills farther south along the peninsula. This process frequently can be observed as a bank of stratus clouds “rolling over” the coastal hills on the west side of the Bay. The depth of the sea breeze depends in large part upon the height and strength of the inversion. The generally low elevation of this stable layer of air prevents marine air from flowing over the coastal hills. It is unusual for the summer sea breeze to flow over terrain exceeding 2,000 feet in elevation.

In winter, the SFBAAB experiences periods of storminess, moderate-to-strong winds, and periods of stagnation with very light winds. Winter stagnation episodes are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, weak onshore flows in the afternoon, and otherwise light and variable winds.

A primary factor in air quality is the mixing depth (the vertical air column available for dilution of contaminant sources). Generally, the temperature of air decreases with height, creating a gradient from warmer air near the ground to cooler air at elevation. This is caused by most of the sun’s energy being converted to sensible heat at the ground, which in turn warms the air at the surface. The warm air rises in the atmosphere, where it expands and cools. Sometimes, however, the temperature of air actually increases with height. This condition is known as temperature inversion because the temperature profile of the atmosphere is “inverted” from its usual state. Over the SFBAAB, the frequent occurrence of temperature inversions limits mixing depth and, consequently, limits the availability of air for dilution.

## **Air Pollutant Types, Sources, and Effects**

### ***Criteria Air Pollutants***

Concentrations of criteria air pollutants are used as indicators of air quality conditions. Air pollutants are termed criteria air pollutants if they are regulated by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. According to the United States Environmental Protection Agency (EPA), criteria air pollutants are ozone, particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), lead, and sulfur dioxide (SO<sub>2</sub>). Table 3.3-1 provides a summary of the types, sources, and effects of criteria air pollutants of national and California concern.

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<sup>2</sup> A flat valley that dominates the geographical center of California stretching 450 miles from north-northwest to south-southeast, inland from and parallel to the Pacific Ocean coast. It is bounded by the Sierra Nevada to the east and the Coast Range to the west.

**Table 3.3-1: Description of Criteria Pollutants of National and California Concern**

Criteria Pollutant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Ozone	Ozone is a photochemical pollutant as it is not emitted directly into the atmosphere, but is formed by a complex series of chemical reactions between volatile organic compounds (VOC), nitrous oxides (NO <sub>x</sub> ), and sunlight. Ozone is a regional pollutant that is generated over a large area and is transported and spread by the wind.	Ozone is a secondary pollutant; thus, it is not emitted directly into the lower level of the atmosphere. The primary sources of ozone precursors (VOC and NO <sub>x</sub> ) are mobile sources (on-road and off-road vehicle exhaust).	Irritate respiratory system; reduce lung function; breathing pattern changes; reduction of breathing capacity; inflame and damage cells that line the lungs; make lungs more susceptible to infection; aggravate asthma; aggravate other chronic lung diseases; cause permanent lung damage; some immunological changes; increased mortality risk; vegetation and property damage.
Particulate matter (PM <sub>10</sub> ) Particulate matter (PM <sub>2.5</sub> )	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM <sub>10</sub> refers to particulate matter that is between 2.5 and 10 microns in diameter, (one micron is one-millionth of a meter). PM <sub>2.5</sub> refers to particulate matter that is 2.5 microns or less in diameter, about one-thirtieth the size of the average human hair.	Stationary sources include fuel or wood combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal, and recycling. Mobile or transportation related sources are from vehicle exhaust and road dust. Secondary particles form from reactions in the atmosphere.	<ul style="list-style-type: none"> <li>• Short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravate existing lung disease, causing asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias.</li> <li>• Long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; death.</li> </ul>
Nitrogen dioxide (NO <sub>2</sub> )	During combustion of fossil fuels, oxygen reacts with nitrogen to produce nitrogen oxides—NO <sub>x</sub> (NO, NO <sub>2</sub> , NO <sub>3</sub> , N <sub>2</sub> O, N <sub>2</sub> O <sub>3</sub> , N <sub>2</sub> O <sub>4</sub> , and N <sub>2</sub> O <sub>5</sub> ). NO <sub>x</sub> is a precursor to ozone, PM <sub>10</sub> , and PM <sub>2.5</sub> formation. NO <sub>x</sub> can react with compounds to form nitric acid and related small particles and result in PM related health effects.	NO <sub>x</sub> is produced in motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers. Nitrogen dioxide forms quickly from NO <sub>x</sub> emissions. NO <sub>2</sub> concentrations near major roads can be 30 to 100 percent higher than those at monitoring stations.	Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; contributions to atmospheric discoloration; increased visits to hospital for respiratory illnesses.

**Table 3.3-1 (cont.): Description of Criteria Pollutants of National and California Concern**

Criteria Pollutant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Carbon monoxide (CO)	CO is a colorless, odorless, toxic gas. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, replaces oxygen as an attachment to hemoglobin, and reduces available oxygen in the blood.	CO is produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources.	Ranges depending on exposure: slight headaches; nausea; aggravation of angina pectoris (chest pain) and other aspects of coronary heart disease; decreased exercise tolerance in persons with peripheral vascular disease and lung disease; impairment of central nervous system functions; possible increased risk to fetuses; death.
Sulfur dioxide (SO <sub>2</sub> )	Sulfur dioxide is a colorless, pungent gas. At levels greater than 0.5 parts per million (ppm), the gas has a strong odor, similar to rotten eggs. Sulfur oxides (SO <sub>x</sub> ) include sulfur dioxide and sulfur trioxide. Sulfuric acid is formed from sulfur dioxide, which can lead to acid deposition and can harm natural resources and materials. Although sulfur dioxide concentrations have been reduced to levels well below State and federal standards, further reductions are desirable because sulfur dioxide is a precursor to sulfate and PM <sub>10</sub> .	Human caused sources include fossil-fuel combustion, mineral ore processing, and chemical manufacturing. Volcanic emissions are a natural source of sulfur dioxide. The gas can also be produced in the air by dimethyl sulfide and hydrogen sulfide. Sulfur dioxide is removed from the air by dissolution in water, chemical reactions, and transfer to soils and ice caps. The sulfur dioxide levels in the State are well below the maximum standards.	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient sulfur dioxide levels. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.
Lead (Pb)	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. Leaded gasoline was used in motor vehicles until around 1970. Lead concentrations have not exceeded State or federal standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering.	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction, behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs.

**Table 3.3-1 (cont.): Description of Criteria Pollutants of National and California Concern**

Criteria Pollutant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
<p>Sources:</p> <p>National Toxicology Program. 2016. Report on Carcinogens, Fourteenth Edition; U.S. Department of Health and Human Services, Public Health Service. Diesel Exhaust Particles. Website: <a href="https://ntp.niehs.nih.gov/ntp/roc/content/profiles/dieselexhaustparticulates.pdf">https://ntp.niehs.nih.gov/ntp/roc/content/profiles/dieselexhaustparticulates.pdf</a>. Accessed July 30, 2018.</p> <p>National Toxicology Program. 2011. Report on Carcinogens, Twelfth Edition; U.S. Department of Health and Human Services, Public Health Service. June 10. Benzene. Website: <a href="http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Benzene.pdf">http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Benzene.pdf</a>. Accessed December 31, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2003. Particle Pollution and your Health. EPA-452/F-03-001. Website: <a href="https://www3.epa.gov/airnow/particles-bw.pdf">https://www3.epa.gov/airnow/particles-bw.pdf</a>. Accessed December 30, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2009. Fact Sheet, Proposed Revisions to the National Ambient Air Quality Standards for Nitrogen Dioxide. July 22. Website: <a href="https://www.gpo.gov/fdsys/pkg/FR-2009-07-15/pdf/E9-15944.pdf">https://www.gpo.gov/fdsys/pkg/FR-2009-07-15/pdf/E9-15944.pdf</a>. Accessed December 31, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2009. Ozone and your Health. EPA-456/F-09-001. Website: <a href="https://www3.epa.gov/airnow/ozone-c.pdf">https://www3.epa.gov/airnow/ozone-c.pdf</a>. Accessed December 30, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2010. Technology Transfer Network, Air Toxics Website. Page updated April 5, 2010. Health Effects Notebook for Hazardous Air Pollutants. Website: <a href="https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants">https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants</a>. Accessed December 31, 2019.</p>			

### **Toxic Air Contaminants**

Concentrations of toxic air contaminants (TAC) are also used as indicators of air quality conditions. TACs are defined as air pollutants that may cause or contribute to an increase in mortality or 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 very low concentrations. 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, runny nose, throat pain, or headaches). For those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which some adverse health impacts are not expected to occur. This contrasts with the criteria pollutants such as nitrogen dioxide and carbon dioxide for which acceptable levels of exposure can be determined and for which the State and federal governments have set ambient air quality standards.

TACs are separated into carcinogens and noncarcinogens based on the nature of the physiological effects associated with exposure to a particular TAC. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. Cancer risk is typically expressed as excess cancer cases per million exposed individuals, typically over a lifetime exposure or other prolonged duration. For noncarcinogenic substances, there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels may vary depending on the specific pollutant. Acute and chronic exposure to noncarcinogens is expressed as a hazard index (HI), which is the ratio of expected exposure levels to an acceptable reference exposure levels (RELs). Table 3.3-2 provides a summary of the types, sources, and effects of TACs.

To date, the California Air Resources Board (ARB) has designated nearly 200 compounds as TACs. The ARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risk from TACs can be attributed to a relatively few compounds, the most important being diesel particulate matter (DPM) from diesel-fueled engines. Common TACs of national and California concern include: DPM, volatile organic compounds (VOCs), benzene, asbestos, hydrogen sulfide, sulfates, visibility-reducing particulates, vinyl chloride, and lead. Table 3.3-2 provides a summary of the types, sources, and effects of TACs of national and California concern.

**Table 3.3-2: Description of Toxic Air Contaminants of National and California Concern**

Toxic Air Contaminant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Diesel Particulate Matter (DPM)	DPM is a source of PM <sub>2.5</sub> —diesel particles are typically 2.5 microns and smaller. Diesel exhaust is a complex mixture of thousands of particles and gases that is produced when an engine burns diesel fuel. Organic compounds account for 80 percent of the total particulate matter mass, which consists of compounds such as hydrocarbons and their derivatives, and polycyclic aromatic hydrocarbons and their derivatives. Fifteen polycyclic aromatic hydrocarbons are confirmed carcinogens, a number of which are found in diesel exhaust.	Diesel exhaust is a major source of ambient particulate matter pollution in urban environments. Typically, the main source of DPM is from combustion of diesel fuel in diesel-powered engines. Such engines are in on-road vehicles such as diesel trucks, off-road construction vehicles, diesel electrical generators, and various pieces of stationary construction equipment.	Some short-term (acute) effects of DPM exposure include eye, nose, throat, and lung irritation, coughs, headaches, light-headedness, and nausea. Studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks, and premature deaths among those suffering from respiratory problems. Human studies on the carcinogenicity of DPM demonstrate an increased risk of lung cancer, although the increased risk cannot be clearly attributed to diesel exhaust exposure.
VOCs	Reactive organic gases (ROGs), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably.	Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM <sub>10</sub> and lower visibility.	Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations because of interference with oxygen uptake. In general, concentrations of VOCs are suspected to cause eye, nose, and throat irritation; headaches; loss of coordination; nausea; and damage to the liver, the kidneys, and the central nervous system. Many VOCs have been classified as toxic air contaminants.

**Table 3.3-2 (cont.): Description of Toxic Air Contaminants of National and California Concern**

Toxic Air Contaminant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Benzene	Benzene is a VOC. It is a clear or colorless light-yellow, volatile, highly flammable liquid with a gasoline-like odor. The EPA has classified benzene as a “Group A” carcinogen.	Benzene is emitted into the air from fuel evaporation, motor vehicle exhaust, tobacco smoke, and from burning oil and coal. Benzene is used as a solvent for paints, inks, oils, waxes, plastic, and rubber. Benzene occurs naturally in gasoline at one to two percent by volume. The primary route of human exposure is through inhalation.	Short-term (acute) exposure of high doses from inhalation of benzene may cause dizziness, drowsiness, headaches, eye irritation, skin irritation, and respiratory tract irritation, and at higher levels, loss of consciousness can occur. Long-term (chronic) occupational exposure of high doses has caused blood disorders, leukemia, and lymphatic cancer.
Asbestos	Asbestos is the name given to a number of naturally occurring fibrous silicate minerals that have been mined for their useful properties such as thermal insulation, chemical and thermal stability, and high tensile strength. The three most common types of asbestos are chrysotile, amosite, and crocidolite.	Chrysotile, also known as white asbestos, is the most common type of asbestos found in buildings. Chrysotile makes up approximately 90 to 95 percent of all asbestos contained in buildings in the United States.	Exposure to asbestos is a health threat; exposure to asbestos fibers may result in health issues such as lung cancer, mesothelioma (a rare cancer of the thin membranes lining the lungs, chest, and abdominal cavity), and asbestosis (a non-cancerous lung disease that causes scarring of the lungs). Exposure to asbestos can occur during demolition or remodeling of buildings that were constructed prior to the 1977 ban on asbestos for use in buildings. Exposure to naturally occurring asbestos can occur during soil-disturbing activities in areas with deposits present.
Hydrogen Sulfide	Hydrogen sulfide (H <sub>2</sub> S) is a flammable, colorless, poisonous gas that smells like rotten eggs.	Manure, storage tanks, ponds, anaerobic lagoons, and land application sites are the primary sources of hydrogen sulfide. Anthropogenic sources include the combustion of sulfur containing fuels (oil and coal).	High levels of hydrogen sulfide can cause immediate respiratory arrest. It can irritate the eyes and respiratory tract and cause headache, nausea, vomiting, and cough. Long exposure can cause pulmonary edema.

**Table 3.3-2 (cont.): Description of Toxic Air Contaminants of National and California Concern**

Toxic Air Contaminant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Sulfates	Sulfates occur in combination with metal and/or hydrogen ions. Many sulfates are soluble in water.	Sulfates are particulates formed through the photochemical oxidation of sulfur dioxide. In California, the main source of sulfur compounds is combustion of gasoline and diesel fuel.	<ul style="list-style-type: none"> <li>(a) Decrease in ventilatory function;</li> <li>(b) aggravation of asthmatic symptoms;</li> <li>(c) aggravation of cardio-pulmonary disease;</li> <li>(d) vegetation damage;</li> <li>(e) degradation of visibility;</li> <li>(f) property damage.</li> </ul>
Visibility Reducing Particles	Suspended particulate matter is a mixture of small particles that consist of dry solid fragments, droplets of water, or solid cores with liquid coatings. The particles vary in shape, size, and composition. PM <sub>10</sub> refers to particulate matter that is between 2.5 and 10 microns in diameter (1 micron is one-millionth of a meter). PM <sub>2.5</sub> refers to particulate matter that is 2.5 microns or less in diameter, about one-thirtieth the size of the average human hair.	Stationary sources include fuel or wood combustion for electrical utilities, residential space heating, and industrial processes; construction and demolition; metals, minerals, and petrochemicals; wood products processing; mills and elevators used in agriculture; erosion from tilled lands; waste disposal; and recycling. Mobile or transportation-related sources are from vehicle exhaust and road dust. Secondary particles form from reactions in the atmosphere.	<ul style="list-style-type: none"> <li>• Short-term exposure (hours/days): irritation of the eyes, nose, throat; coughing; phlegm; chest tightness; shortness of breath; aggravates existing lung disease, causing asthma attacks and acute bronchitis; those with heart disease can suffer heart attacks and arrhythmias.</li> <li>• Long-term exposure: reduced lung function; chronic bronchitis; changes in lung morphology; death.</li> </ul>
Vinyl Chloride	Vinyl chloride, or chloroethene, is a chlorinated hydrocarbon and a colorless gas with a mild, sweet odor. In 1990, the California Air Resources Board (ARB) identified vinyl chloride as a toxic air contaminant and estimated a cancer unit risk factor.	Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products, including pipes, wire and cable coatings, and packaging materials. It can be formed when plastics containing these substances are left to decompose in solid waste landfills. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites.	Short-term exposure to high levels of vinyl chloride in the air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers.

**Table 3.3-2 (cont.): Description of Toxic Air Contaminants of National and California Concern**

Toxic Air Contaminant	Physical Description and Properties	Sources	Most Relevant Effects from Pollutant Exposure
Lead (Pb)	Lead is a solid heavy metal that can exist in air pollution as an aerosol particle component. Leaded gasoline was used in motor vehicles until around 1970. Lead concentrations have not exceeded State or federal standards at any monitoring station since 1982.	Lead ore crushing, lead-ore smelting, and battery manufacturing are currently the largest sources of lead in the atmosphere in the United States. Other sources include dust from soils contaminated with lead-based paint, solid waste disposal, and crustal physical weathering.	Lead accumulates in bones, soft tissue, and blood and can affect the kidneys, liver, and nervous system. It can cause impairment of blood formation and nerve conduction, behavior disorders, mental retardation, neurological impairment, learning deficiencies, and low IQs.
<p>Sources:</p> <p>California Air Resources Board (ARB). 2009. California Air Resources Board. Vinyl Chloride. Website: <a href="https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health">https://ww2.arb.ca.gov/resources/vinyl-chloride-and-health</a>. Accessed December 30, 2019.</p> <p>California Environmental Protection Agency. 2002. Office of Environmental Health Hazard Assessment. Health Effects of Diesel Exhaust. Website: <a href="https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf">https://oehha.ca.gov/media/downloads/calenviroscreen/indicators/diesel4-02.pdf</a>. Accessed December 30, 2019.</p> <p>National Toxicology Program. 2011. Report on Carcinogens, Twelfth Edition; U.S. Department of Health and Human Services, Public Health Service. Diesel Exhaust Particles. Website: <a href="http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/DieselExhaustParticulates.pdf">http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/DieselExhaustParticulates.pdf</a>. Accessed July 18, 2013.</p> <p>National Toxicology Program. 2011. Report on Carcinogens, Twelfth Edition; U.S. Department of Health and Human Services, Public Health Service. June 10. Benzene. Website: <a href="http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Benzene.pdf">http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/Benzene.pdf</a>. Accessed December 31, 2019.</p> <p>National Toxicology Program. 2016. Report on Carcinogens, Fourteenth Edition; U.S. Department of Health and Human Services, Public Health Service. Diesel Exhaust Particles. Website: <a href="https://ntp.niehs.nih.gov/ntp/roc/content/profiles/dieselexhaustparticulates.pdf">https://ntp.niehs.nih.gov/ntp/roc/content/profiles/dieselexhaustparticulates.pdf</a>. Accessed July 30, 2018.</p> <p>United States Environmental Protection Agency (EPA). 2003. Particle Pollution and your Health. EPA-452/F-03-001. Website: <a href="https://www3.epa.gov/airnow/particles-bw.pdf">https://www3.epa.gov/airnow/particles-bw.pdf</a>. Accessed December 30, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2010. Technology Transfer Network, Air Toxics Website. Page updated April 5, 2010. Health Effects Notebook for Hazardous Air Pollutants. Website: <a href="https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants">https://www.epa.gov/haps/health-effects-notebook-hazardous-air-pollutants</a>. Accessed December 31, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2011. Indoor Air Quality. Sources of Indoor Air Pollution—Organic Gases (Volatile Organic Compounds—VOCs). Website: <a href="http://www.epa.gov/iaq/voc.html">www.epa.gov/iaq/voc.html</a>. Accessed December 31, 2019.</p> <p>United States Environmental Protection Agency (EPA). 2012. EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017–2025 Cars and Light Trucks. Website: <a href="http://www.epa.gov/otaq/climate/documents/420f12051.pdf">http://www.epa.gov/otaq/climate/documents/420f12051.pdf</a>. Accessed December 31, 2019.</p>			

## Air Quality

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features. Atmospheric conditions such as wind speed, wind direction, and air temperature inversions interact with the physical features of the landscape

to determine the movement and dispersal of air pollutant emissions and, consequently, their effect on air quality.

### **Regional Air Quality**

The Bay Area Air Quality Management District (BAAQMD) is the regional agency with jurisdiction for regulating air quality within the nine-county SFBAAB.

#### *Air Pollutant Standards and Attainment Designations*

Air pollutant standards have been identified by the EPA and the ARB for the following six criteria air pollutants that affect ambient air quality: ozone, NO<sub>2</sub>, CO, SO<sub>2</sub>, lead, and particulate matter (PM), which is subdivided into two classes based on particle size: PM equal to or less than 10 microns in diameter (PM<sub>10</sub>), and PM equal to or less than 2.5 microns in diameter (PM<sub>2.5</sub>). These air pollutants are called “criteria air pollutants,” because they are regulated by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. California has also established standards for toxic air contaminants such as visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. Table 3.3-3 presents the National Ambient Air Quality Standards (NAAQS) and California ambient air quality standards (CAAQS) for these aforementioned air pollutants. Note that there are no State or federal air quality standards for VOCs, benzene, or DPM.

**Table 3.3-3: Federal and State Air Quality Standards in the SFBAAB**

Air Pollutant	Averaging Time	California Standard	Federal Standard <sup>a</sup>
Ozone	1 Hour	0.09 ppm	—
	8 Hour	0.070 ppm	0.070 ppm <sup>f</sup>
Nitrogen dioxide <sup>b</sup> (NO <sub>2</sub> )	1 Hour	0.18 ppm	0.100 ppm
	Annual	0.030 ppm	0.053 ppm
Carbon monoxide (CO)	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
Sulfur dioxide <sup>c</sup> (SO <sub>2</sub> )	1 Hour	0.25 ppm	0.075 ppm
	3 Hour	—	0.5 ppm
	24 Hour	0.04 ppm	0.14 (for certain areas)
	Annual	—	0.030 ppm (for certain areas)
Lead <sup>e</sup>	30-day	1.5 µg/m <sup>3</sup>	—
	Quarter	—	1.5 µg/m <sup>3</sup>
	Rolling 3-month average	—	0.15 µg/m <sup>3</sup>
Particulate matter (PM <sub>10</sub> )	24 Hour	50 µg/m <sup>3</sup>	150 µg/m <sup>3</sup>
	Mean	20 µg/m <sup>3</sup>	—

**Table 3.3-3 (cont.): Federal and State Air Quality Standards in the SFBAAB**

Air Pollutant	Averaging Time	California Standard	Federal Standard <sup>a</sup>
Particulate matter (PM <sub>2.5</sub> )	24 Hour	—	35 µg/m <sup>3</sup>
	Annual	12 µg/m <sup>3</sup>	12.0 µg/m <sup>3</sup>
Visibility-reducing particles	8 Hour	See note below <sup>d</sup>	
Sulfates	24 Hour	25 µg/m <sup>3</sup>	—
Hydrogen sulfide	1 Hour	0.03 ppm	—
Vinyl chloride <sup>e</sup>	24 Hour	0.01 ppm	—
<p>Notes:</p> <p>ppm = parts per million (concentration) µg/m<sup>3</sup> = micrograms per cubic meter    Annual = Annual Arithmetic Mean  30-day = 30-day average    Quarter = Calendar quarter</p> <p><sup>a</sup> Federal standard refers to the primary national ambient air quality standard, or the levels of air quality necessary, with an adequate margin of safety to protect the public health. All standards listed are primary standards except for 3-Hour SO<sub>2</sub>, which is a secondary standard. A secondary standard is the level of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.</p> <p><sup>b</sup> To attain the 1-hour nitrogen dioxide national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (0.100 ppm).</p> <p><sup>c</sup> On June 2, 2010, a new 1-hour SO<sub>2</sub> standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 part per billion (ppb). The 1971 SO<sub>2</sub> national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.</p> <p><sup>d</sup> Visibility reducing particles: In 1989, the ARB converted both the general Statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and “extinction of 0.07 per kilometer” for the Statewide and Lake Tahoe Air Basin standards, respectively.</p> <p><sup>e</sup> The ARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.</p> <p><sup>f</sup> The EPA Administrator approved a revised 8-hour ozone standard of 0.07 ppb on October 1, 2015. The new standard went into effect 60 days after publication of the Final Rule in the Federal Register. The Final Rule was published in the Federal Register on October 26, 2015 and became effective on December 28, 2015.</p> <p>Source of Standards:  South Coast Air Quality Management District (SCAQMD). 2016. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) Attainment Status for South Coast Air Basin. February. Website <a href="http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf?sfvrsn=2">http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/naaqs-caaqs-feb2016.pdf?sfvrsn=2</a>. Accessed June 30, 2017.</p>			

Ambient air pollutant concentrations in the SFBAAB are measured at air quality monitoring stations operated by the ARB and BAAQMD. In general, the SFBAAB experiences low concentrations of most pollutants compared to federal or State standards.

Both the EPA and ARB use ambient air quality monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify the areas with air quality problems and initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. “Attainment” status refers to those regions that are meeting federal and/or State standards for a specified criteria pollutant. “Nonattainment” refers to regions that do not meet federal and/or State standards for a specified

criteria pollutant. “Unclassified” refers to regions where there is not enough data to determine the region’s attainment status for a specified criteria air pollutant. Each standard has a different definition, or “form” of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual PM<sub>2.5</sub> standard is met if the three-year average of the annual average PM<sub>2.5</sub> concentration is less than or equal to the standard.

The current attainment designations for the SFBAAB are shown in Table 3.3-4. The SFBAAB is designated as nonattainment for the State ozone, PM<sub>10</sub>, and PM<sub>2.5</sub>, standards and nonattainment for the national ozone and PM<sub>2.5</sub> standards.

**Table 3.3-4: San Francisco Bay Area Air Basin Attainment Status**

Pollutant	State Status	National Status
Ozone	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO <sub>2</sub>	Attainment	Attainment
SO <sub>2</sub>	Attainment	Attainment
PM <sub>10</sub>	Nonattainment	Unclassified
PM <sub>2.5</sub>	Nonattainment	Nonattainment
Sulfates	Attainment	N/A
Hydrogen Sulfates	Unclassified	N/A
Visibility-reducing Particles	Unclassified	N/A
Lead	N/A	Attainment
Source: Bay Area Air Quality Management District (BAAQMD). 2017. Air Quality Standards and Attainment Status. January. Website: <a href="http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status">http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status</a> . Accessed February 8, 2019.		

#### *Air Quality Index*

The health impacts of the various air pollutants of concern can be presented in a number of ways. The clearest comparison is to the State and federal ozone standards. If concentrations are below the standard, it is safe to say that no health impact would occur to anyone. When concentrations exceed the standard, impacts will vary based on the amount by which the standard is exceeded. The EPA developed the Air Quality Index (AQI) as an easy-to-understand measure of health impacts compared with concentrations in the air. Table 3.3-5 provides a general description of the health impacts of ozone at different concentrations.

**Table 3.3-5: Air Quality Index and Health Effects from Ozone**

Air Quality Index/ 8-hour Ozone Concentration	Health Effects Description
<b>AQI—51–100—Moderate</b>  Concentration 55–70 ppb	<b>Sensitive Groups:</b> Children and people with asthma are the groups most at risk.
	<b>Health Effects Statements:</b> Unusually sensitive individuals may experience respiratory symptoms.
	<b>Cautionary Statements:</b> Unusually sensitive people should consider limiting prolonged outdoor exertion.
<b>AQI—101–150—Unhealthy for Sensitive Groups</b>  Concentration 86–105 ppb	<b>Sensitive Groups:</b> Children and people with asthma are the groups most at risk.
	<b>Health Effects Statements:</b> Increasing likelihood of respiratory symptoms and breathing discomfort in active children and adults and people with respiratory disease, such as asthma.
	<b>Cautionary Statements:</b> Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
<b>AQI—151–200—Unhealthy</b>  Concentration 86–105 ppb	<b>Sensitive Groups:</b> Children and people with asthma are the groups most at risk.
	<b>Health Effects Statements:</b> Greater likelihood of respiratory symptoms and breathing difficulty in active children and adults and people with respiratory disease, such as asthma; possible respiratory effects in general population.
	<b>Cautionary Statements:</b> Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
<b>AQI—201–300—Very Unhealthy</b>  Concentration 106–200 ppb	<b>Sensitive Groups:</b> Children and people with asthma are the groups most at risk.
	<b>Health Effects Statements:</b> Increasingly severe symptoms and impaired breathing likely in active children and adults and people with respiratory disease, such as asthma; increasing likelihood of respiratory effects in general population.
	<b>Cautionary Statements:</b> Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
Source: Air Now. 2015. AQI Calculator: AQI to Concentration. Website: <a href="http://www.airnow.gov/index.cfm?action=resources.aqi_conc_calc">http://www.airnow.gov/index.cfm?action=resources.aqi_conc_calc</a> . Accessed July 2, 2018.	

### Local Air Quality

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features. Atmospheric conditions such as wind speed, wind direction, and air temperature inversions interact with the physical features of the landscape

to determine the movement and dispersal of air pollutant emissions and, consequently, their effect on air quality. While the predominant average hourly wind direction in the City of Antioch varies throughout the year, and instantaneous wind speed and direction vary more widely than hourly averages, the wind most often comes from the west for approximately 9 months between mid-February and mid-November, and most often from the north for approximately 3 months between mid-November and mid-February.<sup>3</sup>

The local air quality can be evaluated by reviewing relevant air pollution concentrations near the project area. The air quality monitoring station closest to the project site is the Bethel Island Road Air Monitoring Site, which is located approximately 8.3 miles northeast of the project site. Table 3.3-6 summarizes the recorded ambient air data at the representative monitoring stations for years 2016 through 2018, which is the most current data available at the time of this writing. As Table 3.3-6 shows, the recorded data show exceedances of the California standards for PM<sub>10</sub> (24-hour), and national standards for ozone (8-hour) and PM<sub>2.5</sub> (24-hour), on multiple occasions from 2016 through 2018. No exceedances of either the State or national standards were recorded for CO, NO<sub>2</sub>, or SO<sub>2</sub>. No recent monitoring data for Contra Costa County or the San Francisco Air Basin was available for CO or SO<sub>2</sub>. Generally, no monitoring is conducted for pollutants that are no longer likely to exceed ambient air quality standards.

**Table 3.3-6: Air Quality Monitoring Summary**

Air Pollutant	Averaging Time	Item	2016	2017	2018
Ozone <sup>(1)</sup>	1 Hour	Max 1 Hour (ppm)	0.089	0.090	0.093
		Days > State Standard (0.09 ppm)	0	0	0
	8 Hour	Max 8 Hour (ppm)	<b>0.81</b>	<b>0.071</b>	<b>0.078</b>
		Days > State Standard (0.07 ppm)	1	2	2
		Days > National Standard (0.070 ppm) <sup>(2)</sup>	<b>2</b>	<b>1</b>	<b>1</b>
CO	8 Hour	Max 8 Hour (ppm)	ND	ND	ND
		Days > State Standard (9.0 ppm)	ND	ND	ND
		Days > National Standard (9 ppm)	ND	ND	ND
NO <sub>2</sub> <sup>(1)</sup>	Annual	Annual Average (ppm)	0.005	0.005	0.005
	1 Hour	Max 1 Hour (ppm)	0.032	0.034	0.042
		Days > State Standard (0.18 ppm)	0	0	0
SO <sub>2</sub>	Annual	Annual Average (ppm)	ND	ND	ND
	24 Hour	Max 24 Hour (ppm)	ND	ND	ND
		Days > State Standard (0.04 ppm)	ND	ND	ND

<sup>3</sup> Weatherspark. 2020. Average Weather in Antioch. Website: <https://weatherspark.com/y/1111/Average-Weather-in-Antioch-California-United-States-Year-Round>. Accessed March 3, 2020.

**Table 3.3-6 (cont.): Air Quality Monitoring Summary**

Air Pollutant	Averaging Time	Item	2016	2017	2018
Inhalable coarse particles (PM <sub>10</sub> ) <sup>(1)</sup>	Annual	Annual Average (µg/m <sup>3</sup> )	7.5	7.9	10.0
	24 Hour	24 Hour (µg/m <sup>3</sup> )	26.0	<b>52.0</b>	<b>151.0</b>
		Days > State Standard (50 µg/m <sup>3</sup> )	ID	ID	ID
		Days > National Standard (150 µg/m <sup>3</sup> )	0	ID	ID
Fine particulate matter (PM <sub>2.5</sub> ) <sup>(3)</sup>	Annual	Annual Average (µg/m <sup>3</sup> )	5.9	12.0	13.4
	24 Hour	24 Hour (µg/m <sup>3</sup> )	20.7	<b>89.4</b>	<b>180.0</b>
		Days > National Standard (35 µg/m <sup>3</sup> )	0	<b>6.0</b>	<b>14.2</b>

Notes:

> = exceed

ppm = parts per million

µg/m<sup>3</sup> = micrograms per cubic meter

ID = insufficient data

ND = no data

max = maximum

**Bold** = exceedance

State Standard = California Ambient Air Quality Standard

National Standard = National Ambient Air Quality Standard

<sup>(1)</sup> Bethel Island Road Air Monitoring Station

<sup>(2)</sup> On October 1, 2015, the EPA strengthened the NAAQS for ground-level ozone to 70 parts per million through the adoption of a new standard. The Final Rule went into effect on December 28, 2015.

<sup>(3)</sup> Concord-2975 Treat Blvd Air Monitoring Station

Source: California Air Resources Board (ARB). 2018. iADAM: Air Quality Data Statistics. Website: <https://www.arb.ca.gov/adam>. Accessed October 1, 2019.

### Air Pollution Sensitive Receptors

Air pollution does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others are. Land uses such as residences, schools, day care centers, hospitals, nursing and convalescent homes, and parks are considered the most sensitive to poor air quality, because the population groups associated with these uses have increased susceptibility to respiratory distress or, as in the case of residential receptors, their exposure time is greater than that for other land uses. Therefore, these groups are referred to as sensitive receptors. Exposure assessment guidance typically assumes that residences would be exposed to air pollution 24 hours per day, 350 days per year, for 70 years. The BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, day care centers, hospitals, and senior-care facilities.

### Project Vicinity

The areas surrounding the proposed project include a single-family, medium density residential subdivision to the north, undeveloped portions of the Sand Creek Focus Area to the south, Mixed-Use Medical Facility to the east, and a continuation of undeveloped Sand Creek Focus Area land to the west.

The nearest sensitive receptors are single-family residences located approximately 10 feet (3 meters) north of the project site, and the Kaiser Permanente Antioch Medical Center across Deer Valley Road, approximately 500 feet east of the project site.

### Existing Air Pollutant Emissions

There are no calculable sources of air pollutants currently emitted from the project site, although some level of methane is likely emitted from the cattle grazing.

### 3.3.3 - Regulatory Framework

#### Federal

##### *Clean Air Act*

Congress established much of the basic structure of the Clean Air Act (CAA) in 1970 and made major revisions in 1977 and 1990. Six common air pollutants (also known as criteria pollutants) are addressed in the CAA. These are particulate matter, ground-level ozone, CO, sulfur oxides, nitrogen oxides, and lead. The EPA calls these pollutants criteria air pollutants because it regulates them by developing human health-based and/or environmentally based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health are called primary standards. Another set of limits intended to prevent environmental and property damage are called secondary standards.<sup>4</sup> The federal standards are called NAAQS. The air quality standards provide benchmarks for determining whether air quality is healthy at specific locations and whether development activities will cause or contribute to a violation of the standards. The criteria pollutants are:

- Ozone
- Nitrogen dioxide (NO<sub>2</sub>)
- Lead
- Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>)
- Carbon monoxide (CO)
- Sulfur dioxide

The federal standards were set to protect public health, including that of sensitive individuals; thus, the EPA is tasked with updating the standards as more medical research is available regarding the health effects of the criteria pollutants. Primary federal standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

The Clean Air Act also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). 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. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies.

##### *EPA Emission Standards for New Off-Road Equipment*

Before 1994, there were no standards to limit the amount of emissions from off-road equipment. In 1994, the EPA established emission standards for hydrocarbons, NO<sub>x</sub>, CO, and PM to regulate new

<sup>4</sup> United States Environmental Protection Agency (EPA). 2014. Clean Air Act Requirements and History. Website: <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>. Accessed December 10, 2019.

pieces of off-road equipment. These emission standards came to be known as Tier 1. Since that time, increasingly more stringent Tier 2, Tier 3, and Tier 4 (interim and final) standards were adopted by the EPA, as well as by the ARB. Each adopted emission standard was phased in over time. New engines built in and after 2015 across all horsepower sizes must meet Tier 4 final emission standards. In other words, new manufactured engines cannot exceed the emissions established for Tier 4 final emissions standards.

## **State**

### ***California Air Quality Control Plan (State Implementation Plan)***

A SIP is a document prepared by each state describing existing air quality conditions and measures that will be followed to attain and maintain federal standards. The SIP for the State of California is administered by the ARB, which has overall responsibility for Statewide air quality maintenance and air pollution prevention. California's SIP incorporates individual federal attainment plans for regional air districts—an air district prepares their federal attainment plan, which is sent to the ARB to be approved and incorporated into the California SIP. Federal attainment plans include the technical foundation for understanding air quality (e.g., emission inventories and air quality monitoring), control measures and strategies, and enforcement mechanisms for attaining and maintaining air quality standards.

Areas designated nonattainment must develop air quality plans and regulations to achieve standards by specified dates, depending on the severity of the exceedances. For much of the country, implementation of federal motor vehicle standards and compliance with federal permitting requirements for industrial sources are adequate to attain air quality standards on schedule. For many areas of California, however, additional State and local regulation is required to achieve the standards.

### ***California Clean Air Act***

The California Legislature enacted the California Clean Air Act (CCAA) in 1988 to address air quality issues of concern not adequately addressed by the federal CAA at the time. California's air quality problems were and continue to be some of the most severe in the nation, and required additional actions beyond the federal mandates. The ARB administers the CAAQS for the 10 air pollutants designated in the CCAA. The 10 State air pollutants are the six federal standards listed above as well as visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride. The EPA authorized California to adopt its own regulations for motor vehicles and other sources that are more stringent than similar federal regulations implementing the CAA. Generally, the planning requirements of the CCAA are more stringent than the federal CAA; therefore, consistency with the CAA will also demonstrate consistency with the CCAA.

Other ARB responsibilities include but are not limited to overseeing local air district compliance with California and federal laws; approving local air quality plans; submitting SIPs to EPA; monitoring air quality; determining and updating area designations and maps; conducting basic research aimed at providing a better understanding between emissions and public well-being, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

***California Health and Safety Code Section 39655 and California Code of Regulations Title 17 Section 93000 (Substances Identified as Toxic Air Contaminants)***

The ARB identifies substances as TACs as defined in Health and Safety Code Section 39655 and listed in Title 17, Section 93000 of the California Code of Regulations, “Substances Identified As Toxic Air Contaminants.” A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or 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. In general, for those TACs that may cause cancer, there are thresholds set by regulatory agencies below which adverse health impacts are not expected to occur. This contrasts with the criteria pollutants for which acceptable levels of exposure can be determined and for which the State and federal governments have set ambient air quality standards. According to the California Almanac of Emissions and Air Quality, the majority of the estimated health risk from TACs for the State of California can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM) from diesel-fueled engines.

***California Low-Emission Vehicle Program***

The ARB first adopted Low-Emission Vehicle (LEV) program standards in 1990. These first LEV standards ran from 1994 through 2003. LEV II regulations, running from 2004 through 2010, represent continuing progress in emission reductions. As the State’s passenger vehicle fleet continues to grow and more sport utility vehicles and pickup trucks are used as passenger cars rather than work vehicles, the more stringent LEV II standards were adopted to provide reductions necessary for California to meet federally mandated clean air goals outlined in the 1994 SIP. In 2012, the ARB adopted the LEV III amendments to California’s LEV regulations. These amendments, also known as the Advanced Clean Car Program, include more stringent emission standards for model years 2017 through 2025 for both criteria pollutants and greenhouse gas (GHG) emissions for new passenger vehicles.<sup>5</sup>

***California On-Road Heavy-Duty Vehicle Program***

The ARB has adopted standards for emissions from various types of new on-road heavy-duty vehicles. Section 1956.8, Title 13, California Code of Regulations contains California’s emission standards for on-road heavy-duty engines and vehicles, and test procedures. The ARB has also adopted programs to reduce emissions from in-use heavy-duty vehicles including the Heavy-Duty Diesel Vehicle Idling Reduction Program, the Heavy-Duty Diesel In-Use Compliance Program, the Public Bus Fleet Rule and Engine Standards, and the School Bus Program and others.<sup>6</sup>

***California In-Use Off-Road Diesel Vehicle Regulation***

On July 26, 2007, the ARB adopted a regulation to reduce DPM and NO<sub>x</sub> emissions from in-use (existing) off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale.

<sup>5</sup> California Air Resources Board (ARB). 2013. Clean Car Standards—Pavley, Assembly Bill 1493. Website: <http://www.arb.ca.gov/cc/ccms/ccms.htm>. Accessed December 10, 2019.

<sup>6</sup> California Air Resources Board (ARB). 2013. The California Almanac of Air Quality and Emissions—2013 Edition. Website: <http://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm>. Accessed December 10, 2019.

The ARB is enforcing that part of the rule with fines up to \$10,000 per day for each vehicle in violation. Performance requirements of the rule are based on a fleet's average NO<sub>x</sub> emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirements, making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

The latest amendments to the Truck and Bus regulation became effective on December 31, 2014. The amended regulation requires diesel trucks and buses that operate in California to be upgraded to reduce emissions. Newer heavier trucks and buses must meet PM filter requirements beginning January 1, 2012. Lighter and older heavier trucks must be replaced starting January 1, 2015. By January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent.

The regulation applies to nearly all privately and federally owned diesel fueled trucks and buses and to privately and publicly owned school buses with a gross vehicle weight rating greater than 14,000 pounds. The regulation provides a variety of flexibility options tailored to fleets operating low use vehicles, fleets operating in selected vocations like agricultural and construction, and small fleets of three or fewer trucks.<sup>7</sup>

#### ***California Airborne Toxic Control Measures for Asbestos***

The ARB has adopted Airborne Toxic Control Measures (ATCM) for sources that emit a particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate Best Available Control Technology to minimize emissions.

In July 2001, the ARB approved an ATCM for construction, grading, quarrying and surface mining operations to minimize emissions of naturally occurring asbestos. The regulation requires application of Best Management Practices (BMPs) to control fugitive dust in areas known to have naturally occurring asbestos and requires notification to the local air district prior to commencement of ground-disturbing activities. The measure establishes specific testing, notification and engineering controls prior to grading, quarrying, or surface mining in construction zones where naturally occurring asbestos is located on projects of any size. There are additional notification and engineering controls at work sites larger than 1 acre in size. These projects require the submittal of a "Dust Mitigation Plan" and approval by the air district prior to the start of a project.

Construction sometimes requires the demolition of existing buildings where construction occurs. Asbestos is also found in a natural state, known as naturally occurring asbestos. Exposure and disturbance of rock and soil that naturally contain asbestos can result in the release of fibers into the air and consequent exposure to the public. Asbestos most commonly occurs in ultramafic rock that has undergone partial or complete alteration to serpentine rock (serpentinite) and often contains chrysotile asbestos. In addition, another form of asbestos, tremolite, can be found associated with

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<sup>7</sup> California Air Resources Board (ARB). 2015. On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation. Website: <http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>. Accessed December 10, 2019.

ultramafic rock, particularly near faults. Sources of asbestos emissions include unpaved roads or driveways surfaced with ultramafic rock, construction activities in ultramafic rock deposits, or rock quarrying activities where ultramafic rock is present.

The ARB has an Air Toxics Control Measure for construction, grading, quarrying, and surface mining operations, requiring the implementation of mitigation measures to minimize emissions of asbestos-laden dust. The measure applies to road construction and maintenance, construction and grading operations, and quarries and surface mines when the activity occurs in an area where naturally occurring asbestos is likely to be found. Areas are subject to the regulation if they are identified on maps published by the Department of Conservation as ultramafic rock units or if the Air Pollution Control Officer or owner/operator has knowledge of the presence of ultramafic rock, serpentine, or naturally occurring asbestos on the site. The measure also applies if ultramafic rock, serpentine, or asbestos is discovered during any operation or activity.

### ***Verified Diesel Emission Control Strategies***

The EPA and ARB tiered off-road emission standards only apply to new engines and off-road equipment can last several years. The ARB has developed Verified Diesel Emission Control Strategies (VDECS), which are devices, systems, or strategies used to achieve the highest level of pollution control from existing off-road vehicles, to help reduce emissions from existing engines. VDECS are designed primarily for the reduction of DPM emissions and have been verified by the ARB. There are three levels of VDECS, the most effective of which is the Level 3 VDECS. Tier 4 engines are not required to install VDECS because they already meet the emissions standards for lower tiered equipment with installed controls.

### ***California Diesel Risk Reduction Plan***

The ARB Diesel Risk Reduction Plan has led to the adoption of new State regulatory standards for all new on-road, off-road, and stationary diesel-fueled engines and vehicles to reduce DPM emissions in 2020 by about 90 percent overall from year 2000 levels. The projected emission benefits associated with the full implementation of this plan, including federal measures, are reductions in DPM emissions and associated cancer risks of 75 percent by 2010, and 85 percent by 2020.<sup>8</sup>

### ***Tanner Air Toxics Act and Air Toxics Hot Spots Information and Assessment Act***

TACs in California are primarily regulated through the Tanner Air Toxics Act (Assembly Bill [AB] 1807) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588), also known as the Hot Spots Act. To date, the ARB has identified more than 21 TACs, and has adopted the EPA list of Hazardous Air Pollutants (HAPs) as TACs.

### ***Carl Moyer Memorial Air Quality Standards Attainment Program***

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program), a partnership between the ARB and local air districts, issues grants to replace or retrofit older engines and equipment with engines and equipment that exceed current regulatory requirements to reduce air pollution. Money collected through the Carl Moyer Program complements California's regulatory

<sup>8</sup> California Air Resources Board (ARB). 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles. Website: <http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf>. Accessed December 10, 2019.

program by providing incentives to effect early or extra emission reductions, especially from emission sources in environmental justice communities and areas disproportionately affected by air pollution. The program has established guidelines and criteria for the funding of emissions reduction projects. Within the SFBAAB, the BAAQMD administers the Carl Moyer Program. The program has established guidelines and criteria for the funding of emissions reduction projects. Within the SFBAAB, the BAAQMD administers the Carl Moyer Program. The program establishes cost-effectiveness criteria for funding emission reductions projects, which under the final 2017 Carl Moyer Program Guidelines are \$30,000 per weighted ton of NO<sub>x</sub>, ROG, and PM.<sup>9</sup>

## Regional

### ***BAAQMD CEQA Air Quality Guidelines***

The BAAQMD is the primary agency responsible for ensuring that air quality standards (NAAQS and CAAQS) are attained and maintained in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The BAAQMD prepares plans to attain ambient air quality standards in the SFBAAB. The BAAQMD prepares ozone attainment plans for the national ozone standard, clean air plans (CAPs) for the California standard, and PM plans to fulfill federal air quality planning requirements. Additionally, the BAAQMD inspects stationary sources of air pollution; responds to citizen complaints; monitors ambient air quality and meteorological conditions; and implements programs and regulations required by the Clean Air Act, the Clean Air Act Amendments of 1990, and the California Clean Air Act.

The BAAQMD developed quantitative thresholds of significance for its California Environmental Quality Act (CEQA) Guidelines in 2010, which were also included in its updated 2011 Guidelines.<sup>10,11</sup> The BAAQMD adoption of the 2010 thresholds of significance was later challenged in court. In an opinion issued on December 17, 2015, related to the BAAQMD CEQA Guidelines, the California Supreme Court held that CEQA does not generally require an analysis of the impacts of locating development in areas subject to environmental hazards unless the project would exacerbate existing environmental hazards. The Supreme Court also found that CEQA requires the analysis of exposing people to environmental hazards in specific circumstances, including the location of development near airports, schools near sources of toxic contamination, and certain exemptions for infill and workforce housing. The Supreme Court also held that public agencies remain free to voluntarily conduct this analysis not required by CEQA for their own public projects (CBIA v. BAAQMD [2016] 2 Cal. App. 5<sup>th</sup> 1067, 1083).

In view of the Supreme Court's opinion, the BAAQMD published a new version of its CEQA Guidelines in May 2017. The BAAQMD CEQA Guidelines state that local agencies may rely on thresholds designed to reflect the impact of locating development near areas of toxic air contamination where such an analysis is required by CEQA or where the agency has determined that

<sup>9</sup> California Air Resources Board (ARB). 2017. 2017 Carl Moyer Program Guidelines. Website: <https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm>. Accessed November 30, 2019.

<sup>10</sup> Bay Area Air Quality Management District (BAAQMD). 2010. CEQA Air Quality Guidelines. Website: [https://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Draft\\_BAAQMD\\_CEQA\\_Guidelines\\_May\\_2010\\_Final.ashx](https://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx). Accessed November 15, 2019.

<sup>11</sup> Bay Area Air Quality Management District (BAAQMD). 2010. CEQA Air Quality Guidelines. Website: <https://www.baaqmd.gov/~media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en>. Accessed November 15, 2019.

such an analysis would assist in making a decision about the project. However, the thresholds are not mandatory, and agencies should apply them only after determining that they reflect an appropriate measure of a project's impacts. The BAAQMD's guidelines for implementation of the thresholds are for informational purposes only, to assist local agencies.

To fulfill federal air quality planning requirements, the BAAQMD adopted a PM<sub>2.5</sub> emissions inventory for year 2010 at a public hearing on November 7, 2012. The Bay Area Clean Air Plan also included several measures for reducing PM emissions from stationary sources and wood burning. On January 9, 2013, the EPA issued a final rule determining that the Bay Area has attained the 24-hour PM<sub>2.5</sub> NAAQS, suspending federal SIP planning requirements for the SFBAAB.<sup>12</sup> Despite this EPA action, the SFBAAB will continue to be designated as nonattainment for the national 24-hour PM<sub>2.5</sub> standard until the BAAQMD submits a redesignation request and a maintenance plan to the EPA, and the EPA approves the proposed redesignation.

The SFBAAB is in nonattainment for the federal PM<sub>10</sub> and federal PM<sub>2.5</sub> standards. The EPA lowered the 24-hour PM<sub>2.5</sub> standard from 65 micrograms per cubic meter (µg/m<sup>3</sup>) to 35 µg/m<sup>3</sup> in 2006, and designated the Air Basin as nonattainment for the new PM<sub>2.5</sub> standard effective December 14, 2009.

On December 8, 2011, the ARB submitted a "clean data finding" request to the EPA on behalf of the Bay Area. If the clean data finding request is approved, then EPA guidelines provide that the region can fulfill federal PM<sub>2.5</sub> SIP requirements by preparing either a redesignation request and a PM<sub>2.5</sub> maintenance plan, or a "clean data" SIP submittal. Because peak PM<sub>2.5</sub> levels can vary from year to year based on natural, short-term changes in weather conditions, the BAAQMD believes that it would be premature to submit a redesignation request and PM<sub>2.5</sub> maintenance plan at this time. Therefore, the BAAQMD will prepare a "clean data" SIP to address the required elements, including:

- An emission inventory for primary PM<sub>2.5</sub>, as well as precursors to secondary PM formation
- Amendments to the BAAQMD's New Source Review regulation to address PM<sub>2.5</sub>

### **BAAQMD 2017 Clean Air Plan**

The BAAQMD adopted the Bay Area Clean Air Plan: Spare the Air, Cool the Climate (Bay Area Clean Air Plan) on April 19, 2017, to provide a regional strategy to improve Bay Area air quality and meet public health goals.<sup>13</sup> The control strategy described in the Bay Area Clean Air Plan includes a wide range of control measures designed to reduce emissions and lower ambient concentrations of harmful pollutants, safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, and reduce GHG emissions to protect the climate.

The Bay Area Clean Air Plan addresses four categories of pollutants: ground-level ozone and its key precursors, ROG and NO<sub>x</sub>; PM, primarily PM<sub>2.5</sub>, and precursors to secondary PM<sub>2.5</sub>; air toxics; and

<sup>12</sup> United States Environmental Protection Agency (EPA). 2013. Federal Register. Determination of Attainment for the San Francisco Bay Area Nonattainment Area for the 2006 Fine Particle Standard; California; Determination Regarding Applicability of Clean Air Act Requirements. Website: <https://www.federalregister.gov/documents/2013/01/09/2013-00170/determination-of-attainment-for-the-san-francisco-bay-area-nonattainment-area-for-the-2006-fine>. Accessed June 5, 2018.

<sup>13</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Final 2017 Clean Air Plan. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a\\_-proposed-final-cap-vol-1-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en). Accessed April 24, 2018.

GHGs. The control measures are categorized based on the economic sector framework including stationary sources, transportation, energy, buildings, agriculture, natural and working lands, waste management, and water measures.<sup>14</sup>

### ***BAAQMD Regulations***

#### *Regulation 2, Rule 5 (New Source Review Permitting)*

The BAAQMD regulates backup emergency generators, fire pumps, and other sources of TACs through its New Source Review (Regulation 2, Rule 5) permitting process.<sup>15</sup> Although emergency generators are intended to be used only during periods of power outages, monthly testing of each generator is required; however, the BAAQMD limits testing to no more than 50 hours per year. Each emergency generator installed is assumed to meet a minimum of Tier 2 emission standards (before control measures). As part of the permitting process, the BAAQMD limits the excess cancer risk from any facility to no more than 10 per 1-million-population for any permits that are applied for within a 2-year period and would require any source that would result in an excess cancer risk greater than 1 per 1 million to install Best Available Control Technology for Toxics.

#### *Regulation 8, Rule 3 (Architectural Coatings)*

This rule governs the manufacture, distribution, and sale of architectural coatings and limits the reactive organic gases content in paints and paint solvents. Although this rule does not directly apply to the project, it does dictate the ROG content of paint available for use during the construction.

#### *Regulation 8, Rule 15 (Emulsified and Liquid Asphalts)*

Although this rule does not directly apply to the project, it does dictate the reactive organic gases content of asphalt available for use during the construction through regulating the sale and use of asphalt and limits the ROG content in asphalt.

#### *Regulation 1, Rule 301 (Odorous Emissions)*

The BAAQMD is responsible for investigating and controlling odor complaints in the Bay Area. The agency enforces odor control by helping the public to document a public nuisance. Upon receipt of a complaint, the BAAQMD sends an investigator to interview the complainant and to locate the odor source if possible. The BAAQMD typically brings a public nuisance court action when there are a substantial number of confirmed odor events within a 24-hour period. An odor source with five or more confirmed complaints per year averaged over 3 years is considered to have a substantial effect on receptors.

Several BAAQMD regulations and rules apply to odorous emissions. Regulation 1, Rule 301 is the nuisance provision that states that sources cannot emit air contaminants that cause nuisance to a number of persons. Regulation 7 specifies limits for the discharge of odorous substances where the BAAQMD receives complaints from 10 or more complainants within a 90-day period. Among other things, Regulation 7 precludes discharge of an odorous substance that causes the ambient air at or

<sup>14</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Final 2017 Clean Air Plan. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a\\_-proposed-final-cap-vol-1-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en). Accessed April 24, 2018.

<sup>15</sup> Bay Area Air Quality Management District (BAAQMD). 2016. NSR [New Source Review Permitting]. Website: <http://www.baaqmd.gov/permits/permitting-manuals/nsr-permitting-guidance>. Accessed March 4, 2019.

beyond the property line to be odorous after dilution with 4 parts of odor-free air, and specifies maximum limits on the emission of certain odorous compounds.

### ***Association of Bay Area Governments and Metropolitan Transportation Commission Plan Bay Area***

On July 18, 2013, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) approved the Plan Bay Area. The Plan Bay Area includes integrated land use and transportation strategies for the region and was developed through OneBayArea, a joint initiative between ABAG, BAAQMD, MTC, and the San Francisco Bay Conservation and Development Commission. The plan's transportation policies focus on maintaining the extensive existing transportation network and utilizing these systems more efficiently to handle density in Bay Area transportation cores (ABAG and MTC 2013).<sup>16</sup> Assumptions for land use development used are taken from local and regional planning documents. Emission forecasts in the Bay Area Clean Air Plan rely on projections of vehicle miles traveled, population, employment, and land use projections made by local jurisdictions during development of Plan Bay Area. The Plan Bay Area 2040 was adopted July 2017 and updates Plan Bay Area.

Plan Bay Area 2040, published by the MTC and ABAG, is a long-range integrated transportation and land use/housing strategy through 2040 for the Bay Area. Plan Bay Area 2040 functions as the sustainable communities' strategy mandated by Senate Bill (SB) 375. As a regional land use plan, Plan Bay Area 2040 aims to reduce per-capita greenhouse gas emissions through the promotion of more compact, mixed-use residential and commercial neighborhoods located near transit. Plan Bay Area 2040 is a limited and focused update that builds upon a growth pattern and strategies developed in the original Plan Bay Area (adopted by MTC in 2013) but with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last four years.

## **Local**

### ***City of Antioch General Plan***

The City of Antioch General Plan was adopted November 24, 2003.<sup>17</sup> The following are applicable General Plan goals and policies related to air quality from the City of Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area:

- **Policy 4.4.6.7ff:** The Sand Creek Focus Area is intended to be “transit-friendly,” including appropriate provisions for public transit and non-motorized forms of transportation.
- **Objective 10.6.1:** Minimize air pollutant emissions within the Antioch Planning Area so as to assist in achieving state and federal air quality standards.
- **Policy 10.6.2a:** Require development projects to minimize the generation of particulate emissions during construction through implementation of the dust abatement actions outlined in the CEQA Handbook of the Bay Area Air Quality Management District.

<sup>16</sup> Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC). 2013. Plan Bay Area. Website: <https://www.planbayarea.org/previous-plan>. Accessed December 27, 2019.

<sup>17</sup> City of Antioch. 2003. City of Antioch General Plan. November 24. Website: [https://www.antiochca.gov/fc/community-development/planning/Antioch\\_Adopted\\_General\\_Plan.pdf](https://www.antiochca.gov/fc/community-development/planning/Antioch_Adopted_General_Plan.pdf). Accessed September 30, 2019.

- **Policy 10.6.2b:** Require developers of large residential and non-residential projects to participate in programs and to take measures to improve traffic flow and/or reduce vehicle trips resulting in decreased vehicular emissions. Examples of such efforts may include, but are not limited to the following:
  - Development of mixed-use projects, facilitating pedestrian and bicycle transportation and permitting consolidation of vehicular trips.
  - Installation of transit improvements and amenities, including dedicated bus turnouts and sufficient rights-of-way for transit movement, bus shelters, and pedestrian easy access to transit.
  - Provision of bicycle and pedestrian facilities, including bicycle lanes and pedestrian walkways connecting residential areas with neighborhood commercial centers, recreational facilities, schools, and other public areas.
  - Contributions for off-site mitigation for transit use.
  - Provision of charging stations for electric vehicles within large employment-generating and retail developments.
- **Policy 10.6.2f:** Provide physical separations between (1) proposed new industries having the potential for emitting toxic air contaminants and (2) existing and proposed sensitive receptors (e.g., residential areas, schools, and hospitals).
- **Policy 10.6.2g:** Require new wood burning stoves and fireplaces to comply with EPA and BAAQMD approved standards.

### 3.3.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to the CEQA Guidelines' Appendix G Environmental Checklist, to determine whether impacts to air quality are significant environmental effects, the following questions are analyzed and evaluated.

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:

- a) Conflict with or obstruct implementation of the applicable air quality plan?
- b) 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?
- c) Expose sensitive receptors to substantial pollutant concentrations?
- d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

#### Approach to Analysis

Emission factors represent the emission rate of a pollutant over a given time or activity; for example, grams of NO<sub>x</sub> per vehicle miles traveled (VMT) or grams of NO<sub>x</sub> per horsepower hour of equipment

operation. The ARB has published emission factors for on-road mobile vehicles/trucks in the EMFAC mobile source emissions model and emission factors for off-road equipment and vehicles in the OFFROAD emissions model. Activity levels are a measure of how active a piece of equipment is and can be represented as the amount of material processed, elapsed time that a piece of equipment is in operation, horsepower of a piece of equipment used, or VMT per day. An air emissions model (or calculator) combines the emission factors and the various levels of activity and outputs the emissions for the various pieces of equipment.

The California Emissions Estimator Model (CalEEMod) version 2016.3.2 was developed in collaboration with the South Coast Air Quality Management District (SCAQMD) and other air districts throughout the State. CalEEMod is designed as a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant emissions associated with construction and operation from a variety of land uses.

The modeling follows the BAAQMD guidance where applicable from the BAAQMD CEQA Air Quality Guidelines. The models used in this analysis are summarized as follows:

- Construction criteria pollutant and precursor emissions: CalEEMod, version 2016.3.2
- Operational criteria pollutant and precursor emissions: CalEEMod, version 2016.3.2
- Construction TAC emission air dispersion assessment: EPA AERMOD dispersion model, version 9.8.3.

The following criteria air pollutants and precursors are assessed in this analysis:

- Reactive organic gases (ROG)
- Nitrogen oxides (NO<sub>x</sub>)
- Carbon monoxide (CO)
- Particulate matter less than 10 microns in diameter (PM<sub>10</sub>)
- Particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>)

Note that the development of the proposed project would emit ozone precursors ROG and NO<sub>x</sub>. However, the development of the proposed project would not directly emit ozone since it is formed in the atmosphere during the photochemical reactions of ozone precursors.

### ***Construction-related Criteria Pollutants***

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and prevailing weather conditions. Construction emissions result from both on-site and off-site activities. On-site emissions consist of exhaust emissions from the activity levels of heavy-duty construction equipment, motor vehicle operation, and fugitive dust (mainly PM<sub>10</sub>) from disturbed soil. Additionally, paving operations and application of architectural coatings would release ROG emissions. Off-site emissions result from motor vehicle exhaust from delivery vehicles, worker traffic and road dust (PM<sub>10</sub> and PM<sub>2.5</sub>).

### Schedule

The implementation of the proposed project would include demolition of approximately 3,500 square feet of building space, as well as construction of 1,177 single-family residential units (low density, medium density, and age restricted housing) on 253.50 acres, a 5-acre village center consisting of 54,000 square feet of commercial, office, and retail space, 3 acres of public facility space, including a site for a new fire station and a trail staging area, 22.50 acres of public parks and landscaped area, 38 acres of roadway improvements, and the dedication of 229.50 acres of public open space and trails.

Based on information outlined in Section 2, Project Description, construction would be constructed in three phases and take approximately 8 years, with full buildout to occur in Fall 2029. If the construction schedule moves to later years, construction emissions would likely decrease because of improvements in technology and more stringent regulatory requirements for construction equipment and vehicles. The construction work for trail improvements is assumed to occur simultaneously with the construction activities for the proposed project.

The major construction activities associated with each construction activity are noted in Table 3.3-7, while a detailed account of the construction activities in each activity is included in Section 2, Project Description. Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. The conceptual construction schedule for the proposed project is shown in Table 3.3-7.

**Table 3.3-7: Conceptual Construction Schedule**

Construction Activity	Conceptual Construction Schedule		Working Days
	Start Date	End Date	
Phase 1			
Demolition	06/21/2021	07/02/2021	10
Site Preparation	07/03/2021	07/30/2021	20
Grading	07/31/2021	07/30/2021	53
Building Construction	10/14/2021	10/20/2023	527
Architectural Coating	09/01/2023	10/23/2023	37
Paving	10/21/2023	12/12/2023	37
Phase 2			
Site Preparation	03/19/2024	04/16/2024	21
Grading	04/17/2024	07/05/2024	58
Building Construction	07/06/2024	10/07/2026	588
Architectural Coating	08/13/2026	10/07/2026	40
Paving	10/08/2026	12/02/2026	40
Phase 3			
Site Preparation	03/22/2027	04/21/2027	23

**Table 3.3-7 (cont.): Conceptual Construction Schedule**

Construction Activity	Conceptual Construction Schedule		Working Days
	Start Date	End Date	
Grading	04/22/2027	07/13/2027	59
Building Construction	07/14/2027	10/15/2029	589
Architectural Coating	08/17/2029	10/15/2029	42
Paving	10/16/2029	12/12/2029	42
Source: FirstCarbon Solutions (FCS) and CalEEMod. Based on project-specific information (Appendix C).			

*Equipment Tiers and Emission Factors*

Equipment tiers refer to a generation of emission standards established by the EPA and ARB that apply to diesel engines in off-road equipment. The “tier” of an engine depends on the model year and horsepower rating; generally, the newer a piece of equipment is, the greater the tier it is likely to have. Excluding engines greater than 750 horsepower, Tier 1 engines were manufactured generally between 1996 and 2003. Tier 2 engines were manufactured between 2001 and 2007. Tier 3 engines were manufactured between 2006 and 2011. Tier 4 engines are the newest and some incorporate hybrid electric technology; they were manufactured after 2007.

Construction emissions are generally calculated as the product of an activity factor and an emission factor. The activity factor for construction equipment is a measure of how active a piece of equipment is and can be represented as the amount of material processed, elapsed time that a piece of equipment is in operation, horsepower of a piece of equipment used, or the amount of fuel consumed in a given amount of time. The emission factor relates the process activity to the amount of pollutant emitted. Examples of emission factors include grams of emissions per miles traveled and grams of emissions per horsepower-hour. The operation of a piece of equipment is tempered by its load factor which is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity. This analysis uses the CalEEMod default load factors for off-road equipment.

*On-site Off-road Equipment*

CalEEMod contains built-in inventories of construction equipment for a variety of land use construction projects that incorporate estimates of the number of equipment, their age, their horsepower, and emission control equipment tier mix from which rates of emissions are developed. These inventories were developed based on construction surveys for several land use projects. Table 3.3-8 presents the construction equipment used on the proposed project as derived from CalEEMod. The CalEEMod default emission control equipment tier mix was used in this analysis for the estimation of unmitigated emissions from on-site construction equipment.

**Table 3.3-8: Project Construction Equipment Assumptions**

Phase Name	Equipment	Number	Hours per Day	Horsepower	Load Factor
<b>Phase 1</b>					
Demolition	Concrete/Industrial Saws	1	8	81	0.73
	Excavators	3	8	158	0.38
	Rubber Tired Bulldozers	2	8	247	0.40
Site Preparation	Rubber Tired Bulldozers	3	8	187	0.41
	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Graders	1	8	187	0.41
	Excavators	2	8	158	0.38
	Rubber Tired Bulldozers	1	8	247	0.40
	Scrapers	2	8	367	0.48
	Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Cranes	1	8	231	0.29
	Forklifts	3	8	89	0.20
	Generator Sets	1	8	90	0.74
	Tractors/Loaders/Backhoes	3	6	97	0.37
	Welders	1	8	46	0.45
Architectural Coating	Air Compressors	1	6	78	0.48
Paving	Pavers	2	8	130	0.42
	Paving Equipment	2	8	132	0.36
	Rollers	2	8	80	0.38
<b>Phase 2/Phase 3</b>					
Site Preparation	Rubber Tired Bulldozers	3	8	187	0.41
	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Graders	1	8	187	0.41
	Excavators	2	8	158	0.38
	Rubber Tired Bulldozers	1	8	247	0.40
	Scrapers	2	8	367	0.48
	Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Cranes	1	8	231	0.29
	Forklifts	3	8	89	0.20
	Generator Sets	1	8	90	0.74
	Tractors/Loaders/Backhoes	3	6	97	0.37

**Table 3.3-8 (cont.): Project Construction Equipment Assumptions**

Phase Name	Equipment	Number	Hours per Day	Horsepower	Load Factor
	Welders	1	8	46	0.45
Architectural Coating	Air Compressors	1	6	78	0.48
Paving	Pavers	2	8	130	0.42
	Paving Equipment	2	8	132	0.36
	Rollers	2	8	80	0.38
Source: Appendix C.					

*Demolition, Site Preparation, and Grading*

The proposed project would include the demolition of approximately 3,500 square feet of building space, which includes an existing single-family residence, various barns, and outbuildings.

During grading activities, fugitive dust can be generated from the movement of dirt on the proposed project site. CalEEMod estimates dust from dozers moving dirt around, dust from graders or scrapers leveling the land, and loading or unloading dirt onto haul trucks. Each activity is calculated differently in CalEEMod, based on the number of acres traversed by the grading equipment.

Only some pieces of equipment are assumed to generate fugitive dust in CalEEMod. The CalEEMod model manual identifies various equipment and the acreage disturbed in an 8-hour day for each piece of equipment:

- Crawler tractors, graders, and rubber-tired dozers: 0.5-acre per 8-hour day
- Scrapers: 1 acre per 8-hour day

The proposed project analysis assumes the project site will be balanced and will not require import or export of soil.

*Off-site On-road Vehicle Trips*

The CalEEMod model defaults trip length and vehicle fleet were used. The CalEEMod model run used the default worker trip length of 10.8 miles, vendor trip length of 7.3, and the hauling trip length of 20 miles. A summary of the project construction-related trips is shown in Table 3.3-9. Please note that worker and vendor trips are in terms of worker trips per day, while haul trips are presented as total trips.

**Table 3.3-9: Construction Off-site Vehicle Trips**

Construction Activity	Construction Trips per Day		Total Construction Trips
	Worker	Vendor	Haul
<b>Phase 1</b>			
Demolition	15	0	16
Site Preparation	18	0	0
Grading	20	0	0
Building Construction	606	225	0
Architectural Coating	121	0	0
Paving	15	0	0
<b>Phase 2</b>			
Site Preparation	18	0	0
Grading	20	0	0
Building Construction	466	175	0
Architectural Coating	93	0	0
Paving	15	0	0
<b>Phase 3</b>			
Site Preparation	18	0	0
Grading	20	0	0
Building Construction	578	207	0
Architectural Coating	116	0	0
Paving	15	0	0
Source: FirstCarbon Solutions (FCS) and CalEEMod, see Appendix C.			

#### *Off-Gassing Materials*

Asphalt paving and architectural coating materials used during construction would generate off-gas emissions of ROG. The data collection process determined the acres of asphalt paving required, which CalEEMod uses to determine associated ROG emissions. CalEEMod contains assumptions for application of architectural coatings that are based on the BAAQMD's coating regulations and use type, and square footage of the buildings to be constructed and were used to quantify emissions.

#### **Operation-related Criteria Pollutants**

The operational emissions were analyzed assuming full-buildout of the proposed project in December 2029, consistent with the schedule presented in Table 3.3-7.

### *On-road Motor Vehicles*

Motor vehicle emissions refer to exhaust and road dust emissions from the automobiles that would travel to and from the proposed project area. The emissions were estimated using the CalEEMod model. The trip generation rates for the proposed project operations were obtained from the transportation impact assessment (included in Appendix K).<sup>18</sup> As Saturday and Sunday trips were not explicitly stated in the transportation impact assessment, weekday trip generation rates were applied to both Saturday and Sunday trips.

The CalEEMod trip purposes (e.g., primary, pass-by) and default round trip lengths for an urban setting for Contra Costa County were used in this analysis. Emission factors are assigned to the expected vehicle mix as a function of vehicle class, speed, and fuel use (gasoline and diesel-powered vehicles). The CalEEMod default vehicle fleet mix for Contra County was used for this analysis.

### *Architectural Coatings*

Paints release VOC/ROG emissions during application and drying. The buildings would be periodically repainted. The supplier that would likely serve the proposed project would be required to comply with the BAAQMD Regulation 8, Rule 3—Architectural Coatings.<sup>19</sup> This rule governs the manufacture, distribution, and sale of architectural coatings and limits the reactive organic gases content in paints and paint solvents.

### *Consumer Products*

Consumer products include various solvents used in non-industrial applications, which emit VOCs during their product use. “Consumer Product” means a chemically formulated product used by household and institutional consumers, including but not limited to: detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products; home, lawn, and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products. It does not include other paint products, furniture coatings, or architectural coatings.<sup>20</sup> The default emission factor developed for CalEEMod was used.

### *Landscape Equipment*

CalEEMod was used to estimate the landscaping equipment emissions using the default assumptions in the model.

### *Electricity*

Electricity usage (for lighting, etc.) would result in emissions from the power plants that would generate electricity distributed on the electrical power grid. Off-site electricity emissions estimates are used more pertinent for the analysis of GHG emissions. More detail describing assumptions used in estimating parameters specific to electricity is included in Section 3.5, GHG Emissions and Energy.

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<sup>18</sup> Fehr & Peers. 2019. Final Transport Impact Assessment, The Ranch. December.

<sup>19</sup> Bay Area Air Quality Management District (BAAQMD). 2009. Regulation 8: Organic Compounds Rule 3 Architectural Coatings. July 1. Website: [http://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803\\_0709.pdf?la=en](http://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rg0803_0709.pdf?la=en). Accessed September 20, 2019.

<sup>20</sup> California Air Resources Board (ARB). 2011. Regulation for Reducing Emissions from Consumer Products. Website: [www.arb.ca.gov/consprod/regs/fro%20consumer%20products%20regulation.pdf](http://www.arb.ca.gov/consprod/regs/fro%20consumer%20products%20regulation.pdf). Accessed November 27, 2019.

### *Natural Gas*

Implementation of the proposed project would generate emissions from the combustion of natural gas for water heaters, heat, etc. CalEEMod has two categories for natural gas consumption: Title 24 and non-Title 24. The Title 24 uses are defined as the major building envelope systems covered by California's Building Code Title 24 Part 6, such as space heating, space cooling, water heating, and ventilation. Non-Title 24 includes everything else such as appliances and electronics.

### **Construction- and Operation-related Toxic Air Contaminants**

TACs are air pollutants in miniscule amounts in the air that, if a person is exposed to them, could increase the chances of experiencing health problems. Exposures to TAC emissions can have both chronic long-term (over a year or longer) and acute short-term (over a period of hours) health impacts. Construction-period TAC emissions could contribute to increased health risks to nearby residents or sensitive receptors.

An assessment was made of the potential health impacts to surrounding sensitive receptors resulting from TAC emissions during proposed project construction. The TACs of greatest concern are those that cause serious health problems or affect many people. Health problems can include cancer, respiratory irritation, nervous system problems, and birth defects. Some health problems occur soon after a person inhales TACs. These immediate effects may be minor, such as watery eyes; or they may be serious, such as life-threatening lung damage. Other health problems may not appear until many months or years after a person's first exposure to the TAC. Cancer is one example of a delayed health problem.

Fine particle pollution or PM<sub>2.5</sub> describes particulate matter that is 2.5 micrometers in diameter and smaller—one-thirtieth the diameter of a human hair. Fine particle pollution can be emitted directly or formed secondarily in the atmosphere. PM<sub>2.5</sub> health impacts are important because their size can be deposited deeply in the lungs causing respiratory effects.

For purposes of this analysis, exhaust emissions of DPM, are represented as exhaust emissions of PM<sub>2.5</sub>. Studies indicate that DPM poses the greatest health risk among airborne TACs. A 10-year research program conducted by the ARB demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic long-term health risk. DPM differs from other TACs in that it is not a single substance but a complex mixture of hundreds of substances. Although DPM 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 emission control system is present.

### **Odors**

The impact analysis qualitatively evaluates the types of land uses proposed to evaluate whether major sources of anticipated odors would be present and, if so, whether those sources would likely generate objectionable odors. According to the BAAQMD's CEQA Air Quality Guidelines, a project that involves the siting of a new odor source would consider the screening level distances and the complaint history of the odor sources. The proposed project does not include any odor emitting sources such as a wastewater treatment plant, landfill, composting facility, refinery, etc.

## Specific Thresholds of Significance

### Consistency with Air Quality Plan

The applicable air quality plan is BAAQMD's 2017 Bay Area Clean Air Plan, which identifies measures to:

- Reduce emissions and reduce ambient concentrations of air pollutants; and
- Safeguard public health by reducing exposure to the air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily affected by air pollution.

The proposed project would be consistent with the Bay Area Clean Air Plan if it would support the plan's goals, include applicable control measures from the Bay Area Clean Air Plan, and would not disrupt or hinder implementation of any control measures from the Bay Area Clean Air Plan.

Consistency with the Bay Area Clean Air Plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan.

### Ambient Air Quality

Where available, the significance thresholds established by the applicable air quality management or air pollution control district may be relied upon to make the significance determinations. While the final determination of whether or not a project is significant is within the purview of the lead agency pursuant to CEQA Guidelines Section 15064(b), the BAAQMD recommends that its quantitative and qualitative air pollution thresholds be used to determine the significance of project-related emissions.

In June 2010, the BAAQMD adopted thresholds of significance to assist lead agencies in the review of projects under CEQA. These thresholds (see Table 3.3-10) were designed to establish the level at which the BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and included in the BAAQMD's current CEQA Guidelines (last updated May 2017).<sup>21</sup>

**Table 3.3-10: BAAQMD Thresholds of Significance**

Pollutant	Construction Thresholds Average Daily Emissions	Operational Thresholds	
		Average Daily Emissions	Annual Average Emissions
Criteria Air Pollutants			
ROG	54 pounds/day	54 pounds/day	10 tons/year
NO <sub>x</sub>	54 pounds/day	54 pounds/day	10 tons/year
PM <sub>10</sub>	82 pounds/day	82 pounds/day	15 tons/year
PM <sub>2.5</sub>	54 pounds/day	54 pounds/day	10 tons/year
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	

<sup>21</sup> Bay Area Air Quality Management District (BAAQMD). 2017. California Environmental Quality Act Air Quality Guidelines. May. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa\\_guidelines\\_may2017-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en). Accessed September 22, 2018.

**Table 3.3-10 (cont.): BAAQMD Thresholds of Significance**

Pollutant	Construction Thresholds Average Daily Emissions	Operational Thresholds	
		Average Daily Emissions	Annual Average Emissions
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	Increase > 10.0 per one million	Increase > 10.0 per one million	
Chronic or Acute Hazard Index	Increase > 1.0	Increase > 1.0	
Incremental annual average PM <sub>2.5</sub>	0.3 µg/m <sup>3</sup>	0.3 µg/m <sup>3</sup>	
Health Risks and Hazards for Sensitive Receptors (Cumulative from All Sources within 1,000-Foot Zone of Influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	> 100 per 1 million		
Chronic Hazard Index	> 10.0		
Annual Average PM <sub>2.5</sub>	> 0.8 µg/m <sup>3</sup>		
Notes: ROG = reactive organic gases NO <sub>x</sub> = nitrogen oxides PM <sub>10</sub> = coarse particulate matter or particulates with an aerodynamic diameter of 10 µm or less PM <sub>2.5</sub> = fine particulate matter or particulates with an aerodynamic diameter of 2.5 µm or less Source: Bay Area Air Quality Management District (BAAQMD). 2017. California Environmental Quality Act Air Quality Guidelines. May. Website: <a href="http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may_2017-pdf.pdf?la=en">http://www.baaqmd.gov/~media/files/planning-and-research/ceqa/ceqa_guidelines_may_2017-pdf.pdf?la=en</a> . Accessed September 22, 2018.			

### **Health Risk (Toxic Air Contaminants)**

The air quality-related health risk significance thresholds utilized for this assessment were derived from the BAAQMD significance thresholds as project-specific thresholds. These thresholds are:

- **Cancer Risk:** increased cancer risk of greater than 10 in one million
- **Non-cancer Hazard Index:** increased non-cancer risk of greater than 1.0
- **Annual PM<sub>2.5</sub>:** increase greater than 0.3 µg/m<sup>3</sup>

### **Odors**

The significance thresholds for odor impacts are qualitative in nature. The proposed project does not include any significant odor-generating source, as discussed above.

## Impact Evaluation

### *Air Quality Management Plan Consistency*

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**Impact AIR-1:**        **The project would conflict with or obstruct implementation of the applicable air quality plan.**

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#### ***Construction/Operation***

The SFBAAB is designated nonattainment for State standards for 1-hour and 8-hour ozone, 24-hour respirable particulate matter (PM<sub>10</sub>), annual PM<sub>10</sub>, and annual fine particulate matter (PM<sub>2.5</sub>).<sup>22</sup> To address regional air quality standards, the BAAQMD has adopted several air quality policies and plans, and in April 2017, the BAAQMD adopted their 2017 Clean Air Plan,<sup>23</sup> which serves as BAAQMD's most current regional Air Quality Plan (AQP) for the Air Basin for attaining federal ambient air quality standards. The primary goals of the 2017 Clean Air Plan are to protect public health and protect the climate. The 2017 Clean Air Plan acknowledges that the BAAQMD's two stated goals of protection are closely related. As such, the 2017 Clean Air Plan identifies a wide range of control measures intended to decrease both criteria pollutants<sup>24</sup> and GHGs.<sup>25</sup> The 2017 Clean Air Plan updates the previous BAAQMD's 2010 Clean Air Plan, pursuant to air quality planning requirements defined in the California Health and Safety Code.

The 2017 Clean Air Plan also accounts for projections of population growth provided by ABAG and vehicle miles traveled provided by the MTC, and identifies strategies to bring regional emissions into compliance with federal and State air quality standards. A project would be judged to conflict with or obstruct implementation of the 2017 Clean Air Plan if it would result in substantial new regional emissions not foreseen in the air quality planning process.

The primary way of determining whether a project is consistent with the AQPs assumptions is to determine if a General Plan is consistent with the growth assumptions used in the AQPs for the Air Basin, and if the project is consistent with the applicable General Plan. As required by California law, city and county general plans contain a Land Use Element that details the types and quantities of land uses that the city or county estimates will be needed for future growth, and designates locations for land uses to regulate growth. The growth projections and land use information in adopted general plans, among other sources, is used to estimate future average daily trips and associated VMT, which are then provided to the BAAQMD to estimate future emissions in the AQPs. AQPs provide the amount of emission reductions required to reach attainment of the air standards based on the projected growth in emissions, and include control measures required to achieve those reductions by the deadlines mandated by the Clean Air Act.

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<sup>22</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Air Quality Standards and Attainment Status. January. Website: <http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status>. Accessed December 27, 2019.

<sup>23</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Final 2017 Clean Air Plan: Spare the Air—Cool the Climate. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a\\_-proposed-final-cap-vol-1-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en). Accessed December 27, 2019.

<sup>24</sup> The EPA has established National Ambient Air Quality Standards (NAAQS) for six of the most common air pollutants—carbon monoxide, lead, ground-level ozone, particulate matter, nitrogen dioxide, and sulfur dioxide—known as “criteria” air pollutants (or simply “criteria pollutants”).

<sup>25</sup> A greenhouse gas (GHG) is any gaseous compound in the atmosphere that is capable of absorbing infrared radiation, thereby trapping and holding heat in the atmosphere. By increasing the heat in the atmosphere, GHGs are responsible for the greenhouse effect, which ultimately leads to global warming.

The applicable general plan for the project is the City of Antioch General Plan, which was adopted prior to the BAAQMD 2017 Clean Air Plan. According to the City of Antioch General Plan, the proposed project site is located within the Sand Creek Focus Area and is designated for Hillside and Estate Residential/Golf Course/Senior Housing/Public-Quasi Public/Open Space uses. The proposed project seeks a General Plan Amendment to redesignate the site as Restricted Development Area and Limited Development Area. The Restricted Development Area would allow for Rural Residential, Agriculture, and Open Space uses. The Limited Development Area would allow for Estate Residential, Low Density Residential, Medium Low Density Residential, Medium Density Residential, Convenience Commercial, Mixed Use, Public/Quasi Public, and Open Space. Therefore, the proposed land uses are consistent with the allowable land use types pursuant to the current City of Antioch General Plan, and would, in fact, reduce impacts comparatively speaking because less units would be constructed on the project site than previously assumed for analysis purposes, and the neighborhood commercial component would allow for reduced traffic trips for neighbors and the Kaiser Permanente Antioch Medical Center.

The proposed project comprises a multi-generational plan, which would include a wide range of housing, including age-restricted housing for seniors. The proposed project includes development standards and design guidelines consistent with the low density and medium density designations. Development standards for the Low-Density designation “allows 4 single-family units per gross developable acre.” Additionally, development standards for the Medium-Density designation allows for 10 dwelling units for each gross developable acre.

Thus, the proposed project would not directly or indirectly result in substantial unplanned population growth and the overall development of the proposed project site would be consistent with the growth assumptions incorporated into the Antioch General Plan and 2017 BAAQMD CAP.

The BAAQMD does not provide a numerical threshold of significance for project-level consistency analysis. Therefore, the following additional criteria were used for determining a project’s consistency with the AQP.

- **Criterion 1:** Does the project support the primary goals of the AQP?
- **Criterion 2:** Does the project include applicable control measures from the AQP?
- **Criterion 3:** Does the project disrupt or hinder implementation of any AQP control measures?

#### *Criterion 1*

The primary goals of the 2017 Clean Air Plan (CAP), the current AQP to date, are to:

- Attain air quality standards;
- Reduce population exposure to unhealthy air and protecting public health in the Bay area; and
- Reduce GHG emissions and protect the climate.

As discussed under Impact AIR-2, the implementation of the proposed project would not result in a project- or cumulative-level net increase of any criteria air pollutant with implementation of Mitigation Measure (MM) AIR-2a. However, as discussed under Impact AIR-2, even with the implementation of MM AIR-2a and MM AIR-2b, implementation of the proposed project would result in a significant and

unavoidable cumulative operational impact associated with violating an air quality standard in terms of criteria air pollutant emissions. As discussed under Impact AIR-3, the project would not expose sensitive receptors to substantial pollutant concentrations with implementation of MM AIR-2a. Therefore, the proposed project would support the goals of attaining air quality standards and reducing population exposure to unhealthy air. A detailed analysis of impacts as they relate to GHG emissions and climate are included in Section 3.6, GHG Emissions and Energy. As discussed in Section 3.6, project- and cumulative-level GHG emissions impacts would be less than significant. As discussed below under Criterion 2, the proposed project would provide pedestrian connectivity. Considering that the proposed project would violate an air quality standard, the proposed project would not support the overall goals of the 2017 Clean Air Plan. The proposed project is, therefore, inconsistent with Criterion 1, even with implementation of MM AIR-2a and MM AIR-2b.

#### Criterion 2

The 2017 Clean Air Plan contains 85 control measures aimed at reducing air pollutant emissions and GHG emissions at the local, regional, and global levels. Along with the traditional stationary, area, mobile source, and transportation control measures, the 2017 Clean Air Plan contains a number of control measures designed to protect the climate, promote mixed use and to compact development to reduce vehicle emissions and exposure to pollutants from stationary and mobile sources. The 2017 Clean Air Plan also includes an account of the implementation status of control measures identified in the 2010 Clean Air Plan.

Table 3.3-11 lists the Clean Air Plan policies relevant to the proposed project and evaluates the proposed project's consistency with the policies. As shown below, the proposed project would be consistent with the applicable measures.

**Table 3.3-11: Clean Air Plan Control Measures Consistency Analysis**

Control Measure	Plan Consistency
<b>Buildings Control Measures</b>	
<b>BL1:</b> Green Buildings	<b>Consistent.</b> As discussed in more detail in Section 3.6, GHG Emissions and Energy, the proposed project would comply with the California Energy Code and, thus, incorporate applicable energy efficiency features designed to reduce energy consumption associated with the proposed project.
<b>BL4:</b> Urban Heat Island Mitigation	<b>Consistent.</b> The proposed project would incorporate landscaping (including trees) throughout the plan area. The proposed project would provide landscaping in accordance with City standards that would serve to reduce the urban heat island effect and include the planting of shade trees.
<b>Energy Control Measures</b>	
<b>EN2:</b> Decrease Electricity Demand	<b>Consistent.</b> The design of the proposed project would be required to conform to the energy efficiency requirements of the California Building Standards Code, also known as Title 24, which was adopted in order to meet an executive order in the Green Building Initiative to improve the energy efficiency of buildings through aggressive standards.

**Table 3.3-11 (cont.): Clean Air Plan Control Measures Consistency Analysis**

Control Measure	Plan Consistency
	The 2016 Building Efficiency Standards are the current regulations and went into effect on January 1, 2017. The 2019 Title 24 Standards are scheduled to go into effect on January 1, 2020.
<b>Natural and Working Lands Control Measures</b>	
<b>NW2:</b> Urban Tree Planting	<b>Consistent.</b> The proposed project would incorporate landscaping (including trees) throughout the proposed project site. The proposed project would provide landscaping in accordance with City standards that would include the planting of trees.
<b>WA3:</b> Green Waste Diversion	<b>Consistent.</b> The waste service provider for the proposed project would be required to meet AB 341, SB 939, and SB 1374 requirements that require waste service providers to divert green waste away from landfills. All plant refuse generated during operations of the proposed project would be recycled off-site.
<b>WA4:</b> Recycling and Waste Reduction	<b>Consistent.</b> The waste service provider for the proposed project would be required to meet AB 341, SB 939, and SB 1374 requirements that require waste to be recycled.
<b>Stationary Control Measures</b>	
<b>SS29:</b> Asphaltic Concrete	<b>Consistent.</b> Paving activities associated with the proposed project would be required to utilize asphalt that does not exceed BAAQMD emission standards.
<b>SS36:</b> Particulate Matter from Trackout	<b>Consistent with Mitigation.</b> Mud and dirt that may be tracked out onto nearby public roads during construction activities would be removed promptly by the contractor based on BAAQMD requirements. MM AIR-2a, identified under Impact AIR-2, would implement BMPs recommended by BAAQMD for fugitive dust emissions during construction.
<b>SS38:</b> Fugitive Dust	<b>Consistent.</b> Material stockpiling and track out during grading activities as well as smoke and fumes from paving and roofing asphalt operations shall utilize best management practices to minimize the creation of fugitive dust. MM AIR-2a, identified under Impact AIR-2, would implement BMPs recommended by BAAQMD for fugitive dust emissions during construction.
<b>Transportation Control Measures</b>	
<b>TR9:</b> Bicycle and Pedestrian Access and Facilities.	<b>Consistent.</b> The proposed project includes pedestrian access connections within and adjacent to the plan area. The sidewalk network would connect the proposed project to adjacent developments, providing continuous pedestrian connections in the area. The proposed project would also construct a number of off-street trails, ranging from a four-foot natural trail to a 10-foot asphalt trail with

**Table 3.3-11 (cont.): Clean Air Plan Control Measures Consistency Analysis**

Control Measure	Plan Consistency
	stabilized shoulders to accommodate emergency vehicle access. The proposed project would be consistent with the BAAQMD effort to encourage planning for bicycle and pedestrian facilities.
Source: Bay Area Air Quality Management District (BAAQMD). 2017. Final 2017 Clean Air Plan: Spare the Air, Cool the Climate. April 19.	

In summary, the implementation of the proposed project would not conflict with applicable measures under the 2017 Clean Air Plan with the implementation of MM AIR-2a, therefore; the proposed project would be consistent with Criterion 2 with implementation of MM AIR-2a.

#### *Criterion 3*

In addition to being located near planned and existing pedestrian and bicycle facilities, the proposed project would produce a residential development that is within relatively close proximity to local transit authority transit stops. The proposed project site is located 4 miles from the closest Bay Area Rapid Transit (BART) Station. The proposed project would be consistent with transportation plans and targets. The proposed project is surrounded by residential and commercial land uses, and would develop office and retail land uses within proximity of the proposed and existing residents. The proposed project would support the use of public spaces and encourage resident use of these spaces. Implementation of the proposed project would support the overall goals of the 2017 Clean Air Plan. Furthermore, the proposed project would comply with applicable BAAQMD rules and regulations listed above under Regulatory Framework during construction and operations. Considering this information, the proposed project would not create an impediment or disruption to implementation of any AQP control measures. The proposed project is, therefore, consistent with Criterion 3.

#### ***Level of Significance Before Mitigation***

Potentially Significant

#### ***Mitigation Measures***

Implement MM AIR-2a and MM AIR-2b

#### ***Level of Significance After Mitigation***

Significant and Unavoidable

#### ***Cumulative Criteria Pollutant Emissions Impacts***

<b>Impact AIR-2:</b>	<b>The project would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard.</b>
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By its nature, air pollution is largely a cumulative impact resulting from emissions generated over a large geographic region. The nonattainment status of regional pollutants is a result of past and

present development within the air basin, and this regional impact is a cumulative impact. In other words, new development projects (proposed multi-family residential project) within the air basin would contribute to this impact only on a cumulative basis. No single project would be sufficient in size, by itself, to result in nonattainment of regional air quality standards. Instead, a project's emissions may be individually limited, but cumulatively significant when taken in combination with past, present, and future development projects.

In developing thresholds of significance for criteria air pollutants, the BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively significant. As such, if a project exceeds the identified thresholds of significance, its emissions would be significant in terms of both project- and cumulative-level impacts, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Thus, this impact analysis and discussion is related to the project- and cumulative-level effect of the project's regional criteria air pollutant emissions.

The cumulative analysis focuses on whether a specific project would result in cumulatively significant emissions. According to Section 15064(h)(4) of the CEQA Guidelines, the existence of significant cumulative impacts caused by other projects alone does not constitute substantial evidence that the project's incremental effects would be cumulatively significant. Rather, the determination of cumulative air quality impacts for construction and operational emissions is based on whether the proposed project would result in regional emissions that exceed the BAAQMD regional thresholds of significance for construction and operations on a project level. The thresholds of significance represent the allowable amount of emissions each project can generate without generating a cumulatively significant contribution to regional air quality impacts. Therefore, a project that would not exceed the BAAQMD thresholds of significance on the project level also would not be considered to result in a cumulatively significant impact with regard to regional air quality and, therefore, would not be considered to result in a significant impact related to cumulative regional air quality.

### ***Construction***

Construction activities associated with development of the proposed project contemplated by the proposed project would include demolition, site preparation, grading, paving, building construction, and painting. During construction, fugitive dust (PM<sub>10</sub> and PM<sub>2.5</sub>) would be generated from site grading and other earth-moving activities. The majority of this fugitive dust would remain localized and would be deposited near the plan area. However, the potential for impacts from fugitive dust exists unless control measures are implemented to reduce the emissions from this source. Exhaust emissions would also be generated from the operation of the off-road construction equipment, as shown in Table 3.3-9.

#### ***Construction Fugitive Dust***

Construction would require demolition, general site clearing and grading/earthwork activities. Emissions from construction activities are generally short-term in duration, but may still cause adverse air quality impacts. The proposed project would generate emissions from construction equipment exhaust, worker travel, and fugitive dust as PM<sub>10</sub> and PM<sub>2.5</sub>. PM is of concern during construction because of the potential to emit fugitive dust during earth-disturbing activities (construction fugitive dust). The BAAQMD does not have a quantitative significance threshold for

fugitive dust. The BAAQMD's Air Quality Guidelines recommend that proposed projects determine the significance for fugitive dust through application of BMPs. Unmitigated the proposed project does not include any dust control measures. As such, this represents a significant cumulative construction impact related to criteria air pollutant emissions.

However, per MM AIR-2a, the fugitive dust control measures identified in the BAAQMD's Air Quality Guidelines would be required to be implemented during construction of the proposed project in order to reduce localized dust impacts. Therefore, with implementation of MM AIR-2a, cumulative construction impacts associated with violating an air quality standard or contributing substantially to an existing or projected air quality violation in terms of criteria air pollutant emissions specific to fugitive dust would be less than significant.

*Construction Emissions: ROG, NO<sub>x</sub>, PM<sub>10</sub> (exhaust), PM<sub>2.5</sub> (exhaust)*

As described above under Approach to Analysis, CalEEMod was used to estimate the proposed project's construction emissions. Estimated construction emissions are compared with the applicable thresholds of significance established by the BAAQMD to assess ROG, NO<sub>x</sub>, exhaust PM<sub>10</sub>, and exhaust PM<sub>2.5</sub> construction emissions to determine significance for this criterion.

As shown in Table 3.3-7, for the purpose of analysis in this Draft EIR, construction of the proposed project is anticipated to begin as early as June 2021 and continue through December 2029. The construction schedule used in the analysis represents a "worst-case" analysis scenario since a delay in construction dates into the future would result in using emission factors for construction equipment that decrease as the analysis year increases, due to improvements in technology and the need to meet more stringent regulatory requirements. Therefore, construction emissions would decrease if the construction schedule moves to later years. The duration of construction activity and associated equipment represent a reasonable approximation of the expected construction fleet. The construction emissions modeling parameters and assumptions are summarized above under Approach to Analysis, and the complete modeling results are provided in Appendix C. Annual construction emissions are shown by source, converted to average daily construction emissions, and are compared with the applicable significance thresholds in Table 3.3-12.

**Table 3.3-12: Construction Annual and Daily Average Emissions (Unmitigated)**

Construction Activity	Annual Emissions (tons)			
	ROG	NO <sub>x</sub>	PM <sub>10</sub> (exhaust)	PM <sub>2.5</sub> (exhaust)
2021 Total Construction Emissions	0.30	3.03	0.11	0.10
2022 Total Construction Emissions	0.55	5.19	0.12	0.11
2023 Total Construction Emissions	9.27	3.71	0.10	0.09
2024 Total Construction Emissions	0.32	3.00	0.10	0.09
2025 Total Construction Emissions	0.38	3.48	0.08	0.07
2026 Total Construction Emissions	5.90	2.85	0.07	0.07
2027 Total Construction Emissions	0.31	2.87	0.08	0.08
2028 Total Construction Emissions	0.39	3.69	0.08	0.07
2029 Total Construction Emissions	13.06	3.11	0.07	0.07

**Table 3.3-12 (cont.): Construction Annual and Daily Average Emissions (Unmitigated)**

Parameter	Air Pollutants			
	ROG	NO <sub>x</sub>	PM <sub>10</sub> (exhaust)	PM <sub>2.5</sub> (exhaust)
Total Construction Emissions (tons)	30.49	30.94	0.81	0.76
Total project Construction Emissions (lbs)	60,974	61,880	1,616	1,511
Average Daily Construction Emissions (lbs/day) <sup>1</sup>	29.50	29.94	0.78	0.73
<b>BAAQMD Average Daily Construction Emission Thresholds (lbs/day)</b>	<b>54</b>	<b>54</b>	<b>82</b>	<b>54</b>
<b>Exceeds Significance Threshold?</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes: <sup>1</sup> Calculated by dividing the total number of pounds by the total 2,067 working days of construction for the duration of construction (2021-2029). lbs = pounds    ROG = reactive organic gases    NO <sub>x</sub> = oxides of nitrogen PM <sub>10</sub> = particulate matter 10 microns in diameter    PM <sub>2.5</sub> = particulate matter 2.5 microns in diameter All calculation totals may not appear to add exactly due to rounding. Source of thresholds: Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines 2017. Source of Emissions: CalEEMod Output (Appendix C).				

As shown in Table 3.3-12, construction emissions would not exceed the BAAQMD's recommended thresholds of significance with regard to emissions of ROG, NO<sub>x</sub>, exhaust PM<sub>10</sub>, and exhaust PM<sub>2.5</sub>. Therefore, cumulative construction impacts associated with violating an air quality standard or contributing substantially to an existing or projected air quality violation in terms of criteria air pollutant emissions specific to ROG, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> would be less than significant.

### Operation

#### Operational Emissions: ROG, NO<sub>x</sub>, PM<sub>10</sub>, PM 2.5

Operational pollutants of concern include ROG, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub>. Operational emissions include those emissions that occur when a project commences operations. Operations were analyzed assuming that the first year of operation of the proposed project would be at full build out in 2029. The total daily trips associated with proposed and existing land uses are consistent with those presented in the transportation impact assessment included in Appendix K.<sup>26</sup> The CalEEMod default trip lengths for an urban setting in Contra Costa County<sup>27</sup> were used in this analysis of vehicle emissions. The major sources for operational emissions of ROG, NO<sub>x</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> were shown above under Approach to Analysis. The operational emissions for the respective pollutants were calculated using CalEEMod. Annual operational emissions estimated for the proposed project are shown by source and are compared with the applicable significance thresholds in Table 3.3-13. The average daily operational-related emissions for the proposed project are compared with the applicable significance thresholds in Table 3.3-14.

<sup>26</sup> Fehr & Peers. 2019. Final Transport Impact Assessment, The Ranch. December.

<sup>27</sup> Note that the CalEEMod setting is limited to the county level, so there is no option to select a city.

**Table 3.3-13: Project Operation Annual Emissions (Unmitigated)**

Emission Source	Annual Emissions (tons/year)			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Area	16.6514	0.1256	0.0484	0.0484
Energy	0.1771	1.5141	0.1223	0.1223
Mobile	1.7598	8.0473	8.9384	2.4344
Stationary	0.0016	0.0046	0.0002	0.0002
Waste	0.0000	0.0000	0.0000	0.0000
Water	0.0000	0.0000	0.0000	0.0000
<b>Total Project Operational Emissions</b>	<b>18.59</b>	<b>9.69</b>	<b>9.11</b>	<b>2.61</b>
<b>BAAQMD Maximum Annual Emission Threshold (tons/year)</b>	<b>10</b>	<b>10</b>	<b>15</b>	<b>10</b>
<b>Exceeds thresholds?</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes: ROG = reactive organic gases NO <sub>x</sub> = oxides of nitrogen PM <sub>10</sub> = particulate matter 10 microns in diameter PM <sub>2.5</sub> = particulate matter 2.5 microns in diameter Source of emissions: CalEEMod Output (Appendix C).				

**Table 3.3-14: Project Daily Operational Emissions (Unmitigated)**

Parameters	Average Daily Emissions (pounds/day)			
	ROG	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
Area	91.24	0.69	0.27	0.27
Energy	0.97	8.30	0.67	0.67
Mobile (Motor Vehicles)	9.64	44.09	48.98	13.34
Stationary	—	—	—	—
<b>Average Daily Emissions<sup>3</sup> (lbs/day)</b>	<b>101.86</b>	<b>53.10</b>	<b>49.91</b>	<b>14.28</b>
<b>BAAQMD Average Daily Emission Thresholds (lbs/day)</b>	<b>54</b>	<b>54</b>	<b>82</b>	<b>54</b>
<b>Exceeds thresholds?</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>
Notes: ROG = reactive organic gases      NO <sub>x</sub> = oxides of nitrogen PM <sub>10</sub> = particulate matter 10 microns or less in diameter PM <sub>2.5</sub> = particulate matter 2.5 microns or less in diameter The highest daily project emissions occurred in the winter run for NO <sub>x</sub> , PM <sub>10</sub> , and PM <sub>2.5</sub> . The highest ROG emissions occurred in the summer run. Calculations use unrounded results. Source: CalEEMod output (see Appendix C).				

As shown in Table 3.3-13 and Table 3.3-14, the implementation of the proposed project would result in ROG emissions that would exceed BAAQMD's thresholds of significance for both annual operational emissions and daily operational emissions, indicating that on-going operations would be considered to have the potential to generate a significant quantity of ROG. The majority of operational ROG emissions from project area sources is from consumer products. Specifically, these project area sources of ROG emissions include degreasers for the proposed parking lots and pesticide/fertilizers for the proposed public parks and landscaped areas. Refer to Appendix C for details. It is not feasible to regulate the consumer products used by the future project occupants. Therefore, cumulative operational impacts associated with violating an air quality standard or contributing substantially to an existing or projected air quality violation in terms of criteria air pollutant emissions would be significant and unavoidable.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

#### **MM AIR-2a      Implement BAAQMD Best Management Practices During Construction**

The following Best Management Practices (BMPs), as recommended by the Bay Area Air Quality Management District (BAAQMD), shall be included in the design of the proposed project and implemented during construction:

- All active construction areas shall be watered at least two times per day.
- All exposed non-paved surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and access roads) shall be watered at least three times per day and/or non-toxic soil stabilizers shall be applied to exposed non-paved surfaces.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered and/or shall maintain at least 2 feet of freeboard.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage regarding idling restrictions shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

- The prime construction contractor shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The City of Antioch and the construction contractor shall take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

**MM AIR-2b** The following measure shall be applied during construction of the proposed project to facilitate the use of low volatile organic compound (VOC) landscaping equipment during project operations:

- Prior to issuance of building permits, the applicant shall prepare and submit building plans to the City of Antioch that demonstrate that all buildings meet or exceed building code standards.

Additionally, the following measures shall be applied during both construction and operation of the proposed project to reduce reactive organic gases (ROG) emissions:

- Use super-compliant architectural coatings. These coatings are defined as those with volatile organic compound VOC less than 10 grams per liter. South Coast Air Quality Management District (SCAQMD) provides a list of manufacturers that provide this type of coating.<sup>28</sup>
- Keep lids closed on all paint containers when not in use to prevent VOC emissions and excessive odors.
- Use compliant low VOC cleaning solvents to clean paint application equipment.
- Keep all paint and solvent laden rags in sealed containers to prevent VOC emissions.

### ***Level of Significance After Mitigation***

Significant and Unavoidable

### ***Sensitive Receptors Exposure to Toxic Air Contaminant Concentrations***

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**Impact AIR-3:**        **The project would not expose sensitive receptors to substantial pollutant concentrations.**

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This impact addresses whether the implementation of the proposed project would expose air pollution sensitive receptors to TACs such as construction-related asbestos disturbance, construction-generated fugitive dust (PM<sub>10</sub> and PM<sub>2.5</sub>), construction-generated DPM, operational-related TACs, or operational CO hotspots.

The proposed project would result in the development of residential and commercial structures, impacting nearby sensitive receptors once operational. The proposed project would be constructed in three phases. Grading activities and site preparation activities that would generate the greatest amount of emissions during construction when heavy equipment is used to prepare the land for construction. In Phase I, the proposed project's construction activities could impact the neighbors along the northern boundary. The Kaiser Permanente Antioch Medical Center is located approximately

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<sup>28</sup> The availability of super-compliant architectural coatings for purchase is not limited to any geographical area.

500 feet east of the project site, and therefore would experience substantially less impact than the residential receptors located just 10 feet from the project boundary. As a result of the proposed project phasing, there would be time periods when construction activities would overlap with operation of the proposed project (i.e., Phase 1 in operation while Phase 2 is under construction, Phase 1 and Phase 2 in operation while Phase 3 is under construction). Construction of the proposed project is proposed to start in June of 2021 and conclude in December 2029 (see Table 3.3-7). To account for the overlaps in proposed project construction and operations, the Health Risk Assessment is conducted for three exposure scenarios.

- **Scenario 1:** Accounting for exposure to all off-site receptors from construction of all Phases
- **Scenario 2:** Accounting for exposure to on-site receptors occupying Phase 1 from construction of Phase 2 and Phase 3 and
- **Scenario 3:** Accounting for exposure to on-site receptors occupying Phase 1 and Phase 2 from construction of Phase 3

The closest off-site sensitive receptors in the vicinity of the proposed project area include single-family residences located approximately 10 feet north of the proposed project site.

### **Construction**

#### **Construction Asbestos Exposure**

##### *Asbestos from Demolition*

The proposed project includes demolition of one on-site residence and accessory structures, and the movement of dirt surfaces. Demolition of existing buildings or structures would be subject to BAAQMD Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing), which is intended to limit asbestos emissions from demolition or renovation of structure and the associated disturbance of asbestos-containing waste material generated or handled during these activities. The rule addresses the national emissions standards for asbestos along with some additional requirements. The rule requires the Lead Agency and its contractors to notify the BAAQMD of any regulated renovation or demolition activity. This notification includes a description of structures and methods utilized to determine whether asbestos-containing materials are potentially present. All asbestos-containing material found on the site must be removed prior to demolition or renovation activity in accordance with BAAQMD Regulation 11, Rule 2, including specific requirements for surveying, notification, removal, and disposal of asbestos-containing materials. Therefore, projects that comply with BAAQMD Regulation 11, Rule 2 would ensure that asbestos-containing materials would be removed and disposed of appropriately and safely thereby minimizing the release of airborne asbestos emissions and not resulting in a significant impact related to air quality or the exposure of sensitive receptors to substantial pollutant concentrations.

##### *Naturally Occurring Asbestos*

Construction in areas of rock formations that contain naturally occurring asbestos could release asbestos into the air and pose a health hazard. The project site does not have rock formations containing naturally occurring asbestos.<sup>29</sup> The closest ultramafic rock deposits are located 3.57 miles

<sup>29</sup> United States Geological Survey (USGS). 2011. Van Gosen, B.S., and Clinkenbeard, J.P. California Geological Survey Map Sheet 59.

from the project site. Therefore, it can be reasonably concluded that the implementation of the proposed project would not expose sensitive receptors to naturally occurring asbestos during grading. Impacts would be less than significant.

#### **Construction Fugitive Dust**

Construction activities associated with development of the proposed project would include demolition, site preparation, grading, building construction, paving, and architectural coating. Generally, the most substantial air pollutant emissions would be dust generated from site grading. If uncontrolled, these emissions could lead to both health and nuisance impacts. Construction activities would also temporarily create emissions of equipment exhaust and other air contaminants.

The BAAQMD does not recommend a numerical threshold for fugitive, dust-related PM emissions. Instead, the BAAQMD bases the determination of significance for fugitive dust on a consideration of the control measures to be implemented. If all appropriate emissions control measures recommended by the BAAQMD are implemented, then fugitive dust emissions during construction are not considered significant. MM AIR-2a includes the fugitive dust control measures recommended by the BAAQMD, thereby reducing this impact to less than significant.

#### **Construction Toxic Air Contaminants**

During construction, the proposed project would result in the emissions of TACs that could potentially impact nearby sensitive receptors. TACs are the air pollutants of most concern as they relate to sensitive receptors, as they have the greatest potential to pose a carcinogenic and non-carcinogenic (such as asthma and bronchitis) hazard to human health. The BAAQMD has defined health risk significance thresholds as discussed under Specific Thresholds of Significance above (see Table 3.3-13). These thresholds are represented as a cancer risk to the public and a non-cancer hazard from exposures to TACs and annual PM<sub>2.5</sub> impacts to sensitive receptors. Cancer risk represents the probability (in terms of risk per million individuals) that an individual would contract cancer resulting from exposure to TACs continuously over a period of several years.

In this regard, a Health Risk Assessment (HRA) was performed to assess the potential health impacts to sensitive receptors located both external to the proposed project site as well as sensitive receptors located within the proposed project site from TAC emissions during construction. An HRA is a guide that helps to determine whether current or future exposures to a chemical or substance in the environment could affect the health of a population. In general, risk depends on the following factors:

- Identify the TACs that may be present in the air;
- Estimate the amount of TACs released from all sources, or the source of particular concern, using air samples or emission models;
- Estimate concentrations of TACs in air in the geographic area of concern by using dispersion models with information about emissions, source locations, weather, and other factors; and
- Estimate the number of people exposed to different concentrations of the TAC at different geographic locations.

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Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California. Open-File Report 2011-1188. Website: <http://pubs.usgs.gov/of/2011/1188/>. Accessed November 27, 2019.

### Construction DPM Emissions

The principal TAC emission analyzed in this assessment was DPM from the operation of off-road equipment and diesel-powered delivery and worker vehicles during construction. DPM has been identified by the ARB as an important carcinogenic substance. For purposes of this analysis, DPM is represented as exhaust emissions of PM<sub>2.5</sub>. Construction assumptions relating to emissions and health risks are summarized above under Approach to Analysis.

Construction DPM emissions (as PM<sub>2.5</sub> exhaust) and total PM<sub>2.5</sub> (PM<sub>2.5</sub> exhaust and PM<sub>2.5</sub> fugitive dust) were estimated using CalEEMod (version 2016.3.2) and are summarized in Table 3.3-15 below.

**Table 3.3-15: Project Construction DPM (as PM<sub>2.5</sub> Exhaust) and Total PM<sub>2.5</sub> Emissions**

Parameter	On-site DPM (as PM <sub>2.5</sub> Exhaust) (tons/year)	Off-site DPM <sup>(1)</sup> (as PM <sub>2.5</sub> Exhaust) (tons/year)	On-site Total PM <sub>2.5</sub> (as PM <sub>2.5</sub> Total) <sup>(2)</sup> (tons/year)	Off-site Total PM <sub>2.5</sub> <sup>(1)</sup> (as PM <sub>2.5</sub> Total) <sup>(2)</sup> (tons/year)
<b>Annual Average Construction Emissions (No Mitigation)</b>				
Phase 1 <sup>3</sup>	0.100	0.002	0.379	0.043
Phase 2	0.218	0.001	0.310	0.030
Phase 3 <sup>4</sup>	0.208	0.001	0.307	0.036
<i>Total Unmitigated Emissions</i>	<i>0.526</i>	<i>0.003</i>	<i>0.996</i>	<i>0.109</i>
<b>Notes:</b> <sup>(1)</sup> The off-site emissions were estimated over construction vehicle travel routes within approximately 1,000 feet of the project site; see Appendix C for detailed assumptions. <sup>(2)</sup> Compliance with BAAQMD's Best Management Practices for fugitive dust, implemented as MM AIR-2a. <sup>(3)</sup> Phase-1 on-site construction emissions include emissions from roadway improvements. <sup>(4)</sup> Phase-3 on-site construction emissions include emissions from construction of trail network. Source: Appendix C.				

### Estimation of Cancer Risks

The BAAQMD has developed a set of guidelines for estimating cancer risks that provide adjustment factors that emphasize the increased sensitivities and susceptibility of young children to exposures to TACs.<sup>30</sup> These adjustment factors include age-sensitivity weighting factors, age-specific daily breathing rates, and age-specific time-at-home factors. The recommend method for the estimation of cancer risk is shown in the equations below with the cancer risk adjustment factors provided in Table 3.3-16 for several types of sensitive/residential receptors (infant, child, and adult).

$$\text{Cancer Risk} = C_{\text{DPM}} \times \text{Inhalation Exposure Factor} \quad (\text{EQ-1})$$

Where:

Cancer Risk = Total individual excess cancer risk defined as the cancer risk a hypothetical individual faces if exposed to carcinogenic emissions from a particular source for specified exposure durations;

<sup>30</sup> Bay Area Air Quality Management District (BAAQMD). 2016. Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines\\_clean\\_jan\\_2016-pdf.pdf?la=en](http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en). Accessed November 27, 2019.

this risk is defined as an excess risk because it is above and beyond the background cancer risk to the population; cancer risk is expressed in terms of risk per million exposed individuals.

$C_{DPM}$  = Period average DPM air concentration calculated from the air dispersion model in  $\mu\text{g}/\text{m}^3$

Inhalation is the most important exposure pathway to impact human health from DPM and the inhalation exposure factor is defined as follows:

$$\text{Inhalation Exposure Factor} = \text{CPF} \times \text{EF} \times \text{ED} \times \text{DBR} \times \text{AAF}/\text{AT} \quad (\text{EQ-2})$$

Where:

CPF = Inhalation cancer potency factor for the TAC:  $1.1 \text{ (mg/kg-day)}^{-1}$  for DPM

EF = Exposure frequency (days/year)

ED = Exposure duration (years of construction)

AAF = set of age-specific adjustment factors that include age sensitivity factors (ASF), daily breathing rates (DBR), and time at home factors (TAH)—see Table 3.3-16

AT = Averaging time period over which exposure is averaged (days)

The California Office of Environmental Health Hazards Assessment (OEHHA)-recommended values for the various cancer risk parameters shown in EQ 2, above, are provided in Table 3.3-16 as appropriate for the construction duration. For detailed parameter for each scenario analyzed, please see Appendix C.

**Table 3.3-16: Exposure Assumptions for Cancer Risk**

Receptor Type	Exposure Frequency		Exposure Duration (years)	Age Sensitivity Factors	Time at Home Factor (%)	Daily Breathing Rate <sup>(1)</sup> (l/kg-day)
	Hours/day	Days/year				
Scenario 1						
Sensitive/Residential—Infant						
3 <sup>rd</sup> Trimester	24	350	0.25	10	85	361
0–2 years	24	350	2.00	10	85	1,090
2–9 years <sup>2</sup>	24	350	5.64	3	100 <sup>3</sup>	631
Sensitive Receptor—Child						
3–16 years	24	350	7.90	3	100 <sup>3</sup>	572
Sensitive Receptor—Adult						
> 16 to 30 years	24	350	7.90	1	73	261
Scenario 2						
Sensitive/Residential—Infant						
3 <sup>rd</sup> Trimester	24	350	0.25	10	85	361
0–2 years	24	350	2.00	10	85	1,090
2–6 years <sup>4</sup>	24	350	3.17	3	100 <sup>3</sup>	631

**Table 3.3-16 (cont.): Exposure Assumptions for Cancer Risk**

Receptor Type	Exposure Frequency		Exposure Duration (years)	Age Sensitivity Factors	Time at Home Factor (%)	Daily Breathing Rate <sup>(1)</sup> (l/kg-day)
	Hours/day	Days/year				
Sensitive Receptor—Child						
3–16 years	24	350	5.42	3	100 <sup>3</sup>	572
Sensitive Receptor—Adult						
> 16 to 30 years	24	350	5.42	1	73	261
Scenario 3						
Sensitive/Residential—Infant						
3 <sup>rd</sup> Trimester	24	350	0.25	10	85	361
0–2 years	24	350	2.00	10	85	1,090
2–3 years <sup>5</sup>	24	350	0.47	3	100 <sup>3</sup>	631
Sensitive Receptor—Child						
3–16 years	24	350	2.72	3	100 <sup>3</sup>	572
Sensitive Receptor—Adult						
> 16 to 30 years	24	350	2.72	1	73	261
Notes:						
<sup>(1)</sup> The daily breathing rates recommended by the BAAQMD for sensitive/residential receptors assume the 95 <sup>th</sup> percentile breathing rates for all individuals less than 2 years of age and 80 <sup>th</sup> percentile breathing rates for all older individuals. (l/kg-day) = liters per kilogram body weight per day						
<sup>(2)</sup> The proposed project construction will occur in 3 Phases over a period of 8 years, with gaps between each Phase. Scenario 1 assesses exposure to all off-site receptors at full build-out.						
<sup>(3)</sup> There are two schools within 1500 feet of the project. Therefore, the Time at Home Factor is considered to be 1 as recommended by California Office of Environmental Health Hazards Assessment (OEHHA).						
<sup>(4)</sup> Scenario 2 assesses exposure to all occupants in Phase 1 during construction of Phase 2 and Phase 3.						
<sup>(5)</sup> Scenario 3 assesses exposure to all occupants in Phase 1 and Phase 2 during construction of Phase 3.						
Source: Bay Area Air Quality Management District (BAAQMD). 2016. Air Toxics NSR Program Health Risk Assessment (HRA) Guidelines. Website: <a href="http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en">http://www.baaqmd.gov/~media/files/planning-and-research/rules-and-regs/workshops/2016/reg-2-5/hra-guidelines_clean_jan_2016-pdf.pdf?la=en</a> . Accessed November 27, 2019.						

#### Estimation of Non-Cancer Chronic Hazards

An evaluation of the potential non-cancer effects of chronic chemical exposures was also conducted. Adverse health effects are evaluated by comparing the annual receptor concentration of each chemical compound with the appropriate Reference Exposure Level (REL). Available RELs promulgated by the OEHHA were considered in the assessment.

Risk characterization for non-cancer health hazards from TACs is expressed as a hazard index (HI). The HI is a ratio of the predicted concentration of a proposed project's emissions to a concentration considered acceptable to public health professionals, termed the REL.

To quantify non-carcinogenic impacts, the hazard index approach was used.

$$HI = C_{ann}/REL \quad (EQ-3)$$

Where:

HI = chronic hazard index

$C_{ann}$  = annual average concentration of TAC as derived from the air dispersion model ( $\mu\text{g}/\text{m}^3$ )

REL = reference exposure level above which a significant impact is assumed to occur ( $\mu\text{g}/\text{m}^3$ )

The hazard index assumes that chronic exposures to TACs adversely affect a specific organ or organ system (toxicological endpoint) of the body. For each discrete chemical exposure, target organs presented in regulatory guidance were used. To calculate the hazard index, each chemical concentration or dose is divided by the appropriate toxicity REL. For compounds affecting the same toxicological endpoint, this ratio is summed. Where the total equals or exceeds 1, a health hazard is presumed to exist. For purposes of this assessment, the TAC of concern is DPM, for which the OEHHHA has defined a REL for DPM of 5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The principal toxicological endpoint assumed in this assessment was through inhalation.

#### **Air Dispersion Modeling Results**

An air dispersion model is a mathematical formulation used to estimate the air quality impacts at specific locations (receptors) surrounding a source of emissions given the rate of emissions and prevailing meteorological conditions. The air dispersion model applied in this assessment was the American Meteorological Society/EPA Regulatory Model (AERMOD version 19191) air dispersion model that is approved by the BAAQMD for air dispersion assessments. Specifically, the AERMOD model was used to estimate levels of air emissions at sensitive receptor locations from the proposed project construction DPM (as  $\text{PM}_{2.5}$  exhaust) emissions. The use of the AERMOD model provides a refined methodology for estimating construction impacts by utilizing long-term, measured representative meteorological data and a representative construction schedule.

Terrain elevations were obtained using the EPA Terrain Preprocessor (AERMAP) model, the AERMOD terrain data preprocessor. The urban dispersion option was used to describe the air dispersion in the local vicinity of the plan area. The air dispersion model assessment used meteorological data from the Livermore Municipal Airport, which is approximately 18 miles south of the proposed project site.

Receptor locations within the AERMOD model were placed at locations of existing residences, hospital and schools surrounding the plan area. To evaluate localized construction impacts, sensitive receptor height should be taken into account at the point of maximum impact (ground level for the purposes of this analysis). The emissions from the on-site construction exhaust source were assumed to be emitted at a height of 5 meters above ground to account for the top of the equipment exhaust stack where the emissions are released to the atmosphere and the increase in the height of the emissions due to its heated exhaust. The off-site construction vehicle emissions were represented in the AERMOD model as line volume sources with a release height of 3.1 meters for the DPM vehicles. The off-site emissions were estimated over construction vehicle travel routes within approximately 1,000 feet of the proposed project site; see Appendix C for detailed assumptions.

Table 3.3-17 shows the MIR for each scenario analyzed.

**Table 3.3-17 Maximum Impacted Sensitive Receptor in Each Scenario Analyzed**

Phase	MIR	Distance from Closest On-site Construction
<b>Scenario 1:</b> Full Build-out Assessing Off-site Sensitive Receptors Only	An existing residence located approximately 30 feet north of the proposed project site.	30 feet
<b>Scenario 2:</b> Phase 1 Built and Phase 2 and Phase 3 under Construction	A park located between Phase 1 and Phase 2, to be built as part of Phase 1.	Less than 10 feet
<b>Scenario 3:</b> Phases 1 and 2 Built and Phases 3 under Construction	A future proposed project single-family residence located in Phase 2.	200 feet
Source: Appendix C.		

The estimated health and hazard impacts from construction emissions at the MIR are provided in Table 3.3-18. The estimates shown in Table 3.3-18 include application of BMPs recommended by the BAAQMD, as required by MM AIR-2a. It should be noted that inclusion of MM AIR-2a only reduces PM<sub>2.5</sub> total and not PM<sub>2.5</sub> exhaust.

**Table 3.3-18: Project Construction Health Risks and Hazards (Unmitigated)**

Scenario	Cancer Risk (risk per million)	Chronic Non-Cancer Hazard Index <sup>1</sup>	Annual PM <sub>2.5</sub> Concentration (µg/m3)
<b>Scenario 1: Full Buildout Assessing Off-site Sensitive Receptors Only</b>			
Risks and Hazards at the MIR: Infant <sup>2</sup>	6.48	0.003	0.025
Risks and Hazards at the MIR: Child <sup>2</sup>	2.93	0.003	0.025
Risks and Hazards at the MIR: Adult <sup>2</sup>	0.33	0.003	0.025
<b>Scenario 2: Phase 1 Built and Phases 2 and Phase 3 Under Construction</b>			
Risks and Hazards at the MIR: Infant <sup>3</sup>	9.31	0.005	0.035
Risks and Hazards at the MIR: Child <sup>3</sup>	3.42	0.005	0.035
Risks and Hazards at the MIR: Adult <sup>3</sup>	0.38	0.005	0.035
<b>Scenario 3: Phases 1 and 2 built and Phases 3 Under Construction</b>			
Risks and Hazards at the MIR: Infant <sup>4</sup>	0.97	0.0006	0.005
Risks and Hazards at the MIR: Child <sup>4</sup>	0.22	0.0006	0.005
Risks and Hazards at the MIR: Adult <sup>4</sup>	0.02	0.0006	0.005
<b>Highest From Any Scenario</b>			
Risks and Hazards at the MIR	9.31	0.005	0.035

**Table 3.3-18 (cont.): Project Construction Health Risks and Hazards (Unmitigated)**

Scenario	Cancer Risk (risk per million)	Chronic Non-Cancer Hazard Index <sup>1</sup>	Annual PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
<b>BAAQMD Thresholds of Significance</b>	<b>10</b>	<b>1</b>	<b>0.30</b>
Exceeds Individual Source Threshold?	No	No	No
Notes: <sup>1</sup> Chronic non-cancer hazard index was estimated by dividing the annual DPM concentration (as PM <sub>2.5</sub> exhaust) by the REL of 5 µg/m <sup>3</sup> . <sup>2</sup> The MIR for Cancer Risk and Chronic Non-Cancer Hazard is as listed in Table 3.3-19. The MIR for Annual PM <sub>2.5</sub> is a single-family residence located on 80 feet from the project boundary at the southeast of the proposed project site. <sup>3</sup> The MIR is as listed in Table 3.3-19. <sup>4</sup> The MIR is as listed in Table 3.3-19. Source: Appendix C.			

As shown in Table 3.3-18, construction of the proposed project would not exceed the applicable BAAQMD thresholds for any of the three health impact metrics prior to the application of mitigation beyond that required by MM AIR-2a.

## Operation

### Operational Toxic Air Contaminants

The proposed project would include residential and commercial structures. Unlike warehouses or distribution centers, the daily vehicle trips generated by the proposed project would be primarily generated by passenger vehicles. Passenger vehicles typically use gasoline engines rather than the diesel engines that are found in heavy-duty trucks. Compared to the combustion of diesel, the combustion of gasoline had relatively low emissions of DPM. Consistent with BAAQMD guidance, an operational health risk analysis is not necessary, as the implementation of the proposed project would not result in significant health impacts during operation.

### Operational CO Hotspots

Localized high levels of CO (CO hotspot) are associated with traffic congestion and idling or slow-moving vehicles. The BAAQMD recommends a screening analysis to determine if a project's operation has the potential to contribute to a CO hotspot. The screening criteria identify when site-specific CO dispersion modeling is not necessary. The implementation of the proposed project would result in a less than significant impact related to air quality for local CO if the following screening criteria are met:

- **Screening Criterion 1:** The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans; or
- **Screening Criterion 2:** Traffic associated with the project would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; or
- **Screening Criterion 3:** Traffic associated with the project would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal

mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The transportation impact assessment<sup>31</sup> (included as Appendix K) identified AM and PM peak-hour traffic volumes for 25 intersections affected by the implementation of the proposed project. The maximum peak-hour intersection volume would occur at State Route 4 Eastbound and Lone Tree Way intersection, “Cumulative with Project Peak Hour” scenario during the PM peak-hour. The estimated cumulative traffic volume at this intersection is 7,906 PM peak-hour trips. This level of peak-hour trips is substantially less than BAAQMD’s second and third screening criteria of 44,000 vehicles per hour and 24,000 vehicles per hour respectively. The implementation of the proposed project would not result in an increase of traffic volumes at affected intersections to more than 44,000 vehicles per hour and would not increase traffic volumes at affected intersections to more than 24,000 where vertical or horizontal mixing is substantially limited. Therefore, based on the above criteria, the proposed project would not exceed the CO screening criteria and would have a less than significant impact related to CO.

### ***Level of Significance***

Less Than Significant

### ***Objectionable Odors Exposure***

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**Impact AIR-4:**      **The project would not result in other emissions (such as those leading to odors adversely affecting a substantial number of people).**

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As stated in the BAAQMD 2017 Air Quality Guidelines, odors are generally regarded as an annoyance rather than a health hazard and the ability to detect odors is highly subjective and varies considerably among the populations. The BAAQMD does not have a recommended odor threshold for construction activities. However, the BAAQMD recommends operational screening criteria that are based on distance between types of sources known to generate odor and the receptor.<sup>32</sup> For projects within the screening distances, the BAAQMD has the following threshold for project operations:

An odor source with five or more confirmed complaints per year averaged over 3 years is considered to have a significant impact on receptors within the screening distance shown in Table 3-3 [of the BAAQMD’s CEQA Guidelines].

Odors can cause a variety of responses. The impact of an odor often results from interacting factors such as frequency (how often), intensity (strength), duration (time), offensiveness (unpleasantness), location, and sensory perception. Two circumstances have the potential to cause odor impacts:

- 1) A source of odors is proposed to be located near existing or planned receptors; or
- 2) A receptor land use is proposed near an existing or planned source of odor.

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<sup>31</sup> Fehr & Peers. 2019. Final Transport Impact Assessment, The Ranch. December.

<sup>32</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Air Quality Standards and Attainment Status. Website: <http://www.baaqmd.gov/about-air-quality/research-and-data/air-quality-standards-and-attainment-status>. Accessed November 27, 2019.

**Construction**

Diesel exhaust would be emitted during construction, the odors of which are objectionable to some. However, construction activity would be short-term and finite in nature. Furthermore, equipment exhaust odors would dissipate quickly and are common in an urban environment. As such, the project would not create objectionable odors affecting a substantial number of people during construction. Therefore, construction odor impacts at existing off-site odor sensitive receptors would be less than significant.

**Operation***Project as an Odor Generator*

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations.

The proposed project is a residential and commercial development project and is not expected to produce any offensive odors that would result in odor complaints. During operation of the proposed project, odors would primarily consist of passenger vehicles traveling to and from the site. These occurrences would not produce objectionable odors affecting a substantial number of people; therefore, operational impacts associated with the proposed project's potential to create odors would be less than significant.

**Level of Significance**

Less Than Significant

**3.3.5 - Cumulative Impacts****Criteria Pollutants**

The BAAQMD considers the emission levels for which a project's individual emissions would be cumulatively significant. As such, if a project exceeds the identified thresholds of significance, its emissions would be significant in terms of both project- and cumulative-level impacts, resulting in significant adverse air quality impacts to the region's existing air quality conditions. As stated in the BAAQMD 2017 CEQA Guidelines, additional analysis to assess cumulative impacts is unnecessary. Rather, the determination of cumulative air quality impacts for construction and operational emissions is based on whether the project would result in regional emissions that exceed BAAQMD regional thresholds of significance for construction and operations on a project level. Projects that generate emissions below the BAAQMD significance thresholds would be considered consistent with regional air quality planning efforts would not generate cumulatively significant emissions. See Impacts AIR-1 and AIR-2 for analysis and discussion of the cumulative air quality management plan consistency and criteria air pollutant emissions impacts. Overall, Impacts AIR-1 and AIR-2 determined that the cumulative construction criteria air pollutant emissions impacts would be less than significant with mitigation. However, cumulative operational ROG emissions would exceed BAAQMD's threshold of significance even with mitigation and would be considered cumulatively significant and unavoidable.

**Level of Cumulative Significance Before Mitigation**

Potentially Significant

## **Mitigation Measures**

Implement MM AIR-2a and MM AIR-2b.

## **Level of Cumulative Significance After Mitigation**

Significant and Unavoidable

## **Toxic Air Contaminants**

### **Construction Emissions at Existing Maximum-impacted Air Pollution Sensitive Receptor**

The BAAQMD recommends assessing the potential cumulative impacts from sources of TACs within 1,000 feet of a project site. For the proposed project, the cumulative impact assessment quantified TAC emission sources located within 1,000 feet of the proposed project in addition to the maximum TAC emissions from implementation of the proposed project. As previously discussed in Table 3.3-17, the MIR is different for different scenarios. For cumulative-level TACs analysis, the MIRs for all scenarios are analyzed. For cumulative-level TACs analysis, the BAAQMD provides three tools for use in screening potential impacts from cumulative sources of TACs. These tools are:

- **Surface Street Screening Tables.**<sup>33</sup> The BAAQMD pre-calculated potential cancer risk and PM<sub>2.5</sub> concentration increases for each county within their jurisdiction. This information is contained in a series of look-up tables that are used for roadways that meet BAAQMD's "major roadway" criteria of 10,000 vehicles or 1,000 trucks per day. Risks are assessed by roadway volume, roadway direction, and distance to sensitive receptors. Deer Valley Road, located immediately east of the proposed project, is estimated to carry 15,120 annual average daily trips.<sup>34</sup> Dallas Ranch Road, located immediately north of the project is estimated to carry 7,890 annual average daily trips.<sup>35</sup>
- **Freeway Screening Analysis Tool.** The BAAQMD prepared a Google Earth file<sup>36</sup> that contains pre-estimated cancer risk, hazard index, and PM<sub>2.5</sub> concentration increases for highways within the Bay Area. Risks are provided by roadway link and are estimated based on elevation and distance to the sensitive receptor. There are no freeways within 1000 feet of the proposed project.
- **Stationary Source Risk and Hazard Screening Tool.** The BAAQMD prepared a Google Earth file<sup>37</sup> that contains the locations of all stationary sources within the Bay Area that have BAAQMD operating permits. The BAAQMD has also prepared a Geographic Information System (GIS) tool<sup>38</sup> with the location of permitted sources, which has been updated more recently than

<sup>33</sup> Bay Area Air Quality Management District (BAAQMD). 2015. Roadway Screening Analysis Calculator. Website: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>. Accessed November 11, 2019.

<sup>34</sup> TJKM. 2015. Citywide Engineering and Traffic Study Antioch, California. February. Website: <https://www.antiochca.gov/fc/community-development/engineering/TJKM-Final-Report-2015-02-06.pdf>. Accessed December 12, 2019.

<sup>35</sup> Ibid

<sup>36</sup> Bay Area Air Quality Management District (BAAQMD). 2011. Highway Screening-Analysis Tool—Contra Costa County. April 28. Website: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>. Accessed November 11, 2019.

<sup>37</sup> Bay Area Air Quality Management District (BAAQMD). 2012. Stationary Source Screening Analysis Tool—Contra Costa\_2012. August 29. Website: <http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools>. Accessed November 11, 2019.

<sup>38</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Permitted Stationary Sources Risk and Hazards. Permitted Stationary Sources Risk and Hazards. Website: <https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65>. Accessed November 11, 2019.

the previously mentioned Google Earth tool. For each emissions source, the BAAQMD provides conservative estimates of cancer risk, non-cancer hazards, and PM<sub>2.5</sub> concentrations. Using information from both the Google Earth file and the GIS tool, there is one existing stationary source located within approximately 1,000 feet of the proposed project.

Table 3.3-19 lists the cumulative health impacts at the MIR estimated to occur during construction of project.

**Table 3.3-19: Cumulative Construction Air Quality Health Impacts at the Maximum Impacted Sensitive Receptor**

Source	Source Type	Distance from MIR (feet) <sup>(5)</sup>	Cancer Risk (per million)	Chronic Non-Cancer HI	PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
<b>Proposed project</b>					
Unmitigated Construction (Scenario 1) <sup>(1)</sup>	Construction Emissions	30	6.48	0.003	0.025
Unmitigated Construction (Scenario 2) <sup>(2)</sup>	Construction Emissions	10	9.31	0.005	0.035
Unmitigated Construction (Scenario 3) <sup>(3)</sup>	Construction Emissions	200	0.97	0.0006	0.005
<b>Existing Stationary Sources (BAAQMD Facility Number)</b>					
16855	Kaiser Permanente Antioch Medical Center	3200	50.88	0.026	2.120
<b>Local Road<sup>(4)</sup> (&gt;10,000 AADT)</b>					
Deer Valley Road	Traffic on Local Road	2600	8.48	NA	0.216
Dallas Ranch Road	Traffic on Local Road	2500	4.42	NA	0.113
<b>Cumulative Health Risks from Project Construction and Existing TAC Sources</b>					
Cumulative Total at MIR with Construction of the Proposed project (Unmitigated)—Scenario 1			70.26	0.029	2.474
Cumulative Total at MIR with Construction of the Proposed project (Unmitigated)—Scenario 2			73.09	0.031	2.484
Cumulative Total at MIR with Construction of the Proposed project (Unmitigated)—Scenario 3			64.75	0.0266	2.454
<b>BAAQMD Cumulative Thresholds of Significance</b>			<b>100</b>	<b>10</b>	<b>0.8</b>
<b>Threshold Exceeded prior to Application of Mitigation?</b>			<b>No</b>	<b>No</b>	<b>Yes</b>

**Table 3.3-19 (cont.): Cumulative Construction Air Quality Health Impacts at the Maximum Impacted Sensitive Receptor**

Source	Source Type	Distance from MIR (feet) <sup>(5)</sup>	Cancer Risk (per million)	Chronic Non-Cancer HI	PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
<p>Notes:</p> <p>MIR = Maximum Impacted Sensitive Receptor</p> <p>NA = not available</p> <p>AADT = annual average daily traffic</p> <p><sup>(1)</sup> The MIR is an existing residence located approximately 30 feet north of the project site.</p> <p><sup>(2)</sup> The MIR is a park located between Phase 1 and Phase 2, to be built as part of Phase 1.</p> <p><sup>(3)</sup> The MIR is a future project single-family residence located in Phase 2.</p> <p><sup>(4)</sup> Traffic count source: TJKM. 2015. Citywide Engineering and Traffic Study Antioch, California. February. Website: <a href="https://www.antiochca.gov/fc/community-development/engineering/TJKM-Final-Report-2015-02-06.pdf">https://www.antiochca.gov/fc/community-development/engineering/TJKM-Final-Report-2015-02-06.pdf</a>. Accessed December 12, 2019.</p> <p><sup>(5)</sup> All existing sources within 1000 feet of the proposed project boundary are considered for the analysis although the existing sources are more than 1000 feet from the MIR for a conservative analysis.</p> <p>Source: Appendix C.</p>					

As noted above in Table 3.3-19, the cumulative health impacts at the MIR from existing TAC emission sources located within 1,000 feet of the proposed project, combined with the unmitigated construction-related emissions, would exceed the BAAQMD's recommended cumulative health significance thresholds. Therefore, even with implementation of MM AIR-2a and MM AIR-2b, the cumulative TACs impacts would be significant and unavoidable.

**Operational Emissions at Project as an Air Pollution Sensitive Receptor**

The proposed project would locate new sensitive receptors (residents) that could be subject to existing sources of TACs at the project site. However, the California Supreme Court concluded in *California Building Industry Association v. BAAQMD* that agencies generally subject to CEQA are not required to analyze the impact of existing environmental conditions on a project's future users or residents. Although impacts from existing sources of TAC emissions on sensitive receptors on the project site are not subject to CEQA, the BAAQMD recommends assessing the potential *cumulative* impacts from sources of TACs within 1,000 feet of a project when siting new sensitive land uses. The potential TAC risks to the project's future residents are analyzed for informational purposes below. The BAAQMD screening analysis was applied at the project for conditions at build-out. Table 3.3-20 summarizes the cumulative health impacts at buildout.

**Table 3.3-20: Cumulative Operation Air Quality Health Impacts at the Project Site**

Source	Source Type	Distance from Project (feet)	Cancer Risk (per million)	Chronic Non-Cancer HI	PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
<b>Existing Stationary Sources (BAAQMD Facility Number)</b>					
16855	Kaiser Permanente Antioch Medical Center	490	50.88	0.026	2.120

**Table 3.3-20 (cont.): Cumulative Operation Air Quality Health Impacts at the Project Site**

Source	Source Type	Distance from Project (feet)	Cancer Risk (per million)	Chronic Non-Cancer HI	PM <sub>2.5</sub> Concentration (µg/m <sup>3</sup> )
<b>Local Road<sup>(1)</sup> (&gt;10,000 AADT)</b>					
Deer Valley Road	Traffic on Local Road	10	8.48	NA	0.216
Dallas Ranch Road	Traffic on Local Road	10	4.42	NA	0.113
Cumulative Total at the Project Site			63.78	0.03	2.45
Notes: NA = not available AADT = annual average daily traffic <sup>(1)</sup> Traffic count source: TJKM. 2015. Citywide Engineering and Traffic Study Antioch, California. February. Website: <a href="https://www.antiochca.gov/fc/community-development/engineering/TJKM-Final-Report-2015-02-06.pdf">https://www.antiochca.gov/fc/community-development/engineering/TJKM-Final-Report-2015-02-06.pdf</a> . Accessed December 12, 2019. Source: Appendix C.					

**Level of Cumulative Significance Before Mitigation**

Potentially Significant

**Mitigation Measures**

Implement MM AIR-2a and MM AIR-2b.

**Level of Cumulative Significance After Mitigation**

Significant and Unavoidable

## 3.4 - Biological Resources

### 3.4.1 - Introduction

This section describes the existing biological setting and potential effects from project implementation on the project site and the Off-site Improvement Area. This section also identifies mitigation measures to reduce these potential effects to less than significant levels. Descriptions and analysis in this section are based, in part, on a revised Biological Resources Assessment (BRA) prepared by ECORP Consulting, Inc. (ECORP) in November 2017, an updated BRA prepared by Madrone Ecological Consulting, LLC (Madrone) on September 23, 2019, which included protocol-level special-status plant surveys during 2018 and 2019, a Special-status Plant Species Survey Report for the Off-site Improvement Area prepared by Madrone in September 2019, a Tree Survey conducted in July 2015 by Ed Brennan, Consulting Arborist, and a San Joaquin Kit Fox Survey performed by H. T. Harvey & Associates on February 22, 2019, all of which are contained in Appendix D.

The project site is located in the City of Antioch, within the *Antioch South, California*, United States Geological Survey (USGS) 7.5-minute Topographical Quadrangle Map.

### 3.4.2 - Environmental Setting

#### Records Searches and Pedestrian Survey to Identify Existing Biological Resources

##### *Literature Review*

Biologists examined existing environmental documentation for the project site and immediate vicinity. This documentation included the arborist report noted above, relevant biological studies for the area, literature pertaining to habitat requirements of special-status species potentially occurring near the site, and federal and State register listings, protocols, and species data provided by the United States Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW).

##### *Soils*

Biologists also reviewed United States Department of Agriculture (USDA) soil surveys to establish if soil conditions on the project site are suitable for any special-status plant species. These soil profiles include major soil series with similar thickness, arrangement, and other important characteristics. These series are further subdivided into soil mapping units that provide specific information regarding soil characteristics.

##### *Special-status Wildlife and Plant Species*

Biologists compiled a list of threatened, endangered, and otherwise special-status species previously recorded within the general project vicinity. The list was based on a search of the CDFW California Natural Diversity Database (CNDDB), a special-status species and plant community account database, and the California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California database for the Antioch South, California USGS 7.5-minute topographic quadrangle map. The database search results can be found in Attachment B of the BRA (Appendix D). Additionally, Biologists utilized the Western Bat Working Group (WBWG) Species Matrix, and the East Bay Chapter of the CNPS Database of Rare, Unusual and Significant Plants of

Alameda and Contra Costa Counties.<sup>1</sup> The CNDDDB Biogeographic Information and Observation System (BIOS) database<sup>2</sup> was used to determine the distance between known recorded occurrences of special-status species and the project site.

### *Trees*

Biologists reviewed applicable City ordinances pertaining to tree preservation and protective measures and their tree replacement conditions or permits required, such as by Article 12 Section 9-5.1205 of the City of Antioch Municipal Code. Additionally, a tree survey was conducted by Ed Brennan, Consulting Arborist in July 2015 (Appendix D).

### *Jurisdictional Waters and Wetlands*

Biologists reviewed the investigation of waters of the United States from June 3, 2014, by Live Oak Associates, Inc. Additionally, a letter was received from the United States Army Corps of Engineers (USACE) dated February 23, 2016, with an approved jurisdictional determination, concurring with the Live Oak Associates, Inc. report (Appendix D). This approved jurisdictional determination is limited to the project site west of Deer Valley Road; it does not cover the Off-site Improvement Area to the east of Deer Valley Road, where an additional 0.016 acre of seasonal wetland has been identified.

### *Field Surveys*

Numerous rare plant surveys have been conducted on the project site and the off-site improvement areas. Monk & Associates (M&A) Biologists completed focused rare plant surveys within the project site on March 23 and 25, April 28 and 29, and July 14 and 15, 2015. The plant species found within the project site were identified to species level. A list of all vascular plant taxa encountered within the project site was recorded in the field. Plants that needed further evaluation were collected and keyed at the M&A laboratory. Final determinations for collected plants were made by keying specimens using standard references such as The Jepson Manual, 2<sup>nd</sup> Edition.<sup>3,4</sup> More recently, Madrone Biologists conducted protocol-level special-status plant surveys within the project site and Off-site Improvement Areas in 2018 and 2019.<sup>5,6</sup> Madrone Biologists and Botanists conducted special-status plant surveys of the Project Area on September 6 and 7, 2018; March 18 and 19, May 13, 15, and 29, and September 9, 2019. Madrone Biologists followed CDFW Protocols,<sup>7</sup> USFWS Guidelines,<sup>8</sup> and CNPS Survey Guidelines<sup>9</sup> in conducting their surveys. During these surveys,

<sup>1</sup> California Native Plant Society (CNPS). East Bay Chapter CNPS. 2019. Inventory of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties. Website: <https://ebcnps.org/database-of-rare-unusual-and-significant-plants-of-alameda-and-contra-costa-counties/>. Accessed October 8, 2019.

<sup>2</sup> California Department of Fish and Wildlife (CDFW). 2019. Biogeographic Information and Observation System (BIOS). Website: <https://www.wildlife.ca.gov/Data/BIOS>. Accessed October 8, 2019.

<sup>3</sup> Baldwin, B. et al. 2012. The Jepson Manual: Vascular Plants of California. Berkeley: University of California Press. County of San Bernardino (Bernardino). 2007 (amended 2015).

<sup>4</sup> Monk & Associates, Inc. (M&A). 2015. DRAFT Biological Assessment for The Ranch, City of Antioch, Contra Costa County.

<sup>5</sup> Madrone Ecological Consulting, LLC (Madrone). 2019. Biological Resources Assessment for The Ranch in Antioch.

<sup>6</sup> Madrone Ecological Consulting, LLC (Madrone). 2019. Special-status Plant Survey Report for City of Antioch Regional Infrastructure Improvements.

<sup>7</sup> California Department of Fish and Game (CDFG). 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. California Natural Resources Agency, Sacramento, CA. November 24, 2009.

<sup>8</sup> United States Fish and Wildlife Service (USFWS). 2000. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants. January 2000. U.S. Fish and Wildlife Service (USFWS). 1998. Endangered Species Recovery Program, Recovery Plan for Upland Species of the San Joaquin Valley, California. California State University, Stanislaus.

<sup>9</sup> California Native Plant Society (CNPS) 2001. Inventory of rare and endangered plants of California (6<sup>th</sup> Edition). Rare plant scientific

Madrone Biologists also conducted vegetation community mapping to assess the suitability of habitats on-site to support special-status species. Vegetation communities were classified in accordance with *The Manual of California Vegetation, 2<sup>nd</sup> Edition*,<sup>10</sup> and plant taxonomy was based on the nomenclature in the *Jepson eFlora*.<sup>11</sup>

While no protocol level surveys for the San Joaquin kit fox have been conducted, numerous reconnaissance surveys for species have been conducted within the Study Area. The most recent survey was conducted on February 22, 2019, by H.T. Harvey & Associates. The surveys were conducted utilizing trained scent dog surveys for San Joaquin kit fox within the Study Area. Two teams each consisting of one trained scent dog and one Biologist surveyed the entire 551.0-acre project area for sign of San Joaquin kit fox.

### **Physical Habitat/Vegetation**

Habitat is an area consisting of a combination of resources (e.g., food, cover, water) and environmental conditions (e.g., temperature, precipitation, presence, or absence of predators and competitors) that promotes occupancy by individuals of a species and enables those individuals to survive and reproduce. Thus, habitat arises from interaction among soils, hydrology, climate, and vegetation. Soils, hydrology, and climate are addressed in other sections of this Environmental Impact Report (EIR); this habitat discussion includes information regarding vegetation.

### **City of Antioch**

Habitat communities in the City of Antioch consist primarily of grasslands and oak woodland. Habitat including scrub and agricultural land are found sporadically throughout the City. Brackish marsh and stabilized interior dunes are mainly found to the north of the City in association with the Sacramento/San Joaquin Delta.<sup>12</sup>

### **Project Site**

The majority of the project site consists of annual brome grassland with Sand Creek running west to southeast through the center of the project site. The project site ranges from rolling hills to flat terrain, with elevations ranging from approximately 200 feet to 500 feet above mean sea level (MSL). The majority of the project site is undeveloped and used for livestock grazing. One single-family residence is located on the site, in addition to several barns and outbuildings.

### **Off-site Improvement Area**

The proposed project would include the installation of a new sewer main, which would extend eastward and connect to an existing off-site trunk main, as shown in Exhibit 2-14. All on-site and off-site sewer improvements would be constructed within public right-of-way or within public utility easements within private roadways, as needed. Topography within the off-site improvement area ranges from gently rolling hills to flat terrain, with elevations ranging from approximately 200 feet to

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advisory committee, David P. Tibor, convening editor. California Native Plant Society. Sacramento, CA.

<sup>10</sup> Sawyer, J., Keeler-Wolf, T. and Evens, J., 2009. A manual of California vegetation, 2<sup>nd</sup> Edition. California Native Plant Society (CNPS), Sacramento, CA.

<sup>11</sup> Jepson Flora Project (eds.) 2019. Jepson eFlora. Website: <http://ucjeps.berkeley.edu/eflora/>. Accessed September 2019.

<sup>12</sup> City of Antioch. 2003. General Plan EIR. Biological Resources. Figure 4.3.1. Accessed June 21, 2019.

220 feet above MSL. The Off-site Improvement Area is comprised of portions of Deer Valley Road and Sand Creek Road as well as adjacent undeveloped areas to the east of Deer Valley Road.

#### Wildlife

Wildlife species observed within the project site during the 2017 site visits include American crow (*Corvus brachyrhynchos*), American kestrel (*Falco sparverius*), killdeer (*Charadrius vociferus*), barnswallow (*Hirundo rustica*), western meadowlark (*Sturnella neglecta*), Bullock's oriole (*Icterus bullockii*), house finch (*Haemorhous mexicanus*), black phoebe (*Sayornis nigricans*), turkey vulture (*Cathartes aura*), and California ground squirrel (*Otospermophilus beecheyi*). In addition, vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardii*), California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytoni*), western spadefoot (*Spea hammondi*), golden eagle (*Aquila chrysaetos*), Swainson's hawk (*Buteo swainsoni*), and burrowing owl (*Athene cunicularia*) pellets were observed during Madrone's 2018 and 2019 surveys. A complete list of wildlife species observed within the project site during the 2017 site visits is provided as Attachment D of the revised BRA.

#### Vegetation Communities

The 2019 Madrone BRA identified seven vegetation communities and land cover types within the project site and Off-site Improvement Area, including alkali weed (*Cressa truxillensis*), annual brome grassland, California goldfields dwarf plantain, ruderal community vegetation, eucalyptus woodland, valley oak woodland, and developed land that are described in further detail below. (Exhibit 3.4-1)

#### Alkali Weed-Salt Grass Playas and Sinks

Both ponds in the project site and the portion of ephemeral drainage west of Empire Mine Road are dominated by saltgrass (*Distichlis spicata*), perennial ryegrass (*Festuca perennis*), Mediterranean barley, alkali mallow (*Malvella leprosa*), and alkali weed. Other common plant species in these areas include California button-celery (*Eryngium aristulatum* var. *aristulatum*), brass buttons (*Cotula coronopifolia*), alkali popcorn flower (*Plagiobothrys leptocladus*), salt marsh sand spurrey (*Spergularia marina*), and crownscale (*Atriplex coronata*). These features would be classified as alkali weed-salt grass sinks (*Cressa truxillensis*—*Distichlis spicata* Herbaceous Alliance) in accordance with the *Manual of California Vegetation, 2<sup>nd</sup> Edition*.<sup>13</sup> This alliance is considered a Sensitive Natural Community by CDFW.<sup>14</sup>

#### Annual Brome Grassland

As stated above, the majority of the project site is composed of annual brome grassland. Annual brome grasslands on-site are dominated primarily by non-native annual grass species, including ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), wild oat (*Avena fatua*), foxtail barley (*Hordeum murinum*), and perennial ryegrass. Common forb species within the annual brome grasslands include common gumplant (*Grindelia camporum*), turkey mullein (*Croton setiger*), California burclover (*Medicago polymorpha*), and redstemmed filaree (*Erodium cicutarium*). Heavy clay inclusions within this community are dominated by sparse, low-growing forbs, such as California burclover, rose clover

<sup>13</sup> Sawyer, J., Keeler-Wolf, T. and Evens, J., 2009. A manual of California vegetation, 2<sup>nd</sup> Edition. California Native Plant Society (CNPS), Sacramento, CA.

<sup>14</sup> California Department of Fish and Wildlife (CDFW). 2018. California Sensitive Natural Communities List. Dated October 15, 2018.

(*Trifolium hirtum*), and Douglas' microseris (*Microseris douglasii* ssp. *douglasii*). Scattered non-native trees occur occasionally within this community, and some isolated native trees including California buckeye (*Aesculus californicus*), blue oak (*Quercus douglassii*), valley oak (*Quercus lobata*), and interior live oak (*Q. wislizeni*) occur along Sand Creek. Where these native trees form stands, they were mapped as valley oak woodland, as described below. The annual brome grasslands are only lightly grazed in the hills but are very heavily grazed in the flat valley bottom by the end of summer.

#### *Developed*

Developed portions of the project site include the paved Empire Mine Road, Sand Creek Road, Deer Valley Road, the single-family residence and the driveway to the residence, heavily impacted pastures, and associated outbuildings and vehicle storage yards. Many of these areas are characterized as bare dirt or paved, while others are occupied by ruderal vegetation (non-native forbs and grasses characteristic of recently disturbed sites). Dominant plant species within the ruderal areas include yellow star-thistle (*Centaurea solstitialis*), stinkwort (*Dittrichia graveolens*), Russian thistle (*Salsola tragus*), perennial ryegrass, and wild oat.

#### *Eucalyptus Woodland*

A grove of planted blue gum (*Eucalyptus globulus*) occurs along the western boundary of the project site. Little to no vegetation occurs in the understory of this community.

#### *California Goldfields-Dwarf Plantain-Small Fescue Flower Fields*

A small area of California Goldfields-Dwarf Plantain-Small Fescue Flower Fields occurs on a north-facing slope just to the north of the Eucalyptus Woodland on the western side of the project site. This unique area occurs on highly expansive clay soils, supports almost no grass, and dominant plant species include dwarf plantain (*Plantago erecta*), few-flowered evax (*Hesper-evax sparsiflora*), California burclover, rose clover, shining navarretia (*Navarretia nigelliformis* ssp. *radians*), and chaparral fairyfan (*Clarkia affinis*).

#### *Valley Oak Woodland*

Valley oak woodland occurs in several small isolated patches along Sand Creek within the project site, but not within the Off-site Improvement Area. These patches are dominated by valley oak, California buckeye, and interior live oak. Understory species are largely similar to species found in the surrounding wild oats grassland, but some more mesic species are found as well, such as Douglas' mugwort (*Artemisia douglasiana*), California buttercup (*Ranunculus californicus*), and California figwort (*Scrophularia californica*). This community is considered a Sensitive Natural Community by the CDFW.<sup>15</sup>

#### *Ruderal*

Ruderal vegetation occurs adjacent to Deer Valley Road and Sand Creek Road within the eastern portion of the project site and the Off-site Improvement Area. This vegetation community is composed primarily of nonnative forbs and grasses characteristic of recently disturbed sites.

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<sup>15</sup> California Department of Fish and Wildlife (CDFW). 2018. California Sensitive Natural Communities List. Dated October 15, 2018.

Dominant plant species within the ruderal vegetation communities in the project site include yellow star-thistle, stinkwort, Russian thistle, perennial ryegrass, and wild oat.

## Soils

According to the Natural Resources Conservation Service (NRCS) Soil Survey Database,<sup>16</sup> six soil mapping units occur within the project site: (AbD) Altamont Clay, 9 to 15 percent slopes, Major Land Resource Area (MLRA) 15; (AbE) Altamont Clay, 15 to 30 percent slopes, MLRA 15; (AcF) Altamont-Fontana Complex, 30 to 50 percent slopes; (BdE) Briones Loamy Sand, 5 to 30 percent slopes; (CaA) Capay Clay, 0 to 3 percent slopes, MLRA 17; and (RbA) Rincon Clay Loam, 0 to 2 percent slopes, MLRA 14. (CaA) Capay Clay, 0 to 3 percent slopes, MLRA 17; and (RbA) Rincon Clay Loam, 0 to 2 percent slopes, MLRA 14 occur within the Off-site Improvement Area (Exhibit 3.4-2).

None of these soils is derived from serpentine parent material.<sup>17</sup> None of the components of these soil mapping units are considered saline or alkaline,<sup>18</sup> but inclusions of alkaline soils were observed in the northwestern portion of the project site, which was mapped as Altamont clay, and Altamont Fontana complex.

## Sensitive Natural Communities

Sensitive Natural Communities are those Natural Communities that the CDFW has ranked S1 (Critically Imperiled), S2 (Imperiled), or S3 (Vulnerable). Of the vegetation communities described above, two have been designated as Sensitive Natural Communities by the CDFW: alkali weed-salt grass sinks and valley oak woodland.

## City of Antioch

While the City of Antioch is largely developed, portions of undeveloped lands are considered to be sensitive. The Sand Creek Focus Area is the main sensitive biological community within the City of Antioch. The City of Antioch General Plan EIR states that sensitive communities within the City include native grasslands, vernal pools, stabilized interior dunes, seasonal wetlands, freshwater seeps, freshwater marshes, salt brackish marshes, alkaline floodplains, alkali seeps, valley oak woodlands, and riparian woodland.<sup>19</sup>

## Project Site

The project site is located within the Sand Creek Focus Area (Focus Area), which contains one or more sensitive biological communities.<sup>20</sup> The West Sand Creek Initiative was developed to protect nearly 1,244.00 acres of the Focus Area from future development and prohibits development on ridges and hills throughout the Focus Area and along Sand Creek. Although the West Sand Creek Initiative was stricken by the lower court, the project mimics the exact development footprint proposed for the project site in the West Sand Creek Initiative and thus, similarly protects a majority of the sensitive biological communities within the project area.

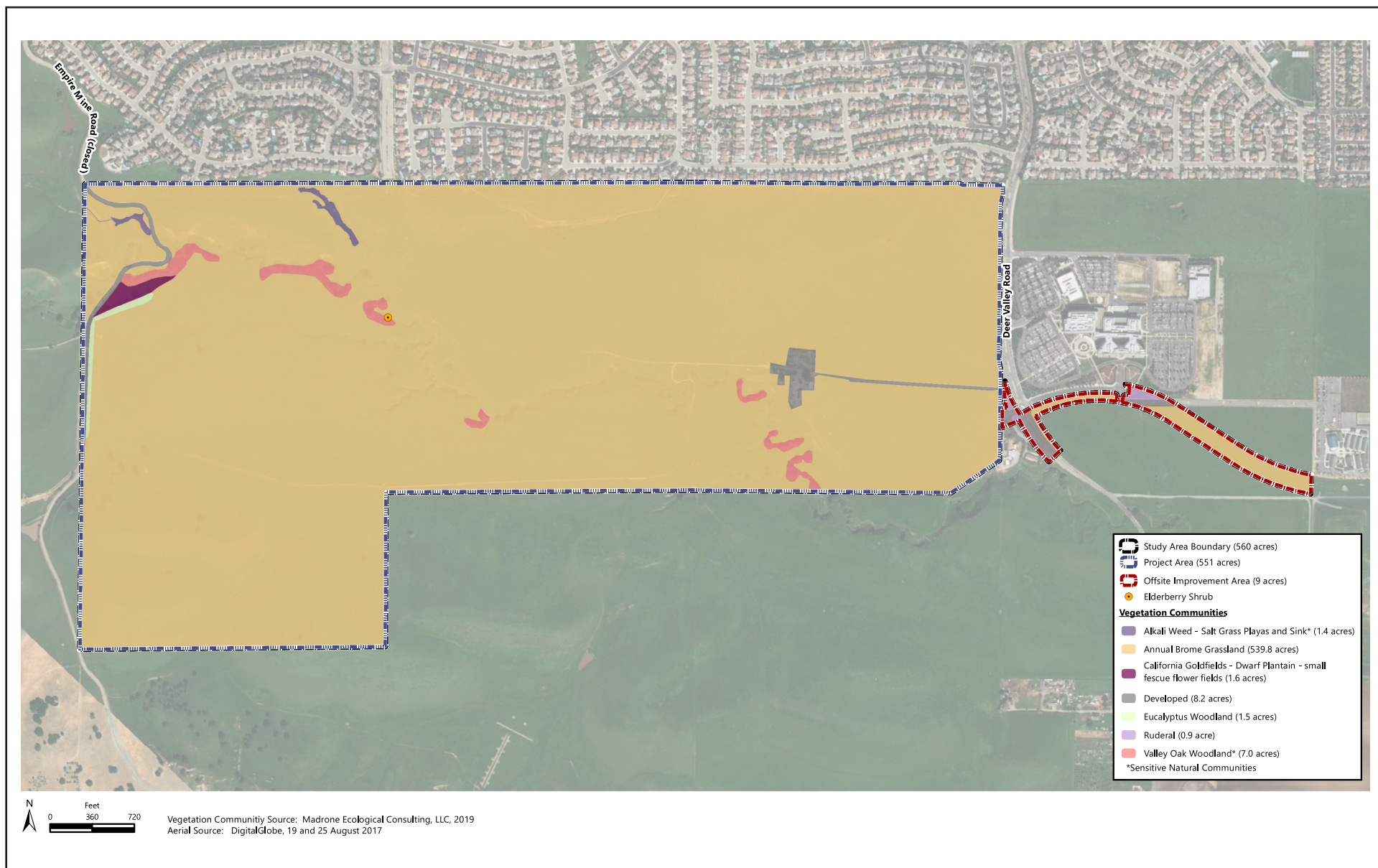
<sup>16</sup> Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture (NRCS). 2019. Web Soil Survey. Available <http://websoilsurvey.nrcs.usda.gov/>.

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

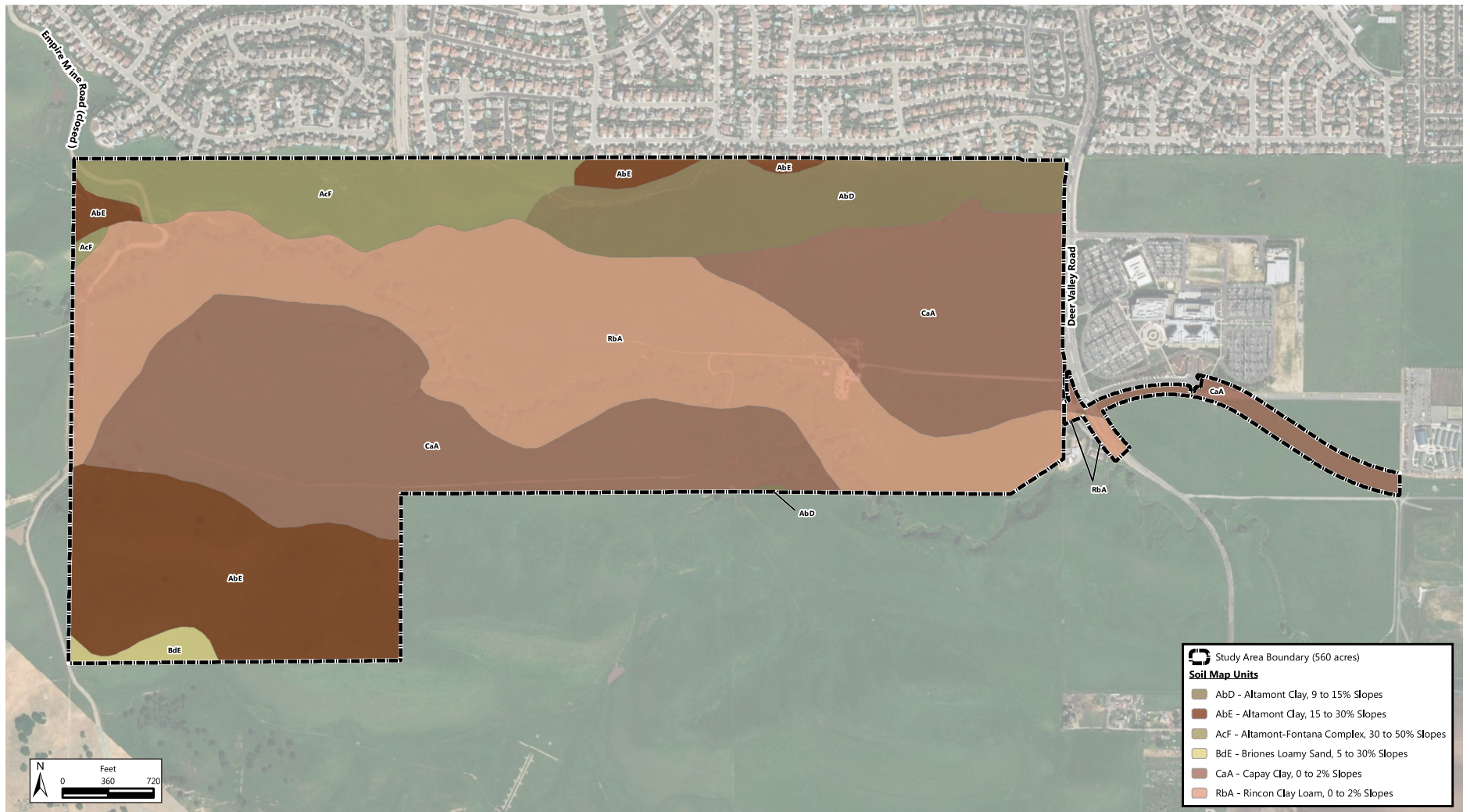
<sup>19</sup> City of Antioch. 2003. General Plan EIR. Biological Resources. Accessed October 3, 2019.

<sup>20</sup> City of Antioch. 2003. General Plan. Resource Management Element. Accessed June 21, 2019.



Source: Madrone Ecological Consulting, LLC (Madrone), February 27, 2020.

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Source: Madrone Ecological Consulting, LLC (Madrone) September 2019.

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### ***Wetlands and Waters of the United States and the State***

Wetlands and waters of the United States and waters of the State are protected as hydrological resources, but also often provide habitat for common and special-status species. Types of water features include open water, developed open water, tidal marsh, seasonal wetland, wetlands swale, and waters.

### ***City of Antioch***

Within the City of Antioch, wetlands, waters of the United States, and waters of the State occur primarily near the San Joaquin River and within the southern portion of the City.<sup>21</sup>

### ***Project Site***

An approved jurisdictional determination has been issued for the project site by the USACE (Attachment D of the BRA), and a protocol-level aquatic resources delineation has been conducted for the off-site infrastructure areas by Madrone.<sup>22</sup> A total of 5.059 acres of aquatic resources were mapped within the project site, and an additional 0.016 acre was mapped within the Off-site Improvement Area, and are shown in Exhibit 3.4-3, and Table 3.4-1.<sup>23</sup> A description of each of the aquatic resources types is included below.

**Table 3.4-1: Aquatic Resources Mapped within the Project Site and Off-site Improvement Area**

Resource Type	Acreage within the Project Site
Seasonal Wetland	1.013
Seasonal Wetland Swale	0.286
Seep	0.030
Ephemeral Drainage	0.473
Intermittent Drainage	1.903
Pond	1.373
<b>Total Acres</b>	<b>5.076<sup>1</sup></b>
Note: <sup>1</sup> Rounding of the individual numbers results in a small summation discrepancy. The underlying GIS data confirms that the total is 5.076 acres.	

### ***Seasonal Wetland***

Seasonal wetlands are ephemerally wet due to accumulation of surface runoff and rainwater within low-lying areas. Inundation periods tend to be relatively short and they are commonly dominated by nonnative annual and sometimes perennial hydrophytic species. There are several seasonal wetlands located in the Off-site Improvement Area along Deer Valley Road. These shallow features are dominated by annual grasses and hydrophytic forbs including perennial ryegrass. On-site, several

<sup>21</sup> City of Antioch. 2003. General Plan EIR. Biological Resources. Figure 4.3.1. Accessed June 21, 2019.

<sup>22</sup> Madrone Ecological Consulting, LLC. 2019a. Aquatic Resources Delineation Report. City of Antioch Regional Infrastructure Improvements. Prepared for The City of Antioch. Dated February 2019.

<sup>23</sup> United States Army Corps of Engineers (USACE). 2016. Approved Jurisdictional Determination for the Ranch Residential Development Site. Dated February 23, 2016.

shallow seasonal wetlands occur near the farmhouse and are mostly unvegetated due to heavy cattle grazing. There are two relatively deep seasonal wetlands located in the central eastern portion of the site. These features appear to have been modified by the installation of earthen berms to make them deeper. There is a cluster of seasonal wetlands located within the southeastern portion of the project site south of Sand Creek. These wetlands are relatively shallow and appear to be natural features.

### ***Seasonal Wetland Swale***

Seasonal wetland swales are generally linear wetland features that convey precipitation runoff and support a predominance of hydrophytic vegetation, but do not exhibit an ordinary high water mark (OHWM). These are typically inundated for short periods during, and immediately after, rain events. However, they usually maintain soil saturation for longer periods during the wet season. One seasonal wetland swale occurs in the northern central portion of the project site. Hydrology for this feature is driven by an existing storm water outfall from the development to the north. This seasonal wetland swale is a narrow, moderate-gradient feature dominated by perennial ryegrass and black mustard (*Brassica negra*).

### ***Intermittent Drainage (Sand Creek)***

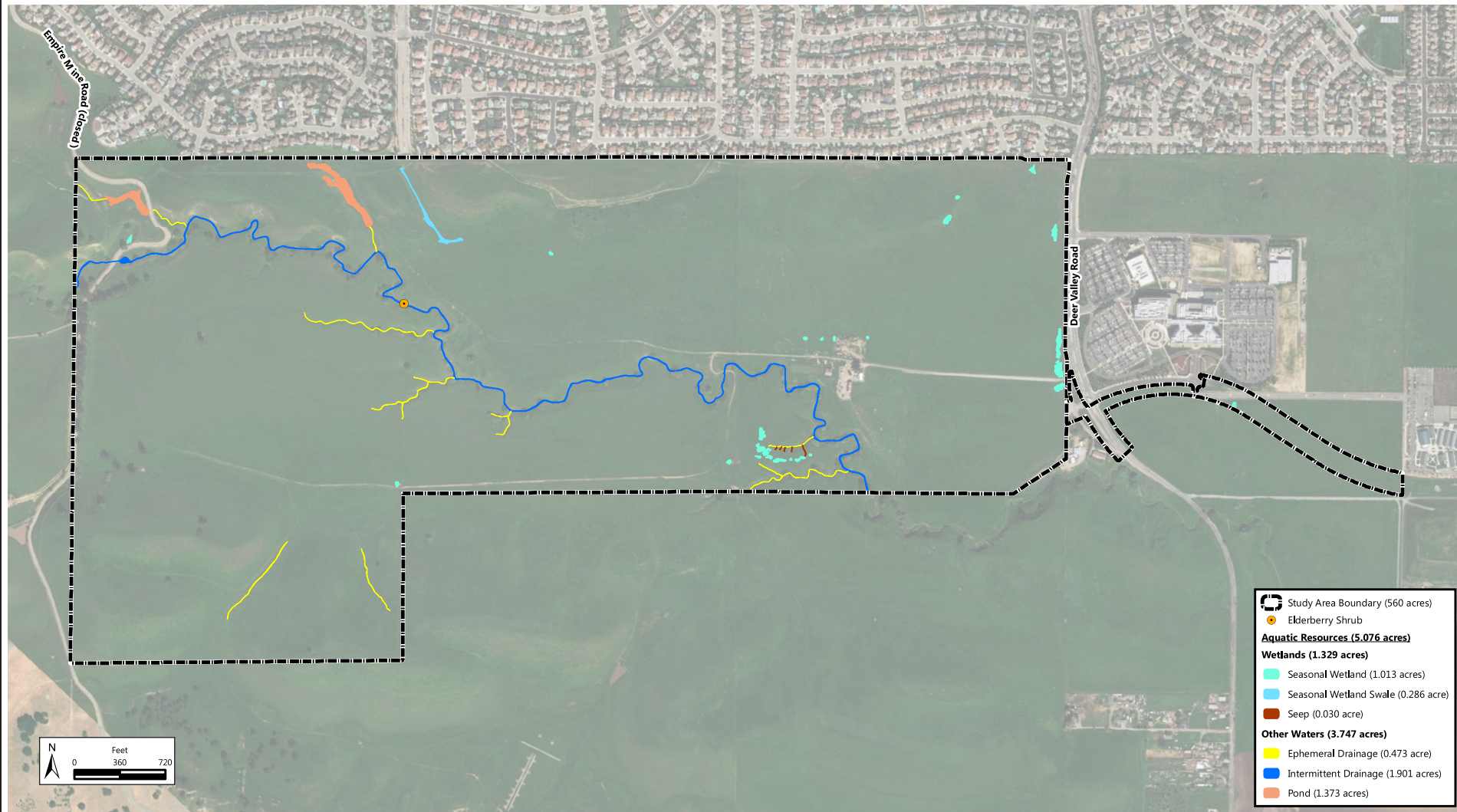
Intermittent drainages are linear features that exhibit a bed and bank and an OHWM. Intermittent drainages differ from ephemeral drainages in that they flow for longer duration, typically weeks or months following rainfall events, and are often influenced by groundwater. This usually results in greater quantities and duration of flow relative to ephemeral drainages. One intermittent drainage, Sand Creek, occurs within the project site and Off-site Improvement Area.

Sand Creek flows from west to east across the central portion of the project site. Sand Creek is an intermittent stream that conveys precipitation runoff during and shortly after rain events. The duration of water flow within the creek ranges from a few days to several weeks after rain events and the duration of water flow is directly linked to the amount of precipitation received.

Sand Creek is highly incised within the project site and contains a primary low-flow channel that ranges from 8 to 10 feet deep and averages 12 feet in width. A secondary flood-plain terrace ranges from approximately 30 to 70 feet in depth and 30 to 70 feet in width. The banks of Sand Creek are generally steep and range from 15 to 60 percent. The bed of Sand Creek is generally unvegetated due to high-volume and high-velocity flows. These flows tend to scour vegetation and soil from the primary channel. As another indicator of the generally flashy flow regime of Sand Creek, rack lines located within the channel were observed as high as 12 to 15 feet above the bed of the creek.<sup>24</sup> Within the project site, there is one large plunge pool within the channel of the creek that remains inundated for long durations. This plunge pool is located immediately east (downstream) of Empire Mine Road. Both California red-legged frog and western spadefoot have been observed within this plunge pool. Sand Creek is a highly incised intermittent drainage with steep banks and little to no vegetation within the channel. The banks of Sand Creek are quite tall, and in most areas, are occupied by species typical of the surrounding annual brome grassland. In addition, a few trees, shrubs, and forbs have established along these banks, including California buckeye, coast live oak (*Quercus agrifolia*), valley oak, California rose (*Rosa californica*), California sagebrush (*Artemisia californica*), and Douglas' mugwort.

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<sup>24</sup> Monk & Associates, Inc. (M&A). 2015. DRAFT Biological Assessment for The Ranch, City of Antioch, Contra Costa County.



Source: Madrone Ecological Consulting, LLC (Madrone) September 2019.

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### **Ephemeral Drainage**

Ephemeral drainages are linear features that exhibit a bed and bank and an OHWM. These features typically convey runoff for short intervals, during and immediately following rain events, and are not influenced by groundwater sources at any time during the year. Ephemeral drainages occur in the two westernmost portions of the project site. These features are sparsely vegetated. Vegetated portions of ephemeral drainages within the off-site infrastructure area are dominated by species typical of the surrounding annual brome grasslands.

### **Pond**

Two ponds are located within the northwestern portion of the project site. These features were man-made by the placement of an earthen berm within an existing ephemeral drainage. The seasonal pond fills during the winter and remains inundated until summer to early fall. Vegetation observed below the OHWM of the ponds consists of salt grass, perennial ryegrass, Mediterranean barley, alkali-mallow, and alkali weed. Above the OHWM vegetation consisted mostly of annual grassland species with a few scattered black willows (*Salix gooddingii*).

Both of the ponds in the project site would be classified as alkali weed-salt grass sinks. This alliance is considered a Sensitive Natural Community by CDFW.<sup>25</sup>

### **Seep**

There are five small seeps located on a hillside south of Sand Creek near the cluster of seasonal wetlands. These narrow linear features appear to be influenced mostly by surface water draining from the adjacent uplands toward Sand Creek. Vegetation within these features is mostly perennial ryegrass with scattered coyote-thistle (*Eryngium vaseyi*).

### **Special-status Species**

Habitat, whether aquatic or terrestrial, supports ecological functions and processes to preserve biological communities (i.e., wildlife) that live within it for all or a portion of their life cycle. Special-status species, whether plants, wildlife, or fish, are considered sufficiently rare that they require special consideration and/or protection and have been or should be listed as rare, threatened, or endangered by the federal and/or state governments. The following discussion focuses on the occurrence or potential for occurrence of special-status species within the project area. Special-status species are defined as those species that are listed as threatened or endangered as follows:

- Listed as threatened or endangered, or proposed or candidates for listing by the USFWS or National Marine Fisheries Service (NOAA);
- Listed as threatened or endangered and candidates for listing by the CDFW;
- Identified as Fully Protected species or Species of Special Concern by the CDFW;
- Identified as Medium or High priority species by the WBWG;<sup>26</sup>

<sup>25</sup> California Department of Fish and Wildlife (CDFW). 2018. California Sensitive Natural Communities List. Dated October 15, 2018.

<sup>26</sup> Western Bat Working Group (WBWG). 2019. Species Matrix and Species Accounts. Website: <http://wbwg.org/>. Accessed September 2019.

- Plant species considered to be rare, threatened, or endangered in California by the CNPS and CDFW:
  - **Rank 1A:** Plants presumed extinct
  - **Rank 1B:** Plants rare, threatened, or endangered in California and elsewhere
  - **Rank 2A:** Plants extirpated in California, but common elsewhere
  - **Rank 2B:** Plants rare, threatened, or endangered in California, but more common elsewhere
  - **Rank 3:** Plants about which the CNPS needs more information—a review list; and
- Plant species considered to be locally rare by CNPS.

While the locally rare plant species are locally of sufficient rarity to be considered under CEQA, Statewide, they are more common. As a result, these species are not tracked by the spatially-searchable CNDDDB or the CNPS Inventory. There are 45 A-ranked plant species that are not California Rare Plant Rank (CRPR)-listed included in the Database of Rare, Unusual, and Significant Plants of Alameda and Contra Costa Counties for the Marsh Creek/Lone Tree Valley area (which includes Sand Creek). While these species were surveyed for during the 2018-2019 protocol-level plant surveys of the site, they are not included in Table 2 for brevity (with the exception of the one species that was documented on-site during the surveys).<sup>27</sup>

### ***Special-status Plants on the Project Site***

The Special-status Species Table identified 61 special-status plant species. Of the 61 special-status plant species with the potential to occur within the vicinity of the Study Area, 35 species were determined to not be present due to the lack of suitable habitat; 22 of the remaining 26 species were determined to be absent from the Study Area as they were not observed during the 2018-2019 special-status plant surveys. The remaining four species were documented within the Study Area during the 2018-2019 special-status plant surveys. Occurrences of special-status plant species occurring within the project site and surrounding area are shown in Exhibit 3.4-4. All species within the Special-status Species Table can be found in Table 2 of the updated BRA by Madrone (Appendix D).

M&A Botanists documented crownscale, shining navarretia, and San Joaquin spearscale (*Extriplex joaquinana*) during their surveys from 2013–2015. A Madrone Botanist searched the location that San Joaquin spearscale was documented by M&A several times throughout the summers of 2018 and 2019 and could not locate any San Joaquin spearscale plants. It is unknown how many plants M&A Biologists observed during their surveys, but the population was indicated by a single dot on the map in their report. It is possible that if the population was comprised of a single plant, the heavy cattle use in the area (as this is the last source of water for cattle in mid-summer) could have extirpated the population.

Additionally, Madrone determined that three special-status plant species and one A-ranked locally rare plant are present within the project site, based on Madrone's observations during the 2018 and 2019 plant surveys, which were conducted on September 6 and 7, 2018; March 18 and 19; May 13, 14, 15, and 29; and September 9, 2019. The three special-status species include crownscale, big tarplant (*Blepharizonia plumosa*), and shining navarretia. Angle-stem buckwheat (*Eriogonum*

<sup>27</sup> Madrone Ecological Consulting, LLC. 2019. Biological Resources Assessment for The Ranch in Antioch. Prepared for Richland Planned Communities. Accessed October 10, 2019.

*angulosum*) is an A-ranked locally rare plant species that was documented on-site. These four plant species present on-site and the remaining 26 special-status species found in the updated BRA Special-status Species Table with the potential to occur are discussed in detail below.

#### *Angle-stem buckwheat*

Angle-stem buckwheat is a common species that is not listed pursuant to either the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA) or designated as a CRPR species. It is listed as a “locally rare” species by the East Bay Chapter of the CNPS as the project site is located at the far northern end of the species’ range. This species is an herbaceous annual that occurs in clay soils within valley grassland, foothill woodland, Joshua tree woodland, and pinyon-juniper woodland.<sup>28</sup> Angle-stem buckwheat blooms in mid to late summer. Angle-stem buckwheat was not a target species for this survey; however, angle-stem buckwheat was documented on the steep south-facing cliffs just north of Sand Creek.

#### *Crownscale*

Crownscale is not listed pursuant to either FESA or CESA but is designated as a CRPR 4.2 species. This species is an herbaceous annual that occurs in alkaline and often clay soils within chenopod scrub, valley and foothill grasslands, and vernal pools.<sup>29</sup> Crownscale blooms from March through October and is known to occur at elevations ranging from approximately 3 feet to 1,936 feet above MSL.<sup>30</sup>

Crownscale was documented along the fringes of the alkali weed-salt grass sinks in the northwestern portion of the project site.

#### *Big tarplant*

Big tarplant is not federally or State-listed, but it is classified as a CRPR List 1B.1 species. This species is an herbaceous annual that occurs in valley and foothill grasslands, usually in clay soil.<sup>31</sup> Big tarplant blooms from July through October and is known to occur from approximately 98 feet to 1,657 feet above MSL.<sup>32</sup>

A single plant of this species was observed in the hills in the southern portion of the project site during a late-season special-status plant survey conducted in September 2018. This area was resurveyed in September of 2019 and one small population consisting of three plants was observed. Protocol-level surveys of the Off-site Improvement Areas conducted by Madrone failed to detect any occurrence of the tarplant.

#### *Shining navarretia*

Shining navarretia is not federally or California listed, but it is classified as a CRPR List 1B.2 species. This annual herb is primarily associated with vernal pools and other mesic areas in cismontane woodland

<sup>28</sup> CalFlora. 2019. Taxon page for *Eriogonum angulosum*. Website: [https://www.calflora.org/cgi-bin/species\\_query.cgi?where-calrecnum=3194](https://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=3194). Accessed September 2019.

<sup>29</sup> California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website: <http://www.rareplants.cnps.org>. Accessed September 2019.

<sup>30</sup> California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website: <http://www.rareplants.cnps.org>. Accessed September 2019.

<sup>31</sup> Ibid.

<sup>32</sup> Ibid.

and valley and foothill grassland, often on clay soils.<sup>33</sup> Shining navarretia occurs at elevations between approximately 210 feet and 3,280 feet, and typically blooms from April through July.<sup>34</sup>

Suitable habitat for this species is present on heavy clay soils in the flat portions of the annual brome grasslands throughout the project site as well as the California Goldfields-Dwarf Plantain-Small Fescue Flower Fields. This species was previously documented in abundance within the project site by M&A,<sup>35</sup> predominantly within openings in the flat Annual Brome Grassland to the south of Sand Creek. During the 2019 surveys, Madrone resurveyed all areas of suitable habitat to obtain sub-meter accurate location data and accurate population counts for this species. Many of the populations of shining navarretia originally observed by M&A were re-documented. Additional discrete populations of this species were observed just to the north of Sand Creek, and at the far eastern boundary of the project site. Thousands of shining navarretia were observed during the 2019 surveys and are present within the area site in isolated locations on heavy clay soils.

#### *San Joaquin spearscale*

Suitable habitat for this species is present in the alkali weed-salt grass sinks in the northwestern portion of the project site, and this species was previously detected by M&A in the eastern pond.<sup>36</sup> Despite a thorough search of the eastern pond (including a targeted search of this location on June 5, 2018, and again in 2019), this species was not detected. It is anticipated that heavy cattle use in the area could have extirpated the population.

### **Special-status Plant Species within the Off-site Improvement Area**

The Off-site Improvement Area was surveyed by Madrone Ecological Consulting between 2018 and 2019 for 11 target special-status plant species, including big tarplant, dwarf downingia, Jepon's coyote thistle, spiny-sealed button-celery, diamond-petaled California poppy, fragrant fritillary, Diablo helianthella, Brewers western flax (*Hesperolinon breweri*), showy golden madia, Shining navarretia, and Bearded popcornflower. No special-status plant species or plant species noted as Locally Rare were observed during the special-status plant surveys within the Off-site Improvement Area. The results of the botanical survey for the 11 target special-status plant species are described in further detail below.

#### *Big tarplant*

Suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

#### *Dwarf downingia*

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

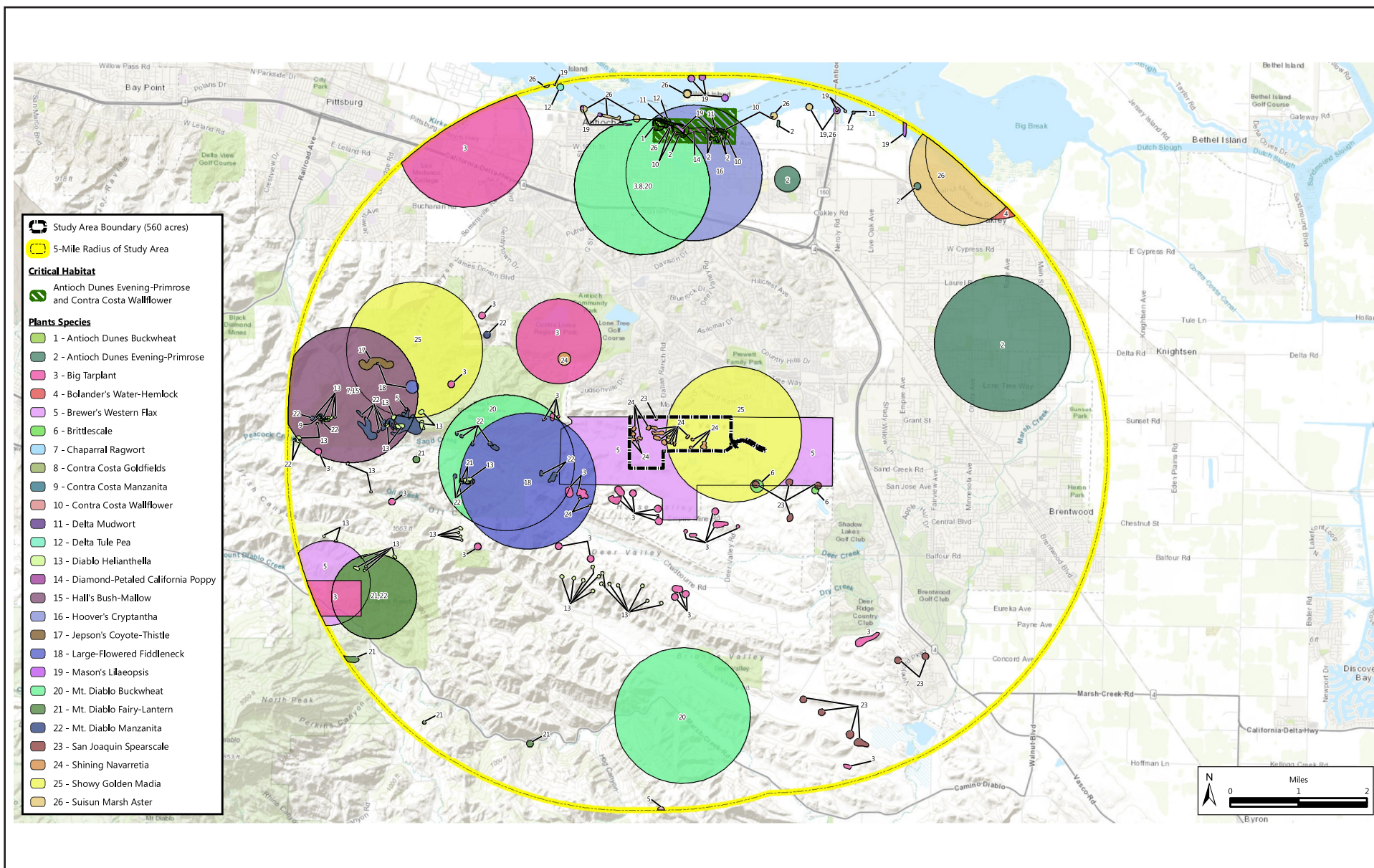
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<sup>33</sup> California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website: <http://www.rareplants.cnps.org>. Accessed September 2019.

<sup>34</sup> Ibid.

<sup>35</sup> Monk & Associates (M&A). 2018. Special-status Plant Survey Report, The Ranch Project Site, Antioch, Contra Costa County, California. Prepared for Richland Planned Communities, Inc.

<sup>36</sup> Ibid.



Source: Madrone Ecological Consulting, LLC (Madrone) September 2019.

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*Jepson's coyote thistle*

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Spiny-sepaed button-celery*

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Diamond-petaled California poppy*

Marginally suitable habitat for this species is present in the annual brome grasslands around the Alkali Weed–Salt Grass Sink in the northwestern portion of the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Fragrant fritillary*

Marginally suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Diablo helianthella*

Marginally suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Brewers western flax*

Marginally suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. The Off-site Improvement Area falls within CNDDDB Occurrence No. 32 for this species.<sup>37</sup> This species was documented by Live Oak Associates somewhere in the Sand Creek Focus Area in 2002.<sup>38</sup> Madrone was not able to locate the map showing the location of these plants within the Sand Creek Focus Area, but given that this site is only a small portion of that area, the marginal nature of the habitat within this Off-site Improvement Area, and the much higher quality habitat in the hills to the south of the Off-site Improvement Area, we find it unlikely that Brewer's western flax was observed within the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

*Showy golden madia*

Suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. The Off-site Improvement Area falls within CNDDDB Occurrence No. 25 for showy golden madia.<sup>39</sup> This occurrence includes two records from Hoover in 1938 and 1941, from "Lone Tree Valley" and "1 mi N of Lone Tree Valley."<sup>40</sup> Given that these occurrences have not been

<sup>37</sup> California Natural Diversity Database (CNDDDB). 2018. RareFind 5. California Department of Fish and Wildlife. Dated July 26, 2018. Accessed December 3, 2019.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

<sup>40</sup> California Natural Diversity Database (CNDDDB). 2018. RareFind 5. California Department of Fish and Wildlife. Dated July 26, 2018.

documented since 1941, the CNPS Inventory considers showy golden madia to be extirpated in Contra Costa County.<sup>41</sup> This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

#### *Shining navarretia*

Suitable habitat for this species is present in the annual brome grasslands throughout the Off-site Improvement Area. Although this species has not previously been documented within the Off-site Improvement Area, it has been documented in relative abundance on the project site. The Madrone Botanist visited these known populations of shining navarretia and found that very few of the previously mapped populations appear to have emerged in 2018, and those that did emerged quite late and senesced quickly. This was a trend noted on numerous sites visited by Madrone Biologists during the spring of 2018; other upland navarretia species that are usually quite prevalent were sparse. Madrone conjectured that it may have been due to the unusual precipitation regime in 2018. As a result, Madrone did not feel that the 2018 surveys were conclusive for this species; therefore, they conducted an additional survey of the Off-site Improvement Area on 14 May 2019, targeting this species only. On that date, shining navarretia was prevalent on the project site. However, this species was not observed during either the 2018 or 2019 follow-up special-status plant survey of the Off-site Improvement Area.

#### *Bearded popcornflower*

Marginally suitable habitat for this species is present in the seasonal wetlands and other aquatic resources within the Off-site Improvement Area. This species was not observed during the 2018 special-status plant surveys of the Off-site Improvement Area.

### **Special-status Wildlife at the Project Site**

Based on queries of the CNDDDB and other information sources, the BRA returned records of 26 special-status wildlife species that occur within the project site. Table 2 of the updated BRA provides a list of all special-status wildlife species, consisting of invertebrates, fish, amphibians, reptiles, birds, and mammals, that are known to occur or have the potential to occur within 5 miles of the project site based on their local and regional distribution. Occurrences of special-status wildlife species occurring within the project site and surrounding area are shown in Exhibit 3.4-5. Twenty-six special-status wildlife species have the potential to occur within the project site. The 26 species are broken down below.

#### **Invertebrates**

##### *Crotch bumblebee*

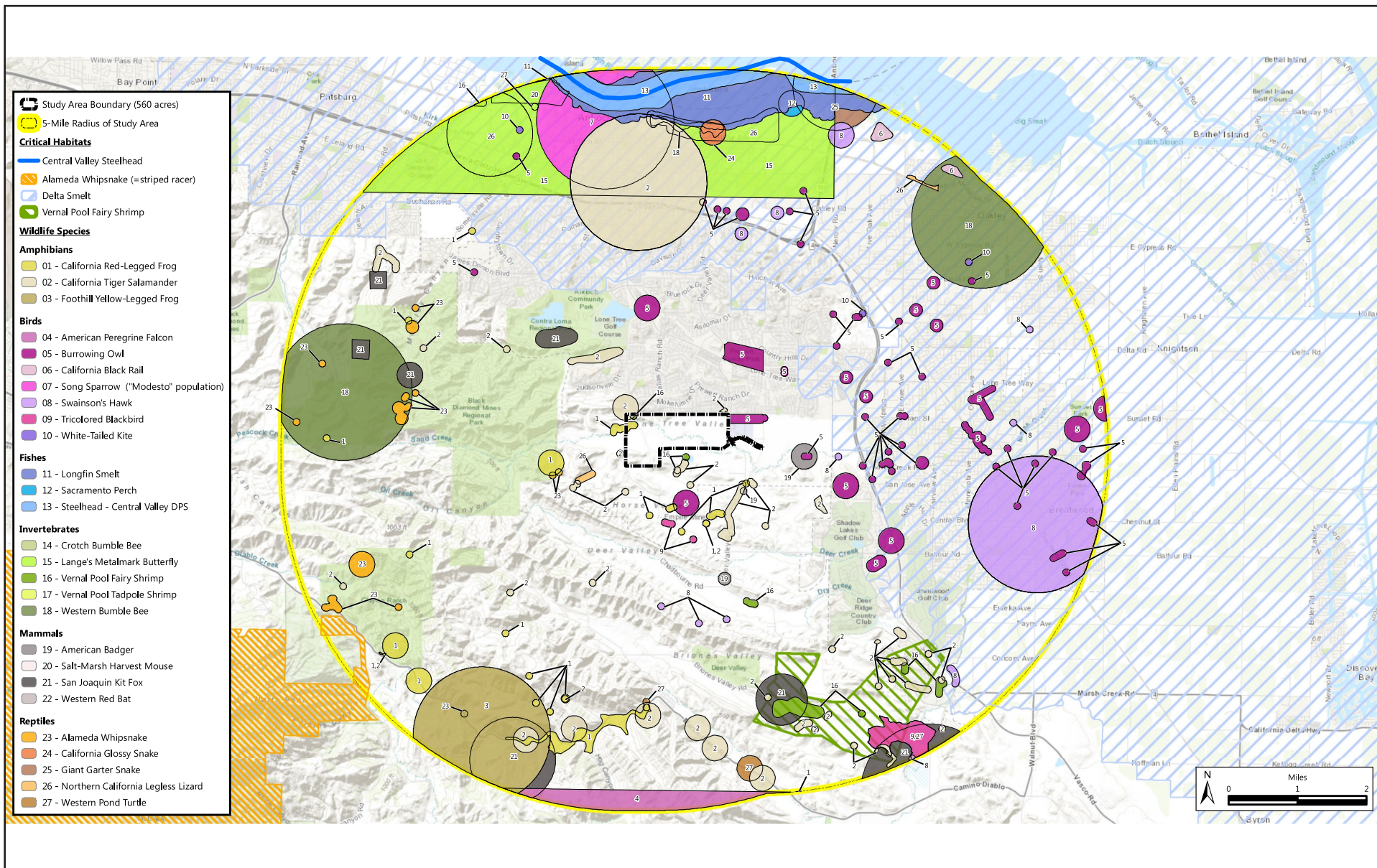
The Crotch bumblebee is a candidate species for CDFW listing. This species was historically common in the Central Valley of California, but now appears to be absent from most of it, especially in the center of its historic range.<sup>42</sup> The hillsides and areas along Sand Creek contain suitable foraging flower populations and abundant ground squirrel burrows that represent potential nesting and overwintering habitat. Due to the fact that crotch bumblebee is currently absent from most of the Central Valley of California, there is low potential for this species to occur within the project site.

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Accessed December 3, 2019.

<sup>41</sup> California Native Plant Society (CNPS). 2018. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website <http://www.rareplants.cnps.org>. Accessed May through July 2018.

<sup>42</sup> Williams, P. H., R. W. Thorp, L. L. Richardson, and S. R. Colla. 2014. The Bumble bees of North America: An Identification guide. Princeton University Press, Princeton.



Source: Madrone Ecological Consulting, LLC (Madrone) September 2019.

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#### *Western bumblebee*

The western bumblebee (*Bombus occidentalis*) is candidate species for CDFW listing. The hillsides and areas along Sand Creek contain suitable foraging flower populations and abundant ground squirrel burrows that represent potential nesting and overwintering habitat. While the Western bumblebee was historically known throughout the mountains and northern coast of California, it is now largely confined to high elevation sites and a small handful of records on the northern California coast.<sup>43</sup> Due to the fact that western bumblebee is currently absent from most of the Central Valley of California, there is low potential for this species to occur within the project site.

#### *Vernal pool fairy shrimp*

Vernal pool fairy shrimp is a federally threatened species. The seasonal wetlands within the project site represent suitable habitat for the species, and vernal pool fairy shrimp has been documented within the project site.

#### *Vernal pool tadpole shrimp*

Vernal pool tadpole shrimp is a federally endangered species. The seasonal wetlands within the project site represent suitable habitat for the species, and vernal pool tadpole shrimp has been documented within the project site.

#### *Valley elderberry longhorn beetle*

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is a federally listed species. A single elderberry shrub is located along the north bank of Sand Creek within the central portion of the project site. The shrub was surveyed in 2016 and no sign (exit holes) of elderberry longhorn beetle was observed. Therefore, this species has low potential to occur within the project site.

### **Amphibians**

#### *California tiger salamander*

California tiger salamander is a State and federally threatened species. The two ponds, plunge pool within Sand Creek, and the deeper seasonal wetlands within the project site represent suitable breeding habitat. The annual brome grassland within the project site contains abundant ground squirrel burrows and represents suitable upland habitat for the species. Madrone Biologists observed hundreds of larvae California tiger salamanders within the easternmost pond in Spring 2019 during the special-status plant surveys. This species is present within the project site.

#### *California red-legged frog*

California red-legged frog (*Ambystoma californiense*) is a federally threatened species. The plunge pool within Sand Creek and the two ponds within the project site represent potential breeding habitat, and Sand Creek represents potential dispersal habitat for the species. This species was documented within Sand Creek at the Empire Mine Road Crossing within the project proposed site. Thus, the California red-legged frog is present within the project site.

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<sup>43</sup> Williams, P. H., R. W. Thorp, L. L. Richardson, and S. R. Colla. 2014. The Bumble bees of North America: An Identification guide. Princeton University Press, Princeton.

*Western spadefoot*

Western spadefoot (*Spea hammondi*) is a Species of Special Concern. The two ponds and the deeper seasonal wetlands within the project site represent potential breeding habitat for the species.

Western spadefoot larvae were observed in Spring 2019 in the plunge pool within Sand Creek. This species is present within the project site.

**Reptiles***Western pond turtle*

Western pond turtle (*Actinemys marmorata*) is a Species of Special Concern. The single plunge pool and two ponds within the project site represent potential habitat for western pond turtle. All three features are ephemeral and dry in the late summer to fall. There is moderate potential for this species to occur within the project site.

*Northern California legless lizard*

Northern California legless lizard (*Aniella pulchra*) is a Species of Special Concern. The annual brome grasslands throughout the project site are only marginally suitable due to the lack of sandy, loose soils. There is low potential for this species to occur within the project site.

*Alameda whipsnake*

Alameda whipsnake (*Masticophis lateralis eurycanthus*) is a federally and State threatened species. The project site contains marginally suitable foraging/dispersal habitat due to the long distance to the nearest chaparral or coastal scrub. There is low potential for this species to occur within the project site.

*Blainville's horned lizard*

Blainville's horned lizard (*Phrynosoma blainvillii*) is a Species of Special Concern. The annual brome grassland within the project site represents marginally suitable habitat for the species. Therefore, there is low potential for this species to occur.

**Mammals***Pallid bat*

Pallid bat (*Antrozous pallidus*) is a Species of Special Concern. It has no special State or federal status or listing. The trees along Sand Creek and the structures in the vicinity of the farmstead provide suitable roosting habitat for this species, and adjacent open areas provide foraging habitat. There is high potential for this species to occur within the project site.

*Townsend's big-eared bat*

Townsend's big-eared bat (*Corynorhinus townsendii*) is a Species of Special Concern. It has no special State or federal status or listing. The structures in the vicinity of the farmstead provide suitable roosting habitat for this species, as these bats prefer to roost in abandoned mines, hollow trees and abandoned structures. While the adjacent open areas provide foraging habitat, they are not premiere habitat as they are not planted with crops. There is low potential for this species to occur on-site.

*Western red bat*

Western red bat (*Lasiurus blossevillii*) is a Species of Special Concern. It has no special State or federal status or listing. The trees along Sand Creek provide suitable roosting habitat for this species, and adjacent open areas provide foraging habitat. There is high potential for this species to occur on-site.

*American badger*

The American badger (*Taxidea taxus*) is a Species of Special Concern. Annual brome grasslands throughout the project site represent suitable, but not ideal, habitat for this species. Therefore, there is moderate potential to this species occur within the project site.

*San Joaquin kit fox*

San Joaquin kit fox (*Corynorhinus townsendii*) is a State threatened and federally endangered species. While annual brome grasslands throughout the project site represent suitable habitat for this species, special surveys for this species did not identify any kit fox or sign of kit fox within the project site. A San Joaquin kit fox survey for the project was conducted on February 22, 2019. No San Joaquin kit fox scat was detected during the surveys. The CNDDDB and prior survey efforts support a determination that San Joaquin kit foxes are absent from the project site. The high detection rate of the scent-detection dogs used for the survey, the absence of detections on more than 9 miles of survey transects on the project site, and an extremely low estimated rate of non-detection provide additional evidence that San Joaquin kit foxes do not occupy the project site. There is low potential for this species to occur within the project site.

The San Joaquin Kit Fox survey area locations are mapped in Exhibit 3.4-6.

**Birds**

*Tricolored blackbird*

Tricolored blackbird (*Agelaius tricolor*) is State threatened and a Species of Special Concern. While dense vegetation does not occur within the project site, this species may forage seasonally. There is low potential for this species to occur on-site.

*Grasshopper sparrow*

Grasshopper sparrow (*Ammodramus savannarum*) is a Species of Special Concern. It has no special State or federal status or listing. Annual Brome grassland within the project site provides suitable nesting habitat, and therefore this species has high potential to occur on-site.

*Golden eagle*

Golden eagle (*Aquila chrysaetos*) is not a State or federally listed species. The annual brome grasslands throughout the project site represent suitable foraging habitat, but there are no trees sufficient to accommodate a golden eagle nest. Golden eagle has been observed foraging and perching on the steep hillsides on-site. While there is very low potential for the species to nest on-site, they still forage on-site.

*Short-eared owl*

Short-eared owl (*Asio flammeus*) is a Species of Special Concern. It has no special State or federal status or listing. Although the annual grassland within the project site does not provide suitable nesting habitat, it provides suitable winter foraging habitat for this species. However, the owl does forage on-site.

*Burrowing owl*

Burrowing owl (*Athene cunicularia*) is a Species of Special Concern. It has no special State or federal status or listing. Many ground squirrel (*Spermophilis beechyi*) burrows were observed within the annual brome grasslands, which represent suitable nesting habitat. Burrowing owl pellets were observed on-site at a low perch (pipe sticking out of the ground) within the eastern annual brome grassland. No burrowing owl was directly observed within the project site, but it is evident that this species is present.

*Swainson's hawk*

Swainson's hawk is a State threatened species. The trees on-site provide suitable nesting habitat, and the annual grasslands represent suitable foraging habitat. The nearest documented occurrence of nesting Swainson's hawk was within the last 5 years in 2016, approximately 2.4 miles south of the project site.<sup>44</sup> Swainson's hawk has been observed soaring and foraging over the project site. There is high potential for this species to be present within the project site.

*Northern harrier*

Northern harrier (*Circus cyaneus*) is a Species of Special Concern. It has no special State or federal status or listing. The harrier prefers nesting in open wetlands or marshy meadows. The project site is comprised mainly of annual brome grasslands, which are heavily grazed throughout the project site. Thus, there is a low potential for suitable nesting habitat. While, the grasslands provide suitable foraging habitat, there are no occurrences of the northern harrier within a 5-mile radius. Therefore, there is low potential for northern harrier to occur on-site.

*White-tailed kite*

White-tailed kite (*Elanus leucurus*) has no special State or federal status or listing. The trees on-site provide suitable nesting habitat, and the annual grasslands represent suitable foraging habitat. There is high potential for this species to occur on-site.

*Loggerhead shrike*

Loggerhead shrike (*Lanius ludovicianus*) is a Species of Special Concern. It has no special State or federal status or listing. Shrubs and trees near Sand Creek within the project site represent suitable nesting habitat, and the annual brome grasslands throughout the project site represent suitable foraging habitat. There is high potential for this species to occur on-site.

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<sup>44</sup> California Natural Diversity Database (CNDDB). 2019. RareFind 5. California Department of Fish and Wildlife. Dated September 2019.



Source: H.T. Harvey & Associates, March 2019.

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### *Migratory and Nesting Birds*

Trees found within the project site provide suitable nesting habitat for avian species, including those protected under the Migratory Bird Treaty Act (MBTA). Some species protected under the MBTA that could occur on the project site include burrowing owl and Swainson's hawk.

## **Wildlife Movement Corridors**

### ***City of Antioch***

Remaining areas of natural land are found in the southern portion of the City. The existing habitat corridor in the Lone Tree Valley has already been affected by development, specifically in the Brentwood area, which blocks the eastern end of this corridor.

### ***Project Site***

The annual grassland within the project site provides a large area of open space along Sand Creek. The annual grassland and Sand Creek may be used by both aquatic and terrestrial species as a wildlife movement corridor. The off-site infrastructure areas are small, disjunct areas along existing roads and infrastructure and are not likely used as major wildlife movement corridors.

## **Regulated Trees**

### ***Project Site***

According to the Tree Survey, 181 of the 255 trees identified within the project site are indigenous trees as identified in the City of Antioch Tree Ordinance.<sup>45,46</sup> The indigenous trees in the project site consist of native oaks (coast live oak, blue oak, valley oak, and interior live oak) and California buckeye.<sup>47</sup> There are also various planted and ornamental trees such blue gum eucalyptus, manna gum (*Eucalyptus viminalis*), black locust (*Robinia pseudoacacia*), and others.<sup>48</sup> Some of these planted and ornamental trees are protected under the City of Antioch Tree Ordinance as "mature trees" or "landmark trees" because they are over 26 inches diameter at breast height (DBH) or 48 inches DBH, respectively.<sup>49,50</sup> In particular, several large eucalyptus trees located along the project site's western boundary, and several indigenous oak trees (mainly within the Sand Creek corridor) were observed.

A tree survey was not conducted for the Off-site Improvement Area, but to the extent there are any protected trees on-site, the City of Antioch Tree Ordinance would apply.

As discussed in this EIR, a Protected Tree is any tree required to be preserved as a condition of an approval from a regular development application.

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<sup>45</sup> City of Antioch. 2017. City of Antioch Code of Ordinances; Title 9, Chapter 5, Article 12 Tree Preservation and Regulations. Website: [http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed 31 August 2019.

<sup>46</sup> Brennan, E. 2015. Tree Preservation Report for The Ranch, Antioch, California. Prepared for Richland Communities, Inc. July 29, 2015.

<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

<sup>49</sup> City of Antioch. 2017. City of Antioch Code of Ordinances; Title 9, Chapter 5, Article 12 Tree Preservation and Regulations. Website: [http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed 31 August 2019.

<sup>50</sup> Brennan, E. 2015. Tree Preservation Report for The Ranch, Antioch, California. Prepared for Richland Communities, Inc. July 29, 2015.

### 3.4.3 - Regulatory Framework

#### Federal

##### ***Federal Endangered Species Act***

The United States Congress passed FESA in 1973 to protect species that are endangered or threatened with extinction. FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

FESA prohibits the “take” of endangered or threatened wildlife species. “Take” is defined to include harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (FESA § 3[19]). “Harm” is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] § 17.3). “Harass” is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR § 17.3). Actions that result in take can result in civil or criminal penalties.

FESA and the Clean Water Act (CWA) Section 404 Guidelines prohibit the issuance of wetland permits for projects that jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. The USACE must consult with the USFWS and/or the NOAA when threatened or endangered species under their jurisdiction may be affected by a proposed project. In the context of the proposed project, FESA consultation would be initiated if development resulted in take of a threatened or endangered species or if issuance of a Section 404 permit or other federal agency action could result in take of an endangered species or adversely modify critical habitat of such a species.

##### ***Migratory Bird Treaty Act***

Raptors (birds of prey), migratory birds, and other avian species are protected by a number of State and federal laws. The federal MBTA prohibits the killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior.

##### ***Clean Water Act***

The USACE regulates the discharge of dredge or fill material into waters of the United States under Section 404 of the CWA. “Discharges of fill material” is defined as the addition of fill material into waters of the United States, including, but not limited to, the following: placement of fill that is necessary for the construction of any structure or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; fill for intake and outfall pipes and subaqueous utility lines (33 CFR § 328.2(f)). In addition, Section 401 of the CWA (33 United States Code [USC] 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification that the discharge will comply with the applicable effluent limitations and water quality standards.

Waters of the United States include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, and wet meadows. Boundaries between jurisdictional waters and uplands are determined in a variety of ways, depending on which type of waters is present. Methods for delineating wetlands and non-tidal waters are described below.

- Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR § 328.3(b)). Presently, to be a wetland, a site must exhibit three wetland criteria: hydrophytic vegetation, hydric soils, and wetland hydrology existing under the “normal circumstances” for the site.
- The lateral extent of non-tidal waters is determined by delineating the OHWM (33 CFR § 328.4(c)(1)). The OHWM is defined by the USACE as “that line on shore established by the fluctuations of water and indicated by physical character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 CFR § 328.3(e)).

## State

### ***California Endangered Species Act***

The State of California enacted CESA in 1984. CESA is similar to FESA but pertains to State-listed endangered and threatened species. CESA requires State agencies to consult with the CDFW when preparing CEQA documents. The purpose of CESA is to ensure that the lead agency actions do not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available (Fish and Game Code [FGC] § 2080). CESA directs agencies to consult with CDFW on projects or actions that could affect listed species, directs CDFW to determine whether jeopardy would occur, and allows the CDFW to identify “reasonable and prudent alternatives” to the project consistent with conserving the species. CESA allows the CDFW to authorize exceptions to the State’s prohibition against take of a listed species if the take is incidental to carrying out an otherwise lawful project that has been approved under CEQA (FGC § 2081).

### ***California Fish and Game Code***

The California Fish and Game Code defines “take” as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill” (FGC § 86). Except for take related to scientific research, all take of fully protected species is prohibited. Fully protected fish species are protected under Fish and Game Code, Section 5515; fully protected amphibian and reptile species are protected under Section 5050; fully protected bird species are protected under Section 3511; and fully protected mammal species are protected under Section 4700. Fish and Game Code, Section 3503, prohibits the killing of birds or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and the destruction of raptor nests. Fish and Game Code, Sections 2062 and 2067, define “endangered and threatened species.”

The CDFW is a trustee agency that has jurisdiction under Fish and Game Code, Section 1600, *et seq.* Under Fish and Game Code, Sections 1602 and 1603, a private party must notify the CDFW if a proposed project would “substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds . . . except when the department has been notified pursuant to Section 1601.” Additionally, the CDFW may assert jurisdiction over native riparian habitat adjacent to aquatic features, including native trees over 4 inches in diameter DBH. If an existing fish or wildlife resource may be substantially adversely affected by the activity, the CDFW may propose reasonable measures that will allow protection of those resources. If these measures are agreeable to the parties involved, they may enter into a streambed alteration agreement with the CDFW identifying the approved activities and associated mitigation measures.

### ***California Department of Fish and Wildlife Species of Concern***

In addition to formal listing under FESA and CESA, species receive additional consideration by the CDFW and local lead agencies during the CEQA process. Species that may be considered for review are included on a list of “Species of Special Concern,” developed by the CDFW. It tracks species in California whose numbers, reproductive success, or habitats may be threatened. In addition to Species of Special Concern, the CDFW identifies animals that are tracked by the CNDDDB but warrant no federal interest and no legal protection. These species are identified as “California Special Animals.”

### ***Porter-Cologne Water Quality Control Act***

Section 13260(a) of the Porter-Cologne Water Quality Control Act (contained in the California Water Code) requires any person discharging waste or proposing to discharge waste, other than to a community sewer system, within any region that could affect the quality of the waters of the State (all surface and subsurface waters) to file a report of waste discharge. The discharge of dredged or fill material may constitute a discharge of waste that could affect the quality of waters of the State.

Historically, California relied on its authority under Section 401 of the CWA to regulate discharges of dredged or fill material to California waters. That section requires an applicant to obtain “water quality certification” from the California State Water Resources Control Board (State Water Board) through its nine local Regional Water Quality Control Boards (RWQCBs) to ensure compliance with State water quality standards before certain federal licenses or permits may be issued. The permits subject to Section 401 include permits for the discharge of dredged or fill material (CWA Section 404 permits) issued by the USACE. Waste discharge requirements under the Porter-Cologne Water Quality Control Act were typically waived for projects that required certification. However, where only waters of the State exist (i.e., isolated waters), RWQCBs may be required to issue a Report of Waste Discharge), depending on whether any exemptions apply.

### ***California Native Plant Protection Act***

State listing of plant species began in 1977 with the passage of the Native Plant Protection Act (NPPA), which directed the CDFW to carry out the Legislature’s intent to “preserve, protect, and enhance endangered plants in this state.” The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting,

transporting, or selling such plants. The CESA expanded on the original NPPA and enhanced legal protection for plants. The CESA established categories for threatened and endangered species, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, the State of California employs three listing categories for plants: rare, threatened, and endangered.

The CNPS maintains a rank of plant species native to California that has low population numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California. Potential impacts to populations of CNPS ranked plants receive consideration under CEQA review. The following identifies the definitions of the CNPS ranks:

- **Rank 1A:** Plants presumed Extinct in California
- **Rank 1B:** Plants Rare, Threatened, or Endangered in California and elsewhere
- **Rank 2:** Plants Rare, Threatened, or Endangered in California, but more numerous elsewhere
- **Rank 3:** Plants about which we need more information—A Review List
- **Rank 4:** Plants of limited distribution—A Watch List

All plants appearing on CNPS List ranked 1 or 2 are considered to meet CEQA Guidelines Section 15380 criteria. While only some of the plants ranked 3 and 4 meet the definitions of threatened or endangered species, the CNPS recommends that all Rank 3 and Rank 4 plants be evaluated for consideration under CEQA.

## Local

### *City of Antioch General Plan*

The City of Antioch General Plan outlines the following objectives and policies related to biological resources.

#### *Land Use Element*

- **Policy 4.4.6.7t:** Adequate buffer areas adjacent to the top of banks along Sand Creek shall protect sensitive plant and amphibian habitats and water quality shall be provided. Adequate buffer areas shall also be provided along the edge of existing areas of permanently preserved open space adjacent to the Sand Creek Focus Area, including but not limited to Black Diamond Mines Regional Park. Buffers established adjacent to existing open space areas shall be of an adequate width to minimize light/glare, noise, fire safety, public safety, habitat, public access impacts within the existing open space areas consistent with the provisions of Section 10.5, Open Space Transitions and Buffers Policies of the General Plan.
- **Policy 4.4.6.7u:** Because of the sensitivity of the habitat areas within the Sand Creek Focus Area, and to provide for mitigation of biological resources impacts on lands in natural open space, a Resource Management Plan attached as Appendix A to this General Plan shall be prepared and approved prior to issuance of the first building permit for the Sand Creek Focus Area properties.
- **Policy 4.4.6.7b.v:** A viable, continuous grassland corridor between Black Diamond Mines Regional Preserve and Cowell Ranch State Park shall be retained in the Restricted Development Area using linkages in the southwestern portion of the Lone Tree Valley (within

the Sand Creek drainage area), Horse Valley, and the intervening ridge. The primary goal of preserving such a corridor is to allow for wildlife movement between Black Diamond Mines Regional Preserve and Cowell Ranch State Park. Completion of such a corridor is contingent upon the cooperation with the City of Brentwood and Contra Costa County, each of whom may have land use jurisdiction over portions of this corridor.

- **Policy 4.4.6.7x:** To mitigate the impacts of habitat that would be lost to future development within the Focus Area, an appropriate amount of habitat shall be preserved on- or off-site per the compensatory provisions of the Framework Resources Management Plan prepared for the Sand Creek Focus Area (attached as Appendix A of the General Plan).
- **Policy 4.4.6.7z:** Chaparral, scrub, and rock outcrop community within the western portion of the Sand Creek Focus Area (west of Empire Mine Road), as well as adjacent grassland community that is suitable habitat for the Alameda whipsnake (*masticophis lateralis euryxanthus*) shall be retained in natural open space. Within other portions of the Focus Area, the chaparral, scrub, and rock outcrop shall be retained in natural open space contiguous to the required grassland linkage to protect the grassland linkage south of the chaparral, scrub, and outcrop community.
- **Policy 4.4.6.7b.aa:** Within the western portion of the Focus Area (west of Empire Mine Road), the oak woodland and savanna community shall be preserved in natural open space. Within other portions of the Focus Area, the oak woodland and savanna community shall be preserved in natural open space where it overlaps the rock outcrop community.

#### Resource Management Element

- **Policy 10.3.2e:** Require proposed development projects containing significant natural resources (e.g. sensitive natural habitats, habitat linkages, steep slopes, cultural resources, wildland fire hazards, etc.) to prepare Resource Management Plans to define appropriate responses to General Plan policies calling for their protection or preservation. The purpose of the RMP is to look beyond the legal status of species at the time the plan is prepared, and provide a long-term plan for conservation and management of the natural communities found onsite. Resource Management Plan shall accomplish the following:
  - Determine the significance of the resources that are found on-site and their relationship to resources in the surrounding area, including habitat linkages and wildlife movement corridors;
  - Define areas that are to be maintained in long-term open space based on the significance of on-site resources and their relationship to resources in the surrounding area; and
  - Establish mechanisms to ensure the long-term protection and management of lands retained in open space.
- **Objective 10.4.1:** Preserve natural streams and habitats supporting rare and endangered species of plants and animals.
- **Policy 10.4.2a:** Comply with the Federal policy of no net loss of wetlands through avoidance and clustered development. Where preservation in place is found not to be feasible (such as where a road crossing cannot be avoided, or where shore stabilization or creation of shoreline trails must encroach into riparian habitats), require 1) on-site replacement of wetland areas, 2) off-site replacement, or 3) restoration of degraded wetland areas at a minimum ratio of one

acre of replacement/restoration for each acre of impacted onsite habitat, such that the value of impacted habitat is replaced.

- **Policy 10.4.2b:** Preserve in place and restore existing wetlands and riparian resources along the San Joaquin River and other natural streams in the Planning Area, except where a need for structural flood protection is unavoidable.
- **Policy 10.4.2c:** Require appropriate setbacks adjacent to natural streams to provide adequate buffer areas ensuring the protection of biological resources, including sensitive natural habitat, special-status species habitats and water quality protection.
- **Policy 10.4.2d:** Through the project approval and environmental review processes, require new development projects to protect sensitive habitat areas, including, but not limited to, oak woodlands, vernal pools, and native grasslands. Ensure the preservation in place of habitat areas found to be occupied by State and federally protected species.
- **Policy 10.4.2e:** Limit uses within preserve and wilderness areas to resource-dependent activities and other uses compatible with the protection of natural habitats (e.g., passive recreation and public trails).
- **Policy 10.4.2f:** Through the project review process, permit the removal of healthy, mature oak trees on a case-by-case basis only where it is necessary to do so.
- **Policy 10.4.2g:** Preserve heritage trees throughout the planning area.
- **Policy 10.5.1c:** In designing buffer areas, the following criteria shall be considered and provided for (when applicable) within the buffer areas to avoid or mitigate significant impacts.
  - **Habitat Management:** How will proposed development affect habitat values on adjacent open space and resource areas? How will development prevent the spread of introduced animals and plant pests into adjacent open space and resource areas? How will proposed development affect wildlife migration corridors between or within open space and/or resource areas?

### ***City of Antioch Code of Ordinances***

#### *Title 9, Chapter 5, Article 12 Section 9-5.1205: Tree Preservation and Regulation*

According to the City of Antioch's Zoning Ordinance, Article 12: Tree Preservation and Regulation (Section 9-5.1205), tree removal for the proposed project is evaluated as part of the "regular development application process." In deciding whether to approve the removal of a tree, or require its preservation, the City considers if the tree being evaluated is considered a landmark, indigenous, mature, or established tree. In addition, the City would also evaluate the tree's appearance, species type, and aesthetic compatibility with the proposed project.

The trees, in which the City authorizes removal, must be replaced. The City's Tree Preservation and Regulation Ordinance requires two 24-inch box trees for each established tree, two 48-inch box trees for each mature tree, and the City Council has discretion in determining the appropriate ratio of box tree replacement for any landmark or indigenous trees. The City of Antioch's Tree Ordinance defines six categories of trees:

- An established tree is any tree that is at least ten inches in diameter, at diameter at breast height (DBH). DBH is measured 4.5 feet above natural or finished grade.

- An indigenous tree is a naturally growing tree of the following species: Blue Oak (*Quercus douglasii*), Valley Oak (*Quercus lobata*), Coast Live Oak (*Quercus agrifolia*), Canyon Live Oak (*Quercus chrysolepis*), Interior Live Oak (*Quercus wislizenii*), California Buckeye (*Aesculus californica*), and California Bay (*Umbellularia californica*)
- A landmark tree is any tree that is at least 48 inches in DBH and/or is over 40 feet in height.
- A mature tree is any tree that is at least 26 inches in DBH.
- A street tree is any tree planted within a public right-of-way and/or a tree planting easement.
- A Protected Tree is any tree required to be preserved as a condition of an approval from a regular development application.

*Title 9, Chapter 4, Section 9-4.617: Street Trees*

The City's Design Requirements under the Subdivision Ordinance require the removal of all trees that conflict with grading, utilities, or improvements in the public right-of-way. Therefore, trees within any right-of-way that would conflict with roadway improvements proposed as part of the project must be removed.

*California Native Plant Society—Locally Rare Plants*

A list of locally rare plant species has been developed by the East Bay Chapter of the CNPS.<sup>51</sup> The plant species included in this database are locally rare and are usually included in CEQA analysis.

### 3.4.4 - Methodology

#### **2017 Biological Resources Assessment prepared by ECORP Consulting, Inc.**

The BRA prepared for the proposed project by ECORP is based on a review of biological resource databases, inventories, regional literature on both plants and animals and limited site reconnaissance. The purpose of the BRA prepared specifically for the proposed project was to assess the potential for occurrence of special-status plant and animal species or their habitat, and to assess the potential for sensitive habitats such as wetlands within the project area. The BRA was peer reviewed by Live Oak Associates, Inc. (see Appendix D).<sup>52</sup>

Prior to conducting the field portion of the assessment, the following species lists were queried to determine the special-status species that had been documented within or in the project site vicinity. Results of the database searches are included as Attachment B of the BRA:

- CDFW CNDDDB for the "Antioch South, California" and surrounding eight 7.5-minute USGS quadrangles;<sup>53</sup>

<sup>51</sup> California Native Plant Society (CNPS). East Bay Chapter. The Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties. Website: <https://ebcnps.org/database-of-rare-unusual-and-significant-plants-of-alameda-and-contra-costa-counties/>. Accessed September 2019.

<sup>52</sup> Live Oak Associates, Inc. Peer review for the proposed The Ranch project in Antioch (Cowan Ranch), Antioch, Contra Costa County, California (PN 2160-01). November 13, 2017.

<sup>53</sup> California Department of Fish and Wildlife (CDFW). 2017. Rarefind Natural Diversity Data Base Program. Version 5, commercial version. California Natural Diversity Database. The Resources Agency, Sacramento. Accessed August 2017.

- USFWS IPaC Resource Report List;<sup>54</sup> and
- CNPS electronic Inventory of Rare and Endangered Plants of California was queried for the “Antioch South, California” 7.5-minute USGS quadrangle, and the eight surrounding USGS topographic quadrangles.<sup>55</sup>

The ECORP BRA included information from a Biological Assessment previously completed by M&A, which was drafted in 2015. The M&A Biological Assessment included protocol-level special-status plant surveys, as well as observations of special status wildlife.

In addition to the aforementioned studies, Live Oak Associates, Inc. completed jurisdictional wetland delineations for the on-site project areas in 2014. The study methodology used was consistent with the USACE guidance, the *1987 Corps of Engineers Wetlands Delineation Manual*<sup>56</sup> and the *Regional Supplement to the Corp of Engineers Wetland Delineation Manual, Arid West Region (Version 2.0)*.<sup>57</sup>

### **Updated Biological Resources Assessment prepared by Madrone Ecological Consulting**

As mentioned earlier, Madrone prepared an updated BRA dated September 2019 which includes a list of special-status species with potential to occur within the project site that was developed by conducting a query of the CNDDDB, IPaC,<sup>58</sup> CNPS Rare and Endangered Plant Inventory query of the “Antioch South, California” USGS topo quadrangle<sup>59</sup> and the eight surrounding quadrangles, WBWG Species Matrix,<sup>60</sup> and East Bay Chapter of the CNPS: The Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties.<sup>61</sup> The BRA also included updated species lists, results of protocol special-status plant surveys, SJKF surveys, and incorporated comments that CNPS and CDFW made to the 2017 ECORP BRA.

Several biological studies over several years have been conducted within the project site and were reviewed during the preparation of the updated BRA. The full list of biological studies referenced can be found within the Updated BRA located in Appendix D.

### **Special-status Plant Survey Report for the Off-site Infrastructure Area Prepared by Madrone Ecological Consulting**

Special-status plant species surveys for the Off-site Improvement Area were conducted in accordance with USFWS Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed,

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<sup>54</sup> United States Fish and Wildlife Service (USFWS). 2017a. USFWS Resource Report List. Information for Planning and Conservation. Internet website: <http://ecos.fws.gov/ipac/>. Accessed August 2017.

<sup>55</sup> California Native Plant Society (CNPS). 2017. Inventory of Rare and Endangered Plants in California (online edition, v7-14). California Native Plant Society. Sacramento, CA. Available online: <http://cnps.site.aplus.net/cgi-bin/inv/inventory.cgi>. Accessed August 2017.

<sup>56</sup> Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Department of the Army. Washington D.C. 100 pp.

<sup>57</sup> United States Army Corp of Engineers (USACE). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Department of the Army.

<sup>58</sup> United States Fish and Wildlife Service (USFWS). 2019. IPaC Trust Resource Report for the Study Area. Website: <http://ecos.fws.gov/ipac/>. Accessed September 6, 2019.

<sup>59</sup> California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website <http://www.rareplants.cnps.org>. Accessed September 2019.

<sup>60</sup> Western Bat Working Group (WBWG). 2019. Species Matrix and Species Accounts. Website: <http://wbwg.org/>. Accessed September 2019.

<sup>61</sup> California Native Plant Society (CNPS). East Bay Chapter. The Database of Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties. Website: <https://ebcnps.org/database-of-rare-unusual-and-significant-plants-of-alameda-and-contra-costa-counties/>. Accessed September 2019.

Proposed and Candidate Plants,<sup>62</sup> CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities,<sup>63</sup> and the CNPS Botanical Survey Guidelines.<sup>64</sup>

A list of special-status plant species with potential to occur within the Off-site Improvement Area was developed by reviewing the following literature, and then refining the list based on habitats present within the Off-site Improvement Area:

- CNPS Rare and Endangered Plant Inventory<sup>65</sup> query of CRPR Lists 1A, 1B, 2A, 2B, and 3 within the “Antioch South, California” USGS topo quadrangle and eight surrounding quadrangles; and
- The CNDDDB occurrences of special-status plant species within 5 miles of the Off-site Improvement Area.<sup>66</sup>

Meandering pedestrian surveys were conducted throughout the Off-site Improvement Area. The surveys were floristic in nature, which means that all plant species observed on-site were identified to the taxonomic level necessary to determine rarity. Thus, if a special-status plant was present but not on the target list (such as CNPS List 4 plant species, locally rare plant species, or special-status plants not previously documented in the vicinity), it would have been detected and documented. Plant taxonomy was based on the nomenclature in the Jepson eFlora.<sup>67</sup> Vegetation communities were classified according to the Manual of California Vegetation, 2<sup>nd</sup> Edition.<sup>68</sup> Qualifications for the botanist that conducted the survey, a list of reference populations of target plants visited, and a comprehensive list of all plant species observed during surveys of the Off-site Improvement Area is included in Appendix D.

### ***San Joaquin Kit Fox Survey Conducted by H.T. Harvey & Associates***

On February 22, 2019, H.T. Harvey & Associates conducted scent dog surveys for San Joaquin kit fox within the project site. Two teams each consisting of one trained scent dog and one Madrone Biologist surveyed the entire 551.0-acre project site for sign of San Joaquin kit fox.

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<sup>62</sup> United States Fish and Wildlife Service (USFWS). 1996. Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants. Sacramento, CA.

<sup>63</sup> California Department of Fish and Wildlife (CDFW). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Dated March 2018.

<sup>64</sup> California Native Plant Society (CNPS). 2001. CNPS botanical survey guidelines. Pages 38-40 in California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (D.P. Tibor, editor). 6th Edition. Special Publication No. 1, California Native Plant Society, Sacramento, 387 pp.

<sup>65</sup> Ibid.

<sup>66</sup> California Native Plant Society (CNPS). 2018. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website <http://www.rareplants.cnps.org> [accessed May through July 2018].

<sup>67</sup> Jepson Flora Project (eds.) 2018. Jepson eFlora. Website: <http://ucjeps.berkeley.edu/eflora/>. Accessed May through November 2018.

<sup>68</sup> Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, 2<sup>nd</sup> Edition. California Native Plant Society, Sacramento, CA. 1300 pp.

### 3.4.5 - Impacts and Mitigation Measures

#### Significance Criteria

According to 2019 CEQA Guidelines Appendix G, to determine whether impacts related to biological resources are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?
- c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?
- d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?
- e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?

#### Approach to Analysis

Impacts on biological resources were evaluated based on the likelihood that special-status species, sensitive habitats, wildlife corridors, and protected trees are present on the project site, and the likely effects of project construction or operation on these resources. For the purposes of this EIR, the word “substantial” as used in the significance thresholds above is defined by the following three principal components:

- Magnitude and duration of the impact (e.g., substantial/not substantial),
- Uniqueness of the affected resource (rarity), and
- Susceptibility of the affected resource to disturbance.

In this Biological Resources Analysis, the project site is defined as all areas directly affected by project development, including the Off-site Improvement Area.

## Impact Evaluation

### *Special-status Species*

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**Impact BIO-1:**        **The project could have a substantial adverse effect, either directly or through habitat modifications, on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.**

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### **Construction**

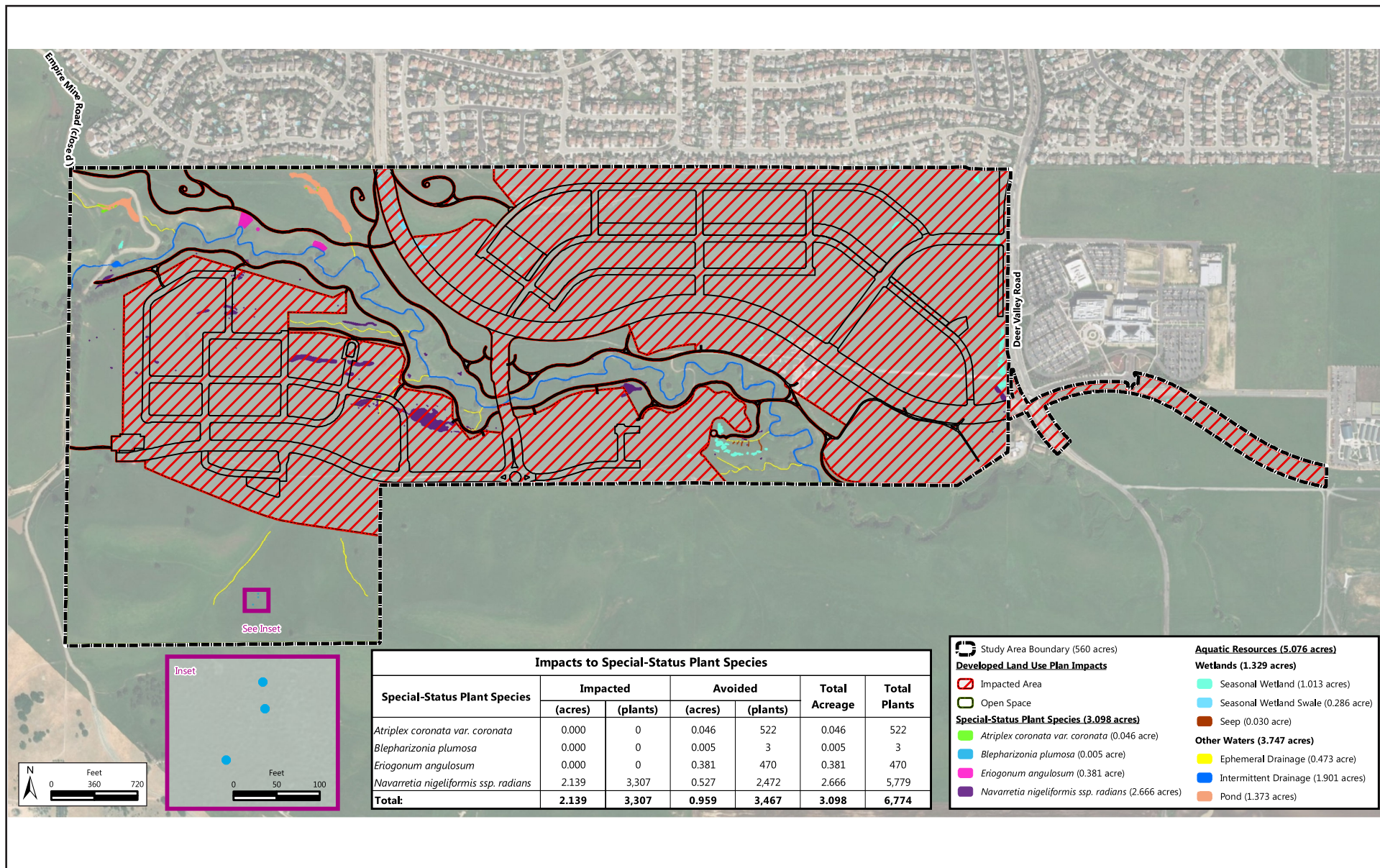
An impact to special-status plant and wildlife species would be considered significant if proposed project operations resulted in a substantial, adverse change in any of the physical conditions (such as habitat) within the area affected by the project. Each potential special-status species that has the potential to be impacted is discussed in detail below.

#### *Special-status Plant Species*

M&A documented three special-status plant species during their surveys from 2013-2015, including shining navarretia, San Joaquin spearscale, and crownscale. Additionally, Madrone observed three special-status plant species during their surveys in 2018 and 2019 including crownscale, big tarplant, and shining navarretia, in addition to angle-stem buckwheat, an A-ranked locally rare species. All other special-status plant species were absent from the site in the 2018 and 2019 surveys, including San Joaquin spearscale, although it was determined that the site contains marginal suitable habitat for some species. Notably, the location of San Joaquin spearscale identified by M&A will be preserved as open space and remain unimpacted by the project.

Three special-status species, including shining navarretia, crownscale, and big tarplant, and a locally rare species, angle-stem buckwheat, were present during the 2018 and 2019 plant surveys and have the potential to occur on-site. While all of the known on-site populations of crownscale, big tarplant, and angle-stem buckwheat will be preserved within the project's open space areas, some of the shining navarretia populations will be directly or indirectly impacted by the development footprint, as shown in Exhibit 3.4-7.

Because the proposed project could result in adverse effects to shining navarretia, this represents a potentially significant impact. No special-status plant species were observed within the Off-site Improvement Area during the 2018 and 2019 surveys. Impacts to special-status plant species are shown in Exhibit 3.4-7. Implementation of Mitigation Measure (MM) BIO-1, which requires avoidance and/or replacement and preservation via a conservation easement, would reduce impacts to shining navarretia to a less than significant level. Options 1 and 2 are equally effective in reducing impacts to a less than significant level if Option 2 succeeds. However, Option 1 is the most effective option, as there is no risk of failure. Additionally, if project construction occurs after the City of Antioch has adopted an HCP/NCCP, the project shall comply with the provisions of the adopted document to the extent that all project impacts would be mitigated to a less than significant level.



Source: Madrone Ecological Consulting, LLC (Madrone) September 2019.



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### *Special-status Wildlife Species*

It was also determined that 26 special-status wildlife species, including Crotch bumblebee, western bumblebee, vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, California tiger salamander, California red-legged frog, western spadefoot, western pond turtle, Northern California legless lizard, Alameda whipsnake, Blainville's horned lizard, tricolored blackbird, grasshopper sparrow, golden eagle, short-eared owl, burrowing owl, Swainson's hawk, northern harrier, white-tailed kite, loggerhead shrike, pallid bat, Townsend's big-eared bat, western red bat, American badger, and San Joaquin kit fox, in addition to birds protected under the MBTA are present or have the potential to occur on-site. The Special-status Species Table within the 2019 BRA (Appendix D) provides the habitat description and rationale of potential special-status species to occur on-site, in addition to previous on-site occurrences. Implementation of MM BIO-2a through MM BIO-2n would reduce impacts to special-status wildlife species to a less than significant level through specific protocols for each species, or compliance with the HCP/NCCP adopted by the City of Antioch if project construction occurs after adoption of the City's plan.

### **Operation**

Project operation has the potential to affect special-status wildlife species. Project lighting and activities could potentially disrupt special-status species within the project area. As mentioned in Section 3.1, Aesthetics, the proposed project has been designed to include significant setbacks from the western boundary of the project site as well as the Sand Creek Corridor to minimize potential impacts, including light and glare, on the natural environment. In addition, as mentioned in Section 3.11, Noise, project operational noise impacts would be reduced with implementation of MM NOI-1b, MM NOI-1c, and MM NOI-1d.

Therefore, project operation would not result in any adverse effects to any candidate, sensitive, or special status species within the project area. As such, impacts would be less than significant with mitigation incorporated.

### **Level of Significance Before Mitigation**

Potentially Significant

### **Mitigation Measures**

#### *Special-status Plant Species*

**MM BIO-1a** The project Applicant hired a qualified Biologist to conduct protocol surveys of the shining navarretia in the 2018-2019 and submitted them to the City for independent peer review. (See Appendix D) To the extent construction moves forward within 5 years of these surveys, they shall be deemed valid and no further surveys shall be required. However, if construction does not occur on affected areas on or before 5 years of the protocol surveys, the project Applicant shall hire a qualified Biologist to survey the project area prior to construction. All survey results shall be submitted to the City of Antioch Planning Division prior to approval of grading permits. Where populations are outside of the project footprint, qualified Biologists shall demarcate these areas for complete avoidance.

Where shining navarretia populations are within the project footprint, this shall be considered a direct impact. If the project will avoid the mapped populations, but will impact a portion of the avoidance zone, then that will be considered an indirect impact.

The project Applicant shall have the following options to mitigate for direct and/or indirect impacts to the shining navarretia. Options one and two are listed by order of effectiveness:

**Option 1.** The project Applicant shall identify one or more existing, unprotected populations of shining navarretia in Contra Costa County (or nearest other jurisdiction) and acquire land that supports those populations. Under this Option, once the proposed mitigation area is approved by the City of Antioch Planning Division, the mitigation habitat shall be protected by a recorded conservation easement and managed in accordance with a long-term management plan, the goal of which is to maintain the shining navarretia population and its habitat. The project Applicant shall provide an endowment in favor of the conservation easement holder to fund the long-term management outlined in the long-term management plan. As this option would preserve an existing, established population, there would be no temporal loss, and no risk of failure. As a result, the mitigation ratio for this option would be 1:1. Alternatively, the project Applicant may purchase mitigation credits (at a 1:1 ratio) from an established mitigation bank for all directly impacted shining navarretia locations.

**Option 2.** The project Applicant shall mitigate for any direct impacts at a ratio of 3:1 (preserved habitat: impacted habitat), and for any indirect impacts at a 1:1 ratio. The ratio shall be reduced to 1.5:1 if the project Applicant chooses to develop a monitoring plan, monitor the relocated seeds/plants in accordance with that plan, and meet established success criteria for successful establishment of a new population of the impacted special-status plant. The success criterion for Option 2 would be 1:1 replacement of special-status plants by Year 5 or later following transplantation. This would require documentation of the number of plants within the proposed impact area such that the number of impacted plants could be compared to the number of established plants at the mitigation site. The monitoring plan and monitoring reports shall be submitted to the City of Antioch Planning Division for review and approval. If the success criteria are not met, additional habitat shall be set aside as set forth under Option 1. As population sizes for annual plants can vary widely from year to year, population counts shall be conducted in the last 3 years of monitoring, and the highest count shall be at least equivalent to the number of impacted plants.

**Option 3.** As an alternative Options 1 and 2, the project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the shining navarretia would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

*Special-status Wildlife Species*

**Crotch and western bumblebee**

**MM BIO-1b** To avoid take of crotch and western bumblebee species the project Applicant shall implement one of the following options:

**Option 1.** Prior to each phase of construction, a qualified Biologist shall conduct a take avoidance survey for active bumblebee colony nesting sites. In order to maximize detection of active bee colonies, the take avoidance survey shall be conducted during the spring, summer, or fall during appropriate weather (not during cool overcast, rainy, or windy days). The Biologist shall walk the entire area proposed for grading and inspect all ground squirrel burrows for bumblebee activity. The survey shall specifically target the slopes that face west to southwest as these areas are specifically utilized by western bumblebee. If any bumblebees are identified during the survey, they shall be identified to species.

All active colonies of crotch bumblebee or western bumblebee shall be avoided and no work shall occur within 50-feet of the colony, unless pursuant to consultation with the California Department of Fish and Wildlife (CDFW) an Incidental Take Permit is obtained prior to disturbance. If a colony can be fully avoided and work will not occur within 50 feet of the colony, no mitigation shall be required.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the western bumblebee would be fully mitigated, including payment of applicable fees, provided that California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**Vernal pool fairy shrimp and vernal pool tadpole shrimp**

The proposed project will result in the loss of approximately 0.687 acre of potential habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp. To mitigate for the loss of potential habitat, the project Applicant shall employ the following mitigation:

**MM BIO-1c** Prior to the issuance of any grading permit, the project Applicant shall implement one of the following options:

**Option 1.** Consult with the United States Fish and Wildlife Service (USFWS) regarding impacts of the project on vernal pool fairy shrimp and vernal pool tadpole shrimp. The project Applicant shall obtain the appropriate take authorization (Section 7 or 10 of the Federal Endangered Species Act [FESA], as appropriate) from the USFWS prior to issuance of grading permits. The project Applicant shall comply with all terms of the endangered species permits, including any mitigation requirements, which shall be determined during consultation with USFWS.

Mitigation may be accomplished through permittee-responsible mitigation and/or through the preservation of vernal pool fairy shrimp habitat at USFWS-approved ratios at a USFWS-approved mitigation bank. A minimum ratio of 1:1 mitigation shall be required.

**Option 2.** The project Applicant shall demonstrate compliance with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts on the fairy and tadpole shrimp would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and USFWS have approved the conservation plan.

#### **Valley elderberry longhorn beetle**

There is one elderberry shrub located within the project site, on the banks of Sand Creek, which will be located in the protected on-site open space. To ensure there are no impacts to any elderberry shrub, and thus, the valley elderberry longhorn beetle, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1d** The project Applicant shall implement one of the following options:

**Option 1.** The elderberry shrub within the project site shall be avoided. Although there were no signs of the valley elderberry longhorn beetle, the following measures will ensure that there are no significant impacts to valley elderberry longhorn beetle:

All elderberry shrubs (which are defined for the purposes of this section as those with stems greater than 1 inch in diameter) shall be avoided completely during project construction with a buffer of at least 20 feet, and the following avoidance and minimization measures [as outlined in the Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle<sup>69</sup>] shall be implemented for all work within 165 feet of a shrub:

- All areas to be avoided during construction activities shall be fenced and/or flagged as close to construction limits as feasible.
- Activities that could damage or kill an elderberry shrub (e.g., trenching, paving, etc.) shall receive an avoidance area of at least 20 feet from the drip-line.
- A qualified Biologist shall provide training for all contractors, work crews, and any on-site personnel on the status of the valley elderberry longhorn beetle, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance, prior to the commencement of work.
- A qualified Biologist shall monitor the work area at project appropriate intervals to assure that all avoidance and minimization measures are implemented.
- As much as feasible, all activities within 165 feet of an elderberry shrub shall be conducted between August and February.

<sup>69</sup> United States Fish and Wildlife Service (USFWS). 2017. Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle. Dated May 2017.

- Elderberry shrubs shall not be trimmed.
- Herbicides shall not be used within the drip-line of the shrub. Insecticides shall not be used within 100 feet of an elderberry shrub.
- Mechanical weed removal within the drip-line of the shrub shall be limited to the season when adults are not active (August–February) and shall avoid damaging the elderberry shrub.

If either a 20-foot diameter avoidance area around the elderberry shrub is found later to not be feasible or an elderberry shrub must be removed to accommodate construction, then the project Applicant shall notify the City and implement additional mitigation measures required by the Framework<sup>70</sup> after consultation with the United States Fish and Wildlife Service (USFWS).

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts on the elderberry beetle would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and USFWS have approved the conservation plan.

#### California tiger salamander

The proposed project will result in the loss of 0.423 acre of potential breeding habitat for the California tiger salamander and approximately 344.6 acres of potential upland habitat. To ensure this loss is mitigated, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1e** Prior to the commencement of construction activities, the project Applicant shall implement one of the following options:

**Option 1.** The project Applicant shall obtain take coverage from the United States Fish and Wildlife Service (USFWS) under Sections 7 or 10 of the Federal Endangered Species Act (FESA) for any impacts to the California tiger salamander and/or its habitat. In addition, the project Applicant shall obtain take coverage from the California Department of Fish and Wildlife (CDFW) under Section 2081 of the California Fish and Game Code for any impacts to the California tiger salamander and/or its habitat. Any required compensatory mitigation shall be determined during consultation with USFWS and CDFW and may include permittee-responsible mitigation and/or the purchase of mitigation credits from a USFWS- and CDFW-approved mitigation bank. Should consultation with the USFWS and CDFW result in required mitigation measures in conflict with the measures included here, USFWS and CDFW measures shall take precedence. A minimum ratio of 1:1 shall apply.

The project Applicant shall preserve both aquatic habitat and upland habitat that are either known to be California tiger salamander breeding habitat and upland habitat, or which have the proper hydrology to support breeding California tiger salamander,

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<sup>70</sup> Ibid.

on off-site mitigation properties and within the on-site open space or as otherwise required as a result of consultation with the USFWS.

Project activities shall occur during the dry season (May 1 through October 15) unless otherwise authorized by the CDFW and USFWS;

Prior to the start of construction, a qualified Biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of the California tiger salamander and its habitat within the project area; an explanation of the species status and protection under State and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the project site; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel by the Biologist. The training shall provide interpretation for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work.

Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be clearly delineated using high visibility orange fencing. The ESA fencing shall remain in place throughout the duration of the construction and shall be regularly inspected and fully maintained at all times by the project Applicant's contractor.

A qualified Biologist shall be on-site during all activities that may result in take of California tiger salamander. The qualifications of the Biologist(s) shall be submitted to the USFWS and CDFW for review and approval at least 30 calendar days prior to the date earthmoving is initiated at the project site.

Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the qualified Biologist. The WEF shall remain in place throughout the duration of the project phase and shall be regularly inspected and fully maintained by the project Applicant's contractor. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed and the area cleaned of debris and trash and returned to natural conditions. Exceptions to the foregoing fencing measures include work sites where the duration of work activities is very short (e.g., 3 days or less), occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities. In this case, the boundaries and access areas and sensitive habitats

may be staked and flagged (as opposed to fully fenced) by the qualified Biologist prior to disturbance and species monitoring would occur during all project activities.

If a water body is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh no larger than 5 millimeters and the intake shall be placed within a perforated bucket or other method to attenuate suction to prevent California tiger salamander from entering the pump system. Pumped water shall be managed in a manner that does not degrade water quality and then upon completion released back into the water body, or at an appropriate location in a manner that does not cause erosion. No rewatering of the water body is necessary if sufficient surface or subsurface flow exists to fill it within a few days, or if work is to be completed during the time of year the water body would have dried naturally.

When constructing a road improvement within California tiger salamander habitat, the project Applicant shall enhance or establish wildlife passage for the California tiger salamander across roads, highways, or other anthropogenic barriers. This may include upland culverts, tunnels, and other crossings designed specifically for wildlife movement, as well as making accommodations in curbs (no vertical faced curbs), median barriers, and other impediments to terrestrial wildlife movement at locations most likely to be beneficial to the California tiger salamander.

Preconstruction surveys shall be provided to the City of Antioch Planning Division, and shall be conducted by a USFWS or CDFW approved Biologist within 72 hours of the initiation of any ground disturbing activities and vegetation clearing that may result in take of the California tiger salamander. All suitable aquatic and upland habitat, including refugia habitat such as small woody debris, refuse, burrow entries, etc., shall be duly inspected. The approved Biologist(s) shall conduct clearance surveys at the beginning of each day and regularly throughout the workday when construction activities are occurring that may result in take of the California tiger salamander. Where feasible and only on a case-by-case basis, rodent burrows and other ground openings suspected to contain Central California tiger salamanders that would be destroyed from project activities may be carefully excavated under supervision of the Biologist. If the California tiger salamander is observed, the approved Biologist shall implement the species observation and handling protocol outlined below.

At least 15 days prior to initiation of ground disturbance activities the project Applicant's Biologist shall prepare and submit a Relocation Plan for the California tiger salamander for the USFWS and CDFW written approval. The plan shall include protocol to be followed should a California tiger salamander be encountered during project activities. The Relocation Plan shall contain the name(s) of the approved Biologist(s) to relocate the California tiger salamander, method of relocation, a map, and description of the proposed release site(s) within 300 feet from the project, unless at a distance otherwise agreed to by the USFWS and CDFW, and written permission from the landowner to use their land as a relocation site.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the California tiger salamander would be fully mitigated, including payment of applicable fees, provided that the CDFW and USFWS have approved the conservation plan.

**California red-legged frog**

While all potential California red-legged frog breeding habitat within the project area will be preserved, approximately 0.005 acre of California red-legged frog dispersal habitat will be impacted by the construction of the proposed bridges over Sand Creek. Additionally, impacts to uplands within 300 feet of Sand Creek may represent potential upland habitat for California red-legged frog. To mitigate for the loss of aquatic and upland habitat for this species, and the species itself, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1f** Prior to issuance of any grading permits, the project Applicant shall implement one of the following options:

**Option 1.** The project Applicant shall consult with the United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) regarding impacts to California red-legged frog from the proposed project. The project Applicant shall obtain the appropriate take authorization from the USFWS (Section 7 or 10 of the Federal Endangered Species Act [FESA]) and/or from the CDFW (Section 2081 of the California Fish and Game Code). The project Applicant shall comply with all required compensatory mitigation determined during consultation with the USFWS and CDFW, and provide proof of compliance to the City of Antioch Planning Division.

Should consultation with the USFWS result in required mitigation measures in conflict with the measures included here, USFWS measures shall take precedence.

Approximately 1.40 acres of California red-legged frog aquatic habitat shall be preserved on-site as part of the proposed project.

Prior to the start of construction, a qualified Biologist shall conduct a training program for all construction personnel including contractors and subcontractors. The training shall include, at a minimum, a description of the California red-legged frog and their habitats within the project site; an explanation of the species status and protection under State and federal laws; the avoidance and minimization measures to be implemented to reduce take of this species; communication and work stoppage procedures in case a listed species is observed within the project site; and an explanation of the importance of the Environmentally Sensitive Areas (ESAs) and Wildlife Exclusion Fencing (WEF). A fact sheet conveying this information shall be prepared and distributed to all construction personnel. The training shall provide interpretation for non-English speaking workers. The same instruction shall be provided to any new workers before they are authorized to perform project work.

Prior to the start of each phase of construction, ESAs (defined as areas containing sensitive habitats adjacent to or within construction work areas for which physical disturbance is not allowed) shall be construction activities are ongoing, and shall be regularly inspected and fully maintained at all times.

A qualified Biologist shall be on-site during all activities that may result in take of the California red-legged frog. The qualifications of the Biologist(s) shall be submitted to the USFWS for review and approval at least 30 calendar days prior to the date earthmoving is initiated at the project site.

Prior to the start of each phase of construction, WEF shall be installed at the edge of the project footprint in all areas where sensitive species could enter the construction area. The location of the fencing shall be determined by the contractor and the qualified Biologist prior to the start of staging or ground disturbing activities. The WEF shall remain in place throughout the duration of the project and shall be regularly inspected and fully maintained. Repairs to the WEF shall be made within 24 hours of discovery. Upon project completion, the WEF shall be completely removed and the area cleaned of debris and trash and returned to natural conditions. An exception to the foregoing fencing measures is that for work sites where the duration of work activities is very short (e.g., 3 days or less) and that occur during the dry season, and the installation of exclusion fencing will result in more ground disturbance than from project activities. In this case, the boundaries and access areas and sensitive habitats may be staked and flagged (as opposed to fenced) by the qualified Biologist prior to disturbance and species monitoring would occur during all project activities at that site.

No more than 24 hours prior to the date of initial ground disturbance, a preconstruction survey for the California red-legged frog shall be conducted by the qualified Biologist at the project site. The results shall be provided to the City of Antioch Planning Division. The survey shall consist of walking the project limits and within the project site to ascertain the possible presence of the species. The Biologist shall investigate all potential areas that could be used by the California red-legged frog for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as California ground squirrels or gophers. If any adults, subadults, juveniles, tadpoles, or eggs are found, the Biologist shall contact the USFWS to determine if moving any of the individuals is appropriate. In making this determination, the USFWS shall consider if an appropriate relocation site exists. Only USFWS-approved Biologists may capture, handle, and monitor the California red-legged frog.

To the extent practicable, initial ground-disturbing activities shall be avoided between November 1 and March 31 because that is the time period when the California red-legged frog are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31,

the project Applicant shall ensure that daily monitoring by the USFWS-approved Biologist is completed.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the California red-legged frog would be fully mitigated, including payment of applicable fees, provided that CDFW and USFWS have approved the conservation plan.

#### **Western spadefoot**

Approximately 0.423 acre of potential western spadefoot aquatic habitat will be directly impacted by the proposed project. To mitigate for this loss, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1g** Prior to initiation of construction activity, the project Applicant shall implement one of the following options:

**Option 1.** The project Applicant shall retain a qualified Biologist to survey all suitable aquatic habitat within the project site (including features proposed for avoidance) by sampling the features thoroughly with dipnets during March or early April, when spadefoot tadpoles would be present. In addition, one nocturnal acoustic survey of all areas within 300 feet of suitable aquatic habitat shall be conducted. Acoustic surveys shall consist of walking through the area and listening for the distinctive snore-like call of this species. The results shall be provided to the City of Antioch Planning Division. Timing and methodology for the aquatic and acoustic surveys shall be based on those described in Distribution of the western spadefoot in the Northern Sacramento Valley of California, with Comments on Status and Survey Methodology.<sup>71</sup> If both the aquatic survey and the nocturnal acoustic survey are negative, further mitigation is not necessary.

If western spadefoot are observed within aquatic habitat proposed for impact, the tadpoles shall be captured by a qualified Biologist and relocated either to aquatic habitat to be avoided on-site (and implement the fencing requirement outlined below), or to an off-site open space preserve with suitable habitat in the vicinity of the project site. If western spadefoot are observed within aquatic habitats proposed for avoidance, then the project Applicant shall install a keyed in silt fence along the edge of the proposed impact area within 300 feet of the occupied aquatic habitat to prevent metamorphose individuals from dispersing into the construction area.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the

<sup>71</sup> Shedd, J.O. 2017. Distribution of the Western Spadefoot in the Northern Sacramento Valley of California, with Comments on Status and Survey Methodology (PDF Download Available). Website: [https://www.researchgate.net/publication/312153742\\_Distribution\\_of\\_the\\_Western\\_Spadefoot\\_Spea\\_hammondii\\_in\\_the\\_Northern\\_Sacramento\\_Valley\\_of\\_California\\_with\\_Comments\\_on\\_Status\\_and\\_Survey\\_Methodology](https://www.researchgate.net/publication/312153742_Distribution_of_the_Western_Spadefoot_Spea_hammondii_in_the_Northern_Sacramento_Valley_of_California_with_Comments_on_Status_and_Survey_Methodology). Accessed February 14, 2018.

extent that all project impacts to the western spadefoot would be fully mitigated, including payment of applicable fees, provided that the California Department of Fish and Wildlife (CDFW) and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**Western pond turtle**

A majority of the on-site western pond turtle habitat will be preserved within the on-site open space. However, approximately 0.005 acre of western pond turtle habitat will be impacted by the construction of two bridges over Sand Creek. To mitigate for the construction impacts to this species, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1h** Prior to construction activities, the project Applicant shall implement one of the following options:

**Option 1.** Within 14 days prior to the initiation of any construction activities for each phase, a qualified Biologist shall conduct preconstruction surveys for northwestern pond turtles. The results shall be provided to the City of Antioch Planning Division. If northwestern pond turtles are found prior to the initiation of, and/or during, construction activities, a qualified Biologist shall relocate them outside of the project site, subject to review and approval by the appropriate resource agencies (i.e., California Department of Fish and Wildlife [CDFW]).

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the western pond turtle would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**Northern California legless lizard, Alameda whipsnake, and coast horned lizard**

There is very low potential for Northern California legless lizard, the Alameda whipsnake or the coast horned lizard to be present within the project area. However, in order to avoid direct mortality of these species, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1i** Prior to construction, the project Applicant shall implement one of the following options:

**Option 1.** Within 14 days prior to the initiation of any construction activities for each phase of the project, a qualified Biologist shall conduct preconstruction surveys for northern California legless lizard, Alameda whipsnake, and coast horned lizard. The results shall be provided to the City of Antioch Planning Division. If Alameda whipsnake is identified during the survey, it will be allowed to leave the work area on its own, subject to confirmation by a qualified Biologist. If Northern California legless lizard or coast horned lizard are found during the survey, a qualified Biologist shall relocate them to suitable habitat outside of the project site, subject to review and approval by the appropriate resource agencies (i.e., California Department of

Fish and Wildlife [CDFW] and/or the United States Fish and Wildlife Service [USFWS], and the City of Antioch Planning Division).

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the lizards and whipsnake would be fully mitigated, including payment of applicable fees, provided that the CDFW and the USFWS have approved the conservation plan.

#### **Nesting raptors and songbirds**

To protect nesting raptors and songbirds during construction, the Applicant shall implement one of the following options:

The following nest survey requirements (MM BIO-2j through MM BIO-2l) shall apply if construction activities take place during the typical bird breeding/nesting season (typically February 15 through September 1).

#### **Swainson's hawk**

At the time of publication of this EIR, a Swainson's hawk nest was reported in the California Natural Diversity Database (CNDDDB) approximately 1.05 miles east of the project site (CNDDDB Occurrence No. 1681); however, this occurrence is only of foraging adults, and no nesting was observed.<sup>72</sup> The nearest documented occurrence of nesting Swainson's hawk within the last 5 years (2016) is CNDDDB Occurrence No. 2692 located approximately 2.4 miles south of the project site. Another active Swainson's hawk nest was documented in 2016 approximately 2.5 miles north of the project site (CNDDDB Occurrence No. 2690). Approximately 344.6 acres of suitable foraging habitat for Swainson's hawk will be impacted by the proposed project. Because the project site has a high potential for both nesting and foraging by the Swainson's hawk, the project Applicant shall comply with the following mitigation measure:

**MM BIO-1j**      **Option 1.** Where construction activities will occur during nesting and breeding season (typically February 15 through September 1), the project Applicant shall conduct a targeted Swainson's hawk nest survey throughout all accessible areas within 0.25 mile of the proposed construction area no later than 14 days prior to construction activities. The results shall be provided to the City of Antioch Planning Division. If active Swainson's hawk nests are found within 0.25 mile of a construction area, construction shall cease within 0.25 mile of the nest until a qualified Biologist determines that the young have fledged, or it is determined that the nesting attempt has failed. If the project Applicant desires to work within 0.25 mile of the nest, the project Applicant shall consult with the California Department of Fish and Wildlife (CDFW) to determine if the nest buffer can be reduced. The project Applicant, the Biologist, and the CDFW shall collectively determine the nest avoidance buffer and what (if any) nest monitoring is necessary. If an active Swainson's hawk nest is found within the project site prior to construction and is in a

<sup>72</sup> California Natural Diversity Database (CNDDDB). 2019. RareFind 5. California Department of Fish and Wildlife. Dated September 2019.

tree that is proposed for removal, then the project Applicant shall implement additional mitigation recommended by a qualified Biologist based on CDFW Guidelines and obtain any required permits from the CDFW.

Prior to project construction, a qualified Biologist shall conduct a review of Swainson's hawk nest data available in the California Natural Diversity Database (CNDDDB) and contact the CDFW to determine if they have any additional nest data. A Biologist shall conduct a survey of these nests to determine if they are still present and provide the City with a summary of the findings. If it is determined that the project site is within 10 miles of an active Swainson's hawk nest (an active nest is defined as a nest with documented Swainson's hawk use within the past 5 years), the project Applicant shall mitigate for the loss of suitable Swainson's hawk foraging habitat by implementing one of the below measures:

*Active nest identified within 1 mile of the project site:* 1 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.

*Active nest identified within 5 miles (but greater than 1 mile) of the project site:* 0.75 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.

*Active nest identified within 10 miles (but greater than 5 miles) of the project site:* 0.5 acre of suitable foraging habitat shall be protected for each acre of suitable foraging habitat developed. Protection shall be via purchase of mitigation bank credits or other land protection mechanism acceptable to the City.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the Swainson's hawk would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

#### **Burrowing owl**

The project site has a high potential for both nesting and foraging by the burrowing owl. Where construction activities will occur during nesting and breeding season (typically February 15 through September 1), the project Applicant shall implement one of the following options:

**MM BIO-1k**      **Option 1.** A targeted take avoidance burrowing owl nest survey shall be conducted of all accessible areas within 500 feet of the proposed construction area within 14 days prior to construction activities utilizing 60 foot transects as outlined in the Staff

Report on Burrowing Owl Mitigation.<sup>73</sup> The results shall be provided to the City of Antioch Planning Division.

If an active burrowing owl nest burrow (i.e., occupied by more than one adult owl, and/or juvenile owls are observed) is found within 250 feet of a construction area either before or during construction, no construction shall occur within 250 feet of the nest burrow until a qualified Biologist determines that the young have fledged or it is determined that the nesting attempt has failed. If the project Applicant desires to work within 250 feet of the nest burrow, the project Applicant shall consult with the California Department of Fish and Wildlife (CDFW) to determine if the nest buffer can be reduced. During the non-breeding season (late September through the end of January), the project Applicant may choose to conduct a survey for burrows or debris that represent suitable nesting habitat for burrowing owls within areas of proposed ground disturbance, exclude any burrowing owls observed, and collapse any burrows or remove the debris in accordance with the methodology outlined by the CDFW.

If any nesting burrowing owl are found during the pre-construction survey, mitigation for the permanent loss of burrowing owl foraging habitat (defined as all areas of suitable habitat within 250 feet of the active burrow) shall be accomplished at a 1:1 ratio. The mitigation provided shall be consistent with recommendations in the 2012 CDFW Staff Report and may be accomplished within the Swainson's hawk foraging habitat mitigation area if burrowing owls have been documented utilizing that area, or if the Biologist, the City, and the CDFW collectively determine that the area is suitable.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to the burrowing owl would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**MM BIO-11** Prior to construction activities, the project Applicant shall implement one of the following options to reduce impacts to Swainson's hawk and Burrowing owl:

#### **Survey Report**

**Option 1.** For any nesting raptor or songbird pre-construction survey conducted pursuant to Mitigation Measure (MM) BIO-2i through MM BIO-2k, a report summarizing the survey(s), including those for Swainson's hawk and burrowing owl, shall be provided to the City and the California Department of Fish and Wildlife (CDFW) within 30 days of the completed survey. The survey report shall be valid for one construction season. If no nests are found, no further mitigation is required.

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<sup>73</sup> California Department of Fish and Game (CDFG). 2012. Staff Report on Burrowing Owl Mitigation. Dated March 7, 2012.

Where birds are nesting during construction and construction activities cause a nesting bird do any of the following in a way that would be considered a result of construction activities: vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, the exclusionary buffer shall be increased such that activities are far enough from the nest to stop this agitated behavior. The exclusionary buffer shall remain in place until the chicks have fledged or as otherwise determined by a qualified Biologist in consultation with the CDFW.

Construction activities may only resume within the buffer zone after a follow-up survey by the biologist has been conducted and a report has been prepared indicating that the nest (or nests) are no longer active, and no new nests have been identified.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to nesting birds would be fully mitigated, including payment of applicable fees, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

#### **Other birds**

Other raptor and songbird species such as the northern harrier, white-tailed kite, and loggerhead shrike have a low potential to nest and/or forage on the project area. To ensure these species are protected, the project Applicant shall implement one of the following options:

**MM BIO-1m Option 1.** A pre-construction nesting bird survey shall be conducted by a qualified Biologist on the project site and within a 500-foot radius of proposed construction areas, where access is available, no more than 3 days prior to the initiation of construction. The results shall be provided to the City of Antioch Planning Division. If there is a break in construction activity of more than 2 weeks, subsequent surveys shall be conducted.

If active raptor nests are found, no construction activities shall take place within 500 feet of the nest until the young have fledged. If active songbird nests are found, a 100-foot no disturbance buffer shall be established. These no-disturbance buffers may be reduced if a smaller buffer is proposed by the Biologist and approved by the City (and California Department of Fish and Wildlife (CDFW) if it is a tricolored blackbird nesting colony) after taking into consideration the natural history of the species of bird nesting, the proposed activity level adjacent to the nest, habituation to existing or ongoing activity, and nest concealment (are there visual or acoustic barriers between the proposed activity and the nest). A qualified Biologist shall visit the nest as needed to determine when the young have fledged the nest and are independent of the site or the nest can be left undisturbed until the end of the nesting season.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, to the extent that all project impacts to raptors and songbirds would be fully mitigated, including payment of applicable fees, provided that the CDFW and the United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

#### Roosting bats

##### MM BIO-1n

Prior to construction activities, the project Applicant shall implement one of the following options:

**Option 1.** A qualified Biologist shall conduct a bat habitat assessment of all potential roosting habitat features, including trees within the proposed development footprint. This habitat assessment shall identify all potentially suitable roosting habitat, and may be conducted up to 1 year prior to the start of construction. The results shall be provided to the City of Antioch Planning Division.

If potential roosting habitat is identified (cavities in trees) within the areas proposed for development, the Biologist shall survey the potential roosting habitat during the active season (generally April through October or from January through March on days with temperatures in excess of 50°F (degrees Fahrenheit) to determine presence of roosting bats. These surveys are recommended to be conducted utilizing methods that are considered acceptable to the California Department of Fish and Wildlife (CDFW) and bat experts, including but not limited to evening emergence surveys, acoustic surveys, inspecting potential roosting habitat with fiber optic cameras or a combination thereof.

If roosting bats are identified within any of the trees planned for removal, or if presence is assumed, the trees shall be removed outside of pup season only on days when temperatures are in excess of 50°F. Pup season is generally during the months of May through August. Two-step tree removal shall be utilized under the supervision of the qualified Biologist. Two-step tree removal involves removal of all branches of the tree that do not provide roosting habitat on the first day, and then the next day cutting down the remaining portion of the tree.

Additionally, all other tree removal shall be conducted from January through March on days with temperatures in excess of 50°F to avoid potential impacts to foliage-roosting bat species.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to

roosting bats would be fully mitigated, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**American badger**

Prior to construction activities, the project Applicant shall implement one of the following options:

**MM BIO-1o**      **Option 1.** Within 48 hours prior to the initiation of any construction activities for any project phase, a qualified Biologist shall conduct a preconstruction-level American badger den survey within the project site. The results shall be provided to the City of Antioch Planning Division. If American badger or burrows with American badger sign are found within the project site or Off-site Improvement Area during the preconstruction surveys, consultation with the California Department of Fish and Wildlife (CDFW) shall occur prior to the initiation of any construction activities to determine an appropriate burrow excavation and/or relocation method. If American badger burrows are not found, further measures are not necessary. All survey results shall be submitted to the City of Antioch Planning Division prior to the initiation of any construction activities or where construction has been halted for 30 days or more.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to the American badger would be fully mitigated, provided that the CDFW and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

**Worker Environmental Awareness Training**

**MM BIO-1p**      Prior to any ground-disturbing or vegetation-removal activities, the project Applicant shall implement one of the following options:

**Option 1.** The project Applicant shall hire a qualified Biologist to conduct a Worker Environmental Awareness Training (WEAT) with the construction crews. The WEAT shall include the following information: discussion of the California Endangered Species Act (CESA) and Federal Endangered Species Act (FESA), the Clean Water Act, the project permits and California Environmental Quality Act (CEQA) documentation, and associated mitigation measures; consequences and penalties for violation or noncompliance with these laws and regulations; identification of special-status wildlife, location of any avoided waters of the United States; hazardous substance spill prevention and containment measures; and the contact person in the event of the discovery of a special-status wildlife species.

The WEAT shall also discuss the different habitats used by the species' different life stages and the annual timing of these life stages. A handout summarizing the WEAT information shall be provided to workers to keep on-site for future reference. Upon completion of the WEAT training, workers shall sign a form stating that they attended the training, understand the information presented and will comply with

the regulations discussed. Workers shall be shown designated “avoidance areas” during the WEAT training, and worker access shall be restricted to outside of those areas to minimize the potential for inadvertent environmental impacts.

**Option 2.** The project Applicant shall comply with a habitat conservation plan and/or natural community conservation plan if developed and adopted by the City, including payment of applicable fees, to the extent that all project impacts to special-status wildlife species would be fully mitigated, provided that the California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS) have approved the conservation plan.

### **Mitigation Measures to Reduce Operational Impacts to Special-status Species**

#### **MM NOI-1b Traffic Noise Reduction Measure**

The proposed project shall construct a soundwall along rear yards of residential lots fronting Deer Valley Road. The soundwall shall be a minimum of 8-foot high, as measured from the finished grade of the proposed residential pads. The soundwall should be located so as to block the line of sight from rear yards for all proposed residences located within 160 feet of the centerline of Deer Valley Road.

#### **MM NOI-1c Mechanical Equipment Noise Reduction Measure**

To reduce potential operational stationary noise impacts from mechanical ventilation equipment at the proposed residential homes, mechanical ventilation equipment must be located a minimum of 15 feet from the boundary of the project site, or must be shielded by a noise-reducing barrier. If a noise barrier is required, the barrier shall be a minimum of 5 feet in height, extending 2 feet beyond the sides of the equipment and located between the equipment and the receiving property line.

#### **MM NOI-1d Commercial Operation Noise Reduction Measure**

The commercial land uses shall be designed so that on-site mechanical equipment (i.e., HVAC units, compressors, generators) and area-source operations (e.g., parking lots) are located no closer than 100 feet from the nearest residential dwelling unit or provide shielding from nearby noise sensitive land uses to meet the City’s normally acceptable threshold of 60 A-weighted decibel (dBA) Community Noise Equivalent Level (CNEL). Shielding shall have a minimum height sufficient to completely block line-of-sight between the on-site noise source and the nearest residential dwelling to meet the City’s noise standards. Based on the size and placement of the HVAC units (i.e., ground level or roof top), barrier heights may range between 3 to 6 feet.

### ***Level of Significance After Mitigation***

Less Than Significant

### ***Sensitive Natural Communities***

**Impact BIO-2:** The project could have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

### ***Construction/Operation***

An impact to sensitive natural communities or riparian habitat would be considered significant if the proposed project construction or operation resulted in a substantial, adverse change in any of the physical conditions (such as removal of vegetation) within the area affected by the project. Potential impacts to sensitive natural communities or riparian habitat that have the potential to be impacted are discussed in detail below.

A total of 350.20 acres of terrestrial vegetation communities would be impacted, and 210.20 acres would be avoided by the proposed project, as shown in Exhibit 3.4-8. Impacts to terrestrial vegetation communities are shown below in Table 3.4-2. No sensitive natural vegetation communities will be impacted by the project.

**Table 3.4-2: Impacts and Avoidance of Terrestrial Vegetation Communities within the Project Site**

<b>Vegetation Community</b>	<b>Impacted Acreage</b>	<b>Avoided Acreage</b>	<b>Total Acreage</b>
Annual Brome Grassland	343.50	196.30	539.80
Developed	5.6	2.60	8.20
Valley Oak Woodland*	0.0	7.0	7.0
California Goldfields—Dwarf Plantain—Small Fescue Flower Fields	0.2	1.4	1.6
Eucalyptus Woodland	0.0	1.5	1.5
Alkali Weed-Salt Grass Playas and Sink*	0.0	1.4	1.4
Ruderal	0.9	0.0	0.9
<b>Total</b>	<b>350.20</b>	<b>210.20</b>	<b>560.40</b>
Note: * Sensitive Natural Community			

A total of 1.041 acres of aquatic resources would be impacted by the project, and 4.035 acres would be avoided, as shown in Exhibit 3.4-9. Impacts to aquatic resources are shown in Table 3.4-3 below.

**Table 3.4-3: Impacts and Avoidance of Aquatic Resources within the Project Site**

Aquatic Resource Type	Impact Acreage	Avoidance Acreage	Total Project Acreage
Intermittent Drainage (Sand Creek)	0.005	1.896	1.901
Pond	0.000	1.373	1.373
Seasonal Wetland	0.680	0.333	1.013
Ephemeral Drainage	0.076	0.397	0.473
Seasonal Wetland Swale	0.280	0.006	0.286
Seep	0.000	0.030	0.030
<b>Total</b>	<b>1.041</b>	<b>4.035</b>	<b>5.076</b>
Note: <sup>1</sup> Rounding may result in small summation errors.			

Sand Creek flows through the project site. In addition, ephemeral tributaries, seasonal wetland pools, wetland seeps, seasonal wetlands, and intermittent drainages also occur across the site. Of the approximately 5.076 acres of aquatic resources mapped within the project site, 1.041 acres would be impacted by the proposed project, and 4.035 acres would be avoided in the open space areas.

Because the proposed project may result in the fill or disturbance of these 1.041 acres of aquatic resources, implementation of MM BIO-3 is required to reduce potential impacts through consultation with State and federal regulatory agencies and adherence to any compensatory permitting requirements imposed. Impacts related to effects on aquatic resources would be less than significant with implementation of mitigation.

#### ***Level of Significance Before Mitigation***

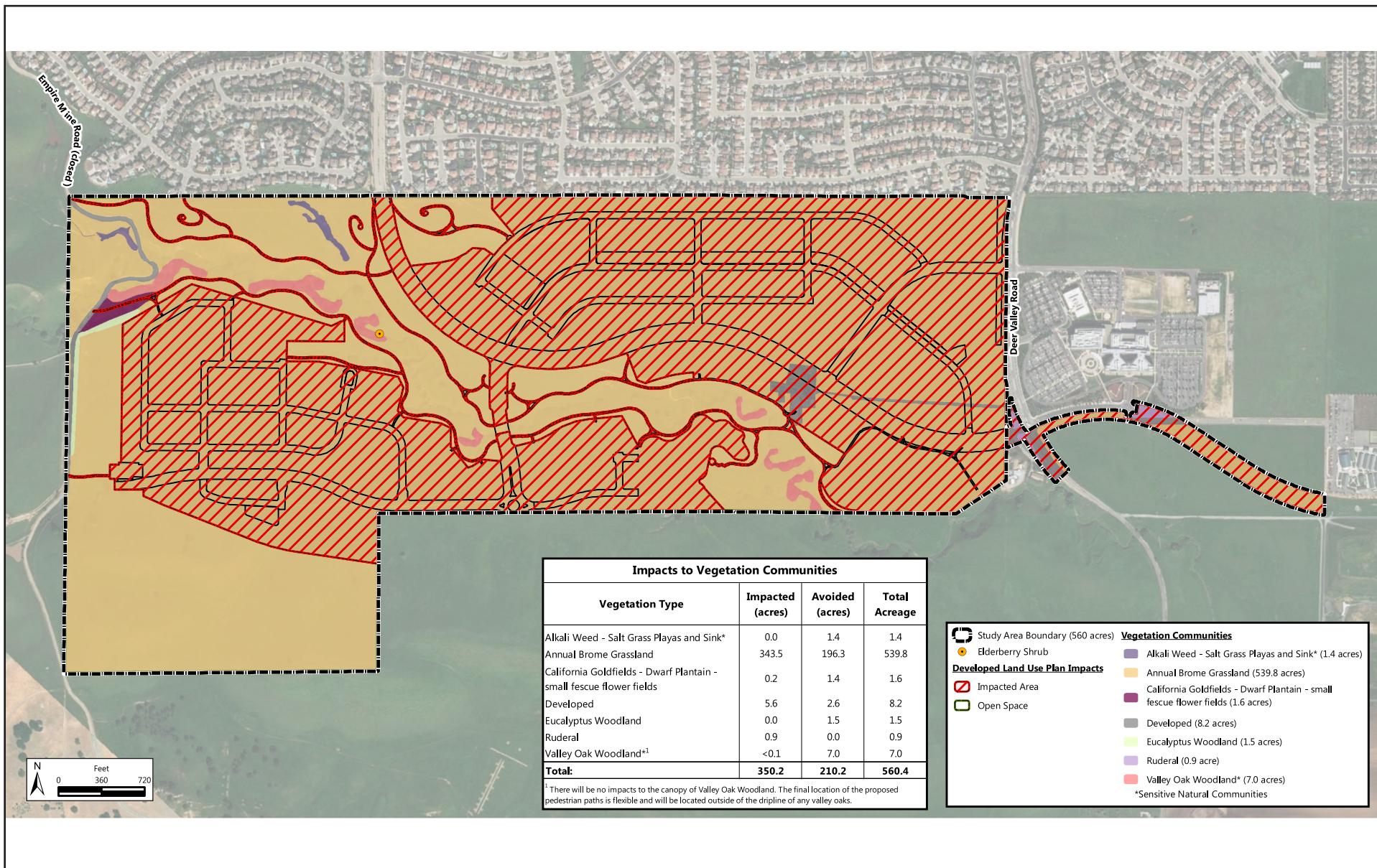
Less Than Significant

#### ***Mitigation Measures***

Implementation of MM BIO-3 below.

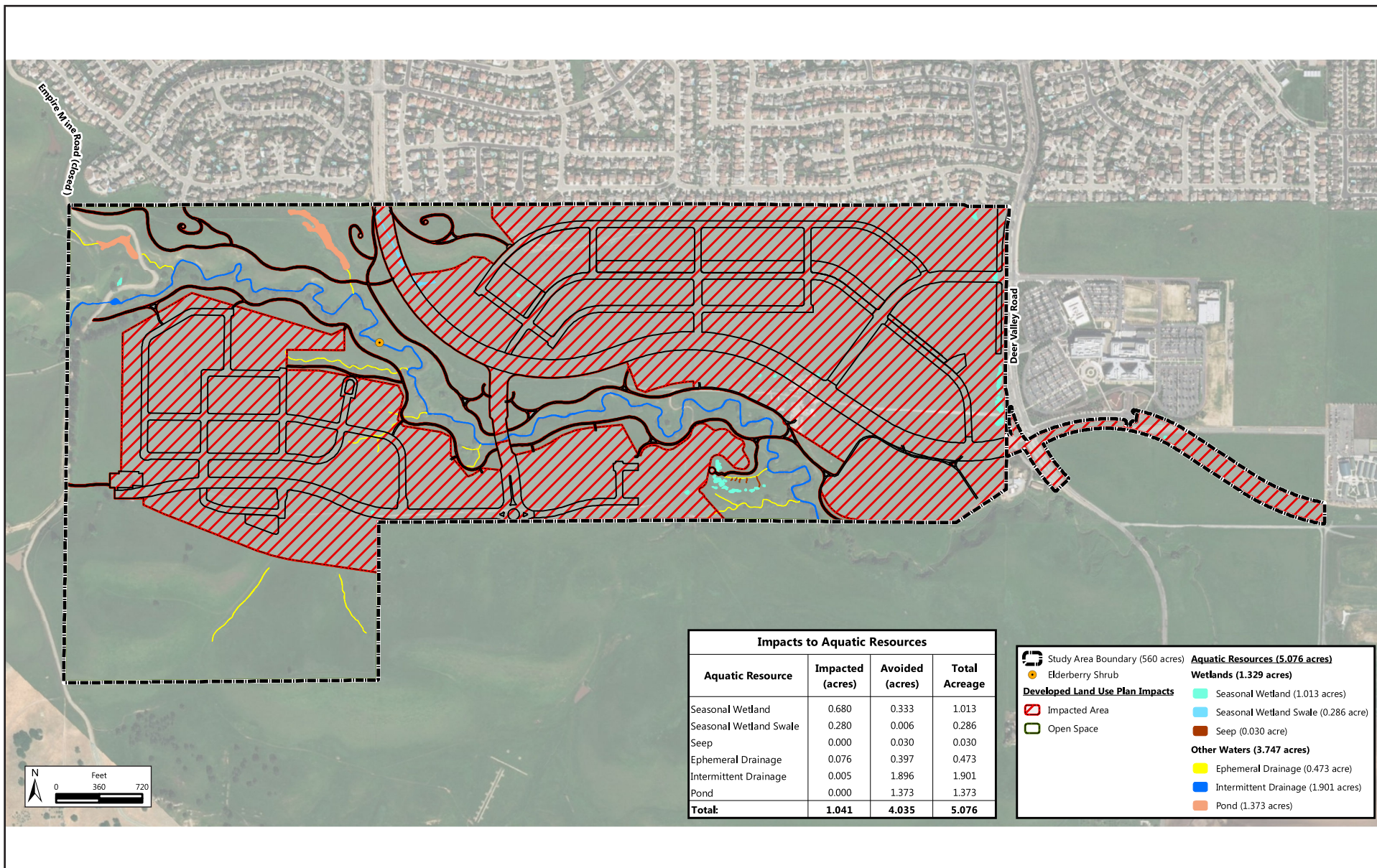
#### ***Level of Significance After Mitigation***

Less Than Significant



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## **Wetlands**

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**Impact BIO-3:**      **The project could have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool coastal, etc.) through direct removal, filling, hydrological interruption, or other means.**

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### **Construction/Operation**

Impacts to State or federally protected wetlands would be considered significant if the proposed project operations resulted in a substantial, adverse change in any of the physical conditions (i.e. fill) of wetlands.

A total of 5.076 acres of aquatic resources have been mapped within the project site, including the Off-site Improvement area. As mentioned above, 1.041 acres will be impacted by the proposed project, and 4.035 acres will be avoided and preserved within open space areas.

Furthermore, 3.948 acres of potentially jurisdictional waters of the United States have been mapped and verified by the USACE within the project site, which includes 1.901 acres of intermittent tributary (Sand Creek), 0.340 acre of ephemeral tributary (tributaries to Sand Creek), 1.372 acres of impoundment, 0.303 acre of seasonal wetland pool, and 0.030 acre of wetland seep. An additional 1.111 acres of non-jurisdictional waters were also verified by the USACE within the project site, which includes 0.132 acre of non-tributary ephemeral drainage, 0.286 acre of isolated wetland drainage, 0.588 acre of seasonal wetland pool, and 0.105 acre of non-wetland seasonal pool.

Prior to any impacts to these features, both a Section 404 permit and a Section 401 water quality certification permit would need to be obtained from the USACE and RWQCB, respectively.

Although the proposed project would include development of much of the upland areas within the project site, the areas classified as jurisdictional seasonal wetland pools, wetland seeps, and impoundments would be preserved within open space areas on the project site.

Additionally, development within the project site would include setbacks averaging 125 feet from the centerline of Sand Creek (a 250-foot-wide corridor) to avoid potential impacts to the jurisdictional ephemeral and intermittent wetland areas associated with Sand Creek. Although disturbance within Sand Creek and wetland areas would be generally avoided, the proposed project would include development of up to two vehicle bridges, a pedestrian bridge, and two outfall structures in or over Sand Creek. Construction of up to two vehicle bridges and the pedestrian bridge are anticipated to include the placement of riprap to secure the sides of the creek, which would be considered a fill of wetland areas associated with Sand Creek. The proposed locations of each of the bridge improvements are identified on each of the land plan exhibits. The proposed locations of the stormwater outfall structures are shown in Appendix H (Stormwater Control Plan).

In addition, there is a very small seasonal wetland (approximately 0.016 acre) just south of Kaiser Permanente Antioch Medical Center that will be filled as part of the off-site improvements for the proposed project. Considering the above, the proposed project may result in fill or other disturbance of waters of the United States and waters of the State, and the project would result in a significant impact to waters of the United States and waters of the State. Implementation of MM BIO-3 would

reduce impacts to on- and off-site wetlands to a less than significant level through consultation with State and federal regulatory agencies and adherence to any compensatory permitting requirements imposed as part of the issuance of a 404 permit, 401 water quality certification, and 1602 Lake and Streambed Alteration Agreement. This would ensure that aquatic resources would be reduced to a less than significant level through minimization and avoidance measures.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

**MM BIO-3** Prior to the issuance of a grading permit for the project, the project Applicant shall obtain all required resource agency approvals for the project, including as follows:

The project Applicant shall obtain for a Section 404 permit from the United States Army Corps of Engineers (USACE). Waters that will be impacted shall be replaced or rehabilitated on a “no-net-loss” basis. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods acceptable to the USACE.

The project Applicant shall apply for and obtain a Section 401 water quality certification from the Regional Water Quality Control Board (RWQCB) and adhere to the certification conditions.

The project Applicant shall apply for and obtain a Section 1602 Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW). The information provided will include a description of all of the activities associated with the proposed project, not just those closely associated with the drainages and/or riparian vegetation. Impacts will be outlined in the application and are expected to be in substantial conformance with the impacts to biological resources outlined in this document. Impacts for each activity will be identified as temporary or permanent with a description of the proposed mitigation for the associated biological resource impacts. Information regarding project-specific drainage and hydrology changes resulting from project implementation will be provided as well as description of stormwater treatment methods. Minimization and avoidance measures shall be proposed as appropriate and may include preconstruction species surveys and reporting; protective fencing around avoided biological resources; worker environmental awareness training; seeding disturbed areas adjacent to open space areas with native seed; and installation of project-specific stormwater Best Management Practices (BMPs). Mitigation may include restoration or enhancement of resources on- or off-site, purchase of habitat mitigation credits from an agency-approved mitigation/conservation bank, purchase of off-site land approved by resource agencies for mitigation, working with a local land trust to preserve land, or any other method acceptable to the CDFW.

***Level of Significance After Mitigation***

Less Than Significant

## Fish and Wildlife Movement Corridors

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<b>Impact BIO-4:</b>	<b>The project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.</b>
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### Construction

Wildlife corridors are linear and/or regional habitats that provide connectivity to other natural vegetation communities within a landscape fractured by urbanization and other development. Wildlife corridors have several functions. First, wildlife corridors provide avenues along which wide-ranging animals can travel, migrate, and breed, allowing genetic interchange to occur. Second, populations can move in response to environmental changes and natural disasters. Last, individuals can recolonize habitats from which populations have been locally extirpated. All three of these functions can be met if both regional and local wildlife corridors are accessible to wildlife. Regional wildlife corridors provide foraging, breeding, and retreat areas for migrating, dispersing, immigrating, and emigrating wildlife populations. Local wildlife corridors also provide access routes to food, cover, and water resources within restricted habitats.

The project is centered around Sand Creek, which is located within the greater Lone Tree Valley. The Creek itself does not provide habitat for endangered fish such as salmon as it only fills after rain, and then almost immediately ceases flow. In short, its flow is too intermittent to provide habitat for fish. However, Lone Tree Valley represents a potential wildlife corridor for highly mobile vertebrate species to move from the lower foothills of the San Joaquin Valley to suitable habitat within the hills to the north and east of Mount Diablo (Black Diamond Mines Regional Preserve area). Special-status species such as California tiger salamander, California red-legged frog, western pond turtle, American badger, and San Joaquin kit fox as well as common species such as Columbian black-tailed deer (*Odocoileus hemionus columbianus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and gray fox (*Urocyon cinereoargenteus*) may also use the Lone Tree Valley and the Sand Creek corridor for seasonal or daily migration. Much of the existing Lone Tree Valley within the project site will be developed with residential neighborhoods and roads. These features may lead to a decrease in special-status and common species migration. This could lead to species populations being cut off from potential breeding locations and may lead to a bottleneck in gene flow. Additionally, it may also lower the likelihood of species such as San Joaquin kit fox from recovering from portions of their historic range (Black Diamond Mines Regional Preserve). Notably, however, wildlife that uses the annual grasslands on the project site as a movement corridor will be still be able to use the Sand Creek corridor, the Restricted Development Area (open space) on the southern portion of the site, and the annual grassland surrounding the project site for dispersal. Furthermore, the entire northwestern portion of the site, where a number of aquatic resources are located just north of Sand Creek, will remain undeveloped in open space. Also, the Sand Creek Corridor will not be developed for the project; it will be fully preserved with an average 125-foot-wide set back from center of the stream throughout the project area (a 250-foot-wide corridor). The vehicular bridges connecting the southern development area to the northern development area and the pedestrian bridge located near the norther detention basin are planned to span Sand Creek. Thus, any use of the Creek bed for wildlife corridor will remain unimpeded. The off-site infrastructure area is a small, disjunct area along existing roads and infrastructure and is not likely used as a major wildlife

movement corridor. Still, certain species will experience reduced annual grasslands due to the project development footprint. Therefore, implementation of MM BIO-4 is required to ensure that impacts related to wildlife movement corridors would be less than significant. With implementation of MM BIO-4, the proposed project would have less than significant impacts related to wildlife movement because it would allow unimpeded movement of species through the existing Sand Creek Corridor.

### ***Operation***

Impacts to migration as a result of project operation have the potential to occur. As mentioned above under the construction analysis, the proposed project would incorporate a 250-foot-wide corridor along Sand Creek. Additionally, implementation of MM BIO-4, which would reduce migratory hindrance through limiting the locations of temporary and permanent fencing included in the project, would reduce impacts to a less than significant level.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

**MM BIO-4** No permanent or temporary fencing shall be erected that will hinder migratory wildlife from utilizing the Sand Creek corridor. Utility and bridge crossings of Sand Creek shall be designed to be free spanning of the creek.

### ***Level of Significance After Mitigation***

Less Than Significant

### ***Local Biological Resources Policies/Ordinances Consistency***

<b>Impact BIO-5:</b>	<b>The project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.</b>
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### ***Construction/Operation***

An on-site tree survey was conducted in 2015 by certified arborist Ed Brennan, which identified 16 tree species and 255 individual trees.<sup>74</sup> Attachment E of the updated BRA in Appendix D provides a map of the trees within the project site. (There are no trees located within the off-site improvement area). Approximately 181 of the 255 trees identified within the project site are native trees as identified in the City of Antioch Tree Ordinance.

The native trees in the project site consist of native oaks (coast live oak, blue oak, valley oak, and interior live oak) and California buckeye. Various planted and ornamental trees such as blue gum eucalyptus, manna gum, black locust, and others also exist in the project site.

<sup>74</sup> Brennan, E. 2015. Tree Preservation Report for The Ranch, Antioch, California. Prepared for Richland Communities, Inc. July 29, 2015.

Some of the planted and ornamental trees are protected under the City of Antioch Tree Ordinance as “mature trees” or “landmark trees” because the trees exceed the 26-inches diameter at breast height (DBH) or 48 inches DBH respective thresholds.

The eucalyptus tree windrow located on the western border of the project site will be preserved. Most of the native oak trees are located within the Sand Creek Corridor setback areas and will be preserved. However, there are 13 trees located within the footprint of the project site that may need to be removed for project infrastructure purposes. (See Attachment E of the updated BRA in Appendix D for a map of the trees and a table of the tree survey data). These trees include eight non-native trees and five native trees. The project Applicant will work with the design team to preserve and incorporate as many of these trees into the project design as feasibly possible; the City will review any proposed tree removals as part of the entitlement process. Implementation of MM BIO-5 would ensure that local trees within the project would remain protected. As such, impacts would be less than significant.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

**MM BIO-5** The project Applicant shall preserve and incorporate existing trees into the project design to the extent feasible. If any Protected Trees (i.e., indigenous trees, street trees, mature trees, and/or landmark trees) are required to be removed due to project-related activities, the removal shall be mitigated in accordance with the City of Antioch Code of Ordinances Title 9, Chapter 5, Article 12 Section 9-5.1205: Tree Preservation and Regulation by either paying the requisite fee as outlined in the City’s ordinance, or through conducting on-site plantings at the ratios required by the City’s Tree Ordinance.

Efforts shall be made to save trees where feasible. This shall include the use of retaining walls, planter islands, pavers, or other techniques commonly associated with tree preservation. The Improvement Plans shall include a note and show placement of temporary construction fencing around trees to be saved: The project Applicant shall install a 4-foot tall, brightly colored (typically orange), synthetic mesh material fence (or an equivalent) approved by the City at the following locations prior to any construction equipment being moved on-site or any construction activities taking place: at the limits of construction; outside the Protected Zone of all native oaks, California buckeye, or landmark trees; within 50 feet of any grading, road improvements, underground utilities, or other development activity; or as otherwise shown on the tentative subdivision map. Any encroachment within these areas, including Protected Zones of trees to be saved, shall first be approved by the City of Antioch Community Development Director. Grade cuts and fills, hardscapes, structures, and utility lines shall be located outside of the drip line of any trees being preserved. All required protective fencing shall be installed prior to the commencement of grading any particular phase.

**Level of Significance After Mitigation**

Less Than Significant

**Habitat/Natural Community Conservation Plan Consistency**

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<b>Impact BIO-6:</b>	<b>The project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.</b>
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**Construction/Operation**

In July 2007, the ECCC HCP/NCCP was adopted by Contra Costa County, other member cities, the USFWS, and the CDFW. The City of Antioch, however, declined to participate in the HCP/NCCP. While the City is attempting to obtain coverage under the ECCC HCP/NCCP, the process is long, and the City is only in the beginning stages. Thus, the project site is not located in an area with an approved HCP/NCCP, or local, regional, or State HCP.

If the City has adopted an HCP prior to the start of project construction, and both the City and all resource agencies have approved the HCP, the proposed project would be required to comply with all provisions of the HCP to the extent such impacts could be mitigated by the HCP, and compliance would reduce any impacts to a less than significant level. However, because no HCP/NCCP currently governs the project site, construction impacts related to the consistency with a conservation plan would have no impact on any such plan.

**Level of Significance**

No Impact

**3.4.6 - Cumulative Impacts**

The geographic scope of the cumulative impact assessment on biological resources is the approximately 2,800-acre Sand Creek Focus Area. The Focus Area includes Lone Tree Valley, Horse Valley, and Sand Creek, which meanders generally in a west-east direction. The project site is 551.5 acres, and thus comprises approximately 19 percent of the entire Focus Area. However, only 346 acres of the project site (or 12 percent of the total Focus Area) would be developed under the proposed project, and a 250-foot-wide corridor along Sand Creek would be preserved.

**Special-status Plant Species**

According to Exhibit 3.4-7, implementation of the proposed project would result in the loss of 2.666 acres of shining navarretia. It is unknown whether the plant occurs elsewhere on the unsurveyed portions of the cumulative area. As a result, the project's contribution to the cumulative loss of shining navarretia would be potentially cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-1 would reduce the project's cumulative contribution to the loss of shining navarretia to a less than significant level.

**Special-status Wildlife Species**

The proposed project and the Focus Area as a whole provides habitat for many special-status wildlife species including Crotch and western bumblebee, vernal pool fairy shrimp, vernal pool tadpole

shrimp, valley elderberry longhorn beetle, California tiger salamander, California red-legged frog, western spadefoot, western pond turtle, Northern California legless lizard, Alameda whipsnake, coast horned lizard, nesting and foraging raptors and songbirds (including western burrowing owl and Swainson's hawk), roosting bats, American badger, and San Joaquin kit fox.

The valley elderberry longhorn beetle lives in elderberry shrubs. As noted above, only one on-site elderberry shrub has been identified and it would be fully avoided by the proposed project as it is located within the Sand Creek corridor and not within development limits. However, to ensure full protection of elderberry shrubs (and any potential beetles), MM-BIO-2c shall be implemented. Thus, the proposed project would have less than significant contribution to any cumulative impact to the valley elderberry longhorn beetle.

The project area has a very low potential for Crotch bumblebee, western bumblebee, northern California legless lizard, Alameda whipsnake, coast horned lizard, American badger, and San Joaquin kit fox. Furthermore, MM BIO-2a, BIO-2h, BIO-2-i through 2-l, BIO-2o and BIO-2p would ensure avoidance and minimization measures should these species be encountered on-site. Thus, the project's cumulative impacts to these species is less than significant.

Like much of the Sand Creek Focus Area, the project site contains suitable habitat for California red-legged frog, western pond turtle, and nesting raptors and songbirds including burrowing owl. However, all suitable aquatic habitat for California red-legged frog and western pond turtle (barring 0.005 acres where the bridges would be constructed) would be avoided by the proposed project. Avoidance and minimization measures would also be implemented to avoid nesting birds and raptors. With the implementation of the proposed avoidance and minimization measures for these species contained in MM BIO-2e, MM BIO-2g, and MM BIO-2i through MM BIO-2l, the proposed project's cumulative impacts to these species is less than significant.

The proposed project would impact approximately 0.680 acre of suitable habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp and avoid 0.333 acre. It is unknown how many acres of suitable habitat for vernal pool tadpole shrimp and vernal pool fairy shrimp are present within the entire Focus Area. The proposed project's contribution to the cumulative loss of vernal pool tadpole shrimp and vernal pool fairy shrimp could be potentially cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-2b would reduce the project's cumulative contribution to a less than significant impact on vernal pool and tadpole shrimp.

The proposed would impact approximately 0.423 acre of aquatic and 344.6 acres of upland habitat for California tiger salamander (approximately 12.7 percent of the Focus Area). It is assumed that most, if not all, of the upland habitats within of the Focus Area represents suitable upland habitat for California tiger salamander. The proposed project's contribution to the cumulative loss of California tiger salamander would be cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-2d would reduce the project's cumulative contribution to a less than significant impact on the California tiger salamander.

The proposed project would impact approximately 0.423 acre of suitable habitat for western spadefoot. It is unknown how many acres of suitable habitat for western spadefoot are present

within the entire Focus Area. The proposed project's contribution to the cumulative loss of western spadefoot could be potentially cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-2f would reduce the project's cumulative contribution to a less than significant impact on the western spadefoot.

The proposed project would impact approximately 344.6 acres of suitable foraging habitat for raptors including Swainson's hawk (approximately 12.7 percent of the Focus Area). It is assumed that most, if not all, of the upland habitats within the Focus Area represents suitable foraging habitat for Swainson's hawk. The proposed project's contribution to the cumulative loss of foraging habitat for Swainson's hawk would be cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-2i would reduce the project's cumulative contribution to a less than significant impact on the Swainson's hawk.

The proposed project would impact potential bat roost habitat consisting of large trees and structures, however, it is unknown how many bat roosts are present within the entire Focus Area. The proposed project's contribution to the potential cumulative loss of bat roosts could be potentially cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-2n would reduce the project's cumulative contribution to a less than significant impact on roosting bats.

Additionally, the proposed project has the potential to impact special-status species during operation. Projects located within the Sand Creek Focus Area would be required implement mitigation similar to MM NOI-1, MM NOI-1c, and MM NOI-1d to reduce potential cumulative operational impacts to a less than significant level.

Adherence to the mitigation measures related to special-status plant and wildlife species identified above would reduce all potentially cumulatively considerable impacts to a less than significant level.

### **Sensitive Natural Communities or Riparian Habitat**

Sensitive natural communities within the Focus Area are primarily the oak woodlands to the west of the proposed project, woodlands in the narrow riparian fringe along Sand Creek, and the alkaline sinks that are scattered throughout the Focus Area. Sensitive natural communities within the project site include valley oak woodland (in a narrow riparian fringe along Sand Creek) and several Alkali Weed-Salt Grass Playas and Sinks. All of these would be avoided by project development. With avoidance of Sand Creek, the proposed project in conjunction with other projects would not result in cumulative impacts to sensitive natural communities or riparian habitat. Therefore, the proposed project would have less than significant cumulative impacts to Sensitive Natural Communities or riparian habitat. (See below for cumulative impacts to aquatic resources.)

### **Aquatic Resources**

The majority of aquatic resources within the Focus Area are comprised of Sand Creek itself, and ponds that have been constructed on tributaries to the creek. All of these aquatic resources have been avoided by construction within the Focus Area to date, and this project also proposes to largely avoid those resources. Small depressional seasonal wetlands are scattered throughout the

grasslands in the Focus Area; these are the resources primarily impacted by construction to-date and proposed for impact by the proposed project. The proposed project would impact approximately 1.041 acre of aquatic resources, including seasonal wetlands, a large seasonal wetland swale (which formed as the result of adjacent development to the north), ephemeral and intermittent drainages, and a small portion of Sand Creek. Because it is unknown how many acres of aquatic resources are present within the entire Focus Area, the proposed project's contribution to the cumulative loss of aquatic resources could be potentially cumulatively considerable, and thus, a potentially significant cumulative impact. MM BIO-3 would reduce the proposed project's cumulative contribution to a less than significant impact on aquatic resources by requiring the project Applicant to conduct surveys, to obtain regulatory permits, and to mitigate all impacts to aquatic resources to a less than significant level.

### **Fish and Wildlife Movement Corridors**

Fish are not present in Sand Creek given it only has intermittent flows after storms. Accordingly, the proposed project would not have any impact on fish migration.

However, development within the project site and the Sand Creek Focus Area could lead to a decrease in special-status and common species migration due to the creation of urban landscapes that could act as barriers. This could lead to species populations being cut off from potential breeding locations and may lead to a bottleneck in gene flow and may also lower the likelihood of species such as San Joaquin kit fox to reoccupy portions of their historic range (Black Diamond Mines Regional Preserve). The Sand Creek corridor and Horse Valley are the most important corridors for wildlife movement within the Sand Creek Focus Area. The proposed project would not affect Horse Valley in any way. In addition, the proposed project has been designed to protect and preserve a 250-foot-wide corridor abutting Sand Creek to ensure free flow of wildlife within and adjacent to it. Moreover, the majority of the southern portion of the project site, as well as a large swath of land along the western boundary of the project site would be designated as open space and serve as a continued wildlife corridor to adjacent open space areas. As such, any wildlife movement occurring within the Sand Creek Focus Area would not be minimally affected by the proposed project as a wide corridor for movement would be available.

Finally, MM BIO-4 would prohibit any exclusionary fencing from being installed along the creek corridor which could prohibit migration throughout the open space corridor provided. Accordingly, the proposed project in conjunction with other projects in the Focus Area would not result in a cumulatively significant impact to wildlife movement corridors.

### **Local Tree Policies or Ordinances**

The proposed project, in addition to other development projects in the City of Antioch would be subject to compliance with the City of Antioch Tree Ordinance and policies outlined in the General Plan related to biological resources. Compliance of the project and cumulative projects to the City of Antioch Tree Ordinance and general plan policies, in addition to providing mitigation for the loss of any trees would reduce potential impacts to a less than significant level. The proposed project would comply with all policies and ordinances in place for purposes of protecting biological resources.

Thus, cumulative impacts regarding conflicts with local, regional, or state policies or ordinances protecting biological species would be less than significant.

### **Habitat and Natural Community Conservation Plan Consistency**

The City of Antioch does not participate in the HCP/NCCP, but is in the process of adopting an HCP/NCCP, which mirrors the East Contra Costa HCP/NCCP. Thus, the proposed project is not inconsistent with any HCP/NCCP as there is not one that governs. If and/or when Antioch adopts an HCP/NCCP, the proposed project has been conditioned to comply with the biological requirements and mitigate accordingly, to the extent the HCP/NCCP would fully mitigate the biological impacts at issue. Similarly, cumulative projects in the City of Antioch would be required to comply with all provisions of the HCP/NCCP if adopted by the City of Antioch and if construction occurs after the time of adoption, to the extent the HCP/NCCP would fully mitigate the impacts sought to be mitigated. Therefore, cumulative projects in conjunction with the project would not conflict with an HCP or NCCP. Cumulative impacts would be less than significant.

### **Level of Cumulative Significance Before Mitigation**

Potentially Significant (Special-status Plant Species, Special-status Wildlife Species, Aquatic Resources)

### **Cumulative Mitigation Measures**

Implementation of MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4 MM NOI-1b, MM NOI-1c, and MM NOI-1d.

### **Level of Cumulative Significance After Mitigation**

Less Than Significant

## 3.5 - Cultural and Tribal Cultural Resources

### 3.5.1 - Introduction

This section describes existing cultural and Tribal Cultural Resources (TCRs) in the region and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to cultural and tribal resources that could result from implementation of the project. Information included in this section is based, in part, on a 2015 Cultural Resources Survey for The Ranch Project prepared by Tom Origer & Associates, a 2017 Cultural Resources Inventory and Evaluation Report prepared by ECORP Consulting, updated Northwest Information Center (NWIC) results, Native American Heritage Commission (NAHC) correspondence, and the City of Antioch General Plan and General Plan Environmental Impact Report (EIR). All reports and correspondence are available in Appendix E.

The following comments were received during the EIR scoping period related to cultural and tribal cultural resources:

- Recommendations for consultation with Native American tribes consistent with Assembly Bill 52 (AB 52) and Senate Bill 18 (SB 18).

### 3.5.2 - Environmental Setting

#### Cultural Resources Components

The term “cultural resources” encompasses historic, archaeological, and TCRs as well as burial sites. Below is a brief summary of each component:

- **Historic Resources:** Historic resources are associated with the recent past. In California, historic resources are typically associated with the Spanish, Mexican, and American periods in the State’s history and are generally less than 200 years old, but older than 50 years old.
- **Archaeological Resources:** Archaeology is the study of artifacts and material culture with the aim of understanding human activities and cultures in the past. Archaeological resources may be associated with prehistoric indigenous cultures as well as historic periods.
- **Tribal Cultural Resources:** TCRs include sites, features, places, or objects that are of cultural value to one or more California Native American Tribes.
- **Burial Sites and Cemeteries:** Burial sites and cemeteries are formal or informal locations where human remains have been interred.

#### Overall Cultural Setting

Following is a brief overview of the prehistory, ethnography, and historic background, providing a context in which to understand the background and relevance of sites found in the general project area. This section is not intended to be a comprehensive review of the current resources available;

rather, it serves as a general overview. Further details can be found in ethnographic studies, mission records, and major published sources.<sup>1,2,3,4,5,6</sup>

### ***Prehistoric and Ethnographic Background***

In general, archaeological research in the greater San Francisco Bay Area (Bay Area) has focused on coastal areas, where large shell mounds were relatively easily identified on the landscape. This research and its chronological framework, however, is relevant to and has a bearing on our understanding of prehistory in areas adjacent to the Bay Area, including modern Contra Costa County.

The Bay Area supported a dense population of hunter-gatherers over thousands of years, leaving a rich a varied archaeological record. The Bay Area was a place of incredible language diversity, with seven languages spoken at the time of Spanish settlement in 1776. The diverse ecosystem of the Bay and surrounding lands supported an average of three to five persons per square mile, but reached 11 persons per square mile in the North Bay. At the time of Spanish contact, the people of the Bay Area were organized into local tribelets that defended fixed territories under independent leaders. Typically, individual Bay Area tribelets included 200 to 400 people distributed among three to five semi-permanent villages, within territories measuring approximately 10.00 to 12.00 miles in diameter.<sup>7</sup>

Native American occupation and use of the greater Bay Area, including the regions comprising modern Walnut Creek and Pleasant Hill, extended over 5,000 to 7,000 years and may be longer. Early archaeological investigations in Central California were conducted at sites located in the Sacramento-San Joaquin Delta region. The first published account documents investigations in the Lodi and Stockton area. The initial archaeological reports typically contained descriptive narratives with more systematic approaches sponsored by Sacramento Junior College in the 1930s. At the same time, University of California at Berkeley excavated several sites in the lower Sacramento Valley and Delta region, which resulted in recognizing archaeological site patterns based on a variation of intersite assemblages. Research during the 1930s identified temporal periods in Central California prehistory and provided an initial chronological sequence. In 1939, researcher Jeremiah Lillard of Sacramento Junior College noted that each cultural period led directly to the next and that influences spread from the Delta region to other regions in Central California.<sup>8</sup> In the late 1940s and early 1950s, researcher Richard Beardsley of the University of California Berkeley documented similarities in artifacts among sites in the San Francisco Bay region and the Delta and refined his findings into a cultural model that ultimately became known as the Central California Taxonomic System (CCTS). This system proposed a uniform, linear sequence of cultural succession.<sup>9</sup>

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<sup>1</sup> Kroeber, A.L. 1925. Handbook of the Indians of California. Bulletin 78. Bureau of American Ethnology. Washington, D.C. Smithsonian Institution.

<sup>2</sup> Beardsley, R.K. 1948. "Cultural Sequences in Central California Archaeology." American Antiquity 14:1-28.

<sup>3</sup> Bennyhoff, J. 1950. Californian Fish Spears and Harpoons. Berkeley: University of California Anthropological Records 9(4):295-338.

<sup>4</sup> Chertkoff J.L. and K.K. Chertkoff. 1984. The Archaeology of California. Menlo Park: Stanford University Press.

<sup>5</sup> Moratto, M.J. 1984. California Archaeology. San Diego: Academic Press.

<sup>6</sup> Jones, T.L. and Kathryn A. Klar. 2007. California Prehistory. Lanham: AltaMira Press; Rowman & Littlefield Publishers, Inc.

<sup>7</sup> Milliken, Randall et.al. 2007. Punctuated Culture Change in the San Francisco Bay Area, In Prehistoric California: Colonization, Culture, and Complexity, edited by T.L. Jones and K.A. Klar, 99–124. AltaMira Press.

<sup>8</sup> Lillard, J.B. and W.K. Purves. 1936. The Archaeology of the Deer Creek-Cosumnes Area, Sacramento Co., California. Sacramento. Sacramento Junior College, Department of Anthropology Bulletin 1.

<sup>9</sup> Beardsley, R.K. 1948. Cultural Sequences in Central California Archaeology. American Antiquity 14:1–28.

To address some of the flaws in the CCTS system, Fredrickson (1973) introduced a revision that incorporated a system of spatial and cultural integrative units. Fredrickson separated cultural, temporal, and spatial units from each other and assigned them to six chronological periods: Paleo-Indian (12000 to 8000 years Before Present [BP]); Lower, Middle and Upper Archaic (8000 to 1500 BP), and Emergent (Upper and Lower, 1500 to 250 BP). The suggested temporal ranges are similar to earlier horizons, which are broad cultural units that can be arranged in a temporal sequence.<sup>10</sup> In addition, Fredrickson defined several patterns—a general way of life shared within a specific geographical region. These patterns include:

- Windmill Pattern or Early Horizon (4500 to 3500 BP )
- Berkeley Pattern or Middle Horizon (3500 to 1500 BP)
- Augustine Pattern or Late Horizon (1500 to 250 BP)

Brief descriptions of these temporal ranges and their unique characteristics follow.

*Windmill Pattern or Early Horizon (4500 to 3500 BP)*

Characterized by the Windmill Pattern, the Early Horizon was centered in the Cosumnes district of the Delta and emphasized hunting rather than gathering, as evidenced by the abundance of projectile points in relation to plant processing tools. Additionally, atlatl, dart, and spear technologies typically included stemmed projectile points of slate and chert but minimal obsidian. The large variety of projectile point types and faunal remains suggests exploitation of numerous types of terrestrial and aquatic species.<sup>11</sup> Burials occurred in cemeteries and intra-village graves. These burials typically were ventrally extended, although some dorsal extensions are known with a westerly orientation and a high number of grave goods. Trade networks focused on acquisition of ornamental and ceremonial objects in finished form rather than on raw material. The presence of artifacts made of exotic materials such as quartz, obsidian, and shell indicate an extensive trade network that may represent the arrival of Utian populations into Central California. Also indicative of this period are rectangular Haliotis and Olivella shell beads, and charmstones that usually were perforated.<sup>12</sup>

*Berkeley Pattern or Middle Horizon (3500 to 1500 BP)*

The Middle Horizon is characterized by the Berkeley Pattern, which displays considerable changes from the Early Horizon. This period exhibited a strong milling technology represented by minimally shaped cobble mortars and pestles, although metates and manos were still used. Dart and atlatl technologies during this period were characterized by non-stemmed projectile points made primarily of obsidian. Fredrickson suggests that the Berkeley Pattern marked the eastward expansion of Miwok groups from the Bay Area. Compared with the Early Horizon, there is a higher proportion of grinding implements at this time, implying an emphasis on plant resources rather than on hunting. Typical burials occurred within the village with flexed positions, variable cardinal orientation, and some cremations. As noted by Lillard, Heizer, and Fenenga, the practice of spreading ground ochre over the burial was common at this time. Grave goods during this period are generally sparse and

<sup>10</sup> Fredrickson, D.A. 1973. Early Cultures of the North Coast of the North Coast Ranges, California. PhD dissertation.

<sup>11</sup> Bennyhoff, J. 1950. Californian Fish Spears and Harpoons. University of California Anthropological Records 9(4):295–338.

<sup>12</sup> Ragir, S.R. 1972. The Early Horizon in Central California Prehistory. Contributions of the University of California Archaeological Research Facility 15. Berkeley, CA.

typically include only utilitarian items and a few ornamental objects. However, objects such as charmstones, quartz crystals, and bone whistles occasionally were present, which suggest the religious or ceremonial significance of the individual.<sup>13</sup> During this period, larger populations are suggested by the number and depth of sites compared with the Windmill Pattern. According to Fredrickson, the Berkeley Pattern reflects gradual expansion or assimilation of different populations rather than sudden population replacement and a gradual shift in economic emphasis.<sup>14</sup>

#### *Augustine Pattern or Late Horizon (1500 to 250 BP)*

The Late Horizon is characterized by the Augustine Pattern, which represents a shift in the general subsistence pattern. Changes include the introduction of bow and arrow technology; and most importantly, acorns became the predominant food resource. Trade systems expanded to include raw resources as well as finished products. There are more baked clay artifacts and extensive use of Haliotis ornaments of many elaborate shapes and forms. According to Moratto, burial patterns retained the use of flexed burials with variable orientation, but there was a reduction in the use of ochre and widespread evidence of cremation.<sup>15</sup> Judging from the number and types of grave goods associated with the two types of burials, cremation seems to have been reserved for individuals of higher status, whereas other individuals were buried in flexed positions. Johnson suggests that the Augustine Pattern represents expansion of the Wintuan population from the north, which resulted in combining new traits with those established during the Berkeley Pattern.<sup>16</sup>

Central California research has expanded from an emphasis on defining chronological and cultural units to a more comprehensive look at settlement and subsistence systems. This shift is illustrated by the early use of burials to identify mortuary assemblages and more recent research using osteological data to determine the health of prehistoric populations. Although debate continues over a single model or sequence for California, the general framework consisting of three temporal/cultural units is generally accepted, although the identification of regional and local variation is a major goal of current archaeological research.

#### *The Bay Miwok*

The Bay Area consisted of several independent tribal territories during the prehistoric and early historic periods. Native Peoples largely spoke dialects of five distinct languages: Costanoan (Ohlone), Bay Miwok, Plains Miwok, Patwin, and Wappo. The project site lies at intersection of several of these groups at different periods in time, however it was largely within the ethnographic and historic boundaries of Bay Miwok speakers, who occupied the eastern portions of Contra Costa County, from Walnut Creek east to the Sacramento-San Joaquin Delta, including the northern slopes of Mount Diablo. Several bands of Miwok are associated with the area, the closest being the Saclan, whose territory extended through the hills east of present-day Rossmore, Lafayette, Moraga, and Walnut Creek.

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<sup>13</sup> Lillard, J.B., R.F. Heizer, and F. Fenenga. 1939. An Introduction to the Archaeology of Central California. Sacramento Junior College, Department of Anthropology, Bulletin 2.

<sup>14</sup> Fredrickson, D.A. 1973. Early Cultures of the North Coast of the North Coast Ranges, California. PhD dissertation.

<sup>15</sup> Moratto, M.J. 1984. California Archaeology. San Diego: Academic Press.

<sup>16</sup> Johnson, J.J. 1976. Archaeological Investigations at the Blodgett Site (CA-SAC-267), Sloughhouse Locality, California. Report to the U.S. National Parks Service, Western Regional Office, Tucson, Arizona.

The foremost political unit of the Miwok was the tribelet; an independent and sovereign nation with defined boundaries and control over the natural resources within those boundaries. As noted by Levy, villages are described as headquarters of a localized patrilineage, and this social organization was further prescribed by individual lineage memberships in a moiety. With the notable exceptions of tobacco and dogs, the Eastern Miwok largely lacked cultivated plants or domesticated animals.<sup>17</sup>

All plant foods were naturally occurring and gathered by hand, the most important of which were the seven varieties of acorn used by the Eastern Miwok people. Acorns were usually allowed to ripen and fall off the tree on their own where they would then be collected in large numbers in burden baskets. The acorns were then shelled, placed on an acorn anvil, and struck with a hammer stone to expose the meats within. These meats were ground into a fine meal using a bedrock mortar and cobblestone pestle. The meal was then sifted into a tightly coiled basket, and several applications of water were run through the basket to leach the bitter tannin from the meal. Once dry, the meal could be used in the preparation of acorn soup, mush, biscuits, and bread. For this reason, access to acorns; clean, moving water; and exposed bedrock was particularly important to the Eastern Miwok. These resources were available in the general project area.

Watercourses were often a focus of prehistoric occupation in Central California with Native American groups exploiting a variety of ecological niches. While this area was within an environmentally advantageous area for Native Americans located between the resources of the San Francisco Bay margin and the foothills and nearby creeks, no ethnographic settlements are known to have been located within or adjacent to the project site. Prehistoric site types recorded in the general Pleasant Hill area consist of lithic scatters, quarries, habitation sites (including burials), bedrock mortars or other milling feature sites, petroglyph sites, and isolated burial sites. However, none of these resources or the habitation mounds mapped by Whitney in 1873 or recorded by Nels C. Nelson in 1912 are located on or near the project site.

### ***Regional Historic Background***

#### ***Spanish Period***

The Eastern Miwok were first contacted by the Spanish exploring expeditions of the Sacramento-San Joaquin Valley in the second part of the 18<sup>th</sup> century. The first Spanish expeditions through the project site were led by Captain Pedro Fages and Father Juan Crespi in 1772. Juan Bautista de Anza also led an expedition in 1776. Expedition campsites have been mapped in the vicinity of Interstate 680, State Route 242, and Willow Pass Road. According to Hart, Spanish colonial policy from 1769-1821 was directed at the founding of presidios, missions, and secular towns, with the land held by the Crown. The depletion of the coastal populations resulted in Spanish missionaries shifting to conversion of the interior peoples. The Bay Miwok were the first of the Eastern Miwok to be missionized, and were generally not willing converts. Mission baptismal records show that Native Americans went to Mission San Francisco de Assisi, founded in 1776, and Mission San Jose, founded in 1797. Their traditional lifeways apparently disappeared by 1810 due to disruption by Euro American diseases, a declining birth rate, and the impact of the mission system. For the most part, the former hunters-gatherers were

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<sup>17</sup> Levy, R. 1978. Costanoan. In California, edited by Robert F. Heizer, pp. 485–495. Handbook of North American Indians, Vol. 8. W.G. Sturtevant, general editor, Smithsonian Institution, Washington D.C.

transformed into agricultural laborers and worked with former neighboring groups such as the Esselen, Yokuts, and Miwok. After secularization of the missions between 1834 and 1836, some Native Americans returned to traditional religious and subsistence practices while others labored on Mexican ranchos. Thus, multi-ethnic Native American communities grew up in and around the area and provided informant testimony to ethnologists from 1878 to 1933.<sup>18</sup>

#### *Mexican Period*

The Mexican Period, 1821 to 1848, was marked by secularization and division of mission lands among the *Californios* as land grants, termed ranchos. During this period, Mariano G. Vallejo assumed authority of Sonoma Mission and established a rapport with the Native Americans who were living there. In particular, Vallejo worked closely with Chief Solano, a Patwin who served as Vallejo's spokesperson when problems with Native American tribes arose. The large rancho lands often were worked by Native Americans who were used as forced labor.

Shoup and Milliken state that mission secularization removed the social protection and support on which Native Americans had come to rely. It exposed them to further exploitation by outside interests, often forcing them into a marginal existence as laborers for large ranchos.<sup>19</sup> Following mission secularization, the Mexican population grew as the Native American population continued to decline. Euro-American settlers began to arrive in California during this period and often married into Mexican families, becoming Mexican citizens, which made them eligible to receive land grants. In 1846, on the eve of the U.S.-Mexican War (1846 to 1848), the estimated population of California was 8,000 non-natives and 10,000 Native Americans. However, these estimates have been debated. Cook suggests the Native American population was 100,000 in 1850; the U.S. Census of 1880 reports the Native American population as 20,385.<sup>20</sup>

#### *Gold Rush and American Expansion Period*

In 1848, James W. Marshall discovered gold at Coloma in modern-day El Dorado County, which started the gold rush into the region that forever altered the course of California's history. The arrival of thousands of gold seekers in the territory contributed to the exploration and settlement of the entire State. By late 1848, approximately four out of five men in California were gold miners. The California Gold Rush originated along the reaches of the American River and other tributaries to the Sacramento River, and Hangtown, present-day Placerville, became the closest town offering mining supplies and other necessities for the miners in El Dorado County. Gold subsequently was found in the tributaries to the San Joaquin River, which flowed north to join the Sacramento River in the great Delta east of San Francisco Bay.<sup>21</sup>

By 1864, California's Gold Rush had essentially ended. The rich surface and river placers were largely exhausted and the miners either returned to their homelands or stayed to start new lives in California. After the California Gold Rush, people in towns such as Jackson, Placerville, and Sonora

<sup>18</sup> Hart, J.D. 1987. *A Companion to California* (New edition, revised and expanded). University of California Press, Berkeley, California.

<sup>19</sup> Shoup, L.H., and R.T. Milliken. 1999. *Inigo of Rancho Posolmi: The Life and Times of a Mission Indian*. Novato, CA. Ballena Press.

<sup>20</sup> Cook, S.F. 1976. *The Population of the California Indians 1769–1970*. University of California Press. Berkeley, California.

<sup>21</sup> Robinson, W.W. 1948. *Land in California*. Berkeley, CA: University of California Press. Cook, S.F. 1976. *The Population of the California Indians 1769–1970*. University of California Press. Berkeley, California.

turned to other means of commerce, such as ranching, agriculture, and timber production. With the decline of gold mining, agriculture and ranching came to the forefront in the State's economy. California's natural resources and moderate climate proved well suited for cultivation of a variety of fruits, nuts, vegetables, and grains.<sup>22</sup>

### ***History of the City of Antioch***

The City of Antioch was established by William Wiggin Smith and Joseph Horton Smith—twin brothers from Maine who arrived in California in July 1849—who were carpenters by trade as well as ordained ministers. Seeking a new life out West, the two brought their families and began working as carpenters at the New York of the Pacific (now the City of Pittsburg, approximately 4.50 miles west of Antioch). Dr. John Marsh offered the brothers two quarter-sections of land located on his Los Maganos Rancho.

The brothers continued to work at the New York of the Pacific while maintaining their newly acquired land, which they had named Smith's Landing. Eventually, the brothers established a restaurant and hotel called the New York House, primarily used by miners and other travelers heading east during the California Gold Rush. In February of 1850, Joseph died of malaria, leaving his brother with both quarter sections of land.

In summer 1851, William Smith received word that a ship of New Englanders landing in San Francisco were looking to establish a colony on the west coast. Eager to attract people onto his land, William met the group of colonists in San Francisco and offered them parcels on which to build homes and create a community. Approximately half of the colonists accepted the offer, while several others headed east to strike it rich in the gold-bearing areas of the Sierra foothills. The name of Antioch was finally chosen for the new community at the 1851 Fourth of July picnic held at William Smith's house. It was named after biblical city of Antioch in Syria. Over the years, Antioch slowly grew with the local grazing, agriculture, and mining industries and remained a key city within Contra Costa County.

Coal was discovered in 1859 in the hills south of Antioch by William Israel. Coal formed the first substantial industry aside from farming and dairying in the region. Coal mining towns south of Antioch began to form in the 1860s as coal veins were discovered. Coal provided a readily available source of energy needed to fuel foundries, mills, ferries, steamers, and other developing industries in the Bay Area. Noah Norton opened the Black Diamond Mine, located below Mount Diablo, and the town of Nortonville in 1861. The Black Diamond Mines District included the settlement of Judsonville. The contribution of the Black Diamond Mines to the development of industry and bulk transportation to the San Francisco Bay Area can be said to have had a significant effect on the whole development of California industry and commerce as a whole by providing a reliable and inexpensive fuel. Four million tons of coal were extracted from the Mount Diablo Coalfields during its history. The coal extracted from the Mount Diablo Coalfields was a soft, bituminous, low-quality coal. When a harder, higher-quality coal, anthracite, was discovered in Washington and Oregon in 1902, the Mount Diablo Coalfield mines and towns were abandoned.

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<sup>22</sup> Beck, Warren A., and Y.D. Haase. 1974. *Historical Atlas of California* (Third Printing 1977). University of Oklahoma Press, Norman, Oklahoma.

Until around 1960, Contra Costa County had the highest population along the shoreline of San Francisco and Suisun bays. The valleys of Central Contra Costa County remained dominated by farming and ranching. Prior to the San Francisco-Oakland Bay Bridge opening in 1936 and the Caldecott Tunnel opening in 1937, residential commuter suburbs in the eastern Bay Area did not exist. After World War I, residential commuter suburbs began to expand around late nineteenth-century communities. From these communities came the towns and cities that make up Contra Costa County today. Dramatic growth in population for central and east Contra Costa County has continued since the 1970s.

### 3.5.3 - Methodology and Results

Two prior Cultural Resource Studies, each consisting of a records search, pedestrian survey, testing and evaluation of existing cultural resources for the project site were conducted by Tom Origer & Associates in 2015, and by ECORP in 2017.<sup>23</sup> Given that the records search data was over 2 years old, FCS conducted updated records searches in 2019, the results of which are detailed below.

#### Updated Records Searches to Identify Existing Cultural Resources

##### *Northwest Information Center*

On June 13, 2019, FCS conducted an updated records search at the NWIC. According to the records search conducted for the proposed project, two previously recorded historical-era cultural resources are present on the property (P-07-000008 and P-07-000010). P-07-000008, the Judsonville town site, and P-07-000010, the ranch complex, were recorded in 1990 and 1994 by William Self Associates<sup>24,25</sup> and evaluated by ECORP in 2017. In total, 13 previous studies have been conducted within a 0.5-mile radius of the project site and three include the project site. Table 3.5-1 lists the recorded cultural resources within 0.5-mile of the project site, and Table 3.5-2 lists previous investigations within 0.5-mile of the project site.

**Table 3.5-1: Recorded Cultural Resources within 0.5-mile Radius of Project Site**

Resource No.	Resource Name/Description	Date Recorded
P-07-000008	Judsonville Site/Historic site	1993
P-07-000009	Historic Site, location of a former school house associated with the Judsonville town	1993
P-07-000010	Ranch complex/Historic site	1993
P-07-000011	Historic District/townsite and mining-related features	1993
Source: NWIC Records Search. June 13, 2019.		

<sup>23</sup> Fuerstenberg, T. and M. Webb 2017a. Test Program Results and Evaluation for Cultural Resources in The Ranch in Antioch Project, Contra Costa County, California (ECORP).

<sup>24</sup> William Self Associates, Inc. 1990. Cultural Resources Assessment report for Lone Tree Valley Feasibility Study, Contra costa County, California. Document S-13420 on file at the Northwest Information Center, Rohnert Park.

<sup>25</sup> William Self Associates, Inc. 1994. Archaeological Survey Report, Future Urban Area 1, Antioch, Contra Costa County, California. Document S-16916 on file at the Northwest Information Center, Rohnert Park.

**Table 3.5-2: Previous Investigations within a 0.5-mile Radius of the Project Site**

Report No.	Report Title/Project Focus	Author	Date
S-9776	Parcels “A” and “B” North American Development Corporation	David Chavez	1988
S-011826	Montezuma I and II Cultural Resources	Dorothea J. Theodoratus, et. al.	1980
S-016916	Archaeological Survey Report, Future Urban Area 1, Antioch, Contra Costa County, California	Ann Samuelson, Carolyn Rice, and William Self Associates	1994
S-006927	Archaeological Reconnaissance of the Horse Valley Estates, Contra Costa County, California	Suzanne Baker	1984
S-010509	Class III Intensive Archaeological Field Reconnaissance of the Kellogg Reformulation Unit, Highline Canal Alternative, Contra Costa and Alameda Counties	Peter M. Jensen, Alfred Farber, and Neal Neuenschwander	1986
S-020481	Cultural Resources Assessment, Roddy Ranch Golf Course Project, Antioch, Contra Costa County, California	Carrie D. Wills	1998
S-020635	Cultural Resources Assessment Report, Horse Valley and Adjoining Lands, Contra Costa County, California	William Self Associates	1998
S-023349	Archival Literature Search and On-Site Archaeological Surface Reconnaissance of an Approximately 20 Acre Parcel of Land, Located Near the Intersection of Dallas Ranch Road and Mount Hamilton Drive, City of Antioch, Contra Costa County, California	Allen G. Pastron	1994
S-029930	Request for SHPO Review of FCC Undertaking, Black Diamond Mine/CA-2786C, Antioch City Water Tank, Empire Mine Road, Antioch.	Lorna Billat	2005
S-035237	New Tower (“NT”) Submission Packet FCC Form 620, Metro PCS, Black Diamond, SF-19000A	Lorna Billat	2008
S-036781	Cultural Resources Records Search Results for T-Mobile USA Condiate [sic] BA21252 (Kaiser Antioch), 4501 Sand Creek Road Antioch, Contra Costa County, California	Wayne Bonner	2009
S-044221	A Cultural Resources Survey for the Aviano Farms Development near Antioch, Contra Costa County, California	Virginia Hagensieker Janine M. Origer	2013
S-049302	Phase I Cultural Resources Evaluation for the Black Diamond Mines Regional Preserve Trails Expansion Project, Contra Costa County, California	Juliana Quist and Allen G. Pastron	2017

Source: NWIC Records Search. June 13, 2019.

Non-confidential NWIC Records Search Results may be found in Appendix E-2.

### **Native American Heritage Commission Record Search**

In July of 2015, Tom Origer & Associates contacted the NAHC in order to determine whether any sacred sites or TCRs are listed on its Sacred Lands File for the project site. The NAHC responded with negative results. At the recommendation of the NAHC, Tom Origer & Associates reached out to Katherine Erolinda Perez of the Ohlone Indian Tribe, and the Trina Marine Ruano for additional information about the project site but did not receive a response.

In compliance with SB 18 (defined in Government Code § 65300 *et seq.* and in Government Code § 65450 *et seq.*), a project notification letter was distributed to the Native American Contacts provided by the NAHC who may have knowledge of Native American cultural resources in the immediate project area. The letters were distributed on October 16, 2017, explaining the nature of the project and soliciting comments and any additional information the individuals might have regarding cultural resources in the project area. To date, none of the tribes have responded. In addition, FCS sent out SB 18 letters to tribal representatives on December 20, 2019. No responses have been received to date.

In 2018, the City of Antioch sent notification letters by mail pursuant to AB 52 as part of the previous EIR. In June 2019, FCS contacted the NAHC to determine whether any sacred sites had been added to the project site or within 0.5-mile. A response was received on June 13, 2019, indicating that the Sacred Lands File failed to indicate the presence of Native American cultural resources on-site or in areas adjacent to the project site. The NAHC included a list of eight tribal representatives available for consultation. FCS assisted the City of Antioch in drafting notification letters including a project description and map that were sent to all tribal representatives on August 29, 2019, pursuant to AB 52. Consultation is ongoing; however, no tribes have responded to date.

### **Cultural Resources Pedestrian Surveys and Field Testing**

A field survey was conducted on July 14, 2015, by Tom Origer & Associates for the project site. Flatter portions of the site were examined by walking in transects approximately 30 meters wide, using a zig-zag pattern to assure complete coverage. Steeper portions of the site were inspected by walking widely spaced transects while searching for archaeologically sensitive locations (e.g. flats, springs, rock outcrops, historic features). Hoes were used to clear small patches of vegetation, as needed, so the ground could be inspected throughout the project site. Subsurface soils were inspected where burrowing animals had deposited spoils. Visibility was good in most of the area.

No prehistoric materials were found within the project site. Given the good ground visibility within the majority of the project site and the lack of prehistoric site indicators found, it is unlikely that prehistoric resources are present. However, the project site contains two historic-era sites: the Judsonville town site (P-07-000008) and the ranch complex (P-07-000010).

The Judsonville town site (P-07-000008), is the location of the former 19<sup>th</sup>-century coalfield community that contains a well pit, a depression with historic-era glass, a large oval depression with historical

material, and a hand dug cave. The cave was previously documented by William Self Associates, Inc.<sup>26</sup> as being associated with the site, but it was outside the current property boundary. In addition to the artifacts noted in the “ovular depression,” a variety of historical materials was noted on the surface of the site. The site record has been updated to expand the limits of the sites to include an additional depression containing historical-era glass fragments on the surface. The community of Judsonville is associated with the Empire Mine<sup>27,28</sup> which represents an important period in the economic development of the area.

The ranch complex (P-07-000010), was built post-1939 (based on aerial photographs) and is currently a working ranch. There are two sheds on-site, in addition to a modular home with two accompanying sheds, a raised chicken coop, and aviary. Also found on-site are two barns, one of which currently houses machinery, a concrete foundation with a water spigot, a former well, a brick square with an opening in the center, and a circular depression. A wooden bridge that spans Sand Creek is located west of the barn. A debris pile of burned wood, metal sheets and barbed wire is just north of the bridge. The chicken coops were built by the current resident or her father, and are thus, modern. Many of the recent additions to the property were made by the current resident and her father.

The Cultural Resources Survey prepared by Tom Origer & Associates recommended archaeological test excavations to better define the boundaries of both historic sites and aid in the evaluation of both for eligibility to the California Register of Historical Resources (CRHR) and National Register of Historic Places (NRHP). In 2017, archaeological test excavations by the ECORP field team attempted to clarify the depth and nature of cultural deposits of the Judsonville town site boundaries.

In one of the two small depressions, excavation yielded historic artifacts to a depth of 60 centimeters. The finds reflected domestic and architectural uses. Combining the results of the test excavations and archival research guided by a townsite research design, the report’s authors concluded that site P-07-000008 (Judsonville) is eligible for the NRHP as an individual resource and as a contributing resource of the Black Diamond Mines Historic District under Criterion A for its association with 19<sup>th</sup> century coal mining in California. The authors also assessed eligibility under Criterion D for the site’s demonstrated ability to yield important information regarding historic townsite establishment and evolution, as well as for commercial behavior and domestic behavior themes. As the townsite is eligible for the NRHP, it is automatically eligible for the CRHR.

The ECORP field team also conducted test excavations at the ranch complex, P-07-000010. Back in 1993, William Self Associates assessed the ranch complex buildings as not eligible for the NRHP or CRHR. However, no record of concurrence from the State Historic Preservation Officer could be located. Nonetheless, ECORP staff concurred with the earlier William Self Associates assessment. As the ranch complex also included historic archaeological deposits and features, the test excavations conducted by the ECORP field team yielded information relevant to several research domains: household composition

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<sup>26</sup> William Self Associates, Inc. 1994. Archaeological Survey Report, Future Urban Area 1, Antioch, Contra Costa County, California. Document S-16916 on file at the Northwest Information Center, Rohnert Park.

<sup>27</sup> Parent, T., and K. Terhune. 2009. Black Diamond Mines Regional Preserve: Images of America. Arcadia Publishing.

<sup>28</sup> William Self Associates, Inc. 1994. Archaeological Survey Report, Future Urban Area 1, Antioch, Contra Costa County, California. Document S-16916 on file at the Northwest Information Center, Rohnert Park.

and lifeways; economic strategies and; site structure and land use patterns. The authors concluded that even though the historic site is an active, working ranch, Locus 1 (original settlement) of the ranch complex is eligible for the NRHP under Criterion D because of its archaeological information potential and therefore, automatically eligible for the CRHR under Criterion 4.

Copies of both reports are confidential and not subject to public disclosure in order to protect the resources.

## **Summary of Existing Cultural Resources at the Project Site**

### ***Historic Architectural Resources***

Based on the Cultural Resources Survey prepared by Tom Origer & Associates and ECORP, two known historic resources are located within the project site boundaries. As described previously, the project site contained two historic-era sites, the Judsonville town site (P-07-000008) and Locus 1 of the ranch complex (P-07-000010).

### ***Archaeological Resources***

No known archaeological sites or burial sites are located within the project site boundaries. However, as noted in Table 3.5-1, two known resources are located within 0.5-mile of the project site in addition to the two known historic sites within the project site boundaries. Archaeological resources are often obscured from view and can be uncovered during construction activities.

### ***Tribal Cultural Resources***

No TCRs have been recorded within the project site, and none have been identified through a search of the NAHC Sacred Lands File and subsequent outreach to Native American representatives conducted pursuant to AB 52. Correspondence with the NAHC and Tribal Representative may be found in Appendix E.

## **3.5.4 - Regulatory Framework**

### **Federal**

#### ***National Historic Preservation Act***

The National Historic Preservation Act of 1966 (NHPA), as amended, established the NRHP, which contains an inventory of the nation's significant prehistoric and historic properties. Under 36 Code of Federal Regulations 60, a property is recommended for possible inclusion on the NRHP if it is at least 50 years old, has integrity, and meets one of the following criteria:

- It is associated with significant events in history, or broad patterns of events.
- It is associated with significant people in the past.
- It embodies the distinctive characteristics of an architectural type, period, or method of construction; or it is the work of a master or possesses high artistic value; or it represents a significant and distinguishable entity whose components may lack individual distinction.
- It has yielded, or may yield, information important in history or prehistory.

Certain types of properties are usually excluded from consideration for listing in the NRHP, but they can be considered if they meet special requirements in addition to meeting the criteria listed above. Such properties include religious sites, relocated properties, graves and cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years.

### ***Archaeological Resources Protection Act***

The Archaeological Resources Protection Act (ARPA) amended the Antiquities Act of 1906 (16 United States Code [USC] 431–433) and set a broad policy that archaeological resources are important to the nation and should be protected, and requires special permits before the excavation or removal of archaeological resources from public or Indian lands. The purpose of ARPA is to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites that are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals having collections of archaeological resources and data that were obtained before October 31, 1979.

### ***American Indian Religious Freedom Act***

The American Indian Religious Freedom Act (AIRFA) established federal policy to protect and preserve the inherent rights of freedom for Native groups to believe, express, and exercise their traditional religions. These rights include, but are not limited to access to sites, use and possession of sacred objects, and freedom to worship through ceremonies and traditional rites.

### ***Native American Graves Protection and Repatriation Act***

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 sets provisions for the intentional removal and inadvertent discovery of human remains and other cultural items from federal and tribal lands. It clarifies the ownership of human remains and sets forth a process for repatriation of human remains and associated funerary objects and sacred religious objects to the Native American groups claiming to be lineal descendants or culturally affiliated with the remains or objects. It requires any federally funded institution housing Native American remains or artifacts to compile an inventory of all cultural items within the museum or with its agency and to provide a summary to any Native American tribe claiming affiliation.

## **State**

### ***CEQA Guidelines Section 15064.5(a)—CEQA Definition of Historical Resources***

California Environmental Quality Act (CEQA) Guidelines Section 15064.5(a), in Title 14 of the California Code of Regulations, defines a “historical resource” as:

- (1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources.
- (2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, shall be

presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

- (3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources.
- (4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code), does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code Sections 5020.1(j) or 5024.1.

Therefore, under the CEQA Guidelines, even if a resource is not included on any local, State, or federal register, or identified in a qualifying historical resources survey, a lead agency may still determine that any resource is a historical resource for the purposes of CEQA if there is substantial evidence supporting such a determination. A lead agency must consider a resource to be historically significant if it finds that the resource meets the criteria for listing in the CRHR.

Archaeological and historical sites are protected pursuant to a wide variety of State policies and regulations, as enumerated in the Public Resources Code Section 5024.1. Cultural resources are recognized as nonrenewable resources and receive additional protection under the Public Resources Code and CEQA.

***CEQA Guidelines Section 15064.5(a)(3)—California Register of Historical Resources Criteria***

As defined by CEQA Guidelines, Section 15064.5(a)(3), a resource shall be considered historically significant if the resource meets the criteria for listing on the CRHR. The CRHR and many local preservation ordinances have employed the criteria for eligibility to the NRHP as a model (see criteria described above under the description of the NHPA), since the NHPA provides the highest standard for evaluating the significance of historic resources. A resource that meets NRHP criteria is clearly significant. In addition, a resource that does not meet NRHP standards may still be considered historically significant at a local or State level.

***Public Resources Code 5024.1(c)—Definition of Historically Significant***

CEQA Guidelines Section 15064.5(a)(3)(A)-(D), in Title 14 of the California Code of Regulations, also defines as resource as "historically significant" if the resource:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

### ***CEQA Guidelines—Effects on Archaeological Resources***

CEQA Guidelines state that a resource need not be listed on any register to be found historically significant. CEQA Guidelines direct lead agencies to evaluate archaeological sites to determine if they meet the criteria for listing in the CRHR. If an archaeological site is a historical resource, in that it is listed or eligible for listing in the CRHR, potential adverse impacts to it must be considered. If an archaeological site is considered not to be an historical resource but meets the definition of a “unique archeological resource” as defined in Public Resources Code Section 21083.2, then it would be treated in accordance with the provisions of that section.

### ***CEQA Guidelines Section 15064.5(d)—Effects on Human Remains***

Native American human remains and associated burial items may be significant to descendant communities and/or may be scientifically important for their informational value. They may be significant to descendant communities for patrimonial, cultural, lineage, and religious reasons. Human remains may also be important to the scientific community, such as prehistorians, epidemiologists, and physical anthropologists. The specific interest of some descendant groups in ancestral burials is a matter of law for some groups, such as Native Americans (CEQA Guidelines § 15064.5(d); Public Resources Code [PRC] § 5097.98). CEQA and other State regulations regarding Native American human remains provide the following procedural requirements to assist in avoiding potential adverse effects on human remains within the contexts of their value to both descendant communities and the scientific community:

- When an initial study identifies the existence or probable likelihood that a project would affect Native American human remains, the lead agency is to contact and work with the appropriate Native American representatives identified through the NAHC to develop an agreement for the treatment and disposal of the human remains and any associated burial items (CEQA Guidelines § 15064.5(d); PRC § 5097.98).
- If human remains are accidentally discovered, the county coroner must be contacted. If the county coroner determines that the human remains are Native American, the coroner must contact the NAHC within 24 hours. The NAHC must identify the most likely descendant (MLD) to provide for the opportunity to make recommendations for the treatment and disposal of the human remains and associated burial items.
- If the MLD fails to make recommendations within 24 hours of notification or the project Applicant rejects the recommendations of the MLD, the Native American human remains and associated burial items must be reburied in a location not subject to future disturbance within the project site (PRC § 5097.98).
- If potentially affected human remains or a burial site may have scientific significance, whether or not it has significance to Native Americans or other descendent communities, then under CEQA, the appropriate mitigation of effect may require the recovery of the scientific information of the remains/burial through identification, evaluation, data recovery, analysis, and interpretation (CEQA Guidelines § 15064.5(c)(2)).

**Health and Safety Code Section 7050.5**

Section 7050.5 of the Health and Safety code sets forth provisions related to the treatment of human remains. As the code states, “every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor”<sup>29</sup> except under circumstances as provided in Section 5097.99 of the Public Resources Code, which provides guidelines for the treatment of human remains found in locations other than a dedicated cemetery including responsibilities of the coroner.

**Public Resources Code Section 5097.98**

Section 5097.98 provides protocol for the discovery and treatment of human remains. It states that “when the commission receives notification of a discovery of Native American human remains from a county coroner pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, it shall immediately notify persons believed to be most likely descended from the deceased Native American.”<sup>30</sup> It also sets forth provisions for descendants’ preferences for treatment of the human remains and what should be done if the commission is unable to identify a descendant.

**California Assembly Bill 52—Effects on Tribal Cultural Resources**

AB 52 was signed into law on September 25, 2014, and provides that any public or private “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.” TCRs include “[s]ites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are eligible for inclusion in the California Register of Historical Resources or included in a local register of historical resources.” Under prior law, TCRs were typically addressed under the umbrella of “cultural resources,” as discussed above. AB 52 formally added the category of “tribal cultural resources” to CEQA, and extends the consultation and confidentiality requirements to all projects, rather than just projects subject to general plan or specific plan amendments.

The parties must consult in good faith, and consultation is deemed concluded when either: (1) the parties agree to measures to mitigate or avoid a significant effect on a tribal cultural resource (if such a significant effect exists); or (2) when a party concludes that mutual agreement cannot be reached. Mitigation measures agreed upon during consultation must be recommended for inclusion in the environmental document. AB 52 also identifies mitigation measures that may be considered to avoid significant impacts if there is no agreement on appropriate mitigation. Recommended measures may include:

- Preservation in place
- Protecting the cultural character and integrity of the resource
- Protecting the traditional use of the resource
- Protecting the confidentiality of the resource
- Permanent conservation easements with culturally appropriate management criteria.

<sup>29</sup> California Legislative Information. 2019. Health and Safety Code—HSC. Website: [http://leginfo.ca.gov/faces/codes\\_displaySection.xhtml?lawCode=HSC&sectionNum=7050.5](http://leginfo.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=7050.5). July 12, 2019

<sup>30</sup> Find Law. 2019. California Code, Public Resources Code—PRC § 5097.98. Website: <https://codes.findlaw.com/ca/public-resources-code/prc-sect-5097-98.html>. Accessed July 12, 2019.

## Local

### **City of Antioch General Plan**

#### *Resource Management Element*

- **Objective 10.9.1:** Preserve archaeological, paleontological, and historic resources within the Antioch Planning Area for the benefit and education of future residents.
- **Policy 10.9.2a:** Require new development to analyze and therefore avoid or mitigate impacts to archaeological, paleontological, and historic resources. Require surveys for projects having the potential to impact archaeological, paleontological, or historic resources. If significant resources are found to be present, provide mitigation in accordance with applicable CEQA guidelines and provisions of the California Public Resources Code.
- **Policy 10.9.2b:** If avoidance and/or preservation in the location of any potentially significant cultural resources is not possible, the following measures shall be initiated for each impacted site:
  - A participant-observer from the appropriate Indian Band or Tribe shall be used during archaeological testing or excavation in the project site.
  - Prior to the issuance of a grading permit for the project, the project proponent shall develop a test-level research design detailing how the cultural resource investigation shall be executed and providing specific research questions that shall be addressed through the excavation program. In particular, the testing program shall characterize the site constituents, horizontal and vertical extent, and if possible, period of use. The testing program shall also address the California Register and National Register eligibility of the cultural resource and make recommendations as to the suitability of the resource for listing on either Register. The research design shall be submitted to the City of Antioch for review and comment. For sites determined, through the Testing Program, to be ineligible for listing on either the California or National Register, execution of the Testing Program will suffice as mitigation of project impacts to this resource.
  - After approval of the research design and prior to the issuance of a grading permit, the project proponent shall complete the excavation program as specified in the research design. The results of this excavation program shall be presented in a technical report that follows the City's outline for Archaeological Testing. The Test Level Report shall be submitted to the City for review and comment. If cultural resources that would be affected by the project are found ineligible for listing on the California or National Register, test-level investigations will have depleted the scientific value of the sites and the project can proceed.
  - If the resource is identified as being potentially eligible for either the California or National register and project designs cannot be altered to avoid impacting the site, a Treatment Program to mitigate potential project effects shall be initiated. A Treatment Plan detailing the objectives of the Treatment Plan shall contain specific, testable hypotheses relative to the sites under study and shall attempt to address the potential of the sites to address these research questions. The treatment Plan shall be submitted to the City for review and comment.
  - After approval of the Treatment Plan, the Treatment Plan for affected, eligible sites shall be initiated. Typically, a Treatment Program involves excavation of a statistically representative sample of the site to preserve those resource values that qualify the site as being eligible for the California or National Register. At the conclusion of the excavation or research program,

the Treatment Report shall be developed. This data recovery report shall be submitted to the City for review and comment.

- **Policy 10.9.2c:** When existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor site grading activities with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate reposition, and file a report with the Community Development Department documenting any paleontological resources found during site grading.
- **Policy 10.9.2d:** As a standard condition of approval for new development projects, require that if unanticipated cultural or paleontological resources are encountered during grading, alteration of earth materials in the vicinity of the find be halted until a qualified expert has evaluated the find and recorded identified cultural resources.
- **Policy 10.9.20e:** Preserve historic structures and ensure that alterations to historic buildings and their immediate settings are compatible with the character of the structure and surrounding neighborhood.

### 3.5.5 - Impacts and Mitigation Measures

The section below evaluates the proposed project's potential to impact cultural resources. Determinations of impacts to cultural resources were based on information from the Cultural Resources Survey prepared by Tom Origer & Associates, and the Test Program Results report and Cultural Resource Inventory report prepared by ECORP, and updated records searches and consultation performed by FCS. Mitigation measures are identified, as necessary.

#### Significance Criteria

According to 2019 CEQA Guidelines Appendix G, to determine whether impacts related to cultural resources are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Cause a substantial adverse change in the significance of a historical resource as pursuant to Section 15064.5?
- b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?
- c) Disturb any human remains, including those interred outside of formal cemeteries?
- d) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?
- e) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object

with cultural value to a California Native American tribe, and that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1?

## Approach to Analysis

This evaluation focuses on whether the proposed project would impact historic, archaeological, or TCRs.

The historic resources impact analysis is based on information collected from record searches at the NWIC, additional archival research, pedestrian surveys, and information from a historic architectural assessment of existing properties more than 45 years in age located within the project boundaries. The archeological and human remains impact analysis is based on information collected from record searches at the NWIC, the NAHC, additional archival research, pedestrian surveys, and outreach to Native American representatives identified by the NAHC as potentially having an interest in or additional information on the project site.

Both direct and indirect effects of project implementation were considered for this analysis. Direct impacts are typically associated with construction and/or ground-disturbing activities, and have the potential to immediately alter, diminish, or destroy all or part of the character and quality of archaeological resources and/or historic architecture. Indirect impacts are typically associated with post-project implementation conditions that have the potential to alter or diminish the historical setting of a cultural resource (generally historic architecture) by introducing visual intrusions on existing historical structures that are considered undesirable.

## Impacts Evaluation

### *Historic Resources*

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<b>Impact CUL-1:</b>	<b>The project could cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.</b>
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### *Construction/Operation*

Prehistoric or historic Native American cultural resources were not identified in the project site. However, as previously discussed, two historical resources are located within the project site: P-07-000008, Judsonville town site; and P-07-000010, the ranch complex. Under Section 15064.5 of the CEQA Guidelines, a resource is considered “historically significant” if the resource meets one or more of the CRHR criteria outlined in the Regulatory Context section above. A resource must be considered historically significant and possess “integrity” in order to qualify for listing in the NRHP and CRHR.

The 2017 ECORP assessment found both the Judsonville town site and Locus 1 of the ranch complex to be significant historic resources per CEQA Guidelines Section 15064.5. Thus, the proposed project has the potential to impact known resources on-site and to encounter previously unknown buried resources. Therefore, the proposed project could have a significant impact related to damaging or destroying such a historic cultural resource. However, implementation of Mitigation Measure (MM) CUL-1 would reduce impacts to a less than significant level by ensuring the historic resources are preserved to the maximum extent possible and not impaired.

**Level of Significance Before Mitigation**

Potentially significant impact.

**Mitigation Measures****MM CUL-1      Avoid and Preserve in Place Existing Cultural Resources**

Historic Resources P-07-000008 and Locus 1 of site P-07-000010 are eligible historic resources that shall be avoided during project construction and preserved in-place. Prior to tentative map approval and the issue of grading permits, if development of the proposed project would occur in areas identified as containing portions of site P-07-000008 and/or Locus 1 of site P-07-000010, and the sites cannot be avoided or preserved, the City, the United States Army Corps of Engineers (USACE), and an Archaeologist meeting the Secretary of the Interior's professional standards for historical archaeology shall coordinate as necessary to determine the appropriate course of action, which could include data recovery, scientific analysis, and professional museum curation of material.

Prior to grading, the Applicant shall hire a qualified Archaeologist to determine the existing boundaries of each historic site and mark the boundaries of each site with protective Environmentally Sensitive Area (ESA) fencing. Any project related ground disturbance occurring within 50 feet of the established boundary of either site shall be monitored by the Archaeologist.

**Level of Significance After Mitigation**

Less Than Significant

**Archaeological Resources**

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<b>Impact CUL-2:</b>	<b>The project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.</b>
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**Construction/Operation**

As previously mentioned, the Judsonville town site and Locus 1 are known on-site historical resources that contain artifacts. The proposed project would include mass grading and soil disturbance in the areas that contain artifacts, and areas that may contain previously unknown buried artifacts. Therefore, construction and development activities related to the proposed project could cause a substantial adverse change in the significance of unique archaeological or paleontological resources.

The 2017 ECORP testing program demonstrated substantial subsurface deposits exist at each of the historic sites identified within the project site, as discussed above, and also determined the boundaries and extent of each deposit. A potential exists for subsurface historic-period archaeological deposits beyond the established boundaries of the sites and elsewhere in the project site. Due to the presence of alluvium along Sand Creek, and given the likelihood of prehistoric archaeological sites located along perennial waterways, a potential exists for buried prehistoric archaeological sites in the project site.

Because artifacts have been found on-site, and because the potential exists for previously undiscovered resources to be unearthed and potentially damaged or destroyed during construction of the site impacts to archaeological resources could be potentially significant. However, implementation of MM CUL-2 would ensure impacts would be reduced to a less than significant level.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

**MM CUL-2      Stop Construction Upon Encountering Archeological Materials**

In the event that subsurface archeological features or deposits, including locally darkened soil (“midden”), that could conceal cultural deposits, animal bone, obsidian and/or mortars are discovered during earth-moving activities, all work within 100 feet of the resource shall be halted, and the Applicant shall consult with a qualified Archeologist. Representatives of the City and the qualified Archeologist shall coordinate to determine the appropriate course of action. All significant cultural materials recovered shall be subject to scientific analysis and professional museum curation.

If a Native American site is discovered, the evaluation process shall include consultation with the appropriate Native American representatives.

If a Native American archeological, ethnographic, or a spiritual resource is discovered, all identification and treatment shall be conducted by qualified Archeologists who are certified by the Society of Professional Archeologists and/or meet the federal standards as stated in the Code of Federal Regulations (36 Code of Federal Regulations [CFR] Part 61), and are Native American representatives, who are approved by the local Native American community as scholars of the cultural traditions.

In the event that no such Native American is available, persons who represent tribal governments and/or organizations in the locale in which resources could be affected shall be consulted. If historic archeological sites are involved, all identified treatment is to be carried out by qualified historical Archeologists, who shall meet Register of Professional Archeologists or 36 Code of Regulations Part 61 requirements.

The Applicant shall retain the services of a professional Archaeologist to educate the construction crew that will be conducting grading and excavation at the project site. The education shall consist of an introduction to the geology of the project site and the kinds of archeological and/or Native American resources that may be encountered, as well as what to do in case of a discovery.

***Level of Significance After Mitigation***

Less Than Significant

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**Human Remains**

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**Impact CUL-3:**        **The project could disturb human remains, including those interred outside of formal cemeteries.**

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**Construction/Operation**

The proposed project would include mass grading and soil disturbance in the areas that contain artifacts, and areas that may contain previously unknown buried human remains. Known human cemeteries or burials have not been detected through subsurface excavation or field surveys. However, there is always the possibility that subsurface construction activities associated with the project, such as trenching and grading, could potentially damage or destroy previously undiscovered human remains. This represents a potentially significant impact related to human remains.

In the unlikely event human remains are discovered, implementation of MM CUL-3 would require that work is halted and the County Coroner is called to make a determination as to the nature of the remains and to confirm next steps regarding contacting the NAHC and appropriate tribal representatives. In addition, in the event of the accidental discovery or recognition of any human remains, CEQA Guidelines Section 15064.5(d)—Effects on Human Remains, Health and Safety Code Section 7050.5, and Public Resources Code Sections 5097.94 and Section 5097.98 must be followed. Requirements of these regulations are described above in Regulatory Setting. Therefore, with implementation of MM CUL-3 and compliance with aforementioned CEQA Guidelines, direct and indirect impacts related to disturbance of human remains would be less than significant with mitigation.

**Level of Significance Before Mitigation**

Potentially Significant

**Mitigation Measures****MM CUL-3        Stop Construction Upon Encountering Human Remains**

If during the course of construction activities there is accidental discovery or recognition of any human remains, the following steps shall be taken:

1. There shall be no further excavation or disturbance within 100 feet of the remains until the County Coroner is contacted to determine if the remains are Native American and if an investigation of the cause of death is required. If the coroner determines the remains to be Native American, the coroner shall contact the Native American Heritage Commission (NAHC) within 24 hours, and the NAHC shall identify the person or persons it believes to be the most likely descendant (MLD) of the deceased Native American. The MLD may make recommendations to the landowner or the person responsible for the excavation work within 48 hours, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in Public Resources Code Section 5097.98.
2. Where the following conditions occur, the landowner or his or her authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity either in accordance with the

recommendations of the most likely descendant or on the project site in a location not subject to further subsurface disturbance:

- The NAHC is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 48 hours after being notified by the commission.
- The descendant identified fails to make a recommendation.
- The landowner or his or her authorized representative rejects the recommendation of the descendant, and mediation by the NAHC fails to provide measures acceptable to the landowner.

### ***Level of Significance After Mitigation***

Less Than Significant

### ***Listed or Eligible Tribal Cultural Resources***

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<b>Impact CUL-4:</b>	<b>The project could cause a substantial adverse change in the significance of a Tribal Cultural Resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k).</b>
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### ***Construction/Operation***

In compliance with AB 52 and SB 18, notification letters were distributed to representatives of the Native American tribes that have expressed interest in development projects in the City and may have additional information regarding TCRs on the project site, respectively. The City has not received any responses to the letters to date. As previously mentioned, Sacred Lands File failed to indicate the presence of Native American cultural resources on-site.

Nonetheless, given similar environmental factors of the proposed project site to known Native American resource sites within Contra Costa County, a moderate potential exists for unrecorded Native American resources to be discovered within the project site. Thus, the possibility exists that construction of the proposed project could directly or indirectly disturb or destroy a unique tribal cultural resource if previously unknown TCR are uncovered during grading or other ground-disturbing activities. Consequently, a significant impact to TCRs could occur. However, implementation of MM CUL-2 would ensure any TCRs uncovered during construction would not be adversely affected. Therefore, construction impacts related to previously listed or eligible TCRs would be less than significant with mitigation.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

Implement MM CUL-2

### ***Level of Significance After Mitigation***

Less Than Significant

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**Lead Agency Determined Tribal Cultural Resources**

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**Impact CUL-5:** The project would not cause a substantial adverse change in the significance of a tribal cultural resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1.

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**Construction/Operation**

The City of Antioch, in its capacity as Lead Agency, has not identified or determined any known TCRs to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. Further, in May 2019, the City sent a letter to the NAHC in an effort to determine whether any sacred sites are listed on its Sacred Lands File for the project site. A response was received on June 13, 2019, indicating the search returned negative results for TCRs in the project site vicinity, and recommended contacting tribal representatives for additional information. The NAHC included a list of eight tribal representatives available for consultation. To ensure that Native American knowledge and concerns over potential TCRs that could be affected by the proposed project are addressed, a letter containing project information and requesting any additional information was sent to each of the seven tribal representatives on August 29, 2019. To date, no response has been received from any of the listed tribal representatives. As such, construction activities would not cause a substantial adverse change in the significance of a tribal cultural resource because the City has never made a significance determination.

**Level of Significance**

Less Than Significant

**3.5.6 - Cumulative Impacts****Historic Resources**

The geographic scope of the cumulative historic resources analysis is the project site and within a 0.5-mile radius of the project site. As discussed previously, the Judsonville town site and Locus 1 are considered significant historic resources per Section 15064.5. Thus, the proposed project has the potential to impact known resources on-site and to encounter previously unknown buried resources. However, implementation of MM CUL-1 would reduce impacts to a less than significant level.

Although there is the possibility that previously undiscovered historic resources could be encountered by subsurface earthwork activities associated with the cumulative projects, the implementation of construction mitigation measures would ensure that undiscovered historic resources are not adversely affected by cumulative project-related construction activities, which would prevent the destruction or degradation of potentially significant historic resources. Given the low potential for disruption, and the comprehensiveness of mitigation measures that would apply to the cumulative projects, the project, in conjunction with other planned and approved projects, would result in a less than significant impact related to historical resources.

**Archeological Resources**

Archaeological resource impacts tend to be localized, because the integrity of any given resource depends on what occurs only in the immediate vicinity around that resource, such as disruption of

soils; therefore, in addition to the project site itself, the area near the project site would be the area most affected by project activities (generally within a 0.5-mile radius).

Construction activities associated with development projects in the project vicinity may have the potential to encounter undiscovered archaeological resources. These projects would be required to mitigate for impacts through compliance with applicable federal and State laws governing archaeological resources. Although there is the possibility that previously undiscovered resources could be encountered by subsurface earthwork activities associated with the cumulative projects, the implementation of construction mitigation measures would ensure that undiscovered archaeological resources are not adversely affected by cumulative project-related construction activities, which would prevent the destruction or degradation of potentially significant archaeological resources. Given the low potential for disruption, and the comprehensiveness of mitigation measures that would apply to the cumulative projects, the project, in conjunction with other planned and approved projects, would result in a less than significant impact related to archaeological resources.

### **Tribal Cultural Resources**

While some cultural resources may have regional significance, the resources themselves are site-specific, and impacts to them are project-specific. For example, impacts to a subsurface archeological find at one project site are generally not made worse by impacts from another project to a cultural resource at another site. Rather, the resources and the effects upon them are generally independent. A possible exception to this would be a cultural resource that represents the last known example of its kind or is part of larger cultural resources, such as a single building along an intact historic Main Street. For such a resource, cumulative impacts, and the contribution of the proposed project to them, may be cumulatively significant.

Prehistoric, historic, and Native American cultural resources are unique and non-renewable resources. As noted previously, the potential exists for unknown subsurface archaeological and Native American cultural resources to be unearthed during site excavation. Accordingly, the proposed project could damage or destroy cultural or tribal resources particular to the project site. However, mitigation measures have been included in this EIR to ensure that any potential impacts to cultural or tribal resources would be reduced to less-than-significant levels.

The possibility exists that future development within the City and other regional development could adversely affect cultural and tribal resources. Though implementation of cumulative projects could collectively impact cultural or tribal resources in the geographic area, the proposed project's incremental impact when added to other past, present, and reasonably foreseeable future actions would be minor. In addition, the City of Antioch General Plan EIR has anticipated the buildout of the proposed project with urban land uses and has ensured that the anticipated projects would not result in substantial adverse cumulative impacts on cultural resources.

Known cultural resources are located on the project site and the potential exists for cultural or tribal resources to be located on the project site; however, as stated above, mitigation measures included in this EIR would reduce any associated impacts to less-than-significant levels. In addition, similar to

the proposed project, all other projects in the City would be subject to the same regulations and standards required to ensure a less-than-significant impact to cultural and tribal resources.

Therefore, the project's contribution to a combined effect on cultural resources would be considered less than significant.

***Level of Cumulative Significance***

Less Than Significant

## 3.6 - Geology and Soils

### 3.6.1 - Introduction

This section describes existing conditions related to geology and soils in the region and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to geology and soils that could result from implementation of the proposed project. Information included in this section is based, in part, on the project-specific geotechnical exploration<sup>1</sup> and Paleontological Records Search<sup>2</sup> included in Appendix F as well as the City of Antioch General Plan and General Plan Environmental Impact Report (EIR). No public comments were received during the EIR public scoping period related to geology and soils.

### 3.6.2 - Environmental Setting

#### Geologic Setting

##### ***Contra Costa County Area***

Contra Costa County is situated in the Coast Ranges geomorphic province of California. The Coast Ranges have experienced a complex geological history characterized by Late Tertiary folding and faulting that has resulted in a series of northwest-trending mountain ranges and intervening valleys. Bedrock in the Coast Ranges consists of igneous, metamorphic, and sedimentary rocks that range in age from Jurassic to Pleistocene. The present physiography and geology of the Coast Ranges are the result of deformation and deposition along the tectonic boundary between the North American plate and the Pacific plate. Plate boundary fault movements are largely concentrated along the well-known fault zones, which in the area include the San Andreas Fault, Hayward Fault, and Calaveras Fault, as well as other lesser-order faults.

The geology of Contra Costa County is dominated by several northwest trending fault systems that divide the County into large blocks of rock. For example, the Briones Hills are bounded by the Hayward Fault on the west and elements of the Franklin-Calaveras Fault system on the east. Within a particular block the rock sequence consists of: (1) a basement complex of broken and jumbled pre-Tertiary sedimentary, igneous and metamorphic rocks; (2) a section of younger Tertiary sedimentary rocks and some volcanic rocks (flows and tuffs) that locally intertongue with and overlie the sedimentary section; and, (3) surficial deposits including stream alluvium, colluvium (slopewash deposits at the foot of steeper slopes), slides, alluvial fans, and Bay Plain deposits.<sup>3</sup>

##### ***City of Antioch***

The Lowland Area of Antioch is underlain by alluvium younger than 2 million years old, consisting mainly of unconsolidated floodplain deposits with sand, silt, gravel, and clay irregularly interstratified.<sup>4</sup>

<sup>1</sup> ENGEO Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.

<sup>2</sup> Kenneth Finger, PhD. 2019. The Ranch Residential Project. Paleontological Records Search. June.

<sup>3</sup> Contra Costa County General Plan 2025. Section 10.6, Seismic Hazards. Page 10-4, Local Geology.

<sup>4</sup> City of Antioch. 2003. General Plan EIR. Section 4.5, Geologic and Seismic Hazards. Page 4.5-1.

The Upland Area consists of tilted sedimentary rocks ranging in age from Upper Cretaceous (65 million years old) to Holocene (11,000 years old). The following geologic units are present: Unit D sandstone, Deer Valley sandstone of Coburn, Lower Unit E siltstone, Upper Unit E siltstone, surficial deposits, Cierbo sandstone, Domingene Formation, Meganso Formation, Neroly sandstone, and Markley Formation.<sup>5</sup>

Black Diamond area coal deposits (within the Domingene Formation) are located in the southwestern portions of the Planning Area. Past mining activities followed two principal coal seams to a depth of more than 550 feet below ground surface (bgs). Records of the Black Diamond Coal Company indicate that, by 1890, more than 85 percent of the total reserve at the Black Diamond region had been mined.

Access tunnel and ventilation shafts constructed as part of the mining operation were generally located at the head of ravines, where erosion had naturally worn away portions of the hillside overlying the coal. Most access tunnels were well documented, and have been relocated and sealed over the years. Ventilation shafts, however, are more numerous and their locations are poorly documented. These shafts were typically sealed through construction of timber floors placed about 10 feet bgs and then backfilled to grade during closure of the mine. The timber floors deteriorate over time, and ventilation shafts can collapse creating soil slumps. The remaining mine openings provide a connection to a labyrinth of subsurface tunnels that can be subject to cave-ins and unexpected dropoffs.

Pockets of poisonous carbon monoxide or methane gas may also be present. These mines present a possible risk of collapse and surface subsidence that could compromise the integrity of buildings developed overlying the mine tunnels. Ultimately, the potential for mine collapse is dependent upon the type of mining that was conducted, the size and dimensions of the mined area, the bearing strength of the materials bounding the mined area, depth of mining, and the length of time since the mining was discontinued.<sup>6</sup>

### **Project Site**

The project site is located in the Coast Ranges geomorphic province on the eastern side of Mount Diablo, where bedrock is mapped as Tertiary Eocene and Oligocene age marine sedimentary rock. The bedrock in the area generally consists of interbedded sandstone and claystone that vary from friable to strong. Bedrock structures in the area generally strike to the northwest and dip at an inclination of 15 to 30 degrees to the northeast.

### **Soils**

Corrosive soils are a geologic hazard, because they react with concrete and ferrous metals, which can cause damage to foundations and buried pipelines. Expansive soils are a geologic hazard, because an increase in soil volume can exert forces on structures and, thus, damage building foundations, walls, and floors. In general, areas are susceptible to differential settlement if underlain by compressible

<sup>5</sup> City of Antioch. 2003. General Plan EIR. Section 4.5, Geologic and Seismic Hazards. Page 4.5-3.

<sup>6</sup> City of Antioch. 2003. General Plan EIR. Section 4.5, Geologic and Seismic Hazards. Page 4.5-4.

sediments, such as poorly engineered artificial fill or loose unconsolidated alluvial sediments. When these soils dry out and shrink, structural damage can occur.

### **Contra Costa County Area**

The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) has characterized the majority of native, undisturbed soils in the Contra Costa County area according to three soil associations: (1) nearly level to strongly sloping, somewhat excessively drained to very poorly drained soils on Valley fill, basin, low terraces, flood plains, and alluvial fans; (2) nearly level, poorly drained and very poorly drained soils on the Delta, flood plains, and saltwater marshes and tidal flats; and (3) nearly level to very steep, moderately well drained to excessively drained soils on terraces and mountainous uplands.<sup>7</sup>

The NRCS divides all soil types into four categories based on the potential to produce runoff. Type A soils have the lowest runoff potential and typically have high infiltration rates. Type D soils have the highest runoff potential and typically have low infiltration rates and/or are shallow.

### **City of Antioch**

The City of Antioch consists of two general topographic areas: the Lowland Area and the Upland Area. The Lowland Area generally corresponds to the estuarine and flatland soils, and the Upland Area includes hillside soils.

The Lowland Area includes the generally level terrain and wetlands adjacent to the San Joaquin River and low-lying areas to the south. Elevations in the Lowland Area generally range from near sea level to approximately 100 feet above mean sea level and contain slopes that range from 0 to 15 percent. The Lowland Area of Antioch is underlain by alluvium that is less than 2 million years old, and consists mainly of unconsolidated floodplain deposits with sand, silt, gravel, and clay irregularly interstratified. The Upland Area comprises moderate to steeply sloping hills, and is generally located south of the Lowland Area. The Upland Area of the City consists primarily of tilted sedimentary rocks that range in age from Upper Cretaceous (65 million years old) to Holocene (11,000 years old).

Specifically, the City of Antioch is comprised of the Capay-Rincon soil association, which consists of nearly level to strong sloping, moderately well drained and well-drained clays and clay loams on valley fill.<sup>8</sup>

### **Project Site Vicinity**

Remnants of a former mining town, known as Judsonville, are located near the western border of the project site along Empire Mine Road. Various debris piles were observed near the Judsonville site, including approximately 5 feet of artificial fills. Given that records pertaining to the placement of these artificial fills could not be found, the artificial fills are, therefore, considered to be non-engineered, which can be highly variable and potentially compressible. Previous mining operations associated with Judsonville occurred to the east of the project site and were used to mine coal. Two

<sup>7</sup> United States Department of Agriculture (USDA), Natural Resources Conservation Service. General Soil Map of Contra Costa County, California. Website: [https://www.nrcs.usda.gov/Internet/FSE\\_MANUSCRIPTS/california/CA013/0/maps/gsm.pdf](https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/california/CA013/0/maps/gsm.pdf). Accessed February 14, 2019.

<sup>8</sup> Ibid.

additional historic coal mines, the Teutonia Mine and the Israel Mine, are located to the south of the project site; all were active during the mid-1860s.

### **Project Site**

The majority of the project site contains soils composed of Capay clay (CaA), Rincon clay loam (RbA), Altamont clay (AbE), and Altamont-Fontana complex (AcF). These soils have a low soil permeability and have a very low potential for water to infiltrate the soil.

The Geotechnical Exploration Report (Appendix F) notes that potentially expansive lean clay soils were observed near the surface in all of the soil test pits. These soils have moderate to high shrink/swell potential with variations in moisture content. Expansive soils can shrink or swell and cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Successful performance of structures on expansive soils requires specific procedures for grading and for establishment of building foundations.

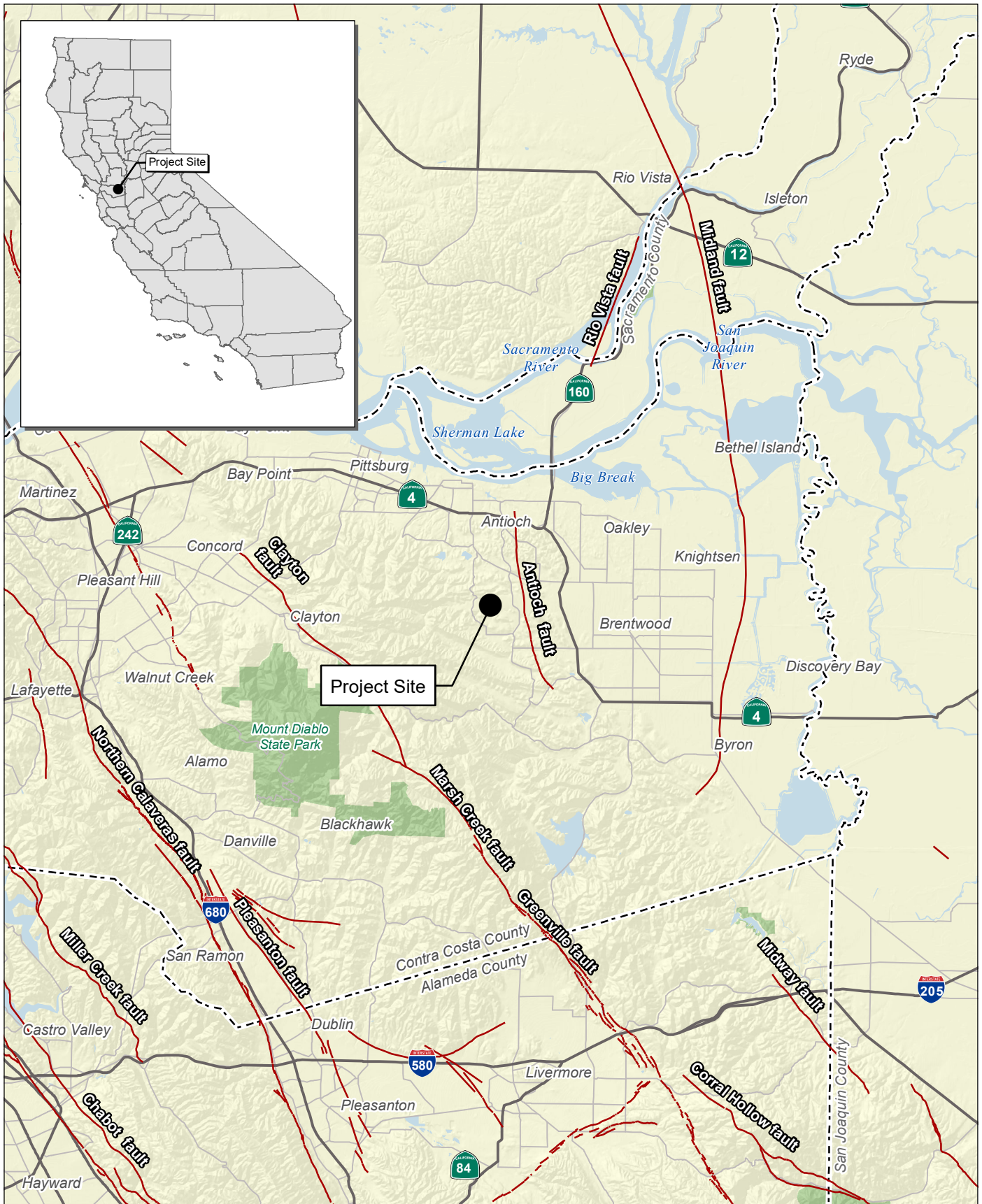
Soils most susceptible to liquefaction are clean, loose, saturated, uniformly graded, fine-grained sands. Although some silty and clayey sand soils were encountered on-site, the Geotechnical Exploration Report concludes that site soils have a low potential for liquefaction, given the soil density and the high fine-grained material content that was observed in the test pits.

### **Seismicity**

The term “seismicity” describes the effects of seismic waves that are radiated from an earthquake fault in motion. While most of the energy released during an earthquake results in the permanent displacement of the ground, as much as 10 percent of the energy may dissipate immediately in the form of seismic waves. Seismicity can result in seismic-related hazards such as fault rupture, ground shaking, and liquefaction faults formed in rocks when stresses overcome the internal strength of the rock. Fault rupture occurs when movement on a fault breaks through to the surface and can result in damage to infrastructure and persons. Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking. Strong ground shaking from an earthquake can result in damage, with buildings shifted off their foundations and underground pipes broken. Liquefaction occurs when an earthquake causes ground shaking that result in saturated soil to lose shear strength, deform, and act like a liquid. When liquefaction occurs, it can result in ground failure that can result in damage to roads, pipelines, and buildings.

### **Contra Costa County Area**

Exhibit 3.6-1 depicts the location of fault lines in Contra Costa County. Seismic risk is assumed by every occupant and developer in Contra Costa County, because the County is within an area of high seismicity; the San Francisco Bay Area (Bay Area) has been impacted by more than 10 severe earthquakes during historic time.



Source: Census 2000 Data, The CaSIL, California Geological Survey.

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Miles

## Exhibit 3.6-1 Regional Fault Map

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Contra Costa County has been subjected to numerous seismic events, originating both on faults within the County and in other parts of the region. Six major Bay Area earthquakes have occurred since 1800 that affected the County, and at least two of the faults that produced them run through or into the County. These earthquakes and the originating faults include the 1836 and 1868 earthquakes on the Hayward Fault, and the 1861 earthquake on the Calaveras Fault. Two earthquakes, in 1838 and 1906, originated on the San Andreas Fault, west of the County near San Francisco or to the south. One earthquake, with two major shocks, occurred in 1872 that caused some damage in the County and was centered north of Contra Costa County in the Vacaville-Winters area of Solano County. These latter events likely occurred on a thrust fault and are not known to have been accompanied by surface fault rupture. A smaller earthquake, centered near Collinsville in Solano County on a fault of uncertain identity, occurred in 1889. Table 3.6-1 lists active faults located in the vicinity of the project site.

**Table 3.6-1: Location and Approximate Magnitude of Potential Earthquakes on Bay Area Faults**

Causative Fault	Distance and direction from project site	Magnitude
Greenville	5 miles to the SW	6.9
Green Valley	11 miles to the W	6.9
Concord	13 miles to the W	5.0–6.0
		6.0–7.0
Calaveras	15 miles to the SE	6.0–7.0
		7.0–7.5
Hayward	24 miles to the SW	6.0–7.0
		7.0–7.5
San Andreas	42 miles to the SW	7.0–8.0
		8.0–8.5
Notes: SW = southwest W = west SE = southeast Source: Contra Costa County Conservation and Development Department estimates. Source: ENGEO Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.		

### City of Antioch

The City of Antioch, located within eastern Contra Costa County, is located within one of the most seismically active regions in the United States. Areas in the vicinity of Antioch have experienced major earthquakes, which can be expected to occur again in the future. There are no active faults within the City of Antioch. However, there are several major faults located within a few miles. The San Andreas Fault, the largest fault of the region, is approximately 45.00 miles west of Antioch.

### **Project Site**

There are no known active faults mapped across the project site,<sup>9</sup> and the project site is not located within an Alquist-Priolo Earthquake Fault Zone.<sup>10</sup> The nearest known active fault surface trace is the Greenville Fault, which is located 5.00 miles southwest from the proposed project site, and the Green Valley Fault located 11.00 miles west of the project site. Portions of the Green Valley Fault are considered seismically active thrust faults; however, since the Green Valley Fault segments are not known to extend to the ground surface, the State of California has not defined Earthquake Fault Hazard Zones around the postulated traces. Active faults within the San Francisco Bay Area capable of producing significant ground shaking at the project site include the Green Valley Fault located 11.00 miles to the west; the Calaveras Fault located 15.00 miles to the southeast; the Hayward Fault located 24.00 miles to the southwest, and the San Andreas Fault located 42.00 miles to the southwest. While the Antioch Fault is located directly east of the site, this fault is not considered active.<sup>11</sup>

### **Slope Disturbance**

Slope disturbance from long-term geologic cycle of uplift, mass wasting, intense precipitation or wind, and gravity can result in slope failure in the form of mudslides and rock fall. The project area is seismically active with known faults; however, the project area does not contain active faults that would cause geologic uplifting. Mass wasting refers to a variety of erosional processes from gradual downhill soil creep to mudslides, debris flows, landslides, and rock fall—processes that are commonly triggered by intense precipitation or wind, which varies according to climactic shifts. Often, various forms of mass wasting are grouped together as landslides, which are generally used to describe the downhill movement of rock and soil. Soil creep is a long-term, gradual downhill migration of soil under the influence of gravity and is generally about a fraction of an inch per year. These soils can creep away downslope sides of foundations and reduce lateral support.

### **Contra Costa County Area**

The major geologic hazards in Contra Costa County, aside from earthquake rupture and direct effects of ground shaking, are unstable hill slopes and reclaimed wetlands and marsh fill areas. Slopes may suffer landslides, slumping, soil slips, and rockslides. Reclaimed wetlands, whether filled or not, experience amplified lateral and vertical movements, which can be damaging to structures, utilities, and transportation routes and facilities.

The Contra Costa County General Plan 2025 recognizes that major slope areas in excess of 26 percent are “not readily developable” and “undevelopable,” recognizing the cost and engineering difficulties of grading steep slopes as well as their inherent unsuitability.<sup>12</sup> Figure 10-6 of the Contra Costa County General Plan 2025 shows Landslide Hazards in Contra Costa County.

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<sup>9</sup> An active fault is defined by the California Geologic Survey as one that has had surface displacement within Holocene time (about the last 11,000 years). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.

<sup>10</sup> ENGEO Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.

<sup>11</sup> An active fault is defined by the California Geologic Survey as one that has had surface displacement within Holocene time (about the last 11,000 years). The State of California has prepared maps designating zones for special studies that contain these active earthquake faults.

<sup>12</sup> Contra Costa County General Plan 2025. Section 10.7, Ground Failure and Landslide Hazards. Page 10-22.

### **City of Antioch**

According to the City of Antioch General Plan EIR, the majority of slopes in the southwest corner of the City are considered unstable or moderately unstable. The eastern portions of Lone Tree Valley across the site have stable to generally stable slopes, and the area north of Lone Tree Valley is generally to marginally stable. Most of the lowlands in the northern area of the City contain stable, generally stable, and marginally stable slopes. The northwest area of the City, including Dow Wetland Preserve, is unstable.<sup>13</sup>

### **Project Site**

Project site elevations vary from approximately 200 feet above mean sea level along Deer Valley Road, to more than 400 feet above mean sea level in the southern hills. Sand Creek divides the site and flows from west to east. Slopes adjacent to the creek generally vary in height between 5 and 40 feet, and can be as steep as 1:1 (horizontal: vertical). Based on topographic and lithologic data, the risk of regional subsidence or uplift, lateral spreading, and landslides is considered to be low to negligible at the project site.<sup>14</sup> The California Department of Conservation's Earthquake Zones of Required Investigation Map identifies the project site as located within a liquefaction zone.<sup>15</sup> However, as noted above in the discussion of soils, the Geotechnical Exploration Report (Appendix F) found a low potential for liquefaction during seismic events, given the soil density and the high fine-grained material content that was observed in the test pits.

### **Paleontological Resources**

#### **Project Site Vicinity**

University of California Museum of Paleontology (UCMP) locality V4719 (Heldorn) yielded late Pleistocene horse (*Equus*) cheek teeth 1.00-mile northwest of the project site. Additionally, 1.00 mile north of that site yielded a mastodon (*Mammuth*) skull fragment of that age was collected at UCMP locality V6650 (Antioch Dam).<sup>16</sup>

#### **Project Site**

No known paleontological resources are located within the project site boundaries.<sup>17</sup>

## **3.6.3 - Regulatory Framework**

### **Federal**

#### **National Earthquake Hazards Reduction Program**

The National Earthquake Hazards Reduction Program (NEHRP) was established by the U.S. Congress when it passed the Earthquake Hazards Reduction Act of 1977, Public Law 95–124. In establishing the NEHRP, Congress recognized that earthquake-related losses could be reduced through improved design and construction methods and practices, land use controls and redevelopment, prediction

<sup>13</sup> City of Antioch. 2003. General Plan EIR. Section 4.5, Geologic and Seismic Hazards. Page 4.5-16.

<sup>14</sup> ENGEO Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.

<sup>15</sup> California Department of Conservation. Seismic Hazards and Zones of Required Investigation. Website: <https://www.conservation.ca.gov/cgs/Pages/Program-SHP/regulatory-hazard-zones.aspx>. Accessed December 11, 2019.

<sup>16</sup> Kenneth Finger, PhD. 2019. The Ranch Residential Project. Paleontological Records Search. June.

<sup>17</sup> Ibid.

techniques and early warning systems, coordinated emergency preparedness plans, and public education and involvement programs. The four basic goals remain unchanged:

1. Develop effective practices and policies for earthquake loss reduction and accelerate their implementation.
2. Improve techniques for reducing earthquake vulnerabilities of facilities and systems.
3. Improve earthquake hazards identification and risk assessment methods, and their use.
4. Improve the understanding of earthquakes and their effects.

Several key federal agencies contribute to earthquake mitigation efforts. There are four primary NEHRP agencies:

- National Institute of Standards and Technology of the Department of Commerce
- National Science Foundation
- United States Geological Survey (USGS) of the Department of the Interior
- Federal Emergency Management Agency (FEMA) of the Department of Homeland Security

Implementation of NEHRP priorities is accomplished primarily through original research, publications, and recommendations to assist and guide State, regional, and local agencies in the development of plans and policies to promote safety and emergency planning.

### ***National Pollutant Discharge Elimination System***

The National Pollutant Discharge Elimination System (NPDES) permit program, authorized by Section 402(p) of the federal Clean Water Act, controls water pollution by regulating point sources, such as construction sites and industrial operations that discharge pollutants into waters of the United States. A Storm Water Pollution Prevention Plan (SWPPP) is required to control discharges from a project site, including soil erosion, to protect waterways. A SWPPP describes the measures or practices to control discharges during both the construction and operational phases of the project. A SWPPP identifies project design features and structural and nonstructural Best Management Practices (BMPs) that will be used to control, prevent, remove, or reduce stormwater pollution from the site, including sediment from erosion.

### ***Society of Vertebrate Paleontology Guidelines***

The Society of Vertebrate Paleontology, a national scientific organization of professional Vertebrate Paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation.<sup>18</sup> Most practicing professional Paleontologists in the nation adhere to the SVP assessment, mitigation, and monitoring requirements, as specifically spelled out in the SVP Standard Guidelines.

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<sup>18</sup> The Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Website: [http://vertpaleo.org/the-Society/Governance-Documents/SVP\\_Impact\\_Mitigation\\_Guidelines.aspx](http://vertpaleo.org/the-Society/Governance-Documents/SVP_Impact_Mitigation_Guidelines.aspx). Accessed December 11, 2019.

## State

### ***Alquist-Priolo Earthquake Fault Zoning Act***

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code [PRC] §§ 2621–2630) was passed in 1972 to provide a Statewide mechanism for reducing the hazard of surface fault rupture to structures used for human occupancy. The main purpose of the Act is to prevent the siting of buildings used for human occupancy across the traces of active faults. It should be noted that the Act addresses the potential hazard of surface fault rupture and is not directed toward other earthquake hazards, such as seismically-induced ground shaking or landslides.

The law requires the State Geologist to identify regulatory zones (known as Earthquake Fault Zones or Alquist-Priolo Zones) around the surface traces of active faults, and to depict these zones on topographic base maps, typically at a scale of 1 inch to 2,000 feet. Earthquake Fault Zones vary in width, although they are often 0.75 mile wide. Once published, the maps are distributed to the affected cities, counties, and state agencies for their use in planning and controlling new or renewed construction. With the exception of single-family wood-frame and steel-frame dwellings that are not part of a larger development (i.e. four units or more), local agencies are required to regulate development within the mapped zones. In general, construction within 50 feet of an active fault zone is prohibited.

### ***Seismic Hazards Mapping Act***

The Seismic Hazards Mapping Act (PRC §§ 2690–2699.6), which was passed in 1990, addresses earthquake hazards other than surface fault rupture. These hazards include strong ground shaking, earthquake-induced landslides, liquefaction, or other ground failures. Much like the Alquist-Priolo Earthquake Fault Zoning Act discussed above, these seismic hazard zones are mapped by the State Geologist to assist local government in the land use planning process. The Act states, “It is necessary to identify and map seismic hazard zones in order for cities and counties to adequately prepare the safety element of their general plans and to encourage land use management policies and regulations to reduce and mitigate those hazards to protect public health and safety.” The Act also states, “Cities and counties shall require, prior to the approval of a project located in a seismic hazard zone, a geotechnical report defining and delineating any seismic hazard.”

### ***California Building Standards Code***

The State of California provides minimum standards for building design through the California Building Standards Code (California Code of Regulations [CCR], Title 24). Where no other building codes apply, Chapter 29 regulates excavation, foundations, and retaining walls. The California Building Standards Code (CBC) applies to building design and construction in the State and is based on the federal Uniform Building Code (UBC) used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with more detailed and/or more stringent regulations.

The State earthquake protection law (California Health and Safety Code § 19100 *et seq.*) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. The intent of the CBC is to enable structures to (i) resist minor earthquakes without damage, (ii) resist moderate earthquakes without structural damage but with some non-structural damage, and (iii) resist

major earthquakes without collapse but with some structural as well as non-structural damage. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16, Structural Design, of the CBC.<sup>19</sup> The CBC identifies seismic factors that must be considered in structural design.

Chapter 18, Soils and Foundations, of the CBC regulates the excavation of foundations and retaining walls, and Appendix Chapter A33 regulates grading activities, including drainage and erosion control and construction on unstable soils, such as expansive soils and areas subject to liquefaction. The CBC contains specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. It also regulates grading activities, including drainage and erosion control (Appendix J). The CBC is updated every 3 years, and the current 2016 CBC took effect January 1, 2017.<sup>20</sup> The 2016 CBC has been adopted by the City of Antioch according to Title 8, Building Regulations, Section 8-1.01, Adoption of the 2016 California Building Code, of the City of Antioch Municipal Code.<sup>21</sup>

## Local

### *City of Antioch General Plan*

The City of Antioch General Plan, adopted in 2003, serves as the overall guiding policy document for the City of Antioch. The following is a list of applicable City of Antioch General Plan objectives and policies most pertinent to the proposed project with respect to geology and soils.

#### *Land Use Element*

- **Policy 4.4.6.7b.s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the Sand Creek Focus Area shall be preserved in open space, exclusive of lands developed for golf course use.
- **Policy 4.4.6.7b.cc:** Mass grading within the steeper portions of the Focus Area (generally exceeding 25 percent slopes) is to be avoided.

#### *Community Image and Design Element*

- **Policy 5.4.14a:** Design hillside development to be sensitive to existing terrain, views, and significant natural landforms and features.
- **Policy 5.4.14b:** Projects within hillside areas shall be designed to protect important natural features and to minimize the amount of grading. To this end, grading plans shall conform to the following guidelines.
  - *Slopes less than 25%:* Redistribution of earth over large areas may be permitted.
  - *Slopes between 25% and 35%:* Some grading may occur, but landforms need to retain their natural character. Split-level designs and clustering are encouraged as a means of avoiding the need for large padded building areas.

<sup>19</sup> California Building Standards Code (CBC). Chapter 16, Structural Design. Website: <https://up.codes/viewer/california/ca-building-code-2016-v2/chapter/16/structural-design#16>. Accessed December 11, 2019.

<sup>20</sup> California Building Standards Code (CBC). Website: <https://up.codes/viewer/california/ibc-2018>. Accessed May 20, 2019.

<sup>21</sup> City of Antioch Municipal Code. Title 8, Building Regulations, Chapter 1, Building Code, Section 8-1.01, Adoption of the 2016 California Building Code. Website: [http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed May 20, 2019.

- *Slopes between 35% and 50%:* Development and limited grading can occur only if it can be clearly demonstrated that safety hazards, environmental degradation, and aesthetic impacts will be avoided. Structures shall blend with the natural environment through their shape, materials and colors. Impact of traffic and roadways is to be minimized by following natural contours or using grade separations. Encouraged is the use of larger lots, variable setbacks and variable building structural techniques such as stepped or post and beam foundations are required.
- *Slopes greater than 50%:* Except in small, isolated locations, development in areas with slopes greater than 50% should be avoided.
- **Policy 5.4.14c:** Manufactured slopes in excess of five vertical feet (5') shall be landform graded. "Landform grading" is a contour grading method which creates artificial slopes with curves and varying slope ratios in the horizontal and vertical planes designed to simulate the appearance of surrounding natural terrain. Grading plans shall identify which slopes are to be landform graded and which are to be conventionally graded.
- **Policy 5.4.14d:** The overall project design/layout of hillside development shall adapt to the natural hillside topography and maximize view opportunities to, as well as from the development.
- **Policy 5.4.14e:** Grading of ridgelines is to be avoided wherever feasible, siting structures sufficiently below ridgelines so as to preserve unobstructed views of a natural skyline. In cases where application of this performance standard would prevent construction of any structures on a lot of record, obstruction of views of a natural skyline shall be minimized through construction techniques and design, and landscaping shall be provided to soften the impact of the new structure.
- **Policy 5.4.14f:** Hillside site design should maintain an informal character with the prime determinant being the natural terrain. This can be accomplished by:
  - Utilizing variable setbacks and structure heights, innovative building techniques, and retaining walls to blend structures into the terrain, and
  - Allowing for different lot shapes and sizes.
- **Policy 5.4.14g:** Buildings should be located to preserve existing views and to allow new dwellings access to views similar to those enjoyed from existing dwellings.
- **Policy 5.4.14h:** Streets should follow the natural contours of the hillside to minimize cut and fill, permitting streets to be split into two one-way streets in steeper areas to minimize grading and blend with the terrain. Cul-de-sacs or loop roads are encouraged where necessary to fit the terrain. On street parking and sidewalks may be eliminated, subject to City approval, to reduce required grading.
- **Policy 5.4.14i:** Clustered development is encouraged as a means of preserving the natural appearance of the hillside and maximizing the amount of open space. Under this concept, dwelling units are grouped in the more level portions of the site, while steeper areas are preserved in a natural state.
- **Policy 5.4.14j:** Project design should maximize public access to canyons, overlooks, and open space areas by:
  - Providing open space easements between lots or near the end of streets or cul-de-sacs; and
  - Designating public pathways to scenic vistas.

- **Policy 5.4.14k:** Permit the use of small retaining structures when such structures can reduce grading, provided that these structures are located and limited in height so as not to be a dominant visual feature of the parcel.
  - Where retaining walls face public streets, they should be faced with materials that help blend the wall into the natural character of the terrain.
  - Large retaining walls in a uniform plane should be avoided. Break retaining walls into elements and terraces, and use landscaping to screen them from view.

#### *Resource Management Element*

- **Policy 10.9.2c:** When existing information indicates that a site proposed for development may contain paleontological resources, a Paleontologist shall monitor site grading activities with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate reposition, and file a report with the Community Development Department documenting any paleontological resources found during site grading.

#### *Environmental Hazards Element*

- **Objective 11.3.2:** Minimize the potential for loss of life, physical injury, property damage, and social disruption from seismic ground shaking and other geologic events.
- **Policy 11.3.2a:** Require geologic soils reports to be prepared for proposed development sites, and incorporate the findings and recommendations of these studies into project development requirements. As determined by the City of Antioch Building Division, a site-specific assessment shall be prepared to ascertain potential ground shaking impacts on new development. The site-specific ground shaking assessment shall incorporate up-to-date data from government sources and may be included as part of any site-specific geotechnical investigation. The site-specific ground shaking assessment shall include specific measures to reduce the significance of potential ground shaking hazards. This site-specific ground shaking assessment shall be prepared by a licensed geologist and shall be submitted to the City of Antioch Building Division for review and approval prior to the issuance of building permits. For the purposes of this policy, “development” applies to new structures and existing structures or facilities that undergo expansion, remodeling, renovation, refurbishment or other modification. This policy does not apply to second units or accessory buildings.
- **Policy 11.3.2g:** Require that engineered slopes be designed to resist seismically-induced failure.
- **Policy 11.3.2h:** Require that parcels overlying both cut and fill areas within a grading operation be over-excavated to mitigate the potential for seismically-induced differential settlement.
- **Policy 11.3.2i:** Limit development in those areas, which, due to adverse geologic conditions, will be hazardous to the overall community and those who will inhabit the area.
- **Policy 11.3.2j:** Require evaluations of potential slope stability for developments proposed within hillside areas, and incorporate the recommendations of these studies into project development and requirements.
- **Policy 11.3.2k:** Require specialized soil reports in areas suspected of having problems with potential bearing strength, expansion, settlement, or subsidence, including implementation of the recommendations of these reports into the project development, such that structures

designed for human occupancy are not in danger of collapse or significant structural damage with corresponding hazards to human occupants. Where structural damage can be mitigated through structural design, ensure that potential soils hazards do not pose risk of human injury or loss of life in outdoor areas of a development site.

- **Policy 11.3.2l:** Where development is proposed within an identified or potential liquefaction hazard area (as determined by the City), adequate and appropriate measures such as (but not limited to) designing foundations in a manner that limits the effects of liquefaction, the placement of an engineered fill with low liquefaction potential, and the alternative siting of structures in areas with a lower liquefaction risk, shall be implemented to reduce potential liquefaction hazards. Any such measures shall be submitted to the City of Antioch Building Division for review prior to the approval of the building permits.
- **Policy 11.3.2m:** As appropriate and necessary to protect public health and safety, abandoned mines shall be placed in natural open space areas, with appropriate buffer areas to prevent unauthorized entry.
- **Policy 11.3.2n:** Within areas of known historic mining activities, site-specific investigations shall be undertaken prior to approval of development to determine the location of any remaining mine openings, the potential for subsidence or collapse, and necessary measures to protect public health and safety, and prevent the collapse or structural damage to structures intended for human occupancy due to mine-related ground failure or subsidence. Such measures shall be incorporated into project approvals.
- **Policy 11.3.2o:** All identified mine openings shall be effectively sealed.
- **Policy 11.3.2p:** Construction of structures for human occupancy shall be prohibited within areas found to have a high probability of surface collapse or subsidence, unless foundations are designed that would not be affected by such surface collapse or subsidence, as determined by site-specific investigations and engineered structural design.
- **Policy 11.3.2q:** The locations of all oil or gas wells on proposed development site shall be identified in development plans. Project sponsors of development containing existing or former oil or gas wells shall submit documentation demonstrating that all abandoned wells have been properly abandoned pursuant to the requirements of the California Department of Conservation Oil, Gas, and Geothermal Resources.

### ***City of Antioch Municipal Code***

#### ***Building and Construction***

City of Antioch Municipal Code Section 8-1.01 adopts the 2016 CBC based on the 2015 International Building Code as the City's Building Code.<sup>22</sup> As such, all new development is required to adhere to its seismic safety standards.

<sup>22</sup> City of Antioch Municipal Code. Title 8, Building Regulations, Chapter 1, Building Code, Section 8-1.01, Adoption of the 2016 California Building Code. Website: [http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed May 20, 2019.

### *Stormwater Control Plan Required*

Because construction activity during land development has the potential to result in pollution of nearby waterways, City of Antioch Municipal Code Section 8-13.01 requires the implementation of stormwater pollution control measures during all construction phases.<sup>23</sup>

## **3.6.4 - Impacts and Mitigation Measures**

### **Significance Criteria**

According to the 2019 California Environmental Quality Act (CEQA) Guidelines, Appendix G Environmental Checklist, to determine whether impacts to geology and soils are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:
  - i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)
  - ii. Strong seismic ground shaking?
  - iii. Seismic-related ground failure, including liquefaction?
  - iv. Landslides?
- b) Result in substantial soil erosion or the loss of topsoil?
- c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?
- d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?
- e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?
- f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

### **Approach to Analysis**

Impacts related to geology and soils were determined by reviewing information contained in the geotechnical exploration prepared for the project site, which is included in Appendix F.

ENGEO, Inc. performed field explorations on August 29, 2019, as part of the Geotechnical Exploration Report. The field exploration included excavation of seven test pits within the historic

<sup>23</sup> City of Antioch Municipal Code. Title 8, Building Regulations, Chapter 13, Storm Water Pollution Control, Section 8-13.01. Website: [http://library.amlegal.com/nxt/gateway.dll/California/antioch/%20cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/%20cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed December 11, 2019.

orchard and homestead. Locations of the explorations were approximate and were estimated using handheld global positioning satellite (GPS) equipment.

An ENGEO, Inc. representative observed the test pit excavation and logged the subsurface conditions at each location. A backhoe was used to excavate the test pits using a 3-foot wide bucket. The type, location, and uniformity of the underlying soil/rock was logged. The maximum depth penetrated by the test pits was 4.25 feet.

The test pit logs present descriptions and graphically depict the subsurface conditions encountered. Field logs were used to develop the report logs found in Appendix A of the Geotechnical Exploration Report. Previous geotechnical reports and historical geologic maps were also reviewed.

Additional evaluations of potential geologic and soil impacts of the proposed project were based on review of available documentation, including the City of Antioch General Plan; USGS “Shake Map” webpage; the USDA NRCS Web Soil Survey; and Association of Bay Area Governments, California Geological Survey, and USGS data and publications.

Impacts to paleontological resources were determined by reviewing the Paleontological Records Search prepared for the project site by Consulting Paleontologist, Kenneth Finger, PhD. Dr. Finger performed a records search on the UCMP database for the project site.

## Impact Evaluation

### *Earthquakes*

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<b>Impact GEO-1:</b>	<b>The proposed project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury or death involving:</b>
	<b>i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.</b>
	<b>ii) Strong seismic ground shaking.</b>
	<b>iii) Seismic-related ground failure, including liquefaction.</b>
	<b>iv) Landslides.</b>

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### *Construction/Operation*

#### *Ground Rupture*

Based on the project-specific geotechnical exploration (Appendix F) prepared for the project site, the potential for ground rupture is considered unlikely. The California Division of Mines and Geology has not identified any active faults within the project site. Additionally, the site is not located within an Alquist-Priolo Earthquake Fault Zone, and surface evidence of faulting was not observed during site reconnaissance. Although portions of the Green Valley Fault were identified 11.00 miles west of the project site, the fault does not extend to the ground surface and therefore, is not considered to be active by the State of California. Ground rupture occurring at the site is considered to be unlikely.

### *Strong Seismic Ground Shaking*

There is potential for considerable ground shaking at the project site resulting from an earthquake of moderate to high magnitude generated within the San Francisco Bay Region.<sup>24</sup> This represents a potentially significant impact related to future structures and residents.

Ground shaking effects can be mitigated through implementation of CBC requirements and sound engineering judgement as outlined in Mitigation Measure (MM) GEO-1a. In addition, the project-specific geotechnical exploration provides earthwork recommendations that would also reduce potential impacts to less than significant. MM GEO-1b requires that final grading and foundation plans be reviewed by a qualified Geotechnical Engineer to confirm that project-specific geotechnical exploration recommendations are incorporated. MM GEO-1b also requires monitoring during construction to check the validity of the assumptions made in the geotechnical exploration, to ensure that site preparation and selected fill materials are satisfactory, and that placement and compaction of the fill is performed in accordance with recommendations and the project specifications. As such, with implementation of identified mitigation, the proposed project would not expose people or structures to substantial adverse effects associated with seismic ground shaking. Therefore, operational impacts related to strong seismic ground shaking would be less than significant with mitigation.

### *Seismic-related Ground Failure*

The project-specific geotechnical exploration indicated that the project site has low potential for seismic related liquefaction due to the densities and high fine-grained material content in the sand on-site. Therefore, operational impacts related to seismic related ground failure would be less than significant with incorporation of the Geotechnical recommendations as required by MM GEO-1a.

### *Landslides*

The project-specific geotechnical exploration determined that the site has little to no potential for landslides based on the topographic and lithologic data observed at the test pits. Furthermore, the incorporation of CBC requirements as well as the specific grading and foundation design recommendations required by MM GEO-1a and MM GEO-1b, would reduce the potential for seismically induced landslides to less than significant.

### ***Level of Significance Before Mitigation***

Potentially Significant (ground shaking, landslides, and liquefaction)

### ***Mitigation Measures***

#### **MM GEO-1a      Implement Project-specific Geotechnical Report Recommendations**

Prior to issuance of any grading permits, all recommendations and specifications set forth in the project-specific Geotechnical Exploration Report prepared for the proposed project shall be reflected on the project grading and foundation plans (inclusive of seismic design parameters), subject to review and approval by the City of Antioch Engineer.

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<sup>24</sup> ENGEO Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.

#### **MM GEO-1b Grading and Foundation Plan Review and Construction Monitoring**

Prior to issuance of any grading permits, the project Applicant shall retain the design geotechnical engineering firm to review the final grading and foundation plans and specifications to evaluate whether recommendations have been implemented from the project-specific Geotechnical Exploration Report, and to provide additional or modified recommendations, as needed.

Construction monitoring shall be performed by a California Registered Geologist and/or Engineer to check the validity of the assumptions made in the geotechnical investigation. Earthwork operations shall be performed under the observation of a California Registered Geologist and/or Engineer to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of the fills has been performed in accordance with recommendations and the project specifications.

#### ***Level of Significance After Mitigation***

Less Than Significant

#### ***Soil Erosion or Topsoil Loss***

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**Impact GEO-2: The proposed project could result in substantial soil erosion or the loss of topsoil.**

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#### ***Construction***

Erosion is a natural and inevitable geologic process whereby earth materials are loosened, worn away, decomposed, or dissolved and transported from one place to another by wind, rain, etc. Erosion can cause damage to the environment by depositing silt, sand, or mud in waterways impacting biological resources. It can also damage infrastructure, including storm drains, roads, and tunnels, by clogging them. Erosion and the loss of topsoil can be accelerated during construction due to disturbance of vegetation cover and soil. As mentioned in Section 3.9, Hydrology and Water Quality, project construction would involve grading, earth-moving activity, and soil disturbance that would take place on 373.60 acres of the 551.50-acre project site and the off-site improvement area. Chapter 9 of the City's Municipal Code, Storm Water Management and Discharge Control, requires projects that propose to disturb more than 1.00 acre of land, such as the proposed project, must obtain coverage under the State's General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit), which pertains to erosion- and siltation-related pollution from grading and project construction. Compliance with the Permit requires the Applicant to file a Notice of Intent (NOI) with the California State Water Resources Control Board (State Water Board) and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs in order to prevent, or reduce to the greatest feasible extent, adverse impacts to water quality from erosion and sedimentation. Such BMPs would include hydro-seeding, the placement of erosion control measures within drainage ways and ahead of drop inlets, the temporary lining (during construction activities) of drop inlets with "filter fabric" (a specific type of geotextile fabric), the placement of straw wattles along slope contours, directing subcontractors to a single designation "wash-out" location (as

opposed to allowing them to wash-out in any location they desire), the use of siltation fences, and the use of sediment basins and dust palliatives

Impacts related to soil erosion and the loss of topsoil would be reduced to a less than significant level with the implementation of MM GEO-2. Therefore, construction impacts related to substantial soil erosion or the loss of topsoil would be less than significant with mitigation.

### ***Operation***

Upon completion of the construction stage, previously disturbed areas would be ultimately protected through the placement of structures, roadways, landscaping, and other improvements, which would substantially minimize long-term erosion. Furthermore, the City implements the NPDES Phase II Municipal Separate Storm Sewer Systems (MS4) requirements through a stormwater management plan and its stormwater ordinance, which require implementation of post-construction stormwater quality improvements. Thus, the potential for erosion or loss of topsoil during project operation would be less than significant.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

#### **MM GEO-2 a. Development of a Storm Water Pollution Prevention Plan**

Prior to the issuance of grading permits, the project Applicant shall prepare and submit to the City Public Works Department and Central Valley Regional Water Quality Control Board (RWQCB), a Storm Water Pollution Prevention Plan (SWPPP) detailing measures to control soil erosion and waste discharges during construction. The SWPPP shall include an erosion control plan, a water quality monitoring plan, a hazardous materials management plan, and post-construction Best Management Practices (BMPs).

### ***Level of Significance After Mitigation***

Less Than Significant

### ***Unstable Geologic Location***

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<b>Impact GEO-3:</b>	<b>The proposed project could be located on a geologic unit or soil that is unstable, or that could become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.</b>
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### ***Construction/Operation***

The project-specific geotechnical exploration conducted by ENGEO, Inc. determined that the potential for lateral spreading, landslide, subsidence, and liquefaction is low to negligible based on topographic and lithologic data (see Appendix F). However, as mentioned above, the California Department of Conservation's Earthquake Zones of Required Investigation Map identifies the project

site as located within a liquefaction zone.<sup>25</sup> Incorporation of standard building code requirements as well as the specific grading and foundation design recommendations required by MM GEO-1a and MM GEO-1b, would reduce the potential for impacts related to unstable soil or geologic units to a less than significant level.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

Implement MM GEO-1a and GEO-1b

***Level of Significance After Mitigation***

Less Than Significant

***Expansive Soil***

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<b>Impact GEO-4:</b>	<b>The proposed project could be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property.</b>
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***Construction/Operation***

According to the project-specific geotechnical exploration, potentially expansive lean clay soils were observed near the surface in all of the soil test pits. These soils have moderate to high shrink/swell potential with variations in moisture content. Expansive soils can shrink or swell and cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations, which is considered a potentially significant impact. Successful performance of structures on expansive soils requires specific procedures for grading and for establishment of building foundations.

Implementation of geotechnical recommendations and MM GEO-1a and MM GEO-1b, which require the incorporation of all recommendations from the geotechnical exploration and monitoring during construction to ensure proper implementation, as well as replacing native soils with engineered fill or the addition of soil amendments are also effective means of mitigating expansive soils, and would reduce potential impacts related to expansive soil to less than significant.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

Implement MM GEO-1a and GEO-1b

***Level of Significance After Mitigation***

Less Than Significant

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<sup>25</sup> California Department of Conservation. Seismic Hazards and Zones of Required Investigation. Website: <https://www.conservation.ca.gov/cgs/Pages/Program-SHP/regulatory-hazard-zones.aspx>. Accessed December 11, 2019.

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**Wastewater Disposal Systems**

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**Impact GEO-5:** The proposed project would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

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**Construction/Operation**

The proposed project would be connected to and served by the existing municipal sanitary sewer system, and would not use septic tanks or any alternative wastewater disposal system. Therefore, there would be no impacts related to soil capability of supporting the use of alternative wastewater disposal systems.

**Level of Significance**

No Impact

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**Destruction of Paleontological Resource or Unique Geologic Feature**

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**Impact GEO-6:** The proposed project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

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**Construction/Operation**

The Paleontological Records Search on the UCMP revealed that the project site consists primarily of Holocene alluvium (QA), which is too young to be fossiliferous, and Eocene Markley Sandstone Member (Tkm) of the Kreyenhagen Formation, which is located in the southwestern portion of the site as well as along the northern boundary.

Within the 0.50 mile search perimeter, the records search identified Eocene rocks assigned to the other members of the Kreyenhagen Formation and older Eocene rocks of the Domengine (Tds) and Meganos Formation (Tmgd).

No known paleontological resources have been identified on the project site, although paleontological resources have been identified within a distance of 1.00 mile. The records search noted that the unmapped older alluvium and Markley sandstone would be of concern during project construction, and that the potential of finding late Pleistocene (Rancholabrean) vertebrates in Lone Tree Valley must also be taken into account. The terrain across the project site is relatively undisturbed and both of the mapped geologic units (Markley sandstone and Quaternary alluvium) have produced significant paleontological resources in the vicinity. This would represent potentially significant impact related to destruction of paleontological resources.

MM GEO-3 requires a pre-construction paleontological walkover survey, and the creation and implementation of a paleontological monitoring program, including training for the construction crew by a qualified professional Paleontologist. With the implementation of this mitigation, impacts related to destruction of paleontological resources or unique geologic features would be less than significant.

**Level of Significance Before Mitigation**

Potentially Significant

## **Mitigation Measures**

### **MM GEO-3      Preconstruction Paleontological Survey**

Prior to any grading or excavation activities, a professional Paleontologist shall conduct a worker awareness training to inform construction personnel of the possibility of encountering fossils, the appearance and types of fossils likely to be seen during construction activities, and the property notification procedures to follow should fossils be encountered.

If paleontological resources are discovered during earth-moving activities, the construction crew shall immediately stop work within 100 feet of the discovery and notify the Planning Department. A qualified Paleontologist shall be retained to evaluate the resource and prepare and implement a proposed mitigation plan, including curation, in accordance with the Society of Vertebrate Paleontology Guidelines.<sup>26</sup>

### **Level of Significance After Mitigation**

Less Than Significant

## **3.6.5 - Cumulative Impacts**

The geographic scope of the cumulative geology and soils analysis is the project vicinity. Adverse effects associated with geology and soils tend to be localized; therefore, the area near the project site would be the area most affected by project activities (generally within a 0.50-mile radius). None of the cumulative projects listed in Chapter 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, are within 0.50 mile of the proposed project; the closest one is the Aviano development, located approximately 0.75 mile to the east. Development in the project vicinity has not included any uses or activities that would result in geology or soils impacts. All construction phases of this project, and other foreseeable projects in the area, would be required to implement mitigation measures similar to those above and adhere to all federal, State, and local programs, requirements, and policies pertaining to building safety and construction permitting. All projects would be required to adhere to the City's Building Code and Grading Ordinance. Therefore, the potential for cumulative impacts related to geology and soils is less than significant.

Cumulative projects, including the project site, have the potential to experience strong to violent ground shaking from earthquakes. The other cumulative projects listed in Table 3-1 would be exposed to the same ground shaking hazards and likewise would be subject to the same requirements. Cumulative projects would adhere to the provisions of the CBC, and policies of the City of Antioch General Plan and Antioch Municipal Code reducing potential hazards associated with seismic ground shaking and ground failure. As such, the proposed project in conjunction with other cumulative projects would not result in a less than significant cumulative impact associated with seismic-related hazards.

<sup>26</sup> The Society of Vertebrate Paleontology (SVP). 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources—Standard Guidelines, Society of Vertebrate Paleontology News Bulletin, Vol. 163. Pages 22-27.

## **Soil-related Hazards**

Soil conditions associated with the project site, such as expansive soils, are specific to the project site and generally do not contribute to a cumulative effect. Some or all other cumulative projects may have similar conditions but they also would not contribute to a general geologic or soil cumulative effect. The proposed project would be subject to all City of Antioch General Plan policies, City Municipal Code policies, and the CBC reducing soil-related hazard impacts. Other current and future development/redevelopment projects in the region would similarly be required to adhere to standards and practices that include stringent geologic and soil-related hazard mitigations. As such, the proposed project, in conjunction with other projects, would not have a cumulatively significant impact associated with soil-related hazards.

## **Unique Geologic Feature and Paleontological Resources**

The geographic scope of the cumulative unique geologic features and paleontological resources analysis is the immediate project vicinity (within a 0.5-mile radius). Geologic resources and paleontological resource impacts tend to be localized, because the integrity of any given resource depends on what occurs only in the immediate vicinity around that resource, such as disruption of soils.

Construction activities associated with development cumulative projects in the project vicinity may have the potential to encounter undiscovered geologic resources and paleontological resources. These cumulative projects would be required to mitigate for impacts through compliance with applicable federal and State laws governing geologic resources and paleontological resources. The likelihood of presence of geologic resources and paleontological resources on the cumulative project sites is relatively low, given that the majority of soil disturbance associated with these projects will take place within Holocene soils too young to be fossiliferous. Although there is the possibility that previously undiscovered resources could be encountered by subsurface earthwork activities, the implementation of standard construction mitigation measures would ensure that undiscovered geologic and paleontological resources are not adversely affected by cumulative project-related construction activities, which would prevent the destruction or degradation of potentially significant cultural resources in the project vicinity. Given the low potential for disruption and the comprehensiveness of mitigation measures that would apply to the cumulative projects in the vicinity, the proposed project, in conjunction with other planned and approved projects, would result in a less than significant cumulative impact related to unique geologic and paleontological resources.

## ***Level of Cumulative Significance***

Less Than Significant

## 3.7 - Greenhouse Gas Emissions and Energy

### 3.7.1 - Introduction

This section describes the existing greenhouse gas (GHG) emissions setting as well as the relevant regulatory framework. This section also evaluates the possible impacts related to GHG emissions that could result from implementation of the proposed project. Information in this section is based on project-specific GHG emissions modeling outputs included in Appendix C. The following comments were received during the Environmental Impact Report (EIR) scoping period related to GHG emissions:

- Recommends including a vehicle miles traveled (VMT) analysis pursuant to City guidelines, or the Office of Planning and Research Draft Guidelines.
- Recommends including multimodal planning (Class II or Class IV bike lanes on Sand Creek Road); transit/para-transit services.
- Suggests including Transportation Demand Management to reduce VMT and GHG emissions.
- Suggests incorporating building electrification requirements into the proposed project to reduce project impacts related to GHG emissions.
- Recommends the conversion of gas to electric buildings to reaching zero emissions.
- Recommends that the City should apply a net-zero emissions GHG threshold to determine GHG impacts.
- Recommends the analysis of Gas Connections included as part of the proposed project.

### 3.7.2 - Environmental Setting

#### Greenhouse Effect, Global Warming, and Climate Change

Most of the energy that affects the Earth's climate comes from the sun. Some solar radiation is absorbed by the Earth's surface, and a smaller portion of this radiation is reflected by the atmosphere back toward space. As the Earth absorbs high-frequency solar radiation, its surface gains heat and then re-radiates lower frequency infrared radiation back into the atmosphere.<sup>1</sup>

Most solar radiation passes through gases in the atmosphere classified as GHGs; however, infrared radiation is selectively absorbed by GHGs. GHGs in the atmosphere play a critical role in maintaining the balance between the Earth's absorbed and radiated energy, the Earth's radiation budget,<sup>2</sup> by trapping some of the infrared radiation emitted from the Earth's surface that otherwise would have escaped to space (Figure 3.7-1). Radiative forcing is the difference between the incoming energy and outgoing energy.<sup>3</sup> Specifically, GHGs affect the radiative forcing of the atmosphere,<sup>4</sup> which in turn

<sup>1</sup> Frequencies at which bodies emit radiation are proportional to temperature. The Earth has a much lower temperature than the sun and emits radiation at a lower frequency (longer wavelength) than the high frequency (short-wavelength) solar radiation emitted by the sun.

<sup>2</sup> This includes all gains of incoming energy and all losses of outgoing energy; the planet is always striving to be in equilibrium.

<sup>3</sup> Positive forcing tends to warm the surface while negative forcing tends to cool it.

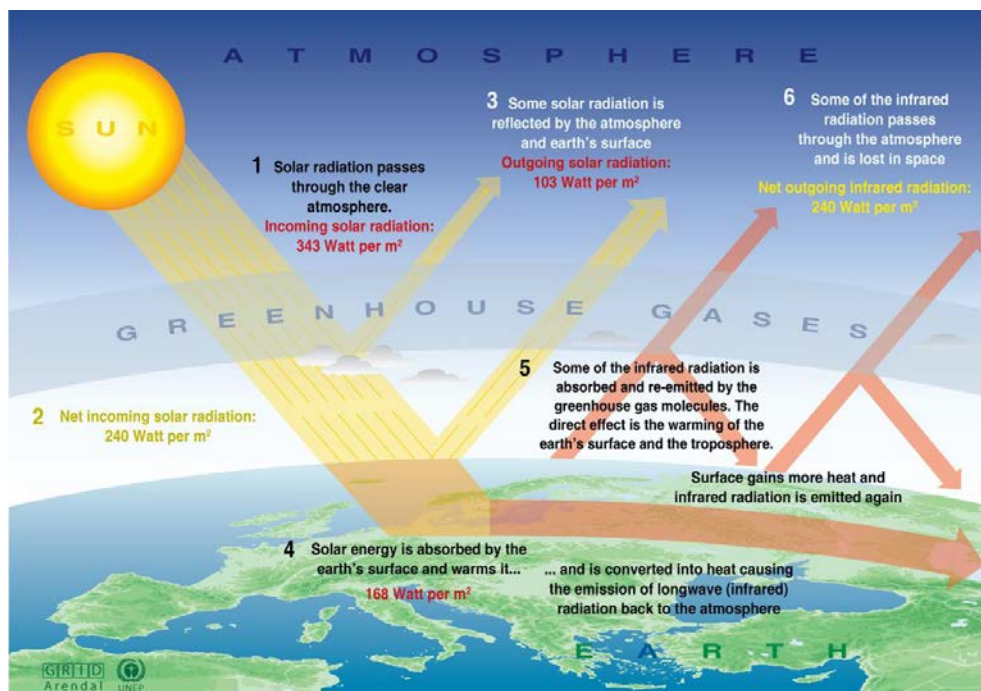
<sup>4</sup> This is the change in net irradiance at the tropopause after allowing stratospheric temperatures to readjust to radiative equilibrium, but with surface and tropospheric temperatures and state held fixed at the unperturbed values.

affects the Earth's average surface temperature. This phenomenon, the *greenhouse effect*, keeps the Earth's atmosphere near the surface warmer than it would be otherwise and allows successful habitation by humans and other forms of life.

Combustion of fossil fuels and deforestation release carbon into the atmosphere that historically has been stored underground in sediments or in surface vegetation, thus exchanging carbon from the geosphere and biosphere to the atmosphere in the carbon cycle. With the accelerated increase in fossil fuel combustion and deforestation since the Industrial Revolution of the 19<sup>th</sup> Century, concentrations of GHGs in the atmosphere have increased exponentially. Such GHG emissions in excess of natural ambient concentrations contribute to the enhancement of the natural greenhouse effect. This enhanced greenhouse effect has contributed to *global warming*, an increased rate of warming of the Earth's average surface temperature.<sup>5</sup> Specifically, increases in GHG emissions lead to increased absorption of infrared radiation by the Earth's atmosphere and warm the lower atmosphere further, thereby increasing temperatures and evaporation rates near the surface.

Variations in natural phenomena such as volcanoes and solar activity produced most of the global temperature increase that occurred during preindustrial times; more recently, however, increasing atmospheric GHG concentrations resulting from human activity have been responsible for most of the observed global temperature increase.<sup>6</sup>

**Figure 3.7-1: The Greenhouse Effect**



Source: UNEP/GRID-Arendal, 2005<sup>7</sup>

<sup>5</sup> This condition results when the Earth has to work harder to maintain its radiation budget, because when more GHGs are present in the atmosphere, the Earth must force emissions of additional infrared radiation out into the atmosphere.

<sup>6</sup> These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

<sup>7</sup> Philippe Rekacewicz, UNEP/GRID-Arendal. Website: <https://www.grida.no/resources/6467>. Accessed on April 26, 2019.

Global warming affects global atmospheric circulation and temperatures; oceanic circulation and temperatures; wind and weather patterns; average sea level; ocean acidification; chemical reaction rates; precipitation rates, timing, and form; snowmelt timing and runoff flow; water supply; wildfire risks; and other phenomena, in a manner commonly referred to as *climate change*. Climate change is a change in the average weather of the Earth that is measured by alterations in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past, such as during previous ice ages. Many of the concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

### Temperature Predictions by the Intergovernmental Panel on Climate Change

The United Nations Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. In its Fourth Assessment Report, the IPCC predicted that the global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1°C (degrees Celsius) to 6.4°C. Regardless of analytical methodology, global average temperatures and sea levels are expected to rise under all scenarios.<sup>8</sup> The report also concluded that “[w]arming of the climate system is unequivocal,” and that “[m]ost of the observed increase in global average temperatures since the mid-20<sup>th</sup> Century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.” Warming of the climate system is now considered to be unequivocal,<sup>9</sup> with the global surface temperature increasing approximately 1.33°F (degrees Fahrenheit) over the last 100 years. The IPCC predicts increases in global average temperature of between 2°F and 11°F over the next 100 years, depending on the scenario.<sup>10</sup>

### GHGs and Global Emission Sources

Gases that trap heat in the atmosphere are referred to as GHGs. The effect is analogous to the way a greenhouse retains heat. Prominent GHGs that naturally occur in the Earth’s atmosphere are water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), oxides of nitrogen (NO<sub>x</sub>), and ozone. Anthropogenic (human-caused) GHG emissions include releases of these GHGs plus release of human-made gases with high global warming potential (GWP) (ozone-depleting substances such as chlorofluorocarbons [CFCs]<sup>11</sup> and aerosols, hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF<sub>6</sub>]). The GHGs listed by the IPCC (CO<sub>2</sub>, methane, nitrous oxide, HFCs, PFCs, and sulfur hexafluoride) are discussed below, in order of abundance in the atmosphere. Water vapor, despite being the most

<sup>8</sup> Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller [eds.]). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Website: [www.ipcc.ch/publications\\_and\\_data/ar4/wg1/en/contents.html](http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html). Accessed December 27, 2019.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Chlorofluorocarbons (CFCs) destroy stratospheric ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited CFCs production in 1987.

abundant GHG, is not discussed below because natural concentrations and fluctuations far outweigh anthropogenic influences, making it impossible to predict. Ozone is not included because it does not directly affect radiative forcing. Ozone-depleting substances, which include chlorofluorocarbons, halons, carbon tetrachloride, methyl chloroform, and hydrochlorofluorocarbons, are not included because they have been primarily replaced by HFCs and PFCs.

The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere. The global warming potential of a gas is essentially a measurement of the radiative forcing of a GHG compared with the reference gas, carbon dioxide (CO<sub>2</sub>).

Individual GHG compounds have varying potential for contributing to global warming. For example, methane is 25 times as potent as CO<sub>2</sub>, while sulfur hexafluoride is 22,200 times more potent than CO<sub>2</sub> on a molecule-per-molecule basis. To simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method for comparing GHG emissions is the GWP methodology defined in the IPCC reference documents.<sup>12</sup> The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalents (CO<sub>2</sub>e), which compares the gas in question to that of the same mass of CO<sub>2</sub> (by definition, CO<sub>2</sub> has a GWP of 1). The global warming potential of a GHG is a measure of how much a given mass of a GHG is estimated to contribute to global warming. Thus, to describe how much global warming a given type and amount of GHG may cause, the CO<sub>2</sub>e is used. A CO<sub>2</sub>e is the mass emissions of an individual GHG multiplied by its global warming potential. As such, a high GWP represents high absorption of infrared radiation and a long atmospheric lifetime compared to CO<sub>2</sub>. One must also select a time horizon to convert GHG emissions to equivalent CO<sub>2</sub> emissions to account for chemical reactivity and lifetime differences among various GHG species. The standard time horizon for climate change analysis is 100 years. Generally, GHG emissions are quantified in terms of metric tons (MT) of CO<sub>2</sub>e (MT CO<sub>2</sub>e) emitted per year.

The atmospheric residence time of a gas is equal to the total atmospheric abundance of the gas divided by its rate of removal.<sup>13</sup> The atmospheric residence time of a gas is, in effect, a half-life measurement of the length of time a gas is expected to persist in the atmosphere when accounting for removal mechanisms such as chemical transformation and deposition.

Table 3.7-1 lists the GWP of each GHG and its lifetime. Units commonly used to describe the concentration of GHGs in the atmosphere are parts per million (ppm), parts per billion (ppb), and parts per trillion (ppt), referring to the number of molecules of the GHG in a sampling of 1 million, 1 billion, or 1 trillion molecules of air. Collectively, HFCs, PFCs, and sulfur hexafluoride are referred to as high-GWP gases. CO<sub>2</sub> is by far the largest component of worldwide CO<sub>2</sub>e emissions, followed by methane, nitrous oxide, and high-GWP gases, in order of decreasing contribution to CO<sub>2</sub>e.

The primary human processes that release GHGs include the burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release methane, such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high-GWP gases. Deforestation and land cover conversion have also been identified as

<sup>12</sup> International Panel on Climate Change (IPCC). 2001. Changes in Atmospheric Constituents on Radiative Forcing (Chapter 2). Website: <https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf>. Accessed December 10, 2019.

<sup>13</sup> Seinfeld, J.H. and Pandis, S.N. 2006. Atmospheric Chemistry and Physics: From Air Pollution to Climate Change, 2<sup>nd</sup> Edition. New York. John Wiley & Sons.

contributing to global warming by reducing the Earth's capacity to remove CO<sub>2</sub> from the air and altering the Earth's albedo or surface reflectance, thus allowing more solar radiation to be absorbed. Specifically, CO<sub>2</sub> emissions associated with fossil fuel combustion are the primary contributors to human-induced climate change. CO<sub>2</sub>, methane, and nitrous oxide emissions associated with human activities are the next largest contributors to climate change.

GHGs of California concern are defined by California Assembly Bill (AB) 32 (see the Regulatory Environment subsection below for a description) and include CO<sub>2</sub>, CH<sub>4</sub>, NO<sub>x</sub>, HFCs, PFCs, and SF<sub>6</sub>. A seventh GHG, nitrogen trifluoride (NF<sub>3</sub>), was also added under the California Health and Safety Code Section 38505(g)(7) as a GHG of concern. These GHGs are described in terms of their physical description and properties, global warming potential, atmospheric residence lifetime, sources, and atmospheric concentration in 2005 in Table 3.7-1.

**Table 3.7-1: Description of Greenhouse Gases of California Concern**

Greenhouse Gas	Physical Description and Properties	Global Warming Potential (100 years)	Atmospheric Residence Lifetime (years)	Sources
Carbon dioxide (CO <sub>2</sub> )	Odorless, colorless, natural gas.	1	50-200	burning coal, oil, natural gas, and wood; decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; oceanic evaporation; volcanic outgassing; cement production; land use changes.
Methane (CH <sub>4</sub> )	Flammable gas and is the main component of natural gas.	25	12	geological deposits (natural gas fields) extraction; landfills; fermentation of manure; and decay of organic matter.
Nitrous oxide (N <sub>2</sub> O)	Nitrous oxide (laughing gas) is a colorless GHG.	298	114	microbial processes in soil and water; fuel combustion; industrial processes.
Chloro-fluoro-carbons (CFCs)	Nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (level of air at the Earth's surface); formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms.	3,800-8,100	45-640	refrigerants aerosol propellants; cleaning solvents.

**Table 3.7-1 (cont.): Description of Greenhouse Gases of California Concern**

Greenhouse Gas	Physical Description and Properties	Global Warming Potential (100 years)	Atmospheric Residence Lifetime (years)	Sources
Hydro-fluoro-carbons (HFCs)	Synthetic human-made chemicals used as a substitute for CFCs and contain carbon, chlorine, and at least one hydrogen atom.	140 to 11,700	1-50,000	automobile air conditioners; refrigerants.
Per-fluoro-carbons (PFCs)	Stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface.	6,500 to 9,200	10,000-50,000	primary aluminum production; semiconductor manufacturing.
Sulfur hexafluoride (SF <sub>6</sub> )	Human-made, inorganic, odorless, colorless, and nontoxic, nonflammable gas.	22,800	3,200	electrical power transmission equipment insulation; magnesium industry, semiconductor manufacturing; a tracer gas.
Nitrogen trifluoride (NF <sub>3</sub> )	Inorganic, is used as a replacement for PFCs, and is a powerful oxidizing agent.	17,200	740	electronics manufacture for semiconductors and liquid crystal displays.

**Sources:**

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller [eds.]). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, Website: <https://www.ipcc.ch/report/ar4/wg1/>. Accessed December 18, 2019.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (Core Writing Team, Pachauri, R.K. and Reisinger, A. [eds.]). IPCC, Geneva, Switzerland. Website: <https://www.ipcc.ch/report/ar4/syr/>. Accessed December 18, 2019.

The State has begun the process of addressing pollutants referred to as short-lived climate pollutants. Senate Bill (SB) 605, approved by the Governor on September 14, 2014 required the California Air Resources Board (ARB) to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016. The ARB released the Proposed Short-Lived Climate Pollutant Reduction Strategy in April 2016. The ARB has completed an emission inventory of these pollutants, identified research needs, identified existing and potential new control measures that offer co-benefits, and coordinated with other state agencies and districts to develop measures.

The short-lived climate pollutants include three main components: black carbon, fluorinated gases, and methane. Fluorinated gases and methane are described in Table 3.7-1 and are already included in the California GHG inventory. Black carbon has not been included in past GHG inventories; however, the ARB will include it in its comprehensive strategy.<sup>14</sup>

Black carbon is a component of fine particulate matter. Black carbon is formed by incomplete combustion of fossil fuels, biofuels, and biomass. Sources of black carbon within a jurisdiction may include exhaust from diesel trucks, vehicles, and equipment, as well as smoke from biogenic combustion. Biogenic combustion sources of black carbon include the burning of biofuels used for transportation, the burning of biomass for electricity generation and heating, prescribed burning of agricultural residue, and natural and unnatural wildfires. Black carbon is not a gas but an aerosol—particles or liquid droplets suspended in air. Black carbon only remains in the atmosphere for days to weeks, whereas other GHGs can remain in the atmosphere for years. Black carbon can be deposited on snow, where it absorbs sunlight, reduces sunlight reflectivity, and hastens snowmelt. Direct effects include absorbing incoming and outgoing radiation; indirectly, black carbon can also affect cloud reflectivity, precipitation, and surface dimming (cooling).

Global warming potentials for black carbon were not defined by the IPCC in its Fourth Assessment Report. The ARB has identified a global warming potential of 3,200 using a 20-year time horizon and 900 using a 100-year time horizon from the IPCC Fifth Assessment. Sources of black carbon are already regulated by the ARB, and air district criteria pollutant and toxic regulations that control fine particulate emissions from diesel engines and other combustion sources.<sup>15</sup> Additional controls on the sources of black carbon specifically for their GHG impacts beyond those required for toxic and fine particulates are not likely to be needed.

Ozone is another short-lived climate pollutant that will be part of the strategy. Ozone affects evaporation rates, cloud formation, and precipitation levels. Ozone is not directly emitted, so its precursor emissions, volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>) on a regional scale and CH<sub>4</sub> on a hemispheric scale will be subject of the strategy.<sup>16</sup>

Water vapor is also considered a GHG. Water vapor is an important component of our climate system and is not regulated. Increasing water vapor leads to warmer temperatures, which causes more water vapor to be absorbed into the air. Warming and water absorption increase in a spiraling cycle. Water vapor feedback can also amplify the warming effect of other GHGs, such that the warming brought about by increased carbon dioxide allows more water vapor to enter the atmosphere.<sup>17</sup>

<sup>14</sup> California Air Resources Board (ARB). 2015. Short-Lived Climate Pollutant Reduction Strategy, Concept Paper. May. Website: [http://www.arb.ca.gov/cc/shortlived/concept\\_paper.pdf](http://www.arb.ca.gov/cc/shortlived/concept_paper.pdf). Accessed December 27, 2019.

<sup>15</sup> California Air Resources Board (ARB). 2015. Short-Lived Climate Pollutant Reduction Strategy, Concept Paper. May. Website: [http://www.arb.ca.gov/cc/shortlived/concept\\_paper.pdf](http://www.arb.ca.gov/cc/shortlived/concept_paper.pdf). Accessed December 27, 2019.

<sup>16</sup> Ibid.

<sup>17</sup> National Aeronautics and Space Administration (NASA). 2015. Global Climate Change, Vital Signs of the Planet. Website: <http://climate.nasa.gov/causes/>. Accessed December 27, 2019.

## Introduction to Global Climate Change

Global climate change is defined as the change in average meteorological conditions on Earth with respect to temperature, precipitation, and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, hydrofluorocarbons, perfluorocarbons and SF<sub>6</sub>. These particular gases are important because of their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth's atmosphere, but prevent radioactive heat from escaping, thus warming the Earth's atmosphere. Global climate change can occur naturally as it has in the past with the previous ice ages. According to the ARB, the climate change since the industrial revolution differs from previous climate changes in both rate and magnitude.

Gases that trap heat in the atmosphere are often referred to as GHGs. GHGs are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse effect, the Earth's average temperature would be approximately 61°F cooler than it is currently. The cumulative accumulation of these gases in the Earth's atmosphere is considered to be the cause for the observed increase in the Earth's temperature.

Although California's rate of growth of GHG emissions is slowing, the State is still a substantial contributor to the U.S. emissions inventory total. In 2004, California is estimated to have produced 492 million metric tons (MMT) of carbon dioxide equivalents (MMT CO<sub>2</sub>e) GHG emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly slowed the rate of growth of GHG emissions because of the implementation of energy efficiency programs as well as adoption of strict emission controls.

## Global Climate Change Issue

Climate change is a global problem because GHGs are global pollutants, unlike criteria air pollutants and hazardous air pollutants (also called toxic air contaminants), which are pollutants of regional and local concern. Pollutants with localized air quality effects have relatively short atmospheric lifetimes, approximately 1 day; by contrast, GHGs have long atmospheric lifetimes, several years to several thousand years. GHGs persist in the atmosphere for a long enough time to be dispersed around the globe.

Although the exact lifetime of any particular GHG molecule depends on multiple variables and cannot be pinpointed, more CO<sub>2</sub> is currently emitted into the atmosphere than is sequestered. CO<sub>2</sub> sinks, or reservoirs, include vegetation and the ocean, which absorb CO<sub>2</sub> through photosynthesis and dissolution, respectively. These are two of the most common processes of CO<sub>2</sub> sequestration. Of the total annual human-caused CO<sub>2</sub> emissions, approximately 54 percent is sequestered through ocean uptake, Northern Hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO<sub>2</sub> emissions is stored in the atmosphere.<sup>18</sup>

Similarly, effects of GHGs are borne globally, as opposed to the localized air quality effects of criteria air pollutants and hazardous air pollutants. The quantity of GHGs that it takes to ultimately result in

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<sup>18</sup> Seinfeld, J. H. and Pandis, S. N. 1998. *Atmospheric Chemistry and Physics from Air Pollution to Climate Change*. New York. John Wiley & Sons.

climate change is not precisely known and cannot be quantified, and no single project would be expected to measurably contribute to a noticeable incremental change in the global average temperature, or to global or local climates or microclimate.

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. A cumulative discussion and analysis of project impacts on global climate change is presented in this EIR because, although it is unlikely that a single project will contribute significantly to climate change, cumulative emissions from many projects affect global GHG concentrations and the climate system.

Global climate change has the potential to result in sea level rise (resulting in flooding of low-lying areas), to affect rainfall and snowfall (leading to changes in water supply), to affect temperatures and habitats (affecting biological resources and public health), and to result in many other adverse environmental consequences.

Although the international, national, State, and regional communities are beginning to address GHGs and the potential effects of climate change, worldwide GHG emissions will likely continue to rise over the next decades.

### **Climate and Topography**

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place. For a detailed discussion of existing regional and project site climate and topography, see Section 3.2, Air Quality.

### **Existing GHG Emissions**

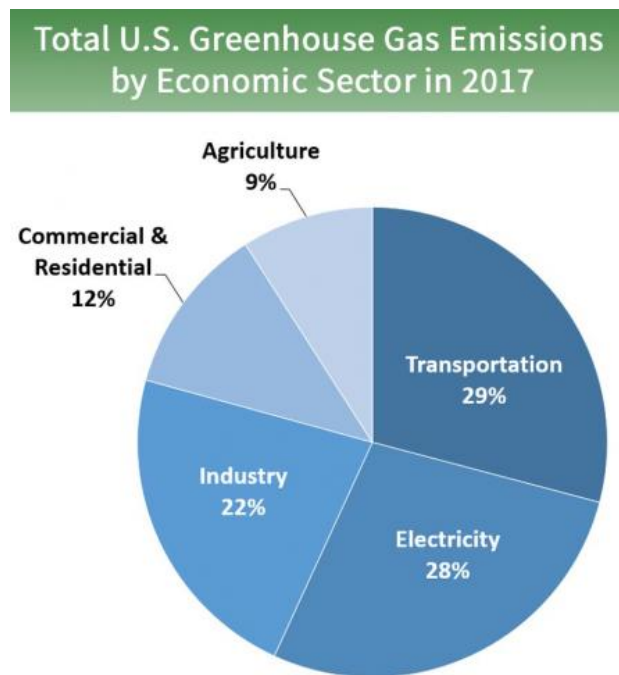
#### ***U.S. GHG Inventory***

Total U.S. GHG emissions were approximately 0.5 percent lower in 2017 than in 2016.<sup>19</sup> This decrease was largely driven by a decrease in emissions from fossil fuel combustion, which was a result of multiple factors including a continued shift from coal to natural gas and increased use of renewables in the electric power sector, and milder weather that contributed to less overall electricity use. Figure 3.7-2 presents 2017 U.S. GHG emissions by economic sector. Total U.S. GHG emissions increased by 3.6 percent from 1990 to 2017 (from 6,233.2 MMT CO<sub>2</sub>e in 1990 to 6,456.7 MMT CO<sub>2</sub>e in 2017).

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<sup>19</sup> United States Environmental Protection Agency (EPA). 2019. Inventory of U.S. Greenhouse Gas Emissions and Sinks. April 11. Website: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>. Accessed September 20, 2019.

Figure 3.7-2: 2017 U.S. Greenhouse Gas Emissions by Economic Sector



Note: Emissions shown do not include carbon sinks such as change in land uses and forestry.

Source: EPA 2019<sup>20</sup>

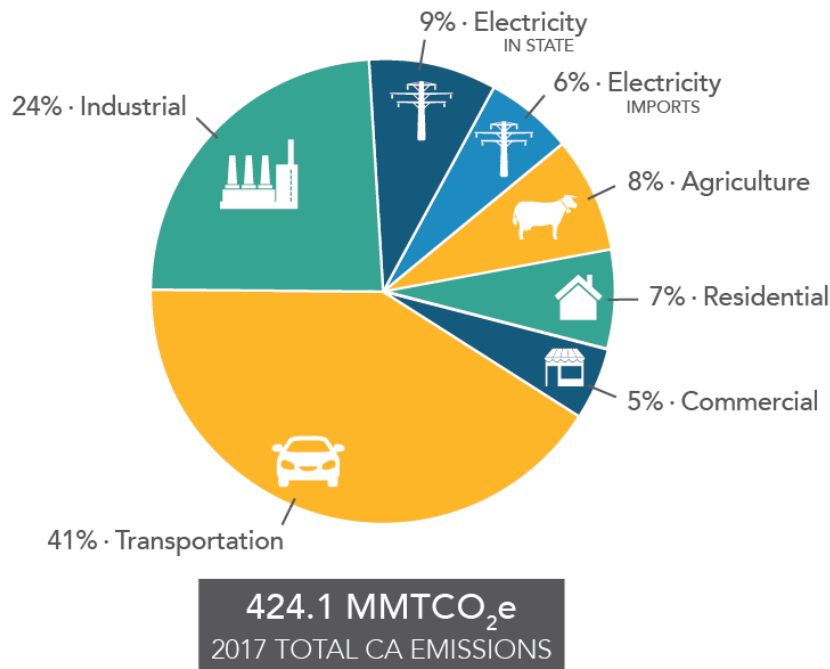
### California GHG Inventory

As the second largest emitter of GHG emissions in the U.S. and the 12<sup>th</sup> to 16<sup>th</sup> largest GHG emissions emitter in the world, California contributes a large quantity (424.1 MMT CO<sub>2</sub>e in 2017) of GHG emissions to the atmosphere.<sup>21</sup> Emissions of CO<sub>2</sub> are byproducts of fossil-fuel combustion and are attributable in large part to human activities associated with transportation, industry/manufacturing, electricity and natural gas consumption, and agriculture. In California, the transportation sector is the largest emitter at 41 percent of GHG emissions, followed by industry/manufacturing at 24 percent of GHG emissions (Figure 3.7-3).

<sup>20</sup> Ibid.

<sup>21</sup> California Climate Change Center. (CCCC). 2006. Our Changing Climate, Assessing the Risks to California: A Summary Report from the California Climate Change Center. Website: [http://meteora.ucsd.edu/cap/pdffiles/CA\\_climate\\_Scenarios.pdf](http://meteora.ucsd.edu/cap/pdffiles/CA_climate_Scenarios.pdf). Accessed December 27, 2019.

**Figure 3.7-3: 2017 California Greenhouse Gas Emissions by Sector**



Sources: ARB 2019<sup>22</sup>

### **Bay Area Air Quality Management District GHG Inventory**

The Bay Area Air Quality Management District (BAAQMD) published a GHG inventory for the San Francisco Bay Area (Bay Area), which provides an estimate of GHG emissions in the base year 2011 for all counties located in the jurisdiction of BAAQMD: Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Napa, and the southern portions of Solano and Sonoma counties.<sup>23</sup> This GHG inventory is based on the standards for criteria pollutant inventories and is intended to support BAAQMD's climate protection activities.

Table 3.7-2 shows the 2011 breakdown of emissions by end-use sector for each county within BAAQMD's jurisdiction. The estimated GHG emissions are presented in CO<sub>2</sub>e, which weights each GHG by its GWP. The GWPs used in the BAAQMD inventory are from the Second Assessment Report of the IPCC.

In 2011, GHG emissions from Contra Costa County accounted for approximately 31 percent of the Bay Area's total GHG emissions with 17.8 percent of the Bay Area's total GHG emissions coming from the industrial/commercial land uses in Contra Costa County.<sup>24</sup> Transportation is the largest GHG emissions sector in the Bay Area, followed by industrial/commercial, electricity generation and cogeneration, and residential fuel usage. In Contra Costa County, the largest amount of GHG

<sup>22</sup> California Air Resources Board (ARB). 2019. California Greenhouse Gas Emission Inventory Program. Website: <https://ww2.arb.ca.gov/our-work/programs/ghg-inventory-program>. Accessed September 20, 2019.

<sup>23</sup> Bay Area Air Quality Management District (BAAQMD). 2015. Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011. January. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011\\_ghgsummary.pdf](http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011_ghgsummary.pdf). Accessed December 27, 2019.

<sup>24</sup> Bay Area Air Quality Management District (BAAQMD). 2015. Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011. January. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011\\_ghgsummary.pdf](http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011_ghgsummary.pdf). Accessed December 27, 2019.

emissions are generated by the industrial/commercial sector, followed by the electricity/cogeneration sector.

**Table 3.7-2: 2011 County GHG Emissions by Sector (MMT CO<sub>2</sub>e/Year)**

Sector	Alameda	Contra Costa	Marin	Napa	San Francisco	San Mateo	Santa Clara	Solano*	Sonoma*
Industrial/Commercial	2.7	17.8	0.4	0.2	1.2	1.4	4.1	2.7	0.5
Residential Fuel	1.3	1.0	0.3	0.1	0.9	0.8	1.5	0.3	0.4
Electricity/Cogeneration	0.9	7.2	0.1	0.1	0.5	0.4	2.2	0.4	0.2
Off-Road Equipment	0.2	0.2	0.0	0.0	0.2	0.1	0.4	0.0	0.
Transportation	7.9	5.0	1.3	0.9	3.0	5.0	7.6	1.6	2.0
Agriculture/Farming	0.1	0.2	0.2	0.1	0.0	0.0	0.2	0.1	0.2
<b>Total</b>	<b>13.2</b>	<b>31.4</b>	<b>2.4</b>	<b>1.5</b>	<b>5.7</b>	<b>7.7</b>	<b>16.0</b>	<b>5.1</b>	<b>3.5</b>

Notes:

\* Portion within BAAQMD jurisdiction

CO<sub>2</sub>e = carbon dioxide equivalent

Source: Bay Area Air Quality Management District (BAAQMD). 2015. Bay Area Emissions Inventory Summary Report: Greenhouse Gases Base Year 2011. January. Website: [http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011\\_ghgsummary.pdf](http://www.baaqmd.gov/~media/files/planning-and-research/emission-inventory/by2011_ghgsummary.pdf). Accessed December 27, 2019.

### **Contra Costa County**

A community-wide baseline (2005) GHG emissions inventory was conducted for Contra Costa County as part of the development of the Climate Action Plan (CAP).<sup>25</sup> Table 3.7-3 provides the estimated 2005 baseline by sector for Contra Costa County.

**Table 3.7-3: 2005 Unincorporated County GHG Emissions Baseline by Sector (excluding Stationary Source Emissions)**

Sector	Metric Tons CO <sub>2</sub> e/Year	Percentage of Total
Residential Energy	274,690	20
Nonresidential Energy	118,770	8
Solid Waste	48,450	3
Landfill	193,950	14
On-road Transportation	628,200	45
Off-Road Equipment	71,880	5
Water and Wastewater	8,080	1
BART	2,300	<1

<sup>25</sup> Contra Costa County. 2015. Contra Costa County Climate Action Plan (CAP). December 15. Website: <http://www.co.contra-costa.ca.us/4554/Climate-Action-Plan>. Accessed February 25, 2019.

**Table 3.7-3 (cont.): 2005 Unincorporated County GHG Emissions Baseline by Sector  
(excluding Stationary Source Emissions)**

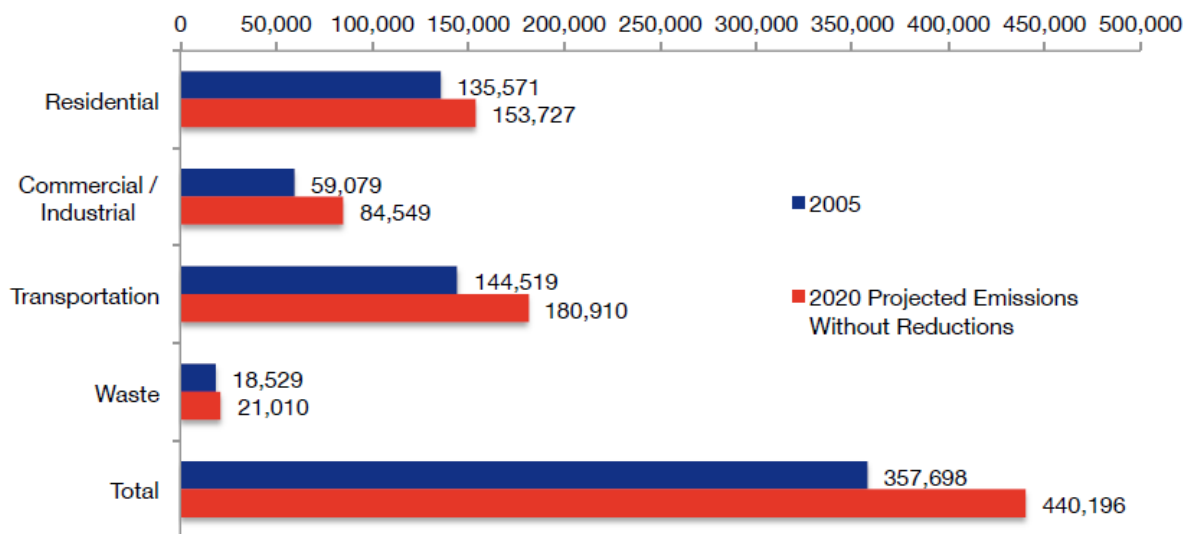
Sector	Metric Tons CO <sub>2</sub> e/Year	Percentage of Total
Agriculture	57,320	4
Total	1,403,610	100

Source: Contra Costa County Climate Action Plan (CAP), December 2015.

### City of Antioch

Antioch's community-wide baseline (2005) GHG emissions inventory was completed as part of a grant with Local Governments for Sustainability (ICLEI) in February 2008.<sup>26</sup> Figure 3.7-4 provides the estimated 2005 baseline by sector for the City of Antioch.

**Figure 3.7-4: Community Emissions Projected Growth by Sector (MT CO<sub>2</sub>e)**



Source: City of Antioch. 2011. Antioch Community Climate Action Plan. Website: <https://www.antiochca.gov/fc/environment/climate/Antioch%20CCAP%20Final.pdf>. Accessed September 20, 2019.

### Project Site

The project site currently includes a cattle-grazing operation, a single-family residence, and various barns and outbuildings that generate limited GHG emissions from sources such as vehicle trips and typical residential uses of energy, water, and waste. Consistent with the project-specific transportation impact assessment, the baseline vehicle trips and associated emissions were assumed to be zero. GHG emissions were not quantified for the existing buildings.

<sup>26</sup> City of Antioch. 2011. Antioch Community Climate Action Plan. Website: <https://www.antiochca.gov/fc/environment/climate/Antioch%20CCAP%20Final.pdf>. Accessed September 20, 2019.

## Energy Basics

Energy is generally transmitted either in the form of electricity, measured in kilowatts (kW) or megawatts (MW),<sup>27, 28</sup> or natural gas measured in therms.<sup>29</sup> Fuel, such as gasoline or diesel, is measured in gallons or liters.

### **Electricity**

Electricity is used primarily for lighting, appliances, and other uses associated with residential, commercial and industrial uses.

### **Natural Gas**

Natural gas is used primarily for heating, water heating, and cooking purposes and is typically associated with commercial and residential uses.

### **Fuel**

Fuel is used primarily for powering off-road equipment, trucks, and worker vehicles. The typical fuel types used are diesel and gasoline.

## Electricity Generation, Distribution, and Use

### **State of California**

The State of California generates approximately 206,336 GWh of electricity. Approximately 43.4 percent of the energy generation is sourced from natural gas, 29.7 percent from renewable sources (i.e., solar, wind, and geothermal), 17.9 percent from large hydroelectric sources, and the remaining 9 percent is sourced from coal, nuclear, oil, and other non-renewable sources.

In 2016, California ranked third in the nation in conventional hydroelectric generation, second in net electricity generation from all other renewable energy resources combined, and first as a producer of electricity from solar, geothermal, and biomass resources. California leads the nation in solar thermal electricity capacity and generation. In 2016, California generated 71 percent of the nation's solar thermal-sourced utility-scale electricity.<sup>30</sup>

Electricity and natural gas are distributed through the various electric load-serving entities (LSEs) in California. These entities include investor-owned utilities, publicly owned LSEs, rural electric cooperatives, community choice aggregators, and electric service providers.<sup>31</sup>

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<sup>27</sup> 1 kW = 1,000 watts; A watt is a derived unit of power that measure rate of energy conversion. 1 watt is equivalent to work being done at a rate of 1 joule of energy per second. In electrical terms, 1 watt is the power dissipated by a current of 1 ampere flowing across a resistance of 1 volt.

<sup>28</sup> 1 MW = 1 million watts

<sup>29</sup> A unit for quantity of heat that equals 100,000 British Thermal Units (BTU). A BTU is the quantity of heat required to raise the temperature of 1 pound of liquid water 1°F at a constant pressure of 1 atmosphere.

<sup>30</sup> United States Energy Information Administration (EIA). California State Profile and Energy Estimates. Website: <https://www.eia.gov/state/?sid=CA>. Accessed December 27, 2019.

<sup>31</sup> California Energy Commission. Electric Load-Serving Entities (LSEs) in California. Website: [https://www2.energy.ca.gov/almanac/electricity\\_data/utilities.html](https://www2.energy.ca.gov/almanac/electricity_data/utilities.html). Accessed December 27, 2019.

### **Contra Costa County**

Pacific Gas and Electric (PG&E) provides electricity to many of the cities throughout Contra Costa County. Most of the County's energy is consumed by residential activities (41 percent), followed by major industrial activities (34 percent) and all other nonresidential activities (25 percent).<sup>32</sup>

### **City of Antioch**

PG&E provides electricity to the City of Antioch.

### **Project Site**

The project site currently includes a single-family residence and various barns and outbuildings located on the eastern portion of the site that consume electricity. As noted in Chapter 2, Project Description, electricity for the project site is provided by PG&E.

### **Climate Change Trends and Effects**

CO<sub>2</sub> accounts for more than 75 percent of all anthropogenic GHG emissions, the atmospheric residence time of CO<sub>2</sub> is decades to centuries, and global atmospheric concentrations of CO<sub>2</sub> continue to increase at a faster rate than ever previously recorded. Thus, the warming impacts of CO<sub>2</sub> will persist for hundreds of years after mitigation is implemented to reduce GHG concentrations.

### **California**

Substantially higher temperatures, more extreme wildfires, and rising sea levels are just some of the direct effects of climate change experienced in California.<sup>33,34</sup> As reported by the California Natural Resources Agency in 2009, despite annual variations in weather patterns, California has seen a trend of increased average temperatures, more extreme hot days, fewer cold nights, longer growing seasons, less winter snow, and earlier snowmelt and rainwater runoff. Statewide average temperatures increased by about 1.7°F from 1895 to 2011, and a larger proportion of total precipitation is falling as rain instead of snow.<sup>35</sup> Sea level rose by as much as seven inches along the California coast over the last century, leading to increased erosion and adding pressure to the State's infrastructure, water supplies, and natural resources.

These observed trends in California's climate are projected to continue in the future. Research indicates that California will experience overall hotter and drier conditions with a continued reduction in winter snow (with concurrent increases in winter rains), as well as increased average temperatures and accelerating sea level rise. The frequency, intensity, and duration of extreme weather events such as heat waves, wildfires, droughts, and floods will also change.<sup>36</sup> In addition,

<sup>32</sup> Contra Costa County. 2015. Contra Costa County Climate Action Plan. Website: <http://www.co.contra-costa.ca.us/4554/Climate-Action-Plan>. Accessed February 26, 2019.

<sup>33</sup> California Natural Resources Agency (CNRA). 2009. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008. Website: [http://resources.ca.gov/docs/climate/Statewide\\_Adaptation\\_Strategy.pdf](http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf). Accessed December 27, 2019.

<sup>34</sup> California Energy Commission (CEC). 2012. Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California. Website: <http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf>. Accessed December 27, 2019.

<sup>35</sup> California Energy Commission (CEC). 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004. Draft Final Report. CEC-600-2006-013-D. Website: <http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-D.PDF>. Accessed December 27, 2019.

<sup>36</sup> California Natural Resources Agency (CNRA). 2009. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008. Website: <https://ww2.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF>. Accessed December 27, 2019.

increased air pollution and spread of insects potentially carrying infectious diseases will also occur as the climate-associated temperature and associated species clines shift in latitude.

The following is a summary of climate change factors and predicted trends specific to California.

In California, climate change may result in the following consequences:<sup>37,38</sup>

- **A reduction in the quality and supply of water from the Sierra snowpack.** If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate water supplies. It can also lead to a potential reduction in hydropower.
- **Increased risk of large wildfires.** If rain increases as temperatures rise, wildfires in the grasslands and chaparral ecosystems of Southern California are estimated to increase by approximately 30 percent toward the end of the 21<sup>st</sup> century because more winter rain will stimulate the growth of more plant “fuel” available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more Northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.
- **Reductions in the quality and quantity of certain agricultural products.** The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.
- **Exacerbation of air quality problems.** If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today’s conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range. This increase in air quality problems could result in an increase in asthma and other health-related problems.
- **A rise in sea levels resulting in the displacement of coastal businesses and residences.** During the past century, sea levels along California’s coast have risen about seven inches. If emissions continue unabated and temperatures rise into the higher anticipated warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.
- **An increase temperature and extreme weather events.** Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.
- **A decrease in the health and productivity of California’s forests.** Climate change can cause an increase in wildfires, an enhanced insect population, and establishment of non-native species.

<sup>37</sup> California Climate Change Center. (CCCC). 2006. Our Changing Climate, Assessing the Risks to California: A Summary Report from the California Climate Change Center. July 2006. CEC-500-2006-077. Website: [http://meteora.ucsd.edu/cap/pdffiles/CA\\_climate\\_Scenarios.pdf](http://meteora.ucsd.edu/cap/pdffiles/CA_climate_Scenarios.pdf). Accessed December 27, 2019.

<sup>38</sup> Moser et al. 2009. Moser, Susie, Guido Franco, Sarah Pittiglio, Wendy Chou, Dan Cayan. 2009. The Future Is Now: An Update on Climate Change Science Impacts and Response Options for California. California Energy Commission, PIER Energy-Related Environmental Research Program. CEC-500-2008-071. Website: [www.energy.ca.gov/2008publications/CEC-500-2008-071/CEC-500-2008-071.PDF](http://www.energy.ca.gov/2008publications/CEC-500-2008-071/CEC-500-2008-071.PDF). Accessed May 7, 2013.

## **Bay Area**

The following is a summary of climate change factors and predicted trends specific to the Bay Area.

### *Temperature, Heat, Drought, and Wildfire Events*

The Bay Area is expected to experience warming over the rest of the 21<sup>st</sup> Century. Consistent with Statewide projections, the annual average temperature in the Bay Area will likely increase by 2.7°F between 2000 and 2050, based on GHGs that have already been emitted into the atmosphere. By the end of the century, the increase in the Bay Area's annual average temperature may range from approximately 3.5°F to 11°F relative to the average annual temperature simulated for the 1961–1990 baseline period used for the study, depending on the GHG emissions scenarios.<sup>39</sup> The projected rate of warming, especially in the latter half of the 21<sup>st</sup> Century, is considerably greater than warming rates derived from historical observed data.

Specific predictions related to temperature/heat are summarized below.

- The annual average temperature in the Bay Area has been increasing over the last several decades.
- The Bay Area is expected to see an increase in average annual temperature of 2.7°F by 2050, and 3.5°F to 11°F by 2100. Projections show a greater warming trend during the summer season. The coastal parts of the Bay Area will experience the most moderate warming trends.<sup>40</sup>
- Extreme heat events are expected to increase in duration, frequency, and severity by 2050. Extreme freeze events are expected to decrease in frequency and severity by 2100, but occasional colder-than-historical events may occur by 2050.<sup>41</sup>

### *Precipitation, Rainfall, and Flooding Events*

Studies of the effect of climate change on the long-term average precipitation for California show some disagreement.<sup>42</sup> Considerable variability exists across individual models, and examining the average changes can mask more extreme scenarios that project much wetter or drier conditions. California is expected to maintain a Mediterranean climate through the next century, with dry summers and wet winters that vary between seasons, years, and decades. Wetter winters and drier springs are also expected, but overall annual precipitation is not projected to change substantially. By mid-century, more precipitation is projected to occur in winter in the form of less frequent but larger events. The majority of global climate models predict drying trends across the State by 2100.<sup>43</sup>

<sup>39</sup> California Climate Change Center (CCCC). 2009. Climate Change Scenarios and Sea Level Rise Estimates for the California 2009 Climate Change Scenarios Assessment. Final Paper. CEC-500-2009-014-F. Website: <http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-F.PDF>. Accessed December 27, 2019.

<sup>40</sup> Cal-Adapt. 2014. Climate Tools. Website: <http://cal-adapt.org/tools/>. Accessed December 27, 2019.

<sup>41</sup> Ibid.

<sup>42</sup> California Climate Change Center (CCCC). 2009. Climate Change Scenarios and Sea Level Rise Estimates for the California 2009. Climate Change Scenarios Assessment. Final Paper. CEC-500-2009-014-F. Website: <http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-F.PDF>. Accessed December 27, 2019.

<sup>43</sup> California Natural Resources Agency (CNRA). 2009. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008. Website: <https://ww2.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF>. Accessed December 27, 2019.

Specific factors related to precipitation/rainfall/extreme events are summarized below.

- The Bay Area has not experienced substantial changes in rainfall depth or intensities over the past 30 years.
- The Bay Area will continue to experience a Mediterranean climate, with little change in annual precipitation projected by 2050, although a high degree of variability may persist.
- An annual drying trend is projected to occur by 2100. The greatest decline in precipitation is expected to occur during the spring months, while minimal change is expected during the winter months.
- Increases in drought duration and frequency coupled with higher temperatures, as experienced in 2012, 2013, and 2014, will increase the likelihood of wildfires.
- California is expected to see increases in the magnitude of extreme events, including increased precipitation delivered from atmospheric river events, which would bring high levels of rainfall during short time periods and increase the chance of flash floods. The Bay Area is also expected to see an increase in precipitation intensities, but possibly through less frequent events.<sup>44</sup>

#### *Reduced Sierra Nevada Snowpack and Water Supply Shortages*

If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate surface water supplies.

#### *Vectors and Disease Events*

Climate change will likely increase the vectors of insects and, in turn, may increase the risk of some infectious diseases, particularly those diseases that appear in warm areas and are spread by mosquitoes and other insects, such as malaria, dengue fever, yellow fever, and encephalitis.

#### *Air Quality and Pollution Events*

Respiratory disorders will be exacerbated by warming-induced increases in the frequency of smog (ground-level ozone) events and particulate air pollution.<sup>45</sup> Although there could be health effects resulting from changes in the climate and the consequences that can occur, inhalation of GHGs at levels currently in the atmosphere would not result in adverse health effects, with the exception of ozone and aerosols (particulate matter). The potential health effects of ozone and particulate matter are discussed in criteria pollutant analyses. At very high indoor concentrations (not at levels existing outside), carbon dioxide, methane, SF<sub>6</sub>, and some chlorofluorocarbons can cause suffocation as the gases can displace oxygen.<sup>46,47</sup>

<sup>44</sup> California Climate Change Center (CCCC). 2009. Climate Change Scenarios and Sea Level Rise Estimates for the California 2009 Climate Change Scenarios Assessment. Final Paper. CEC-500-2009-014-F. Website: <http://www.energy.ca.gov/2009publications/CEC-500-2009-014/CEC-500-2009-014-F.PDF>. Accessed December 27, 2019.

<sup>45</sup> United States Environmental Protection Agency (EPA). 2009. Ozone and your Health. EPA-456/F-09-001. Website: <https://www3.epa.gov/airnow/ozone-c.pdf>. Accessed December 27, 2019.

<sup>46</sup> Centers for Disease Control and Prevention (CDC). 2010. Department of Health and Human Services, the National Institute for Occupational Safety and Health. Carbon Dioxide. Website: [www.cdc.gov/niosh/npg/npgd0103.html](http://www.cdc.gov/niosh/npg/npgd0103.html). Accessed December 27, 2019.

<sup>47</sup> Occupational Safety and Health Administration (OSHA). 2003. United States Department of Labor. Safety and Health Topics: Methane. Website: [www.osha.gov/dts/chemicalsampling/data/CH\\_250700.html](http://www.osha.gov/dts/chemicalsampling/data/CH_250700.html). Accessed December 27, 2019.

## **Contra Costa County**

### *Drought and Wildfires*

Fire hazards present a considerable problem to vegetation and wildlife habitats throughout Contra Costa County. Grassland fires are easily ignited, particularly in dry seasons. (See Section 3.8, Hazards, Hazardous Materials, and Wildfire, for a more detailed discussion related to wildfire hazard areas and wildfire-conducive conditions.) The potential for increased temperatures and drought conditions due to climate change could result in increased risk from wildfire in these areas.

As described in Section 3.8, the project site is located in an incorporated local responsibility area and the area just south of the project site is designated as a moderate fire hazard severity zone.<sup>48</sup> The vegetation on the project site consists of annual grassland and ruderal plants. According to the General Plan EIR, areas of potential wildland fire hazard exist within the southern, mostly unincorporated portions of the General Plan study area, including rural, hilly terrain, as well as areas adjacent to or covered by natural grassland or brush. New development within or near such areas are more likely to be subject to wildfire hazards.

### *Reduced Sierra Nevada Snowpack and Water Supply Shortages*

As described in Section 3.15, Utilities and Service Systems, Contra Costa County receives potable water from the Contra Costa Water District (CCWD), which pumps water from four intakes in the San Joaquin Delta. The CCWD's water source is provided by the Central Valley Project, which receives water from storage releases from Shasta, Folsom, and Clair Eagle reservoirs into the Sacramento River in the San Joaquin Delta.<sup>49</sup> Originating in the Sierra Nevada Mountains, water flows into the Sacramento and San Joaquin Rivers into the Delta where it is drawn and transported via Contra Costa Canal. The availability of surface water supply could decline if climate change results in reduced snowpack in the Sierra Nevada.

## **City of Antioch**

### *Temperature and Heat*

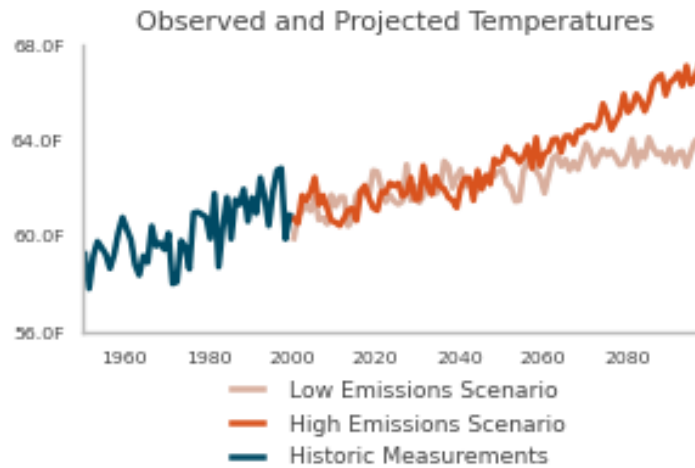
Figure 3.7-5 displays a chart of measured historical (i.e., observed) and projected annual average temperatures in the project area. As shown in the figure, temperatures are expected to rise as part of both the low and high GHG emissions scenarios.<sup>50</sup> The results indicate that temperatures are predicted to increase by 3.4°F under the low emission scenario and 5.8°F under the high emissions scenario.<sup>51</sup>

<sup>48</sup> California Department of Forestry and Fire Protection. Contra Costa County FHSZ Map. December 15, 2019. Available at: [https://osfm.fire.ca.gov/media/6662/fhszs\\_map7.pdf](https://osfm.fire.ca.gov/media/6662/fhszs_map7.pdf). Accessed July 6, 2017.

<sup>49</sup> United States Bureau of Reclamation. 2019. Central Valley Project (CVP) Mid-Pacific Region. Website: <https://www.usbr.gov/mp/cvp/>. Accessed March 19, 2019.

<sup>50</sup> The low and high GHG emissions scenarios are based on IPCC's Special Report on Emissions Scenarios B1 and A1, respectively. The higher global GHG emissions scenario (A1) assumes a global trend of rapid economic growth. The lower GHG emissions scenario (B1) assumes the same global population as in the A1 storyline but with rapid changes in economic structures toward a service and information economy, with reductions in material intensity, and the introduction of clean and resource-efficient technologies. Overall, the B1 scenario places more focus on global environmental sustainability rather than rapid economic growth.

<sup>51</sup> CalAdapt. 2019. Local Climate Snapshots. Website: <http://cal-adapt.org/tools/factsheet/>. Accessed September 30, 2019.

**Figure 3.7-5: Observed and Projected Temperatures in Project Area**Source: CalAdapt 2019<sup>52</sup>**Project Site****3.7.3 - Regulatory Framework****International****Kyoto Protocol**

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at average of five percent against 1990 levels over the five-year period from 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of “common but differentiated responsibilities.”

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014, more than 100 heads of state and government, and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the United Nations. At the Summit, heads of government, business and civil society announced actions in areas that

<sup>52</sup> Ibid.

would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

### ***United Nations Climate Change Framework Convention***

On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Climate Change Framework Convention. Under the Convention, governments agreed to gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

### ***Paris Climate Change Agreement***

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015, in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a 4-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21<sup>st</sup> session of the UNFCCC Conference of the Parties, or “COP 21.” Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;
- Establish binding commitments by all parties to make “nationally determined contributions” (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and “progress made in implementing and achieving” their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every 5 years, with the clear expectation that they will “represent a progression” beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing \$100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address “loss and damage” resulting from climate change, which explicitly will not “involve or provide a basis for any liability or compensation;”
- Require parties engaging in international emissions trading to avoid “double counting;” and

- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC.<sup>53</sup>

On June 1, 2017, President Trump announced the decision for the United States to withdraw from the Paris Climate Accord.<sup>54</sup> California remains committed to combating climate change through programs aimed to reduce GHGs.<sup>55</sup>

## Continental

### ***Western Climate Initiative (Western North America Cap-and-Trade Program)***

Cap-and-trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Each emitter caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce North America GHG emissions to 15 percent below 2005 levels by 2020. The partners are California, British Columbia, Manitoba, Ontario, and Quebec. Currently only California and Quebec are participating in the cap-and-trade program.<sup>56</sup>

## Federal

### ***Clean Air Act***

Coinciding with the 2009 meeting in Copenhagen, on December 7, 2009, the United States Environmental Protection Agency (EPA) issued an Endangerment Finding under Section 202(a) of the Clean Air Act, opening the door to federal regulation of GHGs. The Endangerment Finding notes that GHGs threaten public health and welfare and are subject to regulation under the Clean Air Act. To date, the EPA has not promulgated regulations on GHG emissions, but it has already begun to develop them.

Previously the EPA had not regulated GHGs under the Clean Air Act, because it asserted that the Act did not authorize it to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. In *Massachusetts v. Environmental Protection Agency et al.* (127 S. Ct. 1438 (2007)), however, the U.S. Supreme Court held that GHGs are pollutants under the Clean Air Act and directed the EPA to decide whether the gases endangered public health or welfare (see discussion below).

<sup>53</sup> Center for Climate and Energy Solutions (C2ES). 2015. Outcomes of the U.N. Climate Change Conference. Website: <http://www.c2es.org/international/negotiations/cop21-paris/summary>. Accessed December 27, 2019.

<sup>54</sup> The White House. Statement by President Trump on the Paris Climate Accord. Website: <https://www.whitehouse.gov/briefings-statements/statement-president-trump-paris-climate-accord/>. Accessed December 27, 2019.

<sup>55</sup> California Air Resources Board (ARB). 2017. New Release: California and China Team Up to Push for Millions More Zero-emission Vehicles. Website: <https://ww2.arb.ca.gov/news/california-and-china-team-push-millions-more-zero-emission-vehicles>. Accessed December 27, 2019.

<sup>56</sup> Center for Climate and Energy Solutions (C2ES). 2015b. Multi-State Climate Initiatives. Website: <http://www.c2es.org/category/policy-hub/state/>. Accessed December 27, 2019.

The EPA had also not moved aggressively to regulate GHGs because it expected Congress to make progress on GHG legislation, primarily from the standpoint of a cap-and-trade system. However, proposals circulated in both the House of Representative and Senate have been controversial and it may be some time before the U.S. Congress adopts major climate change legislation. The EPA's Endangerment Finding paves the way for federal regulation of GHGs with or without Congress.

#### ***U.S. Clean Air Act Permitting Programs (New GHG Source Review)***

The EPA issued a final rule on May 13, 2010, that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the federal code of regulations, the EPA states:

This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to greenhouse gas sources, starting with the largest greenhouse gas emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016.

The EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

#### ***Energy Independence and Security Act***

The Energy Policy Act of 2005 created the Renewable Fuel Standard program. The Energy Independence and Security Act of 2007 expanded this program by:

- Expanding the Renewable Fuel Standard program to include diesel in addition to gasoline;
- Increasing the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022;
- Establishing new categories of renewable fuel, and setting separate volume requirements for each one; and
- Requiring EPA to apply life-cycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

This expanded Renewable Fuel Standard program lays the foundation for achieving substantial reductions of GHG emissions from the use of renewable fuels, reducing the use of imported petroleum, and encouraging the development and expansion of the nation's renewable-fuels sector.

Signed on December 19, 2007, by President George W. Bush, the Energy Independence and Security Act (EISA) of 2007 aims to:

- move the United States toward greater energy independence and security;
- increase the production of clean renewable fuels;
- protect consumers;
- increase the efficiency of products, buildings, and vehicles;
- promote research on and deploy GHG capture and storage options;
- improve the energy performance of the Federal Government; and
- increase U.S. energy security, develop renewable fuel production, and improve vehicle fuel economy.

EISA reinforces the energy reduction goals for federal agencies put forth in Executive Order 13423, as well as introduces more aggressive requirements. The three key provisions enacted are the Corporate Average Fuel Economy Standards, the Renewable Fuel Standard, and the appliance/lighting efficiency standards.

The EPA is committed to developing, implementing, and revising both regulations and voluntary programs under the following subtitles in EISA, among others:

- Increased Corporate Average Fuel Economy Standards
- Federal Vehicle Fleets
- Renewable Fuel Standard
- Biofuels Infrastructure
- Carbon Capture and Sequestration<sup>57</sup>

#### ***EPA and National Highway Traffic Safety Administration Light-Duty Vehicle GHG Emission Standards and Corporate Average Fuel Economy Standards Final Rule***

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, the President put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On April 1, 2010, the EPA and the United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States.

The first phase of the national program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these

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<sup>57</sup> United States Environmental Protection Agency (EPA). Summary of the Energy Independence and Security Act. Website: <https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act>. Accessed December 27, 2019.

vehicles to meet an estimated combined average emissions level of 250 grams of CO<sub>2</sub> per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO<sub>2</sub> level solely through fuel economy improvements. Together, these standards would cut CO<sub>2</sub> emissions by an estimated 960 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016).

The EPA and the NHTSA issued final rules on a second-phase joint rulemaking, establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012.<sup>58</sup> The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleet wide level of 163 grams/mile of CO<sub>2</sub> in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

The EPA and NHTSA issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses on September 15, 2011, which became effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that began in the 2014 model year and achieve up to a 20-percent reduction in CO<sub>2</sub> emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles, and a 15-percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10-percent reduction in fuel consumption and CO<sub>2</sub> emissions from the 2014 to 2018 model years.

The State of California has received a waiver from the EPA to have separate, stricter corporate average fuel economy standards. Although global climate change did not become an international concern until the 1980s, efforts to reduce energy consumption began in California in response to the oil crisis in the 1970s, resulting in the incidental reduction of GHG emissions. In order to manage the State's energy needs and promote energy efficiency, AB 1575 created the California Energy Commission (CEC) in 1975. On September 19, 2019, the EPA announced a formal revocation of California's waiver of preemption, and together with the NHTSA issued a final action entitled the "One National Program Rule" to enable the government to provide nationwide uniform fuel economy and greenhouse gas emission standards for automobile and light duty trucks.<sup>59</sup> On November 15, 2019, California and 23 other states filed suit against the EPA over the vehicle waiver revocation. The ARB has announced that during the period the federal action is in effect, the ARB will administer the affected portions of its program on a voluntary basis, including issuing certifications for the greenhouse gas emissions and zero-emissions vehicle programs.<sup>60</sup>

<sup>58</sup> United States Environmental Protection Agency (EPA). 2012. Final Rule for Model Year 2017 and Later Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. Website: <https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-model-year-2017-and-later-light-duty-vehicle>. Accessed December 15, 2019.

<sup>59</sup> United States Environmental Protection Agency (EPA). 2019. One National Program Rule on Federal Preemption of State Fuel Economy Standards. September 19. Website: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P100XI4W.pdf>. Accessed March 4, 2020.

<sup>60</sup> California Air Resources Board (ARB). 2020. ARB Waiver Timeline. Website: <https://ww2.arb.ca.gov/resources/documents/carb-waiver-timeline>. Accessed March 4, 2020.

***Massachusetts et al. v. EPA (U.S. Supreme Court GHG Endangerment Ruling)***

*Massachusetts et al. v. EPA* (Supreme Court Case 05-1120) was argued before the United States (U.S.) Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four GHGs, including CO<sub>2</sub>, under Section 202(a)(1) of the Clean Air Act (CAA). A decision was made on April 2, 2007, in which the Supreme Court found that GHGs are air pollutants covered by the CAA. The Court held that the Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>—in the atmosphere threaten the public health and welfare of current and future generations; and
- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed under “Clean Vehicles” below. After a lengthy legal challenge, the U.S. Supreme Court declined to review an Appeals Court ruling upholding that upheld the EPA Administrator findings.

***U.S. Consolidated Appropriations Act (Mandatory GHG Reporting)***

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA. The first annual reports for the largest emitting facilities, covering calendar year 2010, were submitted to EPA in 2011.

**State*****California AB 1493: Pavley Regulations and Fuel Efficiency Standards***

California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA’s denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011.<sup>61</sup>

<sup>61</sup> California Air Resources Board (ARB). 2013. Clean Car Standards—Pavley, Assembly Bill 1493. Website: <https://ww3.arb.ca.gov/cc/ccms/ccms.htm>. Accessed December 27, 2019.

The standards are to be phased in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in an approximately 22-percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30 percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.<sup>62</sup>

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low Emission Vehicle (LEV) Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The new rules will reduce pollutants from gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The regulations will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.<sup>63</sup>

#### ***California Executive Order S-3-05 (GHG Emissions Reduction Targets)***

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target.

#### ***California AB 32: Global Warming Solutions Act and Scoping Plan***

In response to Executive Order S-3-05, the California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 required that GHGs emitted in California be reduced to 1990 levels by the year 2020. “Greenhouse gases” as defined under AB 32 include CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The ARB is the State agency charged with monitoring and regulating sources of GHGs.

The ARB approved the 1990 GHG emissions level of 427 MMT CO<sub>2</sub>e on December 6, 2007.<sup>64</sup> Therefore, to meet the State’s target, emissions generated in California in 2020 are required to be equal to or less than 427 MMT CO<sub>2</sub>e. Emissions in 2020 in a Business as Usual (BAU) scenario were

<sup>62</sup> California Air Resources Board (ARB). 2013. Facts About the Clean Cars Program. Website: [http://www.arb.ca.gov/msprog/zevprog/factsheets/advanced\\_clean\\_cars\\_eng.pdf](http://www.arb.ca.gov/msprog/zevprog/factsheets/advanced_clean_cars_eng.pdf). Accessed December 27, 2019.

<sup>63</sup> California Air Resources Board (ARB). 2011. Status of Scoping Plan Recommended Measures. Website: [https://ww3.arb.ca.gov/cc/scopingplan/status\\_of\\_scoping\\_plan\\_measures.pdf](https://ww3.arb.ca.gov/cc/scopingplan/status_of_scoping_plan_measures.pdf). Accessed December 27, 2019.

<sup>64</sup> California Air Resources Board (ARB). 2007. Staff Report. California 1990 Greenhouse Gas Level and 2020 Emissions Limit. November 16, 2007. Website: [https://ww3.arb.ca.gov/cc/inventory/pubs/reports/staff\\_report\\_1990\\_level.pdf](https://ww3.arb.ca.gov/cc/inventory/pubs/reports/staff_report_1990_level.pdf). Accessed December 27, 2019.

estimated to be 596 MMT CO<sub>2</sub>e, which do not account for reductions from AB 32 regulations.<sup>65</sup> At that rate, a 28 percent reduction was required to achieve the 427 MMT CO<sub>2</sub>e 1990 inventory. In October 2010, the ARB prepared an updated 2020 forecast to account for the effects of the 2008 recession and slower forecasted growth. The 2020 inventory without the benefits of adopted regulation is now estimated at 545 MMT CO<sub>2</sub>e. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels.<sup>66</sup>

The State has made steady progress in implementing AB 32 and achieving targets included in Executive Order S-3-05. The progress is shown in updated emission inventories prepared by ARB for 2000 through 2012 to show progress achieved to date.<sup>67</sup> The State has also achieved the Executive Order S-3-05 target for 2010 of reducing GHG emissions to 2000 levels. The 2010 emission inventory achieved this target.

The ARB Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 to comply with AB 32.<sup>68</sup> The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a Statewide renewables energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. Capped strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the

<sup>65</sup> California Air Resources Board (ARB). 2008. (includes edits made in 2009) Climate Change Scoping Plan, a framework for change. Website: [https://ww3.arb.ca.gov/cc/scopingplan/document/adopted\\_scoping\\_plan.pdf](https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf). Accessed December 27, 2019.

<sup>66</sup> California Air Resources Board (ARB). 2010. 2020 Greenhouse Gas Emissions Projection and BAU Scenario Emissions Estimate. Website: [https://ww3.arb.ca.gov/cc/inventory/archive/captrade\\_2010\\_projection.pdf](https://ww3.arb.ca.gov/cc/inventory/archive/captrade_2010_projection.pdf). Accessed December 27, 2019.

<sup>67</sup> California Air Resources Board (ARB). 2014. California Greenhouse Gas Emissions for 2000 to 2012—Trends of Emissions and Other Indicators. Website: [https://ww3.arb.ca.gov/cc/inventory/pubs/reports/ghg\\_inventory\\_00-12\\_report.pdf](https://ww3.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-12_report.pdf). Accessed December 27, 2019.

<sup>68</sup> California Air Resources Board (ARB). 2008. (includes edits made in 2009) Climate Change Scoping Plan, a framework for change. Website: [https://ww3.arb.ca.gov/cc/scopingplan/document/adopted\\_scoping\\_plan.pdf](https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf). Accessed December 27, 2019.

inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. Uncapped strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional GHG emission reductions.<sup>69</sup>

ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050.

AB 32 does not give ARB a legislative mandate to set a target beyond the 2020 target from AB 32 or to adopt additional regulations to achieve a post-2020 target. SB 32 (discussed below) is intended to pick up where AB 32 left off.

The Cap-and-Trade Program is a key element of the Scoping Plan. It sets a Statewide limit on sources responsible for 85 percent of California's GHG emissions, and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. The program is designed to provide covered entities the flexibility to seek out and implement the lowest cost options to reduce emissions. The program conducted its first auction in November 2012. Compliance obligations began for power plants and large industrial sources in January 2013. Other significant milestones include linkage to Quebec's cap-and-trade system in January 2014 and starting the compliance obligation for distributors of transportation fuels, natural gas, and other fuels in January 2015.<sup>70</sup>

The Cap-and-Trade Program provides a firm cap, ensuring that the 2020 Statewide emission limit will not be exceeded. An inherent feature of the Cap-and-Trade program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by ARB in the First Update:

The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances. But as the cap declines, aggregate emissions must be reduced. In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program if there is a reduction in GHG

<sup>69</sup> California Air Resources Board (ARB). 2008 (includes edits made in 2009). Climate Change Scoping Plan, a framework for change. Website: [http://www.arb.ca.gov/cc/scopingplan/document/adopted\\_scoping\\_plan.pdf](http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf). Accessed December 27, 2019.

<sup>70</sup> California Air Resources Board (ARB). 2015. ARB Emissions Trading Program. Website: [http://www.arb.ca.gov/cc/capandtrade/guidance/cap\\_trade\\_overview.pdf](http://www.arb.ca.gov/cc/capandtrade/guidance/cap_trade_overview.pdf). Accessed December 27, 2019.

emissions from other covered entities. Such a focus on aggregate GHG emissions is considered appropriate because climate change is a global phenomenon, and the effects of GHG emissions are considered cumulative.<sup>71</sup>

The Cap-and-Trade Program works with other direct regulatory measures and provides an economic incentive to reduce emissions. If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will be responsible for relatively more emissions reductions. Thus, the Cap-and-Trade Program assures that California will meet its 2020 GHG emissions reduction mandate:

The Cap-and-Trade Program establishes an overall limit on GHG emissions from most of the California economy—the “capped sectors.” Within the capped sectors, some of the reductions are being accomplished through direct regulations, such as improved building and appliance efficiency standards, the [Low Carbon Fuel Standard] LCFS, and the 33 percent [Renewables Portfolio Standard] RPS. Whatever additional reductions are needed to bring emissions within the cap is accomplished through price incentives posed by emissions allowance prices. Together, direct regulation and price incentives assure that emissions are brought down cost-effectively to the level of the overall cap. The Cap-and-Trade Regulation provides assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions. In sum, the Cap-and-Trade Program will achieve aggregate, rather than site specific or project-level, GHG emissions reductions. Also, due to the regulatory architecture adopted by ARB in AB 32, the reductions attributed to the Cap-and-Trade Program can change over time depending on the State's emissions forecasts and the effectiveness of direct regulatory measures.<sup>72</sup>

### ***California SB 375: Sustainable Communities and Climate Protection Act***

SB 375 was signed into law on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, “Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32.” SB 375 does the following: (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings determinations for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network if the project:

<sup>71</sup> California Air Resources Board (ARB). 2014. First Update to the Climate Change Scoping Plan. Website: <https://ww3.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm>. Accessed December 27, 2019.

<sup>72</sup> Ibid.

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the greenhouse gas emission reduction targets;
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies); and
3. Incorporates the mitigation measures required by an applicable prior environmental document.

### ***California SB 1368: Emission Performance Standards***

In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law effectively prevents California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007. The regulations implementing SB 1368 establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, of 1,100 lbs CO<sub>2</sub> per megawatt-hour (MWh).

### ***California Executive Order S-01-07: Low Carbon Fuel Standard***

The Governor signed Executive Order S 01-07 on January 18, 2007. The order mandates that a Statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009.

The Low Carbon Fuel Standard was subject to legal challenge in 2011. Ultimately, on August 8, 2013, the Fifth District Court of Appeal (California) ruled that the ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially published opinion, the Court of Appeal directed that Resolution 09-31 and two Executive Orders of ARB approving LCFS regulations promulgated to reduce GHG emissions be set aside. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, ARB was required to bring a new LCFS regulation to the Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. The second public hearing for the new LCFS regulation was held on September 24, 2015 and September 25, 2015, where the LCFS Regulation was adopted. The Final Rulemaking Package adopting the regulation was filed with the Office of Administrative Law (OAL) on October 2, 2015. The OAL approved the regulation on November 16, 2015.<sup>73</sup>

### ***California Executive Order S-13-08***

Executive Order S-13-08 states that “climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California’s economy, to the health and welfare of its population and to its natural resources.” Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy was adopted, which is the “. . . first Statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States.” Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

### ***California SBX 7-7: Water Conservation Act***

This 2009 legislation directs urban retail water suppliers to set individual 2020 per capita water use targets and begin implementing conservation measures to achieve those goals. Meeting this Statewide goal of 20 percent decrease in demand will result in a reduction of almost 2 million acre-feet in urban water use in 2020.

### ***California SB 97 and the CEQA Guidelines Update***

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The Code states “(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a).”

Section 21097 was also added to the Public Resources Code, which provided an exemption until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA. The Natural Resources Agency completed the approval process and the Amendments became effective on March 18, 2010.

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<sup>73</sup> California Air Resources Board (ARB). 2015e. Low Carbon Fuel Standard Regulation. Website: <https://ww3.arb.ca.gov/regact/2015/lcfs2015/lcfs2015.htm>. Accessed December 27, 2019.

The 2010 CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

Section 15064.4(b) of the CEQA Guidelines provides direction for lead agencies for assessing the significance of impacts of GHG emissions:

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; or
- The extent to which the project complies with regulations or requirements adopted to implement a Statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The CEQA Guidelines amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. Instead, they call for a "good-faith effort, based on available information, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project." The amendments encourage lead agencies to consider many factors in performing a CEQA analysis and preserve lead agencies' discretion to make their own determinations based upon substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts, respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze GHG emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable; however, it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of GHG Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable, according to Section 15183.5(b).

In addition, the 2010 CEQA amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in CEQA Guidelines Appendix G was amended to include GHG questions. The most recent sample environmental checklist in Appendix G was further amended in 2018 to include two energy questions.

CEQA emphasizes that the effects of GHG emissions are cumulative, and should be analyzed in the context of CEQA's requirements for cumulative impacts analysis (CEQA Guidelines § 15130(f)).

### ***California SB 350: Clean Energy and Pollution Reduction Act***

In 2015, the State legislature approved - and the Governor signed into law - SB 350 which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the renewables portfolio standard (RPS), higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for electric vehicle charging stations. Provisions for a 50 percent reduction in the use of petroleum Statewide were removed from the Bill due to opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce Statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030, with interim targets of 40 percent by 2024, and 25 percent by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission, the California Energy Commission, and local publicly owned utilities.
- Reorganize the Independent System Operator (ISO) to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States.<sup>74</sup>

### ***California Executive Order B-30-15***

On April 29, 2015, an executive order was issued by the Governor to establish a California GHG emissions reduction target of 40 percent below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the United Nations Climate Change Conference in Paris late 2015. The executive order sets a new interim Statewide GHG emission reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050, and directs the ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of MM CO<sub>2</sub>e. The executive order also requires the State's climate adaptation plan to be updated every three years and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this executive order is not legally enforceable against local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

### ***California Senate Bill 32***

The Governor signed SB 32 in September of 2016, giving the ARB the statutory responsibility to include the 2030 target previously contained in Executive Order B-30-15 in the 2017 Scoping Plan Update. SB 32 states that "In adopting rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions authorized by this division, the state

<sup>74</sup> California Legislative Information (California Leginfo). 2015. Senate Bill 350 Clean Energy and Pollution Reduction Act of 2015. Website: [https://leginfo.ca.gov/faces/billNavClient.xhtml?bill\\_id=201520160SB350](https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350). Accessed December 27, 2019.

[air resources] board shall ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030.” The 2017 Climate Change Scoping Plan Update addressing the SB 32 targets was adopted on December 14, 2017. The major elements of the framework proposed to achieve the 2030 target are as follows:

1. SB 350
  - Achieve 50 percent Renewables Portfolio Standard (RPS) by 2030.
  - Doubling of energy efficiency savings by 2030.
2. Low Carbon Fuel Standard (LCFS)
  - Increased stringency (reducing carbon intensity 18 percent by 2030, up from 10 percent in 2020).
3. Mobile Source Strategy (Cleaner Technology and Fuels Scenario)
  - Maintaining existing GHG standards for light- and heavy-duty vehicles.
  - Put 4.2 million zero-emission vehicles (ZEVs) on the roads.
  - Increase ZEV buses, delivery and other trucks.
4. Sustainable Freight Action Plan
  - Improve freight system efficiency.
  - Maximize use of near-zero emission vehicles and equipment powered by renewable energy.
  - Deploy over 100,000 zero-emission trucks and equipment by 2030.
5. Short-Lived Climate Pollutant (SLCP) Reduction Strategy
  - Reduce emissions of methane and hydrofluorocarbons 40 percent below 2013 levels by 2030.
  - Reduce emissions of black carbon 50 percent below 2013 levels by 2030.
6. SB 375 Sustainable Communities Strategies
  - Increased stringency of 2035 targets.
7. Post-2020 Cap-and-Trade Program
  - Declining caps, continued linkage with Québec, and linkage to Ontario, Canada.
  - ARB will look for opportunities to strengthen the program to support more air quality co-benefits, including specific program design elements. In Fall 2016, ARB staff described potential future amendments including reducing the offset usage limit, redesigning the allocation strategy to reduce free allocation to support increased technology and energy investment at covered entities and reducing allocation if the covered entity increases criteria or toxics emissions over some baseline.
8. 20 percent reduction in GHG emissions from the refinery sector.
9. By 2018, develop Integrated Natural and Working Lands Action Plan to secure California’s land base as a net carbon sink.

**California Code of Regulations Title 24***Part 6 (Energy Efficiency Standards for Residential and Nonresidential Buildings)*

California Code of Regulations Title 24 Part 6 (California's Energy Efficiency Standards for Residential and Nonresidential Buildings), was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The 2016 Building Energy Efficiency Standards went into effect on January 1, 2017.<sup>75</sup> The 2019 Building Energy Efficiency Standards are scheduled to go into effect on January 1, 2020.

*Part 11 (California Green Building Standards Code)*

California Code of Regulations Title 24, Part 11, is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect January 1, 2011. The code is updated on a regular basis, with the most recent update consisting of the 2016 California Green Building Code Standards that became effective January 1, 2017.<sup>76</sup> Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy, which is generally enforced by the local building official.

**California Model Water Efficient Landscape Ordinance**

The Model Water Efficient Landscape Ordinance (Ordinance) was required by AB 1881 Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Reductions in water use of 20 percent consistent with (SBX-7-7) 2020 mandate are expected for Ordinance. Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed DWR to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015, which became effective on December 15, 2015. New development projects that include landscaped areas of 500 square feet or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems
- Incentives for graywater usage
- Improvements in on-site stormwater capture
- Limiting the portion of landscapes that can be planted with high water use plants
- Reporting requirements for local agencies.

<sup>75</sup> California Energy Commission (CEC). 2016. 2016 Building Energy Efficiency Standards Frequently Asked Questions. Website: [http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016\\_Building\\_Energy\\_Efficiency\\_Standards\\_FAQ.pdf](http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf). Accessed December 27, 2019.

<sup>76</sup> California Building Standards Commission (CBC). 2016. Green Building Standards. Website: [https://www.ladbs.org/docs/default-source/publications/code-amendments/2016-calgreen\\_complete.pdf?sfvrsn=6](https://www.ladbs.org/docs/default-source/publications/code-amendments/2016-calgreen_complete.pdf?sfvrsn=6). Accessed December 27, 2019.

### **California Green Building Code**

The Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations [CCR] Title 24, Part 6) were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technology and methods. The most recent update of standards became effective in January 1, 2017. California's building efficiency standards (including standards for energy-efficient appliances). The Energy Commission staff has estimated that the implementation of the 2016 Building Energy Efficiency Standards may reduce Statewide annual electricity consumption by approximately 281 gigawatt-hours per year and reduce GHG emissions by 160 thousand metric tons CO<sub>2</sub>e per year.<sup>77</sup>

### **Regional**

#### **Bay Area 2017 Clean Air Plan**

BAAQMD is responsible for attaining and maintaining federal and state air quality standards in the San Francisco Bay Area Air Basin, as established by the federal CAA and the California Clean Air Act (CCAA), respectively. The CAA and CCAA require that plans be developed for areas that do not meet air quality standards. BAAQMD adopted the Bay Area Clean Air Plan: Spare the Air, Cool the Climate (Bay Area Clean Air Plan) on April 19, 2017, to provide a regional strategy to improve Bay Area air quality and meet public health goals.<sup>78</sup> The control strategy described in the Bay Area Clean Air Plan includes a wide range of control measures designed to reduce emissions and lower ambient concentrations of harmful pollutants, safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, and reduce GHG emissions to protect the climate.

In addition, BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The program includes GHG-reduction measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative energy sources.<sup>79</sup>

The BAAQMD CEQA Air Quality Guidelines also assist lead agencies in complying with CEQA requirements regarding potentially adverse impacts on air quality. BAAQMD advises lead agencies to consider adopting a GHG reduction strategy capable of meeting AB 32 goals. This is consistent with the approach to analyzing GHG emissions described in State CEQA Guidelines Section 15183.5.

### **Rules and Regulations**

All projects under the jurisdiction of the BAAQMD are required to comply with all applicable BAAQMD rules and regulations. Applicable BAAQMD's regulations and rules include, but are not limited to, the following:

- Regulation 6: Particulate Matter and Visible Emissions

<sup>77</sup> California Energy Commission (CEC). 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. Website: <https://www.energy.ca.gov/2015publications/CEC-400-2015-037/CEC-400-2015-037-CMF.pdf>. Accessed December 27, 2019.

<sup>78</sup> Bay Area Air Quality Management District (BAAQMD). 2017. Spare the Air—Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area. Final 2017 Clean Air Plan. Website: [https://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a\\_-proposed-final-cap-vol-1-pdf.pdf?la=en](https://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en). Accessed December 27, 2019.

<sup>79</sup> Bay Area Air Quality Management District (BAAQMD). 2010. Climate Protection Planning Program. Website: <http://www.baaqmd.gov/plans-and-climate/climate-protection/climate-protection-program>. Accessed December 27, 2019.

- Rule 2: Commercial Cooking Equipment
- Rule 3: Wood-burning Devices

## Local

### *City of Antioch General Plan*

The City of Antioch General Plan was adopted November 24, 2003.<sup>80</sup> The following are applicable General Plan goals and policies related to GHG from the City of Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area:

- **Policy 4.4.6.7ff:** The Sand Creek Focus Area is intended to be “transit-friendly,” including appropriate provisions for public transit and non-motorized forms of transportation.
- **Objective 10.6.1:** Minimize air pollutant emissions within the Antioch Planning Area so as to assist in achieving state and federal air quality standards.
- **Policy 10.6.2b:** Require developers of large residential and non-residential projects to participate in programs and to take measures to improve traffic flow and/or reduce vehicle trips resulting in decreased vehicular emissions. Examples of such efforts may include, but are not limited to the following:
  - Development of mixed-use projects, facilitating pedestrian and bicycle transportation and permitting consolidation of vehicular trips.
  - Installation of transit improvements and amenities, including dedicated bus turnouts and sufficient rights-of-way for transit movement, bus shelters, and pedestrian easy access to transit.
  - Provision of bicycle and pedestrian facilities, including bicycle lanes and pedestrian walkways connecting residential areas with neighborhood commercial centers, recreational facilities, schools, and other public areas.
  - Contributions for off-site mitigation for transit use.
  - Provision of charging stations for electric vehicles within large employment-generating and retail developments.

### *City of Antioch Climate Action Planning*

In 2007, the City of Antioch joined the International Council for Local Environmental Initiatives (ICLEI). As a member of the ICLEI, the City drafted and adopted two Climate Action Plans, one for municipal operations and the other for community-wide operations.<sup>81</sup> Both Climate Action Plans provided GHG emissions inventories, with the Municipal Climate Action Plan considering emissions related to the provision of water, wastewater, and solid waste services, as well as assessing emissions related to the City’s vehicle fleet, street lights within the City, City facilities, and employee commutes. Concurrently, the Community Climate Action Plan (CCAP) inventoried emissions related to residential energy consumption, industrial energy use, commercial energy use, solid waste, transportation and other mobile sources, solid waste generation, water consumption, and wastewater production. In compliance with AB 32, emissions reduction targets were established for both community and municipal emissions, and two different approaches were implemented to meet

<sup>80</sup> City of Antioch. 2003. City of Antioch General Plan. November 24. Website: [https://www.antiochca.gov/fc/community-development/planning/Antioch\\_Adopted\\_General\\_Plan.pdf](https://www.antiochca.gov/fc/community-development/planning/Antioch_Adopted_General_Plan.pdf). Accessed September 30, 2019.

<sup>81</sup> City of Antioch. 2011. Antioch Community Climate Action Plan. Website: <https://www.antiochca.gov/environmental-resources/climate-change/>. Accessed December 12, 2019.

the identified targets. The Municipal Climate Action Plan established measures and policies related to each emission source category, which would reduce existing and future emission from the identified sources. Simultaneously, the CCAP included GHG reduction strategies related to land use and transportation, green building and energy, and education and behavior change. The proposed project is community land-use development project and therefore only the community aspect of the CCAP would apply to the proposed project.

Although the CCAP does not include quantitative thresholds to assess a project's compliance with the CCAP, projects that are in compliance with AB 32 would be considered compliant with the CCAP. For instance, project's showing emissions reductions as required by AB 32, or projects incorporating reduction strategies from the CCAP are understood to be in compliance with the CCAP's GHG emissions reductions goals.

#### ***Multi-Generational Plan and Traditional Plan Compliance with the Community Climate Action Plan***

The City's CCAP was established to ensure the City's compliance with the Statewide GHG reduction goals required by AB 32. The CCAP included emissions reduction targets for the City, as well as reduction strategies, but did not specify project-level emissions thresholds. Although the City's CCAP did not establish project-level thresholds to assess a project's compliance with AB 32, the BAAQMD adopted thresholds are designed to assess a project's compliance with AB 32 and Statewide reduction goals. Therefore, if GHG emissions relating to implementation of a project are below the BAAQMD's thresholds of significance, the project would be considered in compliance with AB 32 and the goals of the City's CCAP.

### **3.7.4 - Impacts and Mitigation Measures**

According to 2019 CEQA Guidelines Appendix G, to determine whether impacts related to GHG emissions are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?
- c) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?
- d) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

The impacts associated with GHG emissions are inherently a cumulative impact given that climate change is an accumulation of global projects that collectively affect global climate. Therefore, the analysis below evaluates the GHG and cumulative impacts of the proposed project.

## Approach to Analysis

### ***GHG Emissions Generation Calculation Methodology***

The California Emissions Estimator Model (CalEEMod) version 2016.3.2 was used to estimate the proposed project's construction and operation-related GHG emissions. CalEEMod was developed in cooperation with air districts throughout the State and is designed as a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential GHG emissions associated with construction and operation from a variety of land uses.

#### *Construction*

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and prevailing weather conditions. Construction emissions result from on-site and off-site activities. On-site GHG emissions principally consist of exhaust emissions from heavy-duty construction equipment. Off-site GHG emissions would occur from motor vehicle exhaust from material delivery vehicles and construction worker traffic.

Construction activities would consist of demolition, mass grading, building construction, asphalt paving of roadways, and architectural coating of the inside and outside of the buildings. For each construction activity, the construction equipment operating hours and numbers represent the average equipment activity over the duration of the activity.

The duration of construction activity and associated equipment represent a reasonable approximation of the expected construction fleet as required by the CEQA Guidelines. Full construction emissions modeling parameters and assumptions are provided in Appendix C.

#### *Operation*

Operational GHG emissions are those GHG emissions that would occur during long-term operation of the project. Project operations were modeled for the year 2029 and the year 2030. The major sources for operational GHG emissions are summarized below.

#### **Motor Vehicles**

Motor vehicle emissions refer to exhaust and road dust emissions from the automobiles that would travel to and from the project site. The emissions were estimated using CalEEMod. The trip generation rates for operations associated with the proposed project were obtained from the transportation impact assessment (included in Appendix K).<sup>82</sup> As weekend trips were not explicitly stated in the transportation impact assessment, weekday trip generation rates were applied to both Saturday and Sunday trips. This presents a conservative analysis because the averaged weekend trip generation rates in the ITE Manual<sup>83</sup> for each of the land uses are lower than the weekday trip generation rate.

Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the project on an adjacent

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<sup>82</sup> Fehr & Peers. 2019. The Ranch Final Transportation Impact Assessment. December.

<sup>83</sup> Institute of Transportation Engineers (ITE). 2017. Trip Generation Manual, 10<sup>th</sup> Edition.

street or roadway that offers direct access to the generator. Pass-by trips are not diverted from another roadway. The CalEEMod defaults pass-by trips were used for this analysis.

The CalEEMod default round trip lengths for an urban setting for Contra Costa County were used in this analysis. The vehicle fleet mix is defined as the mix of motor vehicle classes active during the operation of the proposed project. Emission factors are assigned to the expected vehicle mix as a function of vehicle class, speed, and fuel use (gasoline and diesel-powered vehicles). The CalEEMod default vehicle fleet mix for Contra Costa County was used for this analysis.

#### **Landscape Equipment**

The use of landscaping equipment (leaf blowers, chain saws, mowers) would generate GHG emissions as a result of fuel combustion based on assumptions in CalEEMod.

#### **Natural Gas**

These emissions refer to the GHG emissions that occur when natural gas is burned on the project site. Natural gas uses could include heating water, space heating, dryers, stoves, or other uses.

#### **Stationary Sources**

These emissions refer to emergency generators and fire pumps associated with the proposed fire station.

#### **Indirect GHG Emissions**

For GHG emissions, CalEEMod contains calculations to estimate indirect GHG emissions. Indirect emissions are emissions where the location of consumption or activity is different from where the actual emissions are generated. For example, electricity would be consumed at the proposed residential units; however, the emissions associated with producing that electricity are generated off-site at a power plant.

CalEEMod includes calculations for indirect GHG emissions for electricity consumption, water consumption, and solid waste disposal. For water consumption, CalEEMod calculates the embedded energy (e.g., treatment, conveyance, distribution) associated with providing each gallon of potable water to the proposed project. For solid waste disposal, CalEEMod calculates the GHG emissions generated as solid waste generated by the project decomposes in a landfill.

For electricity-related emissions, CalEEMod contains default electricity intensity factors for various utilities throughout California. For the purposes of the proposed project, emission factors for PG&E were selected to quantify electricity emissions. The project is proposed to be operational in the year 2029. As such, the CO<sub>2</sub> emission factor was adjusted consistent to the SB-1078 RPS goal of achieving utility providers achieving 33 percent mix of renewable energy in their retail sales. The adjusted PG&E CalEEMod emission factors are shown below for the year 2029.

- **Carbon dioxide:** 491.65 pound per megawatt hour (lb/MWh)
- **Methane:** 0.022 lb/MWh
- **Nitrous oxide:** 0.005 lb/MWh

SB 350 requires an increase in the amount of electricity procured from renewable energy sources from 33 percent to 50 percent by 2030. Therefore, the adjusted PG&E CalEEMod emission factors are shown below for the year 2030.

- **Carbon dioxide:** 292.24 pound per megawatt hour (lb/MWh)
- **Methane:** 0.022 lb/MWh
- **Nitrous oxide:** 0.005 lb/MWh

#### Refrigerants

During operation, there may be leakage of refrigerants from air conditioners and the refrigeration system. HFCs are typically used for refrigerants, which are long-lived GHGs. Residential uses of refrigerants are minor; therefore, they were not estimated.

#### Life Cycle Emissions

An upstream GHG emissions source (also known as life cycle emissions) refers to emissions that are generated during the manufacturing and transportation of products that would be utilized for project construction. Upstream emission sources for construction of the proposed project include but are not limited to GHG emissions from the manufacturing of cement and steel as well as from the transportation of building materials to the seller of such products. The upstream emissions associated with construction of the proposed project has not been estimated as part of this impact analysis, because such upstream emissions are not within the control of the proposed project, the information is not readily available, and to characterize these emissions would be speculative. Additionally, the California Air Pollution Control Officers Association (CAPCOA) White Paper on CEQA and Climate Change supports this approach by stating, “The full life-cycle of GHG emissions from construction activities is not accounted for . . . and the information needed to characterize [life-cycle emissions] would be speculative at the CEQA analysis level.”<sup>84</sup> Therefore, pursuant to CEQA Guidelines Sections 15144 and 15145, upstream/life cycle emissions are speculative, and is not further discussed as part of this impact analysis.

#### Vegetation

There is currently carbon sequestration occurring on-site from existing vegetation. The project site currently includes several trees and open space vegetation that would help sequester carbon. The proposed project would preserve over 95 percent of existing trees and additionally plant trees and integrate landscaping into the project design, which would continue to provide carbon sequestration. However, data are insufficient to accurately determine the impact that existing plants have on carbon sequestration. For this analysis, it was conservatively assumed that the loss and addition of carbon sequestration that are due to the proposed project would be balanced; therefore, emissions due to carbon sequestration were not included.

#### **GHG Emissions Reduction Plan Consistency Determination Methodology**

In determining whether a project or plan conflicts with any applicable plan, policy, or regulation, the California Natural Resources Agency has stated that in order to be used for the purpose of

<sup>84</sup> California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Available: <http://capcoa.org/wp-content/uploads/downloads/2010/05/CAPCOA-White-Paper.pdf>. Accessed: December 27, 2019.

determining significance, an applicable plan, policy, or regulation must contain specific requirements that result in reductions of GHG emissions to a less than significant level. The proposed project is assessed for its consistency with the City of Antioch's CCAP. This would be achieved with an assessment of the proposed project's compliance with applicable measures contained in the CCAP. The proposed project is also assessed for its consistency with the ARB's adopted AB 32 Scoping Plan and the ARB's adopted 2017 Climate Change Scoping Plan Update. The Scoping Plan Update includes the SB 32 goal of reducing Statewide GHG emissions to at least 40 percent below the Statewide GHG emissions limit by 2030.

### ***Energy Consumption Methodology***

For the purposes of this EIR, the approach to analysis for energy use is based on 2019 CEQA Guidelines Appendix F (Energy Conservation). CEQA Guidelines Appendix F is focused on the goal of conserving energy through the wise and efficient use of energy. The anticipated electricity and natural gas consumption associated with the proposed project were estimated using default CalEEMod assumptions. CalEEMod contains default energy intensity rates for the various land uses selected.

### ***Renewable Energy/Energy Efficiency Plan Consistency Determination Methodology***

The proposed project would be determined to conflict with or obstruct a State or local plan for renewable energy or energy efficiency if the proposed project would not adhere to the energy use reduction measures included in the California Green Building Code or required by the City of Antioch during construction or operational activities.

## **Specific Thresholds of Significance**

### ***GHG Emissions Generation***

The City of Antioch utilizes BAAQMD quantitative thresholds for evaluation of GHG emissions. BAAQMD provides multiple options in its 2017 BAAQMD CEQA Guidelines for operational GHG emissions generation significance thresholds. At the time of this analysis, BAAQMD has not yet provided a construction-related GHG emissions generation significance threshold, but it does recommend that construction-generated GHGs be quantified and disclosed.

BAAQMD's project-level significance threshold for operational GHG generation was deemed appropriate to use when determining the proposed project's potential GHG impacts. The thresholds suggested by BAAQMD are as follows:

- Compliance with a qualified GHG Reduction Strategy, or
- 1,100 MT CO<sub>2</sub>e per year, or
- 4.6 MT CO<sub>2</sub>e per service population (employees plus residents) per year (for 2020)

It should be noted that the BAAQMD's thresholds of significance were established based on meeting the 2020 GHG targets set forth in the AB 32 Scoping Plan. For developments that would occur beyond 2020, the service population threshold of significance (4.6 MT CO<sub>2</sub>e/service population/year) was adjusted to a "substantial progress" threshold that was calculated based on the GHG reduction goals of SB 32/Executive Order B-30-15 and the projected 2030 Statewide population and

employment levels.<sup>85</sup> The 2017 Scoping Plan provides an intermediate target that is intended to achieve reasonable progress towards goals for 2050 under Executive Order S-3-05. The efficiency threshold of 2.6 MT CO<sub>2</sub>e/service population/year is needed to meet the 2030 target. To determine significance for this criterion, the proposed project's GHG emissions are assessed against the 2.6 MT CO<sub>2</sub>e/service population/year threshold for the 2030 operational year. Although the BAAQMD does not have an adopted threshold for 2030, the BAAQMD is currently recommending evaluation of GHG significance based on 2030 GHG targets established in SB 32.

### ***GHG Emissions Reduction Plan Consistency***

The proposed project would be determined to conflict with any applicable GHG emissions reduction plan if it would not adhere to applicable GHG reduction measures included in:

- AB 32 (the ARB-adopted Scoping Plan); or
- SB 32 (the ARB-adopted 2017 Climate Change Scoping Plan Update).

### ***Energy***

The City of Antioch does not have quantitative thresholds for evaluation of energy; however, the following qualitative thresholds are used to evaluate the significance of energy impacts resulting from implementation of the proposed project if the project would:

- Result in a wasteful, inefficient, and unnecessary consumption of energy during construction and operational activities; or if
- Construction and operation of buildings and appliances would not adhere to the energy-use reduction measures included in the California Green Building Code and required by the City of Antioch.

## **Impact Evaluation**

### ***GHG Emissions Generation***

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<b>Impact GHG-1:</b>	<b>The project could generate direct and indirect greenhouse gas emissions that could result in a significant impact on the environment even with mitigation.</b>
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This GHG emissions generation analysis is restricted to emissions of the GHGs identified as those of California concern by AB 32 and SB 32, which include CO<sub>2</sub>, methane, nitrous oxide, HFC, PFC, and SF<sub>6</sub>. The proposed project would generate a variety of GHG emissions during construction and operation, including several defined by AB 32 and SB 32 such as CO<sub>2</sub>, methane, nitrous oxide, and HFCs. Certain GHGs defined by AB 32 and SB 32 would not be generated by the proposed project such as PFCs and SF<sub>6</sub>. As such, CO<sub>2</sub>e emissions discussed below are limited to a combination of emissions of CO<sub>2</sub>, methane, nitrous oxide, HFC, PFC, and SF<sub>6</sub>.

### ***Construction***

Construction of the proposed project would emit GHG emissions during construction from the off-road construction equipment, worker vehicles, and any hauling that may occur. Total GHG emissions

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<sup>85</sup> Personal communication with BAAQMD staff in January 2020.

generated during all construction activities were quantified and combined and are presented in Table 3.7-4. In order to assess the construction emissions, the total emissions generated during construction were amortized based on the life of the development (30 years) and added to the operational emissions. As shown in Table 3.7-4 construction of the proposed project would generate approximately 9,836 MT CO<sub>2</sub>e over the entire construction duration, which is approximately 328 MT CO<sub>2</sub>e per year when amortized over 30 years. The amortized emissions from construction were added to the operational emissions to determine the total emissions. These total emissions were analyzed against the 2020 BAAQMD emissions threshold of 4.6 MT CO<sub>2</sub>e/service population/year and the projected 2.6 MT CO<sub>2</sub>e/service population/year for the 2030 operational year.

**Table 3.7-4: Unmitigated Project Construction GHG Emissions**

Construction Activity	Total Emissions (MT CO <sub>2</sub> e/year)
Demolition—2021	18
Site Preparation—2021	35
Grading—2021	149
Building Construction—2021	353
Building Construction—2022	1,584
Building Construction—2023	1,246
Architectural Coating—2023	20
Paving—2023	39
Site Preparation—2024	37
Grading—2024	163
Building Construction—2024	610
Building Construction—2025	1,236
Building Construction—2026	934
Architectural Coating—2026	17
Paving—2026	42
Site Preparation—2027	40
Grading—2027	165
Building Construction—2027	652
Building Construction—2028	1,363
Building Construction—2029	1,068
Architectural Coating—2029	19
Paving—2029	44
<b>Total Construction Emissions</b>	<b>9,836</b>

**Table 3.7-4 (cont.): Unmitigated Project Construction  
GHG Emissions**

Construction Activity	Total Emissions (MT CO <sub>2</sub> e/year)
<b>Construction Emissions Amortized Over the Life of the Project (30 years)</b>	<b>328</b>
Note: Calculations use rounded numbers. Source: CalEEMod Output (see Appendix C).	

**Operation**

Operational or long-term emissions occur over the life of a project. The operational GHG emissions are combined with the amortized construction emissions and compared with the BAAQMD's per-service-population threshold to make a significance determination. Major sources for operational emissions are summarized below, and are described in more detail above under the Approach to Analysis section. Sources for operational emissions include:

- **Motor Vehicles:** These emissions refer to GHG emissions contained in the exhaust from the cars and trucks that would travel to and from the project site.
- **Natural Gas:** These emissions refer to the GHG emissions that occur when natural gas is burned within the project site. Natural gas uses could include heating water, space heating, dryers, stoves, or other uses.
- **Indirect Electricity:** These emissions refer to those generated by off-site power plants to supply electricity required for the proposed project.
- **Stationary Sources:** These emissions refer to emergency generators and fire pumps associated with the proposed fire station.
- **Water Transport:** These emissions refer to those generated by the electricity required to transport and treat the water to be used by the proposed project.
- **Waste:** These emissions refer to the GHG emissions produced by decomposing waste generated by the proposed project.

Operational GHG emissions by source are shown in Table 3.7-5. As previously indicated, the analysis includes construction emissions amortized over the life of the proposed project. The estimated total annual emissions that would be generated by the proposed project, including operational emissions and amortized construction emissions, were compared with the BAAQMD threshold 4.6 MT CO<sub>2</sub>e/service population/year to determine significance at buildout in the year 2029, and the BAAQMD threshold of 2.6 MT CO<sub>2</sub>e/service population/year to determine significance in the year 2030.

**Table 3.7-5: Unmitigated Project Operational GHG Emissions**

Emission Source	Year 2029 Total Emissions (MT CO <sub>2</sub> e per year)	Year 2030 Total Emissions (MT CO <sub>2</sub> e per year)
Area	49	49
Energy	3,975	3,036
Mobile	7,521	6,903
Stationary	1	1
Waste	837	745
Water	263	161
Amortized Construction Emissions	328	328
<i>Total Project Emissions</i>	<i>12,973</i>	<i>11,222</i>
Service Population (residents and employees)	3,858	3,858
<b>Project emission generation (MT CO<sub>2</sub>e/year/service population)</b>	<b>3.4</b>	<b>2.9</b>
<b>Applicable BAAQMD Threshold (MT CO<sub>2</sub>e/year/service population)</b>	<b>4.6</b>	<b>2.6</b>
<b>Does Project exceed threshold?</b>	<b>No</b>	<b>Yes</b>
Notes: MT CO <sub>2</sub> e = metric tons of carbon dioxide equivalent. Rounded results used to calculate totals. <sup>1</sup> Adjusted threshold to account for 2017 Scoping Plan Update 40 percent reduction goal by 2030 Source of Emissions: CalEEMod Output (Appendix C).		

As shown in Table 3.7-5, the proposed project would generate approximately 12,973 MT CO<sub>2</sub>e per year in 2029 and 11,222 MT CO<sub>2</sub>e per year in 2030 in terms of total (amortized construction plus operational) project GHG emissions. Therefore, the proposed project would not exceed the BAAQMD's threshold of 4.6 MT CO<sub>2</sub>e/year/service population at project buildout, but the proposed project would exceed the threshold of 2.6 MT CO<sub>2</sub>e/year/service population for the 2030 GHG emissions. This represents a potentially significant impact, and mitigation would be required to reduce the proposed project's estimated generation of GHG emissions.

The measures outlined in MM GHG-1 are recommended to reduce GHG emissions to less than significant levels. There are several options available to mitigate project emissions shown in Table 3.7-6. The project could achieve the equivalent of net zero electricity use through a combination of on-site generation or through the purchase of renewable electricity from the utility provider. PG&E currently offers the option to purchase 100 percent renewable energy through the "Solar Choice" program.

Table 3.7-6 shows the total project operational GHG emissions with the use of renewable electricity. As shown in Table 3.7-6, 1,191 MT CO<sub>2</sub>e of carbon credit offsets per year starting in year 2030 would be required to reduce annual operational GHG emissions during the year 2030.

**Table 3.7-6: Mitigated Project 2030 Operational GHG Emissions**

Emission Source	Year 2030 Total Emissions (MT CO <sub>2</sub> e per year)
Area	49
Energy	1,845
Mobile	6,903
Stationary	1
Waste	745
Water	161
Amortized Construction Emissions	328
<i>Total Project Emissions</i>	<i>10,031</i>
Service Population (residents and employees)	3,858
<b>Carbon Credit Offset Required to Meet Threshold (MT CO<sub>2</sub>e/year)</b>	<b>1,191</b>
<b>Project emission generation with the Purchase of Carbon Credit Offsets (MT CO<sub>2</sub>e/year/service population)</b>	<b>2.6</b>
<b>Applicable BAAQMD Threshold (MT CO<sub>2</sub>e/year/service population)</b>	<b>2.6</b>
<b>Does Project exceed threshold?</b>	<b>No</b>
Notes: MT CO <sub>2</sub> e = metric tons of carbon dioxide equivalent. Rounded results used to calculate totals. <sup>1</sup> Adjusted threshold to account for 2017 Scoping Plan Update 40 percent reduction goal by 2030 Source of Emissions: CalEEMod Output (Appendix C).	

As shown in Table 3.7-6, annual operational GHG emissions would not exceed the applicable thresholds with implementation of MM GHG-1. Therefore, the proposed project would not result in a significant generation of GHG emissions after incorporation of that mitigation. However, it is unknown whether carbon credits will be available and/or feasible to obtain. Further, the fate of PG&E and its renewable resources programs is uncertain. While the proposed project would be required to implement all feasible mitigation, given the uncertainty of credits and programs, the City cannot guarantee full and timely mitigation. As a result, this impact would conservatively be significant and unavoidable.

#### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

The recommended mitigation measures listed below shall be implemented in addition to all project design features.

#### **MM GHG-1      Implement potentially feasible mitigation measures**

Prior to the issuance of the last certificate of occupancy (or as otherwise specifically stated), the project Applicant shall provide documentation to the City of Antioch that the proposed project has employed one or more of the following measures to reduce greenhouse gas (GHG) emissions (i.e., 1,191 metric tons of carbon dioxide equivalent per year (MT CO<sub>2</sub>e/year) to at or below 2.6 MT CO<sub>2</sub>e/year/service population by 2030:

- Purchased electricity from a utility offering 100 percent renewable power for some or all of the proposed project's power needs.
- Installed on-site solar panels to generate electricity for a portion or all of project electricity consumption.
- Installed on-site charging units for electric vehicles consistent with parking requirements in California Green Building Standards Code (CALGreen) Section 5.106.5.2.
- Implemented a ride sharing program for employees starting no later than 60 days after commercial operations begin.
- Purchased voluntary carbon credits from a verified GHG emissions credit broker in an amount sufficient to offset operational GHG emissions of approximately 34,531 MT CO<sub>2</sub>e over the lifetime of the proposed project (or a reduced amount estimated based on implementation of other measures listed above). Copies of the contract(s) shall be provided to the City Planning Department.

### ***Level of Significance After Mitigation***

Significant and Unavoidable

### ***GHG Emissions Reduction Plan Consistency***

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**Impact GHG-2:      The project would not conflict with any applicable plan, policy, or regulation of an agency adopted to reduce the emissions of greenhouse gases.**

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The City of Antioch's CCAP was established to ensure the City's compliance with the Statewide GHG reduction goals required by AB 32.<sup>86</sup> The CCAP included emissions reduction targets for the City, as well as reduction strategies, but did not specify project-level emissions thresholds. Although the City's CCAP did not establish project-level thresholds to assess a project's compliance with AB 32, the BAAQMD adopted thresholds are designed to assess a project's compliance with AB 32 and Statewide reduction goals. Therefore, if GHG emissions relating to implementation of a project are

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<sup>86</sup> City of Antioch. 2011. Antioch Community Climate Action Plan. Website: <https://www.antiochca.gov/environmental-resources/climate-change/>. Accessed December 12, 2019.

below the BAAQMD's thresholds of significance, the proposed project would be considered in compliance with AB 32 and the goals of the City's CCAP.

The City's CCAP is focused on 2020 level reductions and does not include project-level emissions thresholds. Therefore, the proposed project is also assessed for its consistency with the ARB's adopted AB 32 Scoping Plan and the ARB adopted 2017 Climate Change Scoping Plan Update. This would be achieved with an assessment of the proposed project compliance with applicable Scoping Plan measures.

### **Construction**

Impacts related to a project's consistency with a GHG emissions reduction plan are primarily related to long-term operational activities. However, short-term construction activities would comply with and use equipment and fuel consistent with Statewide requirements set forth in the AB 32 Scoping Plan or the 2017 Scoping Plan Update. For example, fuel used during construction of the proposed project would be compliant with the California Low Carbon Fuel Standard. Because construction of the proposed project would not conflict with the AB 32 Scoping Plan or the 2017 Scoping Plan Update, the construction impact related to consistency with an applicable GHG emissions reduction plan would be less than significant.

### **Operation**

#### **City of Antioch CCAP Consistency**

The City of Antioch adopted its CCAP in 2011.<sup>87</sup> The proposed project would include several reduction strategies from the City's CCAP. The proposed project would include residential and commercial development along transit corridors (i.e., Deer Valley Road). Such mixed-use and transit friendly development would be consistent with Land Use Strategy L1 of the City's CCAP. The proposed project would include extensive bicycle lanes and pedestrian facilities, and the project site provides access to bus and rail services, thus encouraging alternative modes of transportation, in compliance with Transportation Strategy T7. The landscape design approach outlined in the Ranch Design Guidelines includes minimizing manicured landscapes and extensive lawns.<sup>88</sup> This low-maintenance landscaping design approach is consistent with the Land Use Strategy L5. Furthermore, since the adoption of CCAP the California Building Standards Commission (CBSC) has been updated twice, including updates to the CALGreen Code and the California Building Energy Efficiency Standards.<sup>89</sup> The updates to the CBSC require that new commercial and residential structures be built with energy and water efficiencies equal to or in excess of the efficiencies required by the CCAP's Green Building and Energy Strategies. Finally, the CBSC requires that certain new developments include electric vehicle charging infrastructure. The Ranch Design Guidelines anticipate a site-wide electrical system to accommodate increased loads associated with Level 2 Electric Vehicle (EV) charging in each residence, which would

<sup>87</sup> City of Antioch. 2011. Antioch Community Climate Action Plan. Website: <https://www.antiochca.gov/environmental-resources/climate-change/>. Accessed December 12, 2019.

<sup>88</sup> Ascent Environmental. 2018. The Ranch at Antioch Development Standards & Design Guidelines. October.

<sup>89</sup> California Building Standards Commission (CBSC). 2016. Green Building Standards. Website: [https://www.ladbs.org/docs/default-source/publications/code-amendments/2016-calgreen\\_complete.pdf?sfvrsn=6](https://www.ladbs.org/docs/default-source/publications/code-amendments/2016-calgreen_complete.pdf?sfvrsn=6). Accessed December 27, 2019.

promote electric vehicle use in compliance with Transportation Strategies T8 and T9.<sup>90</sup> Therefore, the proposed project would be consistent with the City’s CCAP.

**AB 32 (ARB Adopted Scoping Plan) Consistency**

The California State Legislature adopted AB 32 in 2006. AB 32 focuses on reducing GHG emissions to 1990 levels by the year 2020. Pursuant to the requirements in AB 32, the ARB adopted the Climate Change Scoping Plan (Scoping Plan) in 2008, which outlines actions recommended to obtain that goal. The Scoping Plan calls for an “ambitious but achievable” reduction in California’s GHG emissions, cutting approximately 30 percent from BAU emission levels projected for 2020, or about 10 percent from 2008 levels. The Scoping Plan contains a variety of strategies to reduce the State’s emissions. As shown in Table 3.7-7, the proposed project is consistent with most of the strategies, while others are not applicable.

**Table 3.7-7: AB 32 (ARB-adopted 2008 Scoping Plan) Consistency Analysis**

Scoping Plan Reduction Measure	Consistency
1. <b>California Cap-and-Trade Program Linked to Western Climate Initiative.</b> Implement a broad-based California Cap-and-Trade program to provide a firm limit on emissions. Link the California Cap-and-Trade Program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California’s program meets all applicable AB 32 requirements for market-based mechanisms.	<b>Not applicable.</b> Although the cap-and-trade system has begun, the proposed project is not targeted by the cap-and-trade system regulations and therefore this measure does not apply to the proposed project.
2. <b>California Light-Duty Vehicle GHG Standards.</b> Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.	<b>Not applicable.</b> This is a Statewide measure that cannot be implemented by a project Applicant or lead agency. California light-duty vehicle GHG standards, such as Pavley 2005 Regulations to Control GHG Emissions from Motor Vehicles and 2012 LEV III Amendments to the California GHG and Criteria Pollutant Exhaust and Evaporative Emission Standards, apply to new vehicles. The proposed project does not involve the manufacturing or sales of new vehicles; however, the standards would be applicable to the light-duty vehicles that access the project site.
3. <b>Energy Efficiency.</b> Maximize energy efficiency building and appliance standards; pursue additional efficiency including new technologies, policy, and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.	<b>Consistent.</b> This is a measure for the State to increase its energy efficiency standards in new buildings. The proposed project is required to build to the new standards and would increase their energy efficiency through compliance with Title 24 and California Green Building Standards Code.

<sup>90</sup> Ascent Environmental. 2018. The Ranch at Antioch Development Standards & Design Guidelines. October.

**Table 3.7-7 (cont.): AB 32 (ARB-adopted 2008 Scoping Plan) Consistency Analysis**

Scoping Plan Reduction Measure	Consistency
4. <b>Renewable Portfolio Standard.</b> Achieve 33 percent renewable energy mix Statewide. Renewable energy sources include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.	<b>Not applicable.</b> This is a Statewide measure that cannot be implemented by a project Applicant or lead agency. PG&E is required to obtain 33 percent of its power supply from renewable sources to by the year 2020 pursuant to various regulations. PG&E is ahead of schedule in meeting the California Renewables Portfolio Standard of 33 percent by 2020 mandate. The proposed project would purchase power that comprises a greater amount of renewable sources and could install renewable solar power systems that could further assist the utility in achieving the mandate.
5. <b>Low Carbon Fuel Standard.</b> Develop and adopt the Low Carbon Fuel Standard.	<b>Not applicable.</b> This is a Statewide measure that applies to transportation fuels utilized by vehicles in California and cannot be implemented by a project Applicant or lead agency. All fuel consumption associated with construction and operational activities associated with the proposed project would use fuel that meets these standards.
6. <b>Regional Transportation-Related GHG Targets.</b> Develop regional GHG emissions reduction targets for passenger vehicles. This measure refers to SB 375.	<b>Not applicable.</b> The proposed project is not related to developing GHG emission reduction targets.
7. <b>Vehicle Efficiency Measures.</b> Implement light-duty vehicle efficiency measures.	<b>Not applicable.</b> The proposed project does not involve the manufacturing or sales of new vehicles; however, the standards would be applicable to the light-duty vehicles that access the project site.
8. <b>Goods Movement.</b> Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	<b>Not applicable.</b> The project proposes no changes to maritime, rail, or intermodal facilities or forms of transportation.
10. <b>Medium/Heavy-Duty Vehicles.</b> Adopt medium and heavy-duty vehicle efficiency measures.	<b>Not applicable.</b> This is a Statewide measure that cannot be implemented by a project Applicant or lead agency.
11. <b>Industrial Emissions.</b> Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce GHG emissions and provide other pollution reduction co-benefits. Reduce GHG emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive CH <sub>4</sub> emissions and reduce flaring at refineries.	<b>Not applicable.</b> This measure would apply to the direct GHG emissions at major industrial facilities emitting more than 500,000 MT CO <sub>2</sub> e per year. The proposed project would generate less than 13,000 MT CO <sub>2</sub> e per year (see Table 3.7-5).
12. <b>High Speed Rail.</b> Support implementation of a high-speed rail system.	<b>Not applicable.</b> This is a Statewide measure that cannot be implemented by a project Applicant or lead agency. Implementation of the proposed project would not preclude the implementation of this strategy.

**Table 3.7-7 (cont.): AB 32 (ARB-adopted 2008 Scoping Plan) Consistency Analysis**

Scoping Plan Reduction Measure	Consistency
13. <b>Green Building Strategy.</b> Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	<b>Consistent.</b> The proposed project would comply with the California Energy Code and, thus, incorporate applicable energy efficiency features designed to reduce energy consumption associated with operation of the proposed project.
14. <b>High Global Warming Potential Gases.</b> Adopt measures to reduce high global warming potential gases.	<b>Consistent.</b> This measure is applicable to the high global warming potential gases that would be used by sources with large equipment (such as in air conditioning and commercial refrigerators). The proposed project includes development of up to 1,177 single-family residential units, a 5-acre commercial, office, and retail space, and a fire station. As such, it is not anticipated that the proposed project would include refrigeration subject to refrigerant management regulations adopted by the ARB. However, specific uses of the commercial center are not known at this time. If the proposed project was to install large air conditioning equipment subject to the refrigerant management regulations adopted by the ARB, they would be required to comply with all ARB requirements for the Stationary Equipment Refrigerant Management Program.
15. <b>Recycling and Waste.</b> Reduce CH <sub>4</sub> emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero waste.	<b>Consistent.</b> Implementation of the proposed project would not conflict with implementation of this measure. The proposed project is required to achieve the recycling mandates via compliance with the CALGreen Code. As noted in Section 2.3.5 of Chapter 2, Project Description, Republic Services would provide solid waste collection, disposal, recycling, and yard waste services to the project site.
16. <b>Sustainable Forests.</b> Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	<b>Not applicable.</b> As noted in Chapter 3.4, Biological Resources, the majority of the proposed project site consists of annual brome grassland. The project site contains approximately 255 trees, and the proposed project does not currently plan to remove any protected trees. As explained in Chapter 3.2, Agricultural Resources and Forestry Resources, the project site does not contain any forest land. Therefore, no on-site preservation is possible.

**Table 3.7-7 (cont.): AB 32 (ARB-adopted 2008 Scoping Plan) Consistency Analysis**

Scoping Plan Reduction Measure	Consistency
17. <b>Water.</b> Continue efficiency programs and use cleaner energy sources to move and treat water.	<b>Consistent.</b> The proposed project would comply with the California Energy Code and the California Updated Model Landscape Ordinance. Furthermore, the City's CCAP includes an emissions reduction strategy, L4. Adopt a Water Conservation Ordinance, that aims to reduce household water use by 20 percent by the year 2020.
18. <b>Agriculture.</b> In the near-term, encourage investment in manure digesters and at the 5-year Scoping Plan update determine if the program should be made mandatory by 2020.	<b>Not applicable.</b> The project site currently includes a cattle-grazing operation, however, no grazing, feedlot, or other agricultural activities that generate manure are proposed to be implemented by the proposed project.
Source of ARB Scoping Plan Reduction Measures: California Air Resources Board (ARB). 2008 (includes edits made in 2009). Climate Change Scoping Plan, a framework for change. Website: <a href="https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf">https://ww3.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf</a> . Accessed December 27, 2019.	

As shown in Table 3.7-7, the proposed project is consistent with the applicable strategies and would not conflict with the recommendations of AB 32 in achieving a Statewide reduction in GHG emissions. Therefore, the proposed project would not significantly hinder or delay the State's ability to meet the reduction targets contained in AB 32 or conflict with implementation of the Scoping Plan.

#### **ARB 2017 Climate Change Scoping Plan Update Consistency**

The 2017 Climate Change Scoping Plan Update addressing the SB 32 targets was adopted on December 14, 2017. Table 3.7-8 provides an analysis of the proposed project's consistency with the 2017 Scoping Plan Update measures. As shown in Table 3.7-8, many of the measures are not applicable to the proposed project. The proposed project is consistent with all strategies that are applicable.

**Table 3.7-8: SB 32 (ARB-adopted 2017 Climate Change Scoping Plan Update) Consistency Analysis**

2017 Scoping Plan Update Reduction Measure	Project Consistency
<b>SB 350 50. Percent Renewable Mandate.</b> Utilities subject to the legislation will be required to increase their renewable energy mix from 33 percent in 2020 to 50 percent in 2030.	<b>Not applicable.</b> This measure would apply to utilities and not to individual development projects. The proposed project would purchase electricity from PG&E, which would be subject to the SB 350 Renewable Mandate.
<b>SB 350. Double Building Energy Efficiency by 2030.</b> This is equivalent to a 20 percent reduction from 2014 building energy usage compared to current projected 2030 levels.	<b>Not applicable.</b> This measure applies to existing buildings. New structures are required to comply with Title 24 Energy Efficiency Standards that are expected to increase in stringency over time. The proposed project would comply with the applicable Title 24 Energy Efficiency Standards in effect at the time building permits are received.

**Table 3.7-8 (cont.): SB 32 (ARB-adopted 2017 Climate Change Scoping Plan Update)  
Consistency Analysis**

2017 Scoping Plan Update Reduction Measure	Project Consistency
<b>Low Carbon Fuel Standard.</b> This measure requires fuel providers to meet an 18 percent reduction in carbon content by 2030.	<b>Not applicable.</b> This is a Statewide measure that cannot be implemented by a project Applicant or lead agency. However, vehicles accessing the project site would benefit from the standards.
<b>Mobile Source Strategy (Cleaner Technology and Fuels Scenario).</b> Vehicle manufacturers will be required to meet existing regulations mandated by the LEV III and Heavy-Duty Vehicle programs. The strategy includes a goal of having 4.2 million ZEVs on the road by 2030 and increasing numbers of ZEV trucks and buses.	<b>Not applicable.</b> This measure is not applicable to the proposed project; however, vehicles accessing the project site would benefit from the increased availability of cleaner technology and fuels. Future residents, visitors, and employees can be expected to purchase increasing numbers of more fuel efficient and zero emission cars and trucks each year. Furthermore, delivery trucks and buses that would serve future residents, visitors, and employees would be made by increasing numbers of ZEV delivery trucks.
<b>Sustainable Freight Action Plan</b> The plan's target is to improve freight system efficiency 25 percent by increasing the value of goods and services produced from the freight sector, relative to the amount of carbon that it produces by 2030. This would be achieved by deploying over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.	<b>Not applicable.</b> This measure applies to owners and operators of trucks and freight operations. The proposed project includes a mix of uses that would support truck and freight operations. It is expected that deliveries throughout the State would be made with an increasing number of ZEV delivery trucks, including deliveries that would be made to future residents of the proposed project.
<b>Short-Lived Climate Pollutant Reduction Strategy.</b> The strategy requires the reduction of SLCPs by 40 percent from 2013 levels by 2030 and the reduction of black carbon by 50 percent from 2013 levels by 2030.	<b>Consistent.</b> No wood-burning devices are proposed as part of the project. Natural gas hearths produce very little black carbon compared to wood-burning fireplace; therefore, the proposed project would not include major sources of black carbon.
<b>SB 375. Sustainable Communities Strategies.</b> Requires Regional Transportation Plans to include a Sustainable Communities Strategy for reduction of per capita vehicle miles traveled.	<b>Not applicable.</b> The proposed project does not include the development of a Regional Transportation Plan.
<b>Post-2020 Cap-and-Trade Program.</b> The Post 2020 Cap-and-Trade Program continues the existing program for another 10 years. The Cap-and-Trade Program applies to large industrial sources such as power plants, refineries, and cement manufacturers.	<b>Not applicable.</b> The proposed project is not targeted by the cap-and-trade system regulations, and, therefore, this measure does not apply. However, the post-2020 Cap-and-Trade Program indirectly affects people and entities who use the products and services produced by the regulated industrial sources when increased cost of products or services (such as electricity and fuel) are transferred to the consumers.

**Table 3.7-8 (cont.): SB 32 (ARB-adopted 2017 Climate Change Scoping Plan Update)  
Consistency Analysis**

2017 Scoping Plan Update Reduction Measure	Project Consistency
<b>Natural and Working Lands Action Plan.</b> ARB is working in coordination with several other agencies at the federal, State, and local levels, stakeholders, and with the public, to develop measures as outlined in the Scoping Plan Update and the governor's Executive Order B-30-15 to reduce GHG emissions and to cultivate net carbon sequestration potential for California's natural and working land.	<b>Not applicable.</b> The proposed project site is a residential and commercial master planned area and would not be considered natural working land.
Source of ARB Scoping Plan Reduction Measures: California Air Resources Board (ARB). 2017. California's 2017 Climate Change Scoping Plan, the strategy for achieving California's 2030 GHG target. Website: <a href="https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm">https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm</a> . Accessed March 1, 2019.	

As shown in Table 3.7-7 the proposed project is consistent with the applicable strategies and would not conflict with the recommendations of SB 32 in achieving a Statewide reduction in GHG emissions. Therefore, the proposed project would not significantly hinder or delay the State's ability to meet the reduction targets contained in SB 32 or conflict with implementation of the Scoping Plan Update.

### **Overall**

In general, the Statewide AB 32 Scoping Plan and the SB 32 Scoping Plan Update rely on increased building energy efficiency as a method to address one of the largest Statewide GHG sectors (i.e., Energy Use). The proposed project would be compliant with all applicable energy efficiency standards such as Title 24 and CALGreen. Compliance with regulations would result in higher energy efficiency operations than the existing buildings. As presented in Table 3.7-7, the proposed project is consistent with the applicable strategies and would not conflict with the recommendations of AB 32 in achieving a Statewide reduction in GHG emissions. Therefore, the proposed project would not significantly hinder or delay the State's ability to meet the reduction targets contained in AB 32 or conflict with implementation of the Scoping Plan. Furthermore, as shown in Table 3.7-8, implementation of the proposed project would not conflict with the reduction measures outlined in the 2017 Scoping Plan Update addressing the SB 32 targets. Therefore, the proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted to reduce the emissions of GHGs. The impact would be less than significant.

### **Level of Significance**

Less Than Significant

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## Energy Use

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**Impact GHG-3:**      **The project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.**

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### Construction

During construction, the proposed project would result in energy consumption through the combustion of fossil fuels in construction vehicles, worker commute vehicles, and construction equipment, and the use of electricity for temporary buildings, lighting, and other sources. No natural gas would be utilized as part of construction. Fossil fuels used for construction vehicles and other energy-consuming equipment would be used during site demolition, site preparation, grading, paving, and building construction. The types of equipment could include gasoline- and diesel-powered construction and transportation equipment, including trucks, bulldozers, frontend loaders, forklifts, and cranes. Other equipment could include construction lighting, field services (office trailers), and electrically driven equipment such as pumps and other tools.

Based on CalEEMod estimations within the modeling output files used to estimate GHG emissions associated with the proposed project, on-site construction equipment usage would consume an estimated 288,268 gallons of diesel and gasoline combined during the construction phase (Appendix C). Construction assumptions used to estimate energy consumption for the proposed project were estimated consistent with the CalEEMod modeling output files used to estimate GHG emissions and are included in Appendix C.

Limitations on idling of vehicles and equipment and requirements that equipment be properly maintained would result in fuel savings. California regulations (CCR Title 13, §§ 2449(d)(3) and 2485) limit idling from both on-road and off-road diesel-powered equipment and are enforced by the ARB. In addition, given the cost of fuel, contractors and owners have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction.

Fuel use associated with construction-related vehicle trips generated by the proposed project was also estimated; trips include construction worker trips, haul trucks trips for material transport, and vendor trips for construction material deliveries. Fuel use from these vehicles traveling to the project site was based on (1) the projected number of trips the proposed project would generate during construction, (2) average trip distances by trip type, and (3) fuel efficiencies estimated in the ARB Emissions Factors model (EMFAC) mobile source emission model. The specific parameters used to estimate fuel usage are included in Appendix C. In total, the proposed project is estimated to generate approximately 12.8 million vehicle miles traveled and consume a combined 633,892 gallons of gasoline and diesel for vehicle travel during construction.

Other equipment could include construction lighting, field services (office trailers), and electrically driven equipment such as pumps and other tools. The City of Antioch Code of Ordinance limits construction activities to the hours between 7:00 a.m. and 6:00 p.m., or between 8:00 a.m. and 5:00 p.m. if within 300 feet of occupied dwellings, on weekdays, and between 9:00 a.m. and 5:00 p.m. on weekends and holidays, irrespective of the distance from occupied dwellings.<sup>91</sup> As on-site construction

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<sup>91</sup> City of Antioch. 2019. City of Antioch Code of Ordinances. Website:

activities would be restricted between these hours, it is anticipated that the use of construction lighting would be minimal. Singlewide mobile office trailers, which are commonly used in construction staging areas, generally range in size from 160 square feet to 720 square feet. A typical 720-square-foot office trailer would consume approximately 108,891 kWh during the 8.5-year construction project (Appendix C).

Due to the temporary nature of construction and the financial incentives for developers and contractors to use energy-consuming resources in an efficient manner, the construction phase of the proposed project would not result in wasteful, inefficient, and unnecessary consumption of energy. Therefore, the construction-related impact related to fuel and electricity consumption would be less than significant.

## **Operation**

### *Electricity and Natural Gas*

Building operations for the proposed project would involve energy consumption for multiple purposes including, but not limited to, building heating and cooling, refrigeration, lighting, and electronics as well as outdoor lighting. Based on CalEEMod estimations within the modeling output files used to estimate GHG emissions associated with the proposed project, operations would consume approximately 9,878,492 kWh of electricity per year and an estimated 32,836,120 kilo-BTU per year of natural gas. Complete CalEEMod output files and additional energy calculations are included in Appendix C. The proposed project would be designed and constructed in accordance with the City's latest adopted energy efficiency standards, which are based on the State's Title 24 energy efficiency standards. These standards are widely regarded as the most advanced energy efficiency standards and compliance would ensure that operational energy consumption would not result in the use of energy in a wasteful manner or inefficient manner. Therefore, the operational impact related to building electricity and natural gas consumption would be less than significant.

### *Fuel*

Operational energy would also be consumed during vehicle trips. Fuel consumption would be primarily related to vehicle use by residents, visitors, and employees. Based on the estimates contained in the CalEEMod output files, vehicle trips associated with the proposed project would result in approximately 23.8 million vehicle miles traveled, and consume an estimated 734,731 gallons of gasoline and diesel combined on an annual basis.<sup>92</sup> Complete CalEEMod output files are included in Appendix C. The project site is located less than 2 miles west of California State Route 4 (SR-4). As such, it would be in proximity to a regional route of travel. The project site is also located approximately 3 miles from the Antioch BART Station, which is served by the yellow line. Tri-Delta Transit provides bus services in eastern Contra Costa County. Local Routes 379, 388, and 392 would provide bus services to the project site, and the nearest bus stop to the project site for the aforementioned routes is located approximately 230 feet east of the project site across Deer Valley Road. The existing transportation facilities in the area would provide future residents, visitors, and

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[http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:antioch\\_ca](http://library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca). Accessed December 12, 2019.

<sup>92</sup> Based on the 23,800,931 annual VMT consistent with CalEEMod output (Appendix C) and an average fuel consumption determined using EMFAC2014 factors for Contra Costa County in the 2029 calendar. Website: <https://www.arb.ca.gov/emfac/2014/>. Accessed December 16, 2019.

employees with access to public transportation, thus further reducing fuel consumption demand. Additionally, the proposed project would include sidewalks on local streets and bicycle lanes, which would connect to existing bicycle lanes, thus encouraging walking and bicycling within the project site and to off-site destinations. For these reasons, transportation fuel consumption would not result in a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during long-term operations. Therefore, the operational impact related to vehicle fuel consumption would be less than significant.

### ***Level of Significance***

Less Than Significant

### ***Energy Efficiency and Renewable Energy Standards Consistency***

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**Impact GHG-4:**      **The project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.**

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The City of Antioch's CCAP focuses on reducing energy from new and existing development as a mechanism to reduce GHG emissions, which is addressed under Impact GHG-2. A significant impact would occur if the proposed project would conflict with or obstruct a State or local plan for renewable energy or energy efficiency.

### ***Construction***

The proposed project would result in energy consumption through the combustion of fossil fuels in construction vehicles, worker commute vehicles, and construction equipment, and the use of electricity for temporary buildings, lighting, and other sources. Fossil fuels used for construction vehicles and other energy-consuming equipment would be used during site clearing, grading, paving, and building construction. The types of equipment could include gasoline- and diesel-powered construction and transportation equipment, including trucks, bulldozers, frontend loaders, forklifts, and cranes. Other equipment could include construction lighting, field services (office trailers), and electrically driven equipment such as pumps and other tools. Limitations on idling of vehicles and equipment and requirements that equipment be properly maintained would result in fuel savings. California Code of Regulations, Title 13, Sections 2449(d)(3) and 2485 limit idling from both on-road and off-road diesel-powered equipment and are enforced by the ARB. The proposed project would be required to comply with these regulations. There are no renewable energy standards that would apply to construction of the proposed project. Therefore, construction would not conflict with or obstruct any regulations adopted for the purposes of increasing the use of renewable energy. Therefore, it is anticipated that construction of the proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing energy use or increasing the use of renewable energy. Therefore, construction-related energy efficiency and renewable energy standards consistency impacts would be less than significant.

### ***Operation***

As noted in Section 2.3.5 of the Project Description, the proposed project would be served with electricity provided by PG&E. Over 85 percent of the electricity that PG&E delivered in 2018 came

from a combination of renewable and GHG-emissions-free resources.<sup>93,94</sup> The 2017 power mix included 27 percent non-emitting nuclear generation, 18 percent large hydroelectric facilities, 33 percent eligible renewable resources, such as wind, geothermal, biomass, solar, and small hydro, 20 percent natural gas/other, and 2 percent unspecified power.<sup>95</sup> PG&E also offers a Solar Choice program, which allows the purchase of up to 100 percent solar energy generated within California.<sup>96</sup> PG&E is ahead of schedule in meeting the California Renewables Portfolio Standard of 33 percent by 2020 mandate, having delivered 39 percent of its energy from qualified renewable energy resources in 2018.<sup>97</sup> As such, the proposed project would purchase power comprised of a greater amount of renewable sources compared to what is required by regulations in effect. In addition, the City's CCAP includes green building and energy efficiency policies that promote planting trees to shade buildings, installing energy efficient appliances, reducing household water use, and expanding bicycle use and public transportation. The proposed project would include extensive bicycle lanes and sidewalks, and would provide access to Tri-Delta Transit bus services. Proposed buildings would be designed and constructed in accordance with the State's Title 24 energy efficiency standards. The project's approach to landscape design aims to minimize manicured landscapes and extensive lawns, and to maximize tree preservation.<sup>98</sup> The proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing energy use or increasing the use of renewable energy. Therefore, operational energy efficiency and renewable energy standards consistency impacts would be less than significant.

### ***Level of Significance***

Less Than Significant

### **3.7.5 - Cumulative Impacts**

As discussed above, GHG emissions are inherently a cumulative impact. Therefore, the analysis presented above addresses the cumulative GHG impacts of the proposed project.

### ***Level of Cumulative Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

MM GHG-1.

### ***Level of Cumulative Significance After Mitigation***

Less Than Significant

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<sup>93</sup> Pacific Gas & Electric (PG&E). 2019. Exploring Clean Energy Solutions. Website: [https://www.pge.com/en\\_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page](https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page). Accessed December 5, 2019.

<sup>94</sup> Renewable sources included solar, wind, geothermal, biomass, and small hydroelectric sources. GHG-emissions-free sources of energy included nuclear and large hydro.

<sup>95</sup> California Energy Commission (CEC). 2019. Annual Power Content Label for 2017. Website: [https://www2.energy.ca.gov/pcl/labels/2017\\_index.html](https://www2.energy.ca.gov/pcl/labels/2017_index.html). Accessed December 5, 2019.

<sup>96</sup> Pacific Gas & Electric (PG&E). 2019. Exploring Clean Energy Solutions. Website: [https://www.pge.com/en\\_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page](https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page). Accessed December 5, 2019.

<sup>97</sup> Ibid.

<sup>98</sup> Ascent Environmental. 2018. The Ranch at Antioch Development Standards & Design Guidelines. October.

## 3.8 - Hazards, Hazardous Materials, and Wildfire

### 3.8.1 - Introduction

This section describes the existing hazards, hazardous materials, and wildfire conditions in the project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to hazards, hazardous materials, and wildfire that could result from implementation of the proposed project. Information included in this section is based on the City of Antioch General Plan, the City of Antioch General Plan Environmental Impact Report (EIR), the 2006 Phase I Environmental Site Assessment (Phase I ESA) and the 2019 Phase I ESA prepared by ENGEO, Inc., all of which are included as Appendix G. During the EIR scoping period, the following comments were received related to hazards and hazardous materials:

- Recommendation that access to a well located on the property be maintained in the event that re-abandonment of the well becomes necessary in the future;
- States the possibility of a well to leak oil, gas, and/or water after abandonment and acknowledges that there is no guarantee of the adequacy of the on-site well's abandonment or potential need for re-abandonment in the future;
- Recommendation to maintain physical access to any gas well encountered and to ensure that the abandonment of gas wells is consistent with current standards;
- Requests that if it is not ensured that abandonment is up to current standards, the recommendation for physical access to any gas well increases;
- Requests that if recommendation for access of the well cannot be followed, it is advised that the local permitting agency, property owner, and/or developer consider any and all alternatives to proposed construction or development of the site;
- States that California Department of Oil, Gas, and Geothermal Resources (DOGGR) has the authority to order the re-abandonment of any well that is hazardous or poses a danger to life, health, or natural resources;
- States that rig access should be maintained without disturbing the integrity of the surrounding infrastructure;
- Requests that if any unknown well(s) are discovered, DOGGR should be notified immediately so that the wells can be incorporated into records and investigated;
- Recommends that any wells found and any information obtained should be communicated to the appropriate county recorder for inclusion in the title information;
- States that no well work may be performed on any oil or gas well without written approval in the form of an appropriate permit from DOGGR; and
- States that if any wells need to be lowered or raised to meet grade regulations, a permit is required before work can commence.

### 3.8.2 - Environmental Setting

#### Fundamentals

##### **Hazards**

This section describes existing conditions and focuses on hazards from underground pipelines, abandoned wells, hazardous materials, wastes, and wildfire. A hazard is a situation that poses a level of threat to life, health, property, or the environment. Hazards can be dormant or have potential, with only a theoretical risk of harm. However, once a hazard becomes active, it can create an emergency. A hazardous situation that has already occurred is called an incident. Emergency response is action taken in response to an unexpected and dangerous occurrence in an attempt to mitigate its impact on people, structures, or the environment. Emergency situations can range from natural disasters to hazardous materials problems and transportation incidents.

##### **Hazards Materials and Wastes**

Hazardous materials include, but are not limited to, hazardous substances, hazardous wastes, and hazardous building materials as defined in Section 25501 and Section 25117, respectively, of the California Health and Safety Code. A hazardous material is any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released; and any material that a handler or an administering regulatory agency under Section 25501 has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment. Various properties may cause a substance to be considered hazardous, including:

- Toxicity—causes human health effects;
- Ignitibility—has the ability to burn;
- Corrosivity—causes severe burns or damage to materials; and
- Reactivity—causes explosions or generates toxic gases.

Hazardous waste is any hazardous material that is to be discarded, abandoned, or recycled. The criteria that define a material as hazardous also define a waste as hazardous. Specifically, materials and waste may be considered hazardous if they are poisonous (toxic); can be ignited by open flame (ignitable); corrode other materials (corrosive); or react violently, explode, or generate vapors when mixed with water (reactive). Soil or groundwater contaminated with hazardous materials above specified regulatory State or federal thresholds is considered hazardous waste if it is removed from a site for disposal. If handled, disposed, or otherwise handled improperly, hazardous materials and hazardous waste can result in public health hazards if released into the soil or groundwater or through airborne releases in vapors, fumes, or dust. Soil and groundwater having concentrations of hazardous constituents higher than specific regulatory levels must be handled and disposed of as hazardous waste when excavated or pumped from an aquifer. The California Code of Regulations, Title 22, Sections 66261.20-24 contains technical descriptions of toxic characteristics that could cause soil or groundwater to be classified as hazardous waste.

### *Hazardous Building Materials*

Many older buildings contain building materials that consist of hazardous materials. These materials include lead-based paint, asbestos-containing material, and polychlorinated biphenyls (PCBs).

Prior to the United States Environmental Protection Agency (EPA) ban in 1978, lead-based paint was commonly used on interior and exterior surfaces of buildings. Disturbances such as sanding and scraping activities, renovation work, gradual wear and tear, old peeling paint, and paint dust particulates have been found to contaminate surface soils or cause lead dust to migrate and affect indoor air quality. Exposure to residual lead can cause severe health effects, especially in children.

Asbestos is a naturally occurring fibrous material that was extensively used as a fireproofing and insulating agent in building construction materials before such uses were banned by the EPA in the 1970s. In addition, many types of electrical equipment contained PCBs as an insulator, including transformers and capacitors. After PCBs were determined to be a carcinogen in the mid to late 1970s, the EPA banned PCB use in new equipment and began a program to phase out certain existing PCB-containing equipment. For example, fluorescent lighting ballasts manufactured after January 1, 1978, do not contain PCBs and are required to have a label clearly stating that PCBs are not present in the unit.

### *Hazardous Substances*

A hazardous substance can be any biological, natural, or chemical substance, whether solid, liquid, or gas, which may cause harm to human health. Hazardous substances are classified based on their potential health effects, whether acute (immediate) or chronic (long-term). Dangerous goods are classified based on immediate physical or chemical effects, such as fire, explosion, corrosion, and poisoning. An accident involving dangerous goods could seriously harm human health or damage property or the environment. Harm to human health may happen suddenly (acute), such as dizziness, nausea, and itchy eyes or skin; or it may happen gradually over years (chronic), such as dermatitis or cancer. Some people can be more susceptible than others. Hazardous substances and dangerous goods can include antiseptic used for a cut, paint for walls, a cleaning product for the bathroom, chlorine in a pool, carbon monoxide from a motor vehicle, fumes from welding, vapors from adhesives, or dust from cement, stone, or rubber operations. Such hazardous substances can make humans very sick if they are not used properly.

### ***Hazardous Materials Listing***

The Cortese List is a list of known hazardous materials or hazardous waste facilities that meet one or more of the provisions of Government Code Section 65962.5, including:

- The list of hazardous waste and substances sites from the California Department of Toxic Substances Control (DTSC) EnviroStor database.<sup>1</sup> The project site is not located on the EnviroStor database.

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<sup>1</sup> California Department of Toxic Substances Control (DTSC). DTSC Hazardous Waste and Substances Site List—Site Cleanup (Cortese List). Website: <https://dtsc.ca.gov/dtscs-cortese-list/>. Accessed: December 11, 2019.

- The list of leaking underground storage tank (LUST) sites by county and fiscal year from the California State Water Resources Control Board (State Water Board) GeoTracker database.<sup>2</sup> No LUST sites are listed in GeoTracker database for the project site.
- The list of solid waste disposal sites identified by the State Water Board with waste constituents exceeding hazardous waste levels outside the waste management unit.<sup>3</sup> No such disposal site exists within the vicinity of the project site.
- The list of active cease-and-desist orders and cleanup and abatement orders from the State Water Board.<sup>4</sup> The project site is not on this list.
- The list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, as identified by the DTSC.<sup>5</sup> The project site is not on this list.

### Existing Fire Related Conditions and Presence of Hazardous Materials

The hazards in the City of Antioch and the project area discussed in this section are related primarily to fire hazards and hazardous materials. Fire hazards and hazards from hazardous materials are typically site-specific, so existing conditions related to fire hazards and the transport, use, and disposal of hazardous materials are discussed below under “project site.”

Fire hazards present a considerable problem to vegetation and wildlife habitats throughout the County. Grassland fires are easily ignited, particularly in dry seasons. These fires are relatively easy to control if they can be reached by fire equipment. The burned slopes, however, are highly subject to erosion and gullying. While brushlands are naturally adapted to frequent light fires, fire protection in recent decades has resulted in heavy fuel accumulation on the ground. Wildfire is a serious hazard in undeveloped areas and on large lot home sites with extensive areas of unirrigated vegetation, particularly near areas of natural vegetation and steep slopes since fires tend to burn more rapidly on steeper terrain.<sup>6</sup> Wildfire is also a serious hazard in areas of high wind, given that fires will travel faster and farther geographically when winds are higher.

### *The City of Antioch*

Hazardous materials and hazardous waste pose potential risks to the health, safety, and welfare of residents and workers, if handled inappropriately. Delta Diablo disposes of hazardous materials within the City of Antioch and operates the Delta Household Hazardous Waste Collection Facility. The facility collects hazardous substances and pollutants such as used oil and filters, anti-freeze, latex and oil-based paints, household batteries, fluorescent and high intensity lamps, cosmetics, pesticides, pool chemicals,

<sup>2</sup> California State Water Resources Control Board (State Water Board). GeoTracker for San Francisco County. Website: <https://geotracker.waterboards.ca.gov/search?cmd=search&hidept=True&status=&reporttitle=San+Francisco+County&county=San%20Francisco&excludenc=True>. Accessed December 11, 2019.

<sup>3</sup> California Environmental Protection Agency (Cal/EPA). Cortese List Data Resources for Solid Waste Disposal Sites. Website: <https://calepa.ca.gov/wp-content/uploads/sites/6/2016/10/SiteCleanup-CorteseList-CurrentList.pdf>. Accessed December 11, 2019.

<sup>4</sup> California Environmental Protection Agency (Cal/EPA). Cortese List of State Water Board sites with active Cease and Desist Orders or Cleanup Abatement Orders. Website: <https://calepa.ca.gov/wp-content/uploads/sites/6/2016/10/SiteCleanup-CorteseList-CDOCAOList.xlsx>. Accessed December 11, 2019.

<sup>5</sup> California Environmental Protection Agency (Cal/EPA). Cortese List: Section 65962.5(a) Sites Subject to Corrective Action. Website: <https://www.calepa.ca.gov/sitecleanup/corteseList/section-65962-5a/>. Accessed December 11, 2019

<sup>6</sup> Contra Costa County General Plan 2025. Section 10.11, Public Protection Services and Disaster Planning. Page 10-42.

and household cleaners for safe disposal at the facility. All hazardous waste must be discharged at a Class I landfill under the Federal Resource Conservation and Recovery Act of 1976 (RCRA).

All pollutants cannot be removed by Delta Diablo's treatment process. To ensure that certain pollutants do not enter the Delta, Delta Diablo has established a Pretreatment Program, which consists of public education and regulation of certain businesses and industries. The Pretreatment Department works closely with commercial and industrial users to ensure that hazardous substances such as solvents, pesticides, metals, grease, petroleum, oil, and paints are not discharged into the stormwater or sewer system.

The City of Antioch has a long history of agricultural production. Agricultural activities typically include the storage and periodic application of pesticides, herbicides, and fertilizers, as well as the storage and use of toxic fuels and solvents. The infiltration of the aforementioned substances may leach into local groundwater supplies, presenting an elevated risk of groundwater contamination. Medical facilities, such as the Kaiser Antioch Medical Center located adjacent to the project site, can generate a wide variety of hazardous substances. Hazardous medical substances may include contaminated medical equipment or supplies, infectious biological matter, prescription medicines, and radioactive materials used in medical procedures. The disposal of medical waste is achieved by on-site autoclaving of red-bagged waste (any medical waste that could possibly transmit a pathogen) and the subsequent transport to a Class III landfill.

Although incidents can happen almost anywhere, certain areas of Antioch are at higher risk for inadvertent release of hazardous materials. Locations near roadways that are frequently used for transporting hazardous materials (e.g., State Route [SR] 4) and locations near industrial facilities that use, store, or dispose of these materials have an increased potential for a release incident, as do locations along the freight railways.

The California DTSC identifies two sites within Antioch where surface and/or sub-surface contamination has occurred due to the release of hazardous materials or wastes. The sites include the GBF/Pittsburg Dumps, located at the intersection of Somersville Road and James Donlon Boulevard, approximately 3 miles northwest of the project site, and the former Hickmott Cannery site, located at the intersection of 6<sup>th</sup> Street and A Street, approximately 4.2 miles north of the project site.

### **Project Site**

A Phase I ESA was prepared for the proposed project on July 10, 2019, by ENGEO, Inc.<sup>7</sup> (Appendix G).

The assessment included a review of local, State, tribal, and federal environmental record sources, standard historical sources, aerial photographs, fire insurance maps and physical setting sources. A reconnaissance of the project site was conducted to review site use and current conditions to check for the storage, use, production or disposal of hazardous or potentially hazardous materials and interviews with persons knowledgeable about current and past site use. The site reconnaissance and records review did not find documentation or physical evidence of significant soil, soil gas, or groundwater impairments associated with the use or past use of the site. A review of regulatory

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<sup>7</sup> ENGEO, Inc. 2006. Modified Phase One Environmental Site Assessment. Sand Creek Ranch Active Adult Community. July.

databases maintained by county, State, tribal, and federal agencies found no documentation of hazardous materials violations or discharge on the project site and did not identify contaminated facilities within the appropriate American Society for Testing and Materials (ASTM) search distances that would reasonably be expected to impact the project site.

A site reconnaissance was conducted on July 2, 2019. The project site was viewed for hazardous materials storage, superficial staining or discoloration, debris, stressed vegetation, or other conditions that may be indicative of potential sources of soil or groundwater contamination. The project site was also checked for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks.

The predominantly undeveloped site consists of sparsely vegetated rolling hills and a relatively level grass-covered valley with occasional groves of trees. Sand Creek is an intermittent, deeply incised creek that traverses the site from west to east. Several unpaved roads/trails cross the site, and the site is bordered by wire fencing. Wire fencing also separates interior fields and corrals. The majority of the project site is currently in use for cattle grazing, although an equipment storage area containing various well-drilling equipment is located adjacent to the existing residential compound, located in the central area of Assessor's Parcel Number (APN) 057-021-003. The compound includes a mobile home trailer, two large barns, several sheds, and an equipment storage area containing well-drilling supplies and equipment, animal pens and corrals, and various agricultural equipment and supplies. The residence area is accessed from Deer Valley Road via an unpaved road, Snodgrass Lane. The on-site mobile home is inhabited and the interior was not viewed during the site visit.

Review of historical records indicates that initial site development predates 1896, where the earliest available topographic map indicates a settlement in the western portion of the project site. This settlement, known as "Judsonville," once existed in APN 057-010-002, east of Empire Mine Road. The remains of this town include a sandstone cave and some evidence of building foundations. A windmill and various water tanks are currently within this area. Two orchards were planted in the northwestern portion of APN 057-010-003 and the central portion of APN 057-021-003. The orchard areas are apparent from at least the late 1930s until the 1970s. There is also evidence of dry hay farming occurring on-site.

In addition to the past settlement and agricultural activities, there are also past activities associated with the Brentwood Oil and Gas Field. Two dry and abandoned gas/oil exploration wells were drilled on the site in 1962 and 2013. In addition, an inactive/abandoned petroleum product pipeline crosses the site oriented northwest-southeast. During the site reconnaissance, the petroleum pipeline and evidence of one of the two former oil/gas wells were observed.

Based on findings of the Phase I ESA, one Recognized Environmental Conditions (REC) was identified for the project site. However, no historical RECs or controlled RECs were identified for the project site. The REC consists of a former dry oil/gas exploration well in the western area of the Property (Well No. 1), which was not properly abandoned in accordance with current DOGGR regulations. The well was not completely grouted and cut off to 5 feet below the surface. The well casing was left in place about the surface for use as a water well. This well will require proper abandonment in accordance with current DOGGR regulations.

ENGEO, Inc. presented the following features of potential environmental concern that were either contained in the databases or observed on the site. These features were not considered to be RECs. Each are briefly discussed below.

- An apparently inactive, northwest-trending, petroleum product pipeline crosses the western portion on APN 057-021-003 and the northeastern portion of APN 057-010-003.
- A second abandoned oil/gas well site is located south of the residence area (Well No. 1-8).
- Due to the age of the structures within the former ranch site, lead-based paint, asbestos-containing materials, and/or organochlorine pesticides may be present within the building perimeters.
- Several aboveground storage tanks and drums containing potentially hazardous materials and numerous abandoned or discarded tanks and drums are present on-site. Previous reports indicate that both aboveground and underground storage tanks have been in use on APN 057-021-003 since at least 1965. Although no releases were documented on-site, it is conceivable that contamination may be uncovered upon removal of the storage tanks.
- Two orchards were planted in limited areas of the northwestern portion of APN 057-010-003 and the central portion of APN 057-021-003. The orchard areas are apparent from at least the late 1930s until the 1970s. It is conceivable that detectable concentrations of residual agrichemicals may exist in site soils.

A previous Phase I ESA was prepared for the proposed project on July 7, 2006 (Appendix G).<sup>8</sup> The findings and conclusions of the report included the following:

- An underground fuel storage tank (UST) is apparently located adjacent to the feed lot buildings on APN 057-060-006. The likelihood of the UST has been confirmed by the presence of a fuel pump on the southwest corner of the main process building on this parcel. Therefore, due to the uncertainty of the tank's condition and the propensity for USTs to result in the release of petroleum hydrocarbons to the soil and/or groundwater, the UST is considered a REC and should be investigated further.
- One, apparently inactive, northwest-trending, petroleum product pipeline crosses the western portion of APN 057-021-003 and the northeastern portion of APN 057-010-003. Environmental sampling along the pipeline was not included in the original scope of services for this assessment. Other sites in the area have revealed petroleum hydrocarbon releases associated with these types of pipelines, regardless of their current status (e.g., operational or abandoned). Although the pipeline operator may be responsible for cleanup of any potential petroleum releases, such releases can become a nuisance with respect to site development; therefore, the pipeline is considered a REC and further subsurface exploration shall be conducted along the pipeline easement to better understand the potential impacts to the site soil.
- Two empty, conventional-style aboveground storage tanks (ASTs) were observed during the reconnaissance at a location north of the largest storage shed in the yard of the residence at

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<sup>8</sup> ENGEO, Inc. 2006. Modified Phase One Environmental Site Assessment. Sand Creek Ranch Active Adult Community. July.

APN 057-021-003. Staining of the soil below the ASTs was not noted during the reconnaissance. Two trailer-mounted diesel ASTs were observed during the site reconnaissance just north of the conventional-style ASTs. The current resident used the ASTs for diesel storage used for fueling farm equipment on the property. A small patch of stained soil about 12 inches in diameter was observed below one of the trailer-mounted ASTs. The current resident had knowledge of six additional ASTs in an area on the north side of the ranch buildings on his parcel. The current resident also noted that two ASTs north of the same shed and north of the gravel road were formerly used for diesel storage, but were currently empty. According to the current resident, a former UST existed on the north side of the ranch as well, but was removed in approximately 1971. The current resident stated that gross evidence of petroleum hydrocarbon releases from the UST was not noted during the removal and that local oversight by environmental agencies was not provided during the removal.

- One half-full, 55-gallon drum was observed east of Empire Mine Road on APN 057-010-002, just north of where Sand Creek crosses onto the site. Stained vegetation was evident beneath the opening of this drum suggestive of hazardous materials. Several rusty drums were located in and around the abandoned structures on APN 057-060-006. Two empty, 55-gallon drums were observed next to the large storage shed on APN 057-021-003. The owner noted that they were once used to store lubricants. Two, rusty 55-gallon drums were also observed in the work yard at that location. They appeared to have been used as garbage containers. One highly-decomposed paper drum of water softener chemicals was noted in the boiler room for the grain processing facility at the feed lot on APN 057-060-006. The contents of this paper drum were released onto the concrete floor of the boiler room.
- Pipeline Easement: An inactive, northwest trending petroleum product pipeline was determined to cross the western portion of APN 057-021-003 and the northeastern portion of APN 057-010-003 as evidenced during the reconnaissance of the site by the line's exposure in a narrow ravine adjacent to Sand Creek and immediately west of the ranch. Because petroleum releases related to similar types of pipelines in the area have occurred, the pipeline is considered a potential REC. The pipeline is owned and was previously operated by PG&E. Signs of leakage or associated contamination was not observed, however, testing was not conducted as part of the Phase I. It should be noted that per the City's Municipal Code Section 9-5.3734(3), Specific Requirements for APN 057-021-003, oil/gas wells are allowed on APN 057-021-003 as a temporary use, subject to the approval of a use permit, but are not allowed on any other properties within the Sand Creek Focus Area. However, oil or gas wells do not currently occur on the project site and are not proposed as part of the proposed project.

#### *Asbestos-containing Materials and Lead-based Paint*

ENGEO, Inc. did not conduct an asbestos and lead-based paint survey as part of the Phase I ESA. Given the estimated age of the structures, the Phase I ESA concluded that asbestos-containing materials (ACMs) and lead-based paint (LBP) may have been used in the construction of the existing on-site ranch and associated structures.

## Wildfire Hazard Area Designations

### *The City of Antioch/Project Site*

According to the United States Forest Service Wildland Fire Assessment System, the City of Antioch, including the project site, is within an area designated as moderate for fire danger.<sup>9</sup> According to the California Department of Forestry and Fire Protection (CAL FIRE), the project site is located in an incorporated local responsibility area and the area just south of the project site is designated as a moderate fire hazard severity zone.<sup>10</sup> According to the General Plan EIR, areas of potential wildland fire hazard exist within the southern, mostly unincorporated portions of the General Plan study area, including rural, hilly terrain, as well as areas adjacent to or covered by natural grassland or brush. New development within or near such areas are more likely to be subject to wildfire hazards.

### Wildfire-conductive Conditions

Grassland or other vegetation in California is easily ignited, particularly in dry seasons. Wildfire is a serious hazard in high dry fuel load areas, particularly near areas of natural vegetation and steep slopes, since fires tend to burn more rapidly on steeper terrain. Wildfire is also a serious hazard in areas of high wind, given that fires will travel faster and farther geographically when winds are higher. Furthermore, wildfire is more likely in areas where electric power lines are located above ground where they can come into contact with either vegetation or building materials.

Within the City of Antioch, areas of potential wildfire hazards exist in the southern predominantly unincorporated areas of the City, including rural, hilly areas and areas adjacent to or covered by natural grassland or brush. Development within those areas may expose individuals to hazardous conditions. Additionally, there is the potential for an increase in the occurrence of fire in these areas due to increasing population and the fact that a majority of wildland fires are caused by human carelessness.<sup>11</sup>

### *Project Site*

According to the CAL FIRE Hazard Severity Zone Map, the project site is not located within a designated “Fire Hazard Severity Zone in a State Responsibility Area” or “Very High Fire Hazard Severity Zone in a Local Responsibility Area.”<sup>12</sup> However, as the project site consists of grasslands and the surrounding area is comprised of wildland and brush, wildfire hazards do exist within the site.

## Emergency and Evacuation Routes/Access

### *The City of Antioch*

There are no specific emergency evacuation routes listed for the City of Antioch. However, it is expected that major arterials, such as A Street and Lone Tree Way, Deer Valley Road, Hillcrest Avenue, L Street and Contra Loma Boulevard, Somersville Road, 18<sup>th</sup> Street, James Donlon Boulevard, West 4<sup>th</sup> Street and the

<sup>9</sup> United States Forest Service. Wildlife Fire Assessment System. 2014. Website: <http://www.wfas.net/index.php/fire-danger-rating-fire-potential--danger-32/fire-danger-subsets-fire-potential--danger-55>. Accessed December 11, 2019.

<sup>10</sup> California Department of Forestry and Fire Protection (CAL FIRE). Contra Costa County Fire Hazard Severity Zones. Website: [https://frap.fire.ca.gov/media/6195/fhszs\\_map7.pdf](https://frap.fire.ca.gov/media/6195/fhszs_map7.pdf). Accessed December 11, 2019.

<sup>11</sup> City of Antioch. 2003. City of Antioch General Plan EIR.

<sup>12</sup> California Department of Forestry and Fire Protection (CAL FIRE). Contra Costa County Fire Hazard Severity Zones. Website: [https://frap.fire.ca.gov/media/6195/fhszs\\_map7.pdf](https://frap.fire.ca.gov/media/6195/fhszs_map7.pdf). Accessed December 11, 2019.

A Street Extension, West 10<sup>th</sup> Street, Wilbur Avenue, Dallas Ranch Road, Buchanan Road, and Davidson Drive<sup>13</sup> would be used in the event of an emergency to provide access to SR-4 and SR-160.

### **Project Site**

Major arterials near the project site that would likely be used as emergency evacuation routes include Deer Valley Road and a future extension of Sand Creek Road through the project site. In addition, as mentioned in Section 3.13, Transportation, a secondary emergency access connection through Village 9 is proposed.

### **Post-fire Slope Instability and Drainage Pattern Changes**

Slope instability from wildfire scarring of the landscape can result in slope instability in the form of more intensive flooding and landslides. Post-fire soils and altered drainage patterns can more easily creep away from downslope sides of foundations and thereby reduce lateral support.

### **The City of Antioch**

The City of Antioch General Plan states that landslide hazards exist primarily in the southwest area of the City, in the hilly areas of Antioch. Most of the slopes in the southwest area are considered to be moderately unstable.<sup>14</sup> In addition, according to the California Department of Conservation, the southern portion of the City contains areas susceptible to liquefaction and landslides.<sup>15</sup>

### **Project Site**

Because of the relatively flat topography of Lone Tree Valley, the focus of development upon slopes lower than 25 percent, and the characterization of soils as summarized in the Geotechnical Exploration Report, the potential for landslides to occur on the project site is low to negligible.<sup>16</sup> As mentioned above, the California Department of Conservation's Earthquake Zones of Required Investigation Map identifies the project site as located within a liquefaction zone.<sup>17</sup>

## **3.8.3 - Regulatory Framework**

### **Occupational Health and Safety Act**

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor is responsible for implementing and enforcing federal laws and regulations that address worker health and safety. OSHA requires specific training for hazardous materials users and handlers, provision of information (procedures for personal safety, hazardous-materials storage and handling, and emergency response) to employees who may be exposed to hazardous materials, and acquisition of material safety data sheets from materials manufacturers. Material safety data sheets describe the risks, as well as proper handling and procedures, related to particular hazardous materials. Employee training must include response and remediation procedures for hazardous materials releases and

<sup>13</sup> City of Antioch. 2003. General Plan EIR. Section 4.13, Traffic and Circulation. Page 4.13-1.

<sup>14</sup> City of Antioch. 2003. City of Antioch General Plan. Environmental Hazards. Website: [https://www.antiochca.gov/fc/community-development/planning/Antioch\\_Adopted\\_General\\_Plan.pdf](https://www.antiochca.gov/fc/community-development/planning/Antioch_Adopted_General_Plan.pdf). Accessed July 17, 2019.

<sup>15</sup> California Department of Conservation. Seismic Hazards and Zones of Required Investigation. Website: <https://maps.conservation.ca.gov/cgs/EQZApp/app/>. Accessed February 25, 2020.

<sup>16</sup> ENGEO, Inc. 2018. The Ranch at Antioch. Geotechnical Exploration. September.

<sup>17</sup> California Department of Conservation. Seismic Hazards and Zones of Required Investigation. Website: <https://www.conservation.ca.gov/cgs/Pages/Program-SHP/regulatory-hazard-zones.aspx>. Accessed December 11, 2019.

exposures. Construction workers and operational employees at the project site would be subject to these requirements.

***Residential Lead-Based Paint Reduction Act (Lead-based Paint)***

The Residential Lead-Based Paint Hazard Reduction Act of 1992, also known as Title X, was passed by Congress to protect families from exposure to lead from paint, soil, and dust. Under Section 1018 of the law, the United States Department of Housing and Urban Development (HUD), in addition to the EPA, are required to disclose known information on lead-based paints and lead-based paint hazards before the lease or sale of most homes built before 1978. Sellers, landlords, and real estate agents are responsible for compliance to this rule.

The law also requires that buyer and renter-specific information about lead-based paint in the housing be provided in addition to a federal pamphlet with tips to identify and control lead-based paint related hazards. This information is to be given to the buyer or renter before the sale or lease of the home.

***Toxic Substances Control Act (Asbestos Containing Materials)***

The EPA prohibited the use of polychlorinated biphenyls (PCBs) in the majority of new electrical equipment starting in 1979 and initiated a phase-out for much of the existing PCB-containing equipment. The inclusion of PCBs in electrical equipment and the handling of those PCBs are regulated by the provisions of the Toxic Substances Control Act, 15 United States Code Section 2601, *et seq.*

Relevant regulations include labeling and periodic inspection requirements for certain types of PCB-containing equipment and outline highly specific safety procedures for their disposal. Likewise, the State of California regulates PCB-laden electrical equipment and materials contaminated above a certain threshold as hazardous waste. These regulations require that such materials be treated, transported, and disposed accordingly. At lower concentrations for non-liquids, RWQCBs may exercise discretion over the classification of such wastes.

***Code of Federal Regulations, Titles 29 and 40***

Regulations in Code of Federal Regulations Title 29 include requirements to manage and control exposure to lead-based paint and ACM. In California, these requirements are implemented by the California Occupational Safety and Health Administration (Cal/OSHA) under California Code of Regulations Title 8 (see further discussion of California Code of Regulations Title 8 below). The removal and handling of asbestos-containing materials is governed primarily by EPA regulations under California Code of Regulations Title 40. The regulations require that the appropriate State agency be notified before any demolition, or before any renovations, of buildings that could contain asbestos or asbestos-containing materials above a specified threshold.

***Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act***

The EPA is responsible for implementing and enforcing federal laws and regulations pertaining to hazardous materials. The primary legislation includes RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Emergency Planning and Community Right-to-Know Act (known as SARA Title III). RCRA and the 1984 RCRA Amendments regulate the treatment,

storage, and disposal of hazardous and non-hazardous wastes and mandate that hazardous wastes be tracked from the point of generation to their ultimate fate in the environment, including detailed tracking of hazardous materials during transport and permitting of hazardous material handling facilities. As permitted by RCRA, in 1992, the EPA approved California's program called the Hazardous Waste Control Law (HWCL), administered by the DTSC, to regulate hazardous wastes in California, as discussed further below. The purpose of CERCLA is to identify and clean up chemically contaminated sites that pose a significant environmental health threat, and the Hazard Ranking System is used to determine whether a site should be placed on the National Priorities List for cleanup activities. SARA relates primarily to emergency management of accidental releases and requires annual reporting of continuous emissions and accidental releases of specified compounds that are compiled into a nationwide Toxics Release Inventory. Finally, SARA Title III requires formation of state and local emergency planning committees that are responsible for collecting material handling and transportation data for use as a basis for planning and provision of chemical inventory data to the community at large under the "right-to-know" provision of the law.

### ***Hazardous Materials Transportation Act***

Under the Hazardous Materials Transportation Act of 1975, the United States Department of Transportation (USDOT), Office of Hazardous Materials Safety regulates the transportation of hazardous materials on water, rail, highways, through air, or in pipelines, and enforces guidelines created to protect human health and the environment and reduce potential impacts by creating hazardous-material packaging and transportation requirements. It also includes provisions for material classification, packaging, marking, labeling, placarding, and shipping documentation. The USDOT provides hazardous-materials safety training programs and supervises activities involving hazardous materials. In addition, the USDOT develops and recommends regulations governing the multimodal transportation of hazardous materials.

### ***Aboveground Petroleum Storage Act, and Spill Prevention, Control, and Countermeasure Rule***

The Aboveground Petroleum Storage Act of 1990, and the Spill Prevention, Control, and Countermeasure (SPCC) Rule (amended 2010) of the Oil Pollution Prevention regulation (40 Code of Federal Regulations [CFR] 112) require the owner or operator of a tank facility with an aggregate storage capacity greater than 1,320 gallons to notify the local Certified Unified Program Agency (CUPA) and prepare an SPCC plan. The SPCC plan must identify appropriate spill containment measures and equipment for diverting spills from sensitive areas, and must discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and training.

### ***Clean Water Act***

The Clean Water Act (CWA) (Title 33 § 1251 *et seq.* of the United States Code [33 USC 1251, *et seq.*]) is the major federal legislation governing water quality. The CWA established the basic structure for regulating discharges of pollutants into waters of the United States (not including groundwater). The objective of the act is "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA establishes the basic structure for regulating the discharge of pollutants into waters of the United States. Responsibility for administering the CWA resides with the State Water Board and nine Regional Water Quality Control Boards (RWQCBs); the Central Valley RWQCB administers the CWA in the City of Antioch area. Section 404 of the CWA regulates temporary and

permanent fill and disturbance of waters of the United States, including wetlands. The United States Army Corps of Engineers (USACE) requires that a permit be obtained if a project proposes to place fill in navigable waters and/or to alter waters of the United States below the ordinary high-water mark in non-tidal waters. Compliance with the water quality standards required under Section 401 is a condition for issuance of a Section 404 permit. Under Section 401 of the CWA, every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain a state water quality certification from the RWQCB to demonstrate that the proposed activity would comply with state water quality standards.

## **State**

### ***Cortese List***

The provisions in Government Code Section 65962.5 are commonly referred to as the “Cortese List.” The Cortese List, or a site’s presence on the list, has bearing on the local permitting process as well as on compliance with the California Environmental Quality Act (CEQA). While Government Code Section 65962.5 refers to the preparation of a ‘list,’ many changes have occurred related to web-based information access since 1992 and this information is now largely available on the State Water Board websites of GeoTracker and EnviroStor. Those requesting a copy of the Cortese “list” are now referred directly to the appropriate information resources contained on the Internet websites (e.g., GeoTracker and EnviroStor).

### ***California Unified Hazardous Waste and Hazardous Materials Management Regulatory Program***

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, also known as the Unified Program, protects residents of California from hazardous materials and hazardous waste by ensuring consistency throughout the state of implementation of administrative requirements, inspections, permits, and enforcement at the regulatory level. The California Environmental Protection Agency (Cal/EPA) has 81 certified local agencies, known as Certified Unified Program Agencies (CUPAs), which assist in overseeing statewide implementation of the Unified Program. CUPAs implement regulatory standards established by the DTSC, the Governor’s Office of Emergency Services (Cal/OES), the State Water Board, and the Office of the State Fire Marshal (OSFM), and Cal/EPA. Each CUPA is periodically evaluated to ensure adequate and effective implementation of the Unified Program.

### ***California Uniform Fire Code (Hazardous Materials Storage in Buildings and Tanks)***

California Code of Regulations, Title 24, also known as the California Building Standards Code, contains the California Fire Code, included as Part 9 of that title. Updated every 3 years, the California Fire Code includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, fire hydrant locations and distribution, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildlife hazard areas.

### ***California Public Resources Code Section 3229, Division 3 (Abandoned Wells)***

Public Resources Code Section 3229, Division 3, states that prior to commencement of work to abandon a well, the operator or owner is required to file with the supervisor or district deputy a

written notice of intention to abandon the well. Abandonment of a well shall not occur until supervisor or district deputy approval is given. If notice is not given by the supervisor or district deputy within 10 working days, the requested abandonment of the well shall be deemed approved and the notice of intention shall be deemed a written report of the supervisor. If abandonment operations have not commenced within one year of receipt of the notice of intention, the notice of intention shall be deemed cancelled.

### ***California Emergency Services Act, Chapter 7, Division 1, Title 2 of the California Government Code***

The California Emergency Services Act confers emergency powers to the Governor and establishes the California Emergency Management Agency. The California Emergency Services Act also delineates emergency responsibilities of State agencies and establishes the State mutual aid system.

### ***California Emergency Plan***

In 2009, the California State Emergency Plan was adopted to address the State's response to extraordinary emergency situations associated with natural disasters or human-caused emergencies. The State Emergency Plan describes the methods for carrying out emergency operations, the process for rendering mutual aid, the emergency services of governmental agencies, and how the public will be informed during an emergency or disaster.

### ***California Connelly Act (Asbestos-containing Buildings)***

Assembly Bill 3713 (AB 3713), known as the Connelly Bill, requires building owners to disclose the presence of any known asbestos containing materials to employees. An owner who intentionally fails to disclose the presence of asbestos containing materials and comply with this law may be found guilty of a misdemeanor and subject to penalty.

### ***California Health and Safety Code (Hazardous Materials Release and Response Plan and Inventory)***

California Health and Safety Code Chapter 6.95, Hazardous Materials Release Response Plans and Inventory, requires the establishment of business and area plans related to the handling and release or threatened release of hazardous materials. The establishment of a statewide environmental reporting system for these plans is required.

Additionally, information on type, location, quantity, and health risks of hazardous materials that are handled, used, stored, and disposed of within the State, which would be accidentally released into the environment is required to be submitted to health officials, planners, firefighters, health care providers, regulatory agencies, and other interested persons. Information provided by business and area plans is necessary to prevent or mitigate the damage to the health and safety of persons and the environment related to the release or threatened release of hazardous materials into the workplace and environment.

A CUPA in consultation with local emergency response agencies, shall establish an area plan for emergency response to a release or threatened release of hazardous materials within its jurisdiction. Area plans shall include procedures and protocols for emergency response personnel, including the health and safety of those personnel, pre-emergency planning, training of appropriate employees,

notification and coordination of on-site activities with State, local, and federal agencies, responsible parties, and special districts, on-site public safety information, required supplies and equipment, access to emergency response contractors and hazardous waste disposal sites, incident critique and follow up, and requirements for notification to the office of reports made pursuant to Section 25510.

### ***California Safe Drinking Water and Toxic Enforcement Act***

The California Safe Drinking Water and Toxic Enforcement Act of 1986 prohibits the contamination of drinking water with chemicals that are known to cause cancer or reproductive toxicity. Furthermore, no person in the course of doing business shall knowingly discharge or release a chemical known to the State to cause cancer or reproductive toxicity onto water or into land where such chemical passes or probably will pass into any source of drinking water. In addition, no person in the course of doing business shall knowingly and intentionally expose any individual to a chemical known to the State to cause cancer or reproductive toxicity without first giving a clear and reasonable warning to such individual.

### ***Standardized Emergency Management System Chapter 1, Division 2, Title 21 of the California Code of Regulations***

The Standardized Emergency Management System (SEMS) is intended to standardize response to emergencies involving multiple jurisdictions or multiple agencies. SEMS requires emergency response agencies use basic principles and components of emergency management, multi-agency or inter-agency coordination, the operational area concept, and established mutual aid systems. As of December 1, 1996, local government must use SEMS in order to be eligible for State funding of response-related personnel costs.

### ***California Public Resources Code Fire Hazard Severity Zones***

California Public Resources Code 4290 states that minimum fire safety standards related to state responsibility areas lands and lands designated as very high fire hazard severity zones as defined in subdivision (i) of Section 51177 of the Government Code must be implemented. These regulations apply to perimeters and access to all commercial, residential, and industrial building construction within state responsibility areas approved after January 1, 2021.

In addition to fire safety standards, the State Fire Marshal has the authority to adopt regulations for openings into attic areas and roof coverings of buildings specific in Section 13108.5 of the Health and Safety Code. Regulations shall include road standards for fire equipment access, minimum private water supply reserves for emergency fire use, standards for signs identifying streets, buildings, and roads, and fuel breaks and greenbelts.

Regulations shall be updated periodically on and after July 1, 2021, for fuel breaks and greenbelts near communities to provide for greater fire safety for the perimeters of all industrial, commercial, and residential building construction within state responsibility areas and lands designated as very

high fire hazard severity zones. Measures to preserve undeveloped ridgelines to reduce fire risk and improve fire protection shall also be included in the regulations.<sup>18</sup>

### **California Hazardous Waste Control Law**

The Hazardous Waste Control Law is the primary hazardous waste statute in the State of California, and implements RCRA as a “cradle-to-grave” waste management system for handling hazardous wastes in a manner that protects human health and the environment and would reduce potential resulting impacts. The law specifies that generators have the primary duty to determine whether their waste is hazardous and to ensure proper management. The Hazardous Waste Control Law also establishes criteria for the reuse and recycling of hazardous waste used or reused as raw materials. The law exceeds federal requirements by mandating source reduction planning, and a much broader requirement for permitting facilities that treat hazardous waste. It also regulates a number of types of waste and waste management activities that are not covered by federal law.

### **California Health and Safety Code**

The California Health and Safety Code (HSC § 25141) defines hazardous waste as a waste or combination of waste that may:

- . . . because of its quantity, concentration, or physical, chemical, or infection characteristics:
- (1) Cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitation-reversible illness.
- (2) Pose a substantial present or potential hazard to human health or the environment, due to factors including, but not limited to, carcinogenicity, acute toxicity, chronic toxicity, bioaccumulative properties, or persistence in the environment, when improperly treated, stored, transported, or disposed of or otherwise managed.

These regulations establish criteria for identifying, packaging, and labeling hazardous wastes; prescribe management practices for hazardous wastes; establish permit requirements for hazardous-waste treatment, storage, disposal, and transportation; and identify hazardous waste that commonly would be disposed of in landfills.

Under both the RCRA and the HWCL, hazardous-waste manifests must be retained by the generator for a minimum of 3 years. The generator must match copies of the manifests with copies of manifest receipts from the treatment, disposal, or recycling facility.

In accordance with Chapter 6.11 of the California Health and Safety Code (HSC § 25404, *et seq.*), local regulatory agencies enforce many federal and State regulatory programs through the CUPA program, including:

- Hazardous Materials Business Plans (HSC § 25501, *et seq.*);

<sup>18</sup> California Legislative Information. Public Resources Code 4290. Website: [http://leginfo.ca.gov/faces/codes\\_displaySection.xhtml?sectionNum=4290.&lawCode=PRC](http://leginfo.ca.gov/faces/codes_displaySection.xhtml?sectionNum=4290.&lawCode=PRC).

- State Uniform Fire Code (UFC) requirements (UFC § 80.103, as adopted by the State Fire Marshal pursuant to HSC § 13143.9);
- Underground Storage Tanks (HSC § 25280, *et seq.*);
- Aboveground Storage Tanks (HSC § 25270.5(c)); and
- Hazardous-waste-generator requirements (HSC § 25100, *et seq.*).

Contra Costa Health Services Hazardous Materials Division is the CUPA for Contra Costa County. As the CUPA, Contra Costa Health Services enforces State statutes and regulations through the Hazardous Materials Unified Program Agency, which oversees aboveground petroleum tanks; generation of hazardous materials; storage and treatment; USTs; generation of medical waste; the accidental-release prevention program; and the Local Oversight Program that interfaces with the State Water Board and the Central Valley RWQCB on LUSTs and UST release sites. A Hazardous Materials Business Plan must be submitted if a facility ever handles any individual hazardous material in an aggregate amount equal to or greater than 55 gallons (liquids), 500 pounds (solids), or 200 cubic feet (gases), and must include the following:

- Details that include facility floor plans and identify the business conducted at the site;
- An inventory of hazardous materials handled or stored on the site;
- An emergency response plan; and
- A training program in safety procedures and emergency response for new employees who may handle hazardous materials, with an annual refresher course in the same topics for those same employees.

### ***California Code of Regulations, Title 8***

Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations. These regulations concern the use of hazardous materials in the workplace, including requirements for employee safety training; availability of safety equipment; accident and illness prevention programs; hazardous-substance exposure warnings, and preparation of emergency action and fire prevention plans.

Cal/OSHA also enforces hazard communication program regulations, including procedures for identifying and labeling hazardous substances, and requires that safety data sheets (formerly known as Material Safety Data Sheets [MSDS]) be available for employee information and training programs. Cal/OSHA standards are generally more stringent than federal regulations. Construction workers and operational employees at the project site would be subject to these requirements.

California Code of Regulations, Title 8, Section 1529 authorizes Cal/OSHA to implement the survey requirements of Code of Federal Regulations Title 29 relating to asbestos. These federal and State regulations require facilities to take all necessary precautions to protect employees and the public from exposure to asbestos. Workers who conduct asbestos abatement must be trained in accordance with federal and State OSHA requirements. The Bay Area Air Quality Management District (BAAQMD) oversees the removal of regulated asbestos-containing materials (see “Asbestos Demolition, Renovation, and Manufacturing Rule” below).

California Code of Regulations, Title 8, Section 1532.1 includes requirements to manage and control exposure to lead-based paint. These regulations cover the demolition, removal, cleanup, transportation, storage, and disposal of lead-containing material. The regulations outline the permissible exposure limit, protective measures, monitoring, and compliance to ensure the safety of construction workers exposed to lead-based material. Loose and peeling lead-based paint must be disposed of as a State and/or federal hazardous waste if the concentration of lead equals or exceeds applicable hazardous waste thresholds. Federal and State OSHA regulations require a supervisor who is certified with respect to identifying existing and predictable lead hazards to oversee air monitoring and other protective measures during demolition activities in areas where lead-based paint may be present. Special protective measures and notification of Cal/OSHA are required for highly hazardous construction tasks related to lead, such as manual demolition, abrasive blasting, welding, cutting, or torch burning of structures, where lead-based paint is present.

#### ***California Code of Regulations Title 22, Division 4.5***

California Code of Regulations, Title 22, Division 4.5, contains the Environmental Health Standards for the Management of Hazardous Waste, which includes California waste identification and classification regulations. California Code of Regulations, Title 22, Chapter 11, Article 3, “Soluble Threshold Limits Concentrations/Total Threshold Limits Concentration Regulatory Limits,” identifies the concentrations at which soil is determined to be a California hazardous waste. California’s Universal Waste Rule (22 California Code of Regulations [CCR] § 66273) provides an alternative set of management standards in lieu of regulation as hazardous wastes for certain common hazardous wastes, as defined in California Code of Regulations, Title 22, Section 66261.9. Universal wastes include fluorescent lamps, mercury thermostats, and other mercury-containing equipment. Existing structures may contain fluorescent light ballasts that could contain mercury or lead. The Alternative Management Standards for Treated Wood Waste (22 CCR § 67386) were developed by the DTSC to allow for disposal of treated wood as a nonhazardous waste, to simplify and facilitate the safe and economical disposal of such waste. Chemically treated wood can contain elevated levels of hazardous chemicals (e.g., arsenic, chromium, copper, pentachlorophenol, or creosote) that equal or exceed applicable hazardous waste thresholds. The Alternative Management Standards provide for less stringent storage requirements and extended accumulation periods, allow shipments without a hazardous waste manifest and a hazardous waste hauler, and allow disposal at specific nonhazardous waste landfills.

#### ***Porter-Cologne Act***

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is California’s statutory authority for the protection of water quality. Under the Porter-Cologne Act, the State must adopt water quality policies, plans, and objectives that protect the State’s waters for the use and enjoyment of the people. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The RWQCBs are required to formulate and adopt water quality control plans (also known as Basin Plans) for all areas of the region and establish water quality objectives in the plans. The Porter-Cologne Act sets forth the obligations of State Water Board and RWQCBs to adopt and periodically update water quality control plans that recognize and reflect the differences in existing water quality, the beneficial uses of the region’s groundwater and surface water, and local water quality conditions and problems. It also authorizes the State Water Board and RWQCBs to

issue and enforce waste discharge requirements and to implement programs for controlling pollution in State waters. Finally, the Porter-Cologne Act also authorizes the State Water Board and RWQCBs to oversee site investigation and cleanup for unauthorized releases of pollutants to soils and groundwater and in some cases to surface waters or sediments. The Sacramento-San Joaquin Rivers Basin Plan governs Sand Creek and the Delta.

### ***California Emergency Response Plan***

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local governments and private agencies. Responding to hazardous-materials incidents is one part of this plan. The plan is administered by the California Governor's Office of Emergency Services, which coordinates the responses of other agencies. When the City of Antioch experiences an emergency, the Contra Costa County Office of Sheriff's Emergency Service Division coordinates response to such emergencies. Emergency response team members respond and work with local fire and police agencies, emergency medical providers, the California Highway Patrol, CAL FIRE, California Department of Fish and Wildlife, and California Department of Transportation (Caltrans).

### ***California Department of Forestry and Fire Protection***

CAL FIRE has mapped fire threat potential throughout California. CAL FIRE maps fire threat based on the availability of fuel and the likelihood of an area burning (based on topography, fire history, and climate). The threat levels include no fire threat, moderate, high, and very high fire threat. Further, the maps designate the City of Antioch as the Local Responsibility Area (LRA) for the project site. Additionally, CAL FIRE produced a 2010 Strategic Fire Plan for California, which contains goals, objectives, and policies to prepare for and mitigate the effects of fire on California's natural and built environments. CAL FIRE's Office of the State Fire Marshal provides oversight of enforcement of the California Fire Code as well as overseeing hazardous liquid pipeline safety.

### ***California Building Code***

The State of California provided a minimum standard for building design through the 2016 California Building Standards Code (CBC), which is located in Part 2 of Title 24 of the California Code of Regulations. The 2016 CBC is based on the 2015 International Building Code, but has been modified for California conditions. It is generally adopted on a jurisdiction by-jurisdiction basis, subject to further modification based on local conditions. Commercial and residential buildings are plan-checked by local City and County building officials for compliance with the CBC. Typical fire safety requirements of the CBC include the installation of sprinklers in all new high-rise buildings and residential buildings; the establishment of fire resistance standards for fire doors, building material; and particular types of construction. The 2019 CBC was published on July 1, 2019, and became effective January 1, 2020.

### ***California Public Resources Code***

The California Public Resources Code includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors<sup>19</sup> on construction equipment that use an internal combustion engine; specify requirements for the safe

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<sup>19</sup> A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas.

These regulations include the following:

- Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (Public Resources Code [PRC] § 4442);
- Appropriate fire suppression equipment shall be maintained during the highest fire danger period—from April 1 to December 1 (PRC § 4428);
- On days when a burning permit is required, flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor would maintain the appropriate fire suppression equipment (PRC § 4427); and
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines shall not be used within 25 feet of any flammable materials (PRC § 4431).

## Regional

### ***BAAQMD Asbestos Demolition, Renovation and Manufacturing Rule***

The removal of asbestos-containing building materials is subject to the limitations of BAAQMD Regulation 11, Rule 2, “Hazardous Materials; Asbestos Demolition, Renovation and Manufacturing.” This rule prohibits visible emissions to outside air from any operation involving the demolition of any structure containing asbestos, and sets out requirements for demolition of such structures, including a pre-demolition survey conducted by a certified professional. All friable (i.e., crushable by hand) asbestos-containing materials or non-friable asbestos-containing materials that may be damaged must be abated before demolition in accordance with applicable requirements. Friable asbestos-containing materials must be disposed of as asbestos waste at an approved facility. Non-friable asbestos-containing materials may be disposed of as nonhazardous waste at landfills that accept such wastes.

### ***Association of Bay Area Governments Hazard Mitigation Plan***

The Association of Bay Area Governments’ multijurisdictional Local Hazard Mitigation Plan for the San Francisco Bay area was updated in 2010 in partnership with the Bay Conservation and Development Commission (BCDC) Adapting to Rising Tides Program to support local governments in the regional plan for existing and future hazards of climate change. This detailed 5-year plan identifies potential natural and human-made hazards, assesses their potential risks, and includes mitigation methods to reduce risks. The potential hazards identified in the Plan include earthquakes and liquefaction, wildfires, floods, drought, solar storms, dam or levee failure, disease outbreak, freezes, wind, heat, thunder and lightning storms, siltation, tornadoes, hazardous materials, slope failure and mudflows, and other hazards. Similarly, mitigation measures include hazard event planning, emergency preparedness coordination, education, facility upgrades, and monitoring actions.

### ***Contra Costa County Hazard Mitigation Plan***

The Contra Costa County Hazard Mitigation Plan (HMP) contains goals and objectives that are intended to reduce loss of life and property from natural disasters.<sup>20,21</sup> During the planning process, this plan used Federal Emergency Management Agency (FEMA) tools to determine the most likely possible threats would be earthquakes, flooding, landslides, tsunamis, and wildfires in urban interface zones. The Contra Costa County HMP identifies mitigation action items that aim to meet objectives and reduce the impacts of these hazards. The Contra Costa County Office of Emergency Services and Contra Costa County Department of Conservation and Development share the lead responsibility for overseeing the plan implementation and maintenance strategy. Plan implementation and evaluation will be a shared responsibility among all planning partnership members and agencies identified as lead agencies in the mitigation action plans. The HMP contains the following Goals aimed at reducing the vulnerability from natural hazards within the County in a cost-effective manner:

- **Goal 1:** Save, or protect lives and reduce injury.
- **Goal 2:** Increase resilience of infrastructure and critical facilities.
- **Goal 3:** Avoid, minimize, or reduce damage to property.
- **Goal 4:** Encourage the development and implementation of long-term, cost-effective, and environmentally sound mitigation projects.
- **Goal 5:** Build and support capacity to enable local government and the public to prepare, respond, and recover from the impact of natural hazards.

### ***Contra Costa County Emergency Operations Plan***

The purpose of the Emergency Operations Plan is to provide the basis for a coordinated response before, during and after an emergency affecting Contra Costa County.<sup>22</sup> The Emergency Operations Plan identifies and facilitates inter-agency coordination in emergency operations. The Plan applies to all emergencies in unincorporated areas of Contra Costa County and within incorporated areas when those emergencies require multi-agency coordination at the operational area level.

## **Local**

### ***City of Antioch General Plan***

The following City of Antioch General Plan objectives and policies are related to hazards, hazardous materials, and wildfire:

<sup>20</sup> Tetra Tech, Inc. 2018. Contra Costa County Hazard Mitigation Plan. Volume 1—Planning Area-Wide Elements. Website: <https://contracosta.ca.gov/DocumentCenter/View/48893/Contra-Costa-County-Draft-Local-Hazard-Mitigation-Plan-Volume-1-January-31-2018?bidId=>. Accessed December 11, 2019.

<sup>21</sup> Tetra Tech, Inc. 2018. Contra Costa County Hazard Mitigation Plan. Volume 2—Planning Partner Annexes. Website: <https://contracosta.ca.gov/DocumentCenter/View/48894/Contra-Costa-County-Draft-Local-Hazard-Mitigation-Plan-Volume-2-January-31-2018?bidId=>. Accessed December 11, 2019.

<sup>22</sup> Contra Costa County. 2015. Emergency Operations Plan. Website: <https://www.contracosta.ca.gov/DocumentCenter/View/37349/Contra-Costa-Emergency-Operations-Plan-2015?bidId=>. Accessed December 11, 2019.

*Fire Protection*

- **Objective 8.10.1:** Provision of an adequate number of fire stations, along with firefighting personnel and equipment to protect Antioch residents and businesses.
- **Policy 8.10.2a:** Work with the Contra Costa County Fire Protection District to provide high quality fire protection services to area residents and businesses. The City's role should include, but not be limited to:
  - Determining the appropriateness of station location sites;
  - Enforcement of building codes to reduce fire hazards;
  - Collection of mitigation fees established by the fire district to construct needed additional stations within the Antioch Planning Area.
  - Support the District in providing funding for personnel costs to staff stations within the City;
  - Support the District in establishing fees that are adequate to mitigate the impacts of new development and income to support operation of new stations whose construction is financed with development fees; and
  - Requiring reasonable reservation of appropriate sites as part of new development.
- **Policy 8.10.2b:** In cooperation with the Contra Costa County Fire Protection District, conduct an annual assessment of the of the adequacy of facilities and services serving Antioch, personnel and staffing needs, and capital needs, based on anticipated growth and the level of service standard set forth in the Growth Management Element. This assessment should be undertaken as part of the annual review of proposed capital projects required by the California Government code (see Chapter 12, Implementation, Section 12.4b).
- **Policy 8.10.2c:** Provide the Contra Costa County Fire Protection District with timely information on development proposals and projected levels of future growth so that it can maintain appropriate long-term master plans and refine the delivery of service and facilities to maintain the performance standards set forth in the Growth Management Element.
- **Policy 8.10.2d:** Involve the Fire Protection District in the development review process by referring development requests to the Police Department for review and comment.

*Wildland Fires*

- **Objective 11.5.1:** Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from wildland fires.
- **Policy 11.5.2a:** Where new development borders wildland areas, require appropriate fuel modification and use of fire retardant building materials per the requirements of the Contra Costa County Fire Protection District. Fuel modification may be permitted to extend beyond the boundaries of the site for which wildland fire protection is being provided only if the adjacent owner provides written permission, the proposed fuel modification is consistent with the management practices of the agency controlling such land (if it is in permanent open space), and the off-site fuel modification activity will not significantly impact sensitive habitat areas.
- **Policy 11.5.2b:** Require that adequate fire protection be available at initial project occupancy, whenever feasible. Thus, stations should be constructed and manned at the outset of new development. If the Contra Costa Fire Protection District finds that a lag time between initial occupancy and operation of new stations cannot be avoided, the City may consider requiring sprinklers in new homes as an alternative.

### *Hazards and Hazardous Materials*

- **Objective 11.7.1:** Minimize the negative impacts associated with the storage, use, generation, transport, and disposal of hazardous materials.
- **Policy 11.7.2n:** Require appropriate design features be incorporated into each facility's layout to increase safety and minimize potential adverse effects on public health.
  - Require the provision of spill containment facilities and monitoring devices in all facilities.
  - Ensure that pipelines and other hazardous waste channels are properly designed to minimize leakage and require above ground pipelines to be surrounded by spill containment basins.
  - Give priority to underground storage of hazardous materials, unless this method is shown to be infeasible.
  - Require hazardous materials storage areas to be located as far from existing pipelines and electrical transmission lines as possible.
- **Policy 11.7.2q:** Facilitate public awareness of hazardous materials by preparing and distributing in conjunction with Contra Costa Health Services public information regarding uniform symbols used to identify hazardous wastes, Antioch's household hazardous waste collection programs, and hazardous waste source reduction programs.
- **Policy 11.7.2r:** Monitor the progress and success of hazardous materials efforts, and modify these efforts as needed.
- **Objective 11.8.1:** Maintain a level of preparedness to adequately respond to emergency situations to save lives, protect property, and facilitate recovery with minimal disruption.
- **Policy 11.8.2b:** Disseminate disaster preparedness information to local residents and businesses, describing how emergency response will be coordinated, how evacuation, if needed, will proceed, and what residents and businesses can do to prepare for emergency situations. Provide information to the public about:
  - Environmental hazards existing in Antioch;
  - The costs of doing nothing to mitigate these hazards;
  - Why governmental agencies cannot eliminate all hazards;
  - What the City does to assist;
  - What the City cannot do; and
  - What the public can do to protect itself.
- **Policy 11.8.2c:** Maintain an effective and properly equipped emergency operations center, along with trained personnel, for receiving emergency calls, providing initial response and key support to major incidents, meeting the demands of automatic and mutual aid programs, and maintaining emergency incident statistical data.
- **Policy 11.8.2d:** Maintain ongoing emergency response coordination with surrounding jurisdictions.
- **Policy 11.8.2e:** Encourage private businesses and industrial uses to be self-sufficient in an emergency by:
  - maintaining a fire control plan, including on-site firefighting capabilities and volunteer response teams to respond and extinguish small fires; and
  - identifying personnel who are capable and certified in first aid and CPR.
- **Policy 11.8.2f:** Regularly review and clarify emergency evacuation plans for dam failure, fire, and hazardous materials releases.

### 3.8.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to the 2019 CEQA Guidelines Appendix G, to determine whether impacts related to hazards and hazardous materials have significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
- b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
- c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
- d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
- e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working the project area?
- f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
- g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury, or death involving wildland fires?

According to the 2019 CEQA Guidelines Appendix G, to determine whether impacts related to wildfire have significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

If located in or near SRAs or lands classified as Very High Fire Hazard Severity Zones, would the project:

- h) 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?
- i) 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?
- j) 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?

## Approach to Analysis

This evaluation focuses on whether the proposed project would result in changes to the physical environment that would cause or exacerbate adverse effects related to the use, transportation, disposal, accidental release, or emission of hazardous materials. The evaluation also includes a determination of whether the changes to the physical environment caused by the proposed project or variant would impair or interfere with emergency response plans, or expose people or structures to increased wildfire hazards or dangers from abandoned wells or pipelines. For the evaluation of potential construction-related and operational impacts from existing hazardous materials in project site soils, sediments, groundwater, surface water, and structures, the results of environmental sampling are compared to identified screening levels. The following analysis is based, in part, on information provided by the City of Antioch General Plan, City of Antioch General Plan EIR, the Phase I ESA, and State of California websites.

Additional analyses regarding hazards and health risks are discussed as follows. Emissions of toxic air contaminants (TACs) are addressed in Section 3.2, Air Quality. Flooding and inundation hazards, including those related to erosion and mudflow, are addressed in Section 3.8, Hydrology and Water Quality. Traffic-related safety hazards are addressed in Section 3.13, Transportation. Other geotechnical-related safety hazards, such as earthquakes, are addressed in Section 3.5, Geology and Soils.

## Specific Thresholds of Significance

For purposes of this analysis, the following thresholds are used to evaluate the significance of hazards and hazardous materials impacts resulting from implementation of the proposed project.

- Routine transport, use, and/or disposal of hazardous materials.
- Regular transport of hazardous materials to/from the project site on an unsuitable road or use of highly volatile hazardous materials.
- Location within 0.25-mile of an existing or proposed school in conjunction with hazardous emissions or handle hazardous materials, waste, or substances.
- Listing on hazardous materials site list and distance of project site to listed hazardous material sites. These lists include the following:
  - The California Environmental Protection Agency (Cal/EPA)
  - California Facility Inventory Database (CA FID) UST and State Water Efficiency and Enhancement Program (SWEEP)
  - Hazardous Waste Tracking System (HAZNET)
  - California Department of Toxic Substance Control (DTSC EnviroStor and BAAQMD)
  - State Water Board GeoTracker regulated facilities databases for files related to possible RECs
- Location proximate to an airport and reduction of safety of people working or residing in the area.
- Impairing implementation of or interference with an adopted emergency response plan or emergency evacuation plan via blockage of an evacuation route or provision of only one access point for emergency vehicles.

- Placement of housing or offices in a designated wildland fire urban interface zone or proximate to unmanaged open space area that is susceptible to wildfires.

## Impact Evaluation

### *Routine Transport, Use, or Disposal of Hazardous Materials*

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**Impact HAZ-1:**        **The project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.**

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#### **Construction**

Construction activities would involve the use of heavy equipment, which would contain fuels, oils, and various other products such as concrete, paints, and adhesives that could be considered hazardous. However, the project contractor would be required to comply with all local, State, and federal laws regulating the handling, storage, and transportation of hazardous and toxic materials, as overseen by Cal/EPA, the Central Valley RWQCB, and the DTSC.

#### **Operation**

The proposed project would include residential development, parks, open space and trails, the dedication of future a fire station site, and a Village Center that would include commercial, office, and retail space. Residential and general commercial land uses do not typically involve the routine transport, use, disposal, or generation of substantial amounts of hazardous materials. During project operation, hazardous materials use would be limited to landscaping products such as fertilizer, pesticides, as well as typical commercial and household-type maintenance products (cleaning agents, degreasers, paints, batteries, and motor oil). Proper handling and usage of such materials in accordance with label instructions would ensure that adverse impacts to human health or the environment would not occur.

#### **Level of Significance**

Less Than Significant

### **Hazardous Materials Upset Risk**

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**Impact HAZ-2:**        **The project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment.**

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#### **Construction**

During construction, the proposed project would be expected to involve the transport, use, and disposal of hazardous materials, such as diesel fuels, aerosols, and paints. However, the duration of these actions would only be temporary and limited to the period of construction. Furthermore, the proposed project would be subject to the Hazardous Materials Transportation Act, California Public Resources Code, the Clean Water Act, and other local, State, and federal regulations that would reduce and limit the associated risks. Any handling, transporting, use, or disposal would comply with applicable laws, policies, and programs set forth by various federal, state, and local agencies and regulations, including the EPA, RCRA, Caltrans, and the Contra Costa Hazardous Materials Program.

Required compliance with applicable hazardous material laws and regulations would ensure that construction-related hazardous material use would not result in significant impacts.

Existing structures would be removed as part of project construction. For buildings constructed prior to 1980, the Code of Federal Regulations (29 CFR § 1926.1101) states that all thermal system insulation and surface materials must be designated as “presumed asbestos-containing material” unless proven otherwise through sampling in accordance with the standards of the Asbestos Hazard Emergency Response Act. ACMs were banned in the mid-1970s. ACMs could include, but are not limited to resilient floor coverings, drywall joint compounds, and acoustic ceiling tiles, piping insulation, electrical insulation, and fireproofing materials. Furthermore, the use of lead-based paint was not banned until 1978 by the Federal Government. Typically, exposure to lead from older vintage paint is possible when the paint is in poor condition or is being removed. Lead-based paints were phased out of production in the early 1970s. Although the exact construction date of the existing ranch located on APN 057-021-003 of the project site is unknown, the Phase I ESA approximated construction between 1953 and 1968. Therefore, given the age of the structures, ACMs and lead-based paint may be present within the structures. Because implementation of the proposed project would include demolition of the existing on-site structures, exposure of workers to ACMs or lead-based paint could occur. This represents a potentially significant impact. Implementation of Mitigation Measure (MM) HAZ-2a, which requires the Applicant to conduct hazardous materials surveys and abatement of on-site structures prior to demolition, would reduce potential impacts to a less than significant level.

Two orchards that were planted in limited areas of the site appear to be utilized from the late 1930s until the 1970s. Detectable concentrations of residual agricultural chemicals may exist within on-site soils. Implementation of MM HAZ-2b, which requires a limited agrichemical soil assessment to be conducted within the areas where the two orchards are located on-site, would reduce potential impacts to soils to a less than significant level.

It was also noted that the two on-site wells pose a potential hazard, as one was not properly abandoned according to DOGGR regulations. Unused groundwater wells that are not properly abandoned could potentially carry bacteria, sediment, fertilizer, pesticides, or other pollutants as a result of runoff flowing into the wells. Contaminated flow into the open wells could potentially contribute to contamination of the underlying groundwater or aquifer. As outlined in MM HAZ-2c, an abandonment permit is required prior to any ground disturbance activities within 50 feet of a well on the project site. As outlined in MM HAZ-2d, proper abandonment of Well No. 1 in accordance with current DOGGR regulations is required prior to construction of the proposed project.

Several aboveground storage tanks and drums containing hazardous materials and numerous abandoned or discarded tanks and drums were also found throughout the property. Records indicate that the above and underground storage tanks were used on-site since at least 1965. While no releases were documented on-site, contamination may be uncovered upon removal of the storage tanks. All hazardous materials containers and storage tanks shall be removed prior to construction, as outlined in MM HAZ 2e. Additionally, MM HAZ-2f requires a Soil Management Plan (SMP) to be prepared to address potential impacted soil within the single-family residence structure, former UST area, and debris/fill area.

The project site contains an inactive and abandoned petroleum product pipeline that traverses the western portion and the northeastern portion of the site. The pipeline traverses the middle of the proposed project site and the development of the proposed project would include mass grading and soil disturbance, as well as development near the pipeline, which may cause workers to be exposed to soil contamination. Accurate depths and alignment of the pipelines could only be determined by field checking and potholing the pipeline, which is recommended to be accomplished prior to completion of construction plans in order to avoid conflicts between the proposed development and the existing pipeline. As a result, construction and development activities related to the proposed project near the pipeline easement could cause a potentially significant impact.

Extreme caution should be used when excavating, drilling, or grading around the former petroleum product pipeline. All excavating, drilling, or grading must comply with all applicable federal and state standards and regulations associated with development near petroleum pipelines. According to the USDOT Pipeline and Hazardous Materials Safety Administration, any project involving digging near a pipeline is required to call prior to commencement of digging in order to notify companies that may operate underground utilities in the area. In addition, the proposed project would be required to comply with Section 195.210 of the Code of Federal Regulations, which requires that the pipeline must avoid and must not be located within 50 feet of any private dwelling, industrial building, or public assembly where people work, unless it is provided with at least 12 inches of cover. The proposed project must also comply with Section 192.325 of the Code of Federal Regulations, which states each transmission line must be installed with at least 12 inches of clearance from any other underground structure and the transmission line must be protected from damage. Without compliance with the above actions, impacts are potentially significant. MM HAZ-2g, which requires proper abandonment of the petroleum pipeline on-site and preparation of an SMP, and MM HAZ-2h, which requires development of construction guidelines shall be implemented to reduce impacts related to pipeline removal to a less than significant level.

It is also important to note that construction activities would involve the use of heavy equipment, which would contain fuels and oils, and various other products such as concrete, paints, and adhesives. There is potential for fuels and oils to spill onto the project site. However, the project contractor would be required to comply with all federal, State, and local ordinances regulating the handling, storage, and transportation of hazardous and toxic materials, as overseen by Cal/EPA and the DTSC. Thus, the on-site construction activities would not create a significant hazard to the public or the environment. Based on the above, implementation of the proposed project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accidental conditions involving the release of hazardous materials into the environment, specifically related to asbestos-containing materials and lead-based paint associated with the existing on-site structures, on-site orchards, existing petroleum pipeline, and existing water wells. As a result, impacts are considered to be potentially significant. Implementation of MM HAZ-2a, MM HAZ-2b, MM HAZ-2c, MM HAZ-2d, MM HAZ-2e, MM HAZ-2f, and MM HAZ-2h would reduce construction impacts to a less than significant level.

### **Operation**

During project operation, hazardous materials use would be limited to landscaping products and typical commercial and household-type maintenance products. Proper handling and usage of such

materials in accordance with label instructions would ensure that adverse impacts to human health or the environment would not occur. Therefore, operational impacts related to hazardous materials upset risk would be less than significant.

***Level of Significance Before Mitigation***

Potentially Significant (construction only)

***Mitigation Measures***

The following mitigation measures shall be implemented:

**MM HAZ-2a      Performance of Pre-Construction Hazardous Materials Surveys**

Prior to the issuance of a demolition permit for each of the structures on-site, the Applicant shall hire a California Registered Asbestos Abatement Contractor to inspect, and if necessary, remove all asbestos containing materials, and conduct final clearance inspections (visual) to document the completion of the action. All demolition activities shall be completed in accordance with California Code of Regulations Title 17, Division 1, Chapter 8, Article 1. All construction work where an employee may be occupationally exposed to lead-containing paint, including demolition, must comply with Occupational and Safety Health Administration (OSHA) Regulation 29 Code of Federal Regulations 1926.62, and California Occupational and Safety Health Administration (Cal/OSHA) Title 8 California Code of Regulations 1523.1.

**MM HAZ-2b      Agrichemical Soil Assessment**

The Applicant shall conduct a limited agrichemical soil assessment within the areas where the two orchards were located on-site to determine if residual agrichemicals are present within on-site soils in excess of applicable limits. If found to be present in excess of applicable limits, the Applicant shall have a remedial action plan developed and implemented to ensure that all residual soils are removed to the satisfaction of the Department of Toxic Substance Control (DTSC) and City of Antioch prior the issuance of a grading permit.

**MM HAZ-2c      Obtain an Abandonment Permit**

Prior to any ground disturbance activities within 50 feet of any water well or septic tank on the project site, the Applicant shall hire a licensed contractor to obtain an abandonment permit from the Contra Costa County Environmental Management Department, and properly abandon the on-site well(s) and/or septic tank, pursuant to review and approval by the City Engineer.

**MM HAZ-2d Well Abandonment**

Proper abandonment of Well No. 1 is required in accordance with current California Department Division of Oil, Gas, and Geothermal Resources (DOGGR) regulations to address past oil and gas exploration and production activities.

Prior to final map approval, the Applicant shall submit to the City of Antioch Engineering Department, for review and approval, plans which show that future inhabited structures will not be located over the two abandoned oil/gas wells. The plans shall be completed in compliance with the DOGGR Construction Site Review Program, which includes guidelines and recommendations for setbacks and mitigation measures for venting systems.

If grading is proposed proximate to the two abandoned well locations, DOGGR shall be consulted to determine if the wells will require modification in casing height. A Soil Management Plan (SMP) shall be prepared to address potential impacted soil that may be encountered during grading activities within the area of the two abandoned wells.

**MM HAZ-2e Removal of Hazardous Material Containers**

Prior to site grading, the Applicant shall cause all noted potentially hazardous material containers and tanks to be removed from the parcel.

**MM HAZ-2f Conduct a Phase II Environmental Site Assessment**

Prior to issuance of a grading permit, the Applicant shall hire a certified Soils Engineer to prepare a Phase II Environmental Site Assessment (Phase II ESA) to address all concerns identified in the Phase I ESAs. The Applicant shall comply with all Phase II recommendations.

**MM HAZ-2g Petroleum Pipeline Abandonment/Removal**

Prior to commencement of residential construction, the Applicant shall ensure that all petroleum pipelines within the areas of the project site planned for development shall be abandoned and/or removed in accordance with applicable federal, state, and/or local standards to the satisfaction of the Contra Costa Environmental Health Department and the City Engineer. If any indicators of apparent soil contamination (soil staining, odors, debris fill material, etc.) are found at the project site associated with the petroleum pipelines, the impacted area shall be isolated from surrounding, non-impacted areas. The project environmental professional shall obtain samples of the potentially impacted soil for analysis of the contaminants of concern and comparison with applicable regulatory residential screening levels (i.e., Environmental Screening Levels, California Human Health Screening Levels, Regional Screening Levels, etc.). Where the soil contaminant concentrations exceed the applicable regulatory residential screening levels, the impacted soil shall be excavated and disposed of off-site at a licensed landfill facility to the satisfaction of the Contra Costa Environmental Health Department. If soil contaminants do not exceed the applicable regulatory residential screening levels, further action is not required.

## **MM HAZ-2h      Preparation of Safety Guidelines**

In the event the pipelines are abandoned and not removed, prior to commencement of grading, the construction contractor, the pipeline operator, and a representative from the City's Engineering Department shall meet on the project site and prepare site-specific safety guidelines for construction in the field to the satisfaction of the City Engineer. The safety guidelines and field-verified location of the pipelines shall be noted on the improvement plans and be included in all construction contracts involving the project site.

### ***Level of Significance After Mitigation***

Less Than Significant

## ***Hazardous Emissions Proximate to a School***

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**Impact HAZ-3:**      The project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

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### ***Construction/Operation***

The nearest schools to the project site are Diablo Vista Elementary School, located 0.79-mile northeast of the proposed project site, and Dozier-Libbey Medical High School, located 0.86-mile southeast of the project site. As such, the project site is not located within 0.25-mile of a school and project construction would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25-mile of an existing or proposed school.

### ***Level of Significance***

Less Than Significant

## ***Government Code Section 65962.5 Sites***

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**Impact HAZ-4:**      The project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would not create a significant hazard to the public or the environment.

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### ***Construction/Operation***

According to the Geotracker and EnviroStor websites, the project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Therefore, impacts would be less than significant.

### ***Level of Significance***

Less Than Significant

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**Proximity to Public Airport Safety Hazard**

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**Impact HAZ-5:** For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would not result in a safety hazard or excessive noise for people residing or working the project area.

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***Construction/Operation***

The project site is not located within an airport land use plan, nor within 2 miles of a public airport or private airstrip. The nearest major airport is the Byron Airport, which is located over 10 miles southeast of the project site. According to the Contra Costa County Airport Land Use Commission, the project site is not within the ALUCP area or the area of influence of the nearest airport; therefore, the project site is not within an area of influence identified for the Byron Airport. Thus, the project site would not be subject to any safety hazards associated with an airport, and no impact would occur.

***Level of Significance***

No Impact

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***Emergency Response and Evacuation***

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**Impact HAZ-6:** The project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

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***Construction***

During construction, it is expected that construction equipment and vehicles would be accessing and leaving the project site, which in turn could potentially impede evacuation or emergency vehicle access. Implementation of MM TRANS-7 would reduce construction impacts to a less than significant level by ensuring that adequate vehicle access is provided during construction. Additionally, the proposed project would be required to comply with the Contra Costa County Emergency Operations Plan. Although the Contra Costa County Emergency Operations Plan does not identify specific emergency evacuation routes, compliance would ensure efficient response to emergency incidents within Contra Costa County and the City of Antioch. As such, construction impacts related to emergency response and evacuation would be less than significant after the implementation of mitigation.

***Operation***

As mentioned above, the proposed project would be required to comply with the Contra Costa County Emergency Operations Plan, which does not identify specific emergency evacuation routes. Implementation of the proposed project would not result in any adverse modifications to the existing roadway system and, thus, would not physically interfere with any existing emergency routes. Instead, the proposed project would expand the existing roadway network to include connection of Dallas Ranch Road and Deer Valley Road by way of an extension of Sand Creek Road and the proposed Street A. The extension of Sand Creek Road would provide increased roadway connectivity within the City. In addition to providing the extension of Sand Creek Road, which would serve as the primary Emergency Vehicle Access (EVA) route to the project site. A secondary EVA would be provided from the southern development area through Village 9 along Street C. EVA routes are shown in Exhibit 2-14. In addition, the proposed project involves the dedication of a 2.00-acre site for construction and operation of a

future fire station on-site. Upon buildout of the future fire station, emergency services would be readily available on-site. Emergency access would be maximized through the provision of proposed roads and multiple connection points between proposed neighborhoods. The proposed project would be required to comply with the City of Antioch General Plan Policy 11.7.2n, which requires new developments to incorporate appropriate design features to increase safety and minimize potential adverse effects on public health. In addition, Policy 11.8.2f requires that the City review and clarify emergency evacuation plans for dam failure, fire, and hazardous materials releases.

As mentioned in Section 3.13, Transportation, development of one or two-family dwellings where the number of dwelling units exceed 30 shall be provided with two separate and approved fire apparatus access roads; where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the California Fire Code, access from two directions shall not be required (D107.1.)<sup>23</sup>

Access to the proposed project would be provided from new roadway connections from Deer Valley Road via Street A and an extension of Sand Creek Road connecting to Dallas Ranch Road. Access to Villages 1 through 8 would be provided from multiple locations, meeting or exceeding the fire code requirements. Access to Villages 9, 10, 11, and 12 with a total of 555 units would be restricted to a single public access roadway (Street C).

MM TRANS-7 requires the emergency access points for Villages 9, 10, 11, and 12 to be reviewed and approved by the City of Antioch and Contra Costa County Fire Protection District to ensure that adequate access for large emergency vehicles is provided.

The proposed project includes dedication of land for the construction and operation of a fire station on a 2.00-acre parcel within the southeastern portion of the project site, adjacent to Deer Valley Road. Construction of the fire station would enhance emergency response capabilities for the project site and the City of Antioch generally.

Cross-sections for the proposed streets within the project site were reviewed. All street sections provide a minimum of 20-feet of clearway (meaning no obstructions in terms of parked vehicles, landscaping, etc.), such that sufficient width is provided for emergency vehicle access and circulation. In addition, the proposed project would be required to comply with the City of Antioch General Plan Policy 11.7.2n, which requires new developments to incorporate appropriate design features to increase safety and minimize potential adverse effects on public health. In addition, Policy 11.8.2f requires that the City review and clarify emergency evacuation plans for dam failure, fire, and hazardous materials releases. Therefore, the proposed project would not be expected to interfere with an adopted emergency response or emergency evacuation plan, and impacts would be less than significant with implementation of mitigation and adherence to 2015 Contra Costa Emergency Operations Plan and City of Antioch General Plan policies. With implementation of MM TRANS-7 and compliance with the Contra Costa County Emergency Operations Plan and City of Antioch General Plan, the proposed project would not conflict with impair implementation of

<sup>23</sup> California Fire Code. 2016. Appendix D—Fire Apparatus Access Roads. Amendment to Section D107—One- or Two-Family Residential Developments. Website: <https://www.codepublishing.com/CA/Galt/html/Galt15/Galt1528.html>. Accessed December 13, 2019.

physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, the proposed project would be consistent with an adopted emergency response or emergency evacuation plan, and impacts would be less than significant.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

The Applicant shall implement MM TRANS-7.

**MM TRANS-7** Prior to recordation of the final map, the City of Antioch and Contra Costa County Fire Protection District shall review and approve the proposed emergency access points for Villages 9, 10, 11, and 12 to ensure that adequate access is provided for large emergency vehicles in accordance with the California Fire Code.

***Level of Significance After Mitigation***

Less Than Significant

**Wildland Fires**

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<b>Impact HAZ-7:</b>	<b>The project would not expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires.</b>
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***Construction***

The potential for construction activities to result in wildland fires is present. The Applicant and construction contractor would be required to work closely with Contra Costa County Fire Protection District to establish Best Management Practices (BMPs) and specific safety precautions to reduce potential wildfire impacts during construction, and to ensure that any wildfire hazards that occur are contained to minimize the potential for significant risk of loss, injury, or death involving wildland fires. As such, impacts would be less than significant.

***Operation***

The majority of the project site currently consists of undeveloped grassland, and the proposed project would preserve the existing Sand Creek corridor, in addition to various hills and ridgeline areas in the northwestern and southwestern portions of the project site, as open space. Landscaping placed between open spaces and developed areas of the project site would have the potential to transfer wildland fires to the developed areas of the project site. However, landscaping within the proposed project would be required to adhere to City of Antioch Municipal Code Section 9-5.1003, which advises that landscaping plantings be selected for fire resistance, where appropriate. Wildland fires in the immediate vicinity of the proposed project would be ground fires (i.e., grass fires versus large stand-replacing crown fires in heavily wooded areas). The maintenance of fire resistant landscaping adjacent to exposed structures would reduce the likelihood that fires would spread from wildlands to adjacent developed areas.

According to CAL FIRE, the project site is not located within a fire hazard severity zone. The General Plan EIR determined that new development within the rural, hilly terrain included in the Sand Creek Focus Area could expose persons to hazardous conditions associated with wildland fires. However, the General Plan EIR concluded that impacts related to wildland fire hazards resulting from buildout of the General Plan would be less than significant with implementation of the fire protection policies in the General Plan.

The proposed project plan includes a 2.00-acre parcel within the southeastern portion of the project site, adjacent to Deer Valley Road, for the construction by Contra Costa County Fire Protection District of a fire station. Construction of the fire station would enhance emergency response capabilities for the project site and the City of Antioch generally.

The proposed project would be required to comply with all applicable fire protection policies, such as Policy 8.10.2a, which includes enforcement of building codes to reduce fire hazards, and Policy 8.10.2d, which includes involvement of Contra Costa County Fire Protection District in the development review process. In addition, development of the proposed project would include the installation of fire suppression systems (e.g., fire hydrants, automatic fire sprinklers, smoke detectors), would be designed in accordance with the latest requirements of the California Fire Code, and would improve emergency access by way of the extension of Sand Creek Road through the project site. The extension of Sand Creek Road would be the primary EVA route to the project site. A secondary EVA would be provided through Village 9. (See Exhibit 2-14.)

In accordance with State standards, the proposed project would be required to maintain defensible space to provide a firebreak that would prevent the spread of ground fires and protect on-site structures. Project plans would be routed to Contra Costa County Fire Protection District for review and approval. Contra Costa County Fire Protection District provides fire prevention services to the City of Antioch through inspections, code enforcement, plan review and engineering services, public education, fire investigations, and exterior hazard control, and review by Contra Costa County Fire Protection District would ensure that any potential hazards associated with wildland fires to the proposed buildings and structures would be appropriately reduced. Therefore, impacts of the proposed project related to exposure of people or structures to the risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands, would be less than significant.

### ***Level of Significance***

Less Than Significant

## Wildfire

### ***Expose Project Occupants to Pollutant Concentrations from Wildfire***

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**Impact WILD-1:** Due to slope, prevailing winds, and other factors, the project would not exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

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### ***Construction/Operation***

The proposed project is located within the Sand Creek Focus Area in the City of Antioch, west of Deer Valley Road. According to CAL FIRE, the project is not located within a State Responsibility Area (SRA) Very High Fire Hazard Severity Zone.<sup>24</sup> However, the property immediately south of the project site is designated high fire hazard zone. While the site itself is not within an SRA, it is located adjacent to a site that is.

The BAAQMD monitors the Bay Area's air quality at a number of stations. The closest air quality data monitoring station to the project site is located in the City of Bethel Island, approximately 8.80 miles to the northeast. According to the BAAQMD, the average wind speed for Bethel Island varies month to month and ranges from 19 to 31 mph. Wind direction also varies from month to month and ranges from 356 to 360 degrees from the monitoring location.<sup>25</sup>

The project site would be developed with buffers between the grasslands to the west and south. Furthermore, no homes will be constructed along ridgelines or slopes of 25 percent or steeper, which reduces wildfire risk. The proposed project also includes the reservation of land for construction of a fire station on a 2.00-acre parcel within the southeastern portion of the project site, adjacent to Deer Valley Road. Construction of the fire station would enhance emergency response times for the project site and the City of Antioch generally. As mentioned in Section 3.13, Public Services, the proposed project would be required to pay a one-time fire impact fee per single-family home of \$951 to assist with costs of constructing a new fire station.<sup>26</sup> Similar construction impact fees would be assessed for multi-family residential, commercial, office, and industrial buildings. In addition, the Applicant will work with the City to create a community facilities district (CFD) to fund its fair share portion of the operation of the fire station. Payment of impact fees and operational costs would ensure that the proposed project would be adequately served by existing Contra Costa County Fire Protection District facilities.

Slopes and areas prone to vegetation/grass fires are present within the project site. However, development along slopes within the site would not occur, and the proposed project would incorporate fire resistant landscaping and building materials to reduce potential wildfire impacts to a less than significant level. Furthermore, proposed project structures would be required to comply with the California Fire Code with regard to emergency/fire access and use of building materials that would limit the spread of wildfire to the greatest extent possible. Therefore, impacts related to

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<sup>24</sup> California Department of Forestry and Fire Protection (CAL FIRE). 2012. State Responsibility Area Viewer. State of California. Website: [http://www.fire.ca.gov/firepreventionfee/sraviewer\\_launch](http://www.fire.ca.gov/firepreventionfee/sraviewer_launch). Accessed May 30, 2019.

<sup>25</sup> Bay Area Air Quality Management District (BAAQMD). Air Monitoring Data. Website: <http://www.baaqmd.gov/about-air-quality/current-air-quality/air-monitoring-data?DataViewFormat=yearly&DataView=met&StartDate=12/11/2017&ParameterId=203&StationId=4902>. Accessed November 1, 2019.

<sup>26</sup> City of Antioch. Antioch Municipal Code. Title 3, Chapter 7.05: Fee Schedule. Amended September 24, 2019. Accessed November 22, 2019.

exposure of project occupants to pollutant concentrations from a wildfire or uncontrolled spread of wildfire would be less than significant.

***Level of Significance***

Less Than Significant

***Infrastructure That Exacerbates Fire Risk***

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**Impact WILD-2:**      **The project would not 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.**

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***Construction/Operation***

The proposed project consists of a master planned community located within the western portion of the Sand Creek Focus Area in the City of Antioch. Because the existing project site is undeveloped, electrical power lines would be required to develop the proposed project. However, all electricity infrastructure would be located underground and tie in to existing infrastructure located at Dallas Ranch Road and an existing substation located approximately 0.50-mile south of the Hillcrest/Prewett Drive intersection. This would minimize risk of potential ignition and related fire risk above ground. Additionally, natural gas would be provided via a joint trench and connected to existing gas lines on the project site. The proposed project would not require installation of emergency water sources as an existing water tank is located just north of the project site.

Furthermore, the proposed project includes a 2.00-acre fire station site within the southeastern portion of the project site, adjacent to Deer Valley Road, upon which Contra Costa County Fire Protection District will construct a new fire station to serve the project and surrounding areas. Construction of the fire station would enhance emergency response capabilities for the project site and the City of Antioch generally.

The proposed project has been designed to include wildfire buffers and to keep development off of ridgelines and hilltops to reduce risk of wildfires. At least two bridges will be installed connecting the southern development area to the northern development area to ensure sufficient access in the event of an emergency.

As such, none of the proposed infrastructure would exacerbate fire risk; thus, this impact would be less than significant.

***Level of Significance***

Less Than Significant

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***Flooding and Landslide Hazards Due to Post-Fire Slope Instability/Drainage Changes***

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**Impact WILD-3:** The project would not 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.

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***Construction/Operation***

The project site is located within the western portion of Sand Creek Focus Area, and is not susceptible to landslides or downstream flooding. While the portion of the site traversed by Sand Creek is within Zone A (a flood zone), the remaining and developable project area is within Zone X. In addition, the proposed project is not located within an area that is susceptible to landslides, as noted in Section 3.6, Geology and Soils. Therefore, the proposed project would not expose people or structures to significant risks and impacts related to flooding and landslide hazards due to post-fire slope instability or drainage changes would be less than significant.

***Level of Significance***

Less Than Significant

**3.8.5 - Cumulative Impacts**

As defined in Section 15355 of the CEQA Guidelines, “cumulative impacts” refers to two or more individual effects which, when considered together, are considerable, or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the proposed project when added to other closely related past, present, and reasonably foreseeable probable future projects.

Hazardous materials and other public health and safety issues are generally site-specific and/or project-specific, and would not be significantly affected by other development inside or outside of the City. The following discussion of cumulative impacts is based on the implementation of the proposed project in combination with other proposed and pending projects in the region. Other proposed and pending projects in the region under the cumulative context would include buildout of the City of Antioch General Plan, as well as development of the most recent planned uses within the vicinity of the project area.

**Hazardous Materials Exposure Risk**

Impacts associated with hazardous materials are site-specific and generally do not affect, or are not affected by, cumulative development. Cumulative effects could be considered if the proposed project was, for example, part of a larger development in which industrial processes that would use hazardous materials are proposed. However, the proposed project is a residential and commercial development and, thus, does not involve industrial processes or any operations that would involve the routine use of hazardous materials. Furthermore, any future proposed development project would be subject to the same federal, State, and local hazardous materials management requirements as the proposed project. Therefore, potential risks associated with increased hazardous materials use in the community, including potential effects, if any, on the proposed project, would not cumulate to become a significant impact.

## Wildfire Hazards and Emergency Response

The proposed project would introduce new people and structures to the area, which would create additional wildland urban interface areas within the City. Although the proposed project would add people and structures to the area, the proposed project would be required to comply with all applicable standards and regulations related to fire suppression, including General Plan Policies 11.8.2.e and 11.8.2.f, which would ensure private businesses and industrial uses would be self-sufficient in an emergency by maintaining a fire control plan, identifying personnel who are capable and certified in the first aid and CPR, as well as regular review of emergency evacuation plans for fire and hazardous materials.

Similar to the proposed project, all other projects in the City would be subject to the same regulations and standards required to ensure a less-than-significant impact related to hazards and hazardous materials. In addition, evacuation procedures in the event of an emergency, such as during a wildfire, are related to circulation and emergency access.

The City of Antioch contains main arterial streets that would act as the most likely routes of the City and provide access to SR-4 and SR-160.

The project vicinity is characterized by urban development and undeveloped wildlands within the Sand Creek Focus Area. The cumulative projects, listed in Table 3-1, would result in predominantly residential development, which would increase emergency situations, including wildfires and thus increase the need for emergency services. Payment of impact development fees would ensure that the proposed project would have adequate fire protection services and emergency access would reduce potential impacts to hazards and emergency response to a less than significant level. Further discussion regarding the potential impacts related to evacuation circulation is included in Chapter 3.14, Transportation and Circulation, of this EIR. In addition, all construction would adhere to the City Building Codes that are designed to minimize the potential for uncontrolled fires. Once development is proposed, the City assesses the needs for fire protection services and informs efforts to improve or expand needed facilities.

As listed in Chapter 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, development in the City would result in predominantly residential development. These developments would increase population in the City of Antioch. The City of Antioch 2003 General Plan EIR acknowledges that future development in the southeast area of Antioch would result in increased population and would alter the existing street network. All development would, however, comply with emergency access requirements as a condition of construction.

Furthermore, the proposed project includes dedication of land for the construction and operation of a future fire station on a 2.00-acre parcel within the southeastern portion of the project site, adjacent to Deer Valley Road. Construction of the fire station would enhance emergency response capabilities for the project site and the City of Antioch generally.

As such, cumulative impacts related to wildfire hazards and emergency response would be less than significant with mitigation.

## **Overall**

With the implementation of policy provisions, regulatory requirements, and mitigation outlined within this section the proposed project would not have any potentially significant impacts on hazards or emergency response/access. Furthermore, any future proposed development would be subject to the same federal and State requirements as the proposed project, which would ensure the safe transport, storage, use, and disposal of hazardous materials and wastes for the protection of human health and the environment. Therefore, the proposed project would not have a significant cumulative impact on hazards or emergency response/access.

### ***Level of Cumulative Significance***

Less Than Significant

## 3.9 - Hydrology and Water Quality

### 3.9.1 - Introduction

This section describes the existing hydrology and water quality setting in the region and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to hydrology and water quality that could result from implementation of the proposed project. Information in this section is based, in part, on the City of Antioch General Plan and General Plan Environmental Impact Report (EIR) as well as the project-specific Preliminary Stormwater Control Plan, and Water Supply Assessment (WSA), included in Appendix H.

The following comments were received during the EIR scoping period related to hydrology and water quality:

- Request for the provision of a hydrology report that examines the Sand Creek watershed.
- Statement that runoff flow volumes, peaks, and durations for 2-, 5-, 10-, 25-, 50-, and 100-year rainfall events should not exceed pre-project conditions.

### 3.9.2 - Environmental Setting

#### Surface Hydrology

##### *Marsh Creek Watershed*

The Contra Costa Clean Water Program (CCCWP) designates watersheds in Contra Costa County. The southern portion of the City of Antioch is located within the overarching Marsh Creek Watershed and its tributaries encompass 60,066 acres in East Contra Costa County. Marsh Creek is the longest tributary in the Marsh Creek Watershed and spans 34.57 miles before flowing into the San Joaquin River Delta at Big Break. All tributaries within the Marsh Creek Watershed eventually drain into the San Joaquin River Delta and ultimately the Pacific Ocean.<sup>1</sup>

##### *Project Site*

The project site is located within the Lower Marsh Creek Sub-Watershed within the overarching Marsh Creek Watershed. Sand Creek, a tributary of Marsh Creek, flows from Empire Mine Road in the northwest corner of the site and through the central portion of the site to the southeastern corner. Sand Creek eventually drains north into Marsh Creek and onward to the San Joaquin River Delta.

#### Surface Water Quality

##### *Central Valley Region Water Basin*

The City of Antioch is located within the Central Valley Region, San Joaquin River Basin Planning Area, under the jurisdiction of the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). The Central Valley Region (Region 5) Water Quality Control Plan outlines the beneficial water uses that the State Water Resources Control Board (State Water Board) will protect,

<sup>1</sup> Contra Costa Clean Water Program (CCCWP). Website: <https://www.cccleanwater.org/watersheds/watersheds-in-contra-costa-county>. Accessed June 12, 2019.

water quality objectives, and strategies for achieving the objectives. The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed.<sup>2</sup> The San Joaquin Delta is impacted by low dissolved oxygen, harmful algal blooms, mercury, and pesticides.<sup>3</sup>

The Central Valley RWQCB deferred oversight of the City of Antioch's permit to the San Francisco RWQCB. As a result, the San Francisco RWQCB oversees the implementation of applicable policies and regulations regarding water quality in the City of Antioch.<sup>4</sup>

### ***Project Site***

The project site is located within the North Diablo Range Hydrologic Unit under the jurisdiction of the Central Valley RWQCB.<sup>5</sup> The United States Environmental Protection Agency (EPA) lists the following water quality impairments to Sand Creek: Chlorpyrifos, dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyltrichloroethane (DDT), Dieldrin, E. Coli, Salinity, and unknown toxins.<sup>6</sup>

## **Ground Basin Hydrology**

### ***Tracy Subbasin***

The City is located within the Tracy Subbasin of the overarching San Joaquin Valley Groundwater Basin. The Tracy Subbasin encompasses a surface area of 345,000 acres across and underlying portions of San Joaquin, Contra Costa, and Alameda counties. The Tracy Subbasin is bounded by the Solano Subbasin of the Sacramento Groundwater Basin to the north, the Eastern San Joaquin Subbasin to the east, and the Delta-Mendota Subbasin to the south. The primary source of groundwater recharge in the Tracy Subbasin is from seepage from streams and percolation of applied irrigation water.<sup>7</sup> The City does not currently pump groundwater and does not intend to pump groundwater from the local groundwater basin in the future.<sup>8</sup>

### ***Project Site***

The project site contains two active groundwater wells: one for purposes of watering the livestock, and the other for the single-family residence. The site is located within the Tracy Subbasin of the San Joaquin Groundwater Basin.

## **Groundwater Water Quality**

### ***Tracy Subbasin***

According to the California Department of Pesticide Regulations, groundwater quality in the Tracy Subbasin is affected by pesticides and inorganic constituents.<sup>9</sup> The Department of Pesticide Regulation reported that between 1983 and 2003, of groundwater samples collected from 900 wells

<sup>2</sup> State of California Regional Water Quality Control Board (State Water Board). 2018. Water Quality Control Plan for the Central Valley RWQCB. Page 15.

<sup>3</sup> Central Valley Regional Water Quality Control Board (RWQCB). Central Valley Water Board Program Fact Sheet 2018-2019.

<sup>4</sup> Personal communication by Spencer Pignotti (FCS), Central Valley Regional Water Quality Control Board (RWQCB). October 8, 2019

<sup>5</sup> Central Valley Regional Water Quality Control Board (RWQCB). 1976. San Joaquin Hydrologic Basin Planning Area map.

<sup>6</sup> United States Environmental Protection Agency (EPA). 2019. Waterbody Quality Assessment Report.

<sup>7</sup> Central Valley Regional Water Quality Control Board (RWQCB). 2006. Draft Existing Conditions Report: Groundwater Quality. Page 4-310.

<sup>8</sup> LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

<sup>9</sup> LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

in San Joaquin County 45 samples had verified detections of pesticides and 84 had unverified detections. These pesticides include 2-amino-4-chloro-6-ethylamino-s-triazine (ACET), atrazine, bromacil, 2,4-diamino-6-chloro-s-triazine (DACT), des-ethyl atrazine (DEA), 3-(3,4-dichlorophenyl)-1,1-dimethylurea (DCMU) [under the trade name of Diuron], norflurazon, and simazine. Elevated chloride concentrations exist in several areas of the Tracy Subbasin including along the San Joaquin River, the northwestern part of the Tracy Subbasin, and in the vicinity of the City of Tracy.<sup>10</sup>

### **Project Site**

The California Division of Oil, Gas, and Geothermal Resources determined that the project site contains two known abandoned dry wells. The project site contains two groundwater wells. Further discussion is provided in in Section 3.8, Hazards, Hazardous Materials, and Wildfire.

## **Stormwater Runoff**

### **City of Antioch**

The Central Valley RWQCB administers the National Pollution Discharge Elimination System (NPDES) stormwater permitting program and regulates stormwater in the Central Valley region. Antioch is a permittee under the Phase I Municipal Separate Storm Sewer Systems (MS4) Municipal Stormwater Program (Order No. R5-2010-0102). As described previously, the City of Antioch deferred oversight of the NPDES program to the San Francisco RWQCB. The Antioch Clean Water Program implements the City of Antioch-specific components of the CCCWP. In addition, the City maintains storm drain pipes and catch basins.

### **Project Site**

The project site is located in the Contra Costa County Flood Control and Water Conservation District Drainage Area (DA) 104 for Sand Creek. Currently, the project site is almost entirely undeveloped with open-space and grassland. Almost all existing drainage on the project site consists of overland sheet flow into Sand Creek, except as described below.

The first drainage pathway exception is a man-made ditch along the north central boundary of the project area that was constructed concurrently with the existing residential development to the north. This ditch currently conveys runoff from approximately 17.10 acres to the storm drain system located to the north of the project site. The second drainage pathway exception is an area along the north portion of the site that drains via sheet flow easterly to Deer Valley Road where it is intercepted by a ditch along the western edge of the roadway and conveyed into a 36-inch storm drain line that was constructed as part of the Kaiser medical complex. Runoff from this area (roughly 87.60 acres) is conveyed easterly along Wellness Way, to join an existing major trunk storm drain system (double 84-inch pipes) that runs south to discharge into the Upper Sand Creek Detention Basin.<sup>11</sup> Existing drainage in the off-site improvement area consists of sheet flow or pooling on-site.

Based on the project specific report, the project site soils are classified as hydrologic soil groups (HSG) 'C' and 'A' under the Natural Resources Conservation Services (NRCS) hydrologic soil group system. The majority of the project site is classified as HSG 'C' soils, which are composed of Capay

<sup>10</sup> Central Valley RWQCB 2006. Draft Existing Conditions Report: Groundwater Quality, page 4-311.

<sup>11</sup> Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 8.

clay (CaA), Rincon clay loam (RbA), Altamont clay (AbE), and Altamont-Fontana complex (AcF). These HSG 'C' soils have a low soil permeability and have a very low potential for water to infiltrate the soil.<sup>12</sup> There is a small section of HSG 'A' soils located in the southwest corner of the southern section of the site consisting of Briones loamy sand (BdE), but this area comprises only 1.5 percent of the project site and would not be developed. The areas mapped for the primary stormwater basins are in soil class 'C'; Capay clay for the southern basin and Rincon clay loam for the northern basin. A 2.80-acre section of off-site land to the north along Dallas Ranch Road currently drains to the site.<sup>13</sup>

## **Flooding and Inundation**

### ***Contra Costa County***

#### *100-year Flood*

Flood hazard areas—those areas susceptible to flooding—are mapped by the Federal Emergency Management Agency (FEMA). FEMA maps do not take into account future conditions. To protect such areas from flood hazards, FEMA administers the National Flood Insurance Program (NFIP). The NFIP is a federal program created to avert future flood losses through building and zoning ordinances and to provide federally backed flood insurance protection for property owners. The City is a participant in the NFIP.

To support the NFIP, FEMA publishes Flood Insurance Rate Maps (FIRMs) for participating communities, which are used for flood insurance and floodplain management purposes. The FIRMs delineate different special flood hazard area zones. Special flood hazard areas associated with the 1 percent probability of annual exceedance are zones that begin with the letter "A" (e.g., Zone A, Zone AE, and Zone AO). FEMA released a preliminary FIRM No. 06013C0291F for the County on June 16, 2009.

#### *Mudflow*

Mudflows typically occur on steep slopes where vegetation is not sufficient to prevent rapid erosion.

#### *Dam-failure Inundation*

The Contra Loma Dam is located at the southwest edge of the City of Antioch. A small portion of the City is located below the Contra Loma Dam and Reservoir.<sup>14</sup> The Bureau of Reclamation Division of Dam Safety determined that "safe performance of the dam can be expected under all anticipated loading conditions, including the maximum credible earthquake and probable maximum flood events."<sup>15</sup>

### ***Project Site***

#### *100-year Flood*

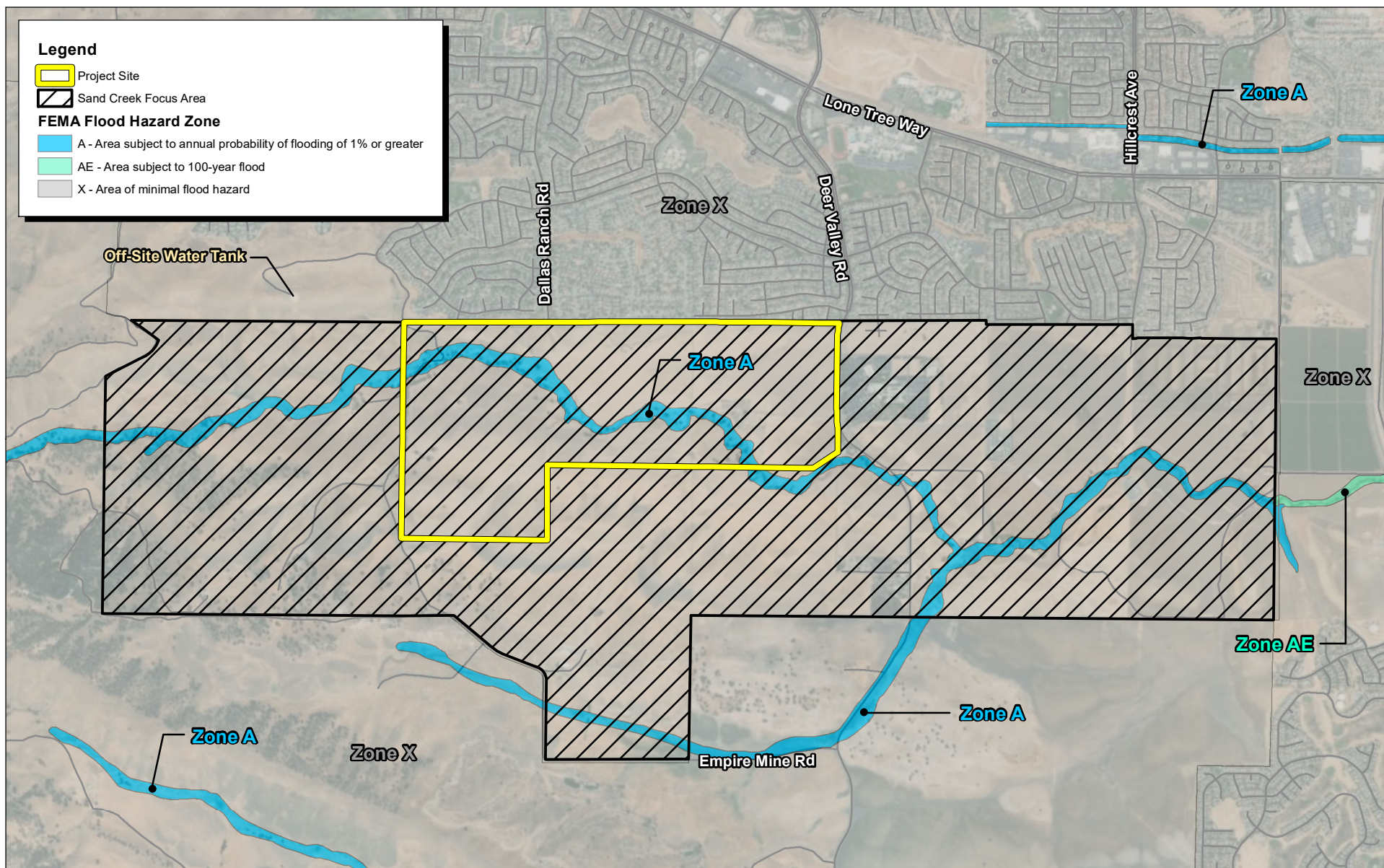
According to FEMA FIRM No. 06013C0331, portions of the project site are located within Flood Hazard Zones A and X (Exhibit 3.9-1). Flood Zone A is described by FEMA as an area subject to inundation by the 1 percent annual chance flood (also known as the 100-year Frequency Flood). The area of the site identified as Zone A follows the course of Sand Creek. The remaining areas of the project site are designated Zone X, which is described by FEMA as an area of minimal flood risk, between the 100-year to 500-year flood levels.

<sup>12</sup> Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

<sup>13</sup> Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 7.

<sup>14</sup> LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.

<sup>15</sup> LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-13.



Source: ESRI Aerial Imagery. ESRI National Flood Hazard Layer (NFHL) - FEMA Data.

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### *Mudflow*

The topography of the site is varied, ranging from relatively level areas in the eastern and central portions of the site, to moderate to steep slopes in the western portion of the site. The elevation on the project site ranges from approximately 220 feet above mean seal level (MSL) along Deer Valley Road to more than 400 MSL in the western and southwestern portions of the site. The slopes adjacent to Sand Creek generally vary in height between 5 feet and 40 feet, and can be as steep as 1:1 (horizontal: vertical).

### *Dam-failure Inundation*

The project site is located to the southeast of the Contra Loma Dam and Reservoir. As shown in Figure 4.7-3 of the Antioch General Plan Update, the Contra Loma Dam Inundation Zone would extend north to the San Joaquin River but would not impact any portion on the project site.<sup>16</sup>

## **3.9.3 - Regulatory Framework**

### **Federal**

#### ***Clean Water Act***

The Clean Water Act (CWA) (33 United States Code [USC] § 1251, *et seq.*) is the major federal legislation governing the water quality aspects of construction and operation of the project. The CWA established the basic structure for regulating discharges of pollutants into waters of the United States (not including groundwater) and waters of the State. The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” The CWA establishes the basic structure for regulating the discharge of pollutants into waters of the United States.

The CWA authorizes the EPA to implement pollution control programs. Under the CWA, it is unlawful for any person to discharge any pollutant from a point source into navigable waters, unless an NPDES permit is obtained. In addition, the CWA requires each state to adopt water quality standards for receiving water bodies and to have those standards approved by the EPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g., wildlife habitat, agricultural supply, fishing), along with water quality objectives necessary to support those uses.

Responsibility for protecting water quality in California resides with the State Water Board and the nine RWQCBs. The State Water Board establishes Statewide policies and regulations for the implementation of water quality control programs mandated by federal and State water quality statutes and regulations. The RWQCBs develop and implement water quality control plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. Water quality standards applicable to the project are listed in the Central Valley (Region 5) RWQCB Basin Plan.

#### ***Section 303—Water Quality Standards and Total Maximum Daily Loads***

Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface waters of the United States based on the water body’s designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric,

<sup>16</sup> LSA Associates. 2003. Antioch General Plan Update EIR. Page 4.7-5.

although narrative criteria based on biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards.

CWA Section 303(d) requires states and authorized Native American tribes to develop a list of water quality impaired segments of waterways. The list includes waters that do not meet water quality standards necessary to support a waterway's beneficial uses even after the minimum required levels of pollution control technology have been installed. Listed water bodies are to be priority ranked for development of a Total Maximum Daily Load (TMDL). A TMDL is a calculation of the total maximum daily load (amount) of a pollutant that a water body can receive on a daily basis and still safely meet water quality standards. The TMDLs include waste load allocations for urban stormwater runoff as well as municipal and industrial wastewater discharges, with allocations apportioned for individual MS4s and wastewater treatment plants, including those in Contra Costa County. For stormwater, load reductions would be required to meet the TMDL waste load allocations within the 20 years required by the TMDLs.

The State Water Board, RWQCBs, and EPA are responsible for establishing TMDL waste load allocations and incorporating approved TMDLs into water quality control plans, NPDES permits, and Waste Discharge Requirements (WDRs) in accordance with a specified schedule for completion. The Central Valley RWQCB develops TMDLs for the City of Antioch.

#### *Section 401—Water Quality Certification*

Section 401 of the CWA requires compliance with State water quality standards for actions within State waters. Under CWA Section 401, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate agency stating that the fill is consistent with the State's water quality standards and criteria. In California, the State Water Board delegates authority to either grant water quality certification or waive the requirements to the nine RWQCBs. The Central Valley RWQCB is responsible for the project site.

#### *Section 402—National Pollution Discharge Elimination System Permits*

The RWQCBs administer the NPDES stormwater permitting program, under Section 402(d) of the federal CWA, on behalf of the EPA. The objective of the NPDES program is to control and reduce levels of pollutants in water bodies from discharges of municipal and industrial wastewater and stormwater runoff. CWA Section 402(d) establishes a framework for regulating nonpoint-source stormwater discharges (33 USC 1251). Under the CWA, discharges of pollutants to receiving water are prohibited unless the discharge complies with an NPDES permit. The NPDES permit specifies discharge prohibitions, effluent limitations, and other provisions, such as monitoring deemed necessary to protect water quality based on criteria specified in the National Toxics Rule (NTR), the California Toxics Rule (CTR), and the Basin Plan.

Discharge prohibitions and limitations in an NPDES permit for wastewater treatment plants are designed to maintain public health and safety, protect receiving-water resources, and safeguard the water's designated beneficial uses. Discharge limitations typically define allowable effluent quantities for flow, biochemical oxygen demand, total suspended matter, residual chlorine, settleable matter, total coliform, oil and grease, pH, and toxic pollutants. Limitations also typically encompass narrative requirements regarding mineralization and toxicity to aquatic life. Under the NPDES permits issued to the City/County to operate the treatment plants, the City/County is required to implement a

pretreatment program. This program must comply with the regulations incorporated in the CWA and the General Pretreatment Regulations (Code of Federal Regulations [CFR] Title 40, Part 403).

*Section 404—Disturbance of Waters of the United States Permit*

Section 404 of the CWA regulates temporary and permanent fill and disturbance of wetlands and waters of the United States. Under Section 404, the discharge (temporary or permanent) of dredged or fill material into waters of the United States, including wetlands, typically must be authorized by the United States Army Corps of Engineers (USACE) through either the Nationwide Permit (general categories of discharges with minimal effects) or the Individual Permit.

**National Pollutant Discharge Elimination Program**

Pursuant to Section 402 of the CWA and the Porter-Cologne Water Quality Control Act, municipal stormwater discharges in the City of Antioch are regulated under the Central Valley Region Municipal Regional Stormwater Issuing Waste Discharge Requirements and NPDES Permit, Order No. R5-2010-0102, NPDES Permit No. CAS083313, adopted October 23, 2010. The City of Antioch's NPDES/MS4 permit is overseen by the San Francisco RWQCB.

The City of Antioch is a member agency of the CCCWP, which assists municipalities and other agencies in Contra Costa County with implementation of the NPDES Permit. NPDES Provision C.3 addresses post-construction stormwater management requirements for new development and redevelopment projects that add and/or replace 10,000 square feet or more of impervious area. Provision C.3 requires the incorporation of site design, source control, and stormwater treatment measures into development projects in order to minimize the discharge of pollutants in stormwater runoff and non-stormwater discharges and to prevent increases in runoff flows. Low Impact Development (LID) methods are to be the primary mechanism for implementing such controls. NPDES Provision C.3(g) pertains to hydromodification management requirements. This NPDES Permit provision requires five Control Design Criteria to be implemented: range of flows to control, goodness of fit criteria, allowable low flow rate, standard hydromodification modeling, and alternate hydromodification modeling and design. As noted above, projects disturbing more than 1 acre of land during construction are required to comply with the NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002 (Construction General Permit). Construction General Permit activities are regulated at a local level by the RWQCB.

To obtain coverage under the Construction General Permit, a project applicant must provide a Notice of Intent, a Storm Water Pollution Prevention Plan (SWPPP), and other documents required by Attachment B of the Construction General Permit. Activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as grubbing or excavation. This permit also covers linear underground and overhead projects such as pipeline installations.

The Construction General Permit uses a risk-based permitting approach and mandates certain requirements based on the project risk level (Level 1, Level 2, or Level 3). The project risk level is based on the risk of sediment discharge and the receiving water risk. The sediment discharge risk depends on project location and timing (such as wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to sediment-sensitive receiving water. The

determination of the project risk level would be made by project applicants when the Notice of Intent is filed (and more details of the ultimate timing of the construction activity are confirmed).

The performance standard in the Construction General Permit is that dischargers minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and Best Management Practices (BMPs). A SWPPP must be prepared by a qualified SWPPP developer that meets the certification requirements in the Construction General Permit. The purpose of the SWPPP is (1) to help identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges, and (2) to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity. Operation of BMPs must be overseen by a qualified SWPPP practitioner who meets the requirements outlined in the permit.

### ***River and Harbors Act Section 10***

Section 10 of the Rivers and Harbors Act of 1899 requires that regulated activities conducted below the ordinary high-water elevation of navigable waters of the United States be approved and permitted by the USACE. Regulated activities include the placement or removal of structures, work involving dredging, disposal of dredged material, filling, excavation, or any other disturbance of soils/sediments or modification of a navigable waterway. Navigable waters of the United States are those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high-water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. Section 10 also regulates tributaries and backwater areas that are associated with navigable waters of the United States and are located below the ordinary high-water elevation of the adjacent navigable waterway.

### ***Federal Antidegradation Policy***

The federal antidegradation policy (40 CFR § 131.12) is designed to protect existing water uses, water quality, and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing instream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

### ***National Toxics Rule and California Toxics Rule***

In 1992, the EPA promulgated the NTR under the CWA to establish numeric criteria for priority toxic pollutants for 14 states to bring all states into compliance with the requirements of CWA Section 303(c)(2)(B). The NTR established water quality standards for 42 pollutants not covered under

California's Statewide water quality regulations at that time. As a result of the court-ordered revocation of California's Statewide Basin Plans in September 1994, the EPA initiated efforts to promulgate additional federal water quality standards for California. In May 2000, the EPA issued the CTR, which includes all the priority pollutants for which the EPA has issued numeric criteria not included in the NTR.

### ***Executive Order 11988***

Executive Order 11988, "Floodplain Management," directs all federal agencies to avoid, to the extent possible, long- and short-term adverse impacts of occupancy and modification of floodplains, and to avoid supporting development in a floodplain either directly or indirectly wherever there is a practicable alternative. Compliance requirements are outlined in 23 Code of Federal Regulations 650, Subpart A, "Location and Hydraulic Design of Encroachment on Floodplains."

If a project involves significant encroachment into the floodplain, the final environmental document must include:

- The reasons why the proposed action must be located in the floodplain,
- Alternatives considered and the reasons they were not practicable, and
- A statement indicating whether the action conforms to applicable State or local floodplain protection standards.

### ***National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973***

The National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973 were enacted to reduce the need for flood protection structures and limit disaster relief costs by restricting development in floodplains. FEMA, established in 1979, is responsible for predicting hazards from flooding events and forecasting the level of inundation under various conditions. As part of its duty to develop standards for delineating fluvial and coastal floodplains, FEMA provides information on FIRMs about the potential for flood hazards and inundation and, where appropriate, designates regions as special flood hazard areas. Special flood hazard areas are defined as areas that have a 1 percent chance of flooding in a given year.

### ***National Flood Insurance Program***

FEMA oversees floodplains and administers the NFIP adopted under the National Flood Insurance Act of 1968. This federal program enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Areas of special flood hazard (those subject to inundation by a 100-year flood) are identified by FEMA through regulatory flood maps FIRMs. The NFIP mandates that development cannot occur within the regulatory floodplain (typically the 100-year floodplain) if that development results in more than a 1-foot increase in flood elevation. In addition, development is not allowed in delineated floodways within the regulatory floodplain.

## **State**

### ***Porter-Cologne Water Quality Control Act***

The Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act) is California's statutory authority for the protection of water quality. Under the Porter-Cologne Act, the State must adopt

water quality policies, plans, and objectives that protect the State's waters for the use and enjoyment of the people. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The RWQCBs are required to formulate and adopt Basin Plans for all areas in the region and establish water quality objectives in the plans. The Porter-Cologne Act sets forth the obligations of the State Water Board and RWQCBs to adopt and periodically update Basin Plans. The Central Valley RWQCB is responsible for the project site.

Basin Plans are the regional water quality control plans required by both the CWA and the Porter-Cologne Act that establish beneficial uses, water quality objectives, and implementation programs for each of the nine regions in California. The Act also requires waste dischargers to notify the RWQCBs of their activities by filing reports of waste discharge and authorizes the State Water Board and RWQCBs to issue and enforce WDRs, NPDES permits, CWA Section 401 water quality certifications, or other approvals. The RWQCBs are also authorized to issue waivers to reports of waste discharge and WDRs for broad categories of "low threat" discharge activities that have minimal potential to cause adverse water quality effects when implemented according to prescribed terms and conditions.

***National Pollutant Discharge Elimination System (See analysis above)***

The NPDES permits all involve similar processes, which include submitting notices of intent for discharging to water in areas under the Central Valley RWQCB's jurisdiction and implementing BMPs to minimize those discharges.

***General Construction Activity Permit***

The State Water Board stormwater general permit for construction activity (Order 2009-009-DWQ, as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ) applies to all construction activities that would disturb 1 acre of land or more. Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters.

Through the NPDES and WDR processes, the State Water Board seeks to ensure that the conditions at a project site during and after construction do not cause or contribute to direct or indirect impacts on water quality (i.e., pollution and/or hydromodification) upstream and downstream. To comply with the requirements of the construction general permit, the project Applicant must file a notice of intent with the State Water Board to obtain coverage under the permit; prepare a SWPPP; and implement inspection, monitoring, and reporting requirements appropriate to the project's risk level as specified in the SWPPP. The SWPPP includes a site map, describes construction activities and potential pollutants, and identifies BMPs that will be employed to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources, such as petroleum products, solvents, paints, and cement. The permit also requires the discharger to consider using post-construction permanent BMPs that will remain in service to protect water quality throughout the life of the project. All NPDES permits also have inspection, monitoring, and reporting requirements.

***Industrial General Stormwater Permit***

The Statewide Stormwater NPDES permit for general industrial activity (Order 2014-0057-DWQ, superseding Order 97-03-DWQ) regulates discharges associated with 10 broad categories of

industrial activities, such as operation of wastewater treatment works, and with recycling facilities. The industrial general permit requires the implementation of Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology to achieve performance standards. The permit also requires development of a SWPPP that identifies the site-specific sources of pollutants and describes the measures at the facility applied to reduce stormwater pollution. A monitoring plan is also required.

#### *NPDES Stormwater Permit*

In November 1990, the EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase I of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase II of the NPDES stormwater permit regulations, which became effective in March 2003, required that NPDES permits be issued for construction activity for projects disturbing 1–5 acres. Phase II of the municipal permit system (known as the NPDES General Permit for Small MS4s, Order No. 2003-0005-DWQ as amended by 2013-0001-DWQ) required small municipalities of fewer than 100,000 persons to develop stormwater management programs. This permit authorizes discharges of stormwater and some categories of non-stormwater that are not “significant contributors of pollutants.”

Provision C.3 in the Municipal Regional Permit 2.0 requires site designs for new developments and redevelopments to minimize the area of new roofs and paving and treat runoff, and in some cases, control the rates and durations of site runoff. Where feasible, pervious surfaces should be used instead of paving so that runoff can infiltrate to the underlying soil. Runoff should be dispersed to landscaping where possible. Remaining runoff from impervious areas must be treated using bioretention. In some developments, the rates and durations of site runoff must also be controlled.

The C.3 requirements are separate from, and in addition to, requirements for erosion and sediment control and for pollution prevention measures during construction. In addition, project applicants must execute agreements to allow municipalities to verify that stormwater treatment and flow-control facilities that are approved as part of new development are maintained in perpetuity.

#### ***California Toxics Rule and State Implementation Policy***

The CTR, presented in 2000 in response to requirements of EPA’s NTR, establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The CTR criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are on the CWA Section 303(c) list for contaminants. The CTR includes criteria for the protection of aquatic life and human health. Human health criteria (water- and organism-based) apply to all waters with a municipal and domestic water supply beneficial use designation as indicated in the Basin Plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Policy, was adopted by the State Water Board in 2000. It establishes provisions for translating CTR criteria, NTR criteria, and Basin Plan water quality objectives for toxic pollutants into:

- NPDES permit effluent limits,
- Effluent compliance determinations,
- Monitoring for 2,3,7,8-tcdd (dioxin) and its toxic equivalents,

- Chronic (long-term) toxicity control provisions,
- Site-specific water quality objectives, and
- Granting of effluent compliance exceptions.

The goal of the State Implementation Plan is to establish a standardized approach for permitting discharges of toxic effluent to inland surface waters, enclosed bays, and estuaries throughout the State.

### ***Sustainable Groundwater Management Act***

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of Assembly Bill 1739 (AB 1739) (Dickinson), Senate Bill 1168 (SB 1168) (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt Groundwater Sustainability Plans (GSPs) for crucial groundwater basins in California. Portions of the City are located in the East Contra Costa County Subbasin. The City has become a GSA and entered into a Memorandum of Understanding (MOU) with eight other local agencies to collaborate and develop a single GSP for the Tracy Subbasin.

## **Regional**

### ***Central Valley Regional Water Quality Control Plan***

The Central Valley RWQCB implements the San Joaquin/Sacramento Rivers Basin Plan, a master policy document for managing water quality in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region. The San Joaquin River Basin Plan applies to the project site because the project site is located within the San Joaquin Hydrologic Basin Planning Area. The Central Valley RWQCB has jurisdiction over the City of Antioch; the Central Valley RWQCB has deferred oversight of the MS4 requirements under its NPDES permit for the City of Antioch to the San Francisco RWQCB. No other authority has been granted.

### ***Contra Costa Clean Water Program***

The CCCWP is within the jurisdiction of the Central Valley RWQCB. The CCCWP works to protect local creeks, reservoirs, watersheds, and San Francisco Bay from contamination and pollution required by federal and State clean water regulations.

## **Local**

### ***City of Antioch General Plan***

The following objectives and policies of the Antioch General Plan, including policies from Section 4.4.6.7 specific to the Sand Creek Focus Area, are applicable to the hydrology and water quality aspects of the proposed project.

#### *Land Use Element*

- **Policy 4.4.6.7s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the Sand Creek Focus Area shall be preserved in open space, exclusive of lands developed for golf course use.
- **Policy 4.4.6.7t:** Adequate buffer areas adjacent to the top of banks along Sand Creek to protect sensitive plant and amphibian habitats and water quality shall be provided. Adequate buffer areas shall also be provided along the edge of existing areas of permanently preserved open space adjacent to the Sand Creek Focus Area, including but not limited to the Black Diamond Mines Regional Park. Buffers established adjacent to existing open space areas shall be of an adequate width to minimize light/glare, noise, fire safety, public safety, habitat, public access impacts within the existing open space areas, consistent with the provisions of Section 10.5, Open Space Transitions and Buffers Policies of the General Plan.

#### *Public Services and Facilities Element*

- **Objective 8.7.1:** Conduct all stormwater via adequately sized storm drains and channels.
- **Policy 8.7.2a:** Continue working with the Contra Costa County Flood Control District to ensure that runoff from new development is adequately handled.
- **Policy 8.7.2b:** Require adequate infrastructure to be in place and operational prior to occupancy of new development, such that:
  - New development will not negatively impact the performance of storm drain facilities serving existing developed areas and
  - The performance standards set forth in the Growth Management Element will continue to be met.
- **Policy 8.7.2c:** Design flood control within existing creek areas to maximize protection of existing natural settings and habitat.
- **Policy 8.7.2d:** Provide retention basins in recreation areas where feasible to reduce increases in the amount of runoff resulting from new development.
- **Policy 8.7.2e:** Require new developments to provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality.
- **Policy 8.7.2f:** Require implementation of Best Management Practices in the design of drainage systems to reduce discharge of nonpoint source pollutants originating in streets, parking lots, paved industrial work areas, and open spaces involved with pesticide applications.

#### *Resource Management Element*

- **Objective 10.3.1:** Maintain, preserve, and acquire open space and its associated natural resources by providing parks for active and passive recreation, trails, and by preserving natural, scenic, and other open space resources.
- **Policy 10.3.2d:** Where significant natural features are present (e.g., ridgelines, natural creeks and other significant habitat areas, rock outcrops, and other significant or unusual landscape features), require new development to incorporate natural open space areas into project design. Require dedication to a public agency or dedication of a conservation easement,

preparation of maintenance plans, and provision of appropriate maintenance in perpetuity of such open space areas.

- **Policy 10.3.2f:** Encourage public access to creek corridors through the establishment of trails adjacent to riparian resources, while maintaining adequate buffers between creeks and trails to protect sensitive habitats, special-status species and water quality to the maximum extent feasible.
- **Policy 10.7.2b:** Require new development to be equipped with drought tolerant landscaping and water conservation devices.
- **Policy 10.7.2d:** Protect, where possible, groundwater recharge areas, including protection of stream sides from urban encroachment.
- **Policy 10.7.2e:** Oppose proposals with the potential to increase the salinity of the Delta and/or endanger the City's rights to divert water from the San Joaquin River.
- **Policy 10.7.2f:** Participate in the Contra Costa Clean Water program to reduce stormwater pollution and protect the water quality of the City's waterways.
- **Policy 10.7.2g:** Require public and private development projects to be in compliance with applicable National Pollution Discharge Elimination System (NPDES) permit requirements, and require the implementation of best management practices to minimize erosion and sedimentation resulting from new development.
- **Policy 10.7.2i:** Design drainage within urban areas to avoid runoff from landscaped areas and impervious surfaces from carrying pesticides, fertilizers, and urban and other contaminants into natural streams.

#### *Environmental Hazards Element*

- **Objective 11.4.1:** Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from flooding.
- **Policy 11.4.2a:** Prohibit all development within the 100-year floodplain, unless mitigation measures consistent with the National Flood Insurance Program are provided.
- **Policy 11.4.2b:** Minimize encroachment of development adjacent to the floodways in order to convey flood flows without property damage and risk to public safety. Require such development to be capable of withstanding flooding and to minimize the use of fill.
- **Policy 11.4.2c:** Prohibit alteration of floodways and channelization of natural creeks if alternative methods of flood control are technically and financially feasible. The intent of this policy is to balance the need for protection devices with land use solutions, recreation needs, and habitat preservation.
- **Policy 11.4.2d:** Require new development to prepare drainage studies to assess storm runoff impacts on the local and regional storm drain and flood control system, along with implementation of appropriate detention and drainage facilities to ensure that the community's storm drainage system capacity will be maintained and peak flow limitations will not be exceeded.
- **Policy 11.4.2e:** Where construction of a retention basin is needed to support new development, require the development to provide for the perpetual funding and ongoing maintenance of the basin.
- **Policy 11.4.2f:** Eliminate hazards caused by local flooding through improvements to the area's storm drain system or creek corridors as resources allow.

### **City of Antioch Municipal Code**

#### *Section 8-13.01: Storm Water Control Plan Required*

Because construction activity during land development has the potential to result in pollution of nearby waterways, City of Antioch Municipal Code Section 8-13.01 requires the implementation of stormwater pollution control measures during all construction phases.

#### *Title 6; Chapter 9: Stormwater Management and Discharge Control*

Chapter 9 of the Municipal Code aims to protect and enhance water quality in the City's waterways consistent with the Porter-Cologne Water Quality Control Act and the CWA. The chapter implements the conditions of the City's NPDES permit in order to ensure proper source pollutant control. Additionally, the chapter contains site design and stormwater treatment measures for projects that create one or more acres of impervious surface. The stormwater treatment measures are intended to minimize non-stormwater discharges, minimize nonpoint sources of pollution, control discharges to the City's stormwater system from spills, dumping or disposal, and reduce stormwater runoff rates and volumes.

### **3.9.4 - Impacts and Mitigation Measures**

#### **Significance Criteria**

According to the 2019 Guidelines for Implementing the California Environmental Quality Act (CEQA) Appendix G, to determine whether impacts related to hydrology and water quality are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
- b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
- c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - (i) result in substantial erosion or siltation on- or off-site;
  - (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
  - (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
  - (iv) impede or redirect flood flows?
- d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?
- e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

#### **Approach to Analysis**

Impacts related to hydrology and water quality were determined by reviewing information regarding regional and local hydrology, climate, topography, and geology contained in the City of Antioch General

Plan and EIR, Central Valley RWQCB Sacramento/San Joaquin Rivers Basin Plan, FEMA FIRMs, and project-specific Preliminary Stormwater Control Plans. Evaluation of impacts is based on comparison of existing conditions to the project's built condition, such as changes in impervious area and facilities located within flood zones. Specifically, the impact evaluation focuses on effects on surface and groundwater quality, groundwater supply, and drainage (in terms of erosion, siltation, flooding, stormwater system exceedance, and polluted runoff). Water quality conditions are compared with water quality standards and WDRs by identifying potential contaminants and pollution pathways, amount of impervious area, and runoff treatment requirements. Finally, as part of the analysis, inundation and flooding on the project site is assessed by reviewing potential inundation zone elevations relative to the final grade elevations of facilities and features for the project.

## Impact Evaluation

### *Surface and Groundwater Quality*

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**Impact HYD-1:**     **The proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.**

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#### **Construction**

Construction activities could expose soils on the project site to potential water erosion and construction equipment-related pollutants. Runoff carrying eroded soils and pollutants could enter storm drainage systems and enter Sand Creek, increasing sedimentation and degrading downstream water quality. These sediments could also be carried downstream and discharged into the San Joaquin River Delta leading to the San Francisco Bay and Pacific Ocean, degrading surface water quality, or allowed to seep into the associated groundwater table. However, Chapter 9 of the City's Municipal Code, Storm Water Management and Discharge Control, requires projects that would disturb more than 1 acre of land to comply with the City's NPDES permit. Consequently, given that proposed construction would disturb more than 1 acre of land, the proposed project would be required by the State to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). Compliance with the Construction General Permit requires the project Applicant to file a Notice of Intent (NOI) with the State Water Board and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs to reduce pollutants from construction activities potentially entering surface waters.

As described in the Preliminary Stormwater Control Plan, the majority of project site soils have a very low potential for infiltration and would prevent most pollutants from seeping into groundwater.<sup>17</sup> Furthermore, implementation of the SWPPP would also prevent pollutants from entering the Tracy Subbasin by implementing BMPs, such as dust-control watering and fiber rolls, which would prevent pollutants from moving off-site. Although construction activities have the potential to generate increased sedimentation, compliance with applicable policies and regulations of would minimize the potential to degrade water quality in downstream water bodies to the maximum extent possible. Therefore, construction impacts related to surface and groundwater and respective water quality would be less than significant and no mitigation is required.

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<sup>17</sup> Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

## Operation

Operation of the proposed project would result in an increase of impervious surfaces on the project site and in turn generate stormwater runoff, which may carry pollutants such as pesticides, fertilizers, and deposits of fluids and metals from motor vehicles into Sand Creek or allow seepage of such pollutants into the associated groundwater table. However, the project site has soils with a very low potential for infiltration, and, thus, potential project operation impacts to groundwater quality would be low.

As shown in Exhibit 3.9-2, the project site would be divided into five main drainage management areas (DMAs). Within each DMA, the proposed project would include Integrated Management Practices (IMPs) that provide full bioretention treatment of stormwater runoff. In addition, each DMA would include a gravity-flow storm drainage system that would collect stormwater and convey it to an IMP feature, such as a stormwater retention basin, specifically designed for the pertinent amount of impervious and pervious surfaces. As discussed further under Impact HYD-3, the proposed stormwater retention basins would contain stormwater cisterns, which would include full water-quality treatment per C.3 criteria. In addition, stormwater entering the stormwater cisterns would percolate through a bioretention medium, or filter, that would provide water quality treatment to stormwater prior to discharge into Sand Creek. Stormwater pollutants would be contained within the retention basins further reducing potential surface or groundwater quality impacts. Additionally, the proposed project would include several permanent and operational BMPs that would further reduce the project's potential to generate pollutants that could degrade surface or groundwater quality. The proposed project's potential sources of runoff pollutants and permanent source controls BMPs are summarized in Table 3.9-1.

**Table 3.9-1: Operational Stormwater Source Control BMPs**

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
On-site dumping into storm drain inlets	All accessible inlets will be marked with the words "No Dumping! Drains to Sand Creek" or similar wording.	Markings will be periodically repainted or replaced. Inlets and pipes conveying stormwater to all IMPs will be inspected and maintained as part of the Project Operations and maintenance Plan. Provide stormwater pollution prevention information to new site homeowners.
Indoor and structural pest control	—	Provide Integrated Pest Management (IPM) information to owners, lessees, and operators
Landscape/outdoor pesticide use	Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Minimize irrigation and runoff and promote infiltration where appropriate. Minimize the use of fertilizers and pesticides. Use pest-resistant plants, especially adjacent to hardscape, when possible. Use plantings appropriate to the site soils, slopes, climate, sun, wind land use, air movement, ecological consistency, and plant interactions.	—

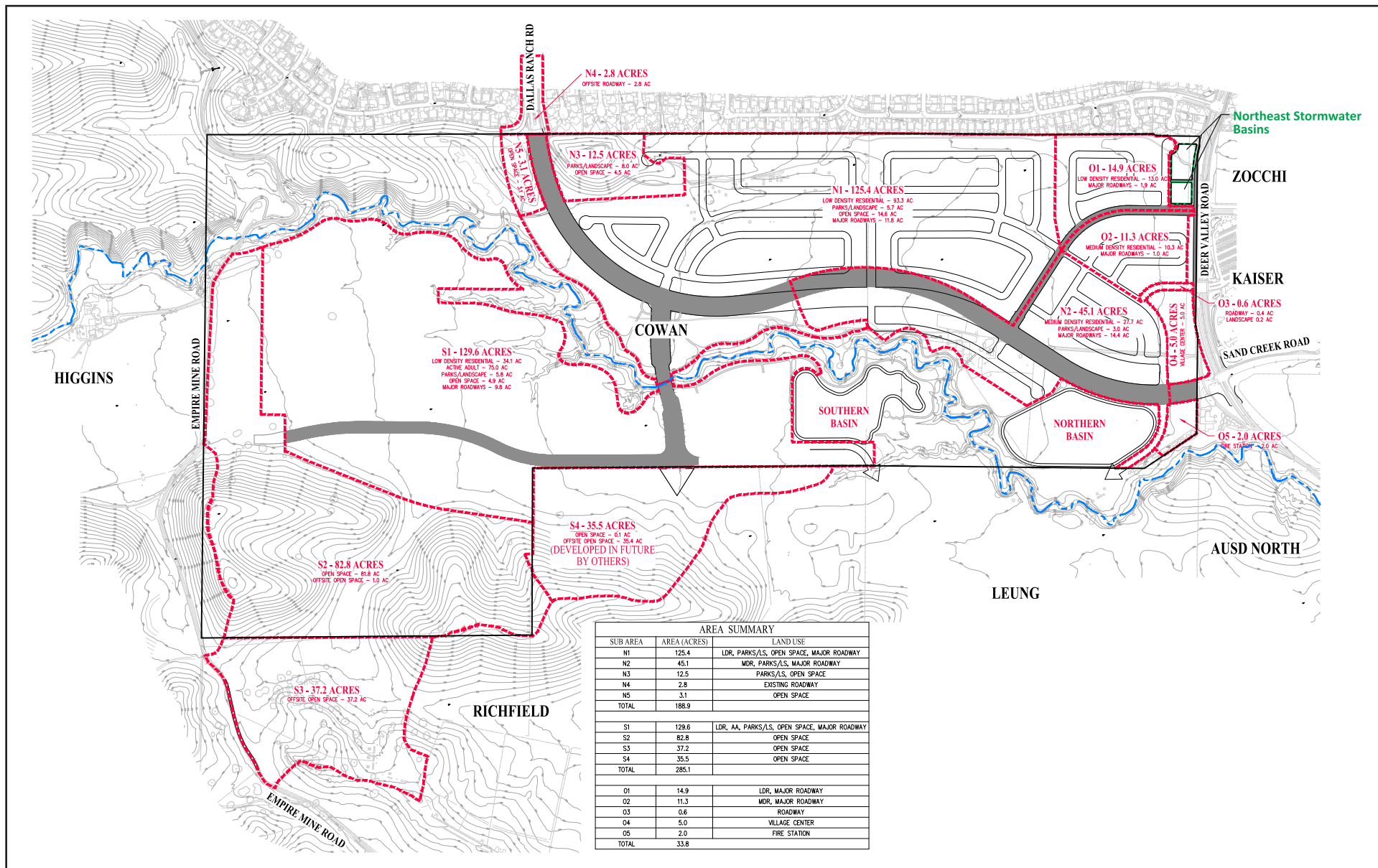
**Table 3.9-1 (cont.): Operational Stormwater Source Control BMPs**

Potential Source of Runoff Pollutants	Permanent Source Control BMPs	Operational Source Control BMPs
Vehicle washing	Stormwater pollution prevention information will be distributed to homeowners.	—
Roofing, gutters, and trim	Do not utilize roofing, gutter, or architectural trim materials made of copper or other unprotected metals that would leach into the storm water runoff.	—
Fire Sprinkler Test Water	Provide means to drain fire sprinkler test water to sanitary sewer system.	See note in Fact Sheet SC-41, “Building and Grounds Maintenance,” in the California Stormwater Quality Association (CASQA) Stormwater Quality Handbooks at <a href="http://www.cabmphandbooks.com">www.cabmphandbooks.com</a>
Air Conditioning	Air conditioner condensation shall be directed to landscaped areas or plumbed to the sanitary sewer	—
Plazas, sidewalks, and parking lots	—	Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm draining to prevent entry into the storm drain system.
Source: Carlson, Barbee & Gibson, Inc. Preliminary Stormwater Control Plan. 2019.		

As a result, the combination of very-low infiltration soils, on-site stormwater treatment facilities, and source control BMPs would prevent project operation from significantly degrading surface or groundwater quality. Therefore, operational impacts related to surface and groundwater and respective water quality would be less than significant and no mitigation is necessary.

### ***Level of Significance***

Less Than Significant



Source: CBG Civil Engineers, September 2019.



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### **Groundwater Supply/Recharge**

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**Impact HYD-2:**      **The proposed project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.**

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#### ***Construction/Operation***

The proposed project would develop 373.60 acres of the 551.50-acre project site and result in 7,731,723 square feet of impervious surfaces. While the tenant currently pumps groundwater for watering livestock and the single-family home use, the proposed project does not propose to pump groundwater from the local groundwater basin in the future for operational activities. Thus, the project would not result in increased withdrawals from, or depletion of, groundwater supplies.

The proposed project would result in an increase in impervious surfaces (e.g., roads, driveways, and roofs), which would reduce the infiltration of groundwater to the underlying groundwater basin. The majority of the project site's on-site soils are characterized as having low soil permeability as only 1.5 percent of the project site contains HSG A soils. The HSG A soils are located in the southern section of the site that would not be developed.<sup>18</sup> Therefore, on-site soils have limited potential for direct infiltration of stormwater. Thus, the proposed project would not be expected to impact groundwater supplies or recharge due to the low possibility of stormwater infiltration on the project site.

The majority of stormwater runoff from the site currently flows into Sand Creek, where waters are allowed to percolate and contribute to groundwater recharge in the area. The proposed stormwater facilities include basins where percolation into the underlying groundwater could occur. In addition, the proposed stormwater facilities, IMPs 4 and 5, would continue to drain into Sand Creek. Accordingly, implementation of the proposed project would continue to allow runoff to contribute to groundwater recharge. Thus, development of the proposed project would not interfere substantially with groundwater recharge.

In conclusion, the proposed project would not interfere substantially with groundwater supply, recharge, or groundwater management. Therefore, impacts related to groundwater recharge and supply would be less than significant.

#### ***Level of Significance***

Less Than Significant

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<sup>18</sup> Carlson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 5.

***Stormwater Drainage Leading to Erosion/Siltation, Flooding, Additional Sources of Polluted Runoff, or Impedance of Flood Flows***

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- Impact HYD-3:** The proposed project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
- i) result in substantial erosion or siltation on- or off-site;
  - (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
  - (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
  - (iv) impede or redirect flood flows?
- 

***Construction****Erosion and Siltation*

Construction of the proposed project would have a significant impact if it were to substantially alter the existing drainage pattern of the site in a manner that would result in substantial erosion or siltation on- or off-site. Such drainage effects could occur from grade changes at the project site and the off-site improvement area, exposure of soils for periods of time during stormwater discharge, or alterations to creek beds. Project construction would involve grading, earth-moving activity, and soil disturbance that would take place over 373.60 acres of the acre project site and the off-site improvement area. Chapter 9 of the City's Municipal Code, Storm Water Management and Discharge Control, requires projects that will disturb more than 1 acre of land, such as the proposed project, to comply with the City's NPDES permit. Consequently, the Applicant would be required by the State to obtain coverage under the State General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit), which pertains to erosion- and siltation-related pollution from grading and project construction. Compliance with the Permit requires the project Applicant to file an NOI with the State Water Board and prepare a SWPPP prior to construction. The SWPPP would incorporate BMPs in order to prevent, or reduce to the greatest feasible extent, adverse impacts to water quality from erosion and sedimentation. Therefore, construction impacts related to alteration of drainage patterns resulting in erosion or siltation would be less than significant.

*Increased Runoff Resulting in Flooding*

Impacts related to the potential for the project's change in impervious surfaces to increase the rate or amount of surface runoff and result in flooding are limited to operational impacts. As such, no construction impacts related to increased runoff resulting in flooding would occur.

*Additional Source of Polluted Runoff or Exceedance of Storm Drainage System Capacity*

The proposed project would be required to implement a SWPPP as part of its Construction General Permit to ensure that additional sources of polluted runoff is prevented during construction. Thus, construction of the project would not create or contribute runoff water that would provide substantial additional sources of polluted runoff. Project construction includes the creation of expanded storm drain capacity along Dallas Ranch Road to convey stormwater that currently sheet flows across the sites, as well as the creation of bioretention basins capable of holding runoff during

storm events and prevent any exacerbation of flooding on- or off-site. Therefore, project construction would improve existing conditions and would not result in exceedance of storm drain capacity or create additional sources of runoff. Impacts would be less than significant.

#### *Impedance or Redirection of Flood Flows*

Impacts related to the potential for the project's placement of new structures or earth to impede or redirect flood flows are limited to operational impacts. As such, no construction impacts related to impedance or redirection of flood flows impacts would occur.

### **Operation**

#### *Erosion and Siltation*

The project site is located in an urbanized area and primarily consists of pervious surfaces. Development of the project site would result in 7,731,723 square feet of new impervious surfaces compared to existing conditions. Thus, project operation could result in increased amounts of stormwater runoff that could cause the increased erosion of soils and carry pollutants into Sand Creek.

The proposed project would include stormwater facilities that would be designed to treat stormwater on-site and prevent erosion and siltation from increasing pollutant loads in Sand Creek. As described in the Project Description, the proposed project would include five DMAs that would convey stormwater into stormwater bioretention basins. Bioretention basins are shallow basins used to slow and treat on-site stormwater runoff. All stormwater bioretention basins would include a cistern designed according to the Stormwater C.3 Guidebooks and would include a bioretention soil medium. Stormwater that would be collected in the cisterns would either evaporate, infiltrate surrounding soils, or drain through a bioretention soil medium to be conveyed to a discharge point. The soil medium would act as a filter to allow stormwater to pass through an underdrain that carries runoff to a discharge point while pollutants would remain behind in the cisterns. Additionally, the proposed project would preserve 253.50 acres of open space, which includes existing grasses and vegetation that prevent significant erosion or siltation from occurring. Furthermore, Mitigation Measure (MM) HYD-3 would ensure a Final Stormwater Control Plan and Stormwater Control Operations and Maintenance (O&M) Plan is submitted to the City and County for review and approval prior issuance of building permits.

The proposed project would include two new outfalls to discharge stormwater from the northern (IMP 4) and southern (IMP 5) bioretention basins into Sand Creek. The bioretention basins in the northeast corner of the project site (IMP 1-2 and IMP 3) would be connected to the existing 36-inch trunk storm drain that runs east from Deer Valley Road along the alignment of Wellness Way. The two new outfalls discharging stormwater into Sand Creek would require a 401 Water Quality Certification from the Central Valley RWQCB. The project Applicant would be required by State law to acquire this certification prior to construction and further measures required by the Central Valley RWQCB would improve stormwater quality impacts. As a result, the proposed project would not substantially increase erosion or siltation with mitigation incorporated. Therefore, impacts would be less than significant.

*Increased Runoff Resulting in Flooding*

Project operation involves a total net increase of 7,731,723 square feet of new of impervious surfaces compared to existing conditions. The addition of new impervious surfaces could increase stormwater runoff rates and volumes.

The proposed project would provide new stormwater treatment and conveyance along an existing 2.80-acre portion of Dallas Ranch Road. In addition, the proposed project would include five new separate DMAs that would convey stormwater into separate stormwater detention basins each sized for the appropriate stormwater runoff that would be generated by that DMA. In addition, these stormwater systems would be designed according to the County's hydrograph modification performance requirements. As shown in Table 3.9-2, the proposed project's detention basins would discharge stormwater into Sand Creek and the 36-inch storm drain connection at a rate that is lower than pre-project discharges during short 10-year and 100-year storm events.

**Table 3.9-2: Proposed Project Stormwater Detention Modeling Results**

Proposed On-site Stormwater Point of Connection (POC)	Storm Design Level	Peak Discharge at Outlet (cfs)	
		Pre-project	Post-project (detained)
POC 1 (IMPs 1, 2, and 3)	10-year 3-hour	43.2	0.9
	10-year 24-hour	41.4	2.9
	100-year 3-hour	72.3	2.6
	100-year 24-hour	80.1	6.8
POC 2 (IMP 4)	10-year 3-hour	54.6	4.4
	10-year 24-hour	52.3	6.8
	100-year 3-hour	92.6	5.6
	100-year 24-hour	102.3	33.3
POC 3 (IMP 5)	10-year 3-hour	164.7	9.8
	10-year 24-hour	158.0	10.7
	100-year 3-hour	270.4	41.6
	100-year 24-hour	296.5	68.7
Source: Carlson, Barbee & Gibson, Inc. Preliminary Stormwater Control Plan. 2019.			

However, longer storm durations or greater year storm events could still increase stormwater runoff rates and volumes. As a result, the proposed project would increase stormwater runoff rates and volumes compared to existing conditions that could result in flooding on- or off-site, exceedance of storm drainage capacity, or redirection of flood flows.

However, the City would require the project Applicant to submit a Final Stormwater Control Plan and related Stormwater Control O&M Plan to the City for review and approval prior to issuance of grading permits. The Final Stormwater Control Plan would be conducted to assess consistency with

all NPDES rules, regulations, and procedures for municipal, construction, and industrial activities as promulgated by the State Water Board or the Central Valley RWQCB. The Final Stormwater Control Plan and related Stormwater Control O&M Plan would be submitted to the City Public Works Department for review and approval related to compliance with the City's NPDES Permit and the CCCWP Stormwater C.3 Guidebook. Grading, construction, and operational site plans would also be reviewed to verify consistency with the final Stormwater Control Plan and compliance with Provision C.3 of the CCCWP's NPDES Permit and the City's Stormwater Management and Discharge Control Ordinance Title 6 Chapter 9, Stormwater Management.

As a result, operation of the proposed project would not substantially increase the rate or amount of surface runoff such that flooding would occur on- or off-site. Therefore, operational impacts related to increased runoff resulting in flooding would be less than significant.

#### *Substantial Additional Sources of Polluted Runoff*

The proposed project would install five DMAs with IMPs, such as bioretention basins, that would provide stormwater treatment and flow control (Exhibit 3.9-2). DMA 1 and 2 would cover 1,117,676 square feet of the project site and would convey stormwater to IMP 1-2. IMP 1-2 would be a bioretention facility proposed for the northeast corner of the project site that would drain to an existing 36-inch trunk storm drain that runs east from Deer Valley Road. DMA 3 would cover 25,037 square feet and would convey stormwater to IMP 3. IMP 3 would be a bioretention facility proposed for the northeast corner of the project site that would drain to an existing 36-inch trunk storm drain that runs east from Deer Valley Road. DMA 4 would cover 8,783,957 square feet of the project site and would include low- and medium-density residential areas as well as parks, open space, and a portion of the existing Dallas Ranch Road that drains into the project site. DMA 4 would convey stormwater to IMP 4, which would be a stormwater bioretention basin located south of Sand Creek Road and north of Sand Creek that would eventually discharge into Sand Creek via a new outfall. DMA 5 would cover 12,825,610 square feet of the project site and include uses such as, low-density residential, age-restricted areas, parks, and open space. DMA 5 would convey stormwater to IMP 5, a stormwater bioretention basin that would be located south of Sand Creek and discharge into Sand Creek via a new outfall. All IMPs would be sized to accommodate full hydrograph modification performance compliance of all stormwater. As shown in Table 3.9-2, both drainage areas would avoid excessive ponding depths in the bioretention areas except under very large storm events (greater than 10-year design storm). Furthermore, as shown in Table 3.9-2 the combined volumes of all bioretention areas would be able to limit peak stormwater flow rates into points of connection with Sand Creek and the 36-inch storm drain trunk east of Deer Valley Road during very large storm events (100-year design storm) to a level below existing conditions. As a result, the proposed project would provide adequate stormwater drainage facility capacity to serve the project and surrounding area.

The proposed stormwater facilities would be designed according to the Stormwater C.3 Guidebooks and would include a bioretention soil medium that would provide stormwater treatment. Additionally, the proposed project would include operational BMPs, such as native landscaping, preservation of open space to maximize ground cover, and maintenance of inlets to ensure debris does not block stormwater flows, which could reduce the amount of pollutants entering Sand Creek. However, increased stormwater runoff from project site development could still increase sources of polluted runoff.

As described previously, implementation of a City-approved Final Stormwater Control Plan and related Stormwater Control O&M Plan would ensure the proposed project includes BMPs designed to prevent the significant release of stormwater pollutants consistent with all NPDES rules, regulations and procedures for municipal, construction, and industrial activities as promulgated by the State Water Board or the Central Valley RWQCB. Thus, with implementation of a City-approved stormwater control plan, operation of the proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Therefore, operational impacts related to additional sources of polluted runoff or exceedance of storm drainage system capacity would be less than significant.

#### *Impedance or Redirection of Flood Flows*

As shown in Exhibit 3.9-1, the majority of the project site is located in Zone X—Area of Minimal Flood Hazard. However, the areas directly adjacent to Sand Creek are designated as Zone A—Area subject to inundations by the 1 percent annual chance flood event. The proposed project would include the construction of a vehicle bridge and a separate bicycle/pedestrian bridge across Sand Creek; the bridges would also accommodate required water and sewer line crossings. Ultimately, the vehicular bridge may be up to four lanes, but construction may be phased such that a 2-lane bridge would be built first, and then widened in the future into the ultimate 4-lane configuration. The vehicular bridge would be constructed on top of bridge abutments located outside the banks of Sand Creek, spanning the jurisdictional areas and ordinary high water mark (OHWM) of Sand Creek. As a result, due to the placement of the bridge above the jurisdiction areas and the OHWM, the vehicle bridge would not have the possibility to impede flood flows because it would be located outside of a known flood hazard zone.

The bicycle/pedestrian bridge could potentially include supports within the Sand Creek OHWM, and could therefore potentially impede or redirect flood flows. Consistent with General Plan policies 8.7.2 and 11.4.2, the proposed project would prepare a hydraulic study to assess the current flow of Sand Creek and to demonstrate the effect of any bridge supports on the creek flow and/or the 100-year floodplain. If needed, modifications to the bridge design, up to and including clear spanning of the creek would be implemented at the City's direction to ensure compliance. If bridge supports are proposed within the creek, applicable regulatory permits including a streambed alteration agreement from California Department of Fish and Wildlife and water quality certification from the RWQCB would impose additional protective measures to ensure water quality.

Compliance with applicable local, State, and federal laws would ensure that the design of the pedestrian/bicycle bridge would not adversely affect the creek flow and/or the 100-year floodplain. Therefore, operational impacts related to impedance or redirection of flood flows would be less than significant.

#### ***Level of Significance***

Less Than Significant

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### ***Risk of Pollutant Release Due to Inundation***

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**Impact HYD-4:**      **The proposed project could be located in a flood hazard zone, tsunami, or seiche zone, or risk release of pollutants due to project inundation.**

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#### ***Construction/Operation***

As shown in Exhibit 3.9-1, the majority of the project site is located within FEMA Flood Zone X, which is outside of the 100-year flood hazard area. However, portions of the project site are located within Zone A, which is an area subject to inundation by the one percent annual chance flood event. The areas designated as Zone A are limited to the portions of the site immediately adjacent and encompassing Sand Creek. The proposed project would include a 250-foot-wide corridor along Sand Creek (approximately 125 feet on either side of the Creek). Additionally, no housing is proposed to be located within the 100-year flood hazard zone.

Construction of the proposed bridges, water line, and 15-inch sewer line would occur within Zone A. The pedestrian/bicycle bridge would be anticipated to be built under either a clear-span design option or a design option using supporting piles. A clear-span pedestrian bridge would allow the bridge to span the 100-year floodplain without requiring construction of structures within the 100-year flood zone. Alternatively, a pedestrian bridge design including support piles would require placement of structures within the 100-year flood zone. Should such structures be placed within the 100-year flood zone, flood waters could be redirected, which would have the potential to result in a change to the FEMA flood hazard zones for the project area. Potential changes to the 100-year flood zone caused by construction of the pedestrian bridge or sewer line could lead to areas identified for residential development or areas designated for use as stormwater treatment, which are currently outside of the 100-year flood zone, being redesignated as within a 100-year flood zone. As a result, the project site could be a risk for inundation from flooding.

However, the City's code requires that a hydraulic study be prepared for City review and would ensure the proposed project acquires and implements the necessary permits and actions to avoid impacts within a designated flood hazard zone. As described previously, should support piles be necessary for the pedestrian bridge, construction of the proposed bridge would require several permits. Compliance with the aforementioned permits, agreements, and certifications would ensure that the proposed project would comply with Central Valley RWQCB Basin Plan policies related to risk of pollutant release within waters.

Tsunamis typically affect coastlines and areas up to one quarter of a mile inland. The project site is located over 50 miles from the Pacific Ocean. Due to the project site's distance from the coast, potential flooding effects related to a tsunami would be minimal. The nearest enclosed body of water to the project site is the Contra Loma Reservoir, which is located over 4.2 miles northwest of the project site. Due to the project site's distance from the nearest enclosed body of water and regional topography, the project site would not be susceptible to flooding resulting from a seiche. As a result, the project site would not be a risk for inundation from tsunami or seiche.

Therefore, overall operational impacts related to risk of pollutant release due to inundation would be less than significant.

**Level of Significance**

Less Than Significant

**Water Quality Control or Sustainable Groundwater Management Plans Consistency**

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**Impact HYD-5:** The proposed project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

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**Construction**

The proposed project would not conflict with the CCCWP or the City's Stormwater NPDES permit. Given that proposed construction would disturb more than 1 acre of land, the proposed project would be required to comply with the terms of the Construction General Permit, which would require the preparation and implementation of a SWPPP to include BMPs to ensure reduction of pollutants from construction activities potentially entering surface waters or groundwater. In addition, the project site is not located within a groundwater basin that is subject to a sustainable groundwater management plan.<sup>19</sup> As discussed under Impact UTIL-1, the City of Antioch does not utilize groundwater as a source of potable water. Therefore, construction impacts related to water quality control plan or groundwater management plan consistency would be less than significant.

**Operation**

The project site is located within the Tracy Subbasin. The project site has a very low potential for groundwater recharge, because the project site contains predominantly HSG 'C' type soils that have a very-low soil permeability, preventing significant groundwater infiltration. In addition, the City does not currently pump groundwater and does not plan to use groundwater as a water source for project operation in the future. Furthermore, the proposed project would be consistent with General Plan Policy 10.7.2d, because the proposed project would include a 250-foot-wide corridor (generally 125 feet on either side) along Sand Creek, which would ensure the protection of groundwater recharge areas. Since the City does not use groundwater as a water source, the proposed project would not conflict with or obstruct a sustainable groundwater management plan. Therefore, operational impacts related to a water quality control plan or groundwater management plan consistency would be less than significant.

**Level of Significance**

Less Than Significant

**3.9.5 - Cumulative Impacts****Hydrology**

Cumulative impacts related to hydrology and water quality typically occur within a defined watershed. The project site and all properties on the cumulative projects list in Table 3-1 are located within the Marsh Creek or the adjacent West Antioch Watershed; notably, all respective surface water in the watershed eventually discharges into the San Joaquin Delta. Some cumulative projects are located within the City of Antioch, including the proposed project, and would be required to comply with the

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<sup>19</sup> East Contra Costa County Integrated Regional Water Management. Website. <https://www.eccc-irwm.org/about-sigma>. Accessed March 2, 2020.

CCCWP and City of Antioch General Plan policies, which prevent a project from increasing off-site surface water flow from existing conditions and ensure that projects adhere to best practices during construction to prevent pollutants from being carried off-site. Some cumulative projects are located in the City of Brentwood. Cumulative development in the City of Brentwood would be required to demonstrate consistency with the City of Brentwood General Plan and applicable codes, ordinances, and policies related to preventing pollutants from being conveyed off site. The combination of these policies and best practices would prevent significant cumulative impacts related to hydrology. Thus, the proposed project would have a less than significant cumulative impact related to hydrology.

## **Water Quality**

The geographic context for consideration of cumulative impacts related to surface water quality is the Marsh Creek Watershed and West Antioch Watershed. All cumulative projects, including the proposed project, would involve short-term construction and long-term operational activities that would have the potential to degrade water quality in downstream water bodies, including Sand Creek and the San Joaquin Delta. All cumulative project construction would be required to obtain coverage under the State's Construction General Permit from the State Water Board, which would require preparation of a SWPPP that would control potential discharges of contaminants into Sand Creek and the San Joaquin Delta. Operations of these cumulative projects would also be required to comply with the CCCWP, the East County MS4 permit (which covers are cumulative project sites), the City of Antioch Municipal Code regarding stormwater, and the City of Brentwood applicable codes, ordinances, and policies related to water quality. Thus, the proposed project would have a less than significant cumulative impact related to surface water quality.

The geographic context for consideration of cumulative impacts related to groundwater quality and management is the San Joaquin Valley Groundwater Basin. No cumulative projects, including the proposed project, would involve short-term construction and long-term operational activities would have the potential to impact groundwater quality and management as local, State, and federal laws require extensive BMPs be made part of the proposed project *prior* to any ground disturbance, and ensure that post-construction runoff is free from pollutants. As discussed above, these laws would reduce any potential for pollutants to make their way into surface and groundwaters. All cumulative project construction would be required to obtain a Construction General Permit from the State Water Board, which would require preparation of a SWPPP that would control pollutants that could seep into groundwater. Operations of cumulative projects in the City of Antioch would be required to comply with the CCCWP and the Antioch Municipal Code regarding groundwater. Operations of cumulative projects in the Cities of Brentwood would be required to comply with the CCCWP and the City of Brentwood Municipal Code regarding groundwater. Thus, the proposed project would have a less than significant cumulative impact related to groundwater quality.

## **Flooding**

The geographic context for consideration of cumulative impacts related to flooding is the City of Antioch south of State Route 4 (SR-4). According to the Antioch General Plan, portions of the City are located within 100-year and 500-year flood zones as determined by FEMA. The Antioch General Plan determined that the majority of the City is located within an area of minimal flood hazard as

identified by FEMA. The cumulative projects listed in Chapter 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, are located throughout the City of Antioch.

Flooding within the City occurs mainly near the San Joaquin River and along tributary creeks. The Antioch General Plan identifies 100-year flood zones in the areas in the southern portion of the City located adjacent to Markley Creek, Los Medanos Wasteway, and Sand Creek. Cumulative development within southern Antioch (South of SR-4) would increase the amount of impervious surface cover and later landscape drainage conditions, which could increase stormwater runoff. The proposed project would contain five DMAs and include three detention basins, which would retain flood waters, if any, during a large storm event. As discussed in this section, all developments are required to install stormwater systems to ensure post-project peak flows do not exceed pre-project flows (see the NPDES permit and MS4 requirements). Furthermore, during design review, the City would ensure all applicable standards related to on- and off-site flooding would be met through project design. Finally, the proposed project would not construct any housing within a floodplain. Thus, the proposed project would have a less than significant cumulative impact related to flooding.

***Level of Cumulative Significance***

Less Than Significant

## 3.10 - Land Use and Planning

### 3.10.1 - Introduction

This section describes existing conditions related to land use and planning as well as the relevant regulatory framework. This section also evaluates the possible impacts related to land use and planning that could result from implementation of the proposed project. Information included in this section is based, in part, on review of applicable land use policies and regulations, including the City of Antioch General Plan and City of Antioch Zoning Ordinance.

No public comments were received during the Environmental Impact Report (EIR) scoping period related to land use and planning.

### 3.10.2 - Environmental Setting

#### City of Antioch

The southern area of the City of Antioch is largely known as the Sand Creek Focus Area and includes a diverse mix of land uses, including open space, residential, general commercial, retail, office, medical, recreation, school, and public uses. All parcels surrounding the project site are within the voter-approved Urban Limit Line (ULL).

#### Project Site Vicinity

Exhibits 3.10-1 and 3.10-2 depict the existing land use designations and zoning for surrounding properties, as described below.

##### *To the West*

Land uses to the west of the project site consist of undeveloped land, and open space, including the Black Diamond Mines Regional Park. The City of Antioch General Plan designates the surrounding area west of the project site, within the Sand Creek Focus Area, as Open Space and Hillside and Estate Residential. The City of Antioch Zoning Code zones the surrounding area west of the project site as Study District.

##### *To the North*

Land uses to the north of the project site consist of existing single-family residential development. The City of Antioch General Plan designates the surrounding area north of the project site as Medium Low Density Residential (MLDR). The City of Antioch Zoning Code zones the surrounding area north of the project site as Planned Development District (PD).

##### *To the East*

Land uses to the east of the project site consist of Kaiser Permanente Antioch Medical Center and undeveloped land. The City of Antioch General Plan designates the surrounding area east of the project site as Mixed Use Medical Facility (MUMF), Low Density Residential (LDR), MLDR, Public/Institutional, Public/Quasi Public, Open Space Multiple Family, Hillside, Estate, and Residential/Executive Open Space,

and Commercial/Open Space. The City of Antioch Zoning Code zones the surrounding area east of the project site as PD, Mixed Use Medical Facility District, and Study District.

### ***To the South***

Land uses to the south of the project site include rural residential and undeveloped land within the Sand Creek Focus Area of the General Plan. The City of Antioch General Plan designates the surrounding area south of the project site, within the Sand Creek Focus Area, as Open Space, Hillside and Estate Residential, Estate and Executive Residential/Open Space, and Public/Quasi Public. The City of Antioch Zoning Code zones the surrounding area south of the project site as Study District.

### **Project Site**

The 551.50-acre project site consists of three Assessor's parcels, as shown in Exhibit 2-3 and listed in Table 3.10-1. The project site is bound by Empire Mine Road to the west, existing residential development to the north, Deer Valley Road and Kaiser Permanente Antioch Medical Center to the east, and undeveloped land to the south.

**Table 3.10-1: Project Site Assessor's Parcel Numbers**

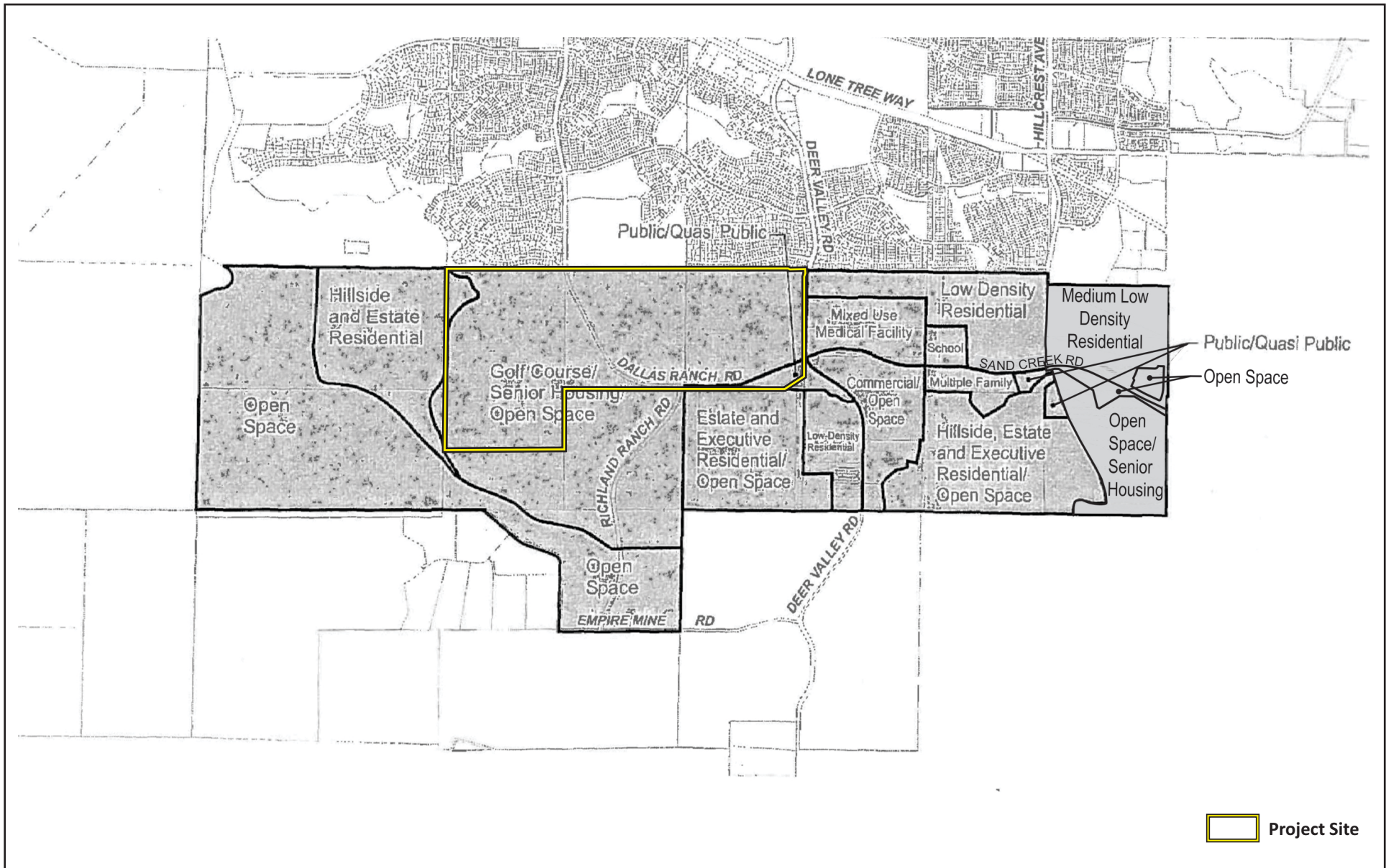
Assessor's Parcel Numbers	Acreage	Addresses	Ownership
057-010-002	236.00	Antioch, CA	American Superior Land LLC & EPC Holdings, LLC
057-010-003	160.00	Antioch, CA	American Superior Land LLC & EPC Holdings, LLC
057-021-003	157.48	6275 Deer Valley Road Antioch, CA	American Superior Land LLC & EPC Holdings, LLC
<p>Note: Acreage listed in this table was taken from the Contra Costa County Assessor's Parcel Map for the project site, which totals 553.48 acres. The project site encompasses approximately 551.50 acres of these three parcels. Source: City of Antioch 2019.</p>			

Sand Creek flows easterly through the center of the project site. The project site is relatively flat with rolling hills in the western and southern portions that extend approximately 200 feet above the valley floor. Additionally, slopes adjacent to the creek area vary in height between 5 and 40 feet, and can be as steep as 1:1 (horizontal: vertical). The project site is currently occupied by a cattle-grazing operation, a single-family residence, and a number of barns and outbuildings located on the eastern portion of the site.

### **General Plan Land Use Designations and Zoning of Project Site**

#### ***Existing General Plan Land Use Designations***

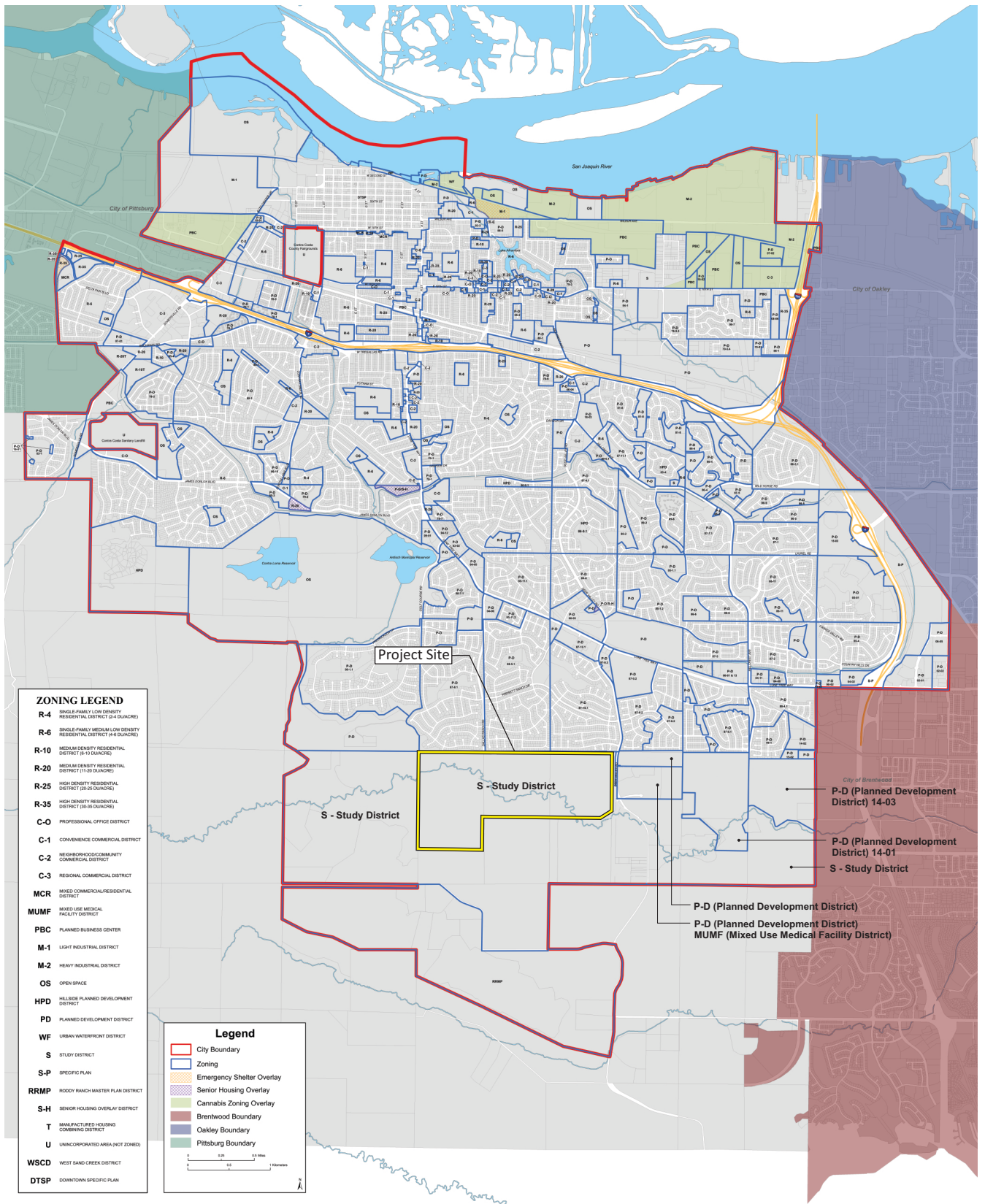
The project site is located within the Sand Creek Focus Area in the General Plan and is currently designated as "Golf Course Community/Senior Housing/Open Space," "Hillside and Estate Residential," and "Public/Quasi Public."



Source: LSA, November 19, 2003, Revised by CBG Civil Engineers, November 9, 2015.



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Source: City of Antioch, February 2019.



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The Golf Course/Senior Housing/Open Space designation is intended to accommodate “Golf Course-Oriented Housing,” consisting of residential units fronting on a golf course to be constructed at a later point in time. The General Plan identifies single-family detached homes as appropriate uses for lots fronting future golf course areas, with lot sizes as small as 5,000 square feet and maximum densities of approximately four dwelling units per acre (du/ac).

Age-restricted senior housing within the Sand Creek Focus Area is intended as a means of expanding the range of housing choice within Antioch, while reducing the Sand Creek Focus Area’s overall traffic and school impacts. Such senior housing may consist of single-family detached, small lot single-family detached, of multi-family attached housing. Areas identified specifically for senior housing may include limited areas of non-senior housing where environmental or topographic constraints would limit development densities to a range more compatible with estate housing than with senior housing.

The Hillside and Estate Residential land use designation is intended to accommodate residential development within the hilly portions of the Sand Creek Focus Area located west of Empire Mine Road. Appropriate land use types include large-lot residential developments. Residential densities within the Hillside and Estate Residential designated areas are to be limited to one du/ac, with typical lot sizes of 20,000 square feet or larger. Approximately 20 percent of the hillside estate housing area is to be devoted to custom home sites.

The Public/Quasi Public land use designation is used to designate public land and institutional uses, including public and private schools and colleges, public corporation yards, libraries, fire stations, police stations, water treatment facilities, animal shelters, public and private museums churches, and governmental offices. The Public/Quasi Public land use designation has a maximum allowable floor area ratio (FAR) of 0.5.

### ***Proposed General Plan Land Use Designations***

The proposed project would amend the City of Antioch General Plan to redesignate the project site with Restricted Development Area and Limited Development Area land use designations, as shown in Exhibit 3.10-3. The Restricted Development Area designation would allow for the following land uses: Rural Residential, Agriculture, and Open Space. The Limited Development Area designation would allow the following land uses: Estate Residential, Low Density Residential, Medium Low Density Residential, Medium Density Residential, Convenience Commercial, Mixed Use, Public/Quasi Public, and Open Space.

### ***Existing Zoning Designation***

The project site is currently zoned “Study Area” (See Exhibit 3.10-2). This zoning is an interim zone which the City’s General Plan directs be updated or revised either by one or more specific plans or master development plans when a site within the Sand Creek Focus Area proposes development.

### ***Proposed Zoning Designation***

The project proposes to amend the zoning code for the project site as required to add a Master Development Plan/Planned Development (PD) district to allow for the following land uses (shown in Exhibit 3.10-4):

- Single-Family Low Density (LD-1 LD-2, and LD-3);

- Single-Family Medium Density (MD-1, MD-2, MD-3 and MD-4);
- Age-Restricted (AR);
- Village Center (VC);
- Rural Residential (RR);
- Agriculture (A);
- Public/Quasi Public (PQP);
- Parks (P);
- Landscape (L); and
- Open Space (OS)

A copy of the proposed PD is included in Appendix B. A Conceptual Site Plan is shown in Exhibit 2-6.

### 3.10.3 - Regulatory Framework

#### Federal

No specific federal plans, policies, regulations, or laws related to land use and planning are applicable to the proposed project.

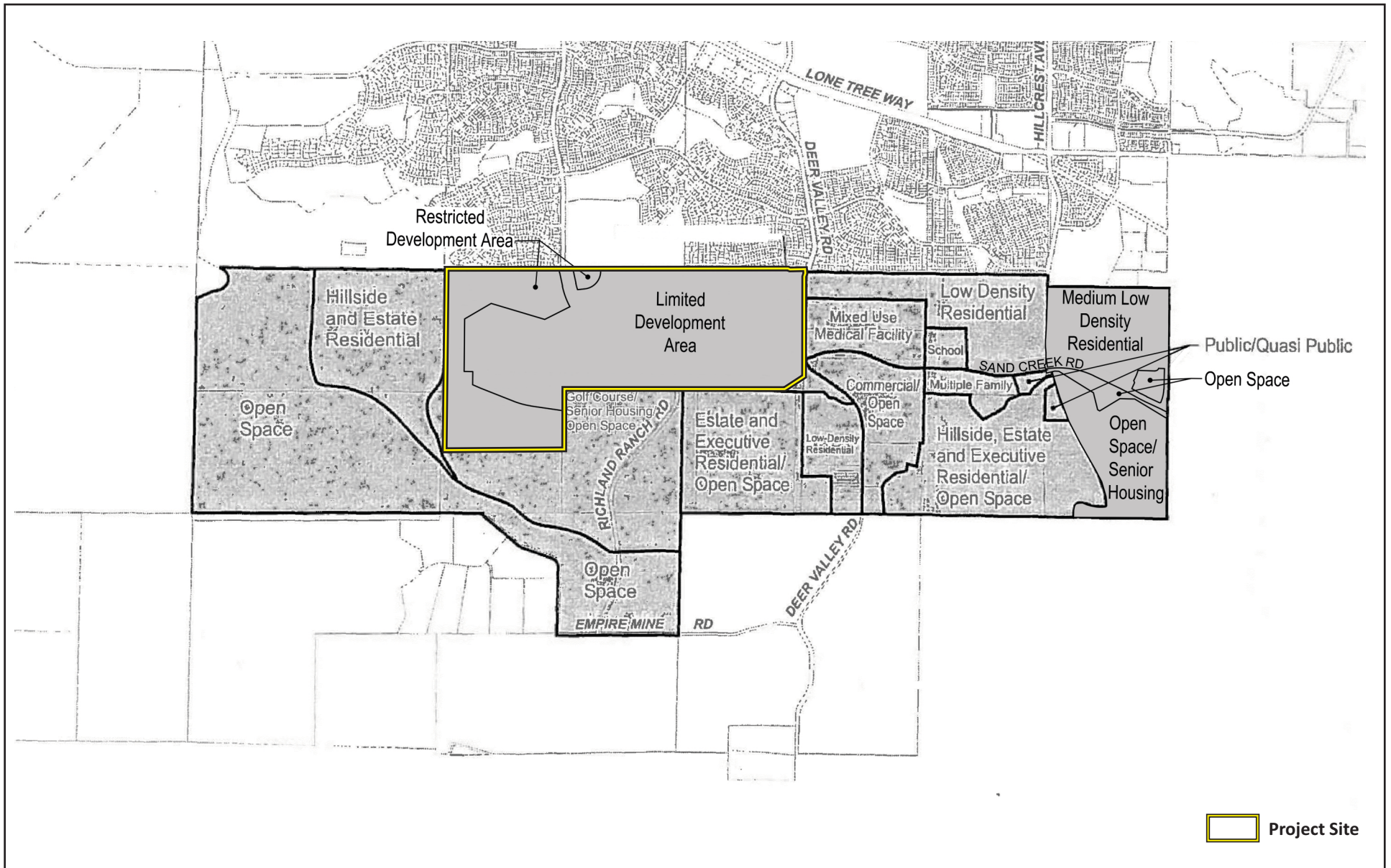
#### State

##### ***Housing Crisis Act of 2019***

Senate Bill 330 (SB 330), entitled the Housing Crisis Act of 2019, took effect on January 1, 2020, and adopts new permitting regulations for housing that limit public agencies' ability to deny housing developments. The Act will sunset January 1, 2025, unless extended by the Legislature.

The primary purpose of the law is to expedite construction of new housing. The Legislature has declared that California needs an estimated 180,000 additional homes annually to keep up with population growth and that the Governor has called for 3.5 million new homes to be built over the next 7 years (500,000 new homes annually). This substantially exceeds recent housing development in California, which has averaged less than 80,000 homes annually over the last 10 years. The consequences of providing inadequate housing has resulted in a lack of housing to support employment growth, imbalance in jobs and housing, reduced mobility, urban sprawl, excessive commuting, air quality deterioration, and increasing greenhouse gas (GHG) emissions from longer commutes to affordable homes far from growing job centers. (Gov. Code, § 65589.5; California Department of Housing and Community Development [HCD] Final Statewide Housing Assessment.)

To accomplish the goal of expediting housing development, SB 330 creates a number of new procedures and legislative limitations on municipalities. Where housing is an allowable use, the City is prohibited from enacting a law that would have the effect of "imposing a moratorium or similar restriction or limitation on housing development" except to protect against an imminent threat to the health and safety of persons in the area. SB 330 also precludes amending development regulations to a less intensive residential use in comparison to those in place on January 1, 2018. SB 330 also prohibits enactment of a law "establishing or implementing any provision that: (i) limits the number of land use approvals or permits necessary for the approval and construction of housing that will be issued or allocated within all or a portion of the ... city," (ii) "acts as a cap on the number of housing units that can be approved or constructed either annually or for some other time period," or (iii) limits the population of the affected city. (Gov. Code, § 66300(b)(1)(D).)



Source: LSA, November 19, 2003, Revised by CBG Civil Engineers, January 21, 2020.



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## Regional

### ***Plan Bay Area***

Plan Bay Area, published by the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), is a long-range integrated transportation and land use/housing strategy through 2040 for the Bay Area. Plan Bay Area functions as the sustainable communities' strategy mandated by SB 375. As a regional land use plan, Plan Bay Area aims to reduce per-capita greenhouse gas emissions through the promotion of more compact, mixed-use residential and commercial neighborhoods located near transit. Plan Bay Area is built on Priority Development Areas selected and approved by city and county governments with planning grants, technical assistance, and prioritization for regional and State transportation and affordable housing funds. Plan Bay Area is a limited and focused update that builds upon a growth pattern and strategies developed in the original Plan Bay Area (adopted by the MTC in 2013) but with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last 4 years.

### ***Regional Housing Needs Plan***

In December 2013, the ABAG projected regional housing needs in its Regional Housing Needs Plan for the San Francisco Bay Area: 2015–2023.<sup>1</sup> According to this Plan, the City of Antioch's projected housing need from 2015 to 2023 is 1,148 residential units, consisting of:

- 349 units within the very-low-income level (0–50 percent of area median income);
- 205 units within the low-income level (51–80 percent of area median income);
- 214 units within the moderate-income level (81–120 percent of area median income); and
- 680 units within the above-moderate-income level (more than 120 percent of area median income).<sup>2</sup>

## Local

### ***City of Antioch General Plan***

The City of Antioch General Plan provides for the day-to-day physical development decisions that shape the social, economic, and environmental character of the City's approximate 22,391-acre Planning Area within the City limits. The City of Antioch General Plan policies guide new development and land use activities that occur within City limits.

The following goal and policies from the 2003 General Plan are relevant to land use and planning:

#### *Land Use Element*

- **Policy 4.4.6.7b.b:** Sand Creek Focus Area development shall make a substantial commitment to employment-generating uses. Up to 280 acres may be devoted to employment-generating uses within the areas shown for Commercial/Open Space, in addition to the area shown as

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<sup>1</sup> ABAG conducts the RHNA process every 8 years as required by State law. ABAG's work on the RHNA for 2022-2030 began in 2019 with the formation of the RHNA Housing Methodology Committee. A draft plan is anticipated in January 2021.

<sup>2</sup> Association of Bay Area Governments (ABAG). Final Regional Housing Need Allocation, 2015-2023. Website: [https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023\\_RHNA\\_Allocations.pdf](https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023_RHNA_Allocations.pdf), at page 22. Accessed July 9, 2019.

Mixed Use Medical Facility. Appropriate primary land uses within employment-generating areas include:

- Administrative and Professional Offices
  - Research and Development
  - Light Manufacturing and Assembly
  - Hospital and related medical uses
- **Policy 4.4.6.7b.k:** A maximum of 4,000 dwelling units may be constructed within the Sand Creek Focus Area.
  - **Policy 4.4.6.7b.l:** It is recognized that although the ultimate development yield for the Focus Area may be no higher than the 4,000 dwelling unit maximum, the actual development yield of the Sand Creek Focus Area will depend on the nature and severity of biological, geologic, and other environmental constraints present within the Focus Area, including, but not limited to constraints posed by slopes and abandoned mines present within portions of the Focus Area; on appropriate design responses to such constraints, and on General Plan policies. Such policies include, and but are not limited to, identification of appropriate residential development types, public services and facilities performance standards, environmental policies aimed at protection of natural topography, and environmental resources, policies intended to protect public health and safety, and implementation of the Resource Management Plan called for in Policy “u,” below.
  - **Policy 4.4.6.7b.m:** As a means of expanding the range of housing choices available within Antioch, two types of “upscale” housing may be provided, including Hillside Estate Housing, Executive Estate Housing, and Golf Course-Oriented Housing. Hillside Estate Housing consists of residential development within the hilly portions of the Focus Area east of Deer Valley Road that are designated for residential development. Appropriate land use types include Large Lot Residential. Within these areas, typical flat land roadway standards may be modified (e.g., narrower street sections, slower design speeds) to minimize required grading. Mass grading would not be permitted within this residential type. Rough grading would be limited to streets and building pad areas. Residential densities within Hillside Estate Areas are to be limited to one dwelling unit per gross developable acre (1 du/ac), with typical lot sizes ranging upward from 20,000 square feet. The anticipated population density for this land use type is up to four persons per developed acre. Included in this category is custom home development, wherein semi-improved lots are sold to individuals for construction of custom homes. Approximately 20 percent of Hillside Estate Housing could be devoted to custom home sites.

Executive Estate Housing consists of large lot suburban subdivisions within the flatter portions of the Focus Area. Appropriate land use types include Large Lot Residential. Densities of Executive Housing areas would typically be 2 du/ac, with lot sizes ranging upward from 12,000 square feet. The anticipated population density for this land use type is up to eight persons per developed acre.

Golf Course-Oriented Housing consists of residential dwelling units fronting on a golf course to be constructed within the portion of the Focus Area identified as Golf Course/Senior Housing/Open Space in Figure 4.8. Appropriate land use types include Single Family Detached and Small Lot Single Family detached for lots fronting on the golf course. Maximum densities for Golf Course-Oriented Housing would typically be 4 du/ac, with lot sizes as small as 5,000

square feet for lots actually fronting on the golf course. Given the significant environmental topographic constraints in the portion of the focus area west of Empire Mine Road, the minimum lot size for executive estate housing within this area shall be a minimum of 10,000 square feet. This would allow additional development flexibility in situations where executive estate housing needs to be clustered in order to preserve existing natural features. In no case shall the 10,000 square foot minimum lot size constitute more than 20 percent of the total number of executive estate housing units in the area west of Empire Mine Road. The anticipated population density for this land use type is up to eight to twelve persons per acre developed with residential uses. Should the City determine as part of the development review process that development of a golf course within the area having this designation would be infeasible, provision of an alternative open space program may be permitted, provided, however, that the overall density of lands designated Golf Course/Senior Housing/Open Space not be greater than would have occurred with development of a golf course.

- **Policy 4.4.6.7b.n:** Single-Family Detached housing within suburban-style subdivisions with lot sizes ranging from 7,000 square feet to 10,000 square feet may also be developed within the Sand Creek Focus Area within areas shown as Residential and Low Density Residential in Figure 4.8 of the General Plan. The anticipated population density for this land use type is up to fourteen to eighteen persons per acre developed with residential uses.
- **Policy 4.4.6.7b.q:** Age-restricted senior housing should be developed within the Focus Area as a means of expanding the range of housing choice within Antioch, while reducing the Focus Area's overall traffic and school impacts. Such senior housing may consist of Single Family Detached, Small Lot Single Family Detached, of Multi Family Attached Housing, and may be developed in any of the residential areas of the Sand Creek Focus Area. Within areas identified in Figure 4.8 of the General Plan specifically for senior housing, limited areas of non-senior housing may be permitted where environmental or topographic constraints would limit development densities to a range more compatible with estate housing than with senior housing.
- **Policy 4.4.6.7b.s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the Sand Creek Focus Area shall be preserved in open space, exclusive of lands developed for golf course use.
- **Policy 4.4.6.7b.t:** Adequate buffer areas adjacent to the top of banks along Sand Creek to protect sensitive plant and amphibian habitats and water quality shall be provided. Adequate buffer areas shall also be provided along the edge of existing areas of permanently preserved open space adjacent to the Sand Creek Focus Area, including but not limited to the Black Diamond Mines Regional Park. Buffers established adjacent to existing open space areas shall be of an adequate width to minimize light/glare, noise, fire safety, public safety, habitat, public access impacts within the existing open space areas, consistent with the provisions of Section 10.5, Open Space Transitions and Buffers Policies of the General Plan.
- **Policy 4.4.6.7b.u:** Because of the sensitivity of the habitat areas within the Sand Creek Focus Area, and to provide for mitigation of biological resources impacts on lands in natural open space, as well as for the long-term management of natural open space, a Resource Management Plan based on the Framework Resource Management Plan attached as

Appendix A to this General Plan shall be prepared and approved prior to issuance of the first building permit for the Sand Creek Focus Area.

- **Policy 4.4.6.7b.x:** To mitigate the impacts of habitat that will be lost to future development within the Focus Area, an appropriate amount of habitat shall be preserved on- or off-site per the compensatory provisions of the Framework Resource Management Plan prepared for the Sand Creek Focus Area (attached as Appendix A of the General Plan).
- **Policy 4.4.6.7b.z:** Chaparral, scrub, and rock outcrop community within the westernmost portion of the Focus Area (west of Empire Mine Road), as well as adjacent grassland community that is suitable habitat for the Alameda whipsnake (*masticophis lateralis euryxanthus*) shall be retained in natural open space. Within other portions of the Focus Area, the chaparral, scrub, and rock outcrop shall be retained in natural open space contiguous to the required grassland linkage to function as a buffer and protect the grassland linkage south of the chaparral, scrub, and outcrop community.
- **Policy 4.4.6.7b.aa:** Within the westernmost portion of the Focus Area (west of Empire Mine Road), the oak woodland and savanna community shall be preserved in natural open space. Within other portions of the Focus Area, the oak woodland and savanna community shall be preserved in natural open space where it overlaps the rock outcrop community.
- **Policy 4.4.6.7b.bb:** As appropriate and necessary to protect public health and safety, abandoned mines shall be included within required natural open space areas, along with appropriate buffer areas and measures to prevent unauthorized entry.
- **Policy 4.4.6.7b.cc:** Mass grading within the steeper portions of the Focus Area (generally exceeding 25 percent slopes) is prohibited.
- **Policy 4.4.6.7b.dd:** Impacts of residential development on the Antioch Unified School District and Brentwood school districts will be mitigated, which may include pursuant to a developer agreement with the District or other acceptable means of mitigation.
- **Policy 4.4.6.7b.ee:** Project entry, streetscape, and landscape design elements are to be designed to create and maintain a strong identification of the Sand Creek Focus Area as an identifiable “community” distinct from Southeast Antioch.
- **Policy 4.4.6.7b.ff:** The Sand Creek Focus Area is intended to be “transit-friendly,” including appropriate provisions for public transit and non-motorized forms of transportation.
- **Policy 4.4.6.7b.hh:** A park program, providing active and passive recreational opportunities is to be provided. In addition to preservation of natural open space within Sand Creek and the steeper portions of the Focus Area, the development shall meet the City’s established park standards. A sports complex may be developed.
  - The sports complex would be located within the Flood Control District’s detention basin.
  - Neighborhood park facilities for the exclusive use of project residents will be privately maintained. Public parks for the use of the general public will be publicly maintained. The sports complex within the Sand Creek Detention Basin is anticipated to be maintained by the City.
- **Policy 4.4.6.7b.ii:** Development of an appropriate level of pedestrian and bicycle circulation throughout the community will be provided, including pathways connecting the residential neighborhoods, as well as non-residential and recreational components of the community. Sand Creek Focus Area development will also provide recreational trail systems for jogging and bicycling, including areas for hiking and mountain biking. Trails along Sand Creek and Horse

Valley Creek shall be designed so as to avoid impacting sensitive plant and amphibian habitats, as well as water quality.

*Community Image and Design Element*

Goals and policies set forth in the Community Image and Design Element that are applicable to the proposed project include:

- **Policy 5.4.12a:** Minimize the number and extent of locations where non-residential land use designations abut residential land use designations. Where such land use relationships cannot be avoided, strive to use roadways to separate the residential and non-residential uses.
- **Policy 5.4.12b:** Ensure that the design of new development proposed within the ULL along a boundary between residential and non-residential uses provides sufficient protection and buffering for the residential use, while maintaining the development feasibility of the nonresidential use. The burden to provide buffers and transitions to achieve compatibility should be on the second use to be developed. Where there is bare ground to start from, both uses should participate in providing buffers along the boundary between them.
- **Policy 5.4.14a:** Design hillside development to be sensitive to existing terrain, views, and significant natural landforms and features.
- **Policy 5.4.14b:** Projects within hillside areas shall be designed to protect important natural features and to minimize the amount of grading. To this end, grading plans shall conform to the following guidelines.
  - *Slopes less than 25%:* Redistribution of earth over large areas may be permitted.
  - *Slopes between 25% and 35%:* Some grading may occur, but landforms need to retain their natural character. Split-level designs and clustering are encouraged as a means of avoiding the need for large padded building areas.
  - *Slopes between 35% and 50%:* Development and limited grading can occur only if it can be clearly demonstrated that safety hazards, environmental degradation, and aesthetic impacts will be avoided. Structures shall blend with the natural environment through their shape, materials and colors. Impact of traffic and roadways is to be minimized by following natural contours or using grade separations. Encouraged is the use of larger lots, variable setbacks and variable building structural techniques such as stepped or post and beam foundations are required.
  - *Slopes greater than 50%:* Except in small, isolated locations, development in areas with slopes greater than 50% should be avoided.
- **Policy 5.4.14c:** Manufactured slopes in excess of five vertical feet (5') shall be landform graded. "Landform grading" is a contour grading method which creates artificial slopes with curves and varying slope ratios in the horizontal and vertical planes designed to simulate the appearance of surrounding natural terrain. Grading plans shall identify which slopes are to be landform graded and which are to be conventionally graded.
- **Policy 5.4.14d:** The overall project design/layout of hillside development shall adapt to the natural hillside topography and maximize view opportunities *to*, as well as *from* the development.
- **Policy 5.4.14e:** Grading of ridgelines is to be avoided wherever feasible, siting structures sufficiently below ridgelines so as to preserve unobstructed views of a natural skyline. In cases

where application of this performance standard would prevent construction of any structures on a lot of record, obstruction of views of a natural skyline shall be minimized through construction techniques and design, and landscaping shall be provided to soften the impact of the new structure.

- **Policy 5.4.14f:** Hillside site design should maintain an informal character with the prime determinant being the natural terrain. This can be accomplished by:
  - Utilizing variable setbacks and structure heights, innovative building techniques, and retaining walls to blend structures into the terrain, and
  - Allowing for different lot shapes and sizes.
- **Policy 5.4.14g:** Buildings should be located to preserve existing views and to allow new dwellings access to views similar to those enjoyed from existing dwellings.
- **Policy 5.4.14h:** Streets should follow the natural contours of the hillside to minimize cut and fill, permitting streets to be split into two one-way streets in steeper areas to minimize grading and blend with the terrain. Cul-de-sacs or loop roads are encouraged where necessary to fit the terrain. On street parking and sidewalks may be eliminated, subject to City approval, to reduce required grading.
- **Policy 5.4.14i:** Clustered development is encouraged as a means of preserving the natural appearance of the hillside and maximizing the amount of open space. Under this concept, dwelling units are grouped in the more level portions of the site, while steeper areas are preserved in a natural state.
- **Policy 5.4.14j:** Project design should maximize public access to canyons, overlooks, and open space areas by:
  - Providing open space easements between lots or near the end of streets or cul-de-sacs; and
  - Designating public pathways to scenic vistas.
- **Policy 5.4.14k:** Permit the use of small retaining structures when such structures can reduce grading, provided that these structures are located and limited in height so as not to be a dominant visual feature of the parcel.
  - Where retaining walls face public streets, they should be faced with materials that help blend the wall into the natural character of the terrain.
  - Large retaining walls in a uniform plane should be avoided. Break retaining walls into elements and terraces, and use landscaping to screen them from view.
- **Policy 5.4.14l:** Lot lines shall be placed at the top of slopes to facilitate maintenance by the down slope owner, who has the greater “stake” in ensuring the continued integrity of the slope.

### ***Proposed General Plan Amendments***

Appendix B contains the entirety of the General Plan Amendments required for the proposed project. In summary, they include the following general revisions:

- The project would revise the General Plan land use map to indicate the Limited and Restricted Development Area designations.
- The project would revise the City’s Land Use element to remove hillside development, further protect hillside viewsheds, bolster setbacks and protections of Sand Creek, and expand open space areas west of Deer Valley Road.

- The project would amend the circulation map to improve circulation and emergency response and reduce the number of Sand Creek crossings to identify a roadway connection (Sand Creek Road) through the project site from the terminus of Dallas Ranch Road to the existing Deer Valley Road.

### **Antioch Zoning Code**

Title 9, Article 23, Chapter 5 of the City’s Code of Ordinances defines the PD District as follows. PD Districts are intended to accommodate a wide range of residential, commercial and industrial land uses which are mutually supportive and compatible with existing and proposed development on surrounding properties. PD Districts shall encourage the use of flexible development standards designed to appropriately integrate a project into its natural and/or man-made setting and shall provide for a mix of land uses to serve identified community needs. In addition, PD Districts shall orient pedestrian and bicycle facilities to encourage non-automobile-oriented circulation within the development. The Zoning Code allows for Mixed Use PD Districts, which include residential and commercial uses within the same or adjacent buildings and requires that development standards (i.e., setbacks, lots sizes, building heights, etc.), be proposed for the PD.

### ***Proposed Planned Development District***

Because the project site is located in the Sand Creek Focus Area, a Master Development Plan/Planned Development rezone process is required to update the zoning of the site from Study District to PD to allow for all the proposed uses.

Given the depth and extent of the new PD, it has been included in Appendix B of this Draft EIR. The PD outlines the types of land uses allowed (i.e., low-density, age-restricted, village commercial), and provides development standards for the permitted uses (i.e., setbacks, lot coverage, lot size, etc.). The Master Development Plan illustrates where each proposed land use is allowed.

## **3.10.4 - Impacts and Mitigation Measures**

### **Significance Criteria**

According to 2019 California Environmental Quality Act (CEQA) Guidelines Appendix G, to determine whether impacts related to land use and planning are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Physically divide an established community?
- b) 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?

### **Approach to Analysis**

The analysis in this section focuses on whether implementing the proposed project would physically divide an established community and whether the proposed project would conflict with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. Conflicts and inconsistencies with a land use policy, in and of themselves, do not constitute significant environmental impacts, unless such conflicts or inconsistencies result in direct physical

environmental impacts. The physical impacts of the proposed project are discussed throughout Chapter 3 of this Draft EIR. Conflicts with land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect are discussed below. Specifically, the City of Antioch General Plan and the Zoning Ordinance were reviewed to identify applicable policies and provisions that pertain to the proposed project.

## **Impact Evaluation**

### ***Divide an Established Community***

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**Impact LAND-1:      The proposed project would not physically divide an established community.**

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#### ***Construction/Operation***

The physical division of an established community would occur if the proposed project would involve construction of a large linear feature such as a railroad or interstate highway or if it would involve removal of access that would impact mobility such as removal of a bridge. To the contrary, the proposed project involves development of a master planned residential community on a largely undeveloped site within the Sand Creek Focus Area of the City of Antioch General Plan. The project does not propose the type of large linear construction that would impact mobility within an existing community and the surrounding area. The proposed project consists primarily of residential and associated commercial/retail development, and would be consistent with the existing single-family residential development to the north of the project site. Existing areas to the west, south, and east of the site are not developed or considered established communities. With the exception of the existing residential development to the north, existing development in the project vicinity includes the Kaiser Permanente Medical Center to the east of the site. The proposed project would include internal vehicular circulation and pedestrian focused elements such as sidewalks that would thus improve connectivity and mobility within the community. For instance, consistent with the Circulation Element of the City of Antioch General Plan, the proposed project would provide the long-planned extension of Dallas Ranch Road through the project site to Deer Valley Road, which will allow better and more fluid access to the Kaiser Medical Center on Deer Valley Road, across from the project site. Thus, the proposed project would not physically divide an established community. Therefore, there would be no impact related to division of an established community.

#### ***Level of Significance***

No Impact

### ***Conflict with Applicable Plans, Policies, or Regulations***

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**Impact LAND-2:      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.**

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Development of the proposed project would result in a significant impact if it would conflict with applicable land use plans and policies of the City of Antioch General Plan or the Zoning Code that were adopted for the purpose of avoiding or mitigating an environmental effect. A policy inconsistency may be considered a significant adverse impact if the inconsistency would result in a significant adverse physical impact based on the established significance criterion. Consistency of the

proposed project with applicable land use plans and policies is evaluated below. Consistency with the City's adopted land use compatibility standards specifically with respect to biological resources (Section 3.4), hazards (Section 3.8), noise (Section 3.11), public services (Section 3.13), and transportation (Section 3.14) are evaluated in the topic-specific EIR sections.

### **Construction**

Impacts related to consistency with applicable land use plans and policies are largely limited to operational impacts. However, consistency with Antioch Municipal Code policies related to tree protection are evaluated in Section 3.4, Biological Resources, and conditions of approval would ensure adherence to the City's tree preservation guidelines. Similarly, impacts related to noise and land use compatibility are evaluated in Section 3.11, Noise, and found to be less than significant with adherence to the noise reduction policies during construction outlined in the General Plan. Otherwise, there are no other adopted land use regulations or standards regarding construction that serve the purpose of avoiding or mitigating an environmental effect.

### **Operation**

#### *City of Antioch General Plan Consistency*

According to the City of Antioch General Plan, the project site is located within the Sand Creek Focus Area and is designated by the City of Antioch General Plan for "Golf Course Community/Senior Housing/Open Space," "Hillside and Estate Residential," and "Public/Quasi Public." The project site is zoned as a Study District, an interim designation that is utilized until all necessary detailed land use studies are completed for a given area.

The project Applicant proposes amendments to the City of Antioch General Plan and Zoning Code for the project site essentially identical to those the City Council unanimously adopted the West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative on July 24, 2018. In particular the project Applicant seeks to amend the City of Antioch General Plan to add a land use designation referred to as the "Restricted Development Area" to the General Plan to protect approximately 149.04 acres of the project site from future urban development and prohibit such development on ridges and major hills throughout the project site and along Sand Creek as well as an open space corridor of up to approximately 250 feet in width along Sand Creek. The project Applicant also seeks to amend the City of Antioch General Plan to add a land use designation referred to as the "Limited Development Area" to allow limited urban development on approximately 401.88 acres of the project site for the various land uses discussed below.

The Restricted Development Area would provide opportunities for low-density rural residential housing and preserve agriculture, grasslands, and open space with the following allowed land uses: Rural Residential, Agriculture, and Open Space. The Limited Development Area would allow a range of single-family housing types, including executive estate housing, age-restricted housing for seniors, suburban single-family detached housing for families or for seniors, as well as commercial uses, public and quasi-public uses, and substantial open space through the allowed land uses: Estate Residential, Low Density Residential, Medium Low Density Residential, Medium Density Residential,

Convenience Commercial, Mixed Use, Public/Quasi Public, and Open Space. The proposed project comprises a multi-generational plan, which would include a wide range of housing, including age-restricted housing. The proposed project includes development standards and design guidelines consistent with the proposed low density and medium density land use designations. Development standards for the Low Density designation would allow “4 single-family units per gross developable acre.” Additionally, development standards for the Medium Density land use designation would allow for 10 dwelling units for each gross developable acre. Average lot sizes would range from 7,000 to 10,000 square feet for single-family detached housing and from 4,000 to 7,000 square feet for small lot single-family detached housing.

Because the trial court invalidated the West Sand Creek Initiative, the proposed project would require a general plan amendment. With the amendment, the proposed project would be consistent with existing and planned residential development within the Sand Creek Focus Area, including the planned development of a maximum of 4,000 residential units in the Sand Creek Focus Area. The proposed project would avoid hillside development through the preservation of open space, and would provide a 250-foot corridor along Sand Creek as a buffer area for sensitive species and habitats. Additionally, as required in the General Plan, the proposed project would develop a Resource Management Plan (RMP) to outline mitigation of biological resources impacts within the project site. Therefore, the proposed project would be consistent with the City of Antioch General Plan. Impacts related to General Plan consistency would be less than significant.

#### *City of Antioch Municipal Code—Zoning Code Consistency*

The project proposes to amend the Zoning Code from Study District to The Ranch Planned Development District, which would include low and medium residential, age-restricted, village commercial, rural residential, agriculture, public and open space uses. The PD would include development standards outlining maximum density and units, minimum lot sizes, landscape requirements, open space requirements, architectural guidelines, and maximum building heights and lot coverage.

As required by the City’s Zoning Code, the project Applicant submitted a master development plan, which will be reviewed by the Planning Commission and City Council. As noted previously, the proposed project would mirror the previously-adopted West Sand Creek Initiative as it pertained to the project site, and would implement all proposed development standards and guidelines. Based on the foregoing, the proposed project would be consistent with the City of Antioch Zoning Code. Therefore, impacts related to Zoning Code consistency would be less than significant.

Overall, the proposed project would not conflict the applicable land uses plans, policies, or regulations of the City of Antioch 2003 General Plan or Antioch Zoning Code adopted for the purpose of avoiding or mitigating an environmental effect. Therefore, impacts on land use policies and plans would be less than significant.

#### ***Level of Significance***

Less Than Significant

### 3.10.5 - Cumulative Impacts

#### **Divide a Community**

The proposed project in conjunction with the cumulative projects listed in Table 3-1 consist of residential and commercial land uses. Development within the City of Antioch is governed by the City of Antioch General Plan and City of Antioch Municipal Code, which ensure logical and orderly land use development and require discretionary review to ensure that projects do not result in environmental impacts due to inconsistency with the general plan and other land use planning regulations. Consistency with the City of Antioch General Plan and City of Antioch Municipal Code would minimize cumulative land use impacts related to division of an established community. In addition, the project would include connections to future development to the south and west of the project site. As such, in conjunction with other cumulative projects, there would be a less than significant cumulative impact with respect to dividing an existing community.

Land use consistency and compatibility is generally discussed in the project-specific context because land use effects related to general plan policy consistency and land use compatibility are generally localized and would not combine with similar effects in other jurisdictions. While the conversion of a large portion of unimproved land to development uses could result in cumulative impacts related to air quality, biological resources, and other environmental effects, the cumulative impacts related to those issue areas are discussed in their respective sections in this Draft EIR. Cumulative impacts with respect to general plan consistency would not differ from those identified for the project.

#### **Conflict with Land Use Plan, Policy, or Regulation**

Land use decisions for both the proposed project and for the other cumulative projects listed in Table 3-1 are site-specific, and thus, made at the respective City level and mitigated on a project-by-project basis. Based on the discussion above, the proposed project would be consistent with the City's General Plan and Zoning Code provisions. Other Development in the City of Brentwood would be required to demonstrate consistency with the City of Brentwood General Plan and applicable codes, ordinances, and policies. Development in the City of Oakley would be required to demonstrate consistency with the City of Oakley General Plan and applicable codes, ordinances, and policies. This would ensure that these cumulative projects comply with applicable planning regulations. Given the above information, there would be a less than significant cumulative impact with respect to conflicting with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

As such, the project would not result in significant cumulative impacts related to the division of an established community, or land use and planning. Development of the project site would be part of implementing the planned vision for this area of the City, and as such, would not contribute to any significant cumulative land use impacts.

#### ***Level of Cumulative Significance***

Less Than Significant

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## 3.11 - Noise

### 3.11.1 - Introduction

This section describes existing conditions related to noise and vibration in the project area as well as the regulatory framework. This section also evaluates the possible impacts related to noise and vibration that could result from implementation of the proposed project. Information included in this section is based on the City of Antioch General Plan, the City of Antioch Code of Ordinances, the project-specific traffic analysis report included in Appendix K, and project-specific noise analysis report provided in Appendix I. No public comments were received during the Environmental Impact Report (EIR) scoping period related to noise.

### 3.11.2 - Environmental Setting

#### Characteristics of Noise

Noise is generally defined as unwanted or objectionable sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in the extreme, hearing impairment. Noise effects can be caused by pitch or loudness. *Pitch* is the number of complete vibrations or cycles per second of a wave that result in the range of tone from high to low; higher-pitched sounds are louder to humans than lower-pitched sounds. *Loudness* is the intensity or amplitude of sound.

Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of less than 3 dB are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Only audible changes in existing ambient or background noise levels are considered potentially significant.

The human ear is not equally sensitive to all frequencies within the audible sound spectrum, so sound pressure level measurements can be weighted to better represent frequency-based sensitivity of average healthy human hearing. One such specific “filtering” of sound is called “A-weighting.” A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear. Because decibels are logarithmic units, they cannot be added or subtracted by ordinary arithmetic means. For example, if one noise source produces a noise level of 70 dB, the addition of another noise source with the same noise level would not produce 140 dB; rather, they would combine to produce a noise level of 73 dB.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level. Noise levels diminish or attenuate as distance

from the source increases based on an inverse square rule, depending on how the noise source is physically configured. Noise levels from a single-point source, such as a single piece of construction equipment at ground level, attenuate at a rate of 6 dB for each doubling of distance (between the single-point source of noise and the noise-sensitive receptor of concern). Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate roughly at a rate of 3 dB per doubling of distance.

Table 3.11-1 shows some representative noise sources and their corresponding noise levels in dBA.

**Table 3.11-1: Typical A-Weighted Noise Levels**

Indoor Noise Source	Noise Level (dBA)	Outdoor Noise Sources
(Threshold of Hearing in Laboratory)	0	—
Library	30	Quiet Rural Nighttime
Refrigerator Humming	40	Quiet Suburban Nighttime
Quiet Office	50	Quiet Urban Daytime
Normal Conversation at 3 feet	60	Normal Conversation at 3 feet
Vacuum Cleaner at 10 feet	70	Gas Lawn Mower at 100 feet
Hair Dryer at 1 foot	80	Freight Train at 50 feet
Food Blender at 3 feet	90	Heavy-duty Truck at 50 feet
Inside Subway Train (New York)	100	Jet Takeoff at 2,000 feet
Smoke Detector Alarm at 3 feet	110	Unmuffled Motorcycle
Rock Band near stage	120	Chainsaw at 3 feet
—	130	Military Jet Takeoff at 50 feet
—	140	(Threshold of Pain)
Source: Compiled by FCS 2018.		

### **Noise Descriptors**

There are many ways to rate noise for various times, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level ( $L_{eq}$ ) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the  $L_{eq}$  and community noise equivalent level (CNEL) or the day-night average level ( $L_{dn}$ ) based on dBA. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly  $L_{eq}$  for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours).  $L_{dn}$  is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and  $L_{dn}$  are within one dBA of each other and are normally exchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level ( $L_{\max}$ ), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by  $L_{\max}$  for short-term noise impacts.  $L_{\max}$  reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

### **Noise Propagation**

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source, as well as ground absorption, atmospheric conditions (wind, temperature gradients, and humidity) and refraction, and shielding by natural and manmade features. Sound from point sources, such as an air conditioning condenser, a piece of construction equipment, or an idling truck, radiates uniformly outward as it travels away from the source in a spherical pattern.

The attenuation or sound drop-off rate is dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in noise models: soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA per each doubling of the distance (dBA/DD) is typically observed over soft ground with landscaping, as compared with a 6 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources, such as traffic noise on a roadway, a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3 dBA/DD drop-off rate for hard-site conditions. Table 3.11-2 briefly defines these measurement descriptors and other sound terminology used in this section.

**Table 3.11-2: Sound Terminology**

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which represents the squared ratio of sound-pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.

**Table 3.11-2 (cont.): Sound Terminology**

Term	Definition
Equivalent Noise Level ( $L_{eq}$ )	The average sound energy occurring over a specified time period. In effect, $L_{eq}$ is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels ( $L_{max}$ and $L_{min}$ )	The maximum or minimum instantaneous sound level measured during a measurement period.
Day-Night Level (DNL or $L_{dn}$ )	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10 p.m. and 7 a.m. (nighttime).
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7 p.m. and 10 p.m. and 10 dB added to the A-weighted sound levels occurring between 10 p.m. and 7 a.m.
Source: Compiled by FCS 2019.	

**Traffic Noise**

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the Federal Highway Administration (FHWA) community noise assessment criteria, this change is “barely perceptible;” for reference, a doubling of perceived noise levels would require an increase of approximately 10 dBA. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

**Stationary Noise**

A stationary noise producer is any entity in a fixed location that emits noise. Examples of stationary noise sources include machinery, engines, energy production, and other mechanical or powered equipment and activities such as loading and unloading or public assembly that may occur at commercial, industrial, manufacturing, or institutional facilities. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, although the use of these vehicles is considered a stationary noise source when operated on private property such as at a construction site, a truck terminal, or warehousing facility. The emitted noise from the producer can be mitigated to acceptable levels either at the source or on the adjacent property through the use of proper planning, setbacks, block walls, acoustic-rated windows, dense landscaping, or by changing the location of the noise producer.

The effects of stationary noise depend on factors such as characteristics of the equipment and operations, distance and pathway between the generator and receptor, and weather. Stationary noise sources may be regulated at the point of manufacture (e.g., equipment or engines), with limitations on the hours of operation, or with provision of intervening structures, barriers or topography.

Construction activities are a common source of stationary noise. Construction-period noise levels are higher than background ambient noise levels but eventually cease once construction is complete. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on each construction site and, therefore, would change the noise levels as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 3.11-3 shows typical noise levels of construction equipment as measured at a distance of 50 feet from the operating equipment.

**Table 3.11-3: Typical Construction Equipment Maximum Noise Levels,  $L_{max}$**

Type of Equipment	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Impact Pile Driver	95
Auger Drill Rig	85
Vibratory Pile Driver	95
Jackhammer	85
Pneumatic Tool	85
Pump	77
Scraper	85
Crane	85
Portable Generator	82
Roller	85
Bulldozer	85
Tractor	84
Front-End Loader	80
Backhoe	80
Excavator	85
Grader	85
Air Compressor	80
Dump Truck	84
Concrete Mixer Truck	85
Pickup Truck	55
Source: FHWA 2006. Highway Construction Noise Handbook, August.	

### **Noise from Multiple Sources**

Because sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Therefore, sound pressure levels in decibels are logarithmically added on an energy summation basis. In other words, adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. Instead, if the difference between two noise sources is 10 dBA or more, the louder noise source will dominate and the resultant noise level will be equal to the noise level of the louder source. In general, if the difference between two noise sources is 0–1 dBA, the resultant noise level will be 3 dBA higher than the louder noise source, or both sources if they are equal. If the difference between two noise sources is 2–3 dBA, the resultant noise level will be 2 dBA above the louder noise source. If the difference between two noise sources is 4–10 dBA, the resultant noise level will be 1 dBA higher than the louder noise source.

### **Characteristics of Vibration**

Groundborne vibration consists of rapidly fluctuating motion through a solid medium, specifically the ground, which has an average motion of zero and in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The effects of groundborne vibration typically only causes a nuisance to people, but in extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room, and may consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels—denoted as LV—and is based on the reference quantity of 1 micro inch per second. To distinguish vibration levels from noise levels, the unit is written as “VdB.”

Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. When assessing annoyance from groundborne vibration, vibration is typically expressed as rms velocity in units of decibels of 1 micro-inch per second, with the unit written in VdB. Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. Human perception to vibration starts at levels as low as 67 VdB. Annoyance due to vibration in residential settings starts at approximately 70 VdB.

Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration. Construction activities, such as blasting, pile driving and operating heavy earthmoving equipment, are common sources of groundborne vibration. Construction vibration

impacts on building structures are generally assessed in terms of PPV. Typical vibration source levels from construction equipment are shown in Table 3.11-4.<sup>1</sup>

**Table 3.11-4: Vibration Levels of Construction Equipment**

Construction Equipment	PPV at 25 Feet (inches/second)	RMS Velocity in Decibels (VdB) at 25 Feet
Bulldozer–Small	0.003	58
Jackhammer	0.035	79
Loaded Trucks	0.076	86
Bulldozer–Large	0.089	87
Caisson Drilling	0.089	87
Clam Shovel Drop	0.202	94
Vibratory Roller–Large	0.210	94
Pile Driver (impact-typical)	0.644	104
Pile Driver (impact-upper range)	1.518	112
Source: Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.		

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform medium, while groundborne vibrations travel through the earth, which may contain significant geological differences. Factors that influence groundborne vibration include:

- **Vibration source:** Type of activity or equipment, such as impact or mobile, and depth of vibration source;
- **Vibration path:** Soil type, rock layers, soil layering, depth to water table, and frost depth; and
- **Vibration receiver:** Foundation type, building construction, and acoustical absorption.

Among these factors that influence groundborne vibration, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface, and can result in groundborne vibration problems at large distance from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils. There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or

<sup>1</sup> Federal Highway Administration (FHWA). 2006. Highway Construction Noise Handbook. August.

Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil type, but it has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests. The vibration level (calculated below as "PPV") at a distance from a point source can generally be calculated using the vibration reference equation:

$$PPV = PPV_{ref} * (25/D)^n \text{ (in/sec)}$$

Where:

PPV<sub>ref</sub> = reference measurement at 25 feet from vibration source

D = distance from equipment to the receptor

n = vibration attenuation rate through ground

According to Chapter 12 of the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual, an "n" value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.<sup>2</sup> The FTA Guidance Manual is a nationally accepted guidance manual for construction vibration impact assessment for a wide variety of soil conditions.

## Existing Noise Levels

### **Ambient Noise**

The existing noise environment in the vicinity of the project site was documented through a long-term noise monitoring effort performed at the project site, as documented in the project-specific Environmental Noise Analysis report included in Appendix I. No new development or changes in the noise environment have occurred on the project site, or in the immediate vicinity of the project site since the time of these measurements. Therefore, they are still accurate representations of the existing ambient noise environment on the project site. The noise monitoring locations are shown in Exhibit 3.11-1, and the noise measurement data outputs are contained in Appendix I.

Two short-term ambient noise measurements were conducted at the northern project boundary, approximately 555-feet west of Deer Valley Road. The location is shown on Exhibit 3.11-1. The noise measurement ST-1 was taken on May 27, 2015, at 1:30 p.m., and ST-2 was taken on May 28, 2015, at 4:10 p.m. These noise measurements document the daytime ambient noise conditions at the project

<sup>2</sup> Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

site’s northern boundary, adjacent to the existing single-family residential development. The results are summarized in Table 3.11-5.

The long-term noise measurement, shown on Exhibit 3.11-1, was conducted within the eastern portion of the project site, adjacent to Snodgrass Lane approximately 530 feet west of Deer Valley Road and 720 feet northwest of the closest single-family residence located adjacent to the project’s southern boundary. The noise measurement started at 11:00 a.m. on Wednesday, May 27, 2015, and ended at 11:00 a.m. on Thursday, May 28, 2015. This long-term ambient noise measurement provides a baseline of existing noise conditions on the project site. The resulting measurement determined that ambient noise levels at this location averaged 52 dBA CNEL. Daytime ambient noise levels at this location, between the hours of 7:00 a.m. and 10:00 p.m., were 50 dBA  $L_{eq}$ , 41 dBA  $L_{50}$ , and 63 dBA  $L_{max}$ . Nighttime ambient noise levels at this location, between the hours of 10:00 p.m. and 7:00 a.m., were 43 dBA  $L_{eq}$ , 40 dBA  $L_{50}$ , and 58 dBA  $L_{max}$ . The long-term measurement results are summarized in Table 3.11-5.

**Table 3.11-5: Existing Noise Level Measurement in the Vicinity of the Project Site**

Site ID No.	Location Description	Date	CNEL, dBA	$L_{eq}$ , dBA (daytime/nighttime)	$L_{max}$ , dBA (daytime/nighttime)
LT-1	On existing Snodgrass Lane, approximately 530-feet west of Deer Valley Road.	May 27–28, 2015	52	50/43	63/58
ST-1	Adjacent to northern project boundary, approximately 550-feet west of Deer Valley Road.	May 27, 2015	NA	57/NA	76/NA
ST-2	Adjacent to northern project boundary, approximately 550-feet west of Deer Valley Road.	May 28, 2015	NA	59/NA	75/NA

Note:  
The Site ID corresponds to locations shown in Exhibit 3.11-1. Daytime represents the hours of 7:00 a.m. and 10:00 p.m.; nighttime represents the hours between 10:00 p.m. and 7:00 a.m.  
NA = Not applicable as this noise metric was not recorded for this measurement.  
Source: FCS 2019.

### Traffic Noise

In addition to the ambient noise measurements, existing traffic noise on local roadways in the areas surrounding the project site was calculated to quantify existing traffic noise levels, based on the existing traffic volumes included in Appendix K. Existing traffic noise levels along selected roadway segments in the project vicinity (specifically, Dallas Ranch Road, which dead-ends at the northern boundary of the project site, and Deer Valley Road, which runs adjacent to the eastern boundary of the project site) were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, travel speed, noise source and receiver heights, and the percentages of automobiles, medium trucks, and heavy trucks that the traffic is made up of throughout the day, amongst other variables. The modeled average daily traffic (ADT) volumes were obtained by multiplying the PM peak-hour intersection traffic volumes from the project-specific traffic study by a factor of 10.<sup>3</sup> The model inputs and outputs,

<sup>3</sup> Fehr & Peers. 2019. The Ranch Draft Final Transportation Impact Assessment. November.

including the 60 dBA, 65 dBA, and 70 dBA  $L_{dn}$  traffic noise contour distances, are provided in Appendix I. A summary of the modeling results is shown in Table 3.11-6. The modeling results show that existing traffic noise levels on roadway segments adjacent to the project site range up to 66.5 dBA CNEL as measured at 50 feet from the centerline of the outermost travel lane.

**Table 3.11-6: Existing Traffic Noise Levels in the Vicinity of the Project Site**

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane
Dallas Ranch Road—north of Prewett Ranch Road	7,400	< 50	65	133	64
Dallas Ranch Road—south of Prewett Ranch Road	1,800	< 50	< 50	56	58
Deer Valley Road—Lone Tree Way to Prewett Ranch Road	12,900	< 50	91	191	67
Deer Valley Road—Prewett Ranch Road to Wellness Way	12,000	< 50	87	182	66
Deer Valley Road—Wellness Way to Sand Creek Road	9,900	< 50	76	160	66
Note: ADT = Average Daily Traffic Modeling results do not take into account mitigating features such as topography, vegetative screening, fencing, building design, or structure screening. Rather it assumes a worst case of having a direct line of site on flat terrain. Source: FCS 2019.					

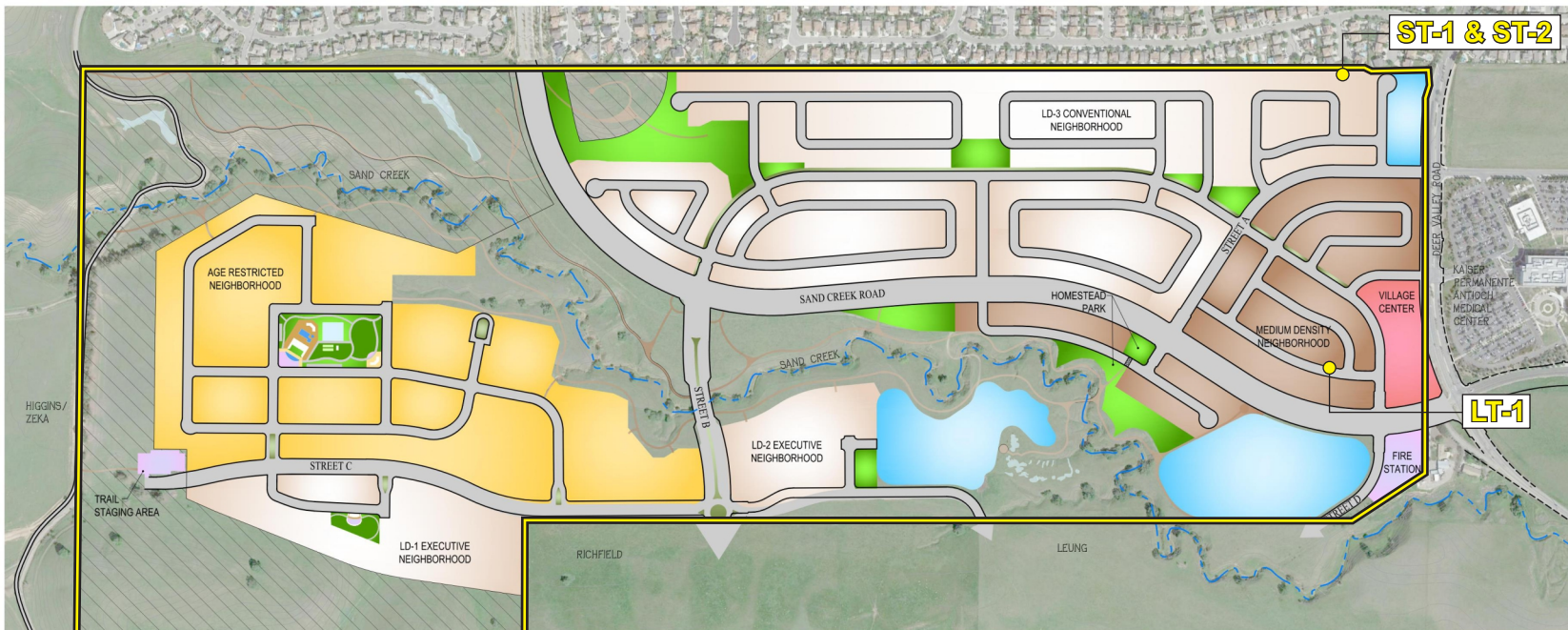
### **Existing Stationary Noise Levels**

Residential land uses to the north of the project site, and the medical center land use to the east of the project site, generate noise from mechanical ventilation systems, and landscaping and maintenance equipment activities. These activities are point sources of noise that affect the existing noise environment. The parking areas associated with the medical center east of the project site is another stationary noise source affecting the ambient noise environment in the project vicinity.

The existing ambient noise measurement results described above, with documented noise levels of 52 dBA CNEL, and daytime hourly average noise levels of 50 dBA  $L_{eq}$ , captured all stationary and mobile source noise levels at the noise monitoring location.

### **Noise-Sensitive Land Uses**

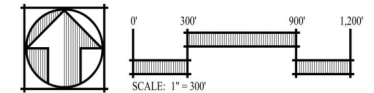
Noise-sensitive land uses generally consist of those uses where exposure to noise would result in adverse effects, as well as uses for which quiet is an essential element of their intended purpose. Residential dwellings are of primary concern, because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other typical noise-sensitive land uses include hospitals, convalescent facilities, hotels, religious institutions, libraries, and other uses where low noise levels are essential.



LT-1: Long-term noise measurement location  
ST-1 & ST-2: Short-term noise measurement locations

#### PRODUCT & AREA SUMMARY

TYPE	PRODUCT OR AREA TYPE	ACREAGE	% OVERALL	% RES ACREAGE	NET DENSITY (DU/AC)	AVERAGE LOT SIZE (SF)	TARGET # UNITS	% RES UNITS
	LOW DENSITY (LD)	140.5	25.5%	55.4%	3.9		543	42.7%
	• LD-1 EXECUTIVE	18.5	3.4%	7.3%	3.7	10,000	68	5.8%
	• LD-2 EXECUTIVE	18	3.3%	7.1%	3.6	7,000	65	5.5%
	• LD-3 CONVENTIONAL	104	18.9%	41.0%	3.9	7,000*	410	31.4%
	AGE RESTRICTED (AR)	75	13.6%	29.6%	5.6	5,000	422	38.2%
	MEDIUM DENSITY (MD)	38	6.9%	15.0%	5.6	4,500	212	18.0%
	RESIDENTIAL TOTAL	253.5	46.0%	100.0%	4.6		1,177	100.0%
	VILLAGE CENTER	5	0.9%					
	PUBLIC USE (PU)	3	0.5%					
	• FIRE STATION (PU-F)	2	0.4%					
	• TRAIL STAGING AREA (PU-S)	1	0.2%					
	PARKS (P)	20	3.6%					
	LANDSCAPE (L)	2.5	0.5%					
	OPEN SPACE (OS)	229.5	41.6%					
	MAJOR ROADWAYS	38	6.9%					
	TOTAL	551.5	100%					



Source: CBG Civil Engineers, June 4, 2019.

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Noise-sensitive land uses in the vicinity of the project site include a single-family residential subdivision and the Kaiser Permanente Antioch Medical Center, a full-service medical care facility operating 24-hours a day. The residential subdivision is adjacent to the northern boundary of the project site. The medical center is located approximately 490 feet east of the project site, across Deer Valley Road and the medical center parking lot. There are also two rural single-family residences located south of the project site, adjacent to Deer Valley Road.

The only noise-sensitive land use within the project site boundaries is a single-family residence which will be removed with implementation of the proposed project.

### **3.11.3 - Regulatory Framework**

#### **Federal**

##### **Noise Control Act**

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting State and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees.

Among the agencies now regulating noise are the Occupational Safety and Health Administration (OSHA), which limits noise exposure of workers to 90 dB  $L_{eq}$  or less for 8 continuous hours or 105 dB  $L_{eq}$  or less for 1 continuous hour; the United States Department of Transportation (USDOT), which assumed a significant role in noise control through its various operating agencies; and the Federal Aviation Administration (FAA), which regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the FTA. Transit noise is regulated by the federal Urban Mass Transit Administration, while freeways that are part of the interstate highway system are regulated by the FHWA. Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being sited adjacent to a highway, or alternatively, that developments are planned and constructed in such a manner that minimize potential noise impacts.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by transportation sources, local jurisdictions are limited to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

##### **Federal Transit Administration Standards and Guidelines**

The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment

Manual. The FTA Guidelines include thresholds for construction vibration impacts for various structural categories as shown in Table 3.11-7.

**Table 3.11-7: Federal Transit Administration Construction Vibration Impact Criteria**

Building Category	PPV (in/sec)	Approximate VdB
I. Reinforced Concrete, Steel, or Timber (no plaster)	0.5	102
II. Engineered Concrete and Masonry (no plaster)	0.3	98
III. Non-engineered Timber and Masonry Buildings	0.2	94
IV. Buildings Extremely Susceptible to Vibration Damage	0.12	90
Source: Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.		

## State

### ***California General Plan Guidelines***

Established in 1973, the California Department of Health Services Office of Noise Control was instrumental in developing regulatory tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix,” which allows the local jurisdiction to delineate compatibility of sensitive uses with various incremental levels of noise.<sup>4</sup>

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise/land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. The proposed project is also subject to review under the State of California Environmental Quality Act (CEQA). Appendix G of the CEQA Guidelines provides impact thresholds for potential noise and vibration impacts.

### ***California Building Standards Code***

The State of California has established noise insulation standards for new hotels, motels, apartment houses, and dwellings (other than single-family detached housing). These requirements are provided in the 2016 California Building Standards Code (CBC) (California Code of Regulations [CCR], Title 24).<sup>5</sup> As provided in the CBC, the noise insulation standards set forth an interior standard of 45 dBA CNEL as measured from within the structure’s interior. When such structures are located within a 65-dBA CNEL (or greater) exterior noise contour associated with a traffic noise along a roadway, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL threshold. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

<sup>4</sup> California Department of Health, Office of Noise Control, “Land Use Compatibility for Community Noise Environments Matrix,” 1976.

<sup>5</sup> California Building Standards Commission. 2017. California Building Standards Code (California Code of Regulations, Title 24), January 1.

## Local

### ***The City of Antioch General Plan***

#### *Noise Element*

The City of Antioch General Plan sets forth noise and land use compatibility standards to guide development, as well as noise goals and policies to protect citizens from the harmful and annoying effects of excessive noise. The following noise objectives and policies are applicable to the proposed project.

- **Policy 10.5.1c:** In designing buffer areas, the following criteria shall be considered and provided for (when applicable) within the buffer areas to avoid or mitigate significant impacts.
  - **Noise:** Will noise generated by the proposed development affect the public's quiet enjoyment of public open space? What are the sensitive noise receptors in open space areas and how can impacts on those sensitive receptors be avoided or mitigated? Can noise-generating uses be located away from noise sensitive areas?
- **Objective 11.6.1:** Achieve and maintain exterior noise levels appropriate to planned land uses throughout Antioch as described below:
  - **Residential**
    - *Single-family:* 60 dBA CNEL within rear yards
    - *Multi-family:* 60 dBA CNEL within exterior open space
  - **Schools**
    - *Classrooms:* 65 dBA CNEL
    - *Play and sports areas:* 70 dBA CNEL
  - **Hospitals, Libraries:** 60 dBA CNEL
  - **Commercial/Industrial:** 70 dBA CNEL at the front setback
- **Policy 11.6.2a:** Implementation of the noise objective contained in Section 11.6.1 and the policies contained in 11.6.2 of the Environmental Hazards Element shall be based on noise data contained in Section 4.9 of the General Plan EIR, unless a noise analysis conducted pursuant to the City's development and environmental review process provides more up-to-date and accurate noise predictions, as determined by the City.
- **Policy 11.6.2b:** Maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources to the extent possible, and guide noise-tolerant land uses into the noisier portions of the Planning Area.
- **Policy 11.6.2c:** Minimize motor vehicle noise in residential areas through proper route location and sensitive roadway design.
  - Provide planned industrial areas with truck access routes separated from residential areas to the maximum feasible extent.
  - Where needed, provide traffic calming devices to slow traffic speed within residential neighborhoods.
- **Policy 11.6.2d:** Where new development (including construction and improvement of roadways) is proposed in areas exceeding the noise levels identified in the General Plan Noise Objective, or where the development of proposed uses could result in a significant increase in noise, require a detailed noise attenuation study to be prepared by a qualified acoustical engineer to determine appropriate mitigation and ways to incorporate such mitigation into project design and implementation.

- **Policy 11.6.2e:** When new development incorporating a potentially significant noise generator is proposed, require noise analyses to be prepared by a qualified acoustical engineer. Require the implementation of appropriate noise mitigation when the proposed project will cause new exceedances of General Plan noise objectives, or an audible (3.0 dBA) increase in noise in areas where General Plan noise objectives are already exceeded as the result of existing development.
- **Policy 11.6.2f:** In reviewing noise impacts, utilize site design and architectural design features to the extent feasible to mitigate impacts on residential neighborhoods and other uses that are sensitive to noise. In addition to sound barriers, design techniques to mitigate noise impacts may include, but are not limited to:
  - Increased building setbacks to increase the distance between the noise source and sensitive receptor.
  - Orient buildings that are compatible with higher noise levels adjacent to noise generators or in clusters to shield more noise sensitive areas and uses.
  - Orient delivery, loading docks, and outdoor work areas away from noise sensitive uses.
  - Place noise tolerant use, such as parking areas, and noise tolerant structures, such as garages, between the noise source and sensitive receptor.
  - Cluster office, commercial, or multifamily residential structures to reduce noise levels within interior open space areas.
  - Provide double glazed and double paned windows on the side of the structure facing a major noise source, and place entries away from the noise source to the extent possible.
- **Policy 11.6.2g:** Where feasible, require the use of noise barriers (walls, berms, or a combination thereof) to reduce significant noise impacts.
  - Noise barriers must have sufficient mass to reduce noise transmitting and high enough to shield the receptor from the noise source.
  - To be effective, the barrier needs to be constructed without cracks or openings.
  - The barrier must interrupt the line-of-sight between the noise source and the receptor.
  - The effects of noise “flanking” the noise barrier should be minimized by bending the end of the barrier back from the noise source.
  - Require appropriate landscaping treatment to be provided in conjunction with noise barriers to mitigate their potential aesthetic impacts.
- **Policy 11.6.2h:** Continue enforcement of California Noise Insulation Standards (Title 25, Section 1092, California Administrative Code).
- **Policy 11.6.2i:** Ensure that construction activities are regulated as to hours of operation in order to avoid or mitigate noise impacts on adjacent noise-sensitive land uses.
- **Policy 11.6.2j:** Require proposed development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan. This plan would depict the location of construction equipment storage and maintenance areas, and document methods to be employed to minimize noise impacts on adjacent noise sensitive land uses.
- **Policy 11.6.2k:** Require that all construction equipment utilize noise reduction features (e.g., mufflers and engine shrouds) that are no less effective than those originally installed by the manufacturer.
- **Policy 11.6.2m:** Prior to the issuance of any grading plans, the City shall condition approval of subdivisions and non-residential development adjacent to any developed/occupied noise

sensitive land uses by requiring applicants to submit a construction-related noise mitigation plan to the City for review and approval. The plan should depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of the project through the use of such methods as:

- The construction contractor shall use temporary noise-attenuation fences, where feasible, to reduce construction noise impacts on adjacent noise sensitive land uses.
- During all project site excavation and grading on-site, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. No construction shall be allowed on Sundays and public holidays.
- **Policy 11.6.2n:** The construction-related noise mitigation plan required shall also specify that haul truck deliveries be subject to the same hours specified for construction equipment. Additionally, the plan shall denote any construction traffic haul routes where heavy trucks would exceed 100 daily trips (counting those both to and from the construction site). To the extent feasible, the plan shall denote haul routes that do not pass sensitive land uses or residential dwellings. Lastly, the construction-related noise mitigation plan shall incorporate any other restrictions imposed by the City.

## ***City of Antioch Code of Ordinances***

### *Chapter 5. Zoning*

#### **Section 9-5.1901. Noise Attenuation Requirements**

- A. Stationary noise sources.** Uses adjacent to outdoor living areas (e.g., backyards for single-family homes and patios for multi-family units) and parks shall not cause an increase in background ambient noise which will exceed 60 CNEL.
- B. Mobile noise sources.**
  - 1. Arterial and street traffic shall not cause an increase in background ambient noise which will exceed 60 CNEL.
- D. Noise attenuation.** The City may require noise attenuation measures be incorporated into a project to obtain compliance with this section. Measures outlined in the noise policies of the General Plan should be utilized to mitigate noise to the maximum feasible extent.

### *Chapter 17. Disturbing the Peace*

#### **Section 5-17.04. Heavy Construction Equipment Noise**

- A. For the purpose of this chapter, the following definitions shall apply unless the context clearly indicates or requires a different meaning.

**HEAVY CONSTRUCTION EQUIPMENT.** Equipment used in grading and earth moving, including diesel engine equipped machines used for that purpose, except pickup trucks of one ton or less.

**OPERATE.** Includes the starting, warming-up, and idling of heavy construction equipment engines or motors.

- B. It shall be unlawful for any person to be involved in construction activity during the hours specified below:
- (1) On weekdays prior to 7:00 a.m. and after 6:00 p.m.
  - (2) On weekdays within 300 feet of occupied dwellings, prior to 8:00 a.m. and after 5:00 p.m.
  - (3) On weekends and holidays, prior to 9:00 a.m. and after 5:00 p.m., irrespective of the distance from the occupied dwellings.

### 3.11.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to 2019 CEQA Guidelines Appendix G, to determine whether impacts related to noise and vibration are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
- b) Generate excessive groundborne vibration or groundborne noise levels?
- c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

#### Approach to Analysis

##### Noise Measurement Methodology

The sound level meter was programmed to record the maximum, median, and average noise levels at each site during the survey. The maximum value, denoted  $L_{max}$ , represents the highest noise level measured. The average value, denoted  $L_{eq}$ , represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted  $L_{50}$ , represents the sound level exceeded 50 percent of the time during the monitoring period.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the ambient noise level measurement survey. The meter was calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurement. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

### ***Traffic Noise Modeling Methodology***

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of traffic noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the FHWA community noise assessment criteria, this change is “barely perceptible;” for reference a doubling of perceived noise levels would require an increase of approximately 10 dBA. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the project site. Model input data includes without- and with-project average daily traffic volumes on adjacent roadway segments, day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. The roadway speeds are based on the posted speed limits along each modeled roadway segment. Traffic modeling was performed using the data obtained from the project-specific traffic study conducted by Fehr & Peers.<sup>6</sup> The resultant noise levels were weighed and summed over a 24-hour period to determine the CNEL values.

The roadway traffic noise model assumptions and outputs are provided in Appendix I.

### ***Vibration Methodology***

The City of Antioch has not adopted criteria for construction groundborne vibration impacts. Therefore, the FTA’s vibration impact criteria are utilized to evaluate potential vibration impacts resulting from construction activities. The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment Manual,<sup>7</sup> and are summarized in Table 3.11-7 in the regulatory discussion above.

## **Impact Evaluation**

### ***Substantial Noise Increase in Excess of Standards***

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<b>Impact NOI-1:</b>	<b>The proposed project could generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.</b>
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### ***Construction***

For temporary construction noise, a significant impact would occur if construction activities would result in a substantial temporary increase in ambient noise levels outside of the permissible hours for construction (7:00 a.m. to 6:00 p.m., or 8:00 a.m. to 5:00 p.m. if within 300 feet of occupied

<sup>6</sup> Fehr & Peers. 2019. The Ranch Draft Final Transportation Impact Assessment. November.

<sup>7</sup> Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

dwelling, Monday through Friday, and 9:00 a.m. to 5:00 p.m. on weekends and holidays, irrespective of the distance from occupied dwellings) that would result in annoyance or sleep disturbance of nearby sensitive receptors.

Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction traffic, construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. A discussion of the potential impacts associated with each of these types of activities is provided below.

#### *Construction Traffic Noise*

One type of noise impact that could occur during project construction would result from the increase in traffic flow on local streets, associated with the transport of workers, equipment, and materials to and from the project site. The transport of workers and construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the site. Because project construction workers and construction equipment would use existing routes, noise from passing trucks would be similar to existing vehicle-generated noise on these local roadways. In addition, these trips would not result in a doubling of daily traffic volumes on any of the local roadways in the project vicinity and would thus not result in a perceptible change in existing traffic noise levels. For this reason, intermittent noise from construction trips would be minor when averaged over a longer time-period and would not be expected to result in a perceptible increase in hourly- or daily-average traffic noise levels in the project vicinity. Therefore, construction-related noise impacts associated with the transportation of workers and equipment to the project site would be less than significant.

#### *Construction Equipment Noise*

Construction is performed in discrete steps, each of which entails its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on-site. Thus, the noise levels vary as construction progresses. Despite the variety in the types and sizes of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction noise ranges to be categorized by work phase. Table 3.11-3 lists the maximum noise levels recommended for noise impact assessments for typical construction equipment based on a distance of 50 feet between the equipment and a noise receptor.

The site preparation phase, which includes excavation and grading activities, tend to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery and compacting equipment, such as bulldozers, draglines, backhoes, front loaders, roller compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings. Operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 or 4 minutes at lower power settings.

Construction of the proposed project is expected to require the use of scrapers, bulldozers, water trucks, haul trucks, and pickup trucks. The foundation would involve spread footings, so impact equipment such as pile drivers is not expected to be used during construction of the project. Based

on the information provide in Table 3.11-3, the maximum noise level generated by each scraper is assumed to be 85 dBA  $L_{max}$  at 50 feet from this equipment. Each bulldozer would generate 85 dBA  $L_{max}$  at 50 feet. The maximum noise level generated by graders is approximately 85 dBA  $L_{max}$  at 50 feet. Each doubling of sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, a reasonable worst-case combined noise level during this phase of construction would be 90 dBA  $L_{max}$  at a distance of 50 feet from the acoustic center of a construction area. This would result in a reasonable worst-case hourly average of 86 dBA  $L_{eq}$ . The acoustic center reference is used, because construction equipment must operate at some distance from one another on a project site, and the combined noise level as measured at a point equidistant from the sources would (acoustic center) be the worst-case maximum noise level. The effect on sensitive receptors is evaluated below.

The nearest off-site noise-sensitive receptors to the project site are the single-family residential land uses located north of the project site, which could be located as close as 80 feet from the acoustic center of construction activity where multiple pieces of heavy machinery would operate. Again, the acoustic center refers to a point equidistant from multiple pieces of equipment operating simultaneously which would produce the worst-case maximum noise level. At this distance, construction noise levels at the exterior facade of this nearest residential home would be expected to range up to approximately 86 dBA  $L_{max}$ , with a worst-case hourly average of approximately 82 dBA  $L_{eq}$ , intermittently, when multiple pieces of heavy construction equipment operate simultaneously at the nearest construction footprint. These noise levels would be intermittent and would be reduce as equipment moves over the project site further from adjacent sensitive receptors.

Although there could be a relatively high single event noise exposure potential causing an intermittent noise nuisance, the effect of project-related construction noise levels on longer-term (hourly or daily) ambient noise levels would be small but could result in annoyance or sleep disturbances at nearby sensitive receptors if construction activities are not limited to the permissible construction hours established by the City of Antioch Code of Ordinances. Compliance with the permissible construction hours would reduce the potential impacts from construction noise that could result in annoyance or sleep disturbances at nearby sensitive receptors. The City's Code of Ordinances limits noise producing construction activities during the hours of 7:00 a.m. to 6:00 p.m., or 8:00 a.m. to 5:00 p.m. if within 300 feet of occupied dwellings, Monday through Friday, and 9:00 a.m. to 5:00 p.m. on weekends and holidays. Restricting construction activities to these time-periods and implementing the best management noise reduction techniques and practices outlined in Mitigation Measure (MM) NOI-1a, would ensure that construction noise levels would not result in a substantial temporary increase in ambient noise levels that would result in annoyance or sleep disturbance of nearby sensitive receptors. Therefore, temporary construction noise impacts would be less than significant with implementation of MM NOI-1a.

### **Operation**

The proposed project will result in an increase in traffic on local roadway segments in the project vicinity. In addition, implementation of the proposed project would introduce new stationary noise sources to the ambient noise environment in the project vicinity, including new mechanical ventilation equipment, parking lot activities, and delivery trucks. For operational noise, a significant

impact would occur if the proposed project would cause the CNEL to increase by 5 dBA or more even if the CNEL would remain below normally acceptable levels for a receiving land use (60 dBA CNEL, as measured in the rear yards of residential homes); or by 3 dBA or more, thereby causing the CNEL in the project vicinity to exceed normally acceptable levels and result in noise levels that would be considered conditionally acceptable for a receiving land use. A doubling of traffic volume generally results in a 3 dBA increase in noise. The potential for a substantial increase in ambient noise levels resulting from these noise sources is analyzed below.

#### *Traffic Noise*

The highest traffic noise level increase with implementation of the proposed project would occur along Dallas Ranch Road south of Prewett Ranch Road under existing plus project conditions. Along this roadway segment, the proposed project would result in traffic noise levels ranging up to approximately 62.7 dBA CNEL as measured at 50 feet from the centerline of the nearest travel lane, representing an increase of 4.8 dBA over existing conditions for this roadway segment. The calculated traffic noise levels as measured in the rear yards of adjoining residential land uses would be below 56 dBA CNEL due to shielding provided by existing soundwalls. Therefore, the substantial increase standard would be a 5 dBA increase. As this greatest increase in traffic noise levels would be a 4.8 dBA increase, the impact related to operational traffic noise proximate to Dallas Ranch Road would be less than significant.

No other modeled roadway segment would experience an increase of 3 dBA or greater under any of the plus project traffic scenarios. Therefore, project-related traffic noise level would result in less than significant increases in traffic noise levels along modeled roadway segments in the project site vicinity. Therefore, the impact related to operational noise proximate to other roadway segments would be a less than significant impact.

A significant impact would also occur if the project would introduce new land uses to traffic noise levels that are in excess of the City's adopted land use compatibility standards. For new single-family residential land use developments, ambient noise levels are restricted to 60 dBA CNEL or less, as measured in the rear yards of residential homes.

As described in the existing noise levels discussion in Section 3.11-2 above, the existing noise environment in the vicinity of the project site was documented through a long-term noise monitoring effort performed at the project site. The long-term noise measurement, shown on Exhibit 3.11-1, was conducted on Snodgrass Lane, approximately 530 feet west of Deer Valley Road. The resulting measurement determined that ambient noise levels at this location averaged 52 dBA CNEL. Daytime ambient noise levels at this location, between the hours of 7:00 a.m. and 10:00 p.m., were 50 dBA  $L_{eq}$ , 41 dBA  $L_{50}$ , and 63 dBA  $L_{max}$ . Nighttime ambient noise levels at this location, between the hours of 10:00 p.m. and 7:00 a.m., were 43 dBA  $L_{eq}$ , 40 dBA  $L_{50}$ , and 58 dBA  $L_{max}$ . These noise levels are below the City's land use compatibility standard of 60 dBA CNEL for new residential land use development.

To further analyze the ambient noise environment of the project site for compatibility with the proposed land use development, traffic noise modeling was performed to document traffic noise levels along roadway segments in the project vicinity. The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate existing and future project-related traffic noise conditions

along modeled roadway segments in the vicinity of the project site. Traffic modeling was performed using the data obtained from the project-specific traffic impact study included in Appendix K<sup>8</sup>. This traffic impact study provides data for existing, near-term, and cumulative conditions. The resultant traffic noise levels were weighed and summed over a 24-hour period to determine the CNEL values. The traffic noise modeling input and output files—including the 60 dBA, 65 dBA, and 70 dBA CNEL noise contour distances—are included in Appendix I. The following tables show a summary of the traffic noise levels for existing, near term, and cumulative traffic conditions, with and without the proposed project, as measured at 50 feet from the centerline of the outermost travel lane.

Table 3.11-8 shows a summary of the traffic noise levels for existing scenarios with and without project conditions as measured at 50 feet from the centerline of the outermost travel lane.

**Table 3.11-8: Existing Traffic Noise Modeling Results Summary**

Roadway Segment	CNEL (dBA) 50 feet from Centerline of Outermost Lane		
	Existing without Project	Existing with Project	Increase over Existing (dBA) without Project
Dallas Ranch Road—north of Prewett Ranch Road	64.1	65.5	1.4
Dallas Ranch Road—south of Prewett Ranch Road	57.9	62.7	4.8
Deer Valley Road—Lone Tree Way to Prewett Ranch Road	66.5	67.6	1.1
Deer Valley Road—Prewett Ranch Road to Wellness Way	66.2	67.6	1.4
Deer Valley Road—Wellness Way to Sand Creek Road	65.8	66.6	0.8
Note: Modeling results do not take into account mitigating features such as topography, vegetative screening, fencing, building design, or structure screening. Rather it assumes a worst case of having a direct line of site on flat terrain. Source: FCS 2019.			

Table 3.11-9 shows a summary of the traffic noise levels for near-term traffic conditions with and without project conditions as measured at 50 feet from the centerline of the outermost travel lane.

**Table 3.11-9: Near Term Traffic Noise Modeling Results Summary**

Roadway Segment	CNEL (dBA) 50 feet from Centerline of Outermost Lane		
	Near-Term without Project	Near-Term with Project	Increase over Near-Term without Project (dBA)
Dallas Ranch Road—north of Prewett Ranch Road	64.2	65.7	1.5
Dallas Ranch Road—south of Prewett Ranch Road	58.2	62.9	4.7
Deer Valley Road—Lone Tree Way to Prewett Ranch Road	67.5	68.2	0.7

<sup>8</sup> Fehr & Peers. 2019. The Ranch Draft Final Transportation Impact Assessment. November.

**Table 3.11-9 (cont.): Near Term Traffic Noise Modeling Results Summary**

Roadway Segment	CNEL (dBA) 50 feet from Centerline of Outermost Lane		
	Near-Term without Project	Near-Term with Project	Increase over Near-Term without Project (dBA)
Deer Valley Road—Prewett Ranch Road to Wellness Way	66.7	68.1	1.4
Deer Valley Road—Wellness Way to Sand Creek Road	66.5	67.4	0.9
Source: FCS 2019.			

Table 3.11-10 shows a summary of the traffic noise levels for cumulative conditions with and without project conditions as measured at 50 feet from the centerline of the outermost travel lane.

**Table 3.11-10: Cumulative Traffic Noise Modeling Summary**

Roadway Segment	CNEL (dBA) 50 feet from Centerline of Outermost Lane		
	Cumulative without Project	Cumulative with Project	Increase over Cumulative without Project (dBA)
Dallas Ranch Road—north of Prewett Ranch Road	64.2	65.6	1.4
Dallas Ranch Road—south of Prewett Ranch Road	62.6	64.8	2.2
Deer Valley Road—Lone Tree Way to Prewett Ranch Road	68.4	68.9	0.5
Deer Valley Road—Prewett Ranch Road to Wellness Way	67.1	67.8	0.7
Deer Valley Road—Wellness Way to Sand Creek Road	67.4	67.9	0.5
Source: FCS 2019.			

The highest traffic noise levels that would be experienced at the proposed project would occur on Deer Valley Road between Prewett Ranch Road and Wellness Way under cumulative with project conditions. These traffic noise levels would range up to approximately 67.8 dBA CNEL as measured at 50 feet from the centerline of the nearest travel lane. These noise levels would be in excess of the City's land use compatibility standard as measured within rear yards of new residential land uses. This represents a potentially significant impact.

However, implementation of MM NOI-1b, requiring that a soundwall would be constructed as part of the proposed project along rear yards of residential lots fronting Deer Valley Road would reduce traffic noise levels to below 60 dBA CNEL as measured at the nearest proposed rear yards. The soundwall shall be a minimum of 8-foot high, as measured from the finished grade of the proposed residential pads. The soundwall should be located so as to block the line of sight from rear yards for all proposed residences located within 160 feet of the centerline of Deer Valley Road. This would

reduce traffic noise levels at all receiving residential rear yards to below 60 dBA CNEL. As such, with implementation of MM NOI-1b, requiring implementation of the described soundwall, traffic noise levels would be reduced to not exceed the City's land use compatibility standards as measured at the nearest backyards of the proposed residences. Therefore, with implementation of MM NOI-1b, traffic noise impacts would be reduced to less than significant.

#### *Stationary Noise*

Implementation of the proposed project would introduce new stationary noise sources to the ambient noise environment in the project vicinity, including new mechanical ventilation equipment at residential homes, and new mechanical ventilation equipment, parking lot activities, and delivery trucks at the proposed Village Center. Other stationary noise sources would include an emergency backup generator and parking lot activities at the proposed fire station.

#### **Residential Stationary Noise**

Noise levels from typical mechanical ventilation equipment range up to approximately 60 dBA  $L_{eq}$  as measured at a distance of 25 feet. The closest residential receptor is the residence on the west side of the Vallejo Court cul-de-sac, off Mammoth Way, the façade of which is about 5 feet from the project property line. Specific details regarding location of mechanical ventilation systems are not available at the time of this analysis. However, if residential mechanical ventilation systems are located within 15 feet of the project boundary, then operational noise levels could exceed the City's normally acceptable threshold of 60 dBA CNEL as measured in rear yards of existing residential receptors. This would represent a potentially significant impact.

However, MM NOI-1c would require that mechanical ventilation equipment for the proposed homes be located a minimum of 15 feet from the boundary of the project site, or that mechanical ventilation equipment be shielded by a noise-reducing barrier. At this distance, or with a barrier, and with shielding from the existing wood fence along the property line, noise from mechanical ventilation equipment would remain below the City's normally acceptable level of 60 dBA CNEL, as measured in the rear yards of residential homes. Implementation of MM NOI-1c would ensure that mechanical ventilation equipment at the proposed residential homes would not result in a substantial temporary increase in ambient noise levels in excess of 60 dBA CNEL. Therefore, the impact related to operational residential stationary noise would be less than significant with mitigation.

#### **Village Center Stationary Noise**

The proposed Village Center is a 5.7-acre neighborhood commercial use. Noise sources could include parking lot activities, delivery trucks, and rooftop mechanical ventilation equipment, which would result in potentially significant impacts to proposed on-site residential receptors as well as to the two existing off-site single-family residential receptors located south of Sand Creek Road, west of Deer Valley Road.

Specific details regarding building or parking lot footprints or location of mechanical ventilation systems are not available at the time of this analysis. However, a general conservative operational noise impact analysis is provided based on typical commercial stationary source reference noise levels.

*Parking Lot Activities*

Typical parking lot activities, including expected delivery activity for typical deliveries for small commercial land uses, can generate noise levels of approximately 60 dBA to 70 dBA  $L_{max}$  at 50 feet.

The closest noise-sensitive receptor to potential parking and delivery areas at the Village Center are the proposed residential land uses that would be developed west of the commercial area. Parking and delivery areas would be separated from the proposed residential land uses by an internal street at a minimum distance of 75 feet. At this distance parking lot activity noise levels would attenuate to 66 dBA  $L_{max}$ , with reasonable worst-case hourly average noise levels from these activities averaging approximately 55 dBA  $L_{eq}$ . Therefore, when averaged over a 24-hour period these noise levels would not exceed the City's normally acceptable threshold of 60 dBA CNEL as measured in rear yards of residential receptors.

Therefore, the proposed the Village Center parking lot activities would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the local general plan or noise ordinance; and the impact of noise produced by these parking lot activities to the nearest sensitive receptors would be less than significant.

*Mechanical Equipment Operations*

The proposed commercial development would include new mechanical ventilation equipment. Noise levels from typical commercial mechanical ventilation equipment range up to approximately 60 dBA  $L_{eq}$  at a distance of 25 feet. At a distance of 100 feet, noise generated by mechanical ventilation equipment would attenuate to approximately 48 dBA  $L_{eq}$ . When averaged over a 24-hour period these noise levels would not exceed the City's normally acceptable threshold of 60 dBA CNEL as measured in rear yard of this nearest residential receptors. Therefore, the commercial land uses shall be designed so that on-site mechanical equipment (i.e., HVAC units, compressors, generators) are located no closer than 100 feet from the nearest residential dwelling unit or provided shielding from nearby noise sensitive land uses to meet the City's normally acceptable threshold of 60 dBA CNEL. Shielding shall have a minimum height sufficient to completely block line-of-sight between the on-site noise source and the nearest residential dwelling to meet the City's noise standard. Based on the size and placement of the HVAC units (i.e., ground level or roof top), barrier heights may range between three to six feet.

Therefore, with implementation of MM NOI-1d mechanical ventilation equipment operations associated with the Village Center commercial development would not generate a substantial temporary or permanent increase in excess of the City's noise standards as measured at the nearest sensitive receptors. Therefore, the impact related to operational Village Center stationary noise would be less than significant with mitigation.

**Fire Station Stationary Noise**

The proposed fire station could result in stationary noise sources, including parking lot activities and rooftop mechanical ventilation equipment, which would result in potentially significant impacts to proposed on-site residential receptors and to the two existing off-site single-family residential receptors located south of Sand Creek Road, west of Deer Valley Road. Again, a significant impact

would occur if the proposed project would cause the CNEL to increase by 5 dBA or more even if the CNEL would remain below normally acceptable levels for a receiving land use (60 dBA CNEL, as measured in the rear yards of residential homes); or by 3 dBA or more, thereby causing the CNEL in the project vicinity to exceed normally acceptable levels and result in noise levels that would be considered conditionally acceptable for a receiving land use.

The intermittent noise that would result from emergency vehicle sirens are regulated and required pursuant to public health and safety regulations and are therefore exempt from the City's noise performance standards. Furthermore, it should be noted that the Contra Costa County Fire Prevention District will implement Opticom™ Intelligreen Priority software for traffic control at the nearest intersections to minimize emergency vehicle delay (and therefore would minimize the duration of siren noise in the project vicinity). Therefore, with these minimization features and because of the temporary and intermittent nature of emergency vehicle siren noise would not result in a substantial increase in ambient noise levels in the project vicinity and the impact would therefore be less than significant.

#### *Parking Lot Activities*

Typical parking lot activities include vehicles cruising at slow speeds, doors shutting, or cars starting, and can generate noise levels of approximately 60 dBA to 70 dBA  $L_{max}$  at 50 feet.

The closest noise-sensitive receptor to the proposed fire station parking areas at the project site are the proposed residential land uses located on the north side of Sand Creek Road. The closest of these residences is located approximately 125 feet from the acoustic center of the nearest proposed parking area on the project site. At this distance, parking lot activity would result in intermittent noise levels ranging up to 62 dBA  $L_{max}$  at the property line of the nearest residence. Assuming a reasonable worst-case scenario of one parking movement per parking stall within a single hour would result in an hourly average noise level of 45 dBA  $L_{eq}$  as measured at this nearest receptor. These noise levels would not exceed existing background ambient noise levels. Furthermore, when averaged over a 24-hour period these noise levels would not exceed the City's normally acceptable threshold of 60 dBA CNEL as measured in rear yards of residential receptors.

Therefore, the proposed fire station parking lot activities would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the local general plan or noise ordinance; and the impact of noise produced by the fire station parking lot activities to sensitive receptors would be less than significant.

#### *Mechanical Equipment Operations*

The proposed fire station would include new mechanical ventilation equipment. Noise levels from typical mechanical ventilation equipment range up to approximately 60 dBA  $L_{eq}$  at a distance of 25 feet. Proposed mechanical ventilation systems could be located as close as 150 feet from the nearest noise-sensitive receptor, which is the single-family residential home located east of the proposed fire station (south of Sand Creek Road, west of Deer Valley Road). At this distance, noise generated by mechanical ventilation equipment would attenuate to below 45 dBA  $L_{eq}$  at this nearest single-family residential receptor. These noise levels would not exceed existing background ambient noise levels. Furthermore,

when averaged over a 24-hour period these noise levels would not exceed the City's normally acceptable threshold of 60 dBA CNEL as measured in rear yard of this nearest residential receptors.

Therefore, the proposed fire station mechanical ventilation equipment operations would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project site in excess of standards established in the local general plan or noise ordinance; and the impact of noise produced by the proposed fire station mechanical ventilation equipment operations to sensitive receptors would be less than significant.

#### *Standby Generator Operations*

The proposed fire station would also include installation of a new emergency standby generator. The proposed generator equipment would be located on the south side of the fire station building. Noise levels from the proposed standby generator equipment (125 kilowatt (KW) diesel fueled Kohler or similar brand) operating at full power typically range up to approximately 107 dB sound pressure level (dB SPL) at 63 hertz at a distance of 3.3 feet in unshielded conditions. It is expected that the generator would be tested for a few minutes during daytime hours on, at most, a monthly basis. Full operation of the standby generator would only occur during loss of power in the project vicinity, and operation would cease once power has been restored to the area.

The generator would be located on the south side of the proposed fire station building. The generator could be located as close as 170 feet from the nearest off-site noise-sensitive receptor, which is the existing residential home located east of the proposed fire station. At this distance, noise generated by the proposed standby generator would be expected to attenuate to less than 73 dB SPL at this nearest sensitive receptor. Ongoing monthly operations of generator testing at full power for up to 30 minutes within an hour would result in a worst-case average hourly noise level of 67 dBA  $L_{eq}$ , and a 24-hour average noise level of 60 dBA CNEL, as measured at the nearest sensitive receptor.

Existing background ambient noise levels in the project vicinity are documented to range up to 52 dBA CNEL as measured at long-term noise measurement location LT-1 shown in Exhibit 3.11-1. In addition, existing traffic noise levels on roadway segments adjacent to these nearest receptors are projected to range up to 66 dBA CNEL along Deer Valley Road between Wellness Way and Sand Creek Road. Therefore, operational noise levels generated by scheduled testing of the standby generator equipment would not exceed existing background noise levels in the project vicinity, and operational noise levels generated by the proposed standby generator equipment would have a less than significant impact to off-site noise-sensitive receptors.

Therefore, the proposed fire station emergency standby generator would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance; and the impact of noise produced by the proposed fire station emergency standby generator to sensitive receptors would be less than significant.

#### *Overall*

Implementation of the proposed project would introduce construction and new operational noise sources to the ambient noise environment in the project site vicinity. However, implementation of

MM NOI-1a through MM NOI-1d would reduce construction and operational noise impacts. Therefore, overall, the impact related to substantial noise increase in excess of standards would be less than significant with mitigation.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

#### **MM NOI-1a Construction Noise Reduction Measure**

To reduce potential construction noise impacts, the City shall ensure that the following multi-part mitigation measure is implemented at the project site:

- The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers, which are in good condition and appropriate for the equipment.
- The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of 5 minutes) is prohibited.
- The construction contractor shall utilize “quiet” models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading and construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.
- The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
- The construction contractor shall designate a “noise disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g. starting too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. The construction contractor shall conspicuously post a telephone number for the disturbance coordinator at entrances to the construction site.
- The construction contractor shall comply with the City’s permissible hours for construction (7:00 a.m. to 6:00 p.m., or 8:00 a.m. to 5:00 p.m. if within 300 feet of occupied dwellings, Monday through Friday, and 9:00 a.m. to 5:00 p.m. on weekends and holidays).

#### **MM NOI-1b Traffic Noise Reduction Measure**

The proposed project shall construct a soundwall along rear yards of residential lots fronting Deer Valley Road. The soundwall shall be a minimum of 8-foot high, as measured from the finished grade of the proposed residential pads. The soundwall

should be located so as to block the line of sight from rear yards for all proposed residences located within 160 feet of the centerline of Deer Valley Road.

**MM NOI-1c Mechanical Equipment Noise Reduction Measure**

To reduce potential operational stationary noise impacts from mechanical ventilation equipment at the proposed residential homes, mechanical ventilation equipment must be located a minimum of 15 feet from the boundary of the project site, or must be shielded by a noise-reducing barrier. If a noise barrier is required, the barrier shall be a minimum of 5 feet in height, extending 2 feet beyond the sides of the equipment and located between the equipment and the receiving property line.

**MM NOI-1d Commercial Operation Noise Reduction Measure**

The commercial land uses shall be designed so that on-site mechanical equipment (i.e., HVAC units, compressors, generators) and area-source operations (e.g., parking lots) are located no closer than 100 feet from the nearest residential dwelling unit or provide shielding from nearby noise sensitive land uses to meet the City's normally acceptable threshold of 60 dBA CNEL. Shielding shall have a minimum height sufficient to completely block line-of-sight between the on-site noise source and the nearest residential dwelling to meet the City's noise standards. Based on the size and placement of the HVAC units (i.e., ground level or roof top), barrier heights may range between three to six feet.

***Level of Significance After Mitigation***

Less Than Significant

***Groundborne Vibration/Noise Levels***

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**Impact NOI-2:        The project would not result in generation of excessive groundborne vibration or groundborne noise levels.**

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***Construction***

A significant impact would occur if the proposed project would generate groundborne vibration or groundborne noise levels in excess of applicable standards. The City of Antioch has/has not adopted criteria for construction or operational groundborne vibration impacts. Therefore, for purposes of this analysis, the FTA's construction vibration impact criteria are utilized. The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in the agency's Transit Noise and Vibration Impact Assessment Manual.<sup>9</sup> Therefore, for purposes of this analysis, a significant impact would occur if the proposed project would generate groundborne vibration or groundborne noise levels in excess of the FTA impact assessment criteria for construction (0.2 in/sec PPV for non-engineer timber and masonry buildings).

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<sup>9</sup> Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

Groundborne noise is generated when vibrating building components radiate sound, or noise generated by groundborne vibration. In general, if groundborne vibration levels do not exceed levels considered to be perceptible, then groundborne noise levels would not be perceptible in most interior environments. Therefore, this analysis focuses on determining exceedances of groundborne vibration levels.

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of a construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels, to slight damage at the highest levels. As shown in the Setting section above, Table 3.11-4 provides approximate vibration levels for various construction activities.

Impact equipment, such as pile drivers, are not expected to be used during construction of the proposed project. Therefore, of the variety of equipment used during construction of this component of the proposed project, a large bulldozer that could be used in the site preparation phase of construction, and the small vibratory rollers that would be used in the internal roadway improvements phase of construction would produce the greatest groundborne vibration levels. Large bulldozers produce groundborne vibration levels ranging up to 0.089 in/sec PPV at 25 feet from the operating equipment. Small vibratory rollers produce groundborne vibration levels ranging up to 0.101 in/sec PPV at 25 feet from the operating equipment.

The nearest off-site receptor to where the heaviest construction equipment (a large bulldozer) would operate are the single-family residences located 50 feet north of the nearest construction footprint that might require heavy grading using a large bulldozer. As measured at the nearest receptor, operation of a large bulldozer could result in groundborne vibration levels up to 0.031 in/sec PPV. This is well below the FTA's damage threshold criteria of 0.2 PPV for non-engineer timber and masonry buildings (this is the type of construction of the residential buildings north of the project site).

The nearest off-site receptor to where small vibratory roller equipment would operate are the single-family residences located 75 feet from the nearest construction footprint of the proposed roadway improvements. These closest roadway improvement operations would occur at the proposed connection of the future extension of Sand Creek Road to Dallas Ranch Road. As measured at the nearest receptor to this location, operation of a small vibratory roller could result in groundborne vibration levels up to 0.019 in/sec PPV. This is well below the FTA's damage threshold criteria of 0.2 PPV for non-engineer timber and masonry buildings.

Overall, project construction activities would not generate groundborne vibration or groundborne noise levels in excess of the FTA impact assessment criteria for construction-related groundborne vibration. Therefore, construction-related groundborne vibration impacts to existing off-site sensitive land use receptors would be less than significant.

### **Operation**

The City of Antioch has not adopted criteria for operational groundborne vibration impacts. Therefore, for purposes of this analysis, a significant impact would occur if project on-going activities would

produce groundborne vibrations that are perceptible without instruments by a reasonable person at the property lines of a project site. Implementation of the proposed project would not include any permanent sources of vibration that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing off-site sensitive land use receptors. Therefore, operational groundborne vibration impacts would be less than significant.

***Level of Significance***

Less Than Significant

***Excessive Noise Levels from Airport Activity***

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**Impact NOI-3:**      **The proposed project would not expose people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.**

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***Construction/Operation***

A significant impact would occur if the proposed project would expose people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport.

The project site is not located within the vicinity of a public airport or a private airstrip and is not within an airport land use plan. The closest public airport is the Byron Airport, located approximately 12 miles southeast of the project site. As such, operation of the proposed project would not expose people residing or working at the project site to excessive noise levels associated with public airport or public use airport noise. Therefore, no impact related to exposure of persons residing or working at the project site to excessive noise levels associated with airport activity would occur.

***Level of Significance***

No Impact

**3.11.5 - Cumulative Impacts**

The geographic scope of the cumulative noise analysis is the project site vicinity, including surrounding sensitive land use receptors. Noise impacts tend to be localized; therefore, the area near the project site (approximately 0.25-mile radius) would be the area that could be most affected by cumulative projects (including the proposed project) construction and operational activities. Cumulative groundborne vibration impacts are even more localized with potential construction and operational cumulative vibration impacts limited to areas within 100 feet of project construction and operations. There are no known approved cumulative development projects that would lie within these boundaries.

**Construction Noise**

The proposed project's loudest phase of construction activity (the site preparation phase) would not overlap with any other current or planned cumulative development projects located within 0.25-

mile of the project site. As such, there would be no possibility of combination of potential construction noise associated with the cumulative projects. Therefore, there would be no cumulative impact related to construction noise.

### **Operational Traffic Noise**

The significance threshold for a cumulative traffic noise impact would be traffic noise levels that would cause the CNEL to increase by 3 dBA or more where the CNEL currently exceeds conditionally acceptable levels.

None of the modeled roadway segments in the project vicinity would have traffic noise levels that would exceed conditionally acceptable noise levels for any adjacent land use. As shown in Table 3.11-10, none of the modeled roadway segments in the project site vicinity would result in a 3 dBA or greater increase under cumulative plus project conditions compared to future cumulative projects traffic noise levels that would exist without the proposed project. However, combined cumulative year traffic noise levels at the project site would exceed noise levels that the City considers acceptable for new residential land uses. As was shown in Impact NOI-1 discussion, implementation of MM NOI-1 would reduce traffic noise levels to meet the City's normally acceptable noise level standards for proposed land uses. Therefore, project-related traffic noise level would result in less than significant increases in traffic noise levels along modeled roadway segments in the project vicinity, and with implementation of MM NOI-1b, would not expose new land uses to traffic noise levels in excess of the City's acceptable land use compatibility standards and the contribution of the proposed project to cumulative projects traffic noise levels would be less than significant.

Given the above information, the proposed project, in conjunction with other existing, planned, and probable future projects, would result in a less than significant cumulative impact related to traffic noise.

### **Operational Stationary Noise**

Implementation of the proposed project would introduce new stationary noise sources to the ambient noise environment in the project vicinity, including new mechanical ventilation equipment at residential homes, new mechanical ventilation equipment, parking lot activities, and delivery trucks at the proposed Village Center, and new mechanical ventilation equipment and parking lot activities at the proposed fire station.

However, implementation of MM NOI-2b and 2c would ensure that project-related stationary noise sources would not exceed the City's normally acceptable noise level thresholds. Therefore, implementation of the proposed project would not combine with any other planned projects in the project vicinity to result in a cumulatively considerable contribution to existing ambient noise conditions in the project site vicinity. Therefore, the cumulative operational stationary noise impact would be less than significant.

### **Construction Vibration**

The proposed project would not result in vibration during construction activity that could overlap with any other current or planned cumulative development projects located within 100 feet of the

project site. As such, there would be no possibility of combination of potential construction vibration associated with the cumulative projects. Therefore, there would be no cumulative impact related to construction vibration.

### **Operational Vibration**

Implementation of the proposed project would not include any permanent sources of vibration that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing sensitive land use in the vicinity of the project site. The only cumulative contribution to vibration conditions in the vicinity of the project site could result from introduction of new permanent sources of groundborne vibration in the project site vicinity. The only major sources of groundborne vibration in the project vicinity is railroad activity along the light rail line, located approximately 2.75 miles north of the project site. Implementation of the proposed project would not introduce any new permanent sources of groundborne vibration to the project site vicinity and would not increase existing off-site railroad activity. Therefore, implementation of the proposed project would not result in a contribution to cumulative operational groundborne vibration conditions in the project site vicinity. Therefore, the cumulative impact related to project operational vibration would be less than significant.

### ***Level of Significance***

Less Than Significant

## 3.12 - Population and Housing

This section describes existing population and housing in the region, City, and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to population and housing that could result from implementation of the proposed project. Information included in this section is based, in part, on information included in the California Department of Finance (CDF) population estimates; the Association of Bay Area Governments (ABAG) regional projections, regional forecast, and Regional Housing Need Plan; and the City of Antioch General Plan Housing Element. No public comments were received during the Environmental Impact Report (EIR) public scoping period related to population and housing.

### 3.12.1 - Existing Conditions

#### Population

##### *San Francisco Bay Area*

ABAG conducts long-term forecasts of population, households, and employment for the nine-county<sup>1</sup> San Francisco Bay Area (Bay Area) to project growth in the region. The Bay Area has experienced population growth over the past several decades, and that growth is expected to continue. ABAG 2013 projection estimates that approximately 7,150,700 residents were living in the Bay Area in 2010. ABAG projects that the Bay Area's population will grow by 9 percent each decade between 2010 and 2040, or approximately 716,120 new residents each decade.<sup>2</sup> Between 2010 and 2040, ABAG projects that the region will grow 25 percent to a population of 9,522,300.<sup>3</sup>

##### *Contra Costa County*

In 2010, Contra Costa County had a population of 1,049,025.<sup>4</sup> The CDF estimates that the total population of Contra Costa County was 1,155,879 as of January 1, 2019, which was a 0.87 percent increase from January 1, 2018, when the population was 1,147,879. The CDF estimates that the County had an average household size of 2.94 persons per household and a total of 416,062 dwelling units as of January 1, 2019.

The CDF provides population projections for Contra Costa County in 1-year increments. Contra Costa County is projected to have a population of 1,166,670 in 2020 with a consistent growth rate of at least 1.01 percent each of the following years.<sup>5</sup>

Table 3.12-1 summarizes the County's historic and projected population growth between 1960 and 2040.

<sup>1</sup> The Bay Area is defined as the nine counties that make up the region: Sonoma, Marin, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco.

<sup>2</sup> Association of Bay Area Governments (ABAG). 2013. Forecasts and Projections. Website: <http://abag.ca.gov/planning/research/forecasts.html>.

<sup>3</sup> Association of Bay Area Governments (ABAG). Regional Forecast for Plan Bay Area 2040, page 2. Website: [https://abag.ca.gov/planning/research/memos/Regional\\_Forecast\\_for\\_Plan\\_Bay\\_Area\\_2040\\_F\\_030116.pdf](https://abag.ca.gov/planning/research/memos/Regional_Forecast_for_Plan_Bay_Area_2040_F_030116.pdf).

<sup>4</sup> California Department of Finance (CDF). 2018. Report E-5 Population Estimates for Cities, Counties, and the State. May.

<sup>5</sup> California Department of Finance (CDF). 2018. Total Estimated and Projected Population for California and Counties: 2010 to 2060 1-year Increments. January.

**Table 3.12-1: Contra Costa County Historic and Projected Population Growth**

Year	Population	Change From Previous (Percent)*
1960	413,200	—
1970	557,500	1.35
1980	658,500	1.18
1990	803,732	1.22
2000	948,816	1.18
2010	1,049,025	1.11
2020	1,178,639	1.12
2030	1,309,118	1.11
2040	1,420,595	1.09

Note:  
 \* Calculated with available information provided by the California Department of Finance  
 Source: CDF 2018.

**City of Antioch**

The City of Antioch population as of January 1, 2019 was 113,901.<sup>6</sup> The CDF estimates that the City of Antioch had an average household size of 3.34 persons per household and a total of 36,015 dwelling units as of January 1, 2019.

**Project Site**

The project site contains one existing single-family residence. Using the average household size of 3.34 persons per household, the existing population on the project site is estimated to be 3.34 persons.

**Housing****San Francisco Bay Area**

Growth in the Bay Area housing supply slowed down between 2010 and 2014 compared with previous decades, likely in part because of the effects of the Great Recession. Specifically, the Bay Area added an average of 9,600 housing units per year between 2010 and 2014, compared with an average of 23,200 housing units per year between 2000 and 2010. During the 1990s, the Bay Area averaged an additional 18,700 housing units per year.<sup>7</sup>

ABAG periodically develops Bay Area regional projections for population, households, and economic activity. These projections span four decades and include forecasts of 25 years into the future. ABAG calculates these projections based on a combination of economic relationships, policy development,

<sup>6</sup> California Department of Finance (CDF). 2019. E-1 Population Estimates for Cities, Counties, and the State—January 1, 2018 and 2019. June.

<sup>7</sup> Association of Bay Area Governments (ABAG). 2015. Executive Summary—State of the Region 2015: Economy, Population and Housing. Website: <http://reports.abag.ca.gov/sotr/2015/executive-summary.php>. Accessed November 16, 2018.

and other factors. Based on ABAG projections for households from 2010 to 2040, the compound annual growth rate is 4.04 percent. This rate is calculated from the average growth rate of each 5-year period<sup>8</sup> and forecasts the needed development of 822,600 new housing units between 2010 and 2040.<sup>9</sup> The growth in housing construction would provide a total of approximately 3,607,000 housing units by 2040, implying an average rate of increase between 17,000 and 37,000 housing units per year. According to ABAG, the majority of forecasted new housing units would be to fill the needs of projected household growth within the region.

### **Contra Costa County**

The CDF also provides historic housing growth estimates for Contra Costa County. The County's housing stock increased by 31.59 percent between 1990 and 2019, growing at a compound annual growth rate of 0.95 percent. According to the most recent housing estimate for 2019, there are 416,062 dwelling units in Contra Costa County.<sup>10</sup> The County's housing growth between 1990 and 2019 is summarized in Table 3.12-2.<sup>11,12,13</sup>

**Table 3.12-2: Contra Costa County Historic Housing Unit Growth**

Year	Dwelling Units	Change from Previous (Percent)
1990	316,170	—
1995	336,384	6.39
2000	353,742	5.16
2005	354,577	0.24
2010	400,263	12.88
2015	407,661	1.85
2019	416,062	26.59

Note:  
<sup>1</sup> The City of Oakley incorporated in 1999 resulting in a decline in housing units in the County.  
Source: CDF 2018, 2012, 2007.

### **City of Antioch**

The CDF also provides historic housing growth estimates for the City of Antioch. The City's housing stock increased by 4.96 percent between 2010 and 2019, growing from 34,849 to 36,015 units at a compound annual growth rate of 0.37 percent. According to the most recent housing estimate for

<sup>8</sup> Association of Bay Area Governments (ABAG). 2013. Bay Area Regional Projections. Website: <https://abag.ca.gov/planning/research/forecasts.html>. Accessed December 19, 2019.

<sup>9</sup> Association of Bay Area Governments (ABAG). Regional Forecast for Plan Bay Area 2040. Page 8. Website: [https://abag.ca.gov/planning/research/memos/Regional\\_Forecast\\_for\\_Plan\\_Bay\\_Area\\_2040\\_F\\_030116.pdf](https://abag.ca.gov/planning/research/memos/Regional_Forecast_for_Plan_Bay_Area_2040_F_030116.pdf). Accessed February 12, 2019.

<sup>10</sup> California Department of Finance (CDF). 2018. Report E-5 Population and Housing Estimates for Cities, Counties, and the State. May.

<sup>11</sup> California Department of Finance (CDF). 2007. Report E-8 Historical Population and Housing Estimates for Cities, Counties, and the State, 1990-2000. August.

<sup>12</sup> California Department of Finance (CDF). 2012. Report E-8 Historical Population and Housing Estimates for Cities, Counties, and the State, 2000-2010. November.

<sup>13</sup> California Department of Finance (CDF). 2012. Report E-5 Population and Housing Estimates for Cities, Counties, and the State. July.

2019, there are 36,015 dwelling units in the City. The City's housing growth between 2010 to 2019 is provided in Table 3.12-3.

**Table 3.12-3: City of Antioch Historic Housing Unit Growth**

Year	Dwelling Units	Change from Previous (Percent)
2010	34,849	—
2011	34,948	0.28
2012	35,041	0.27
2013	35,278	0.68
2014	35,482	0.59
2015	35,750	0.75
2016	35,822	0.20
2017	35,860	0.11
2018	35,882	0.06
2019	36,015	0.37

Source:  
California Department of Finance (CDF). 2018-Table E-5 Population and Housing Estimates for [Cities] 2011–2019 with 2010 Census Benchmark. Website: <http://www.dof.ca.gov/Forecasting/Demographics/Estimates/e-5/>.

### **Project Site**

The project contains one existing dwelling unit.

### **Affordable Housing**

#### **San Francisco Bay Area**

In July 2013, ABAG projected regional housing needs in its Regional Housing Needs Plans for the San Francisco Bay Area: 2015-2023. According to the ABAG forecasts, the San Francisco Bay Area's projected housing need from 2015-2023 is 187,990 residential units, consisting of:

- 46,680 within the very low income level (0–50 percent of area median income);
- 28,940 within the low income level (51–80 percent of area median income);
- 33,420 within the moderate income level (81–120 percent of area median income); and
- 78,950 within the above moderate income level (more than 120 percent of area median income).<sup>14</sup>

<sup>14</sup> Association of Bay Area Governments (ABAG). Final Regional Housing Need Allocation, 2015-2023. Website: [https://abag.ca.gov/sites/default/files/2015-23\\_rhna\\_plan.pdf](https://abag.ca.gov/sites/default/files/2015-23_rhna_plan.pdf). Page 22. Accessed July 12, 2019.

### **Contra Costa County**

In July 2013, ABAG projected regional housing needs in its Regional Housing Needs Plans for the San Francisco Bay Area: 2015-2023. According to the ABAG forecasts, Contra Costa County's projected housing need from 2015 to 2023 is 20,630 residential units, consisting of:

- 5,264 units within the very-low-income level (0–50 percent of area median income);
- 3,086 units within the low-income level (51–80 percent of area median income);
- 3,496 units within the moderate-income level (81–120 percent of area median income); and
- 8,784 units within the above-moderate-income level (more than 120 percent of area median income).<sup>15</sup>

### **City of Antioch**

In July 2013, ABAG projected regional housing needs in its Regional Housing Needs Plan for the San Francisco Bay Area: 2015-2023. According to ABAG forecasts, the City of Antioch's projected housing needs from 2015-2023 is 1,148 units, consisting of:

- 349 units within the very-low-income level (0–50 percent of area median income);
- 205 units within the low-income level (51–80 percent of area median income);
- 214 units within the moderate-income level (81–120 percent of area median income); and
- 680 units within the above moderate income level (more than 120 percent of area median income).<sup>16</sup>

### **Project Site**

The project site does not currently contain affordable housing units.

## **Employment**

### **San Francisco Bay Area**

The Bay Area region has experienced a strong recovery since the 2007–2009 Great Recession, with job growth proceeding at a pace greater than that experienced by the State of California or the United States as a whole. By mid-2013, the Bay Area had regained all of the jobs lost during the Great Recession; however, if 2000 is used as the baseline year, the average rate of growth is much less and closer to zero since the peak of the dot-com boom era.<sup>17</sup>

More recent data indicates that almost half of the projected job growth from 2010 had already occurred as of 2015. The 2010 to 2015 strength reflects a combination of recovery from the depths of the 2007 to 2009 recession and a strong surge in economic activity related to the technology and social media sectors. In this projection, employment growth slightly outpaces the nation, with the

<sup>15</sup> Association of Bay Area Governments (ABAG). Final Regional Housing Need Allocation, 2015-2023. Website: [https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023\\_RHNA\\_Allocations.pdf](https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023_RHNA_Allocations.pdf), at page 22. Accessed February 12, 2019.

<sup>16</sup> Association of Bay Area Governments (ABAG). Final Regional Housing Need Allocation, 2015-2023. Website: [https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023\\_RHNA\\_Allocations.pdf](https://abag.ca.gov/planning/housingneeds/pdfs/2015-2023_RHNA_Allocations.pdf), at page 22. Accessed July 9, 2019.

<sup>17</sup> Association of Bay Area Governments (ABAG). 2015. Executive Summary—State of the Region 2015: Economy, Population and Housing. Website: <http://reports.abag.ca.gov/sotr/2015/executive-summary.php>. Accessed November 16, 2018.

Bay Area share of U.S. employment growing from 2.5 percent in 2010 (3,422,800) to 2.69 percent in 2015 (4,025,600) and to 2.76 percent in 2040 (4,698,400).<sup>18</sup>

### ***Contra Costa County***

In April 2019, the California Employment Development Department (EDD) estimated 545,400 employed persons and 16,000 unemployed persons for an unemployment rate of 2.8 percent within Contra Costa County.<sup>19</sup> According to the Bureau of Labor Statistics, in April of 2019, the State of California had an unemployment rate of 4.3 percent.<sup>20</sup>

### ***City of Antioch***

Total Employment in the City of Antioch was 49,200 as of May 2019.<sup>21</sup> Based on 2016 data, approximately 14 percent of the City's employed population is in the construction industry, followed by retail trade (12 percent), accommodation and food services (9 percent), manufacturing (9 percent), transportation and warehousing (8 percent), health care and social assistance (8 percent), and professional, scientific, and technical services (7 percent).<sup>22</sup> The City's unemployment rate was 3.4 percent in May 2019.<sup>23</sup>

### ***Project Site***

The project site contains one dwelling unit. The site was historically used for cattle grazing and limited natural gas exploration; however, the site does not contain any employment generating land uses.

## **3.12.2 - Regulatory Setting**

### **Federal**

No federal plans, policies, regulations, or laws related to population and housing are applicable to the proposed project.

### **State Regulations**

#### ***California Housing Element Law***

The State Housing Element Law (Government Code Chapter 1143, Article 10.6, §§ 65580 and 65589) requires each city and county to adopt a general plan for future growth. This plan must include a housing element that identifies housing needs for all economic segments and provides opportunities for housing development to meet that need. The amount of housing that must be accounted for in a local housing element is determined through a process called the Regional Housing Needs Allocation

<sup>18</sup> Association of Bay Area Governments (ABAG). Regional Forecast for Plan Bay Area 2040, Fiscal Year 2016, Table 1. Website: [https://abag.ca.gov/planning/research/memos/Regional\\_Forecast\\_for\\_Plan\\_Bay\\_Area\\_2040\\_F\\_030116.pdf](https://abag.ca.gov/planning/research/memos/Regional_Forecast_for_Plan_Bay_Area_2040_F_030116.pdf). Accessed February 12, 2019.

<sup>19</sup> California Employment Development Department (EDD). 2019. Contra Costa County Profile. Website: <https://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/localAreaProfileQSResults.asp?selectedarea=Contra+Costa+County&selectedindex=7&menuChoice=localAreaPro&state=true&geogArea=0604000013&countyName=>. Accessed June 13, 2019.

<sup>20</sup> United States Bureau of Labor Statistics. 2019. Economy at a Glance. California. Website: <https://www.bls.gov/eag/eag.ca.htm>. Accessed June 13, 2019.

<sup>21</sup> California Employment Development Department (EDD). 2019. Labor Force and Unemployment Rate for Cities and Census Designated Places. Contra Costa County. Website: <https://www.labormarketinfo.edd.ca.gov/data/labor-force-and-unemployment-for-cities-and-census-areas.html>. Accessed July 1, 2019.

<sup>22</sup> City Data. Antioch, California. Website: <http://www.city-data.com/city/Antioch-California.html/>. Accessed July 1, 2019.

<sup>23</sup> California Employment Development Department (EDD). 2019. Labor Force and Unemployment Rate for Cities and Census Designated Places. Contra Costa County. Website: <https://www.labormarketinfo.edd.ca.gov/data/labor-force-and-unemployment-for-cities-and-census-areas.html>. Accessed July 1, 2019.

(RHNA). In the RHNA process, the State gives each region a number representing the amount of housing needed, based on existing need and expected population growth.

At the State level, the California Department of Housing and Community Development (HCD) estimates the relative share of the State's anticipated population growth that would occur in each county in the State, based on CDF population projections and historic growth trends. Where there is a regional council of governments, as in the San Francisco Bay Area (in this case, the ABAG), the HCD provides the regional housing need to the council. The council then assigns a share of the regional housing need to each of its cities and counties. The process of assigning shares provides cities and counties the opportunity to comment on the proposed allocations. The HCD oversees the process to ensure that the council of governments distributes its share of the State's projected housing need.

Each city and county must update its general plan housing element on a regular basis pursuant to the requirements of Government Code Section 65580, *et seq.* Among other things, the housing element must incorporate policies and identify potential sites that would accommodate a city's share of the regional housing need. Before adopting an update to its housing element, a city or county must submit the draft to the HCD for review. The HCD will advise the local jurisdiction whether its housing element complies with the provisions of California Housing Element Law. The regional councils of governments are required to assign regional housing shares to the cities and counties within their region on a similar schedule. At the beginning of each cycle, the HCD provides population projections to the regional councils of governments, who then allocate shares to their cities and counties. The shares of the regional need are allocated before the end of the cycle so that the cities and counties can amend their housing elements by the deadline.

## Regional

### ***Plan Bay Area and ABAG Regional Housing Needs Assessment***

The Plan Bay Area, published by the Metropolitan Transportation Commission and the ABAG, is a long-range integrated transportation and land use/housing strategy through 2040 for the Bay Area. The Plan Bay Area functions as the sustainable communities' strategy mandated by Senate Bill 375. In July 2013, the ABAG projected regional housing needs in its Regional Housing Needs Plan for the San Francisco Bay Area: 2014–2022.

Acting in coordination with the HCD, the ABAG determines the Bay Area's regional housing need based on regional trends, projected job growth, and existing needs. The City of Antioch's fair share of the regional housing need allocation for an 8-year period (2015 to 2023) was calculated as 1,148 units, or about 181 units per year. The RHNA determination includes production targets addressing the housing needs of a range of household income categories. A total of about 680 units, or 47 percent of the RHNA target, must be affordable to households making up to 80 percent of the area's median income.<sup>24</sup> The United States Department of Housing and Urban Development (HUD) determines the annual area median income for the Oakland-Fremont Metropolitan Statistical Area, which includes

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<sup>24</sup> Association of Bay Area Governments (ABAG). 2013. Regional Housing Need Plan, San Francisco Bay Area 2015–2023. About the Regional Housing Needs Allocation. Website: [https://abag.ca.gov/sites/default/files/2015-23\\_rhna\\_plan.pdf](https://abag.ca.gov/sites/default/files/2015-23_rhna_plan.pdf). Accessed November 16, 2018.

Contra Costa County. In 2018, the area's median income for a single-person household was almost \$58,100 and \$89,600 for a household of four people.<sup>25</sup>

## Local

### ***City of Antioch General Plan***

#### *Land Use Element*

- **Policy 4.4.6.7b.k:** A maximum of 4,000 dwelling units may be constructed within the Sand Creek Focus Area. Appropriate density bonuses may be granted for development of age-restricted housing for seniors; however, such density bonuses may not exceed the total maximum of 4,000 dwelling units for the Sand Creek Focus Area.
- **Policy 4.4.6.7b.l:** It is recognized that although the ultimate development yield for the Focus Area may be no higher than the 4,000 dwelling unit maximum, the actual development yield is not guaranteed by the General Plan, and could be substantially lower. The actual residential development yield of the Sand Creek Focus Area will depend on the nature and severity of biological, geologic, and other environmental constraints present within the Focus Area, including, but not limited to constraints posed by slopes and abandoned mines present within portions of the Focus Area; on appropriate design responses to such constraints, and on General Plan policies. Such policies include, and but are not limited to, identification of appropriate residential development types, public services and facilities performance standards, environmental policies aimed at protection of natural topography, and environmental resources, policies intended to protect public health and safety, and implementation of the Resource Management Plan called for in Policy "u," below.
- **Policy 4.4.6.7b.m:** As a means of expanding the range of housing choices available within Antioch, two types of "upscale" housing are to be provided, including Hillside Estate Housing, Executive Estate Housing and Golf Course Oriented Housing.

Hillside Estate Housing consists of residential development within the hilly portions of the Focus Area east of Deer Valley Road that are designated for residential development. Appropriate land use types include Large Lot Residential. Within these areas, typical flat land roadway standards may be modified (e.g., narrower street sections, slower design speeds) to minimize required grading. Mass grading would not be permitted within this residential type. Rough grading would be limited to streets and building pad areas. Residential densities within Hillside Estate Areas are to be limited to one dwelling unit per gross developable acre (1 du/ac), with typical lot sizes ranging upward from 20,000 square feet. The anticipated population density for this land use type is up to four persons per developed acre. Included in this category is custom home development, wherein semi-improved lots are sold to individuals for construction of custom homes. Approximately 20 percent of Hillside Estate Housing could be devoted to custom home sites.

Executive Estate Housing consists of large lot suburban subdivisions within the flatter portions of the Focus Area. Appropriate land use types include Large Lot Residential. Densities of Executive Housing areas would typically be 2 du/ac, with lot sizes ranging upward from 12,000 square feet. The anticipated population density for this land use type is up to eight persons per developed acre.

<sup>25</sup> United States Department of Housing and Urban Development (HUD). FY 2018 Income Limits Summary. Website: <https://www.huduser.gov/portal/datasets/il/il2018/2018summary.odn>. Accessed December 3, 2018.

Golf Course-Oriented Housing consists of residential dwelling units fronting on a golf course to be constructed within the portion of the Focus Area identified as Golf Course/Senior Housing/Open Space in Figure 4.8. Appropriate land use types include Single Family Detached and Small Lot Single Family detached for lots fronting on the golf course. Maximum densities for golf course-oriented housing would typically be 4 du/ac, with lot sizes as small as 5,000 square feet for lots actually fronting on the golf course. Given the significant environmental topographic constraints in the portion of the focus area west of Empire Mine Road, the minimum lot size for executive estate housing within this area shall be a minimum of 10,000 square feet. This would allow additional development flexibility in situations where executive estate housing needs to be clustered in order to preserve existing natural features. In no case shall the 10,000 square foot minimum lot size constitute more than 20 percent of the total number of executive estate housing units in the area west of Empire Mine Road. The anticipated population density for this land use type is up to eight to twelve persons per acre developed with residential uses. Should the City determine as part of the development review process that development of a golf course within the area having this designation would be infeasible, provision of an alternative open space program may be permitted, provided, however, that the overall density of lands designated Golf Course/Senior Housing/Open Space not be greater than would have occurred with development of a golf course.

- **Policy 4.4.6.7b.n:** Single-Family Detached housing within suburban-style subdivisions with lot sizes ranging from 7,000 square feet to 10,000 square feet may also be developed within the Sand Creek Focus Area within areas shown as Residential and Low Density Residential in Figure 4.8 of the General Plan. The anticipated population density for this land use type is up to eight to twelve persons per acre developed with residential uses.
- **Policy 4.4.6.7b.o:** Small Lot Single Family Detached Housing at the Aviano planned development and the Vineyards at Sand Creek planned development with lots smaller than 7,000 square feet may be developed within the Sand Creek Focus Area within areas shown as Medium Low Density Residential and Low Density Residential in Figure 4.8.
- **Policy 4.4.6.7b.p:** A total of 25 to 35 acres is to be reserved by multi-family housing to a maximum density of 20 du/ac. Areas devoted to multi-family housing should be located adjacent to the main transportation routes within the Focus Area, and in close proximity to retail commercial areas. The anticipated population density for this land use type is up to forty persons per acre developed with residential uses.
- **Policy 4.4.6.7b.q:** Age-restricted senior housing should be developed within the Focus Area as a means of expanding the range of housing choice within Antioch, while reducing the Focus Area's overall traffic and school impacts. Such senior housing may consist of Single Family Detached, Small Lot Single Family Detached, of Multi-Family Attached Housing, and may be developed in any of the residential areas of the Sand Creek Focus Area. Within areas identified in Figure 4.8 specifically for senior housing, limited areas of non-senior housing may be permitted where environmental or topographic constraints would limit development densities to a range more compatible with estate housing than with senior housing.
- **Policy 4.4.6.7b.s:** Sand Creek, ridgelines, hilltops, stands of oak trees, and significant landforms shall be preserved in their natural condition. Overall, a minimum of 25 percent of the San Creek Focus Area shall be preserved in open space, exclusive of lands to be developed for golf course use.

*Community Image and Design Element*

- **Policy 5.4.12a:** Minimize the number and extent of locations where non-residential land use designations abut residential land use designations. Where such land use relationships cannot be avoided, strive to use roadways to separate the residential and non-residential uses.<sup>26</sup>
- **Policy 5.4.12b:** Ensure that the design of new development proposed along a boundary between residential and non-residential uses provides sufficient protection and buffering for the residential use, while maintaining the development feasibility of the nonresidential use. The burden to provide buffers and transitions to achieve compatibility should be on the second use to be developed. Where there is bare ground to start from, both uses should participate in providing buffers along the boundary between them.
- **Policy 5.4.14g:** Buildings should be located to preserve existing views and to allow new dwellings access to views similar to those enjoyed from existing dwellings.
- **Policy 5.4.14i:** Lot lines shall be placed at the top of slopes to facilitate maintenance by the down slope owner, who has the greater “stake” in ensuring the continued integrity of the slope.

*Housing Element*

- **Goal 1:** Conserve and improve the existing housing supply to provide adequate, safe, and decent housing for existing Antioch residents.
- **Policy 1.1:** Ensure the supply of safe, decent, and sound housing for all residents.
- **Goal 2:** Facilitate the development of a broad array of housing types to accommodate new and current Antioch residents of diverse ages and socioeconomic backgrounds.
- **Policy 2.1:** Provide adequate residential sites for the production of new for-sale and rental residential units for existing and future residents.
- **Policy 2.2:** Facilitate the development of new housing for all economic segments of the community, including lower income, moderate-, and above moderate-income households.
- **Policy 2.3:** Actively pursue and support the use of available County, State, and Federal housing assistance programs.
- **Policy 2.4:** Proactively assist and cooperate with non-profit, private, and public entities to maximize opportunities to develop affordable housing. One of the objectives of the General Plan Land Use Element is to distribute low and moderate-income housing throughout the City, rather than concentrate it in one portion of the community. For example, the element allows for higher density housing within designated Focus Areas to facilitate affordable housing development. Additionally, the recent amendments to the Zoning Ordinance rezoned seven sites for higher density development. These sites are now more geographically dispersed around the City.
- **Goal 3:** Facilitate the development of special purpose housing to meet the needs of the elderly, persons with disabilities, and the homeless.
- **Policy 3.1:** Identify and maximize opportunities to expand housing opportunities for those residents of the City who have special housing needs, including the elderly, disabled, large families, and the homeless.

<sup>26</sup> It is recognized that residential and non-residential properties will sometimes abut along a common property line (such as between neighborhood shopping centers and adjacent neighborhoods).

- **Goal 4:** Reduce residential energy and water use to conserve energy/water and reduce the cost of housing.
- **Policy 4.1:** Provide incentives for energy conservation measures in new housing by providing information on programs available through PG&E.
- **Goal 5:** Remove governmental constraints inhibiting the development of housing required to meet identified needs in Antioch.
- **Goal 5.1:** Review and modify standards and application processes to ensure that City standards to not act to constrain the production of affordable housing units.

### ***City of Antioch Municipal Code***

#### *Chapter 8-9.01 Adoption of the State Housing Code*

Chapter 8-9.01, Adoption of the State Housing Code, adopts the California Building Code, 2016 Edition, based on the 2015 International Building Code, published by the International Code Council (ICC), as adopted and amended by the California Building Standards Commission in the California Building Standards Code, Title Update for consistency with 24 of the California Code of Regulations, by reference.

### **3.12.3 - Impacts and Mitigation Measures**

#### **Significance Criteria**

According to 2019 California Environmental Quality Act (CEQA) Guidelines Appendix G Environmental Checklist, to determine whether impacts related to population and housing are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
- b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

#### **Approach to Analysis**

Impacts related to population, housing, and employment were determined by analyzing existing and projected population, housing, and employment estimates provided by the CDF, ABAG, and the City of Antioch General Plan. The project's impacts were evaluated by determining their consistency with these projections, estimates, and the City of Antioch General Plan.

## Impact Evaluation

### Population Growth

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**Impact POP-1:**      **The proposed project would not induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).**

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#### **Construction/Operation**

Direct population growth is a result of developing residential units. The proposed project consists of a master planned community comprised of 1,177 dwelling units, further broken down into 543 Low Density units, 422 Age Restricted units, and 212 Medium Density units. According to the CDF, the estimated number of persons per household is 3.34.<sup>27</sup> Using this figure as a multiplier, the proposed project would result in an increase of 3,931 persons in the City of Antioch. According to the CDF, the total City population as of January 1, 2019 was estimated to be 113,901. The proposed increase in population resulting from the project would represent a 3 percent increase in overall population compared to January 2019 estimate. Notably, the proposed project is consistent with and below the maximum 4,000 units permitted within the Sand Creek Focus Area outlined by the City of Antioch General Plan and with the West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative, which specifically allows for the development of 1,177 dwelling units within a portion of The Ranch property. Thus, implementation of the proposed project would not induce substantial unplanned direct population growth within the City of Antioch.

Indirect population growth occurs when a project creates substantial employment opportunities, provides new infrastructure that can lead to additional growth, and/or removes barriers to growth. For example, a project could create thousands of jobs and attract a substantial amount people to the area. The proposed project would create employment opportunities with the addition of the future fire station once constructed, and the office, retail, and commercial space within the proposed Village Center. Once operational, the proposed project is expected to employ approximately 108 workers on-site daily for the maintenance and operation of the proposed office, retail, and commercial space. Further, with respect to the infrastructure, the proposed project does not propose constructing new infrastructure beyond that which is already contemplated and provided for by the West Sand Creek District. Thus, implementation of the proposed project would not induce substantial population growth within the City of Antioch.

Therefore, the proposed project would not result in substantial population, housing, or employment growth in excess of that analyzed for the City of Antioch planning area and anticipated under local and regional projections for the City. This would represent a less-than-significant impact related to induced population growth.

#### **Level of Significance**

Less Than Significant

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<sup>27</sup> California Department of Finance (CDF). 2019. Report E-5. Population Estimates for Cities, Counties and the State. January 2019. Accessed June 14, 2019.

## Housing Displacement/Replacement Housing

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**Impact POP-2:**      **The proposed project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.**

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### ***Construction***

Construction of the proposed project includes the demolition of one residence, and the construction of 1,177 new housing units, which would greatly expand the provision of housing in the City of Antioch. The demolition of one housing unit would not result in substantial displacement of houses or people. Impacts would be less than significant.

### ***Operation***

The project site currently contains one dwelling unit, in addition to barns and other structures. These existing structures would be removed and a total of 1,177 new residential units (anticipated to house up to 3,931 new residents) would be added to the project site. Thus, while the proposed project would displace one existing dwelling unit, it would not necessitate the construction of replacement housing elsewhere.

According to the CDF, City of Antioch has an average of 3.34 persons per household. Using this figure as a multiplier, the demolition of one existing residence would displace up to 3.34 persons. However, because of the provision of 1,177 new residential units, the proposed project would not necessitate the construction of replacement housing elsewhere.

Therefore, the proposed project would not require the construction of replacement housing elsewhere due to the displacement of housing or people. This would represent a less-than-significant impact related to population and housing displacement.

### ***Level of Significance***

Less Than Significant

## **3.12.4 - Cumulative Impacts**

Cumulative population and housing effects must be considered in relationship to land use, plans, and policy considerations for development facilitated by the City of Antioch General Plan. The relevant cumulative geographic context is the City of Antioch and surrounding areas within Contra Costa County including Brentwood and Oakley, identified in Table 3-1: Cumulative Projects (See Chapter 3.0, Environmental Analysis).

### **Population Growth**

Cumulative projects listed in Table 3-1 in conjunction with the proposed project would add population. The CDF estimates that the population in Contra Costa County as of January 1, 2019, is 1,155,879. Additionally, the cumulative projects listed in Table 3-1 would add a total of 3,299 residential units. Based on the CDF average household size of 2.94 persons for Contra Costa County, the cumulative projects listed in Table 3-1 would increase persons by 9,699 persons in addition to the proposed project's estimated increase of 3,931 persons for a total cumulative increase of 13,630 persons. This cumulative population is consistent with the Bay Area region population growth

projections of ABAG, which projected a growth in housing construction of 822,600 new units that would contribute to a total housing stock of approximately 3,607,000 housing units across the Bay Area by 2040.<sup>28</sup>

These employment opportunities are expected to draw employees primarily from the local labor force. California Department of Employment Development estimates that Contra Costa County 2018 employment to be 561,700 employed persons. The cumulative projects' estimated increase in jobs would total approximately 300 workers, representing an increase of less than 1 percent relative to the 2018 estimate.<sup>29</sup> As such, there would not be substantial indirect population growth associated with implementation of the identified cumulative projects.

Therefore, cumulative impacts related to population growth, both direct and indirect, would be considered less than significant.

### **Population/Housing Displacement**

Cumulative projects listed in Table 3-1 in conjunction with the proposed project would add residential units to the City of Antioch. None of the listed projects substantially displaces housing units or people within the City or surrounding areas. In fact, implementation of cumulative projects would result in a net increase of housing in the cities of Antioch, Brentwood, and Oakley within the unincorporated County). Therefore, cumulative impacts associated with population and housing displacement would be less than significant.

### ***Level of Cumulative Significance***

Less Than Significant

<sup>28</sup> Association of Bay Area Governments (ABAG). Regional Forecast for Plan Bay Area 2040, page 8. Website: [http://reports.abag.ca.gov/other/Regional\\_Forecast\\_for\\_Plan\\_Bay\\_Area\\_2040\\_F\\_030116.pdf](http://reports.abag.ca.gov/other/Regional_Forecast_for_Plan_Bay_Area_2040_F_030116.pdf). Accessed February 12, 2019.

<sup>29</sup> Institute of Transportation Engineers (ITE) 2017. Trip Generation Manual 10<sup>th</sup> Edition. Website: <https://www.ite.org/tripgeneration/index.asp>.

## 3.13 - Public Services and Recreation

### 3.13.1 - Introduction

This section describes the existing conditions related to public services in the City and project area, as well as the relevant regulatory framework. This section also evaluates the possible impacts related to public services that could result from implementation of the proposed project. Information in this section is based, in part, on information obtained from the City of Antioch General Plan, Contra Costa County Fire Protection District, and the Antioch Unified School District. The following comments were received during the Environmental Impact Report (EIR) scoping period related to public services and recreation.

- Request for analysis of impacts of the proposed trail staging area;
- Request to address emergency vehicle access on Empire Mine Road;
- Request to consider the safety of all trail uses as well as slopes, views, site features, and impacts on resources;
- Request to consider potential regional trail connections from Empire Mine Road through the development to the Mokelumne Coast to Crest Trail.

### 3.13.2 - Environmental Setting

#### Fire Protection and Emergency Medical Services

##### *Northern California*

California Department of Forestry and Fire Protection (CAL FIRE) is responsible for fire protection and stewardship of over 31 million acres of California's privately owned wildlands. CAL FIRE also provides varying levels of emergency services in 36 of California's 58 counties via contracts with local governments. Because of CAL FIRE's size and major incident management experience, it is often asked to assist or take the lead in disasters. CAL FIRE is divided into 21 units throughout California that are designed to address fire suppression.<sup>1</sup>

##### *The City of Antioch*

The project site is within the service boundaries of the Contra Costa County Fire Protection District. The Fire Protection District boundaries encompass the central and northern portions of Contra Costa County from the City of Antioch in the east to the eastern border of the City of Richmond in the west, and as far south as the northern border of the City of Moraga. The Fire Protection District has a boundary area of approximately 257 square miles and provides fire suppression (structural, vehicle, and vegetation fires) and prevention, basic life support and advanced life support for medical emergencies, rescue, dispatch, initial hazardous materials response, fire inspection, plan review, and education. As of 2019, the Fire Protection District has 28 companies in service, compared to 2010, when 30 companies were in service.<sup>2</sup> Each company is comprised of three personnel on a fire engine

<sup>1</sup> California Department of Forestry and Fire Protection (CAL FIRE). 2018. About CAL FIRE. Website: <http://calfire.ca.gov/about/about>. Accessed May 20, 2019.

<sup>2</sup> Contra Costa County Fire Protection District. 2019. Email Correspondence with Lewis Broschard, Fire Chief. August 26, 2019.

or ladder truck (a federal Staffing for Adequate Fire and Emergency Response [SAFER] grant has allowed the Fire Protection District to increase staffing on certain ladder truck companies to four personnel through February 2022).

There are four fire stations within the City of Antioch. See Table 3.13-1 below for fire station locations and their proximity to the project site.

**Table 3.13-1: Fire Station Locations**

Station	Distance from Project Site	Address
Station 82	1.95 miles	196 Bluerock Drive, Antioch
Station 88	2.45 miles	4288 Folsom Drive, Antioch
Station 83	4.17 miles	2717 Gentrytown Drive, Antioch
Station 81	4.45 miles	315 West 10 <sup>th</sup> Street, Antioch
Source: Google Earth 2019.		

Current staffing for the stations closest to the project site is detailed below. At least one member of each company is a paramedic, and all members are Emergency Medical Technicians (EMTs).

- Station 81—Engine Company (Captain, Engineer, Firefighter)
- Station 83—Ladder Truck Company (Captain, Engineer, two Firefighters)
- Station 88—Engine Company (Captain, Engineer, Firefighter)

According to the General Plan, the Fire Protection District has a response time goal of 90 percent for all City emergencies within 5 minutes. However, average response time for the Fire Protection District in 2018 was 7 minutes and 5 seconds, and 7 minutes and 50 seconds for the City of Antioch.<sup>3</sup> Annual service calls totaled 98,007 for the year 2017 and totaled 100,153 for 2018. Specifically, service calls in the City of Antioch have risen from 9,070 in 2009 to 13,450 in 2018, which represents an average annual increase of 4.8 percent per year.

### **Project Site**

The project site is largely undeveloped land used for grazing purposes. One single-family home and a few accessory structures are located in the eastern portion of the site. The nearest fire station (Station 82) is located approximately 1.95 miles northwest of the project site. The Kaiser Permanente Antioch Medical Center is located directly across Deer Valley Road to the east.

### **Police Protection**

#### ***The City of Antioch***

The Antioch Police Department (APD) is responsible for providing crime prevention and law enforcement services within the City of Antioch. The APD operates from a central station located in

<sup>3</sup> Contra Costa County Fire Protection District. 2019. Email Correspondence with Lewis Broschard, Fire Chief. August 26, 2019.

Rivertown and is comprised of 112 sworn officers as well as non-sworn employees, including dispatchers, administrative support staff, and community services officers.<sup>4</sup> The APD is broken up into two divisions: Field Services and Support Services. The Field Services Division includes Community Engagement, Traffic Bureaus, and Patrol. The Support Services Division includes Dispatch, Special Operations, Investigations, Administration, and Records. Additionally, the APD provides animal control services within the City of Antioch.<sup>5</sup>

The City of Antioch is divided into six “beats,” or patrol zones, based on geographical area. The project site would be served by Beat 5. Additionally, each service call is categorized as a Priority 1, Priority 2, or Priority 3 call. Priority calls are classified below.

- **Priority 1:** in-progress crimes or life threatening situations.
- **Priority 2:** calls demanding immediate attention, but are not life threatening or crimes in progress.
- **Priority 3:** calls that do not require immediate response and can be handled as soon as practical.

#### *Contra Costa County Office of the Sheriff*

The Contra Costa County Office of the Sheriff provides safety services to the City of Antioch in addition to unincorporated areas of Contra Costa County adjacent to the City. The Office of the Sheriff serves the City of Antioch in two ways. The Sheriff’s Office patrols the Contra Costa Fairgrounds within the City of Antioch and responds to critical incidents in which mutual aid is required. The closest Sheriff’s station to the City of Antioch is located at 200 O’Hara Avenue, Oakley, California.<sup>6</sup>

#### **Project Site**

There are no law enforcement facilities on the project site; however, Antioch Police Department headquarters, located at 300 L Street, is approximately 4.79 miles northwest of the site.

#### **Schools**

##### ***The City of Antioch***

The proposed project site is located within the Antioch Unified School District (AUSD). Some parts of the City, mainly those within the East Lone Tree and Sand Creek Focus Areas are served by Liberty and Brentwood Unified School Districts. The AUSD contains 13 elementary schools, four middle schools, and three high schools, in addition to two continuation high schools, one alternative high school, one K–8 school, and one adult school.<sup>7</sup>

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<sup>4</sup> City of Antioch. 2019. Email Correspondence with Alexis Morris, Planning Manager and Anthony Morefield, Police Captain. December 17, 2019.

<sup>5</sup> City of Antioch, 2019. About APD. Website: <https://www.antiochca.gov/police/about-apd/>. Accessed May 14, 2019.

<sup>6</sup> City of Antioch. 2003. General Plan EIR. Public Services. Website: <https://www.antiochca.gov/fc/community-development/planning/Draft-General-Plan-EIR.pdf>. Accessed May 14, 2019.

<sup>7</sup> Antioch Unified School District (AUSD). School Directory. Website: <https://www.antiochschools.net/domain/52>. Accessed May 10, 2019.

**Project Site**

No schools exist on the project site. The closest schools to the project site include Lone Tree Elementary School, which is approximately 0.76 mile northeast of the site, Deer Valley High School located approximately 0.84 mile north of the site, and Dozier-Libbey Medical High School located approximately 0.86 mile southeast of the site. Additionally, Dallas Ranch Middle School is approximately 1.36 miles north from the site. There are several other schools within a 3-mile radius of the project site, including Diablo Vista Elementary School, Golden Hills Christian School, Carmen Dragon Elementary School, Jack London Elementary School, Hilltop Christian, and John Muir Elementary School.

**Libraries*****The City of Antioch***

Contra Costa County operates two library facilities within the City of Antioch, including the GenOn Gateway Center for Learning, known as the Prewett Library, and the Antioch Public Library. The 11,000-square-foot Antioch Library, located at 501 West 18<sup>th</sup> Street, was recently remodeled and houses a large collection of materials including books, DVDs, and audio books. The Prewett Library, which opened in January 2011, is located within the Antioch Community Center on Lone Tree Way approximately 1.5 miles northwest of the project site. The Prewett Library is an “express library” where customers can pick up their requested materials and browse through almost 9,000 items including best sellers, teen books, magazines, audio books, CDs, DVDs, and children’s materials. The Prewett Library houses two early literacy workstations for children and is adjacent to the Antioch Community Center’s technology lab, which contains 25 computers. Both Antioch libraries offer free wireless internet access.

**Project Site**

There are no libraries on the project site. The closest library to the project site is Prewett Library, located approximately 1.1 miles northeast of the site. Antioch Public Library is located approximately 3.97 miles northwest of the project site.

**Existing Parks and Recreational Facilities**

There are a number of local, regional, and State parks and recreational facilities within or near the City of Antioch. Parks are discussed separately below.

**State Parks**

California Department of Parks and Recreation manages and preserves 1,650,779 acres within 280 parklands and 4,500 miles of trails throughout the State.<sup>8</sup> Marsh Creek State Historic Park is located within 10 miles of the project site.

***Marsh Creek State Historic Park***

Marsh Creek State Historic Park is located approximately 5.6 miles southeast of the project site.

**Project Site**

There are no State parks, public trails or recreational facilities on the project site.

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<sup>8</sup> California Department of Parks and Recreation. 2016. California State Park System Statistical Report 2015/16 Fiscal Year. Website: [http://www.parks.ca.gov/?page\\_id=23308](http://www.parks.ca.gov/?page_id=23308). Accessed February 13, 2019.

### **Regional Parks**

The East Bay Regional Park District (EBRPD) operates manages and preserves 121,397 acres of regional park facilities, including 73 parks and more than 1,250 miles of trails.<sup>9</sup> There are three regional parks located within 5 miles of the project site: Black Diamond Mines Regional Preserve, Contra Loma Regional Park, and Antioch/Oakley Regional Shoreline.

#### ***Black Diamond Mines Regional Preserve***

Black Diamond Mines Regional Preserve is located approximately 2.28 miles west of the project site. The preserve is almost 6,096 acres and serves as a location for nature study, hiking, and picnicking. The park includes the historic Rose Hill Cemetery, which is home to former residents of the City that were buried at the cemetery. Additionally, the preserve contains the Sidney Flats Visitor Center, a building original to the coalfield with photos and artifacts from the 1800s and early 1900s. The Greenhouse Visitor Center is also located within the preserve, a part of an underground cave that was excavated during the mid-1920s. The Greenhouse Visitor Center is temporarily closed due to construction.<sup>10</sup>

#### ***Contra Loma Regional Park***

Contra Loma Regional Park is located approximately 2.52 miles northwest of the project site in the City of Antioch. The 780-acre park includes a lifeguarded swim lagoon, 80-acre reservoir with black and striped bass, catfish, trout, bluegill, and red-eared sunfish for fishing year round. The park also offers equestrian staging areas and several trails.<sup>11</sup>

#### ***Antioch/Oakley Regional Shoreline***

Antioch/Oakley Shoreline East Bay Regional Park is located approximately 4.84 miles north of the site. The park includes a 550-foot pier and allows fishing, picnicking, and kite flying. Fishing is allowed 24-hours a day, year-round. The park also offers a fish cleaning station, several paved trails, and picnic tables.<sup>12</sup>

#### ***Project Site***

There are no existing regional parks, public trails, or recreational facilities located on the project site.

### **Local Community Parks**

The City provides a number of community parks and recreational facilities within its boundaries, including 18 community parks and recreational facilities that are located within 3 miles of the project site (Exhibit 3.13-1). The closest community parks to the project site are Prewett Family Park and Antioch Community Park. Table 3.13-2 provides a brief description of 23 community parks (18 owned and operated by the City and 5 owned and operated by City of Brentwood or EBRPD) within a 3-mile search radius of the project site, the recreational amenities they feature, and the jurisdiction where the park is located.

<sup>9</sup> East Bay Regional Park District. 2018. About the District. Website: <https://www.ebparks.org/about/default.htm>. Accessed May 13, 2019.

<sup>10</sup> East Bay Regional Park District. 2018. Black Diamond Mines Regional Preserve. Website: [https://www.ebparks.org/parks/black\\_diamond/default.htm#features](https://www.ebparks.org/parks/black_diamond/default.htm#features). Accessed November 8, 2019.

<sup>11</sup> East Bay Regional Park District. 2018. Contra Loma Regional Park. Website: [https://www.ebparks.org/parks/contra\\_loma/default.htm#about](https://www.ebparks.org/parks/contra_loma/default.htm#about). Accessed June 11, 2019.

<sup>12</sup> East Bay Regional Park District. 2018. Antioch/Oakley Regional Shoreline. Website: [https://www.ebparks.org/parks/antioch\\_oakley/default.htm#about](https://www.ebparks.org/parks/antioch_oakley/default.htm#about). Accessed June 11, 2019.

**Table 3.13-2: Community Parks within 3 Miles of the Project Site**

Name	Acreage	Distance from Project Site	Jurisdiction and Park Department	Amenities
Diablo West Park	—	0.87 mile	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball court</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot play area</li> </ul>
Dallas Ranch Park	5	0.91 mile	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball court</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot play area</li> <li>• Bike Trail</li> </ul>
Antioch/Prewett Family Water Park	99	1.08 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Group picnic area</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Youth play area</li> <li>• Sand volleyball courts</li> <li>• Trails/Open space</li> <li>• Community Center</li> </ul>
Hansen Park	—	1.37 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball court</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot play area</li> </ul>
Chaparral Park	—	1.48 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Baseball field and Basketball court</li> <li>• Exercise course</li> <li>• Group picnic area</li> </ul>
Antioch Skate Park	—	1.6 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Skate and skateboard areas</li> </ul>
Contra Loma Regional Park	780	1.61 miles	East Bay Regional Park District and Contra Costa Water District	<ul style="list-style-type: none"> <li>• 80-acre reservoir for year-round fishing</li> <li>• Swim lagoon</li> <li>• Boat launch ramp</li> <li>• Picnic areas</li> <li>• Restrooms and Showers</li> <li>• Concession Stand</li> <li>• Trails, including connections to Black Diamond Mines Regional Preserve</li> </ul>

**Table 3.13-2 (cont.): Community Parks within 3 Miles of the Project Site**

Name	Acreage	Distance from Project Site	Jurisdiction and Park Department	Amenities
Black Diamond Mines Regional Preserve	6,096	1.62 miles	East Bay Regional Park District	<ul style="list-style-type: none"> <li>• Historic cemetery</li> <li>• Visitor centers</li> <li>• Mine tours</li> <li>• Restrooms</li> <li>• Camping areas</li> <li>• Picnic tables</li> <li>• Trails, including connections to Contra Loma Regional Park</li> </ul>
Knoll Park	5	1.8 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Horseshoes</li> <li>• Picnic tables</li> <li>• Tot play area</li> </ul>
Williamson Ranch Park	5	1.81 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot play area</li> </ul>
Eagleridge Park	5.4	1.88 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot and Youth play areas</li> </ul>
Deerfield Park	0.5	2.01 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Picnic tables</li> <li>• Youth play area</li> </ul>
Heidorn Park	—	2.03 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Tot play area</li> </ul>
Country Manor Park	20	2.05 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Horseshoes</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Soccer field(s) and Softball field</li> <li>• Youth play area</li> <li>• Trails/Open space</li> </ul>
Rolling Hills Park	2.05	2.31 miles	City of Brentwood Parks and Recreation Department	<ul style="list-style-type: none"> <li>• Picnic tables</li> </ul>
Meadow Creek Estates Park	5	2.38 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball court</li> <li>• Picnic tables</li> <li>• Tot play area</li> </ul>

**Table 3.13-2 (cont.): Community Parks within 3 Miles of the Project Site**

Name	Acreage	Distance from Project Site	Jurisdiction and Park Department	Amenities
Black Gold Park	6.22	2.47 miles	City of Brentwood Parks and Recreation Department	<ul style="list-style-type: none"> <li>• Picnic tables</li> <li>• Children's play area</li> <li>• Bike path</li> </ul>
Balfour-Guthrie Park	6.43	2.48 miles	City of Brentwood Parks and Recreation Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball and Tennis court</li> <li>• Ballfield &amp; Soccer field</li> <li>• Bocce ball court</li> <li>• Reservable picnic tables</li> <li>• Restrooms</li> <li>• Children's play equipment</li> <li>• Bike path</li> </ul>
Antioch Community Park	20	2.75 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Group picnic area</li> <li>• Horseshoes</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Soccer and Softball fields</li> <li>• Tot &amp; Youth play area</li> <li>• Volleyball/sports court</li> <li>• Trails/Open Space</li> </ul>
Chichibu Park	6.3	2.77 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Group picnic area</li> <li>• Horseshoes</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tennis courts</li> <li>• Tot and Youth play area</li> </ul>
Mountaineer Park	5.1	2.81 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Picnic tables</li> <li>• Tot and Youth play area</li> </ul>
Harbour Park	7.9	2.84 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Softball field and Tennis courts</li> <li>• Youth play area</li> </ul>
Hillcrest Park	18	2.87 miles	City of Antioch Public Works Department	<ul style="list-style-type: none"> <li>• Barbeque pits</li> <li>• Basketball and Tennis courts</li> <li>• Exercise course</li> <li>• Picnic tables</li> <li>• Restroom(s)</li> <li>• Tot and Youth play area</li> <li>• Volleyball/sport court</li> </ul>

**Table 3.13-2 (cont.): Community Parks within 3 Miles of the Project Site**

Name	Acreage	Distance from Project Site	Jurisdiction and Park Department	Amenities
<p>Sources:</p> <p>City of Antioch. 2019. Parks Directory. Website: <a href="https://www.antiochca.gov/public-works-department/parks-and-landscaping/parks/">https://www.antiochca.gov/public-works-department/parks-and-landscaping/parks/</a>. Accessed April 26, 2019.</p> <p>LSA Associates, Inc. 2003. Draft General Plan Update Environmental Impact Report: City of Antioch. July.</p> <p>East Bay Regional Park District. 2018. Contra Loma Regional Park. Website: <a href="https://www.ebparks.org/parks/contra_loma/">https://www.ebparks.org/parks/contra_loma/</a>. Accessed April 26, 2019.</p> <p>East Bay Regional Park District. 2018. Contra Loma Regional Park. Website: <a href="https://www.ebparks.org/parks/black_diamond/">https://www.ebparks.org/parks/black_diamond/</a>. Accessed April 26, 2019.</p> <p>De Novo Planning Group. 2014. Public Draft Environmental Impact Report for the 2014 Brentwood General Plan Update. April.</p>				

#### *Project Site*

There are no existing community parks, public trails, recreational facilities, or designated open spaces on the project site. Exhibit 3.13-2 shows parks and open space proposed as part of the project.

### **3.13.3 - Regulatory Framework**

#### **Federal**

No federal plans, policies, regulations, or laws related to public services or recreation are applicable to the proposed project.

#### **State**

##### ***California Fire Code***

The California Fire Code contains specialized regulations related to the construction, maintenance, and use of buildings in relation to fire and safety. The extent of the code coverage pertains to fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, provisions to aid fire responders, and other fire-safety requirements for new and existing buildings.

##### ***California Health and Safety Code***

California Health and Safety Code, Sections 13100–13135, establish the following policies related to fire protection:

- **Section 13100.1:** The functions of the office of the State Fire Marshal, including CAL FIRE, shall be to foster, promote, and develop strategies to protect life and property against fire and panic.

##### ***California Senate Bill 50***

California Senate Bill 50 (SB 50) (funded by Proposition 1A; approved in 1998) limits the power of cities and counties to require mitigation of school facilities impacts as a condition of approving new

development, and provides instead for a standardized developer fee. SB 50 generally provides for a 50/50 State and local school facilities funding match. SB 50 also provides for three levels of statutory impact fees. The application level depends on whether State funding is available, whether the school district is eligible for State funding, and whether the school district meets certain additional criteria involving bonding capacity, year-round school, and the percentage of moveable classrooms in use.

### ***California Government Code, Section 65995(b) and Education Code, Section 17620***

SB 50 amended Section 65995 of the California Government Code, which contains limitations on Section 17620 of the Education Code, the statute that authorizes school districts to assess development fees within school district boundaries. Section 65995(b)(3) of the Government Code requires the maximum square footage assessment for development to be increased every 2 years, according to inflation adjustments. The Antioch Unified School District is authorized to levy Level 1 fees. On January 24, 2018, the State Allocation Board approved an increase in the Level 1 school impact fees to \$3.79 per square foot for residential and \$0.61 per square foot for commercial development.

### ***Quimby Act***

The Quimby Act (California Government Code § 66477) was established by the California Legislature in 1965 to preserve open space and parkland in rapidly urbanizing areas of the State. The Quimby Act allows cities and counties to establish requirements for new development to dedicate land for parks, pay an in-lieu fee, or provide a combination of the two.

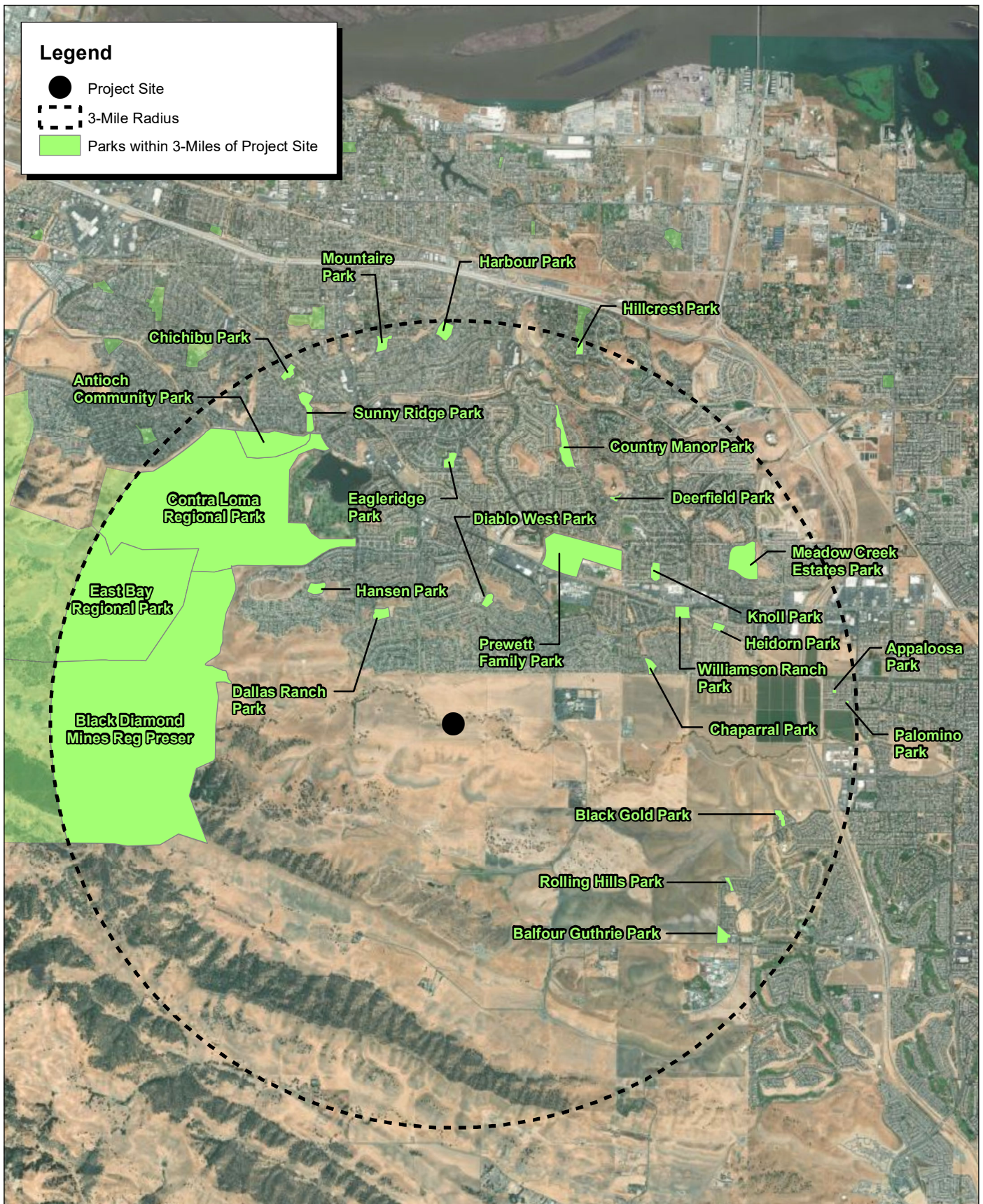
The Quimby Act provides two standards for the dedication of land for use as parkland. If the existing area of parkland in a community is greater than 3 acres per 1,000 residents, then the community may require dedication based on a standard of up to 5 acres per 1,000 persons residing in the subdivision based on the current ratio of parkland per 1,000 residents. If the existing amount of parkland in a community is less than 3 acres per 1,000 residents, then the community may require dedication based on a standard of only 3 acres per 1,000 persons residing in the subdivision.

The Quimby Act requires a city or county to adopt standards for recreational facilities in its general plan to adopt a parkland dedication or fee ordinance. The City of Antioch has established a parks and recreation fee of \$3,261 per single-family residential unit.<sup>13</sup>

It should be noted that the Quimby Act applies only to the acquisition of new parkland; it does not apply to the physical development of new park facilities or associated operations and maintenance costs. Therefore, the Quimby Act effectively preserves open space needed to develop park and recreation facilities, but it does not ensure the development of the land or the provision of park and recreation services to residents. In addition, the Quimby Act applies only to residential subdivisions. Nonresidential projects could contribute to the demand for park and recreation facilities without providing land or funding for such facilities. Quimby Act fees are collected by the local agency (park district, city, or county) in which the new residential development is located.

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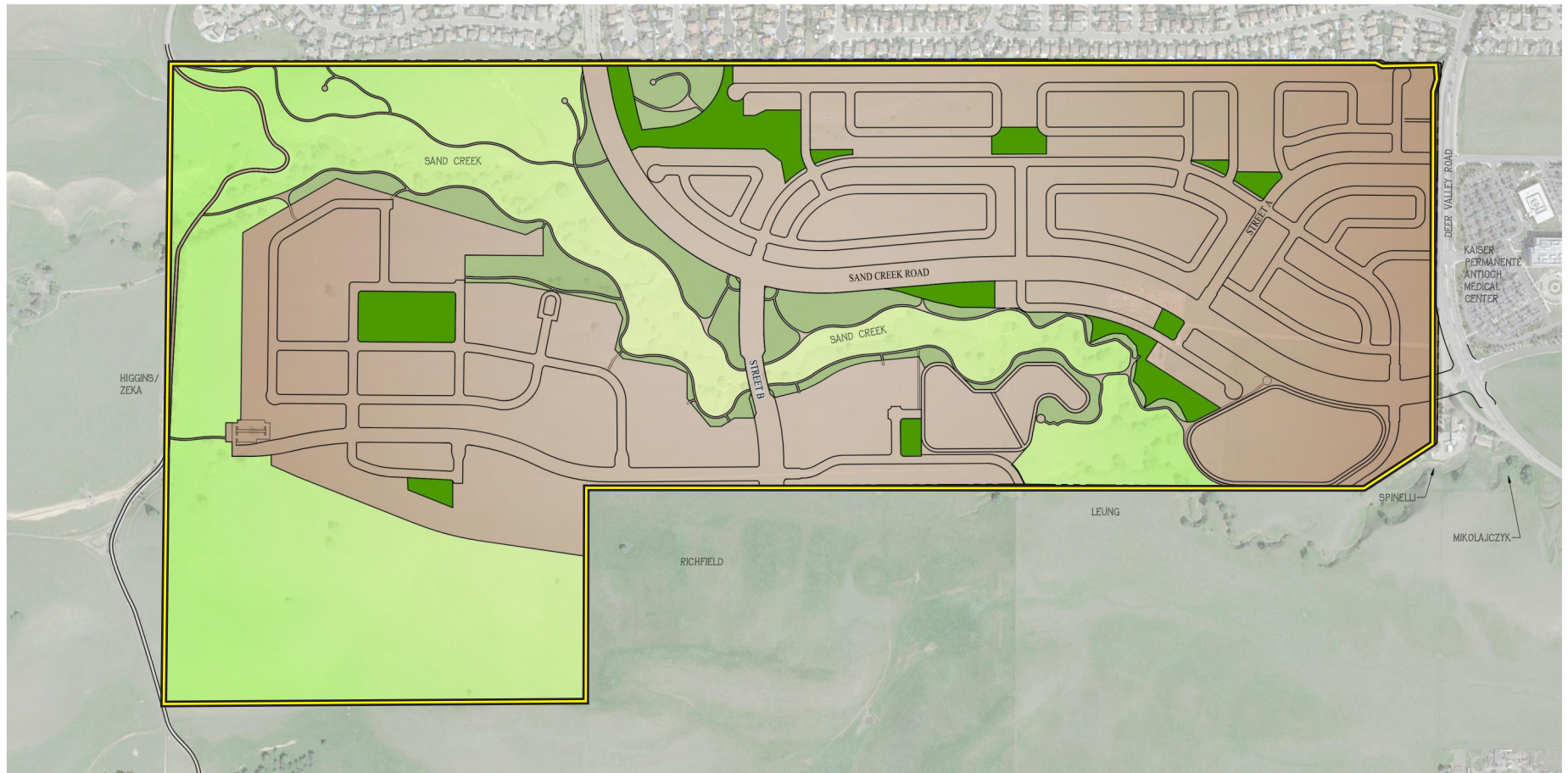
<sup>13</sup> City of Antioch. 2018. Community Development Department. Master Fee Schedule. Website: <https://www.antiochca.gov/fc/finance/Master-Fee-Schedule-09-24-2018.pdf>. Accessed July 8, 2019.



Source: ESRI Aerial Imagery.







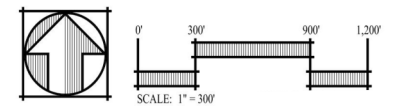
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 Project Site

### LEGEND

	IMPACTED (DEVELOPABLE) AREA = 341.8± AC
	ON-SITE PRESERVE = 170.1± AC
	ON-SITE PASSIVE OPEN SPACE = 39.0± AC
	PARKS = 20± AC



Source: CBG Civil Engineers, March 13, 2020.

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## Local

### ***The City of Antioch General Plan***

#### *Growth Management Element*

- **Objective 3.5.1.1:** Ensure that community centers provide sufficient space to conduct civic meetings, recreational programs, and social activities to meet the needs of Antioch residents.
- **Standard 3.5.1.2:** Maintain a minimum of 750 square feet of space per 1,000 population.
- **Objective 3.5.2.1:** Maintain competent and efficient fire prevention and emergency fire, medical and hazardous materials response services with first responder capability in order to minimize risks to life and property.
- **Standard 3.5.2.2:** Prior to the approval of discretionary development projects, require written verification from the Contra Costa County Fire Protection District that a five-minute response time (including a three-minute running time) can be maintained for 80 percent of emergency fire, medical, and hazardous materials calls on a citywide response area basis.
- **Objective 3.5.3.1:** Maintain an active police force, while developing programs and police facilities that are designed to enhance public safety and protect the citizens of Antioch by providing an average response time to emergency calls of between seven and eight minutes from the time the call is received to the time an officer arrives.
- **Standard 3.5.3.1:** Maintain a force level within a range of 1.2 to 1.5 officers, including community service officers assigned to community policing and prisoner custody details, per 1,000 population. The ratio of community service officers assigned to community policing and prisoner custody details to sworn officers shall not exceed 20 percent of the total number of sworn officers.
- **Objective 3.5.7.1:** A system of park, recreational, and open space lands of sufficient size in appropriate locations, including provisions of a range of recreational facilities, to serve the needs of Antioch residents of all ages.
- **Standard 3.5.7.2:** Provide five acres of improved public and/or private neighborhood parks and public community parkland per 1,000 population, including appropriate recreational facilities.
- **Objective 3.5.8.1:** Provision of schools in locations that are readily accessible to student populations along with sufficient facilities to provide educational services without overcrowding.
- **Standard 3.5.8.2:** Require new development to provide necessary funding and/or capital improvements to mitigate projected impacts on school facilities, as determined by the responsible school district.
- **Standard 3.5.9.2b:** Require new development to fund public facilities and infrastructure, either directly or through participation in a land-based financing district, as necessary to mitigate the impacts of new development on public services and facilities.
- **Standard 3.6.1a:** Provide for a reasonable rate of residential growth that ensures that ability of the City to provide housing opportunities for all economic segments of the community as required by State Housing Element law, and that facilitates the ability of public services and facilities provided by the City and outside agencies to expand at a commensurate rate.
- **Policy 4.4.6.7b.ii:** Development of an appropriate level of pedestrian and bicycle circulation throughout the community is to be provided, including pathways connecting the residential

neighborhoods, as well as non-residential and recreational components of the community. Sand Creek Focus Area development should also provide recreational trail systems for jogging and bicycling, including areas for hiking and mountain biking. Trails along Sand Creek and Horse Valley Creek shall be designed so as to avoid impacting sensitive plant and amphibian habitats, as well as water quality.

- **Objective 8.3.1:** Provide public and cultural facilities supportive of a high level of community activities, and facilitating conduct of the daily operations of municipal government.
- **Policy 8.3.2d:** Work with the Contra Costa Library System to achieve and maintain facilities and titles consistent with the standards of the American Library Association.
- **Objective 8.8.1:** Cooperate with the Antioch Unified School District, Brentwood School District, and the Liberty Union High School District to facilitate the acquisition of sites and the construction of school facilities such that all school age children have access to uncrowded school facilities providing superior educational opportunities.
- **Policy 8.8.2b:** Coordinate the planning efforts of the City and local school districts by:
  - Locating school facilities to facilitate the primary educational purpose of the facility and allow for safe pedestrian, bicycle, and vehicular access, including the provision of traffic calming measures, where appropriate, in the vicinity of schools;
  - Maximizing the joint use of facilities by the City and local school district (including, joint school/park sites and, where feasible, joint use of athletic fields, community meeting facilities, and provision of child and senior care facilities) by developing joint funding for such facilities through a combination of school district and City sources, provided that City contributions to joint facilities are consistent with the availability of such joint facilities to meet non-school recreational and other community needs;
  - Designing attractive facilities that can also serve as neighborhood and community gathering places, and contribute to neighborhood identity and pride;
  - Requiring reasonable reservation of appropriate locations for development of new schools as part of new development; and
  - Regularly exchanging information on (1) the status of development review and construction, (2) the capacity of area schools, (3) the status of site acquisitions by the districts, and (4) applicable student generation factors by type of development.
- **Policy 8.8.2c:** Require new development to pay all legally established fees or participate in land-based financing districts established by local school districts for the acquisition and development of school sites with adequate, permanent classroom space, as required by the local school district.
- **Policy 8.8.2d:** Maintain land development regulations permitting the development of public and private educational facilities at appropriate locations within the Planning Area.
- **Policy 8.8.2e:** Provide incentives in the City's residential growth management program for the provision of developer assistance to local school districts beyond nominally required mitigation fees. The objective of such incentive is that the combination of required feed and incentives provide a full contribution proportional to the needs of the proposed development for all school-related facilities to serve the proposed project.
- **Objective 8.9.1:** Maintain a system of parks, specialized recreational facilities, and natural open spaces of sufficient size and variety and in the appropriate locations to serve the needs of Antioch residents of all ages.

- **Policy 8.9.2a:** Provide a comprehensive system of recreation and park facilities and services needed by various segments of the City's population—including specific age groups, persons with special physical requirements, and groups interested in specific recreational activities—and make these facilities and services easily accessible and affordable to all users.
- **Policy 8.9.2b:** Provide a range of public parklands for use by the community including the following.
  - **Neighborhood Park:** A park or playground generally five to ten acres in size primarily developed to meet the recreational needs of citizens living within 0.5 to one mile.
  - **Joint School/Park:** A neighborhood park development, improved, and maintained on or adjacent to school grounds by the City. Joint school/park facilities are utilized jointly by students and residents from the surrounding neighborhoods. Since school facilities are only available for use by the general public when school is not in session, only half of the total acreage is to be applied to the City's park standard.
  - **Community Park:** A larger park or facility developed to meet the park and recreational needs of those living or working within a three to 5-mile radius. Community parks generally range in size from 10 to 60 acres.
  - **Regional Park:** A park having a wide range of improvements not usually found in neighborhood or community parks, and designed to meet recreational needs of an entire regional population. Regional parks are generally over 100 acres and serve a population within a 30-minute driving time. Regional parks are generally provided by County and State agencies and are therefore not included in local park standards.
  - **Specialized Recreation Areas:** These include recreational areas of facilities devoted to specific activities or uses. Examples include linear parks (trails), sports and ball field complexes, swimming pools, river access and viewing areas, bicycle facilities, and riverfront trail and sitting areas, and marinas and boat launch facilities.
    - \* The facilities identified above, with the exception of regional parks devoted to preserving the natural environment, generally require relatively flat land. Areas over 10 percent slope will be reviewed by the City prior to dedication to determine the extent to which they serve the intended purposes of the park and to which dedication of such sloping lands will therefore be credited against the applicable performance standards of the Growth Management Element.
- **Policy 8.9.2c:** Maintain a minimum size for neighborhood parks of five acres or more, unless there is a specific need for a smaller facility.
- **Policy 8.9.2e:** Provide passive and active elements within neighborhood and community parks to meet the needs of citizens of all ages and interests, and thereby ensuring that the needs for lands for athletics and team sports is an equal to the provision of tranquil settings for picnicking, walking, and relaxation.
- **Policy 8.9.2f:** Develop athletic field complexes and specialized recreation areas to accommodate the growing community needs for such facilities.
- **Policy 8.9.2g:** Encourage the preservation of significant natural features and development of landscaped parkways and trail systems in new development in addition to required park development.

- **Policy 8.9.2h:** Work with Contra Costa County to establish joint use flood control/recreational facilities, including multi-use trails and open space along channels and creeks, and within detention basins.
- **Policy 8.9.2i:** Provide incentives in the City's residential growth management program for the dedication and improvement of useable parklands beyond those normally required by the City.
- **Policy 8.9.2l:** Recognize that high quality maintenance and upkeep of park facilities is necessary for the economic health of the community, and place appropriate priority on park maintenance.
- **Policy 8.9.2m:** Locate new park facilities so that they are highly visible from adjacent streets and neighborhoods to increase safety and enhance visual quality.
- **Policy 8.9.2n:** Require the provision of private play space for children in small lot single family subdivisions and attached residential development.
- **Objective 8.10.1:** Provision of an adequate number of fire stations, along with firefighting personnel and equipment to protect Antioch residents and businesses.
- **Policy 8.10.1a:** Work with the Contra Costa County Fire Protection District to provide high quality fire protection services to area residents and businesses. The City's role should include, but not be limited to:
  - Determining the appropriateness of station location sites;
  - Enforcement of building codes to reduce fire hazards;
  - Collection of mitigation fees established by the fire district to construct needed additional stations within the Antioch Planning Area.
  - Support the District in providing funding for personnel costs to staff stations within the City;
  - Support the District in establishing fees that are adequate to mitigate the impacts of new development and income to support operation of new stations whose construction is financed with development fees; and
  - Requiring reasonable reservation of appropriate sites for new fire stations as part of new development.
- **Policy 8.10.1d:** Involve the Fire Protection District in the development review process by referring development requests to the Fire District for review and comment.
- **Policy 8.10.2a:** Work with the Contra Costa County Fire Protection District to provide high quality fire protection services to area residents and businesses.
- **Objective 8.11.1:** Reduce the risk of crime and provide security to Antioch residents and businesses through maintenance of an adequate force of police personnel, physical planning strategies, and a high level of public awareness and support for crime prevention.
- **Policy 8.11.1a:** Provide an adequate police force meeting the performance standards for police services set forth in the Growth Management Element.
- **Policy 8.11.1b:** Provide sufficient facilities and staffing to ensure the safety of the citizens of Antioch by:
  - Providing expedient response to emergency calls.
  - Maintaining an efficient well-trained and adequately equipped force of police personnel.
  - Providing neighborhood watch and crime prevention programs, and attempting to improve the participation of individual neighborhoods and businesses.
  - Continuing to provide a variety of programs within the Police Department (e.g., traffic crime prevention, REACH, narcotics, investigations) to meet the needs of an active community.

- **Policy 8.11.1c:** Provide basic requirements and incentives for the provision of design features in new development to reduce the potential for crime.
  - Provide well-lighted and visible streets and street names, entrances, addresses, recreation areas, and parking areas.
  - Limit access into and between buildings to reduce escape routes and undetected entry is made difficult.
  - Provide landscaping which permits surveillance of open areas and entryways, and does not create places for concealment.
  - Within multi-family and non-residential developments, design access systems to allow emergency vehicle access around buildings to the greatest extent possible.
  - Within multi-family and non-residential developments, eliminate the potential for access to roofs by pallets, flag poles, etc.
- **Policy 8.11.1d:** Involve the Antioch Police Department in the development review process by referring development requests to the Police Department for review and comment.
- **Objective 8.13.1:** Ensure that the expansion of public facilities occurs in an equitable manner such that new development pays for all of the infrastructure and public facilities required to support the development without impacting levels of service provided to existing residents and businesses.
- **Policy 8.13.2a:** Place the ultimate responsibility on the sponsor of proposed development projects for ensuring that the services and facilities needed to support the project and maintains applicable performance standards in the Growth Management Element are available at the time they are needed.
- **Policy 8.9.2b:** Require that new development:
  - Participate in a land-based financing district, construct, and/or pay for the new onsite capital improvements required to meet the applicable performance standards of the Growth Management Element;
  - Be phased so as to ensure the services and capital facilities used by the new development meet the applicable performance standards of the Growth Management Element; and
  - Ensure that, in the event public services or off-site capital facilities do not meet the applicable performance standards of the Growth Management Element prior to approval of the project, the level of service provided to existing development will not be further impacted by new development.
- **Policy 8.9.2f:** As part of new development proposals, determine whether any service level deficiencies might result, and place needed conditions on the proposed development to ensure that:
  - Service level standards will continue to be met, and
  - New development will not result in any substantial, short- or long-term reduction in the level of municipal services provided by the City to existing developed areas.
- **Objective 10.3.1:** Maintain, preserve and acquire open space and its associated natural resources by providing parks for active and passive recreation, trails, and by preserving natural, scenic, and other open space resources.
- **Policy 10.3.1d:** Where significant natural features are present (e.g., ridgelines, natural creeks and other significant habitat areas, rock outcrops, and other significant or unusual landscape features), require new development to incorporate natural open space areas into project

design. Require dedication to a public agency or dedication of a conservation easement, preparation of maintenance plans, and provision of appropriate long-term management and maintenance of such open space areas.

- **Policy 10.5.1c:** In designing buffer areas, the following criteria shall be considered and provided for (when applicable) within the buffer areas to avoid or mitigate significant impacts.
  - **Fire Safety:** How will development affect the risk of fire on adjacent open space and resource areas? How would development affect or be affected by existing fire abatement practices on adjacent open space and resource areas, including livestock grazing, prescribed fire, plant pest management, mowing, disking, ecological restoration and other practices?
  - **Public Safety:** How will development adjacent to open space or resource areas increase the risk of vandalism, trespass, and theft in adjacent open space and resource areas?
  - **Public Access Management:** How will development adjacent to public open space and resource areas affect the maintenance of existing public facilities, such as roads, trails, fences, gates and restrooms? How might development adjacent to open space or resource areas facilitate illegal public access?
  - **Buffer Management:** How can appropriate management of lands that are set aside as buffers between development and open space or resource areas be ensured?

### ***City of Antioch Municipal Code***

The City of Antioch Code of Ordinances sections related to public services that are applicable to the project area presented below:

#### **Section 3-7.04 Payment of Fees; Uses.**

Upon the adoption of the resolution referred to in § 3-7.03 of this chapter, developments shall pay fees for fire protection facilities as a condition of approval. The City and the Contra Costa County Fire Protection District shall enter into a binding agreement regarding how the collected fees will be used to provide fire protection facilities. Upon the execution of such agreement by both agencies, the fees which are collected shall be transferred to the Contra Costa County Fire Protection District and shall be used only for the purpose of providing fire protection facilities, as defined in County Ordinance Chapter 818-2.  
(‘66 Code, § 3-7.04) (Ord. 658-C-S, passed 1-29-87)

#### **Section 3-7.05 Fee Schedule.**

The amount of fees imposed shall be as follows:

- (A) Per single-family dwelling unit, \$951;
- (B) Per multi-family dwelling unit, \$451;
- (C) Per 1,000 square feet of office space, \$568;
- (D) Per 1,000 square feet of commercial space, \$649; and
- (E) Per 1,000 square feet of industrial space, \$379.

The definition of single-family, multi-family, office, commercial, and industrial is found in Section 3-9.03 of this code.

(‘66 Code, § 3-7.05) (Ord. 658-C-S, passed 1-29-87; Am. Ord. 1097-C-S, passed 7-10-07)

### **Section 3-7.06 Collection of Fire Protection Facility Fees.**

The fees required by this chapter shall be imposed and collected at the time the building permit is issued, irrespective of whether a subdivision map has been approved prior to the adoption of this chapter. In cases where a building permit is not required, the payment shall be a condition precedent to the provision of water to the project by the city. Such fees shall be placed into an interest-bearing trust account, to be used for no other purpose. The City Manager and the Fire Chief of the Contra Costa County Fire Protection District shall administratively adopt procedures for the transfer of funds from the city to the Fire Protection District. Such fees shall not be considered city “proceeds of taxes” under Article XIII B of the Constitution of the State. The city shall retain 1% of the amount of the fees collected to reimburse itself the cost of administering this chapter.

### **Section 8-12.01 Building Permits; Clearance Required**

No building permit shall be issued for the construction of new residential or commercial projects until the person applying for the permit presents evidence from the Antioch Unified School District that its requirements for school impact mitigation have been satisfied.

#### *Section 9-4.1004 Standards and Formula for the Dedication of Land*

Per Section 9-4.1004 of the Antioch Municipal Code, the proportion of a subdivision to be dedicated or the amount of fees to be paid in lieu thereof, or a combination of both, must be determined based on the average number of persons per dwelling unit and the City’s standard of 5 acres of dedicated land per 1,000 persons. Table 3.13-3 below summarizes the City’s dedication standards.

**Table 3.13-3: City Standards and Formula for the Dedication of Park and Recreational Lands**

Unit Category	Average Person Per Dwelling Unit	Average Requirement Per Dwelling Units
Single-family, Detached	3.0	0.015
Single-family, Attached	2.2	0.011
Duplexes	1.9	0.0095
Multi-family	1.9	0.0095
Source: Antioch Municipal Code 2019.		

### **Section 9-4.1005 Fee Determination.**

- (A) *Formula determination.* The Council finds that the fees established by § 9-4.1007 of this article represents the value of the land prescribed for dedication in § 9-4.1004 of this article.
- (B) *Fees in lieu of land; 50 parcels or less.* If the proposed subdivision contains 50 parcels or less, the subdivider shall pay the fee established by § 9-4.1007 of this article, rather than having to dedicate land; except that when a condominium

project, stock cooperative, or community apartment project, as those terms are defined in Cal. Civil Code §§ 4105, 4125 and 4190, exceeds 50 dwelling units, dedication of land may be required, at the option of the city.

- (C) *Use of money.* The moneys collected pursuant to the provisions of this article shall be used only for the purpose of developing new or rehabilitating existing park or recreation facilities to serve a subdivision.

**Section 9-4.1006 Criteria for Requiring Both the Dedication of Land and The Payment of Fees.**

- (A) When only a portion of the land to be subdivided is proposed in the Park and Recreation Element of the General Plan as the site for a park, such portion shall be dedicated for park purposes. The value of such dedication shall be a credit against the fees required for any additional land which would have been required to be dedicated pursuant to § 9-4.1004 of this article.
- (B) When a major part of the park or recreational site has already been acquired by the city, and only a small portion of land is needed from the subdivision to complete the site, such remaining portion shall be dedicated, and the value of such dedication shall be a credit against the fees which otherwise would have been required to be paid. Fees collected shall be used for the improvement of the existing park and recreational facility or for the improvement of other parks and recreational facilities serving the subdivision

**Section 9-4.1007 Amount of Fees in Lieu of Land Dedications.**

The Council finds that the average land value for improved residential land is \$100,000 per acre. Therefore, the amount of fees required to be paid in lieu of land dedication shall be the following amounts. (See Table 3.13-4 below)

**Table 3.13-4: City of Antioch In-Lieu Fees**

Type of Unit	Fee Per Dwelling Unit
Single-family Detached	\$1,500
Single-family, Attached	\$1,100
Duplexes	\$950
Multi-family	\$950
Mobile Home	\$950
Source: Antioch Municipal Code 2019.	

**Section 9-4.1008 Determination of the Dedication of Land or the Payment of Fees.**

Whether the City accepts the dedication of land or elects to require the payment of a fee in lieu thereof, or a combination of both, shall be determined by the consideration of the following:

- (A) The Environmental Resource and Land Use Elements of the General Plan;
- (B) Any adopted Specific Plan for the area;

- (C) The topography, geology, access, and location of land in the subdivision available for dedication;
- (D) The size and shape of the subdivision and the land available for dedication;
- (E) The feasibility of dedication;
- (F) The compatibility of dedication with the General Plan and Specific Plan, if any; and
- (G) The availability of previously acquired park property. The determination of the City as to whether land shall be dedicated or whether a fee shall be charged, or a combination thereof, shall be final and conclusive.

**Section 9-4.1009 Credit for Improvements.**

If the subdivider provides park and recreational improvements to the dedicated land, the value of the improvements, together with any equipment located thereon, shall be a credit against the payment of fees or dedication of land required by this article.

**Section 9-4.1010 Credit for Private Recreation Improvements.**

- A. Planned developments and real estate developments, as defined in Cal. Bus. and Prof. Code § 11003, respectively, shall be eligible to receive a credit, as determined in this section, against the amount of land required to be dedicated, or the amount of the fee imposed, for the value of private open space within the development which is usable for active recreational uses.
- B. Park and recreational uses shall include land and facilities for the activity of recreational community gardening, which activity consists of the cultivation by persons other than, or in addition to, the owner of such land, of plant materials not for sale.
- C. Credit shall be computed on an acre-for-acre basis. A minimum of two acres of contiguous private open space or private recreational facilities shall be provided before any credit shall be given. A maximum credit of six and three-fourths acres shall be allowable for such private open space or private recreational facilities.
- D. To be eligible for credit for private recreation improvements, the following standards shall be met:
  - 1. That yards, court areas, setbacks, and other open areas required to be maintained by the zoning and building laws and regulations shall not be included in the computation of such private open space;
  - 2. That the private ownership and maintenance of the open space is adequately provided for by recorded written agreement, conveyance, or restrictions;
  - 3. That the use of the private open space is restricted for park and recreational purposes by recorded covenant which runs with the land in favor of the future owners of the property and which cannot be defeated or eliminated without the consent of the city or its successor;
  - 4. That the proposed private open space is reasonably adaptable for use for park and recreational purposes, taking into consideration such factors as size, shape, topography, geology, access, and location;
  - 5. That the facilities proposed for open space are in substantial accordance with the provisions of the Park and Recreation Element of the General Plan of the City; and

6. That the open space for which credit is given is a minimum of two acres and provides a minimum of four of the following Local Park Basic Elements or a combination of such and other recreational improvements which will meet the specific recreation park needs of the future residents of the area. [Table 3.13-5]...represents the minimum acreage required before credit will be given for a particular element and the maximum credit which will be allowed for each element, though the element may encompass a larger area:

**Table 3.13-5: City of Antioch Private Recreation Improvements Credit**

Criteria List	Acres	
	Minimum	Maximum
Children's Play Apparatus Areas	0.50	0.75
Family Picnic Areas	0.25	0.75
Landscape Park-like and Quiet Area	0.50	1.00
Game Court Areas	0.25	0.50
Turf Playfields	10.00	3.00
Swimming Pools with Adjacent Deck and Lawn Areas	0.25	0.50
Recreation Center Buildings	0.15	0.25
Source: Antioch Municipal Code 2019.		

- (E) In smaller developments where less than two acres of contiguous private open space or recreational facilities are provided, credit shall be granted on an acre-for-acre basis for the space or facilities so provided.
- (F) Before credit is given, the Parks and Recreation Commission shall make written findings that the standards set forth in this section are met and shall report the same to the Planning Commission which shall in turn recommend to the Council.

**Section 9-4.1011 Procedure.**

- (A) At the time of the review of the tentative subdivision map, the Parks and Recreation Commission shall determine, after a report and recommendation from the City Engineer/Director of Public Works pursuant to the provisions of § 9-4.1008 of this article, the land to be dedicated and/or the fees to be paid by the subdivider. The recommendation by the City Engineer/Director of Public Works and the action of the Parks and Recreation Commission shall be forwarded to the Planning Commission and shall include the following:
- (1) The amount of land required; or
  - (2) That a fee be charged in lieu of land; or
  - (3) That land and a fee be required; and/or
  - (4) That a stated amount of credit be given for private recreation facilities or unique natural and special features and the like;
  - (5) The location of the park land to be dedicated or the use of the in-lieu fees; and

- (6) The approximate time when the development of the park and recreation facility shall commence.
- (B) Such action shall be reviewed by the Planning Commission for recommendation to the Council, which shall then make the final determination. In making its determination, the Council shall be guided by the same standards set forth in this article where applicable.
- (C) At the time of the filing of the final subdivision map, the subdivider shall dedicate the land and/or pay the fees as previously determined by the City.
- (D) Open space covenants for private park or recreational facilities shall be submitted to the city prior to the approval of the final subdivision map and shall be recorded.

**Section 9-4.1012 Schedule of Development and Commitment of Funds.**

The City shall develop a schedule specifying how, when, and where it will use the land or fees, or both, to develop park or recreational facilities to serve the residents of the subdivision. Any fees collected under this article shall be committed within five years after the payment of such fees or the issuance of building permits on one-half of the lots created by the subdivision, whichever occurs later. If such fees are not committed, they shall be distributed and paid to the then record owners of the subdivision in the same proportion that the size of their lot bears to the total area of all lots within the subdivision.

**Section 9-4.1014 Fees to be Placed in the Park Fee Trust Fund.**

Fees received by the City pursuant to this article shall be deposited in a separate Park Fee Trust Fund. Moneys in said fund, including interest earned and accrued on such moneys, shall be expended solely for the purposes described in division (C) of § 9-4.1005 of this article. The Council shall receive a report at least annually on the fee and interest income, expenditures, and status of the Park Fee Trust Fund.

### 3.13.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to 2019 California Environmental Quality Act (CEQA) Guidelines Appendix G, to determine whether impacts related to public services are significant environmental effects, the following question is analyzed and evaluated. Would the project:

Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

- a) Fire protection
- b) Police protection
- c) Schools
- d) Other public facilities

- e) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?
- f) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

### Approach to Analysis

The project site includes dedicated land for a fire station to be constructed and operated by the Contra Costa County Fire Protection District. As such, impacts on fire services were determined by evaluating whether potential adverse physical impacts related to the construction and operation of the proposed fire station could cause significant environmental impacts. Impacts on police services were determined by evaluating whether new or expanded facilities would be required to provide services to the project site and, if required, whether they would result in significant physical impacts. Under CEQA's definition of environmental impacts, an increase in demand on public facilities and services that would result from a project are not, in and of themselves, environmental impacts. (City of Hayward v. Board of Trustees of Cal. State Univ. (2015) 242 CA4<sup>th</sup> 833 (increased demand for emergency services not environmental impact requiring mitigation).) Accordingly, projected population provided by the California Department of Finance (CDF) were also reviewed. Impacts on schools were determined by evaluating the proposed project's effect on existing school enrollment. Projected population and school enrollment data provided by the AUSD and Department of Education were also reviewed. Furthermore, impacts to police, fire, schools, and library facilities were also based on estimates and information received in response to request letters sent to each of these service providers for their input related to possible project impacts.

Impacts related to parks and recreational facilities were determined by evaluating the proposed project's effect on existing park and recreational facility usage levels. In addition, the analysis assesses whether project-related population increases could affect achievement of the City of Antioch General Plan Public Services and Facilities Element standard and, thus, whether there would be need for construction or expansion of parks and recreational facilities in a manner that would result in environmental impacts.

### Impact Evaluation

#### ***Need for New or Altered Fire Protection Facilities***

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<b>Impact PUB-1:</b>	<b>The project could result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection.</b>
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#### ***Construction***

The proposed project would add 1,177 dwelling units, 54,000 square feet of neighborhood commercial uses, and increase the population living in the Sand Creek Focus Area by 3,931 people, resulting in an increased number of emergency calls.

The General Plan calls for one firefighter per 1,000 residents. Thus, the proposed project would require the addition of four firefighters. The Contra Costa County Fire Protection District currently operates four stations in the City of Antioch: Station 81 at 315 West 10<sup>th</sup> Street (4.45 miles away); Station 82 at 196 Bluerock Drive (1.95 miles away); Station 83 at 2712 Gentrytown Drive (4.17 miles away); and Station 88 at 4288 Folsom Drive (2.45 miles away).

Contra Costa County Fire Protection District desires and intends to construct a fire station on all or a portion of the 2.00-acre site identified as Public/Quasi Public (PQP) south and across Sand Creek Road from the Village Center. For the purposes of analysis, the fire station is estimated to be 5,600 square feet and would contain a total of 9 staff members working in 48 hour shifts).

Construction of the proposed fire station would require compliance with mitigation measures and regulations outlined in respective sections of this EIR. Requirements for construction for each topical section are explained below.

As described in Section 3.3, Air Quality, implementation of Mitigation Measure (MM) AIR-2a, which requires implementation of Bay Area Air Quality Management District (BAAQMD) Best Management Practices (BMPs) during construction would reduce potential impacts related to conflict with the 2017 Clean Air Plan. Therefore, construction impacts would be less than significant.

As described in Section 3.4, Biological Resources, the impacts related to special-status species, aquatic resources, and wildlife movement would be reduced to a less than significant level with the implementation of MM BIO-1a through MM BIO-1p, MM BIO-3, and MM BIO-4. Therefore, construction impacts related to biological resources would be less than significant with implementation of pre-construction surveys and specific protocols for special-status species, acquisition of applicable United States Army Corp of Engineers (USACE) and California Department of Fish and Wildlife (CDFW) permits, implementation of BMPs, and prohibitions against the construction of fencing that could hinder migratory wildlife movement.

As described in Section 3.5, Cultural and Tribal Cultural Resources, implementation of MM CUL-1, MM CUL-2, and MM CUL-3 would reduce construction impacts to a less than significant level. Therefore, construction of the fire station would result in less than significant impacts related to cultural resources and tribal cultural resources.

As discussed in Section 3.6, Geology and Soils, implementation of MM GEO-1a, MM GEO-1b, MM GEO-2, and MM GEO-3 would reduce project construction impacts to a less than significant level.

As described in Section 3.8, Hazards, Hazardous Materials, and Wildfire, implementation of MM HAZ-2a, MM HAZ-2f, and MM HAZ-2h would require implementation of a number of actions that would reduce impacts to a less than significant level. Actions would include completion of a pre-construction hazardous materials survey, completion of a Phase II Environmental Site Assessment, and preparation of safety guidelines for construction workers.

As described in Section 3.9, Hydrology and Water Quality, construction impacts would be less than significant, and no mitigation would be required because all construction in California is required to

comply with local, State, and federal water quality laws and regulations. Therefore, construction of the fire station would result in less than significant impacts to hydrology and water quality.

As described in Section 3.11, Noise, implementation of MM NOI-1a would reduce construction noise to a less than significant level through limiting construction hours, as well as compliance with standard mitigation to reduce construction equipment noise.

As described in Section 3.14, Transportation, implementation of TRANS-1a, would reduce construction impacts to a less than significant level through the implementation of a traffic construction management plan.

Based on the foregoing, construction of the proposed fire station would result in less than significant impacts.

### **Operation**

According to Mike Quesada, Interim Assistant Fire Chief of the Contra Costa County Fire Protection District, Station 82 is 5,600 square feet and is staffed with 9 employees.<sup>14</sup> Each shift at Station 82 is 48 hours long. Station 82 receives between approximately 2,000 and 2,500 emergency calls annually. It is expected that the proposed fire station would be staffed with a similar number of employees and be similar in square footage on a similarly-sized site and field a similar number of calls. The site would also operate similar equipment (i.e., one Type 1 Fire Engine, one Type 2 Rescue Engine, one decontamination (Decon) trailer, one Mass Casualty Incident (MCI) trailer, one confined space trailer, and one Type 3 Rescue Engine).<sup>15</sup> The proposed fire station would be located along a proposed extension of Sand Creek Road, just west of Deer Valley Road. As discussed in Section 3.1, Aesthetics, the buildout of the entire proposed project would obstruct views of a protected scenic resource, Mount Diablo, from a General Plan designated view corridor, Deer Valley Road. However, the fire station itself would not independently significantly impact such views, as it would be sited behind two existing homes and outbuildings that is located along Deer Valley with significant mature vegetation that already obscures the fire station site and views of Mt. Diablo from passing motorists. As such, the operation of the fire station would result in less than significant impacts to visual character within the project area, and no mitigation is required.

As discussed in Section 3.4, Biological Resources, implementation of MM NOI-1b, MM NOI-1c, MM NOI-1d, and incorporation of setbacks into the proposed project design would result in less than significant operational impacts to special-status species.

As mentioned in Section 3.7, Greenhouse Gas Emissions and Energy, operation of the fire station is expected to generate approximately 1 metric ton of carbon dioxide equivalent per year (MT CO<sub>2</sub>e/year). Compared to the other emissions resulting from the proposed project, including mobile, waste decomposition, water transport, and amortized construction emissions, this would not result in a significant impact. Therefore, operational impacts of the station related to GHG emissions would be less than significant.

<sup>14</sup> Contra Cost County Fire Protection District. Phone Conversation with Mike Quesada, Interim Assistant Fire Chief. December 18, 2019.

<sup>15</sup> Contra Costa County Fire Protection District. Phone Conversation with Mike Quesada, Interim Assistant Fire Chief. December 20, 2019.

As mentioned in Section 3.8, Hazards, Hazardous Materials, and Wildfire, operational impacts related to hazards, hazardous materials, and wildfire would be less than significant with the implementation of MM TRANS-7.

As described in Section 3.9, Hydrology and Water Quality, operational impacts would be less than significant.

As described in Section 3.10, Land Use and Planning, project operation would have less than significant impacts related to the division of an established community, nor would it conflict with an applicable land use plan, policy, or regulation. Therefore, operational impacts of the fire station related to land use and planning would be less than significant.

As described in Section 3.11, Noise, operational noise impacts related to parking lot activities, mechanical equipment operations, and standby generator operations would not be in excess of standards established in the City of Antioch General Plan or noise ordinance, and therefore would be less than significant. In addition, the intermittent noise that would result from emergency vehicle sirens are regulated and required pursuant to public health and safety regulations and are therefore exempt from the City's noise performance standards. Furthermore, it should be noted that the Contra Costa County Fire Protection District will implement Opticom™ Intelligreen Priority software for traffic control at the nearest intersections to minimize emergency vehicle delay by giving priority to exiting vehicles, which would minimize the duration of siren noise in the project vicinity. Therefore, operation of the fire station would not result in a substantial increase in ambient noise levels in the project vicinity and the impact would be less than significant.

As described in Section 3.12, Population and Housing, the proposed project would have a less than significant impact related to the increase in population and necessity for housing. Therefore, operational impacts would be less than significant, and no mitigation is required.

As described in Section 3.14, Transportation, the Transportation Impact Assessment estimated separate trip generation for the Village Center under the assumptions that it would be developed with a retail option or with an office option. As shown in Tables 3.14-5 and Table 3.14-6, the proposed fire station is expected to result in 20 total weekday trips. This number is less than the proposed weekday peak-hour trips under the retail option or office option for the project's village center which were determined to have less than significant impacts. Therefore, the proposed fire station would not result in or contribute to significant impacts to traffic. In addition, as mentioned above, the Contra Costa County Fire Protection District would utilize Opticom™ Intelligreen Priority software that would ensure that the nearest traffic signal would remain green in the event of an emergency, which would ensure adequate emergency access and circulation. Implementation of MM TRANS-1b, MM TRANS-1c, MM TRANS-2, MM TRANS-3f, MM TRANS-7, MM TRANS-8a, MM TRANS-8b, and MM TRANS-8c would require improvements to further reduce project impacts to the circulation system.

Lastly, as discussed in Section 3.15, Utilities and Service Systems, operation of the fire station would not result in significant impacts related to water or wastewater supply, or water, wastewater, electric

power, telecommunications, natural gas, or solid waste facilities. Impacts would be less than significant, and no mitigation is required.

Updated Fire Facilities Impact Fees were recently adopted by the City, which increased the fee to \$951 per single-family home. A Community Facilities District (CFD) fee may be established for the proposed project through the proposed development agreement which, if established would provide additional funding for fire station operation. According the Contra Costa County Fire Protection District, the minimum charge for the CFD per house should be \$350 annually to assist in the funding difference between the cost of the proposed fire station operation and property taxes from the project at full buildout. Additionally, the CFD fee would assist in the funding, operations, and staffing of the proposed fire station due to the anticipated gap between the property tax revenue at full buildout of the Sand Creek Focus Area and the annual cost of staffing and operation the fire station to serve the project area.

Based on the foregoing analysis, the operation of the fire station would not result in significant impacts to the environment.

#### ***Level of Significance Before Mitigation***

Potentially Significant

#### ***Mitigation Measures***

Implementation of MM AQ-2a, MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4, MM CUL-1, MM CUL-2, MM CUL-3, MM GEO-1a, MM GEO-1b MM GEO-2, and MM GEO-3, MM HAZ-2a, MM HAZ-2f, MM HAZ-2h MM NOI-1a, MM NOI-1b, MM NOI-1c, MM TRANS-1a, TRANS-1b, MM TRANS-1c, MM TRANS-2, MM TRANS-7, MM TRANS-8a, MM TRANS-8b, and MM TRANS-8c.

#### ***Level of Significance After Mitigation***

Less than Significant

#### ***Need for New or Altered Police Protection Facilities***

<b>Impact PUB-2:</b>	<b>The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection.</b>
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#### ***Construction/Operation***

The APD would provide police services to the project site during construction and over the course of its operation. Buildout of the proposed project would result in the development of approximately 1,177 residential units and would house an estimated 3,931 residents. In addition, the proposed project would include a Village Center area capable of accommodating up to 54,000 square feet of commercial, office, and retail space. As a result of the added population and commercial development, the APD would experience an increase in demand for police services within Beat 5.

Standard 3.5.3.2 in the City’s General Plan requires the APD to maintain a staffing ratio of approximately 1.2 to 1.5 officers per 1,000 residents. Using the higher ratio of 1.5 officers per 1,000 persons, the proposed project would trigger the need for 2.5 new officers in Phase 1 (1,500 residents) and 5.8 new officers at buildout (at 3,931 residents). The General Plan also sets a goal of response times between 7 and 8 minutes, which the APD almost meets (the current average response time is 8 minutes and 27 seconds).<sup>16</sup> The APD currently has 112 sworn officers with a City population of 114,000.

The proposed project would include annexation of the project site into a CFD for financing police services; the proposed project would also be required to pay an associated annual tax of \$445 per unit. With the addition of the proposed project, the APD would employ a total 143 officers and staff. Police headquarters is located in downtown Antioch, in a 67,000-square-foot facility, which features an indoor firing range, weight training and exercise room, and a community meeting room. Typically, approximately 475 square feet is needed per employee. If there were 143 officers and staff, approximately 67,925 square feet of headquarters space would be required at the buildout of the proposed project. Given the City currently has a 67,000-square-foot Police Headquarters, the proposed project would not trigger the need for a new facility. Therefore, the proposed project would not result in any adverse physical impacts associated with the provision of a new facility.

### ***Level of Significance***

Less Than Significant

### ***Schools***

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<b>Impact PUB-3:</b>	<b>The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for schools.</b>
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### ***Construction/Operation***

The project does not propose to construct any schools. The project site is located within the AUSD. The proposed project consists of a master planned residential community. The closest schools to the project site include Lone Tree Elementary School, which is approximately 0.76 mile northeast of the site, Deer Valley High School located approximately 0.84 mile from the site, and Dozier-Libbey Medical High School, which is approximately 0.86 mile southeast of the site. Additionally, Dallas Ranch Middle School is approximately 1.36 miles from the site. Because the proposed project consists of a multi-generational plan, the 422 Age Restricted (AR) units would not contribute to an increase in school-aged children. Therefore, the analysis in this section is based on the number of residential units within the project area excluding AR units, which totals 755 units.

The proposed project would result in approximately 3,931 new residents to the City of Antioch. Based on the response received from AUSD Deputy Superintendent, Jessica Romeo, using the current generation factor used by the School District, the proposed project would result in an estimated increase of 378 students for the elementary level, 114 students for the middle school level, and 189

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<sup>16</sup> City of Antioch 2019. Email Communication with Alexis Morris, Planning Manager. December 16, 2019.

students for the high school level based on the proposed 755 dwelling units.<sup>17</sup> Table 3.13-6 below summarizes the current enrollment and ratios and capacity for schools serving the project area.

**Table 3.13-6: Current School Capacity and Enrollment Ratios**

School Year	Site Code	School Site	Actual	Capacity	Ratio
<b>Elementary School</b>					
2018/2019	103	Diablo Vista Elementary School	482	870	55 percent
<b>Middle School</b>					
2018/2019	153	Dallas Ranch Middle School	911	1,560	58 percent
<b>High School</b>					
2018/2019	202	Deer Valley High School	1,986	3,450	58 percent

According to the correspondence with Ms. Romeo, Diablo Vista Elementary School would likely require construction of new classroom buildings to accommodate growth resulting from the proposed project. However, existing middle school and high school facilities should be able to accommodate the proposed growth.<sup>18</sup>

The project Applicant would be required to pay school impact fees prior to the receipt of building permits for future development. According to the AUSD's website, residential development within the City of Antioch is required to pay \$3.79 per square foot in development fees.<sup>19</sup> School impact fees may be used by the AUSD to fund the acquisition of new school sites and/or the construction of new school facilities, the construction of which are studied under those particular CEQA documents. Proposition 1A/SB 50 prohibits local agencies from using the inadequacy of school facilities as a basis for denying or conditioning approvals of any "[...] legislative or adjudicative act . . . involving . . . the planning, use, or development of real property" (Government Code 65996(b)). Satisfaction of the Proposition 1A/SB 50 statutory requirements by a developer is deemed "full and complete mitigation." With adequate payment of development impact fees to the AUSD, impacts related to the need for new or altered school facilities would be less than significant.

### **Level of Significance**

Less Than Significant.

<sup>17</sup> Antioch Unified School District (AUSD). 2019. Mail Correspondence with Jessica Romeo, Deputy Superintendent. June 27, 2019.

<sup>18</sup> Antioch Unified School District (AUSD). 2019. Mail Correspondence with Jessica Romeo, Deputy Superintendent. June 27, 2019.

<sup>19</sup> Antioch Unified School District (AUSD). 2019. Developer Fees. Website: <https://www.antiochschools.net/Page/284>. Accessed June 24, 2019.

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## **Libraries**

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**Impact PUB-4:** The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities, or the need for new or physically altered library facilities, the construction of which could cause significant environmental impacts.

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### **Construction/Operation**

The project does not propose to construct any library facilities. The proposed project is located within the jurisdiction of Contra Costa County Library. Contra Costa County operates all public libraries in East County, including the City of Antioch, with funds from residents' property taxes. The nearest library to the project site is the 1,500-square-foot Prewett Library, located approximately 1.1 miles northeast. The proposed project would result in an increase of 3,931 individuals to the City of Antioch. Population growth associated with the proposed project would result in an increase in demand for library services in the City of Antioch.

According to County Librarian, Melinda Cervantes, the City of Antioch is responsible for the expansion and/or construction of library facilities within its jurisdictional boundaries. Additionally, Contra Costa County Library receives an annual allocation of approximately 1.5 percent of property tax revenue collected by the County. There is no specific development fee currently assessed by or for the library. Ms. Cervantes also confirmed that Contra Costa County Library can accommodate, with limited services, new library uses resulting from the increase in residents by the proposed project. While the 1,500-square-foot Prewett Library has insufficient spaces to deliver the expanded programs and services provided at full service libraries such as Brentwood and Concord Library, an increase in Prewett Library service hours from 35 hours per week to 50 hours per week (for an additional 15 hours per week) for 6 days of service would also improve the provision of library services for new residents.

The population growth associated with the proposed project would increase the demand on library services for the City of Antioch. The Contra Costa County Library system is funded primarily by local taxes, and the proposed project would substantially increase the number of houses paying taxes, and, thus, would generate additional revenue for the library system. The additional revenue is anticipated to provide funding for the Contra Costa County Library system to plan and purchase additional volumes, or to expand staff or facilities as part of long-term library planning. However, new library facilities are not proposed as part of the project, and a less-than-significant impact would occur related to the construction of new library facilities.

### **Level of Significance**

Less Than Significant

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***Effects of Increased Use of Existing Parks***

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**Impact PUB-5:** The project would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

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***Construction/Operation***

The project consists of a master planned residential community within the Sand Creek Corridor consisting of 1,177 units and housing approximately 3,931 residents. The project design incorporates approximately 20.00 acres of parks of varying sizes and design within the community, in addition to vast amounts of open space, 6 miles of trails, and a 1.00-acre trail staging area. The City of Antioch General Plan sets forth a standard of 5.00 acres of improved public and/or private neighborhood public community parkland per 1,000 population. With the increase in population resulting from the project, an additional 19.60 acres of parkland would be required. With the provision of the park and open space amenities listed above, the project would meet this requirement.

The nearest existing neighborhood park to the project site is Diablo West Park, located approximately 0.71 mile northwest of the site. Additionally, Chaparral Park is located 1.02 miles northeast, Country Manor Park is located 1.7 miles northeast, and Dallas Ranch Park is located approximately 1.16 miles northwest. Contra Loma Regional Park is approximately 2.52 miles northwest of the site, and Antioch/Oakley Regional Shoreline is approximately 4.84 miles north of the site. While the project may increase the use of existing parks, there are several parks and open space areas included in the project design. Additionally, the project would be required to either pay park impact fees for each residential unit prior to the construction of that unit, or dedicate land for park credits, or a combination of both to mitigate for impacts to existing park and recreational facilities. Therefore, the proposed project would not result in substantial deterioration of existing facilities. As such, impacts related to use of existing parks would be less than significant.

***Level of Significance***

Less Than Significant

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***Effects from Provision of Parks or Recreational Facilities***

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**Impact PUB-6:** The project would include the construction of recreational facilities which could have an adverse physical effect on the environment.

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***Construction/Operation***

The project would include 20.00 acres of active public parks, median and landscape areas, in addition to 190 acres of active open space, including 6 acres of trails and a 1.00-acre trail staging area.

As described in Section 3.2, Air Quality, implementation of BAAQMD BMPs during construction would reduce potential impacts related to conflict with the 2017 Clean Air Plan to a less than significant level.

As described in Section 3.3, Air Quality, implementation of MM AIR-2a, which requires implementation of BAAQMD BMPs during construction would reduce potential impacts related to conflict with the 2017 Clean Air Plan. Therefore, construction impacts would be less than significant.

As described in Section 3.4, Biological Resources, the impacts related to special-status species, aquatic resources, and wildlife movement would be reduced to a less than significant level with the implementation of MM BIO-1a through MM BIO-1p, MM BIO-3, and MM BIO-4. Therefore, construction impacts related to biological resources would be less than significant with implementation of pre-construction surveys and specific protocols for special-status species, acquisition of applicable USACE and CDFW permits, implementation of BMPs, and prohibitions against the construction of fencing that could hinder migratory wildlife movement.

As described in Section 3.5, Cultural and Tribal Cultural Resources, implementation of MM CUL-1, MM CUL-2, and MM CUL-3 would reduce construction impacts to a less than significant level. Therefore, construction of the fire station would result in less than significant impacts related to cultural resources and tribal cultural resources.

As discussed in Section 3.6, Geology and Soils, implementation of MM GEO-1a, MM GEO-1b, MM GEO-2, and MM GEO-3 would reduce project construction impacts to a less than significant level.

As described in Section 3.8, Hazards, Hazardous Materials, and Wildfire, implementation of MM HAZ-2a, MM HAZ-2f, and MM HAZ-2h would require completion of a pre-construction hazardous materials survey, completion of a Phase II Environmental Site Assessment, and preparation of safety guidelines for construction workers.

As described in Section 3.11, Noise, implementation of MM NOI-1a would reduce construction noise to a less than significant level through limiting construction hours and compliance with standard mitigation to reduce construction equipment noise.

As described in Section 3.14, Transportation, implementation of MM TRANS-1a, would reduce construction impacts to a less than significant level.

With the implementation of MM AQ-2a, MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4, MM CUL-1, MM CUL-2, MM CUL-3, MM GEO-1a, MM GEO-1b, MM GEO-2, MM GEO-3, MM HAZ-2a, MM HAZ-2f, MM HAZ-2h, MM NOI-1a, and MM TRANS-1a, impacts due to construction of recreational facilities would be reduced to less than significant. Operational impacts would be less than significant, as effects related to the provision of parks and recreational facilities are limited to construction.

### ***Level of Significance Before Mitigation***

Potentially Significant

### ***Mitigation Measures***

Implementation of MM AQ-2a, MM BIO-1a through MM BIO-1p, MM BIO-3, MM BIO-4, MM CUL-1, MM CUL-2, MM CUL-3, MM GEO-1a, MM GEO-1b, MM GEO-2, M GEO-3, MM HAZ-2a, MM HAZ-2f, MM HAZ-2h, MM NOI-1a, and MM TRANS-1a.

### ***Level of Significance After Mitigation***

Less Than Significant

### 3.13.5 - Cumulative Impacts

The geographical scope of the cumulative public services analysis for fire protective services is the boundary of the Contra Costa County Fire Protection District; for school services it is the boundary of the Antioch Unified School District and for police protective and library services, it is the City boundaries. Because of the differences in nature of the public service topical areas, they are discussed separately.

#### Fire Protection Facilities

Other cumulative projects listed in Section 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, in conjunction with the proposed project would result in residential, commercial, and office development. Cumulative development in the surrounding area would be expected to substantially increase permanent residents and daytime population, which includes employees and visitors/patrons. The cumulative increase in population could in turn result in an increased demand for fire protection facilities and would be considered potentially significant.

As discussed above, this Draft EIR analyzes construction and operational impacts of a 5,600 square foot fire station with nine employees on the PQP site located on the south side of Sand Creek Road, west of Deer Valley Road and across from the Village Commercial Center. The cumulative impacts of constructing and operating a new fire station on-site have been analyzed in the relevant impact chapters (i.e., Air Quality, Traffic, Noise, etc.). The construction and operation of fire facilities within the project site would not have a cumulatively considerable impact. Thus, the cumulative impact of providing fire protection facilities would be less than significant.

#### Police Protection Facilities

Other cumulative projects listed in Table 3-1 in conjunction with the proposed project would result in residential, commercial, and office development. Cumulative development in the surrounding area would be expected to increase permanent residents and daytime population, which includes employees and visitors/patrons. Cumulative projects listed in Table 3-1 total 3,299 residential units; accordingly, based on the CDF average of household size of 3.34 persons, the estimated increase in persons would total 10,912 and would represent an increase of 9.5 percent relative to the January 1, 2019 estimate. The cumulative increase in population could in turn result in an increased demand for police protection personnel and services. This could be a potentially significant cumulative impact requiring the construction of new or expanded police facilities.

To help offset the increased demand for police protection facilities, all projects would be required to pay development impact fees to the APD, as well as annex into a Police Services CFD. Further, the project itself, would not trigger the need for new police facilities to be constructed or expanded. Thus, the project would not have a cumulatively considerable impact on the need for new police facilities. Therefore, cumulative impacts related to the construction of new or altered police protection facilities would be less than significant.

## **School Facilities**

Other cumulative projects listed in Table 3-1 in conjunction with the proposed project would result in residential development. Cumulative development would increase the population and demand for educational facilities. Cumulative projects listed in Table 3-1 total 3,267 residential units; accordingly, based on the CDF average household size of 3.34 persons, the estimated increase in persons would total 10,912 and would represent an increase of 9.5 percent relative to the January 1, 2019 estimate. This would result in approximately 378 elementary-aged children, 114 middle school children, and 189 high school aged children. The cumulative increase in population could in turn result in an increased demand for school facilities, which could be a potentially significant impact.

All cumulative developments, including the proposed project, would be required to pay development impact fees towards the two applicable school districts. Under state law, this is the exclusive means of mitigating impacts to school facilities due to increased enrollment. As part of the project entitlement process, the project applicants for all projects would be responsible for paying their fair share of these school facility fees.

The proposed project would not include construction of a school. Further, with the payment of impact fees, the proposed project would not have a cumulatively considerable impact on school ratios or services. As a result, the proposed project would have a less than significant cumulative impact related to the construction of new or altered school facilities.

## **Library Facilities**

Other cumulative projects listed in Table 3-1 in conjunction with the proposed project would result in residential development. Cumulative development would increase the population and demand for library facilities. Cumulative projects listed on Table 3-1 would total 3,267 residential units; accordingly, based on the CDF average household size of 3.34 persons, the estimated increase in persons would total 10,912 and would represent an increase of 9.5 percent relative to the January 1, 2019 estimate. The increase in population could in turn result in an increased demand for library facilities, and potentially significant cumulative impact.

Cumulative projects would result in the need for additional library space and services. However, the proposed project does not trigger the need for a new library, nor would it include construction of new or altered library facilities. Accordingly, the project would not have a significant cumulative impact on the construction of library facilities. Residential projects included in Table 3-1 would be subject to the 1.5 percent property tax, which would fund library services, offerings, and improvements. Therefore, cumulative impacts related to new or expanded library facilities would be less than significant.

## ***Level of Cumulative Significance***

Less Than Significant

## **Park Facilities**

The geographic scope of the cumulative parks and recreation analysis consists of the local community, regional, and state parks within the boundaries of Contra Costa County and the City of Antioch, with a focus on areas near the project site.

The proposed project would include the construction of park facilities, including 20.00 acres of active public parks, median and landscape areas, in addition to 190 acres of active open space, including 6.00 acres of trails and a 1.00-acre trail staging area. The construction of these facilities would result in potentially significant impacts related to aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, and transportation. However, all potential impacts would be reduced to a less than significant level with the implementation of mitigation. Therefore, the proposed project would have a less than significant cumulative impact related to the provision of park facilities with the implementation of mitigation.

### **Increased Park Use**

The proposed project in conjunction with the cumulative projects listed in Section 3, Environmental Impact Analysis, Table 3-1, Cumulative Projects, would result in residential development within the project area. Cumulative development in the project area would be expected to increase permanent residents. Of 14,843 residents, 3,931 of them would be associated with the proposed project. With 5 acres of park required per 1000 residents, approximately 74 acres of new parks will be required to accommodate the increase in population resulting from cumulative projects. This increase in permanent population would result in an increased cumulative demand for park facilities.

To help offset that demand, residential projects listed in Table 3-1 are all subject to a Park In-Lieu fee if the required park and open space acreage for each project is not accommodated on each project site. The Park Impact fees would be collected to fund the acquisition and development of parks in the City of Antioch and Contra Costa County to serve City of Antioch residents. The cumulative projects listed in Table 3-1 that are within the City of Brentwood would similarly be required to provide parkland or pay development fees. The proposed project itself mitigates its specific impacts to parks through the provision of 20 acres of parkland. Therefore, the proposed project would have a less than significant cumulative impact related to potential increased use and physical deterioration of existing parks and recreational facilities.

### ***Level of Cumulative Significance***

Less Than Significant

## 3.14 - Transportation

### 3.14.1 - Introduction

This section describes existing conditions related to transportation in the project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to transportation that could result from implementation of the proposed project. Information in this section is based on the project-specific Transportation Impact Assessment prepared by Fehr & Peers (included as Appendix K). The following comments were received during the Environmental Impact Report (EIR) scoping period related to transportation:

- California Department of Transportation (Caltrans), District 4 (Travel Demand Analysis, Multimodal Planning, Vehicle Trip Reduction)

### 3.14.2 - Existing Conditions

The following discusses the existing roadways that provide access to the project site and vicinity.

#### **Roadway System**

The project site is bound by medium density single-family homes to the north, Deer Valley Road and the Kaiser Permanente Antioch Medical Center to the east, undeveloped land to the south, and Empire Mine Road, Black Diamond Mine Preserve and undeveloped land to the west. Antioch is in eastern Contra Costa County, adjacent to the cities of Oakley and Brentwood, located east and southeast, respectively. Land uses surrounding the project site are residential, medical, or undeveloped.

Regional access to the site is provided by State Route 4 (SR-4), Lone Tree Way, Deer Valley Road and, once extended, Sand Creek Road. Dallas Ranch Road and Deer Valley Road provide local access. The following discusses the roadways that would provide access to the site and are most likely to experience direct traffic impacts, if any, from the proposed project.

#### **State Route 4**

SR-4 is an east-west freeway that extends from Hercules in the west to Stockton and beyond in the east. In the project area, SR-4 has a northwest/southeast orientation between State Route 160 (SR-160) and Walnut Boulevard in east Contra Costa County. The facility is an eight-lane freeway in the west to SR-160, a six-lane freeway from SR-160 to Laurel Road and a four-lane freeway from Laurel Road to Sand Creek Road. Between Sand Creek Road and Walnut Boulevard, the facility is a two-lane highway with at-grade intersections at Balfour Road and Marsh Creek Road. Each intersection is signalized and operated by Caltrans. SR-4 is a designated Route of Regional Significance by the Contra Costa County Transportation Agency (CCTA). Routes of regional significance are roadways that connect two or more subareas of Contra Costa County, cross county boundaries, carry significant through traffic, and/or provide access to a regional highway or transit facility.

#### **Lone Tree Way**

Lone Tree Way is an east-west roadway located north of the project site. The roadway provides three travel lanes in both directions to the east of Hillcrest Avenue. The roadway is also three lanes in each

direction to the west of Hillcrest Avenue until Blue Rock Drive, where the roadway narrows, becoming two lanes in each direction at James Donlon Boulevard. The posted speed limit is 45 miles per hour (mph). No on-street parking is permitted. Lone Tree Way is a designated Route of Regional Significance.

### ***Sand Creek Road***

Sand Creek Road is a four-lane, east-west roadway that extends east from SR-4 through Brentwood. The posted speed limit is 45 mph. No on-street parking is permitted on Sand Creek Road. Class II bicycle lanes and sidewalks are provided along most of the roadway through Brentwood. Sand Creek Road from Brentwood Boulevard to its current terminus at SR-4 is a Route of Regional Significance. Sand Creek Road is planned to be extended westward to Deer Valley Road, and through the project site, connecting with Dallas Ranch Road, as shown in Section 2, Project Description, Exhibit 2-9. Once constructed, the future extension of Sand Creek Road would also be a designated Route of Regional Significance.

### ***Deer Valley Road***

Deer Valley Road is a north-south roadway connecting Brentwood to Antioch. From south of Balfour Road to the project vicinity, it is two-lane rural road with adjacent areas mostly undeveloped and agricultural. Along this rural section, there are no bicycle or pedestrian facilities and no paved shoulders. Around Sand Creek Road, Deer Valley Road starts to widen to provide two travel lanes in each direction, sidewalks adjacent to developed parcels, and Class II bicycle lanes. As part of the proposed project, Deer Valley Road would be improved along the project frontage to its ultimate standard, which includes two travel lanes in each direction, bicycle lanes, and sidewalks. Deer Valley has a posted speed limit of 45 mph. Deer Valley Road is a designated Route of Regional Significance.

### ***Dallas Ranch Road***

Dallas Ranch Road is a four-lane north-south roadway that would connect to the proposed Sand Creek Road extension, providing a new access route to Deer Valley Road and SR-4. Two travel lanes are provided in each direction with bicycle lanes and sidewalks. No direct residential access is provided from Dallas Ranch Road. The posted speed limit on Dallas Ranch Road is 45 mph although it is temporarily posted 25 mph approaching the southerly terminus.

## **Project Facilities and Traffic Counts**

Weekday AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak period intersection turning movement counts were collected at the project intersections listed below, including separate counts of pedestrians, bicyclists and heavy vehicles. Traffic counts at the italicized intersections were first collected in 2017 and then again in May and August 2019 with area schools in normal session. At the italicized intersections, previously collected counts from 2017 and the recent 2019 counts were compared. Around the Hillcrest Avenue interchange, traffic volumes changed dramatically due to the opening of the Bay Area Rapid Transit (BART) station in 2018. However, at intersections away from the freeway, traffic volumes decreased slightly between 2017 and 2019. At non-italicized intersections, 2017 data remains reflective of current conditions based on spot counts collected at other locations. The 2017 data was, however, increased by 2 percent to reflect that some traffic changes may have occurred. In August 2019, 72-hour counts (Tuesday through Thursday) were collected on the three roadway segments while area schools were in normal session.

1. Lone Tree Way/A Street/SR-4 Westbound Ramps
2. Lone Tree Way/A Street/SR-4 Eastbound Ramps
3. *Hillcrest Avenue/Sunset Drive/Slatten Ranch Road*
4. *Slatten Ranch Road/SR-4 Westbound Ramps*
5. *Hillcrest Avenue/SR-4 Eastbound Ramps*
6. Lone Tree Way/Davison Drive
7. *Deer Valley Road/Hillcrest Avenue/Davison Drive*
8. Lone Tree Way/James Donlon Boulevard
9. Lone Tree Way/Dallas Ranch Road
10. Lone Tree Way/Deer Valley Road
11. *Lone Tree Way/Hillcrest Avenue*
12. *Lone Tree Way/SR-4 Eastbound Ramps*
13. *Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way*
14. Prewett Ranch Drive/Dallas Ranch Road
15. Prewett Ranch Drive/Deer Valley Road
16. Deer Valley Road/Wellness Way/Street A
17. Sand Creek Road/Deer Valley Road
18. Sand Creek Road/Hillcrest Avenue (future intersection)
19. Sand Creek Road/Heidorn Ranch Road (future intersection)
20. *Sand Creek Road/SR-4 Eastbound Ramps*
21. *Sand Creek Road/SR-4 Westbound Ramps*
22. *Balfour Road/Deer Valley Road*
23. *Balfour Road/SR-4 Eastbound Ramps*
24. *Balfour Road/SR-4 Westbound Ramps*
25. *Prewett Ranch Drive/Hillcrest Avenue*

Peak-hour intersection vehicle volumes are summarized on Exhibit 3.14-1 along with existing lane configurations and traffic controls. Bicycle and pedestrian counts are presented on Exhibit 3.14-2, which shows existing bicycle and pedestrian activity at the project intersection as being generally low.

### **Level of Service**

The operations of roadway facilities are described with the term “Level of Service” (LOS). LOS is a qualitative description of traffic flow from a vehicle driver’s perspective based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (free-flow conditions) to LOS F (over capacity conditions). LOS E corresponds to operations “at capacity.” When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F.

### **Signalized Intersections**

Traffic conditions at signalized intersections were evaluated using methods developed by the Transportation Research Board (TRB), as documented in the Highway Capacity Manual 6<sup>th</sup> Edition (2016 HCM) for vehicles using the analysis software Synchro 10.0. The Highway Capacity Manual (HCM) method calculates control delay at an intersection based on inputs such as traffic volumes, lane geometry, signal phasing and timing, pedestrian crossing times, and peak-hour factors. Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal)

and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The relationship between LOS and control delay is summarized in Table 3.14-1.

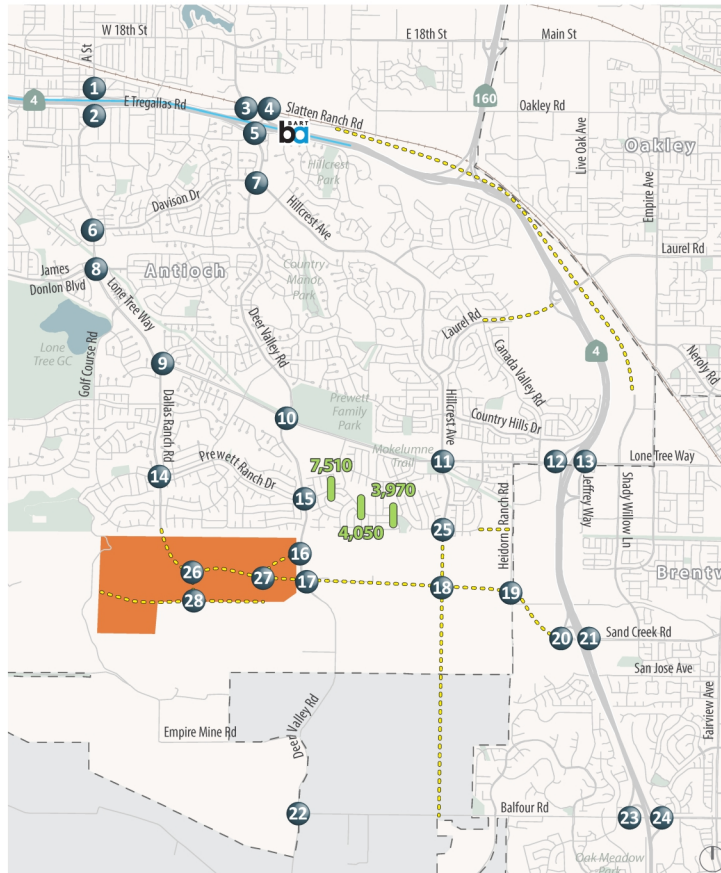
**Table 3.14-1: Signalized Intersection Level of Service Criteria**

Level of Service	Description	Delay in Seconds
A	Progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	< 10.0
B	Progression is good, cycle lengths are short, or both. More vehicles stop than with LOS A, causing higher levels of average delay.	> 10.0 to 20.0
C	Higher congestion may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, though many still pass through the intersection without stopping.	> 20.0 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	> 35.0 to 55.0
E	This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	This level is considered unacceptable with oversaturation, which is when arrival flow rates exceed the capacity of the intersection. This level may also occur at high V/C ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to such delay levels.	> 80.0

Source: Fehr & Peers 2019.

### **Unsignalized Intersections**

For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the HCM 6<sup>th</sup> Edition method for unsignalized intersections was used. With this method, operations are defined by the average control delay per vehicle (measured in seconds). The control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in queue. Table 3.14-2 summarizes the relationship between LOS and delay for unsignalized intersections. At side-street stop-controlled intersections, the delay is calculated for each stop-controlled movement, the left turn movement from the major street, as well as the intersection average. The intersection average delay and highest movement/approach delay are reported for side-street stop-controlled intersections.



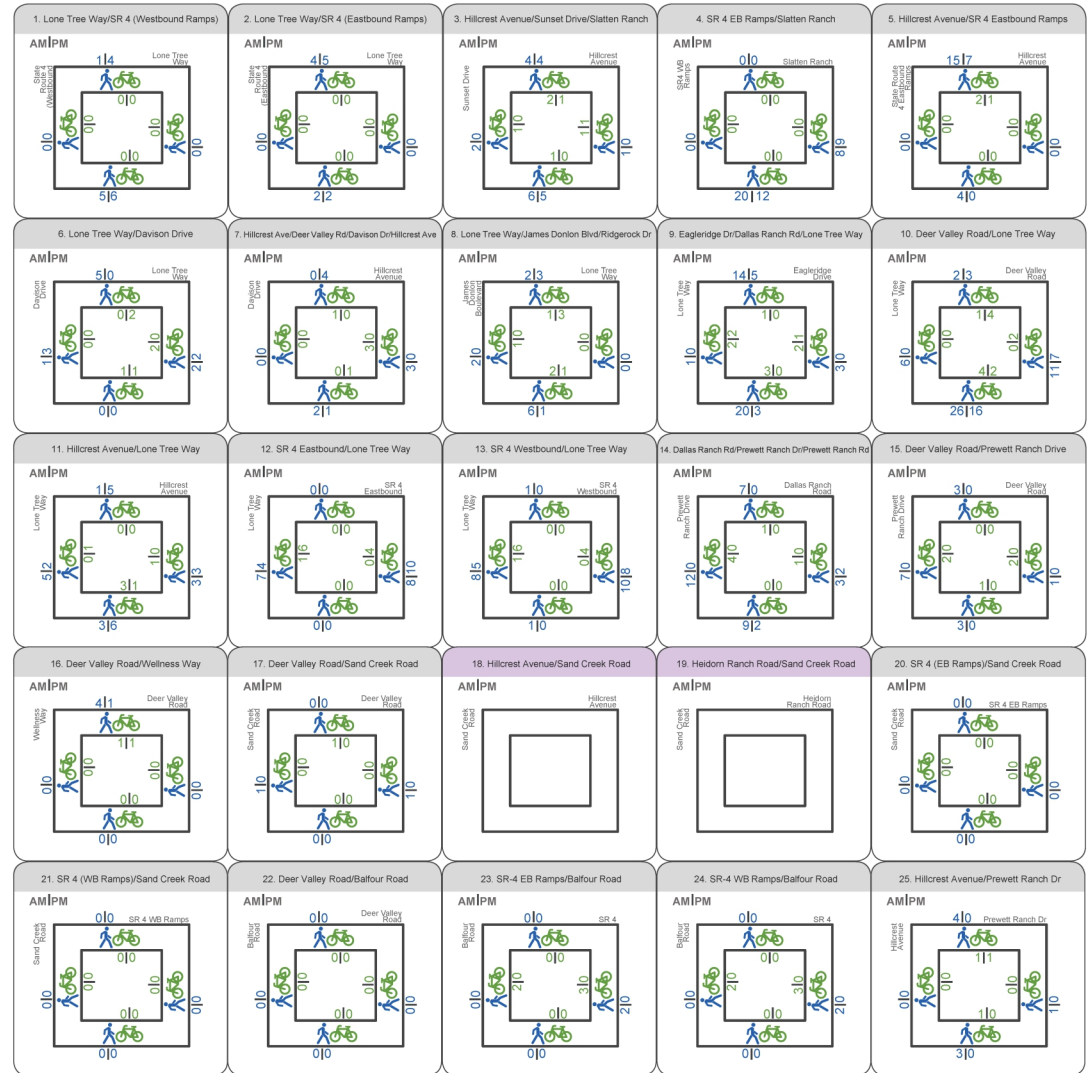
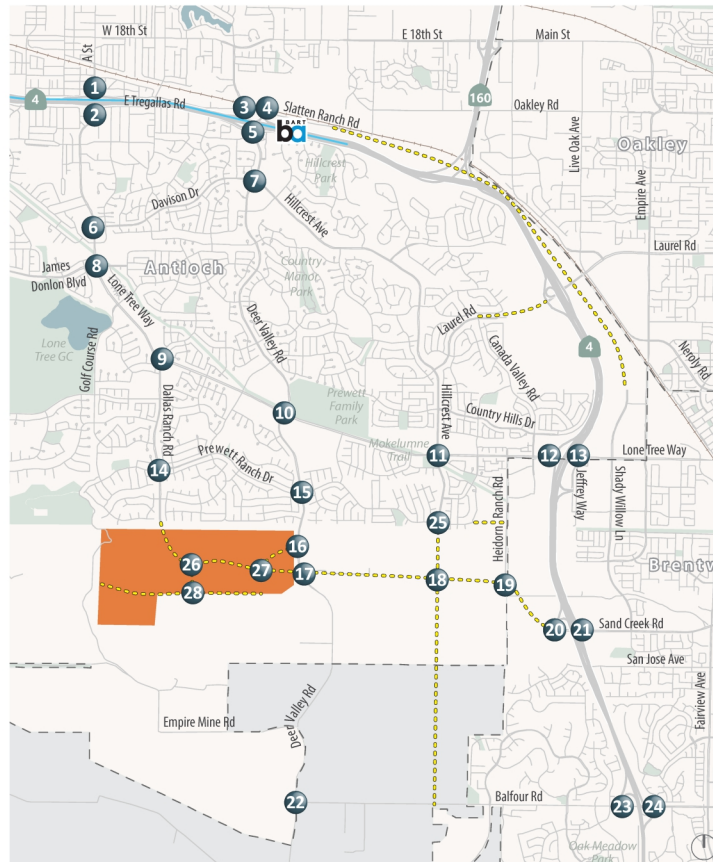
XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Future Intersection  
 Daily Roadway Segment Volume

1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Slatten Ranch	4. SR 4 WB Ramps/Slatten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgerock Dr	9. Eagleridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Wellness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidom Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR-4 EB Ramps/Balfour Road	24. SR-4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

## Exhibit 3.14-1 Existing Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls and Daily Roadway Segment Volumes

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Source: FEHR & PEERS, December 2019.

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**Table 3.14-2: Unsignalized Intersection Level of Service Criteria**

Level of Service	Description	Delay in Seconds
A	Little or no delays	≤ 10.0
B	Short traffic delays	> 10.0 to 15.0
C	Average traffic delays	> 15.0 to 25.0
D	Long traffic delays	> 25.0 to 35.0
E	Very long traffic delays	> 35.0 to 50.0
F	Extreme traffic, delays where intersection capacity exceeded	> 50.0

Source: Fehr & Peers 2019.

### Existing Intersection Operations

Existing intersection lane configurations, signal timings, and peak-hour turning movement volumes were used to calculate the LOS for the project intersections during each peak-hour, using the Synchro 9.0 software program, as presented in Table 3.14-3. Observed peak-hour factors were used at all intersections for the existing analysis.<sup>1</sup> Pedestrian and bicycle activity was also factored into the analysis.

As shown, signalized project intersections generally operate within the LOS standards set by the City of Antioch and Contra Costa County, except for Intersection 5, the Hillcrest Avenue/SR-4 Eastbound Ramp intersection, which operates at an overall LOS F during the PM peak-hour. Poor operations are primarily due to the close proximity of the adjacent intersection (Hillcrest Avenue at Tregallas Road/Larkspur Drive), poor vehicle progression between closely spaced intersections that do not make efficient use of green time, and lane utilization imbalances for the eastbound right-turn movement from the off-ramp as well as the northbound through movement.

**Table 3.14-3: Existing Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Delay <sup>2</sup>	LOS
1. Lone Tree Way/A Street/SR-4 Westbound Ramps	Signal	AM PM	13 9	B A
2. Lone Tree Way/A Street/SR-4 Eastbound Ramps	Signal	AM PM	15 15	B B
3. Hillcrest Avenue/Sunset Drive/Slatten Ranch Road	Signal	AM PM	18 17	B B
4. Slatten Ranch Road/SR-4 Westbound Ramps	Signal	AM PM	8 8	A A
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	32 90	C F

<sup>1</sup> The peak-hour factor is the relationship between the peak 15-minute flow rate and the full hourly volume: PHF = Hourly volume/(4 x (volume during the peak 15 minutes of flow)). The analysis level of service is based on peak rates of flow occurring within the peak hour because substantial short term fluctuations typically occurring during an hour.

**Table 3.14-3 (cont.): Existing Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Delay <sup>2</sup>	LOS
6. Lone Tree Way/Davison Drive	Signal	AM PM	16 15	B B
7. Deer Valley Road/Hillcrest Avenue/Davison Drive	Signal	AM PM	24 28	C C
8. Lone Tree Way/James Donlon Boulevard	Signal	AM PM	20 17	B B
9. Lone Tree Way/Dallas Ranch Road	Signal	AM PM	30 16	C B
10. Lone Tree Way/Deer Valley Road	Signal	AM PM	32 23	C C
11. Lone Tree Way/Hillcrest Avenue	Signal	AM PM	18 21	B C
12. Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM PM	18 32	B C
13. Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way	Signal	AM PM	9 12	A B
14. Prewett Ranch Drive/Dallas Ranch Road	Signal	AM PM	18 14	B B
15. Prewett Ranch Drive/Deer Valley Road	Signal	AM PM	27 14	C B
16. Deer Valley Road/Wellness Way/Street A	Signal	AM PM	7 5	A A
17. Sand Creek Road/Deer Valley Road	Signal	AM PM	9 7	A A
18. Sand Creek Road/Hillcrest Avenue (future intersection)	Signal	AM PM	— —	— —
19. Sand Creek Road/Heidorn Ranch Road (future intersection)	Signal	AM PM	— —	— —
20. Sand Creek Road/SR-4 Eastbound Ramps	Signal	AM PM	4 4	A A
21. Sand Creek Road/SR-4 Westbound Ramps	Signal	AM PM	5 6	A A
22. Balfour Road/Deer Valley Road	SSSC	AM PM	14 (23) 10 (14)	B (C) B (B)
23. Balfour Road/SR-4 Eastbound Ramps	Signal	AM PM	33 30	C C
24. Balfour Road/SR-4 Westbound Ramps	Signal	AM PM	25 23	A A

**Table 3.14-3 (cont.): Existing Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Delay <sup>2</sup>	LOS
25. Prewett Ranch Drive/Hillcrest Avenue	Signal	AM PM	19 16	B B
Notes: <sup>1</sup> Signal = signalized intersection; SSSC = side-street stop-control <sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM method for vehicles. Source: Fehr & Peers 2017.				

The unsignalized intersection of Deer Valley Road at Balfour Road currently operates at an acceptable level; however, previous data collection efforts and analyses noted deficient operations for this intersection. Completion of the Balfour Road interchange and associated SR-4 widening between Sand Creek Road and Balfour Road may have resulted in travel pattern shifts, with more vehicles traveling on SR-4, versus Deer Valley and other parallel roadways. To assess the need for signalization of stop-controlled intersections, the Manual of Uniform Traffic Control (MUTCD) presents nine signal warrants. The Peak-hour Volume Warrant and the Peak-hour Delay Warrant was used in this analysis as a supplemental analysis tool to assess operations at the unsignalized intersections.<sup>2</sup> The Deer Valley Road at Balfour Road intersection does not meet peak-hour signal warrants during the AM peak-hour.

### Existing Queuing

Vehicle queues were also calculated by Synchro 10.0. In the existing condition, average left-turn vehicle queues are contained within the available storage with the 95<sup>th</sup> percentile vehicle queue for some movements potentially extending beyond the available storage, including:

- Lone Tree Way/A Street/SR-4 Westbound Ramps (northbound left movement, AM peak-hour)
- Hillcrest Avenue/Sunset Drive/Slatten Ranch Road (northbound left movement, AM peak-hour)
- Lone Tree Way/Davison Drive (westbound left, AM peak-hour, and northbound left, PM peak-hour)
- Hillcrest Avenue/Davison Drive/Deer Valley Road (eastbound left, AM peak-hour; northbound left, PM peak-hour)
- Lone Tree Way/James Donlon Boulevard/Ridgerock Drive (eastbound left and southbound left AM and PM peak-hours)

<sup>2</sup> Unsignalized intersection warrant analysis is intended to examine the general correlation between existing conditions and the need to install new traffic signals. Existing peak-hour volumes are compared against a subset of the standard traffic signal warrants recommended in the MUTCD and associated State guidelines. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely on the warrants because the installation of signals can lead to certain types of collisions. The responsible State or local agency should undertake regular monitoring of actual traffic conditions and accident data and conduct a timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.

- Lone Tree Way/Dallas Ranch Road/Eagle Ridge Drive (eastbound left-turn and northbound left-turn, AM peak-hour and PM peak-hour)
- Lone Tree Way/Deer Valley Road (northbound left-turn, AM peak-hour)
- Lone Tree Way/SR-4 Eastbound Ramps (southbound left and through, AM and PM peak-hour)
- Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way (northbound left-turn, AM and PM peak-hour)
- Prewett Ranch Drive/Dallas Ranch Road (southbound left, AM peak-hour)
- Prewett Ranch Drive/Deer Valley Road (westbound left, AM peak-hour)
- Balfour Road/SR-4 Eastbound Ramps (northbound left-turn, AM peak-hour, eastbound through AM and PM peak-hour)

### Daily Roadway Segment Operation

Sand Creek Road would be constructed in phases as adjacent development occurs. In the near-term when Sand Creek Road is extended from SR-4 to Hillcrest Avenue, and Hillcrest Avenue is extended to Sand Creek Road, some additional through vehicle traffic could be added to Prewett Ranch Drive until Sand Creek Road is extended to Deer Valley Road, and ultimately Dallas Ranch Road. This additional traffic could result in traffic volumes on Prewett Ranch Drive exceeding desired levels, especially in the vicinity of Diablo Vista Elementary School and houses fronting Prewett Ranch Drive. To address the issue, automatic machine traffic counts along Prewett Ranch Drive were conducted over a 72-hour period (Tuesday through Thursday) on clear days in August 2019 with area schools in session. The average daily traffic volumes on these roadways are summarized below in Table 3.14-4. Prewett Ranch Drive carries approximately 7,510 vehicles per day east of Deer Valley Road. In the vicinity of the school, traffic volumes are approximately 4,050 per day. West of Hillcrest Avenue, average daily traffic volumes decrease to approximately 3,970, which is higher than the desired amount for a residential collector roadway that has front-on housing. The peak-hour of travel along the Prewett Ranch Drive corridor tends to align with school bell times.

**Table 3.14-4: Existing Average Daily Traffic**

Segment	Daily Traffic	Project Traffic	Daily Fluctuation
1. Prewett Ranch Drive, east of Deer Valley Road	7,510	520	± 1.2 percent
2. Prewett Ranch Drive at Diablo Vista Elementary School	4,050	520	± 1.8 percent
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,970	520	± 2.9 percent

Source: Fehr & Peers 2019.

### Existing Public Transit Service and Facilities

The Eastern Contra Costa Transit Authority (Tri Delta Transit) provides transit service in eastern Contra Costa County, serving the communities of Brentwood, Antioch, Oakley, Concord, Discovery

Bay, Bay Point, and Pittsburg. Fifteen routes operate on weekdays, with five routes operating on weekends. Routes 379, 388, and 392 operate in the vicinity of the project site, stopping at the Kaiser Permanente Antioch Medical Center on Deer Valley Road, opposite from the project site. Route 388 also has stops on Dallas Ranch Road and Prewett Ranch Road.

Routes 388 and 392 provide access to the Antioch BART Station and Pittsburg BART Station, with Route 388 providing weekday service on 30-to 60 minute headways and Route 392 providing weekend service on 60-minute headways. These routes also connect to Kaiser Permanente Antioch Medical Center, Sutter Delta Medical Center, Downtown Antioch, Pittsburg Center BART, the Pittsburg Civic Center, and numerous schools.

Route 379 provides weekday school service with one morning bus from the Antioch BART Station to Kaiser Permanente Antioch Medical Center.

In addition to the regular transit service to the proposed project site, dial-a-ride, door-to-door service within Eastern Contra Costa County is provided by Tri Delta Transit for disabled people of all ages and senior citizens. A new micro-transit pilot program was launched in June 2019 to provide on-demand rideshare service within specific boundaries connecting riders to key destinations, include the Antioch BART Station and key shopping destinations. The service area boundaries are SR-4, Long Tree Way, and Deer Valley Road. Rides cost \$2. If successful, the program could be expanded.

BART provides fixed rail transit to Eastern Contra Costa County. The terminus station is located in Antioch at Hillcrest Avenue, approximately 4 miles from the project site, with timed transfers from traditional BART transit to diesel BART trains at the Pittsburg/Bay Point BART Station. Weekday service is provided on approximately 15-minute headways and weekend service is provided on approximately 20-minute headways. The Antioch Line connects to key regional employment centers, including Concord, Pleasant Hill, Walnut Creek, Oakland, and San Francisco. Transfers to other lines can be made in Oakland.

## **Bicycle Facilities**

Bicycle facilities include the following:

- **Bike Paths (Class I):** Paved trails that are separated from roadways. These trails are also shared with pedestrians.
- **Bike Lanes (Class II):** Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs.
- **Bike Routes (Class III):** Roadways designated for bicycle use by signs only; may or may not include additional pavement width for cyclists.
- **Separated Bikeway (Class IV):** Separated bikeways, also referred to as cycle tracks or protected bikeways, are bikeways for the exclusive use of bicycles which are physically separated from vehicle traffic. Separated Bikeways were adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking.

In the immediate project vicinity, portions of Deer Valley Road and Dallas Ranch Road provide Class II bicycle facilities with separate lanes designated for bicycle travel. Lone Tree Way has a striped shoulder that can be used by bicyclists along some roadway sections, but it is not a designated bicycle lane. The Class I Mokelumne Trail<sup>3</sup> is located north of the project site. The Mokelumne Trail ultimately connects to the Pittsburg/Bay Point BART Station. There are numerous existing Class I trails in the existing Dallas Ranch and Prewett Ranch neighborhoods, connecting residential neighborhoods to parks and schools.

### **Pedestrian Facilities**

Pedestrian facilities in the vicinity of the proposed project include sidewalks, crosswalks, pedestrian signals, and multi-use trails. Improved roadways in the project area generally provide sidewalks on both sides of the street. No sidewalks or other infrastructure currently exist on-site. At the signalized intersection of Deer Valley Road and Sand Creek Road, crosswalks and pedestrian push-button actuated signals are provided.

### **3.14.3 - Regulatory Framework**

#### **Federal**

No federal plans, policies, regulations, or laws related to transportation and traffic are applicable to the proposed project.

#### ***California Department of Transportation***

Caltrans builds, operates, and maintains the State highway system, including the interstate highway system. Caltrans's mission is to improve mobility Statewide. The department operates under strategic goals to provide a safe transportation system, optimize throughput and ensure reliable travel times, improve the delivery of State highway projects, provide transportation choices, and improve and enhance the State's investments and resources. Caltrans controls the planning of the State highway system and accessibility to the system. Caltrans establishes LOS goals for highways and works with local and regional agencies to assess impacts and develop funding sources for improvements to the State highway system. Caltrans requires encroachment permits from agencies or new development before any construction work may be undertaken within the State's right-of-way. For projects that would impact traffic flow and levels of services on State highways, Caltrans would review measures to mitigate the traffic impacts.

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway facilities; however, Caltrans recognizes that achieving LOS C/LOS D may not always be feasible.

For the Caltrans highway facilities being studied, the operational standards and significance criteria are established by the CCTA acting as the designated congestion management agency (CMA) representing the jurisdictions of Contra Costa County. As the acting CMA, the CCTA establishes the traffic LOS standards for all State highway facilities in Contra Costa County, which supersede the general Caltrans operational standard for all State highways in the project area.

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<sup>3</sup> The Mokelumne Trail follows East Bay Municipal Utility District's Mokelumne aqueduct within Antioch and Pittsburg.

### **Senate Bill 743**

In November 2017, the Governor’s Office of Planning and Research (OPR) released a technical advisory containing recommendations regarding the assessment of vehicle miles traveled (VMT), proposed thresholds of significance, and potential mitigation measures for lead agencies to use while implementing the required changes contained in Senate Bill 743 (SB 743). Also in November 2017, the OPR released the proposed text for California Environmental Quality Act (CEQA) Guidelines Section 15064.3, “Determining the Significance of Transportation Impacts,” which summarized the criteria for analyzing transportation impacts for land use projects and transportation projects and directs lead agencies to “choose the most appropriate methodology to evaluate a project’s vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure.” The OPR recommends that for most instances a per service population threshold should be adopted and that a 15 percent reduction below that of existing development would be a reasonable threshold.

As noted in the OPR Guidelines, agencies are directed to choose metrics that are appropriate for their jurisdiction to evaluate the potential impacts of a project in terms of VMT. The City of Antioch has/has not established specific local VMT thresholds and industry-wide standards are still in the advisory stage. The latest direction from the OPR also lists new exemptions for certain projects with revised screening thresholds (e.g., 100 trips/day, map based, or near transit stations

Mandatory implementation of the VMT metric and application of Section 15064.3 has been delayed to July 1, 2020. Additionally, per CEQA Guidelines Section 15007(c) the revised Guidelines will apply to a CEQA document only if the revised Guidelines are in effect when the document is sent out for public review. As such, a VMT analysis is not required under CEQA at this time; however, a brief VMT analysis is provided herein for informational purposes only.

### **Regional**

#### ***Contra Costa Transportation Authority***

CCTA is the Congestion Management Agency for Contra Costa County. CCTA implements the East County Action Plan for Routes of Regional Significance, which sets forth performance objectives for Routes of Regional Significance. SR-4, Balfour Road, Deer Valley Road, Hillcrest Avenue, Lone Tree Way, and Sand Creek Road/Dallas Ranch Road are Routes of Regional Significance within the Study Area.

The East County Action Plan for Routes of Regional Significance establishes a Multimodal Transportation Service Objective for SR-4:

- Delay Index of less than 2.5 (<2.5)
- High Occupancy Vehicle (HOV) usage greater than 600 vehicles per lane per peak-hour in peak direction (>600 vehicles/lane/peak-hour)

## Local

### *The City of Antioch*

#### *General Plan*

The City of Antioch General Plan sets for the following goals, objectives, and policies relevant to transportation:

#### Goals

- To provide for a sustained high quality of life, it is the goal of the Circulation Element to achieve and maintain a balanced, safe, problem-free transportation system that:
  - Improves present traffic flows and provides easy and convenient access to all areas of the community;
  - Is safe for all modes of motorized and non-motorized transportation;
  - Reduces dependence on single occupant automobile travel by providing a high level of pedestrian, bicycle, and public transit travel opportunities; and
  - Preserves a sense of comfort and wellbeing throughout the community by reducing the intrusiveness of commercial, business park, and industrial traffic, rail traffic, and regional traffic on neighborhood streets and residents' quality of life.
- **Objective 7.3.1:** Provide adequate roadway capacity to meet the roadway performance standards set forth in the Growth Management Element.
- **Policy 7.3.2a:** Facilitate meeting the roadway performance standards set forth in the Growth Management Element and improving traffic flow on arterial roadways.
  - Work with the UP and BNSF railroads to construct grade separations along the tracks at Somersville Road, Hillcrest Avenue, "A" Street, the proposed Viera Road extension, and the proposed Phillips Lane extension.
  - Promote the design of roadways to optimize safe traffic flow within established roadway configurations by minimizing driveways and intersections, uncontrolled access to adjacent parcels, on-street parking, and frequent stops to the extent consistent with the character of adjacent land uses.
  - Provide adequate capacity at intersections to accommodate future traffic volumes by installing intersection traffic improvements and traffic control devices, as needed, as development occurs.
  - Facilitate the synchronization of traffic signals.
  - Where needed, provide acceleration and deceleration lanes for commercial access drives.
  - Provide for reciprocal access and parking agreements between adjacent land uses, thereby facilitating off-street vehicular movement between adjacent commercial and other nonresidential uses.
  - Encourage regional goods movement to remain on area freeways and other appropriate routes.
- **Policy 7.3.2b:** Design and reconfigure collector and local roadways to improve circulation within and connections to residential and commercial areas.
  - Implement appropriate measures to mitigate speeding and other traffic impacts in residential areas.
  - Implement roadway patterns that limit through traffic on local residential streets.

- **Policy 7.3.2c:** Require the design of new developments to focus through traffic onto arterial streets.
- **Policy 7.3.2d:** Where feasible, design arterial roadways, including routes of regional significance, to provide better service than the minimum standards set forth in Measure C and the Growth Management Element. Thus, where feasible, the City will strive to maintain a “High D” level of service (v/c-0.85-0.89) within regional commercial areas and at intersections within 1,000 feet of a freeway interchange. The City will also strive where feasible to maintain Low-range “D” (v/c = 0.80-0.84) in all other areas of the City, including freeway interchanges.
- **Policy 7.3.2e:** Establish Assessment Districts in areas that will require major roadway infrastructure improvements that will benefit only that area of the City, and thereby facilitate the up-front construction of needed roadways.
- **Policy 7.3.2f:** Design street intersections to ensure the safe passage of through traffic and accommodate anticipated turning movements. Implement intersection improvements consistent with the following lane geometrics, unless traffic analyses indicate the need for additional turn lanes.
- **Policy 7.3.2h:** Require traffic impact studies for all new developments that propose to increase the approved density or intensity of development or are projected to generate 50 peak hour trips or more at any intersection of Circulation Element roadways. The purpose of these studies is to demonstrate that:
  - the existing roadway system, along with roads to be improved by the proposed project, can meet the performance standards set forth in Sections 3.4.1 and 3.4.2 of the Growth Management Element, and
  - required findings of consistency with the provisions of the Growth Management Element can be made.
- **Policy 7.3.2n:** Use raised medians as a method for achieving one or more of the following objectives: access control, separation of opposing traffic flows, left turn storage, aesthetic improvement, and/or pedestrian refuge.
- **Policy 7.3.2p:** Where a series of traffic signals are provided along a route, facilitate the coordination of traffic signals to optimize traffic progression on a given route. Traffic signalization should emphasize facilitating access from neighborhood areas onto the City’s primary roadway network, and should work to discourage through traffic from using local streets.

### 3.14.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to the CEQA Guidelines’ Appendix G Environmental Checklist, to determine whether transportation and traffic impacts are significant environmental effects, the following questions are analyzed and evaluated. Would the project:

- a) Conflict with a program plan, ordinance or policy of the circulation system, including transit, roadway, bicycle and pedestrian facilities?
- b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?

- c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
- d) Result in inadequate emergency access?

In the context of Checklist Question (a), the following thresholds are used:

### **Roadway System**

The proposed project could create a significant impact related to intersection operations if the following criteria is met:

1. Would the operations at a project intersection on a Route of Regional Significance decline from high LOS D (an average delay of 55 seconds for signalized intersections) or better to LOS E or F, based on the HCM LOS method, with the addition of proposed project traffic?
2. Would the operations at a project intersection not on a Route of Regional Significance decline from the established performance standard for the roadway facility type?
  - a. Low LOS E (an average delay of 65 seconds for signalized intersections) or better to a high LOS E or F, based on the HCM LOS method, with the addition of proposed project traffic for intersections within 1,000 feet of a freeway interchange?
  - b. High LOS D (an average delay of 55 seconds for signalized intersections) or better to a LOS E or F, based on the HCM LOS method, with the addition of proposed project traffic for residential and commercial portions of the Focus Area?
  - c. Mid LOS D (an average delay of 50 seconds for signalized intersections) or better to a high LOS D, LOS E, or LOS F, based on the HCM LOS method, with the addition of proposed project traffic for residential and arterial roadways in non-regional commercial areas?
3. Would the proposed project deteriorate already unacceptable operations at a signalized intersection by adding traffic?
4. Would the operations of an unsignalized project intersection decline from acceptable to unacceptable with the addition of proposed project traffic, and would the installation of a traffic signal based on the Manual of Uniform Traffic Control Devices (MUTCD) Peak-hour Signal Warrant (Warrant 3), be warranted?
5. Would the proposed project result in or worsen unacceptable conditions on the SR-4 mainline, based on delay index calculations?
  - a. The delay index should not exceed 2.5 seconds during the AM or PM peak-hour, meaning that congested travel times should not be more than 2.5 times the uncongested travel times.

### **Transit System**

The proposed project would create a significant impact related to transit service if the following criteria is met:

1. The proposed project interferes with existing transit facilities or precludes the construction of planned transit facilities.

### ***Bicycle System***

The proposed project would create a significant impact related to the bicycle system if any of the following criteria are met:

1. Disrupt existing bicycle facilities; or
2. Interfere with planned bicycle facilities; or
3. Create inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

### ***Pedestrian System***

The proposed project would create a significant impact related to the pedestrian system if any of the following criteria are met:

1. Disrupt existing pedestrian facilities; or
2. Interfere with planned pedestrian facilities; or
3. Create inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

### **Approach to Analysis**

Analysis in this section is based on the Transportation Impact Analysis that is provided in Appendix K. The following is a summary of the analysis methodology.

### ***Trip Generation***

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the daily condition and for the peak 1-hour period during the morning and evening commute when traffic volumes on the adjacent streets are typically the highest. Project trip generation was estimated using rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual (10<sup>th</sup> Edition), with the resulting estimates presented in Table 3.14-5 assuming that the Village Center is developed with the retail option and in Table 3.14-6 assuming the Village Center is developed with the office option.

**Table 3.14-5: Vehicle Trip Generation Estimates—Retail Option**

Use	Size	Weekday						
		Daily	AM Peak-hour			PM Peak-hour		
			In	Out	Total	In	Out	Total
Phase 1								
All Ages Single-family Homes <sup>1</sup>	421 dwelling units	3,970	78	234	312	263	154	417
Village Center—Retail <sup>2</sup>	54,000 square feet	2,040	32	19	51	99	107	206
Fire Station <sup>3</sup>	—	20	1	1	2	1	1	2
Phase 1 Subtotal Total		6,030	111	254	365	363	262	625

**Table 3.14-5 (cont.): Vehicle Trip Generation Estimates—Retail Option**

Use	Size	Weekday						
		Daily	AM Peak-hour			PM Peak-hour		
			In	Out	Total	In	Out	Total
Phase 2								
All Ages Single-family Homes <sup>1</sup>	201 dwelling units	1,900	37	112	149	125	74	199
Phase 3								
All Ages Single-family Homes <sup>1</sup>	133 dwelling units	1,260	25	73	98	83	49	132
Age Restricted Single-family Homes <sup>4</sup>	422 dwelling units	1,800	33	68	101	77	50	127
Phase 3 Subtotal		3060	58	141	199	160	99	259
Total Project Trips		10,990	206	507	713	648	435	1,083

Notes:

<sup>1</sup> ITE land use category 210—Single-family Homes (Adj Streets, 7-9A, 4-6P):

Daily: (T) = 9.44 (X)

AM Peak-hour: T = 0.74(X); Enter = 25 percent; Exit = 75 percent

PM Peak-hour: T = 0.99 (X); Enter = 63 percent; Exit = 37 percent

<sup>2</sup> ITE land use category 820—General Commercial (Adj Streets, 7-9A, 4-6P):

Daily: (T) = 37.75 (X)

AM Peak-hour: T = 0.94 (X); Enter = 62 percent; Exit = 38 percent

PM Peak-hour: T = 3.81 (X); Enter = 48 percent; Exit = 52 percent

<sup>3</sup> Based on Observations of Fire Station 9, 70 and 86 in Contra Costa County<sup>4</sup> ITE land use category 252—Senior Adult Housing—Attached (Adj Streets, 7-9A, 4-6P):

Daily: (T) = 4.27 (X)

AM Peak-hour: T = 0.24 (X); Enter = 33 percent; Exit = 67 percent

PM Peak-hour: T = 0.30 (X); Enter = 61 percent; Exit = 39 percent

Source: Trip Generation Manual (10<sup>th</sup> Edition), ITE, 2019; Fehr & Peers June 2019.**Table 3.14-6: Vehicle Trip Generation Estimates—Office Option**

Use	Size	Weekday						
		Daily	AM Peak-hour			PM Peak-hour		
			In	Out	Total	In	Out	Total
Phase 1								
All Ages Single-family Homes <sup>1</sup>	421 dwelling units	3,970	78	234	312	263	154	417
Village Center—Office <sup>2</sup>	54,000 square feet	530	54	9	63	10	52	62
Fire Station <sup>3</sup>	—	20	1	1	2	1	1	2
Phase 1 Subtotal Total		4,520	133	244	377	274	207	481

**Table 3.14-6 (cont.): Vehicle Trip Generation Estimates—Office Option**

Use	Size	Weekday						
		Daily	AM Peak-hour			PM Peak-hour		
			In	Out	Total	In	Out	Total
Phase 2								
All Ages Single-family Homes <sup>1</sup>	201 dwelling units	1,900	37	112	149	125	74	199
Phase 3								
All Ages Single-family Homes <sup>1</sup>	133 dwelling units	1,260	25	73	98	83	49	132
Age Restricted Single-family Homes <sup>4</sup>	422 dwelling units	1,800	33	68	101	77	50	127
Phase 3 Subtotal		3060	58	141	199	160	99	259
Total Project Trips		9,480	228	497	725	559	380	939
Notes:								
<sup>1</sup> ITE land use category 210—Single-family Homes (Adj Streets, 7-9A, 4-6P): Daily: (T) = 9.44 (X) AM Peak-hour: T = 0.74(X); Enter = 25 percent; Exit = 75 percent PM Peak-hour: T = 0.99 (X); Enter = 63 percent; Exit = 37 percent								
<sup>2</sup> ITE land use category 710—Office (Adj Streets, 7-9A, 4-6P): Daily: (T) = 9.74 (X) AM Peak-hour: T = 1.16 (X); Enter = 86 percent; Exit = 14 percent PM Peak-hour: T = 1.15 (X); Enter = 16 percent; Exit = 84 percent								
<sup>3</sup> Based on Observations of Fire Station 9, 70, and 86 in Contra Costa County								
<sup>4</sup> ITE land use category 252—Senior Adult Housing—Attached (Adj Streets, 7-9A, 4-6P): Daily: (T) = 4.27 (X) AM Peak-hour: T = 0.24 (X); Enter = 33 percent; Exit = 67 percent PM Peak-hour: T = 0.30 (X); Enter = 61 percent; Exit = 39 percent								
Source: Trip Generation Manual (10 <sup>th</sup> Edition), ITE 2019; Fehr & Peers June 2019.								

With the Village Center developed with all retail uses, the proposed project is expected to generate approximately 10,990 daily vehicle trips, including approximately 713 AM peak-hour and 1,083 PM peak-hour trips, including the trip generating potential of the commercial uses on Deer Valley Road and the fire station. With the Village Center developed with all office uses, the proposed project is expected to generate 9,480 daily trips, including 725 AM peak-hour and 939 PM peak-hour trips. Overall, the retail option is expected to generate significantly more daily and PM peak-hour trips than an office development; during the AM peak-hour, an office development would generate 22 more inbound trips as compared to a retail development, but fewer outbound trips (12 more overall trips). This slight difference in trip generation is not expected to result in changed conclusions for the assessment of AM peak-hour operations in the area, and would likely result in better travel conditions as it would provide more employment opportunities in the area. Therefore, for the purposes of the traffic analysis, development of an all commercial/retail center was assumed.

It is expected that some proportion of trips generated by the proposed Village Center would have an origin or destination within the residential portion of the development. However, as there are not

specific uses proposed, the level of internal trip making is difficult to quantify. Additionally, given the size of the proposed project, it is expected that many trips to the Village Center originating from the residential uses would be vehicle trips. Therefore, internal trips are considered in the project trip assignment phase.

For the Village Center if developed as a retail center, a proportion of the trips could be trips that are already on the roadway system. These trips are typically referred to as pass-by or diverted trips. However, as the proposed uses are unknown and through traffic volumes are relatively low on the portion of Deer Valley Road adjacent to the project site, no pass-by or diverted trip reductions were considered in the initial trip generation estimates. As the proposed project commercial components are better defined, the application of appropriate pass-by rates and recalculation of applicable fair-share contributions (if applicable) is recommended.

### ***Trip Distribution and Assignment***

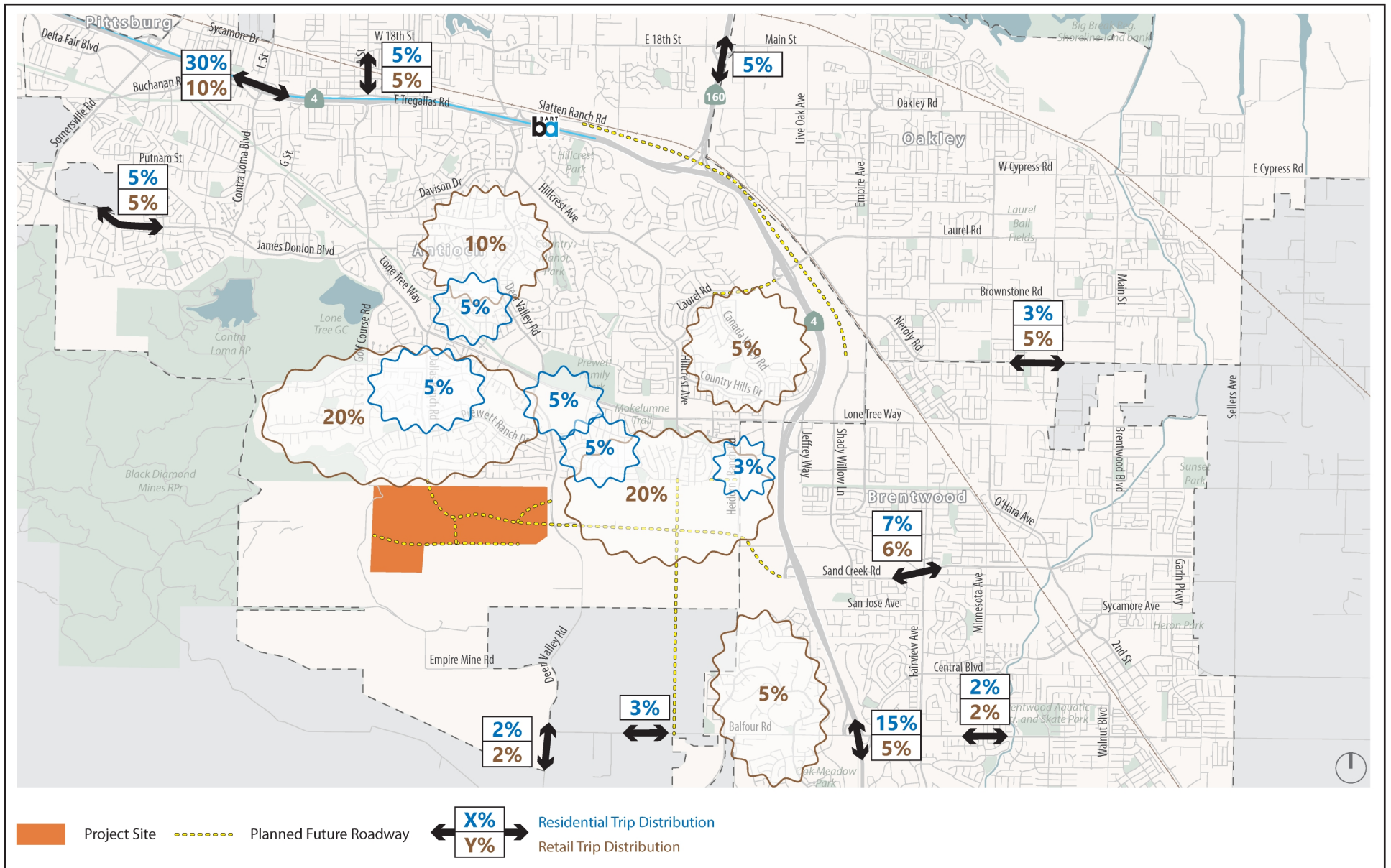
Project trip distribution refers to the directions of approach and departure that vehicles would take to access and leave the site. Estimates of regional project trip distribution were developed based on existing travel patterns in the area, a select zone analysis using the CCTA travel demand model, and the location of complementary land uses, such as schools, employment centers, and retail/recreational opportunities. Separate estimates were developed for the residential and commercial portions of the proposed project, as they are likely to have different trip distribution patterns. The resulting trip distribution percentages are shown on Exhibit 3.14-3. Project trips were then assigned to the roadway network as shown on Exhibit 3.14-4 for the existing roadway network, Exhibit 3.14-5 for the near-term roadway network, and Exhibit 3.14-6 for the cumulative roadway network. The volumes presented in these figures represent the full project build-out.

### ***Project Phasing***

The project is proposed to be constructed in three major phases. Exhibit 3.14-7 shows the conceptual phasing plan for the project. As the proposed project would likely be built-out over many years, the transportation impacts of the project may not materialize until substantial portions of the proposed project are built and occupied.

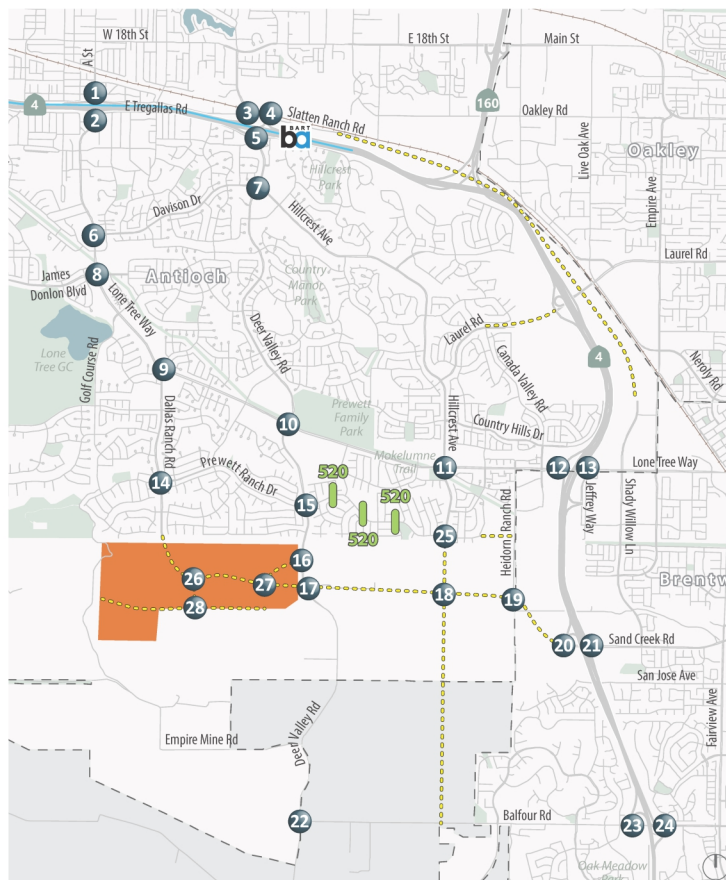
In Phase 1, two roadway connections from Deer Valley Road (Sand Creek Road and Street A) would be constructed in addition to frontage improvements on Deer Valley Road. Sand Creek Road would be extended into the site to provide access to individual neighborhoods. Land uses that would be developed include the commercial site, and up to 421 single-family homes.

In Phase 2, Sand Creek Road would be extended further into the site to provide an additional neighborhood access point. For the purposes of preparing a conservative analysis, the extension of Sand Creek Road to Dallas Ranch Road was not assumed as this analysis is intended to identify when that connection is needed. Additional land uses that would be developed in Phase 2 include up to 201 single-family homes.



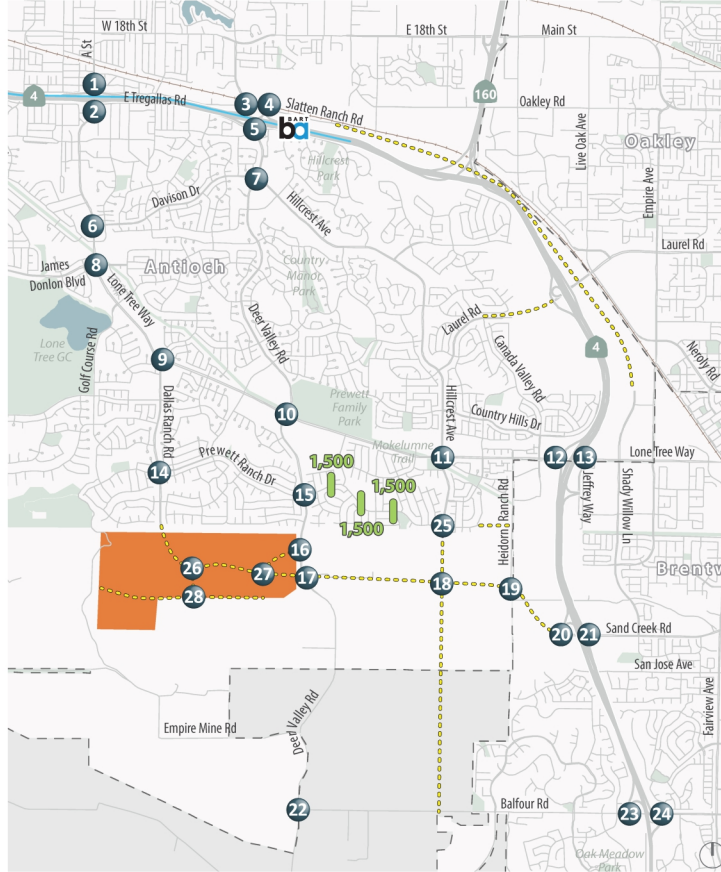
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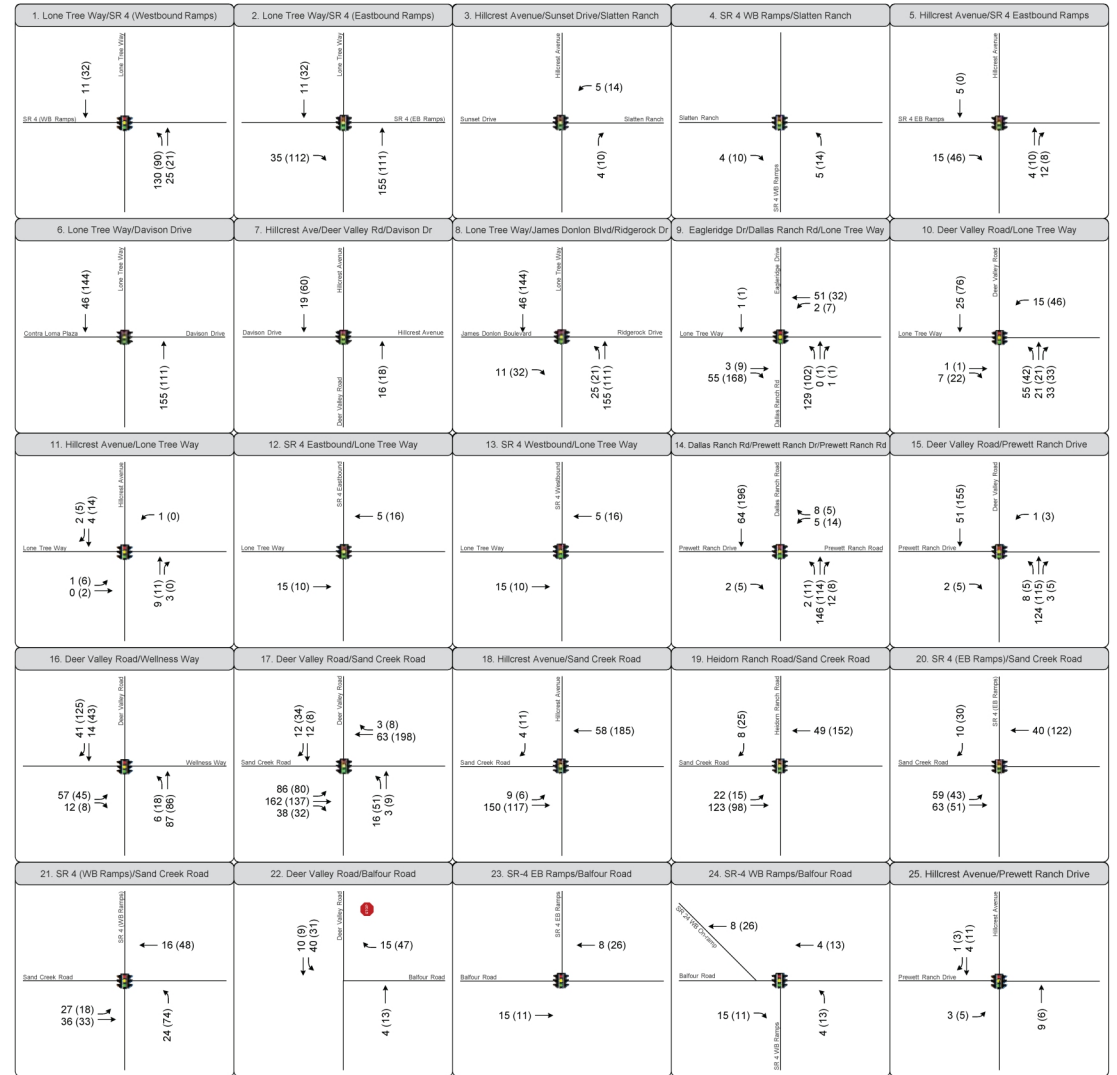
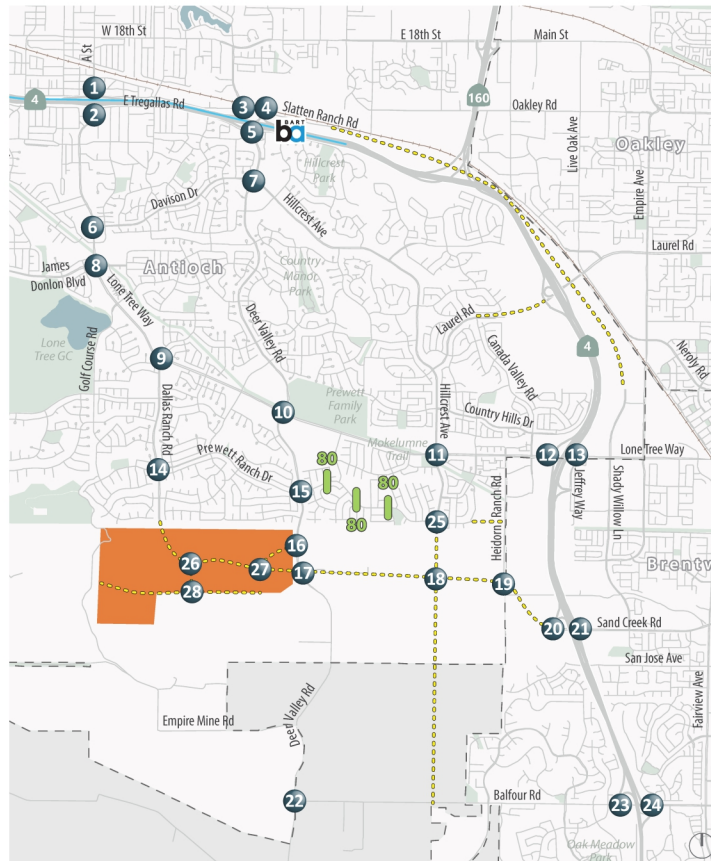


XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Future Intersection  
 Daily Roadway Segment Volume



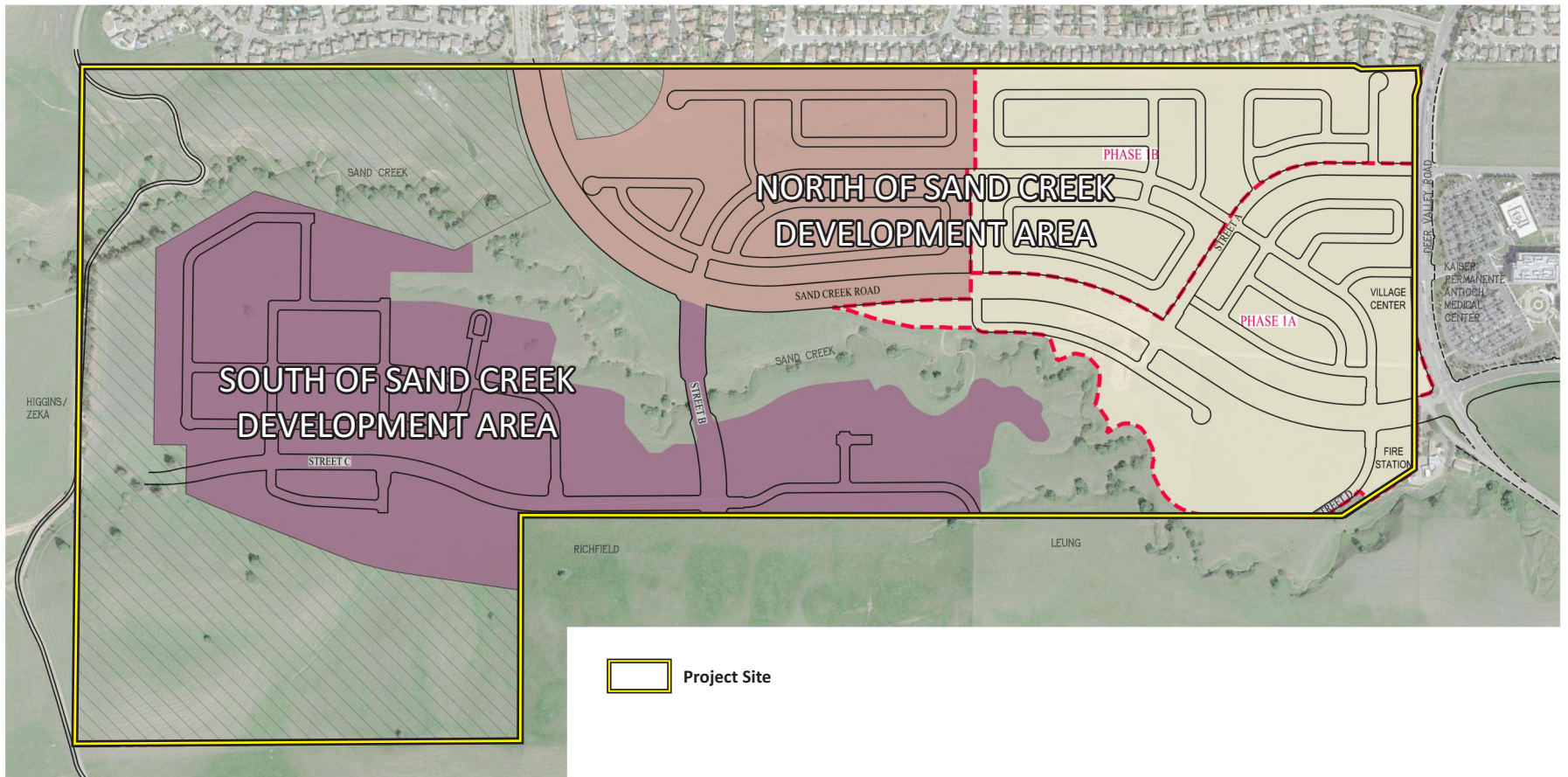
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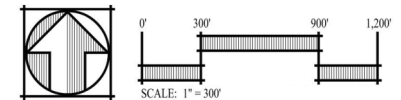
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	PHASE 1
	PHASE 2
	PHASE 3
	PHASE 1A/1B
	PROPOSED RESTRICTED DEVELOPMENT AREA

GRADING AREA SUMMARY	
PHASE 1A	78 AC
PHASE 1B	60 AC
PHASE 2	73 AC
PHASE 3	135 AC



Source: CBG Civil Engineers, March 13, 2020.

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## Exhibit 3.14-7 Phasing Plan

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Proposed project buildout would occur during Phase 3. The impact analysis under each scenario (existing plus project, near-term plus project, and cumulative plus project) were each based on buildout of the proposed project.

## Impact Evaluation

### *Existing Plus Project Traffic*

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**Impact TRANS-1:**    **The project could conflict with a program plan, ordinance or policy of the circulation system under Existing Plus Project traffic conditions.**

---

#### ***Construction***

The assessment of construction activity considers construction vehicles (including vehicles removing or delivering fill material, bulldozers, and other heavy machinery, as well as building materials delivery) and construction worker activity.

Given the topography of the site, import and/or export of fill is not expected. Proposed project construction would likely stage any large vehicles (i.e., earth-moving equipment, cranes, etc.) on the site prior to beginning site work, and would remove these vehicles at project completion. As such, a daily influx of construction equipment is unlikely.

Based on information from other residential developments, approximately five workers per day are needed for each home under construction, with one to two deliveries per week of materials for each home. Not all homes are expected to be under construction at the same time and construction workers tend to arrive/depart work sites outside typical commute periods. Assuming 10 percent of homes under construction at the peak of project construction, there could be 570 workers on-site at one time (up to 114 homes with five workers for each home), plus additional people such as building inspectors, supervisors, and others. Maximum site activity could result in 2,000 to 3,000 daily trips to/from the site (including up to 500 truck trips), which is less than would be generated by the proposed project at completion.

Certain construction-related activities could create potential conflicts with other roadway users, including the following: activities resulting in lane closures along the proposed project frontage, construction vehicles queuing within the public right-of-way waiting entry to the site, construction worker parking in non-designated parking areas, or construction debris on public streets. Construction impacts would be temporary in nature; however, this impact is considered potentially significant.

Although construction impacts would be temporary, development of a construction management plan would reduce the potential for construction vehicle conflicts with other roadway users. Mitigation Measure (MM) TRANS-1a requires the Applicant to implement a Construction Traffic Management Plan for City review and approval. Implementation of a Construction Traffic Management Plan would reduce the temporary construction impact to a less than significant level.

#### ***Existing Plus Project Conditions***

The Existing and Existing Plus Project analysis results are presented in Table 3.14-7, based on the traffic volumes and intersection configurations presented on Exhibit 3.14-8. The addition of proposed project traffic would increase average delay at the signalized project intersections and

would worsen already deficient operations at the Hillcrest Avenue at SR-4 Eastbound Ramp intersection. No signalized intersections that are currently operating within the City's LOS standard are projected to degrade beyond the established LOS standard with the addition of proposed project traffic in the existing condition.

**Table 3.14-7: Existing Plus Project Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Existing		Existing Plus Project	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
1. Lone Tree Way/A Street/SR-4 Westbound Ramps	Signal	AM PM	13 9	B A	14 9	B A
2. Lone Tree Way/A Street/SR-4 Eastbound Ramps	Signal	AM PM	15 15	B B	17 17	B B
3. Hillcrest Avenue/Sunset Drive/Slatten Ranch Road	Signal	AM PM	18 17	B B	18 17	B B
4. Slatten Ranch Road/SR-4 Westbound Ramps	Signal	AM PM	8 8	A A	8 8	A A
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	30 <b>90</b>	C <b>F</b>	30 <b>99</b>	C <b>F</b>
6. Lone Tree Way/Davison Drive	Signal	AM PM	17 15	B B	18 16	C C
7. Deer Valley Road/Hillcrest Avenue/Davison Drive	Signal	AM PM	26 29	C C	27 30	C B
8. Lone Tree Way/James Donlon Boulevard	Signal	AM PM	19 16	B B	20 17	D B
9. Lone Tree Way/Dallas Ranch Road	Signal	AM PM	27 16	C B	33 18	D C
10. Lone Tree Way/Deer Valley Road	Signal	AM PM	30 21	C C	36 26	B C
11. Lone Tree Way/Hillcrest Avenue	Signal	AM PM	19 20	B C	19 21	B C
12. Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM PM	17 32	B C	18 34	A B
13. Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way	Signal	AM PM	9 12	A B	9 13	C B
14. Prewett Ranch Drive/Dallas Ranch Road	Signal	AM PM	19 14	B B	20 14	C B
15. Prewett Ranch Drive/Deer Valley Road	Signal	AM PM	27 14	C B	30 15	B B
16. Deer Valley Road/Wellness Way/Street A	Signal	AM PM	7 5	A A	13 13	B B

**Table 3.14-7 (cont.): Existing Plus Project Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Existing		Existing Plus Project	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
17. Sand Creek Road/Deer Valley Road	Signal	AM PM	9 7	A A	11 8	B A
18. Sand Creek Road/Hillcrest Avenue (future intersection)	Signal	AM PM	— —	— —	— —	— —
19. Sand Creek Road/Heidorn Ranch Road (future intersection)	Signal	AM PM	— —	— —	— —	— —
20. Sand Creek Road/SR-4 Eastbound Ramps	Signal	AM PM	4 4	A A	4 4	A A
21. Sand Creek Road/SR-4 Westbound Ramps	Signal	AM PM	5 6	A A	5 5	A A
22. Balfour Road/Deer Valley Road	SSSC	AM PM	14 (23) 11 (14)	B (C) B (B)	27 ( <b>52</b> ) 14 (22)	D ( <b>F</b> ) B (C)
23. Balfour Road/SR-4 Eastbound Ramps	Signal	AM PM	33 30	C C	34 32	C C
24. Balfour Road/SR-4 Westbound Ramps	Signal	AM PM	25 23	A A	25 22	C C
25. Prewett Ranch Drive/Hillcrest Avenue	Signal	AM PM	19 16	B B	21 17	B B
Notes: <b>Bold</b> indicates potentially deficient operations. <b><i>Bold Italics</i></b> indicates potentially significant impact. <sup>1</sup> Signal = signalized intersection; SSSC = side-street stop-controlled <sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6 <sup>th</sup> Edition method for vehicles. Source: Fehr & Peers 2019.						

Vehicle queues are expected to increase slightly with the addition of proposed project traffic, but would be generally contained within the available storage space. For intersections that are projected to operate at LOS D or better during the AM and PM peak-hours (as either roundabouts or signalized intersections), it is expected that vehicle queue spillback can be managed through signal timing adjustments, which the City of Antioch periodically undertakes to optimize travel flow along major corridors.

At the Deer Valley Road at Balfour Road intersection, the addition of proposed project traffic would result in LOS F conditions for the side-street movement, resulting in a potentially significant impact. Peak-hour signal warrants would be satisfied with the addition of proposed project traffic during the AM peak-hour with Phase 1 development.

#### *Daily Roadway Segment Operation*

Automatic machine traffic counts were conducted over a 72-hour period (Tuesday through Thursday) on clear days in August 2019 with area schools in session along Prewett Ranch Drive as some vehicle

traffic accessing the site could travel through Prewett Ranch Drive to access Hillcrest Avenue and Sand Creek Road prior to the completion of the Sand Creek Road extension between Hillcrest Avenue and Deer Valley Road. To assess the effects of the addition of proposed project traffic on Prewett Ranch Drive in the existing condition, the daily trip generation estimates were applied to the project trip assignment. The resulting trips were then added to the existing traffic volumes. The percent increase in project trips was also calculated, with the results presented in Table 3.14-8.

**Table 3.14-8: Existing Plus Project Conditions Average Daily Traffic**

Segment	Daily Traffic	Project Traffic	Existing Plus Project	Daily Fluctuation	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	7,510	520	8,030	± 1.2 percent	7 percent
2. Prewett Ranch Drive at Diablo Vista Elementary School	4,050	520	4,570	± 1.8 percent	13 percent
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,970	520	4,490	± 2.9 percent	13 percent

Source: Fehr & Peers 2019.

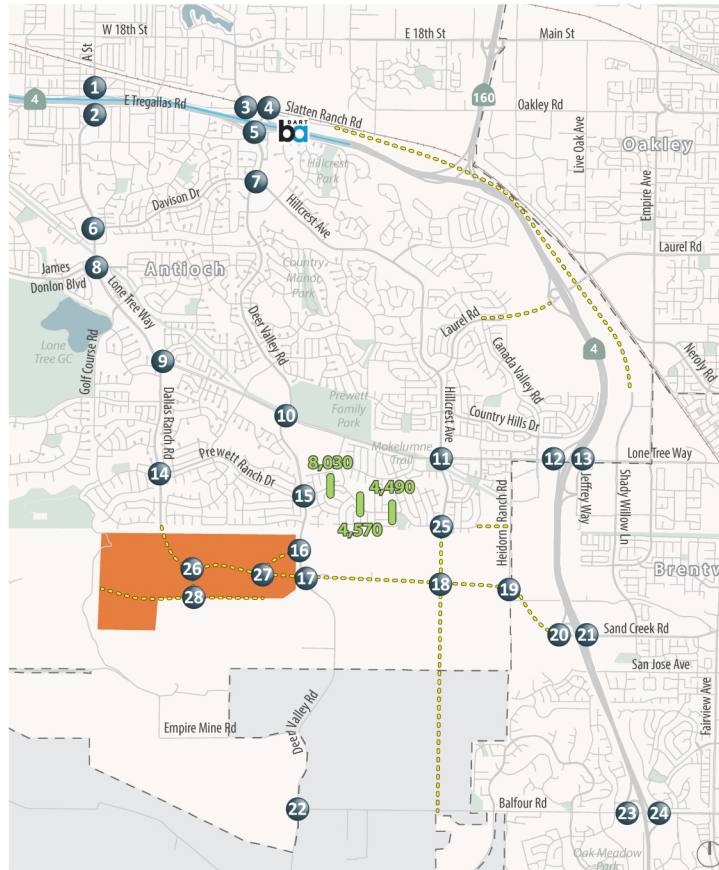
For Segments 1 and 2, the Existing Plus Project daily traffic volumes are below the maximum desired level for a residential collector roadway without front-on housing. For Segment 3 between Grass Valley Way and Hillcrest Avenue, existing traffic volumes exceed the desired level for a residential collector roadway with front-on housing (3,000 vehicles per day), with the proposed project expected to increase vehicle traffic by up to 13 percent.

#### *Hillcrest Avenue at SR-4 Eastbound Ramps*

The Hillcrest Avenue at SR-4 Eastbound Ramps intersection operates at a deficient LOS F during the PM peak-hour prior to the addition of proposed project traffic in the existing condition. The addition of proposed project traffic would worsen operations and increase delay by 9 seconds. Based on the significance criteria, this is considered a significant impact. This impact would occur with Phase 1 of the project. This interchange has been built to its ultimate right-of-way and no additional physical improvements are planned. Poor operations at this intersection are primarily due to the proximity of adjacent intersections that affect vehicle progression through the interchange area. As a result, adjusting the timing of the traffic signals would improve operations and allow increased travel through the interchange.

Mitigation Measure (MM) TRANS-1b requires the project Applicant to fund the design and installation of Adaptive Signal Control Technologies (ASCT) or other traffic signal interconnect system approved by the City at the following intersections:

- Slatten Ranch Road at SR-4 Westbound Ramps
- Slatten Ranch Road/Sunset Drive at Hillcrest Avenue
- Hillcrest Avenue at SR-4 Eastbound Ramps
- East Tregallas Road/Larkspur Drive at Hillcrest Avenue



XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Future Intersection  
 Daily Roadway Segment Volume

1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Slatten Ranch	4. SR 4 WB Ramps/Slatten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgerock Dr	9. Eagleridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Wellness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidom Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR-4 EB Ramps/Balfour Road	24. SR-4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-8 Existing with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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ASCT are able to adjust traffic signal cycle lengths and phasing based on actual conditions with the ability to adjust signal timing parameters to best serve actual conditions every few minutes.

In conjunction with the signal timing adjustments, the project Applicant shall also work with the City and Caltrans to design and install potential restriping options within the Hillcrest Avenue at SR-4 interchange area that improve vehicle and bicycle travel through the interchange area.

The design process shall start prior to the issuance of the 10<sup>th</sup> residential building permit for the project, and installation of the traffic signal interconnect system and restriping shall be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch Engineer determines that design and installation delays are beyond the control of the project Applicant. If such a determination is made, the City would be required to refund any unused fees. This is reflected in MM TRANS-1b.

With signal timing adjustments to better serve projected traffic flows, intersection operations would improve to an acceptable level, reducing the impact to a less-than-significant level, as shown in Table 3.14-9.

Although the implementation of the above measures would reduce the impact to a less-than significant level, Caltrans controls the operations of the traffic signals at the Slatten Ranch Road at SR-4 Westbound Ramps and Hillcrest Avenue at SR-4 Eastbound Ramps intersection. Caltrans staff has indicated initial support for the striping changes and installation of traffic signal equipment to improve operations for all modes of travel through the interchange; however, the City cannot assure full implementation of this improvement and the impact would remain significant and unavoidable if Caltrans does not authorize and/or accept the improvements.

**Table 3.14-9: Existing Plus Project with Mitigation Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Existing		Existing Plus Project		Existing Plus Project with Mitigation	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	32 <b>90</b>	C <b>F</b>	32 <b>99</b>	C <b>F</b>	32 44	C D
22. Balfour Road/Deer Valley Road	SSSC/ Signal	AM PM	14 (23) 11 (14)	B (C) B (B)	27 ( <b>52</b> ) 14 (22)	D ( <b>F</b> ) B (C)	8 7	A A
Notes: <b>Bold</b> indicates potentially deficient operations. <b>Bold Italics</b> indicates potentially significant impact. <sup>1</sup> Signal = signalized intersection; SSSC = side-street stop-controlled <sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6 <sup>th</sup> Edition method for vehicles. Source: Fehr & Peers 2019.								

*Balfour Road at Deer Valley Road*

The addition of proposed project-generated vehicle trips during the AM peak-hour would result in LOS F conditions for side-street movements and would result in peak-hour signal warrants being satisfied with the addition of full-buildout proposed project traffic in the existing condition. Based on the significance criteria, this is considered a significant impact.

The project Applicant shall install a traffic signal at this intersection in conjunction with other planned improvements, including the construction of a southbound left-turn lane, as well as separate westbound left and right-turn lanes. Improvements shall be completed prior to the issuance of the 431<sup>st</sup> residential building permit. These improvements would result in overall acceptable service levels, reducing the proposed project impact to a less-than-significant level, as shown in Table 3.14-8, because the project Applicant would construct the improvements. The responsibility for improvements to this intersection are shared by the City of Antioch and the City of Brentwood. Therefore, a reimbursement agreement with the City of Brentwood for half the signal costs and the cost of all improvements on Balfour Road could be sought. Although the project Applicant would be required to make the improvement, the impact could remain significant and unavoidable if either the City of Brentwood or Contra Costa County do not approve/accept the improvements. This is reflected in MM TRANS-1c.

***Phasing Analysis under Existing Plus Project Conditions***

To provide better insight into when each improvement needs to be implemented, Fehr & Peers considered the development of just Phase 1, as well as development of Phases 1 and 2 under Existing Plus Project Conditions. Existing Plus Project Conditions for Phase 1 and Phase 2 are presented on Exhibits 3.14-9 and 3.14-10.

Results of the phasing analysis indicate that the addition of traffic from Phase 1 would worsen the operations of the Hillcrest Avenue/SR-4 Eastbound intersection, but would not result in any new deficiencies, even considering all project access from Deer Valley Road. As such, MM TRANS-1b would be required for Phase 1, but MM TRANS-1c would not be required.

The addition of proposed project traffic through Phase 2 would result in an impact at the Deer Valley Road at Balfour Road intersection as the side street would degrade to LOS E and peak-hour signal warrants would be met. As such, MM TRANS-1c would be required for implementation of Phase 2.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

**MM TRANS-1a** Prior to issuance of grading permits, the project Applicant shall retain a qualified transportation consultant to prepare and submit a Construction Traffic Management Plan to the City of Antioch for review and approval. The plan shall include:

- Project staging plan to maximize on-site storage of materials and equipment;
- A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak-hours; lane closure proceedings; signs, cones, and other warning devices for drivers; and designation of construction access routes;

- Permitted construction hours;
- Location of construction staging;
- Identification of parking areas for construction employees, site visitors, and inspectors, including on-site locations; and
- Provisions for street sweeping to remove construction related debris on public streets.

**MM TRANS-1b** Prior to issuance of the first building permit, the project Applicant shall provide fees to the City of Antioch to fund the design and installation of Adaptive Signal Control Technologies (ASCT) or other traffic signal interconnect system approved by the City at the following intersections:

- Slatten Ranch Road at SR-4 Westbound Ramps
- Slatten Ranch Road/Sunset Drive at Hillcrest Avenue
- Hillcrest Avenue at SR-4 Eastbound Ramps
- East Tregallas Road/Larkspur Drive at Hillcrest Avenue

In conjunction with the signal timing adjustments, the Applicant shall work with the City and Caltrans to design and install potential restriping options within the Hillcrest Avenue at SR-4 interchange area that improve vehicle and bicycle travel through the interchange area.

The design process for these improvements shall start prior to the issuance of the 10<sup>th</sup> residential building permit for the proposed project, and installation of the traffic signal interconnect system and restriping shall be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch Engineer determines that design and installation delays are beyond the control of the project Applicant.

**MM TRANS-1c** Prior to issuance of the 431<sup>st</sup> building permit, the project Applicant shall install a traffic signal at the intersection at Balfour Road/Deer Valley Road in conjunction with other planned improvements, including the construction of a southbound left-turn lane, as well as separate westbound left and right-turn lanes.

### ***Level of Significance After Mitigation***

**TRANS-1a**—Less Than Significant

**TRANS-1b**—Significant and Unavoidable (unless and until Caltrans accepts the improvements)

**TRANS-1c**—Significant and Unavoidable (unless and until the City of Brentwood and Contra Costa County accepts the improvements).

**Near-term Traffic**

**Impact TRANS-2: The project could conflict with a program plan, ordinance or policy of the circulation system under Near-term traffic conditions.**

The near-term scenario reflects existing traffic counts plus traffic from approved and pending developments that are expected to be completed and occupied in the next 5 to 10 years. Near-term conditions without and with the project are evaluated. This scenario also includes transportation projects programmed for implementation over the near-term horizon, and construction of required transportation mitigation measures for approved projects, as the traffic generated by those projects is considered in this scenario.

**Near-term Forecasts**

The available City of Brentwood Project Status Report (May 2019) and City of Antioch Project Pipeline (as of January 2019) at the time the proposed project Notice of Preparation (NOP) was issued were reviewed to identify developments to include in this scenario. Developments that could generate additional traffic through the project area are summarized in Table 3.14-10 and their locations shown on Exhibit 3.14-11.

**Table 3.14-10: Pending and Approved Projects Summary**

Map Location	Project Name	Size	Land Use Activity	Status
1	Park Ridge, Antioch	525 dwelling units	Single-family Homes	Approved, under construction
2	Heidorn Village, Antioch	117 dwelling units	Single-family Homes	Approved, under construction
3	Aviano, Antioch	533 dwelling units	Single-family Homes	Approved, under construction
4	Promenade—Vineyards at Sand Creek, Antioch	641 dwelling units	Single-family Homes	Approved, under construction
5	Laurel Ranch, Antioch	180 dwelling units; 10 acres commercial	Single-family Homes	Approved
6	Wildflower Station, Antioch	22 single-family 98 Condos 89,400 square feet commercial	Mixed-Use	Approved
7	Parkside Villas, Brentwood	37 dwelling units	Single-family Homes	Approved
8	Bridle Gate Residential Elementary School, Brentwood	265 dwelling units 700 students	Single-family Homes Elementary School	Pending Pending
8	Bridle Gate Commercial, Brentwood	150,000 square feet	Shopping Center	Pending
8	The Enclave, Brentwood	258 dwelling units	Apartments	Pending

**Table 3.14-10 (cont.): Approved Projects Summary**

Map Location	Project Name	Size	Land Use	Status
9	Brentwood Country Club, Brentwood	63 dwelling units 123 units	Detached Active Adult Residential Care Facility	Approved
10	Orfanos, Brentwood	160 dwelling units	Single-family Homes	Approved
11	Alvarez Partners, Brentwood	48 dwelling units	Single-family Homes	Approved
12	Streets of Brentwood, Brentwood	320 dwelling units 32,000 square feet	Apartments Shopping Center	Pending
13	Shops at Lone Tree Village, Brentwood	54,000 square feet	Shopping Center	Pending
14	Quail Cove	32 dwelling units	Single Family Homes	Approved
Source: Fehr & Peers 2019.				

Near-term project vehicle trip generation was estimated using trip generation rates and equations for the proposed land uses from the ITE Trip Generation Manual (10<sup>th</sup> Edition). Traffic generated by approved and pending developments was added to the existing traffic volumes to provide the basis for the Near-term without Project analysis, as presented on Exhibit 3.14-12. The existing traffic counts were also increased by 5 percent to account for traffic growth from projects outside the immediate project area that could add through traffic to the area. Project traffic volumes from Exhibit 3.14-5 were added to the Near-term without Project forecasts to estimate Near-term with Project volumes at the project intersections, as presented on Exhibit 3.14-13.

#### *Near-term Roadway Assumptions*

A number of roadway improvements are conditioned on near-term developments and considered in the near-term forecasts, including an extension of Hillcrest Avenue from its current terminus to an extension of Sand Creek Road, improvements to Heidorn Ranch Road, the extension of Sand Creek Road from SR-4 in the east to a new terminus by the Dozier-Libbey Medical High School, the extension of Prewitt Ranch Drive to Heidorn Ranch Road, and the Laurel Road extension from SR-4 to its current terminus east of Canada Valley Road.

For the extension of Sand Creek Road, no direct through travel would be permitted between Deer Valley Road and Hillcrest Avenue; however, vehicles would be able to travel through Prewett Ranch Drive to Hillcrest Avenue to Sand Creek Road to access destinations to the east.

Lone Tree Way is also planned to be restriped to provide three through lanes in both the eastbound and westbound directions from west of Deer Valley Road to Hillcrest Avenue; at the Lone Tree Way/Deer Valley Road intersection, the third westbound through lane would become a second westbound left-turn lane.

As part of the proposed project, roadway improvements would be constructed to extend Sand Creek Road from Deer Valley Road to Dallas Ranch Road, and Deer Valley Road would be improved along the proposed project frontage to provide two travel lanes in each direction through the Sand Creek Road intersection, where it would taper to a two-lane cross-section.

#### *Near-term Traffic Conditions*

The analysis results are presented in Table 3.14-11, based on the traffic volumes and lane configurations presented on Exhibit 3.14-12 and Exhibit 3.14-13. In the Near-term condition, the Hillcrest Avenue at SR-4 Eastbound Ramp and Lone Tree Way at SR-4 Eastbound Ramp would operate at deficient levels prior to the addition of proposed project traffic. All other project intersections would operate at acceptable service levels prior to the addition of proposed project traffic.

**Table 3.14-11: Near-term Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Near-term without Project		Near-term with Project	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
1. Lone Tree Way/A Street/SR-4 Westbound Ramps	Signal	AM PM	16 10	B A	19 10	B B
2. Lone Tree Way/A Street/SR-4 Eastbound Ramps	Signal	AM PM	19 19	B B	21 22	C C
3. Hillcrest Avenue/Sunset Drive/Slatten Ranch Road	Signal	AM PM	16 18	B B	16 18	B B
4. Slatten Ranch Road/SR-4 Westbound Ramps	Signal	AM PM	8 9	A A	8 9	A A
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	46 <b>121</b>	D <b>F</b>	50 <b>133</b>	D <b>F</b>
6. Lone Tree Way/Davison Drive	Signal	AM PM	20 17	C B	24 18	C B
7. Deer Valley Road/Hillcrest Avenue/Davison Drive	Signal	AM PM	31 45	C D	32 46	C D
8. Lone Tree Way/James Donlon Boulevard	Signal	AM PM	21 18	C B	22 20	C C
9. Lone Tree Way/Dallas Ranch Road	Signal	AM PM	30 17	D B	38 19	D C
10. Lone Tree Way/Deer Valley Road	Signal	AM PM	35 27	C C	40 33	C C
11. Lone Tree Way/Hillcrest Avenue	Signal	AM PM	43 34	D C	46 36	D D
12. Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM PM	24 <b>56.7</b>	C <b>E</b>	24 <b>57.4</b>	C <b>E</b>
13. Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way	Signal	AM PM	12 21	B C	12 21	B C

**Table 3.14-11 (cont.): Near-term Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Near-term without Project		Near-term with Project	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
14. Prewett Ranch Drive/Dallas Ranch Road	Signal	AM PM	19 15	B B	21 14	<b>C</b> B
15. Prewett Ranch Drive/Deer Valley Road	Signal	AM PM	34 17	C B	43 24	D C
16. Deer Valley Road/Wellness Way/Street A <sup>3</sup>	Signal	AM PM	6 5	A A	15 15	B B
17. Sand Creek Road/Deer Valley Road <sup>3</sup>	Signal	AM PM	9 7	A A	11 9	C C
18. Sand Creek Road/Hillcrest Avenue	Signal	AM PM	5 5	A A	6 6	A A
19. Sand Creek Road/Heidorn Ranch Road	Signal	AM PM	17 21	B C	18 22	B D
20. Sand Creek Road/SR-4 Eastbound Ramps	Signal	AM PM	10 14	B B	11 25	A A
21. Sand Creek Road/SR-4 Westbound Ramps	Signal	AM PM	7 9	A A	7 9	A A
22. Balfour Road/Deer Valley Road	SSSC	AM PM	18 (33) 12 (21)	C (D) B (C)	34 ( <b>71</b> ) 20 (37)	D ( <b>F</b> ) B (C)
23. Balfour Road/SR-4 Eastbound Ramps	Signal	AM PM	32 31	C C	33 32	B B
24. Balfour Road/SR-4 Westbound Ramps	Signal	AM PM	24 21	C C	24 21	B B
25. Prewett Ranch Drive/Hillcrest Avenue	Signal	AM PM	20 15	C B	27 18	C B

Notes:

**Bold** indicates potentially deficient operations. ***Bold Italics*** indicates potentially significant impact.

<sup>1</sup> Signal = signalized intersection; SSSC = side-street stop-controlled

<sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6<sup>th</sup> Edition method for vehicles.

<sup>3</sup> Traffic signal timings optimized in “with project” conditions to better accommodate changed geometry.

Source: Fehr & Peers 2019.

Peak-hour signal warrants would be met at the Balfour Road at Deer Valley Road intersection in the Near-term condition prior to the addition of proposed project traffic due to traffic growth from approved and pending projects. With the addition of proposed project traffic, operations of the two deficient intersections would further degrade, and operations of the side-street movement at the Deer Valley Road at Balfour Road intersection would degrade from acceptable to unacceptable. All other project intersections would operate at acceptable service levels with the addition of proposed project traffic.

Vehicle queues are expected to increase at project intersections as traffic volumes increase, which would further increase with the addition of proposed project traffic. Monitoring and adjusting traffic signal timings in response to actual traffic volumes to minimize the potential for vehicle queue spillback is recommended.

#### *Daily Roadway Segment Operation*

Traffic from Near-term projects was added to the existing daily traffic volumes on Prewett Ranch Drive, with the resulting volumes shown in Table 3.14-12. Proposed project trips that could use the roadway were then estimated considering the changes to the roadway network in the Near-term condition discussed previously and added to the Near-term without Project volumes. The percent increase in proposed project trips was also calculated, with the results presented in Table 3.14-12.

**Table 3.14-12: Near-term Conditions Average Daily Traffic**

Segment	Daily Traffic	Project Traffic	Existing Plus Project	Daily Fluctuation	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	7,990	1,500	9,490	± 1.2 percent	19 percent
2. Prewett Ranch Drive at Diablo Vista Elementary School	4,360	1,500	5,860	± 1.8 percent	34 percent
3. Prewett Ranch Drive, west of Hillcrest Avenue	4,280	1,500	5,780	± 2.9 percent	35 percent

Source: Fehr & Peers 2019.

For Segments 1 and 2, the near-term daily traffic volumes considering the addition of proposed project traffic are below the maximum desired level for a residential collector roadway without front-on housing. For Segment 3 between Grass Valley Way and Hillcrest Avenue, existing traffic volumes exceed the desired level for a residential collector roadway with front-on housing (3,000 vehicles per day). In the Near-term condition, volumes are expected to further increase and the addition of proposed project traffic would further add vehicle travel to the roadway, with the proposed project expected to increase traffic volumes on this roadway segment more than the existing daily fluctuation.

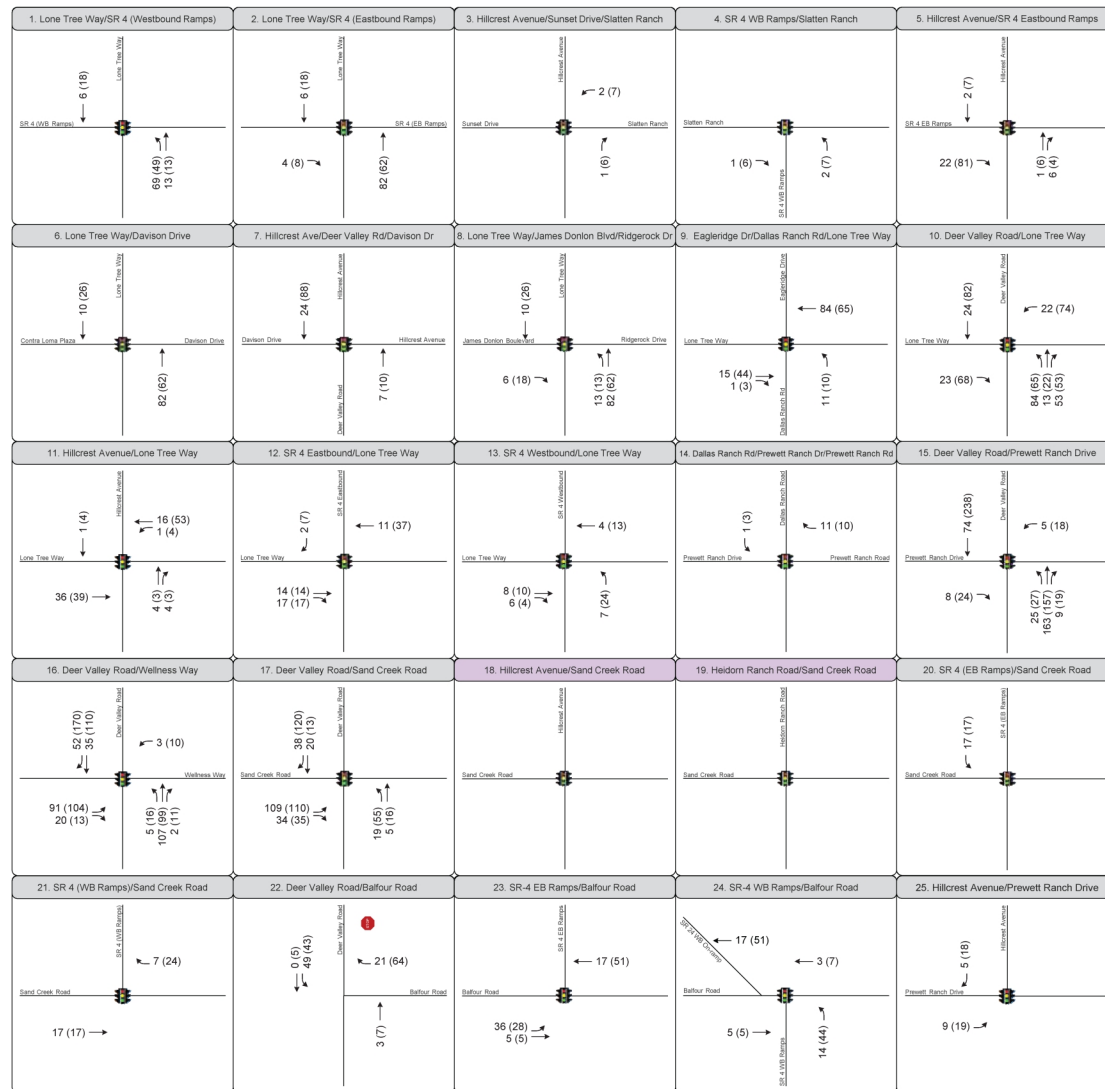
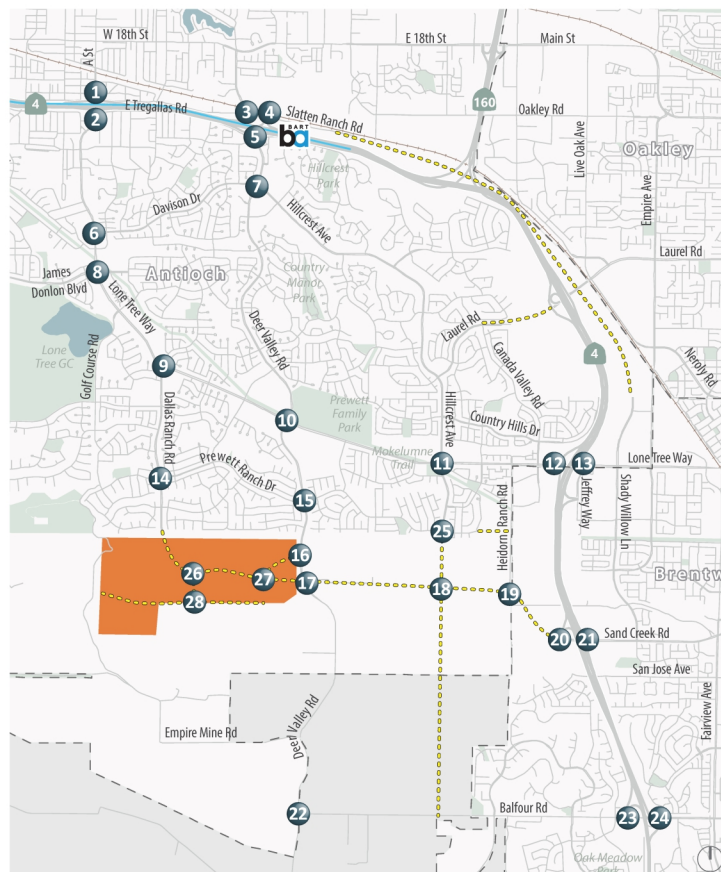
#### *Impacts and Mitigation*

The addition of near-term traffic would result in impacts at three intersections:

##### **Hillcrest Avenue at SR-4 Eastbound Ramps**

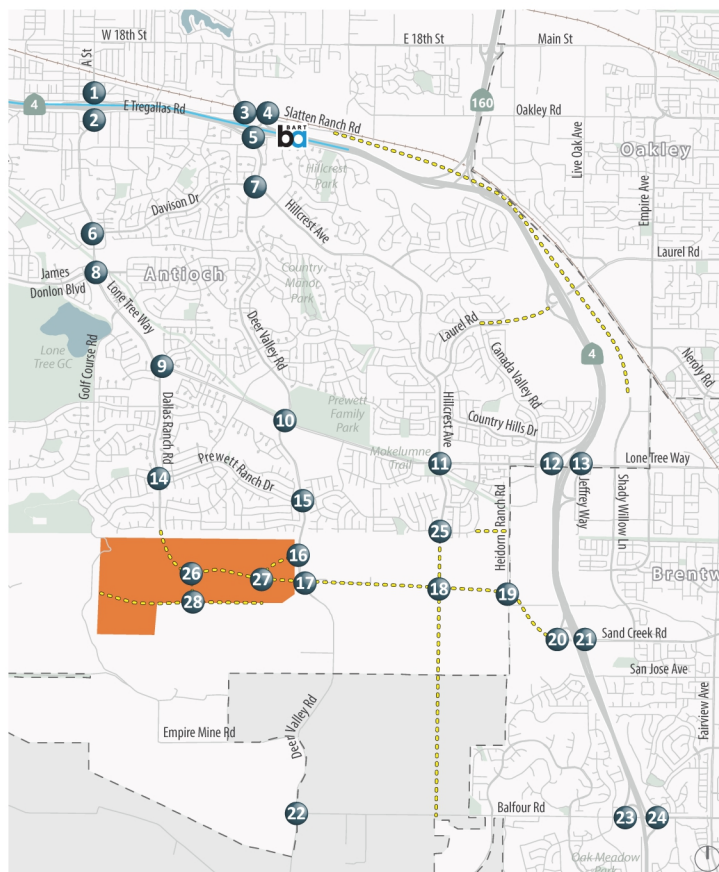
The Hillcrest Avenue at SR-4 Eastbound Ramps intersection operates at a deficient LOS F during the PM peak-hour prior to the addition of proposed project traffic in the Near-term condition. The addition of proposed project traffic would worsen operations and increase average delay by 12 seconds. Based on the significance criteria, this is considered a significant impact.

This interchange has been built to its ultimate right-of-way and no additional physical improvements are planned. Poor operations at this intersection are primarily due to the close proximity of adjacent intersections that affect vehicle progression through the interchange area. As a result, adjusting the timing of the traffic signals would improve operations and allow increased travel through the interchange. These improvements are reflected in MM TRANS-1b.

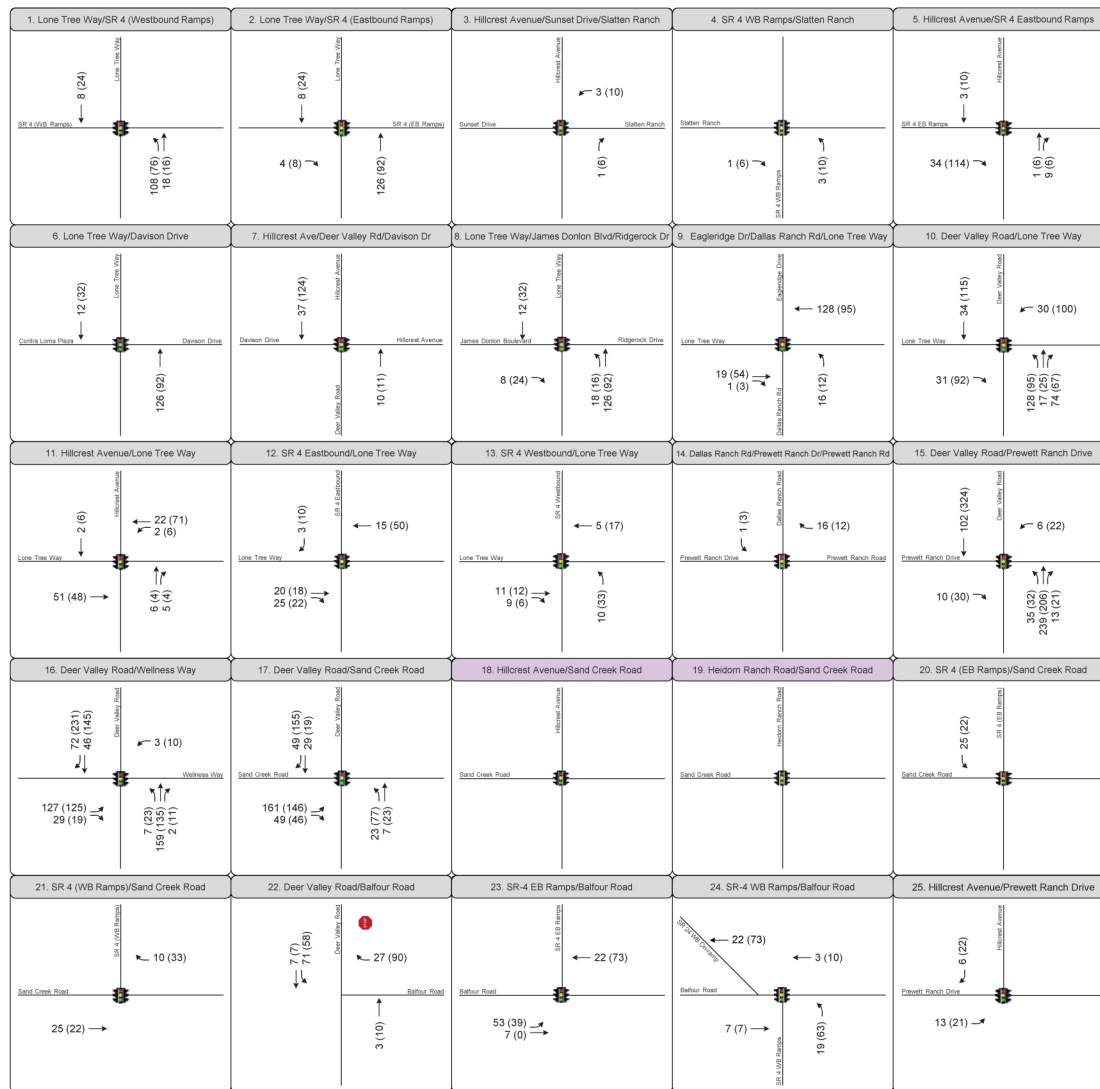


Source: FEHR & PEERS, December 2019.

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XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Signalized Intersection  
 Stop Sign  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Future Intersection

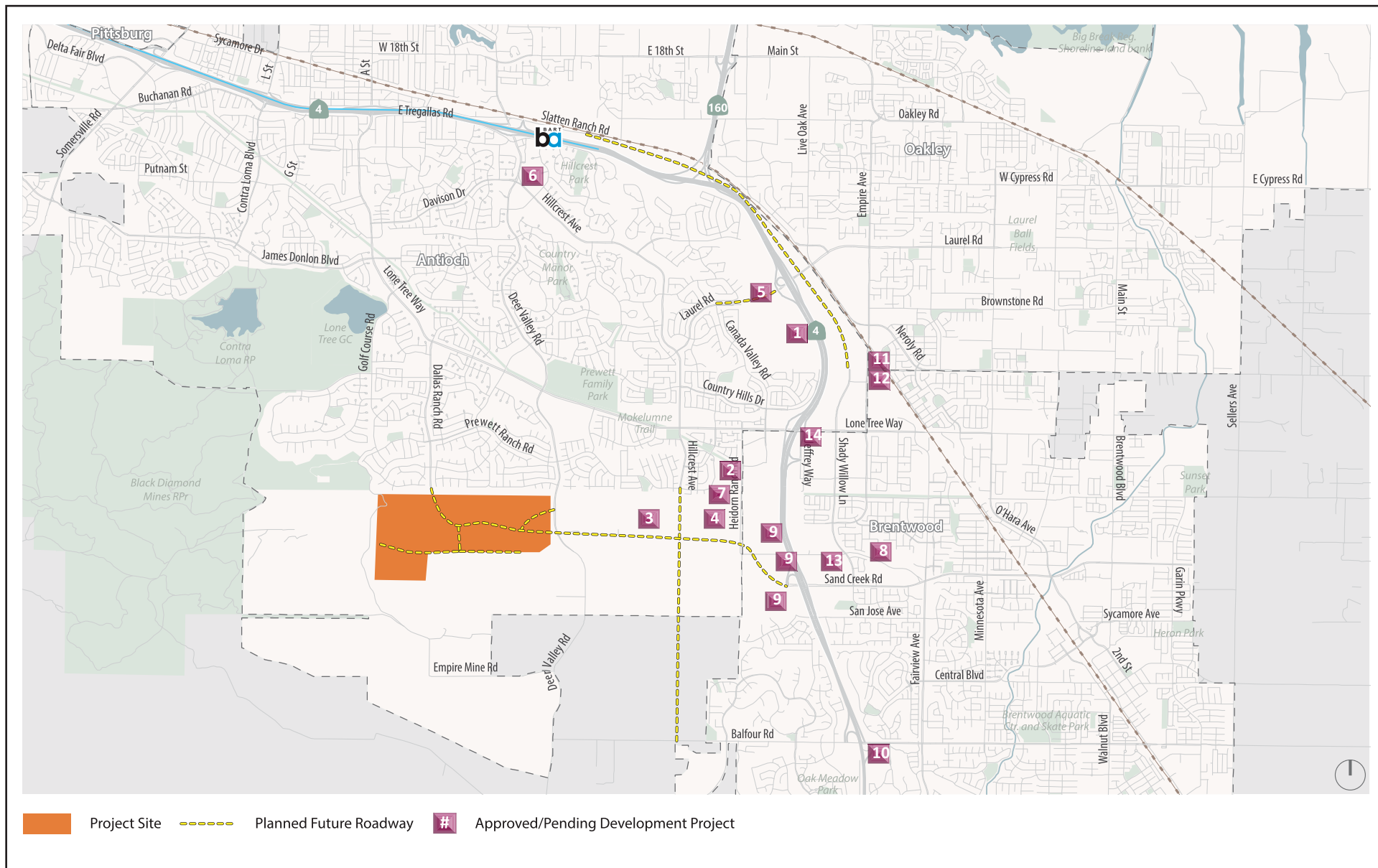


Source: FEHR & PEERS, December 2019.

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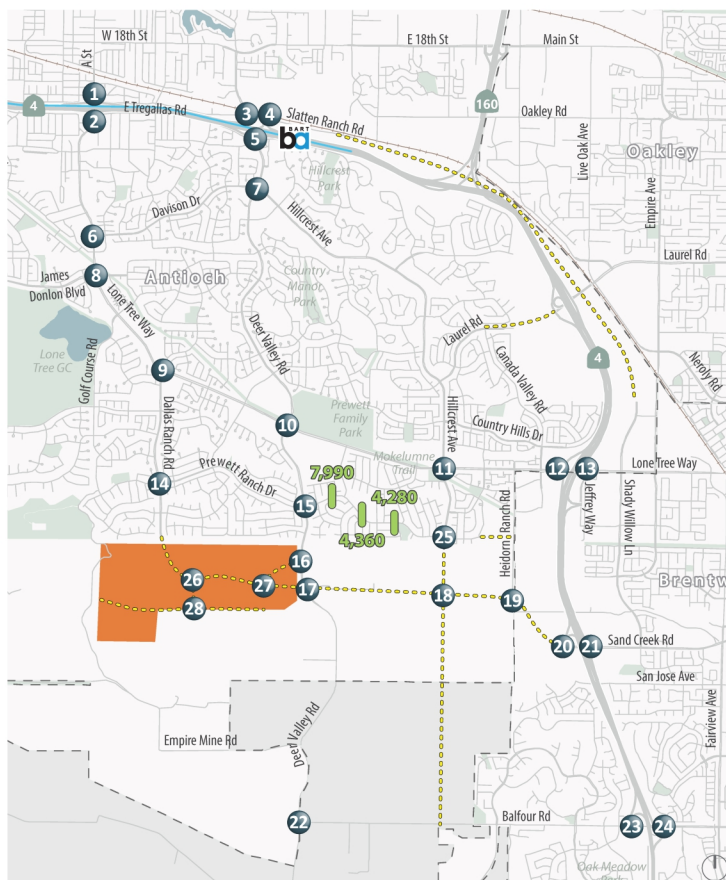
## Exhibit 3.14-10 Project Trip Assignment Existing Roadway Network — Phase 2

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Source: FEHR & PEERS, December 2019.

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XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Daily Roadway Segment Volume

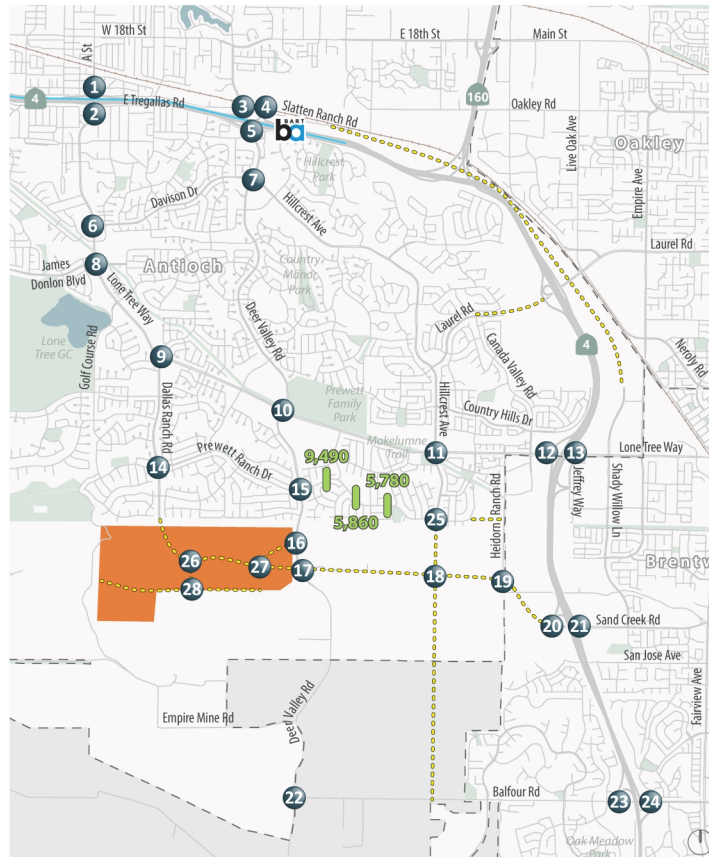
1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Slatten Ranch	4. SR 4 WB Ramps/Slatten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgeway Dr	9. Eagleridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Wellness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidorn Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR 4 EB Ramps/Balfour Road	24. SR 4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-12 Near-Term without Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Daily Roadway Segment Volume

1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Statten Ranch	4. SR 4 WB Ramps/Statten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgerock Dr	9. Eagleridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Wellness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidorn Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR 4 EB Ramps/Balfour Road	24. SR 4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-13 Near-Term with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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As other projects would benefit from this improvement, a reimbursement agreement could be established by the project Applicant with the City of Antioch. During the PM peak-hour in the Near-term condition, proposed project traffic represents 1.8 percent of the traffic flow, other near-term growth represents 5.9 percent of traffic flow, and existing traffic represents 92.3 percent of traffic flow.

With signal timing adjustments to better serve projected traffic flows, intersection operations would improve to LOS D during the PM peak-hour, reducing the impact to a less-than-significant level, as shown in Table 3.14-13.

Although the implementation of the above measures would reduce the impact to a less-than-significant level, Caltrans controls the operations of the traffic signals at the Slatten Ranch Road at SR-4 Westbound Ramps and Hillcrest Avenue at SR-4 Eastbound Ramps intersections. Although Caltrans staff has indicated initial support for the striping changes and installation of traffic signal equipment to improve operations for all modes of travel through the interchange, the City cannot assure full implementation of this improvement and the impact would remain significant and unavoidable if Caltrans does not accept the improvements.

#### **Lone Tree Way at SR-4 Eastbound Ramps**

The Lone Tree Way at SR-4 Eastbound Ramp intersection is projected to operate at a deficient LOS E in the PM peak-hour prior to the addition of proposed project traffic in the Near-term condition. The proposed project would increase traffic through this intersection, resulting in a significant impact.

Improvements at this interchange are programmed in the East Contra Costa Regional Fee and Financing Authority (ECCRFFA) regional fee program, although specific improvements or the timing of their installation have not yet been identified. Fees are based on the land use type and are payable at the time building permits are issued based on either the number of dwelling units for residential uses or square-footage for non-residential uses, as established through a nexus study.

MM TRANS-2 requires the project Applicant to pay its fair share towards potential improvements at this intersection through participation in the ECCRFFA regional fee program. Potential improvements under consideration include optimization of the signal timing or widening of the southbound off-ramp to provide a second southbound right-turn only lane. These improvements would result in overall acceptable service levels, reducing the proposed project impact to a less-than-significant level, as shown in Table 3.14-12. However, because specific improvements and their timing have not yet been established, the payment of fees cannot assure that the improvement would be implemented when the impact occurs; therefore, the impact would remain significant and unavoidable.

#### **Balfour Road at Deer Valley Road**

The addition of proposed project-generated vehicle trips during the AM peak-hour would result in LOS F conditions for the side-street movement; peak-hour signal warrants would be satisfied prior to the addition to proposed project traffic. Based on the significance criteria, this is considered a significant impact. MM TRANS-1b, discussed previously, would address this impact.

Post mitigation LOS is shown in Table 3.14-13.

**Table 3.14-13: Near-term With Project With Mitigation Conditions Peak-hour Intersection Level of Service Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Near-term Without Project		Near-term with Project without Mitigation		Near-term with Project with Mitigation	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	46 <b>121</b>	D <b>F</b>	50 <b>133</b>	D <b>F</b>	39 38	D D
12. Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM PM	24 <b>56.7</b>	C <b>E</b>	24 <b>57.4</b>	C <b>E</b>	24 53	C D
22. Balfour Road/Deer Valley Road	SSSC/ Signal	AM PM	18 (33) 12 (21)	C (D) B (C)	34 ( <b>71</b> ) 20 (37)	D ( <b>F</b> ) B (C)	8 7	A A
Notes: <b>Bold</b> indicates potentially deficient operations. <b>Bold Italics</b> indicates potentially significant impact. <sup>1</sup> Signal = signalized intersection <sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6 <sup>th</sup> Edition method for vehicles. Source: Fehr & Peers 2019.								

**Phasing Analysis for the Near-Term Plus Project Conditions**

To provide better insight into when each improvement needs to be implemented, Fehr & Peers considered the development of just Phase 1, as well as development of Phases 1 and 2 under Near-term Conditions. Near-Term Conditions for Phase 1 and Phase 2 are presented on Exhibits 3.14-14 and 3.14-15.

The addition of proposed project traffic through Phase 1 would worsen average delay at the already deficient intersections, and would result in deficient operations for the side-street movement at the Deer Valley Road at Balfour Road intersection. Peak-hour signal warrants would also be satisfied. As such, MM TRANS-1b would be required.

With the addition of traffic through Phase 2, no additional deficiencies were identified and operations of the already deficient intersections would continue to worsen. MM TRANS-2 would be required to address the worsening operation at the Lone Tree/SR-4 Eastbound ramp intersection.

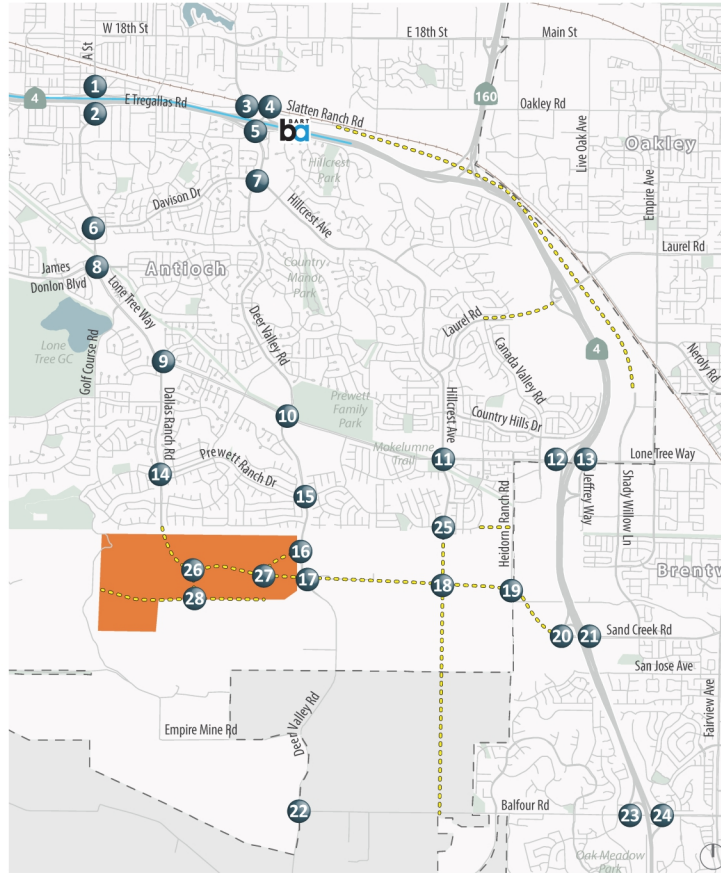
**Level of Significance Before Mitigation**

Potentially Significant

**Mitigation Measures**

Implement MM TRANS-1b, MM TRANS-1c, and:

**MM TRANS-2** Prior to issuance of the first building permit, the project Applicant shall provide the City of Antioch with East Contra Costa Regional Fee and Financing Authority regional transportation impact fees in accordance with the latest adopted fee schedule to support improvements at the Lone Tree Way/SR-4 Eastbound ramp intersection. If the required fees would not support the necessary improvements at the intersection of Lone Tree Way and the Eastbound ramp of SR-4, then no such fees shall be required.



XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Signalized Intersection Stop Sign  
 Project Site Planned Future Roadway Study Intersection

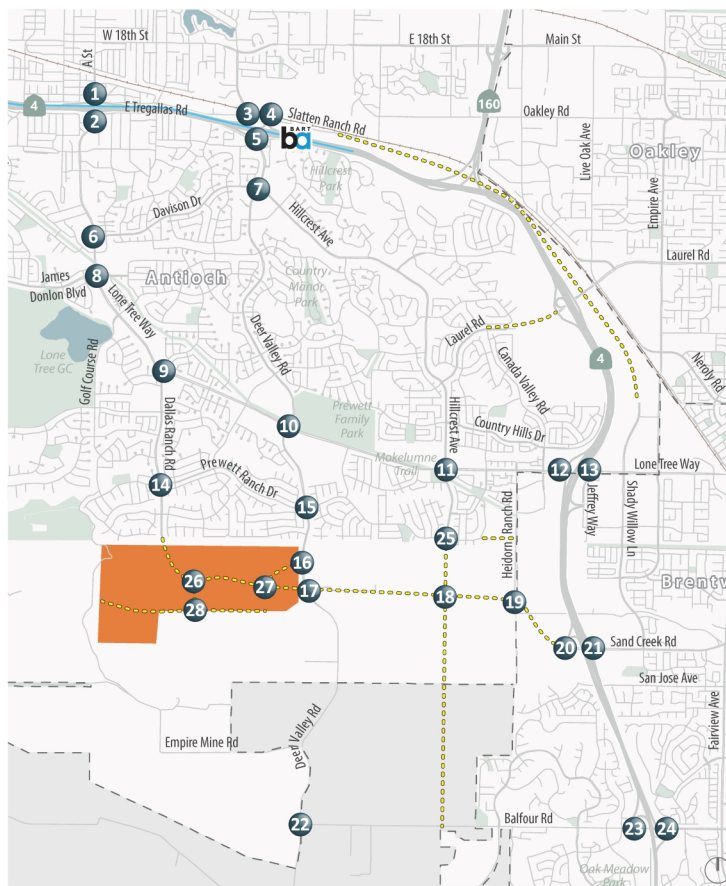


Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-14 Project Trip Assignment Near-Term Roadway Network — Phase 1

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XX (YY) AM (PM) Peak Hour Traffic Volumes    Signalized Intersection    Stop Sign  
 Project Site    Planned Future Roadway    Study Intersection



Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-15 Project Trip Assignment Near-Term Roadway Network — Phase 2

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### ***Level of Significance After Mitigation***

Significant and Unavoidable (until the improvements are implemented)

### ***Cumulative Traffic***

---

**Impact TRANS-3: The project could conflict with a program plan, ordinance or policy of the circulation system under Cumulative Traffic Conditions.**

---

The future condition analysis considers development within the City of Antioch as described in the General Plan, as well as development in Brentwood given that some project intersections are in close proximity to the Brentwood/Antioch border.

### ***Cumulative Traffic Forecasts***

To assess future growth with planned development in both the cities of Antioch and Brentwood, several sources of data were reviewed, including the Contra Costa County Travel Demand Model, future traffic projections as documented in the administrative draft Antioch Transportation Impact Fee, future projections from the City of Brentwood Priority Area 1 Specific Plan EIR (June 2018), and projections developed as part of the Antioch Aviano and Vineyards at Sand Creek transportation impact studies. Traffic forecasts within the immediate project area were reviewed to ensure that known developments were adequately reflected in the forecasts, such as the Bridle Gate Project located on the south side of the proposed Sand Creek extensions, west of SR-4, and the development of the Albers Property, east of the project site. Minor adjustments were made to the forecasts to balance traffic volumes between closely spaced intersections in the project area. The resulting Cumulative without Project forecasts are presented in Exhibit 3.14-16, which are representative of conditions over the next 20 to 25 years. The project volumes from Exhibit 3.14-6 Cumulative without Project traffic volumes to represent Cumulative with Project conditions, as presented on Exhibit 3.14-17.

The potential traffic shifts associated with completing the connection of Sand Creek Road at Dallas Ranch Road to SR-4 are also reflected in the volumes presented on Exhibit 3.14-17.

### ***Cumulative Roadway Assumptions***

In addition to the roadway improvements considered in the analysis of Near-term conditions, the extension of Hillcrest Avenue to Balfour Road was considered in the Cumulative condition in conjunction with the construction of Sand Creek Road between the Kaiser Permanente Antioch Medical Center and Deer Valley Road. Widening of SR-4 to provide two travel lanes in each direction from south of Balfour Road to Marsh Creek Road was assumed to be completed in the Cumulative condition.

As part of the proposed project, roadway improvements would be constructed to extend Sand Creek Road from Deer Valley Road to Dallas Ranch Road, and Deer Valley Road would be improved along the proposed project frontage to provide two travel lanes in each direction through the Sand Creek Road intersection, where it would taper to a two-lane cross-section.

The assumed lane configurations in each scenario are shown on Exhibit 3.14-16 and Exhibit 3.14-17. Vehicle traffic generated by the proposed project would contribute to the need for local and regional

roadway improvements. The proposed project would contribute to the construction of regional roadway improvements through the payment of regional transportation impact fees to the ECCRFFA.

### Analysis of Cumulative Conditions

The analysis results are presented in Table 3.14-14, based on the traffic volumes presented on Exhibit 3.14-16 and Exhibit 3.14-17.

**Table 3.14-14: Cumulative Conditions Peak-hour Intersection Level of Service Summary**

Intersection		Control <sup>1</sup>	Peak-hour	Cumulative without Project		Cumulative with Project		Impact?
				Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	
1.	Lone Tree Way/A Street/SR-4 Westbound Ramps	Signal	AM	25	C	30	C	No
			PM	33	C	38	D	No
2.	Lone Tree Way/A Street/SR-4 Eastbound Ramps	Signal	AM	22	C	24	C	No
			PM	30	C	45	D	No
3.	Hillcrest Avenue/Sunset Drive/Slatten Ranch Road	Signal	AM	24	C	24	C	No
			PM	41	D	42	D	No
4.	Slatten Ranch Road/SR-4 Westbound Ramps	Signal	AM	31	C	32	C	No
			PM	12	B	12	B	No
5.	Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM	<b>94</b>	<b>F</b>	<b>96</b>	<b>F</b>	Yes; increases traffic at deficient location
			PM	<b>227</b>	<b>F</b>	<b>235</b>	<b>F</b>	
6.	Lone Tree Way/Davison Drive	Signal	AM	43	D	<b>56</b>	<b>E</b>	Yes; results in LOS E operations
			PM	22	C	24	C	
7.	Deer Valley Road/Hillcrest Avenue/Davison Drive	Signal	AM	<b>67</b>	<b>E</b>	<b>68</b>	<b>E</b>	Yes; increases traffic at deficient location
			PM	<b>107</b>	<b>F</b>	<b>116</b>	<b>F</b>	
8.	Lone Tree Way/James Donlon Boulevard	Signal	AM	31	C	33	C	No
			PM	21	C	23	C	No
9.	Lone Tree Way/Dallas Ranch Road	Signal	AM	31	C	38	D	No
			PM	17	B	20	C	No
10.	Lone Tree Way/Deer Valley Road	Signal	AM	41	D	46	D	No
			PM	38	D	48	D	No
11.	Lone Tree Way/Hillcrest Avenue	Signal	AM	<b>81</b>	<b>F</b>	<b>82</b>	<b>F</b>	Yes; increases traffic at deficient location
			PM	<b>77</b>	<b>E</b>	<b>79</b>	<b>I</b>	
12.	Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM	<b>97</b>	<b>F</b>	<b>98</b>	<b>F</b>	Yes; increases traffic at deficient location
			PM	<b>133</b>	<b>F</b>	<b>134</b>	<b>F</b>	

**Table 3.14-14 (cont.): Cumulative Conditions Peak-hour Intersection Level of Service Summary**

	Intersection	Control <sup>1</sup>	Peak-hour	Cumulative without Project		Cumulative with Project		Impact?
				Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	
13.	Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way	Signal	AM PM	<b>68</b> <b>87</b>	<b>E</b> <b>F</b>	<b>69</b> <b>88</b>	<b>E</b> <b>F</b>	<b>Yes</b> ; increases traffic at deficient location
14.	Prewett Ranch Drive/Dallas Ranch Road	Signal	AM PM	27 17	C B	30 18	C B	No No
15.	Prewett Ranch Drive/Deer Valley Road	Signal	AM PM	<b>78</b> 23	<b>E</b> C	<b>68</b> 24	<b>E</b> C	No; results in a decrease in delay with the provision of parallel capacity.
16.	Deer Valley Road/Wellness Way/Street A	Signal	AM PM	10 7	A A	11 6	B A	No No
17.	Sand Creek Road/Deer Valley Road	Signal	AM PM	9 10	A A	17 14	B B	No No
18.	Sand Creek Road/Hillcrest Avenue	Signal	AM PM	44 49	D D	47 54	D D	No No
19.	Sand Creek Road/Heidorn Ranch Road	Signal	AM PM	14 14	B B	14 15	B B	No No
20.	Sand Creek Road/SR-4 Eastbound Ramps	Signal	AM PM	<b>81</b> <b>103</b>	<b>F</b> <b>F</b>	<b>90</b> <b>120</b>	<b>F</b> <b>F</b>	<b>Yes</b> ; increases average delay more than 5 seconds
21.	Sand Creek Road/SR-4 Westbound Ramps	Signal	AM PM	<b>56</b> 24	<b>E</b> C	<b>62</b> 27	<b>E</b> C	<b>Yes</b> ; increases average delay more than 5 seconds
22.	Balfour Road/Deer Valley Road	SSSC	AM PM	<b>&gt; 150</b> <b>(&gt; 180)</b> <b>98 (&gt;180)</b>	<b>F (F)</b> <b>F (F)</b>	<b>&gt; 150</b> <b>(&gt; 180)</b> <b>139 (&gt;180)</b>	<b>F (F)</b> <b>F (F)</b>	<b>Yes</b> ; deficient side-street and overall operations and signal warrants met.
23.	Balfour Road/SR-4 Eastbound Ramps	Signal	AM PM	43 <b>56</b>	D <b>E</b>	43 <b>58</b>	D <b>E</b>	<b>Yes</b> ; increases traffic at deficient location

**Table 3.14-14 (cont.): Cumulative Conditions Peak-hour Intersection Level of Service Summary**

	Intersection	Control <sup>1</sup>	Peak-hour	Cumulative without Project		Cumulative with Project		Impact?
				Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	
24.	Balfour Road/SR-4 Westbound Ramps	Signal	AM PM	25 19	C B	25 19	C B	No No
25	Prewett Ranch Drive/Hillcrest Avenue	Signal	AM PM	39 18	D B	41 19	D B	No No

Notes:

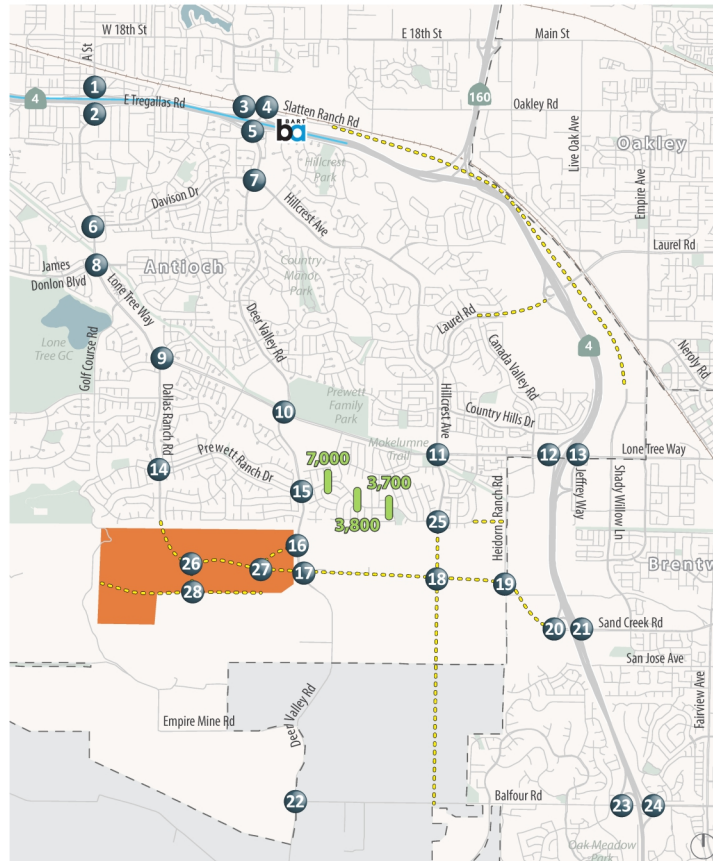
**Bold** reflects potentially deficient operations; ***Bold Italics*** reflects potentially significant impact.<sup>1</sup> Signal = signalized intersection; SSSC = side-street stop-controlled<sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6<sup>th</sup> Edition method for vehicles.<sup>3</sup> Intersection operations improve with the proposed project as the combination of the Sand Creek Road connection to Dallas Ranch Road and the Sand Creek Road extension between Dozier-Libbey Medical High School and Deer Valley Road is expected to result in some existing travel from the Dallas Ranch neighborhood to the Sand Creek Road corridor, shifting traffic from the Prewett Ranch Road intersection.

Source: Fehr &amp; Peers 2019.

Ten intersections are projected to operate at deficient levels in the Cumulative condition prior to the addition of proposed project traffic:

- Hillcrest Avenue at SR-4 Eastbound Ramps—LOS F AM and PM Peak-hour
- Deer Valley at Hillcrest/Davison Drive—LOS E AM Peak-hour and LOS F PM Peak-hour
- Lone Tree Way at Hillcrest Avenue—LOS F AM Peak-hour and PM Peak-hour
- Lone Tree Way at SR-4 Eastbound Ramps—LOS F AM and PM Peak-hour
- Lone Tree Way at SR-4 Westbound Ramps—LOS F AM Peak-hour and PM Peak-hour
- Prewett Ranch Drive at Deer Valley Road—LOS E AM Peak-hour
- Sand Creek Road at SR-4 Eastbound Ramps—LOS F AM and PM Peak-hour
- Sand Creek Road at SR-4 Westbound Ramps—LOS E AM Peak-hour
- Balfour Road at Deer Valley Road—LOS F AM and PM Peak-hour
- Balfour Road at SR-4 Eastbound Ramps—LOS E PM Peak-hour

The addition of proposed project traffic and associated roadway improvements would improve operations of the Prewett Ranch Drive at Deer Valley Road intersection. Delay at all other intersections would increase, resulting in potentially significant impacts. The addition of proposed project traffic would also result in LOS E operations at the Lone Tree Way at Davison Drive intersection in the AM peak-hour.



XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Daily Roadway Segment Volume

1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Statten Ranch	4. SR 4 WB Ramps/Statten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgerock Dr	9. Eagleridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Welness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidorn Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR-4 EB Ramps/Balfour Road	24. SR-4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

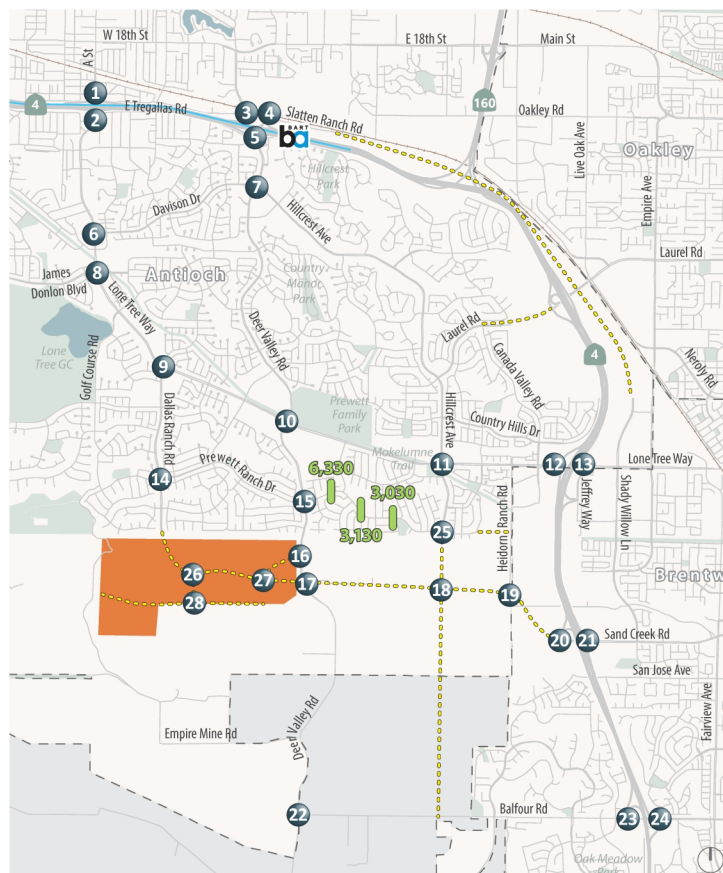
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## Exhibit 3.14-16 Cumulative without Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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XX (YY) AM (PM) Peak Hour Traffic Volumes  
 Project Site  
 Planned Future Roadway  
 Study Intersection  
 Daily Roadway Segment Volume

1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Slatten Ranch	4. SR 4 WB Ramps/Slatten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgerock Dr	9. Eaglridge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Wellness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidorn Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR-4 EB Ramps/Balfour Road	24. SR-4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

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## Exhibit 3.14-17 Cumulative with Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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Vehicle queues are expected to increase at project intersections as traffic volumes increase, which would further increase with the addition of proposed project traffic. Monitoring and adjusting traffic signal timings in response to actual traffic volumes to minimize the potential for vehicle queue spillback is recommended. Peak-hour signal warrants are satisfied at the Balfour Road at Deer Valley Road intersection in the Cumulative condition prior to the addition of proposed project traffic.

#### *Daily Roadway Segment Operation*

Cumulative traffic forecasts were developed for Prewett Ranch Drive based on the same procedures and assumptions described previously for intersections, with the resulting volumes shown in Table 3.14-15. Project trips were then estimated considering the changes to the roadway network in the Cumulative condition with Project, and then added to the Cumulative without Project volumes. With the construction of the proposed project roadway system, some existing trips that originate in the Dallas Ranch neighborhoods are expected to shift from traveling on Prewett Ranch Drive to Sand Creek Road. The percent increase in proposed project trips was also calculated, with the results presented in Table 3.14-15.

**Table 3.14-15: Cumulative Conditions Average Daily Traffic**

Segment	Daily Traffic	Project Traffic	Existing Plus Project	Daily Fluctuation	Project Increase
1. Prewett Ranch Drive, east of Deer Valley Road	7,000	80	(900)	± 1.2 percent	1 percent
2. Prewett Ranch Drive at Diablo Vista Elementary School	3,800	80	(900)	± 1.8 percent	1 percent
3. Prewett Ranch Drive, west of Hillcrest Avenue	3,700	80	(900)	± 2.9 percent	1 percent
Source: Fehr & Peers 2019.					

With completion of the Sand Creek Road corridor, and the resulting traffic shifts away from Prewett Ranch Drive, the segments of Prewett Ranch Drive between Deer Valley Road and Hillcrest Avenue are expected to experience levels of daily traffic appropriate for the roadway type.

#### ***Cumulative Impacts and Mitigation***

##### *Hillcrest Avenue at SR-4 Eastbound Ramps*

The Hillcrest Avenue at SR-4 Eastbound Ramps intersection operates at a deficient LOS F during both peak-hours prior to the addition of proposed project traffic in the Cumulative condition. The addition of proposed project traffic would worsen operations by 2 seconds in the AM peak-hour and 8 seconds in the evening peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

As already noted in MM TRANS-1b, the project Applicant shall fund the design and installation of ASCT or other traffic signal interconnect system approved by the City at the following intersections (same as MM TRANS-1b):

- Slatten Ranch Road at SR-4 Westbound Ramps
- Slatten Ranch Road/Sunset Drive at Hillcrest Avenue
- Hillcrest Avenue at SR-4 Eastbound Ramps
- East Tregallas Road/Larkspur Drive at Hillcrest Avenue

In conjunction with the signal timing adjustments, the project Applicant shall also work with the City and Caltrans to design and install potential restriping options within the Hillcrest Avenue at SR-4 interchange area that improve vehicle and bicycle travel through the interchange area.

The design process shall start prior to the issuance of the 10<sup>th</sup> residential building permit for the proposed project and installation shall be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch Engineer determines that design and installation delays are beyond the control of the project Applicant.

With signal timing adjustments to better serve projected traffic flows, intersection operations would improve to better than the Without Project condition, as shown in Table 3.14-15.

Although the implementation of the above measures would reduce the impact to a less-than significant level, Caltrans controls the operations of the traffic signals at the Slatten Ranch Road at SR-4 Westbound Ramps and Hillcrest Avenue at SR-4 Eastbound Ramps intersection. Although Caltrans staff has indicated initial support for the striping changes and installation of traffic signal equipment to improve operations for all modes of travel through the interchange, the City cannot assure full implementation of this improvement and the impact would remain significant and unavoidable if Caltrans does not accept the improvements.

#### *Lone Tree Way at Davison Drive*

The Lone Tree Way at Davison Drive intersection is projected to operate at an acceptable LOS D in the AM peak-hour prior to the addition of proposed project traffic in the Cumulative condition. The addition of proposed project traffic would result in LOS E operations. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

To mitigate the impact, the westbound approach of Davison Drive should be restriped to convert the westbound through lane to a left-through shared lane. The median on the south leg of the intersection may need to be reconstructed to allow concurrent left-turn movements on the westbound approach. Implementation of this improvement in combination with retiming of the traffic signals along the corridor would result in overall acceptable service levels, reducing the project's cumulative impact to a less than significant level, as shown in Table 3.14-16. This recommendation is reflected in MM TRANS-3a.

*Deer Valley Road at Hillcrest Avenue/Davison Drive*

The Deer Valley Road at Hillcrest Avenue/Davison Drive intersection is projected to operate at an unacceptable LOS E in the AM peak-hour and LOS F in the PM peak-hour prior to the addition of proposed project traffic in the Cumulative condition. The proposed project would add traffic and increase delay by 1 second in the AM peak-hour and 9 seconds in the PM peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

To mitigate this impact, ASCT or other traffic signal interconnect system approved by the City shall be implemented at the following intersections:

- Deer Valley Road at Hillcrest Avenue/Davison Drive
- Hillcrest Avenue at Hillcrest Crossroads

This would create an adaptive signal control corridor between SR-4 and Deer Valley Road on Hillcrest Avenue. Implementation of this improvement in combination with retiming of the traffic signals along the corridor would result in better operations than the Cumulative without Project condition, when also implemented with MM TRANS-1b, reducing the proposed project cumulative impact to a less-than-significant level, as shown in Table 3.14-11. This recommendation is reflected in MM TRANS-3b.

*Lone Tree Way at Hillcrest Avenue*

The Lone Tree Way at Hillcrest Avenue intersection is projected to operate at a deficient LOS E in the AM peak-hour and a LOS F in the PM peak-hour prior to the addition of proposed project traffic in the Cumulative condition and the proposed project would add traffic through the intersection, increasing delay during the AM peak-hour by 1 second and in the PM peak-hour by 2 seconds. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

To mitigate the impact, the eastbound approach of Lone Tree Way shall be modified to provide two left-turn lanes, two through lanes, and a through-right-shared lane. This improvement would result in acceptable operations during the AM peak-hour when the addition of proposed project traffic results in a significant impact, reducing the proposed project impact to less-than-significant, as presented in Table 3.14-11. This recommendation is reflected in MM TRANS-3c.

*Lone Tree Way at SR-4 Eastbound Ramps*

The Lone Tree Way at SR-4 Eastbound Ramps intersection is projected to operate at a deficient LOS F in the AM and PM peak-hours prior to the addition of proposed project traffic in the Cumulative condition, and the proposed project would add traffic through the intersection, increasing delay by 1 second in the AM peak-hour and 1 second in the PM peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact. This impact would occur with Phase 1 of the proposed project. Proposed project traffic comprises 1 percent of overall traffic growth through the interchange in the Cumulative condition.

MM TRANS-2 requires the project Applicant to pay its fair share towards potential improvements at this intersection through participation in the ECCRFFA regional fee program. Improvements may include optimization of the signal timing or widening of the southbound off-ramp to provide a second southbound right-turn only lane.

These potential improvements would improve intersections operations; however, they would not result in LOS D operations, as presented in Table 3.14-16 (effects of signal timing shown in Table 3.14-16), in the Cumulative condition. Therefore, as payment of fees cannot assure that effective improvements would be implemented, the cumulative impact would remain significant and unavoidable.

#### *Lone Tree Way at SR-4 Westbound Ramps/Jeffery Way*

The Lone Tree Way at SR-4 Westbound Ramps/Jeffery Way intersection is projected to operate at a deficient LOS F in the AM and PM peak-hours prior to the addition of proposed project traffic in the Cumulative condition, and the proposed project would add traffic through the intersection and increase delay by 1 second in the AM peak-hour and 1 second in the PM peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact. As detailed in Chapter 7, this impact would occur with Phase 1 of the proposed project.

MM TRANS-3c requires the project Applicant to restripe the westbound approach to provide a second westbound left-turn lane (requires widening of the south leg of the intersection to provide a second southbound receiving lane, which is currently under construction) by the time the 431<sup>st</sup> residential building permit is issued. This improvement is under construction by others and would only be required if not already in place by the time the 431<sup>st</sup> residential building permit is issued.

This improvement would result in acceptable operations during the PM peak-hour and decrease the delay in the AM peak-hour to the same as under the Without Project condition. Because the improvement cannot achieve acceptable operations during the AM peak-hour and because the City of Antioch cannot assure its implementation because the intersection is located in the City of Brentwood, the impact would remain significant and unavoidable.

#### *Sand Creek Road at SR-4 Eastbound Ramps*

The Sand Creek Road at SR-4 Eastbound Ramps intersection is projected to operate at a deficient LOS F in the PM peak-hour prior to the addition of proposed project traffic in the Cumulative condition, and the proposed project would add traffic through the intersection, increasing average delay by 9 seconds during the AM peak-hour and 17 seconds during the PM peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

MM TRANS-2 requires the project Applicant to pay its proportionate share of the improvements that would improve operations through participation in the ECCRFFA regional fee program. Planned improvements include construction of a slip-ramp for the eastbound Sand Creek to southbound SR-4 movement, eliminating the conflicting left-turn movement at the intersection.

This improvement is included in the regional fee program and implementation of this improvement would result in overall acceptable service levels. However, at the time of Draft EIR release, the fee program does not necessarily cover the actual cost of the necessary improvements and, therefore, the residual significance of this impact is significant and unavoidable.

*Sand Creek Road at SR-4 Westbound Ramps*

The Sand Creek Road at SR-4 Westbound Ramps intersection is projected to operate at a deficient LOS E in the AM peak-hour prior to the addition of proposed project traffic in the Cumulative condition, and the proposed project would increase delay by 6 seconds during the AM peak-hour. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

To mitigate the impact, the westbound approach of Sand Creek Road shall be modified to provide two through lanes and two right-turn only lanes. This improvement is not included in the regional fee program and, therefore, no mechanism currently exists to allow the project Applicant to contribute to this improvement. MM TRANS-3d requires the project Applicant to contribute its proportionate share to this improvement provided that it is included in an adopted fee program. Until that occurs, the City of Antioch cannot assure that this proposed project would be implemented, and the impact would remain significant and unavoidable.

*Balfour Road at Deer Valley Road*

The addition of proposed project-generated vehicle trips during both the AM and PM peak-hours would worsen deficient conditions. Peak-hour signal warrants are also met prior to the addition of proposed project traffic in the Cumulative condition. Based on the significance criteria, this is considered a significant impact.

The implementation of MM TRANS-1c, which requires the installation of a traffic signal and implementation of lane improvements, would result in overall acceptable service levels, reducing the proposed project's impact to a less than cumulatively considerable level, as shown in Table 3.14-16.

*Balfour Road at SR-4 Eastbound Ramps*

The Balfour Road at SR-4 Eastbound Ramps intersection is projected to operate at a deficient LOS E in the PM peak-hour prior to the addition of proposed project traffic in the Cumulative condition, and the proposed project would add 2 seconds of delay at the intersection. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

MM TRANS-2 requires the project Applicant to pay its proportionate share of improvements that would improve operations. Restriping the southbound approach to provide two left turn lanes and one right-turn only lane would result in overall acceptable service levels, as shown in Table 3.14-15. Inclusion of this improvement or one of similar effectiveness (restriping the southbound approach to provide a left-turn lane, a shared left-through right lane, and a right-turn only lane) is proposed to be added to the ECCRFFA Fee Program, and the project Applicant is coordinating with CCTA to review and confirm details and timing for this modification to the fee program.

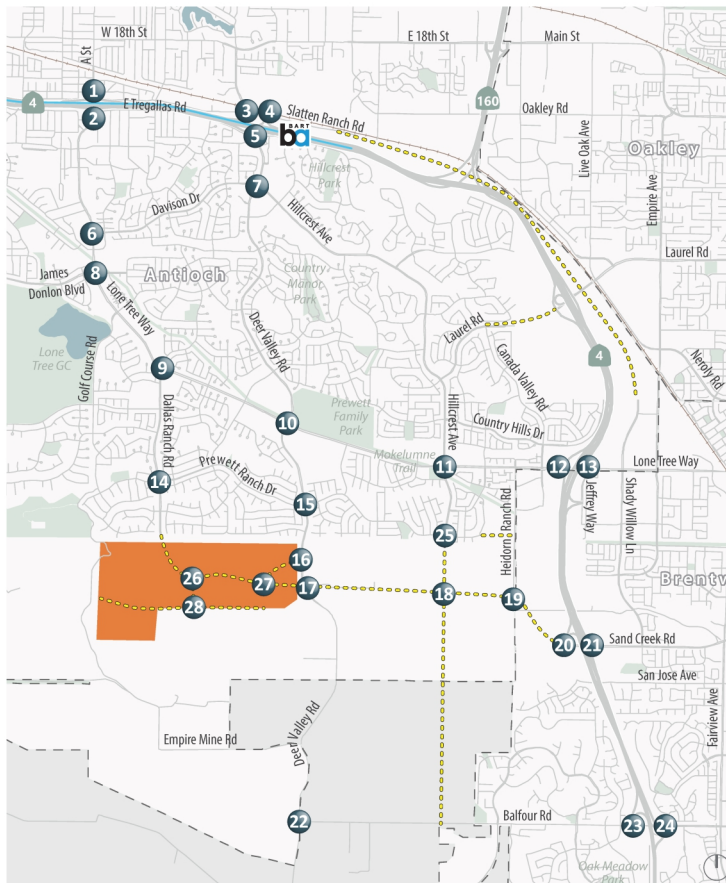
Even though improvements at this interchange may be included in the regional fee program, they have not yet been included. Thus, the City of Antioch cannot assure that the improvement would be implemented and the cumulative impact would remain significant and unavoidable.

**Table 3.14-16: Cumulative With Project With Mitigation Conditions Peak-hour Intersection LOS Summary**

Intersection	Control <sup>1</sup>	Peak-hour	Cumulative		Cumulative with Project		Cumulative with Project with Mitigation	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
5. Hillcrest Avenue/SR-4 Eastbound Ramps	Signal	AM PM	<b>94</b> <b>227</b>	<b>F</b> <b>F</b>	<b>96</b> <b>235</b>	<b>F</b> <b>F</b>	<b>68</b> <b>224</b>	<b>E</b> <b>F</b>
6. Lone Tree Way/Davison Drive	Signal	AM PM	43 22	D C	<b>56</b> 24	<b>E</b> C	39 20	D C
7. Deer Valley Road/Hillcrest Avenue/Davison Drive	Signal	AM PM	<b>67</b> <b>107</b>	<b>E</b> <b>F</b>	<b>59</b> <b>98</b>	<b>E</b> <b>F</b>	55 <b>63</b>	D <b>E</b>
11. Lone Tree Way/Hillcrest Avenue	Signal	AM PM	<b>81</b> <b>77</b>	<b>F</b> <b>E</b>	<b>82</b> <b>79</b>	<b>F</b> <b>E</b>	42 <b>60</b>	D <b>E</b>
12. Lone Tree Way/SR-4 Eastbound Ramps	Signal	AM PM	<b>97</b> <b>133</b>	<b>F</b> <b>F</b>	<b>98</b> <b>134</b>	<b>F</b> <b>F</b>	<b>92</b> <b>131</b>	<b>F</b> <b>F</b>
13. Lone Tree Way/SR-4 Westbound Ramps/Jeffery Way	Signal	AM PM	<b>68</b> <b>87</b>	<b>E</b> <b>F</b>	<b>69</b> <b>88</b>	<b>E</b> <b>F</b>	<b>68</b> 51	<b>E</b> D
20. Sand Creek Road/SR-4 EB Ramps	Signal	AM PM	<b>81</b> <b>103</b>	<b>F</b> <b>F</b>	<b>90</b> <b>120</b>	<b>F</b> <b>F</b>	22 32	C C
21. Sand Creek Road/SR-4 WB Ramps	Signal	AM PM	<b>57</b> 24	<b>E</b> C	<b>62</b> 27	<b>E</b> C	44 22	D C
22. Balfour Road/Deer Valley Road	SSSC/ Signal	AM PM	<b>&gt; 150 (&gt; 180)</b> <b>98 (&gt; 180)</b>	<b>F (F)</b> <b>F (F)</b>	<b>&gt; 150 (&gt; 180)</b> <b>139 (&gt; 180)</b>	<b>F (F)</b> <b>F (F)</b>	12 12	B B
23. Balfour Road/SR-4 Eastbound Ramps	Signal	AM PM	43 <b>56</b>	D <b>E</b>	43 <b>58</b>	D <b>E</b>	55 40	D D
Notes: <sup>1</sup> Signal = signalized intersection <sup>2</sup> Average intersection delay is calculated for all signalized intersections using the HCM 6 <sup>th</sup> Edition method for vehicles. Source: Fehr & Peers 2019.								

### **Phasing Analysis for the Cumulative Plus Project Condition**

To provide better insight into when each improvement needs to be implemented, Fehr & Peers considered the development of just Phase 1, as well as development of Phases 1 and 2 under Cumulative Conditions. Cumulative Conditions for Phase 1 and Phase 2 are presented on Exhibits 3.14-18 and 3.14-19.

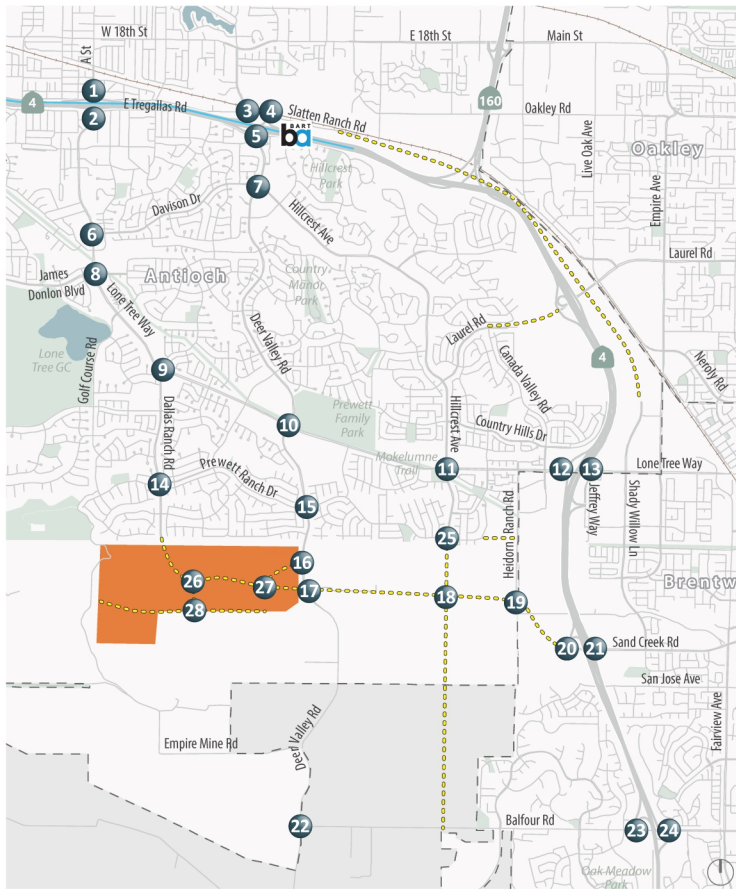


XX (YY) AM (PM) Peak Hour Traffic Volumes    Signalized Intersection    Stop Sign  
 Project Site    Planned Future Roadway    Study Intersection



Source: FEHR & PEERS, December 2019.

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1. Lone Tree Way/SR 4 (Westbound Ramps)	2. Lone Tree Way/SR 4 (Eastbound Ramps)	3. Hillcrest Avenue/Sunset Drive/Slatten Ranch	4. SR 4 WB Ramps/Slatten Ranch	5. Hillcrest Avenue/SR 4 Eastbound Ramps
6. Lone Tree Way/Davison Drive	7. Hillcrest Ave/Deer Valley Rd/Davison Dr	8. Lone Tree Way/James Donlon Blvd/Ridgeway Dr	9. Eagleidge Dr/Dallas Ranch Rd/Lone Tree Way	10. Deer Valley Road/Lone Tree Way
11. Hillcrest Avenue/Lone Tree Way	12. SR 4 Eastbound/Lone Tree Way	13. SR 4 Westbound/Lone Tree Way	14. Dallas Ranch Rd/Prewett Ranch Dr/Prewett Ranch Rd	15. Deer Valley Road/Prewett Ranch Drive
16. Deer Valley Road/Welness Way	17. Deer Valley Road/Sand Creek Road	18. Hillcrest Avenue/Sand Creek Road	19. Heidorn Ranch Road/Sand Creek Road	20. SR 4 (EB Ramps)/Sand Creek Road
21. SR 4 (WB Ramps)/Sand Creek Road	22. Deer Valley Road/Balfour Road	23. SR-4 EB Ramps/Balfour Road	24. SR-4 WB Ramps/Balfour Road	25. Hillcrest Avenue/Prewett Ranch Drive

Source: FEHR & PEERS, December 2019.

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Exhibit 3.14-19

Project Trip Assignment Cumulative Roadway Network — Phase 2

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In the Cumulative condition, project impacts were identified at the following intersections with project buildout; for all but two locations, as noted below, the impact in the Cumulative condition would occur with the Phase 1 project:

- Hillcrest Avenue at SR-4 Eastbound Ramps (with Phase 1)
- Lone Tree Way at Davidson Drive (with Buildout Only)
- Deer Valley at Hillcrest/Davison Drive (with Phase 1)
- Lone Tree Way at Deer Valley Road (with Phase 2)
- Lone Tree Way at Hillcrest Avenue (with Phase 1)
- Lone Tree Way at SR-4 Eastbound Ramps (with Phase 1)
- Lone Tree Way at SR-4 Westbound Ramps (with Phase 1)
- Sand Creek Road at SR-4 Eastbound Ramps (with Phase 1)
- Sand Creek Road at SR-4 Westbound Ramps (with Phase 1)
- Balfour Road at Deer Valley Road (with Phase 1)
- Balfour Road at SR-4 Eastbound Ramps (with Phase 1)

Moreover, the addition of Phase 1 proposed project traffic in the Cumulative condition would result in deficient operations of the Prewett Ranch Drive at Deer Valley Road. Construction of the Sand Creek Road extension to Dallas Ranch Road would shift traffic from Prewett Drive, resulting in better operations under project buildout conditions than the no project condition. Nevertheless, the other impacts would remain significant and require mitigation. As such, MMs TRANS-1b, TRANS-1c, TRANS-3b, and TRANS-3c would be required for Phase 1.

In addition to the previously identified impacts, Phase 1 would result in one additional impact (at Prewett Ranch Drive/Deer Valley Road), and Phase 2 would result in one additional impact (at Lone Tree Way/Deer Valley Road). These additional impacts are discussed below.

#### *Prewett Ranch Drive/Deer Valley Road*

This intersection is projected to operate at LOS E prior to the addition of proposed project traffic during the AM peak-hour in the Cumulative condition. The addition of proposed project traffic through Phase 1 would worsen LOS E operations and increase traffic. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

This intersection has been built to its ultimate configurations and no reconfigurations within the existing intersection cross-section that would result in acceptable operations were identified.

MM TRANS-3f requires that if not already completed by others, the project Applicant shall construct Sand Creek Road from the Kaiser Permanente Antioch Medical Center entrance roadway to the western boundary of the Dozier Libbey High School prior to the issuance of the 421<sup>st</sup> residential building permit for the proposed project as a two-lane roadway (one lane in each direction) along the ultimate alignment, connecting to the portion of Sand Creek Road at Dozier Libbey High School to the segment constructed by others. Construction of that portion of Sand Creek Road would shift existing and future traffic and provide other travel routes for proposed project traffic.

Construction of the aforementioned improvements would result in acceptable intersection operations through project buildout reducing the proposed project's cumulative impact to a less than cumulatively considerable level. Additionally, it would reduce the level of vehicle traffic on Prewett Ranch Road.

As these connections would provide benefit for other development projects in the area, the project Applicant may enter into a reimbursement agreement with the City of Antioch for improvement costs beyond the project's fair share. Additionally, should the Sand Creek Road extension be added to the ECCRFFA program, regional fee credit could be sought. Construction of this improvement would reduce the proposed project's cumulative impact to a less-than-significant level.

#### *Lone Tree Way/Deer Valley Road*

This intersection is projected to operate at LOS D prior to the addition of proposed project traffic during the PM peak-hour. The addition of proposed project traffic through Phase 2 would result in LOS E operations. Based on the significance criteria, this is considered a significant cumulative impact.

This intersection has been built to its ultimate configurations and no reconfigurations within the existing intersection cross-section that would result in acceptable operations were identified.

MM TRANS-3e requires the project Applicant to construct the Sand Creek Road extension from Deer Valley Road to Dallas Ranch Road as a four-lane roadway prior to the issuance of the 622<sup>nd</sup> residential building permit. The construction of this four lane extension of Sand Creek Road between Deer Valley Road and Dallas Ranch Road would shift enough of the proposed project traffic from the intersection of Lone Tree Way at Deer Valley Road to Lone Tree Way at Dallas Ranch Road, to improve the operations of this intersection to an acceptable level through project buildout, reducing the project's significant cumulative impact to a less-than-significant cumulative impact.

#### ***Level of Significance Before Mitigation***

Potentially Significant

#### ***Mitigation Measures***

The project Applicant shall implement MM TRANS-1b, MM TRANS-1c, and MM TRANS-2 as well as the following additional mitigation measures:

**MM TRANS-3a** Prior to issuance of the 1,000<sup>th</sup> residential building permit, the project Applicant shall implement the following improvements to the Lone Tree Way/Davison Drive:

1. The westbound approach of the Davison Drive approach shall be converted from a westbound through lane to a left-through shared lane; and
2. If determined necessary by the City of Antioch Engineer, the project Applicant shall reconstruct the median on the south leg of the intersection to allow concurrent left-turn movements on the westbound approach.

**MM TRANS-3b** The design process shall start prior to the issuance of the 10<sup>th</sup> residential building permit for the proposed project, and installation shall be completed prior to the issuance of the 422<sup>nd</sup> building permit unless the City of Antioch City Engineer determines that design and installation delays are beyond the control of the project Applicant, the project Applicant shall fund the design and installation of Adaptive Signal Control Technologies (ASCT) or other traffic signal interconnect system approved by the City at the following intersections:

- Deer Valley Road/Hillcrest Avenue-Davison Drive
- Hillcrest Avenue/Hillcrest Crossroads

The ASCT system at the Deer Valley Road at Hillcrest Avenue/Davison Drive and Hillcrest Avenue at Hillcrest Crossroads shall be coordinated with the ASCT systems identified as part of Mitigation Measure (MM) TRANS-1b.

**MM TRANS-3c** Prior to issuance of the 431<sup>st</sup> residential building permit, project Applicant shall restripe the westbound approach of Lone Tree Way at SR-4 Westbound Ramps/Jeffery Way to provide a second westbound left-turn lane (requires widening of the south leg of the intersection to provide a second southbound receiving lane, which is currently under construction). This improvement is under construction by others and shall only be required if not already in place by the time the 431<sup>st</sup> residential building permit is issued.

**MM TRANS-3d** Prior to issuance of the first building permit, the project Applicant shall provide the City of Antioch with East Contra Costa Regional Fee and Financing Authority regional transportation impact fees in accordance with the latest adopted fee schedule to support improvements at the Sand Creek Road/SR-4 Westbound Ramps intersection. If the required fees would not support the necessary improvements at the intersection, then no such fees shall be required.

**MM TRANS-3e** Prior to the issuance of the 622<sup>nd</sup> residential building permit, the project Applicant shall have started construction on the Sand Creek Road extension from Deer Valley Road to Dallas Ranch Road as a four-lane roadway.

**MM TRANS-3f** Prior to the issuance of the 421<sup>st</sup> residential building permit for the proposed project, the project Applicant shall have started construction on Sand Creek Road from the Kaiser Permanente Antioch Medical Center entrance roadway to the western boundary of the Dozier Libbey High School as a two-lane roadway (one lane in each direction) along the ultimate alignment, connecting to the portion of Sand Creek Road at Dozier Libbey High School to be constructed by others.

### ***Level of Significance After Mitigation***

Significant and Unavoidable

## Freeway Analysis

**Impact TRANS-4:** The project would conflict with a program plan, ordinance or policy of the circulation system.

### Existing

Mainline traffic counts were conducted on SR-4 south of Balfour Road in January 2019. Traffic volumes at the interchanges along the corridor were used to estimate traffic volumes on the mainline segments from south of Balfour Road to west of Lone Tree Way/A Street. Project traffic volumes were then considered. The traffic volumes and number of travel lanes were used to calculate vehicle speeds using the HCM 6<sup>th</sup> Edition method, which were then used to calculate the delay index. The results were verified through travel of the corridor during peak-hours.

The results are presented in Table 3.14-17 for the AM peak-hour and Table 3.14-18 for the PM peak-hour. SR-4 from south of Balfour Road through Lone Tree Way/A Street generally operates at free-flow speeds during both the AM and PM peak-hours. SR 160 also operates with minimal congestion during peak-hours. With the addition of proposed project traffic in the existing condition, all mainline freeway segments in the immediate project area would continue to operate within the established service objective and the proposed project impact to freeway operations in the immediate project vicinity in the existing condition is considered less-than-significant. However, there are greater levels of congestion on SR-4 further west of Lone Tree Way/A Street and the proposed project would add vehicle traffic to these roadway segments. The proposed project's percentage of overall traffic would be minimal, but it would contribute to worsening levels of congestion along the SR-4 corridor.

**Table 3.14-17: Existing Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Existing		Existing Plus Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB	3,325	1.00	3,381	1.00
	WB <sup>1</sup>	3,931	1.00	4,085	1.00
2. SR-4, west of Hillcrest Avenue	EB	2,931	1.00	2,946	1.00
	WB <sup>1</sup>	3,248	1.00	3,253	1.00
3. SR-4, west of SR-160	EB	2,472	1.00	2,484	1.00
	WB	2,710	1.00	2,715	1.00
4. SR-4, west of Laurel Road	EB	2,756	1.00	2,761	1.00
	WB	3,318	1.00	3,330	1.00
5. SR-4, north of Lone Tree Way	SB	2,800	1.01	2,805	1.01
	NB	2,909	1.02	2,921	1.02
6. SR-4, north of Sand Creek Road	SB	2,461	1.00	2,496	1.00
	NB	2,837	1.01	2,851	1.01

**Table 3.14-17 (cont.): Existing Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Existing		Existing Plus Project	
		Volume	Delay Index	Volume	Delay Index
7. SR-4, north of Balfour Road	SB	2,022	1.05	2,022	1.05
	NB	2,036	1.05	2,036	1.05
8. SR-4, south of Balfour Road	SB	1,201	1.20	1,275	1.32
	NB	940	1.03	968	1.04
9. SR-160, north of SR-4	NB	1,284	1.00	1,308	1.00
	SB	960	1.00	970	1.00
Note: <sup>1</sup> AM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the AM peak-hour. Source: Fehr & Peers 2019.					

**Table 3.14-18: Existing Conditions Freeway Operations Summary—PM Peak-hour**

Segment	Direction	Existing		Existing Plus Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB <sup>1</sup>	5,977	1.06	6,151	1.08
	WB	4,334	1.00	4,444	1.00
2. SR-4, west of Hillcrest Avenue	EB <sup>1</sup>	5,267	1.02	5,313	1.02
	WB	3,771	1.00	3,771	1.00
3. SR-4, west of SR-160	EB	4,383	1.00	4,391	1.00
	WB	3,506	1.00	3,520	1.00
4. SR-4, west of Laurel Road	EB	4,361	1.02	4,375	1.02
	WB	2,957	1.00	2,965	1.00
5. SR-4, north of Lone Tree Way	SB	3,731	1.11	3,745	1.12
	NB	2,990	1.02	2,998	1.02
6. SR-4, north of Sand Creek Road	SB	3,205	1.03	3,234	1.04
	NB	2,947	1.02	2,991	1.02
7. SR-4, north of Balfour Road	SB	2,058	1.06	2,028	1.05
	NB	2,235	1.11	2,235	1.11
8. SR-4, south of Balfour Road	SB	1,015	1.05	1,069	1.08
	NB	1,431	1.82	1,518	2.31
9. SR-160, north of SR-4	NB	1,143	1.00	1,159	1.00
	SB	1,670	1.00	1,698	1.00

**Table 3.14-18 (cont.): Existing Conditions Freeway Operations Summary—PM Peak-hour**

Segment	Direction	Existing		Existing Plus Project	
		Volume	Delay Index	Volume	Delay Index
Note:					
<sup>1</sup> PM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the PM peak-hour.					
Source: Fehr & Peers 2019.					

**Near-term**

Near-term freeway forecasts were developed based on the same method used to develop the near-term intersection forecasts, both without and with the project. No freeway improvements over the existing condition were considered in the evaluation of the Near-term condition. The Near-term without and with Project analysis results are presented in Table 3.14-19 and Table 3.14-20 for the AM and PM peak-hours, respectively, based on the estimates of Near-term traffic volumes, plus estimates of proposed project traffic.

**Table 3.14-19: Near-term Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Near-term		Near-term with Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB	3,658	1.00	3,719	1.00
	WB <sup>1</sup>	4,660	1.01	4,814	1.01
2. SR-4, west of Hillcrest Avenue	EB	3,204	1.00	3,224	1.00
	WB <sup>1</sup>	3,760	1.00	3,780	1.00
3. SR-4, west of SR-160	EB	2,724	1.00	2,741	1.00
	WB	3,189	1.00	3,209	1.00
4. SR-4, west of Laurel Road	EB	3,049	1.00	3,059	1.00
	WB	3,785	1.01	3,812	1.01
5. SR-4, north of Lone Tree Way	SB	3,124	1.03	3,134	1.03
	NB	3,270	1.04	3,297	1.04
6. SR-4, north of Sand Creek Road	SB	2,737	1.01	2,742	1.01
	NB	3,232	1.04	3,247	1.04
7. SR-4, north of Balfour Road	SB	2,487	1.00	2,516	1.00
	NB	2,297	1.00	2,305	1.00
8. SR-4, south of Balfour Road	SB	1,602	<b>3.02</b>	1,676	<b>3.90</b>
	NB	1,130	1.12	1,158	1.00

**Table 3.14-19 (cont.): Near-term Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Near-term		Near-term with Project	
		Volume	Delay Index	Volume	Delay Index
9. SR-160, north of SR-4	NB	1,436	1.00	1,460	1.00
	SB	1,165	1.00	1,175	1.00
Note: <sup>1</sup> AM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the AM peak-hour. Source: Fehr & Peers 2019.					

**Table 3.14-20: Near-term Conditions Freeway Operations Summary—PM Peak-hour**

Segment	Direction	Near-term		Near-term with Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB <sup>1</sup>	6,762	1.17	6,950	1.21
	WB	4,901	1.00	5,003	1.00
2. SR-4, west of Hillcrest Avenue	EB <sup>1</sup>	5,882	1.06	5,942	1.06
	WB	4,196	1.00	4,198	1.00
3. SR-4, west of SR-160	EB	4,952	1.00	4,974	1.00
	WB	3,920	1.00	3,936	1.00
4. SR-4, west of Laurel Road	EB	5,026	1.05	5,054	1.05
	WB	3,401	1.00	3,411	1.00
5. SR-4, north of Lone Tree Way	SB	4,229	1.31	4,257	1.33
	NB	3,501	1.07	3,511	1.07
6. SR-4, north of Sand Creek Road	SB	3,599	1.09	3,613	1.09
	NB	3,405	1.06	3,415	1.06
7. SR-4, north of Balfour Road	SB	2,465	1.00	2,485	1.00
	NB	2,807	1.01	2,832	1.01
8. SR-4, south of Balfour Road	SB	1,330	1.46	1,384	1.63
	NB	1,909	<b>9.20</b>	1,996	<b>12.70</b>
9. SR-160, north of SR-4	NB	1,275	1.00	1,291	1.00
	SB	1,868	1.00	1,896	1.00
Note: <sup>1</sup> PM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the PM peak-hour. Source: Fehr & Peers 2019.					

In the Near-term condition, the segment of SR-4 south of Balfour Road would experience increased congestion with a delay index greater than 2.5 in the southbound direction during the AM peak-hour and in the northbound direction during the PM peak-hour. The proposed project would worsen operations on this segment, but would not result in additional project-segments to degrade beyond the established standard. Additionally, the proposed project would contribute to worsening levels of congestion on SR-4 further west of the project area.

### **Cumulative**

Cumulative freeway forecasts were developed based on the same method used to develop the cumulative intersection forecasts, both without and with the proposed project. The Cumulative without and with Project analysis results are presented in Table 3.14-21 and Table 3.14-22 for the AM and PM peak-hours, respectively, based on the estimates of cumulative traffic volumes, plus estimates of proposed project traffic. In the Cumulative condition, all freeway segments in the project area are projected to continue operating within the Multimodal Transportation Service Objective (MTSO), as planned improvements to SR-4 south of Balfour Road would improve operations of the segment between Marsh Creek Road and Balfour Road.

**Table 3.14-21: Cumulative Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Cumulative		Cumulative with Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB	4,320	1.00	4,390	1.00
	WB <sup>1</sup>	5,250	1.02	5,404	1.03
2. SR-4, west of Hillcrest Avenue	EB	3,640	1.00	3,675	1.00
	WB <sup>1</sup>	4,390	1.01	4,410	1.01
3. SR-4, west of SR-160	EB	2,890	1.00	2,922	1.00
	WB	3,550	1.00	3,570	1.00
4. SR-4, west of Laurel Road	EB	3,250	1.00	3,275	1.00
	WB	4,310	1.01	4,337	1.01
5. SR-4, north of Lone Tree Way	SB	3,190	1.03	3,215	1.03
	NB	3,850	1.15	3,877	1.16
6. SR-4, north of Sand Creek Road	SB	2,620	1.01	2,645	1.01
	NB	3,450	1.06	3,477	1.07
7. SR-4, north of Balfour Road	SB	2,370	1.00	2,444	1.00
	NB	2,560	1.01	2,584	1.01
8. SR-4, south of Balfour Road	SB	1,420	1.00	1,494	1.00
	NB	1,520	1.00	1,278	1.00
9. SR-160, north of SR-4	NB	1,600	1.00	1,624	1.00
	SB	1,200	1.00	1,210	1.00

**Table 3.14-21 (cont.): Cumulative Conditions Freeway Operations Summary—AM Peak-hour**

Segment	Direction	Cumulative		Cumulative with Project	
		Volume	Delay Index	Volume	Delay Index
Note:					
<sup>1</sup> AM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the AM peak-hour.					
Source: Fehr & Peers 2019.					

**Table 3.14-22: Cumulative Conditions Freeway Operations Summary—PM Peak-hour**

Segment	Direction	Cumulative		Cumulative with Project	
		Volume	Delay Index	Volume	Delay Index
1. SR-4, west of Lone Tree Way/A Street	EB <sup>1</sup>	8,290	1.87	8,464	2.03
	WB	6,980	1.07	7,092	1.08
2. SR-4, west of Hillcrest Avenue	EB <sup>1</sup>	7,440	1.37	7,502	1.39
	WB	6,010	1.02	6,022	1.02
3. SR-4, west of SR-160	EB	5,170	1.01	5,194	1.01
	WB	5,420	1.01	5,446	1.01
4. SR-4, west of Laurel Road	EB	5,070	1.05	5,100	1.05
	WB	4,720	1.03	4,738	1.03
5. SR-4, north of Lone Tree Way	SB	4,320	1.37	4,350	1.39
	NB	4,780	1.83	4,798	1.86
6. SR-4, north of Sand Creek Road	SB	4,220	1.31	4,250	1.32
	NB	4,070	1.23	4,088	1.24
7. SR-4, north of Balfour Road	SB	2,830	1.01	2,873	1.01
	NB	3,240	1.04	3,314	1.04
8. SR-4, south of Balfour Road	SB	1,760	1.00	1,814	1.00
	NB	2,400	1.00	2,487	1.00
9. SR-160, north of SR-4	NB	1,600	1.00	1,616	1.00
	SB	2,200	1.00	2,230	1.00
Note: <sup>1</sup> PM peak-hour analysis reflects operation of the HOV lane, which carries approximately 13 percent of traffic volumes and reduces the number of mixed-flow lanes available during the PM peak-hour. Source: Fehr & Peers 2019.					

The proposed project would increase traffic on freeways in the project area; it would worsen the operations of SR-4 south of Balfour Road, resulting in a significant impact in the Near-term condition.

The proposed project would also contribute to worsening levels of congestion on SR-4 further west of the project area.

**Conclusion**

In the Near-term condition, the segment of SR-4 south of Balfour Road would experience increased congestion with a delay index greater than 2.5 in the southbound direction during the AM peak-hour and in the northbound direction during the PM peak-hour. The proposed project would worsen operations on this segment resulting in a potentially significant cumulative impact. Additionally, the proposed project would contribute to worsening levels of congestion on other freeway segments, including SR-4 further west of the project area (between Loveridge Road and Morello Avenue) by adding traffic to freeway segments where the CCTA has documented delay indices higher than 2.5. Based on the significance criteria, any contribution to a cumulative impact would be deemed significant. Thus, the proposed project is considered to result in a cumulatively considerable contribution to a potentially significant cumulative impact.

The CCTA plans to widen SR-4 between Marsh Creek Road and Balfour Road to provide two additional travel lanes (for a total of four—two in each direction). Participation in the ECCRFFA program would constitute a fair-share payment towards this planned improvement and would reduce this impact to a less-than-significant level.

No additional capacity enhancing projects are planned on SR-4 from in the vicinity of the Lone Tree Way/A Street to the west. The CCTA has developed the SR-4 Integrated Corridor Management (ICM) Plan that includes strategies such as adaptive ramp metering, incident management, traffic and transit information systems, traffic arterial and transit information systems, connected vehicle technologies, and integration with the Interstate 80 (I-80) corridor ICM to better manage traffic flows along the corridor.

Although the project Applicant would pay its fair share towards regional transportation improvements through the participation in the ECCRFFA program (as required by MM TRANS-2), the ICM improvement is not part of the fee program and full funding for that improvement has not been identified. Additionally, as the widening of SR-4 between Marsh Creek Road and Balfour Road cannot be assured through the payment of fees, and the effectiveness of the ICM project is uncertain, the proposed project impact to the regional freeway system would remain significant and unavoidable.

**Level of Significance Before Mitigation**

Potentially Significant

**Mitigation Measures**

Implement MM TRANS-2.

**Level of Significance After Mitigation**

Significant and Unavoidable

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### **Vehicle Miles Traveled**

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#### **Impact TRANS-5: The project would be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b).**

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In response to SB 743, the OPR has updated CEQA Guidelines to include new transportation-related evaluation metrics. Draft Guidelines were developed in August 2014, with updated draft Guidelines prepared January 2016, which incorporated public comments from the August 2014 Guidelines. The OPR released final proposed Guidelines on November 27, 2017, with an associated Technical Advisory Document on Evaluating Transportation Impacts in CEQA dated December 2018. The Updated CEQA Guidelines were finalized in January 2019 by the Natural Resources Agency, which includes a new Section 15064.3 on VMT analysis and thresholds for land use developments. Updated CEQA Guidelines Section 15064.3 states that they do not take effect until July 1, 2020 unless the lead agency adopts them earlier. Changes to Appendix G of the CEQA Guidelines were finalized in January 2019, with methods for evaluating transportation impacts detailed in the Technical Advisory on Evaluating Transportation Impacts in CEQA.

A VMT analysis was conducted pursuant to CEQA Guidelines, as the environmental document may not be certified until after July 1, 2020, and providing the VMT analysis in advance of it being required provides additional information during the decision making process. As neither the City of Antioch nor the Contra Costa Transportation Authority have established any standards or thresholds on VMT, OPR Guidelines were used to assess potential significance.

#### **CEQA Guidelines**

CEQA Guideline Section 15064.3(b)(1) states that lead agencies generally should presume that certain projects (including certain residential, retail, and office projects, as well as projects that are a mix of these uses) proposed within 0.5 mile of an existing major transit stop<sup>4</sup> or an existing stop along a high quality transit corridor<sup>5</sup> will have a less-than-significant impact on VMT. As the project site is not located along a high-quality transit corridor, the presumption of a less-than-significant impact on VMT does not apply, and a detailed VMT analysis is required.

The OPR's December 2018 Technical Guidance recommends that a proposed residential project exceeding 85 percent of the existing Bay Area regional VMT per capita or Citywide VMT per capita may indicate a significant impact, as would a proposed office project that exceeds 85 percent of the existing regional VMT per employee. For proposed retail projects, the OPR guidance recommends that a net increase in total VMT may indicate a significant transportation impact. The guidance also states that local-serving retail developments smaller than 50,000 square feet may be presumed to have a less-than-significant impact on VMT because adding these retail spaces into the urban fabric improves retail destination proximity, tending to shorten trips and reduce VMT.

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<sup>4</sup> Public Resources Code Section 21064.3: "Major transit stop" means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

<sup>5</sup> Public Resources Code Section 21155: A high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

### Analysis Methods

To conduct the VMT assessment, Fehr & Peers used the CCTA travel demand model as well as information from the MTC. The CCTA model was used to estimate average trip lengths for the proposed project, while MTC data was used to establish average trip lengths for existing residential uses in Antioch. The existing average trip lengths for the City of Antioch, Contra Costa County and the Bay Area based on the MTC data are presented in Table 3.14-23. Home based trips in Antioch and Contra Costa County are slightly higher than the Bay Area average, while work based trips to jobs in Antioch are much lower than regional averages, indicating a jobs-housing imbalance where more people commute from Antioch to other employment centers, while jobs in Antioch tend to be filled by more local residents.

**Table 3.14-23: Average Home-Based VMT Per Capita**

Land Use Type	Antioch	Contra Costa County	Bay Area
Home Based VMT	17.9	18.0	15.3

Source: MTC, Fehr & Peers 2019.

### Analysis Results

A select zone analysis was conducted using the CCTA model whereby all the trips generated by the residential portion of the project were tracked through the transportation system. Based on this analysis, the proposed project is estimated to generate approximately 22 VMT per day per person. This includes all trips generated by each person that is projected to live in the development that either start or end at home. This level of vehicle travel is higher than the City of Antioch average as well as the Bay Area Average; the proposed project would need to generate less than 15.2 VMT per day per person to be 85 percent of the existing Citywide average per resident, or 13 VMT per day per person to be 85 percent of the existing regional average per resident. Based on these thresholds, this would be a significant impact.

A VMT assessment was not prepared for the proposed commercial uses as the actual uses are unknown. However, up to 50,000 square feet of retail uses may be considered to have a less-than-significant VMT impact as it is expected to be locally serving. Office or other employment uses are also expected to have a lower than average trip length. The proposed Village Center would accommodate approximately 54,000 square feet of neighborhood commercial uses that would cater to the nearby residents, workers and visitors at the Kaiser Permanente Antioch Medical Center (across the street), and commuters who drive along Deer Valley Road on a daily route. Such neighborhood uses could include businesses such as Starbucks, Jamba Juice, Chipotle, a dry cleaners, a café or sandwich shop, a pet store/groomers, etc. The Village Center is not proposed to be a regional shopping center.

### **Conclusion**

Results of the VMT analysis indicate that the proposed project would contribute to an increase in VMT on a per-capita basis as the proposed project adds a housing development that would require residents to travel longer-than-average distances to meet their daily needs. While various project components (i.e., the pedestrian and bicycle facilities, neighborhood commercial uses) and mitigation measures (i.e., intersection signalization, etc.) would reduce some potential VMT impacts, there is no way to guarantee a reduction in estimated vehicle trips. Accordingly, the VMT impacts cannot be reduced to a less than significant level.

### **Level of Significance Before Mitigation**

Potentially Significant

### **Mitigation Measures**

MM TRANS-1 through MM TRANS-8

### **Level of Significance After Mitigation**

Significant and Unavoidable

### **Roadway Safety Hazards**

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<b>Impact TRANS-6:</b>	<b>The project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).</b>
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Access to the project site would be provided by a new roadway—Sand Creek Road—connecting the terminus of Dallas Ranch Road to Deer Valley Road. As proposed, Sand Creek Road and Street B would be up to four lanes with the remaining roadways within the project site developed as two-lane roadways.

Through the project site, Sand Creek Road would provide either a 96-foot right-of-way (when development is proposed on one side of the street) or a 112-foot right-of-way (when development is proposed on both sides of the street). The cross-section would generally include a 6-foot wide sidewalk, 10-foot wide landscape buffer, 8-foot wide bicycle lane, and two 12-foot wide travel lanes in each direction plus a 16-foot wide median that would allow for turn pockets to be provided at intersections. Along some portions of the street section, additional right-of-way to provide landscaping outside the public right-of-way is also proposed on each side of the street.

Deer Valley Road along the project frontage would be improved to provide sidewalks, landscape buffer, bicycle lane, and additional travel lanes to match the cross-section on the opposite side of the roadway. An additional landscape setback is also proposed in the vicinity of the Village Center.

Other major streets through the project site would provide one vehicle lane in each direction in addition to sidewalks, bicycle facilities, and landscaping. Their ultimate design would conform to City Code requirements.

Typical internal local residential streets would feature two travel lanes within rights-of-ways ranging from 37 to 54 feet in width. With the exception of private lanes/alleys, local streets would include on-street vehicle parking, either on one or both sides of the street, as well as 4 to 5-foot wide sidewalks on both sides of the streets. Private alleys or courts may be used to access residential units, and would be allowed to be narrower than public streets; such alleys or courts would not be anticipated to offer on-street parking or sidewalks. A small number of local residential streets would abut open space areas with readily accessible trail systems, and therefore, include a 2-foot wide curb and gutter without parking lanes or sidewalks.

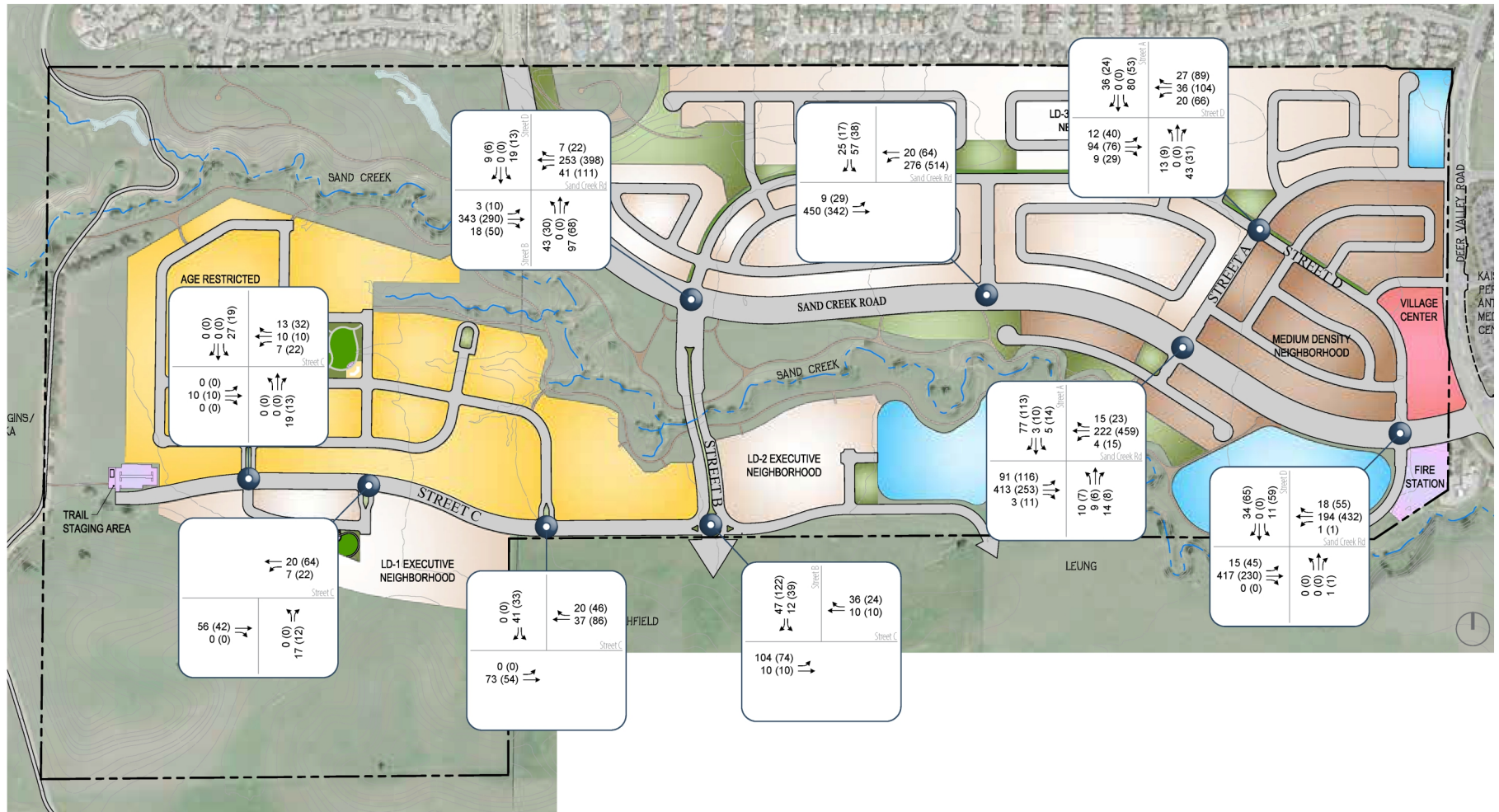
Projected peak-hour turning movement forecasts the major roadway connections are presented on Exhibit 3.14-12, representative of Cumulative conditions. As shown, most intersections are projected to carry low volumes. Analysis was conducted for the three primary internal intersections under both traffic signal and roundabout as presented Table 3.14-24. Cumulative a.m. and p.m. peak-hour volumes with the project are shown on Exhibit 3.14-20. As shown, internal intersections are projected to operate at acceptable levels under either a two-lane or four-lane Sand Creek Road.

**Table 3.14-24: Cumulative With Project Conditions Internal Intersection LOS Summary**

Intersection		Peak-hour	Roundabout		Traffic Signal	
			Delay <sup>2</sup>	LOS	Delay <sup>2</sup>	LOS
25.	Sand Creek Road/B Street	AM PM	7 9	A A	17 17	B B
26.	Sand Creek Road/Village 3	AM PM	6 8	A A	29 29	C C
27.	Sand Creek Road/A Street	AM PM	7 8	A A	18 19	B C
28.	Sand Creek Road/Street D	AM PM	6 7	A A	25 29	C C
29.	B Street/C Street	AM PM	4 5	A A	N/A	N/A
30.	Sand Creek Road/Deer Valley Road	AM PM	15 15	B B	17 14	B B
Notes:						
<sup>1</sup> Signal = signalized intersection						
<sup>2</sup> Delay is based on HCM 6 <sup>th</sup> Edition method for vehicles.						
Source: Fehr & Peers 2019.						

### **Level of Significance**

Less Than Significant



XX (YY) AM (PM) Peak Hour Traffic Volumes

Source: FEHR & PEERS, December 2019.

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## **Emergency Access**

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### **Impact TRANS-7: The project could result in inadequate emergency access.**

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Several factors determine whether a project has sufficient access for emergency vehicles, including:

1. Number of access points (both public and emergency access only)
2. Width of access points
3. Width of internal roadways

Based on the 2016 California Fire Code as amended by Contra Costa County Ordinance 2016-23, the minimum number of access roads serving residential development(s) shall be based upon the number of dwelling units served as follows:

- Multiple Family Residential Projects having more than 100 dwelling units should be provided with two separated and approved fire apparatus access roads (D106.1)
- Development of one or two-family dwellings where the number of dwelling units exceed 30 shall be provided with two separate and approved fire apparatus access roads; where there are more than 30-dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3 of the California Fire Code, access from two directions shall not be required (D107.1)

Access to the proposed project would be provided from new roadway connections from Deer Valley Road via Street A and an extension of Sand Creek Road connecting to Dallas Ranch Road. Access to Villages 1 through 8 would be provided from multiple locations, meeting or exceeding the Fire Code requirements. Access to Villages 9, 10, 11, and 12 with a total of 555 units would be restricted to a single public access roadway. A secondary emergency access connection from Empire Mine Road is proposed. This configuration may not meet the California Fire Code and the Contra Costa County Fire Protection District (CCCFPD) Ordinance (D107.1).

MM TRANS-7 requires the emergency access points for Villages 9, 10, 11, and 12 to be reviewed and approved by the City of Antioch and CCCFPD to ensure that adequate access for large emergency vehicles is provided.

Cross-sections for the proposed streets within the project site were reviewed. All street sections provide a minimum of 20-feet of clearway (meaning no obstructions in terms of parked vehicles, landscaping, etc.), such that sufficient width is provided for emergency vehicle access and circulation.

### **Level of Significance Before Mitigation**

Potentially Significant

### **Mitigation Measures**

**MM TRANS-7** Prior to recordation of the final map, the City of Antioch and Contra Costa County Fire Protection District shall review and approve the proposed emergency access points for Villages 9, 10, 11, and 12 to ensure that adequate access is provided for large emergency vehicles in accordance with the California Fire Code.

**Level of Significance After Mitigation**

Less Than Significant

**Public Transit, Bicycles, and Pedestrians**

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**Impact TRANS-8: The project would provide adequate access for public transit, bicycles, or pedestrians.**

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The Master Development Plan includes a Pedestrian and Bicycle Plan for the proposed project. (See Exhibit 3.14-21) This Exhibit also identifies the proposed public transit stops.

**Public Transit**

No transit service is currently provided to the project site as it is undeveloped. A BART station is located approximately 4 miles from the site in the vicinity of Hillcrest Avenue at SR-4, and an additional BART station may be constructed within the median of SR-4 between Lone Tree Way and Sand Creek Road, approximately 2.5 to 4 miles east of the project site. Bus pullouts are shown along Sand Creek Road at Street B and west of Deer Valley Road to accommodate the potential for TriDelta Transit to serve the site. Bus turnouts and shelters meeting TriDelta Transit requirements would be provided.

Although transit facilities would be provided on Sand Creek Road, numerous neighborhoods, specifically in the southwestern portion of the site would be located more than 0.25-mile walk to a bus stop, reducing the potential for transit trips for residents of those neighborhoods.

MM TRANS-8a requires the project Applicant to consult with TriDelta Transit to determine if additional transit facilities should be provided and, if so, prepare and submit plans depicting transit stops.

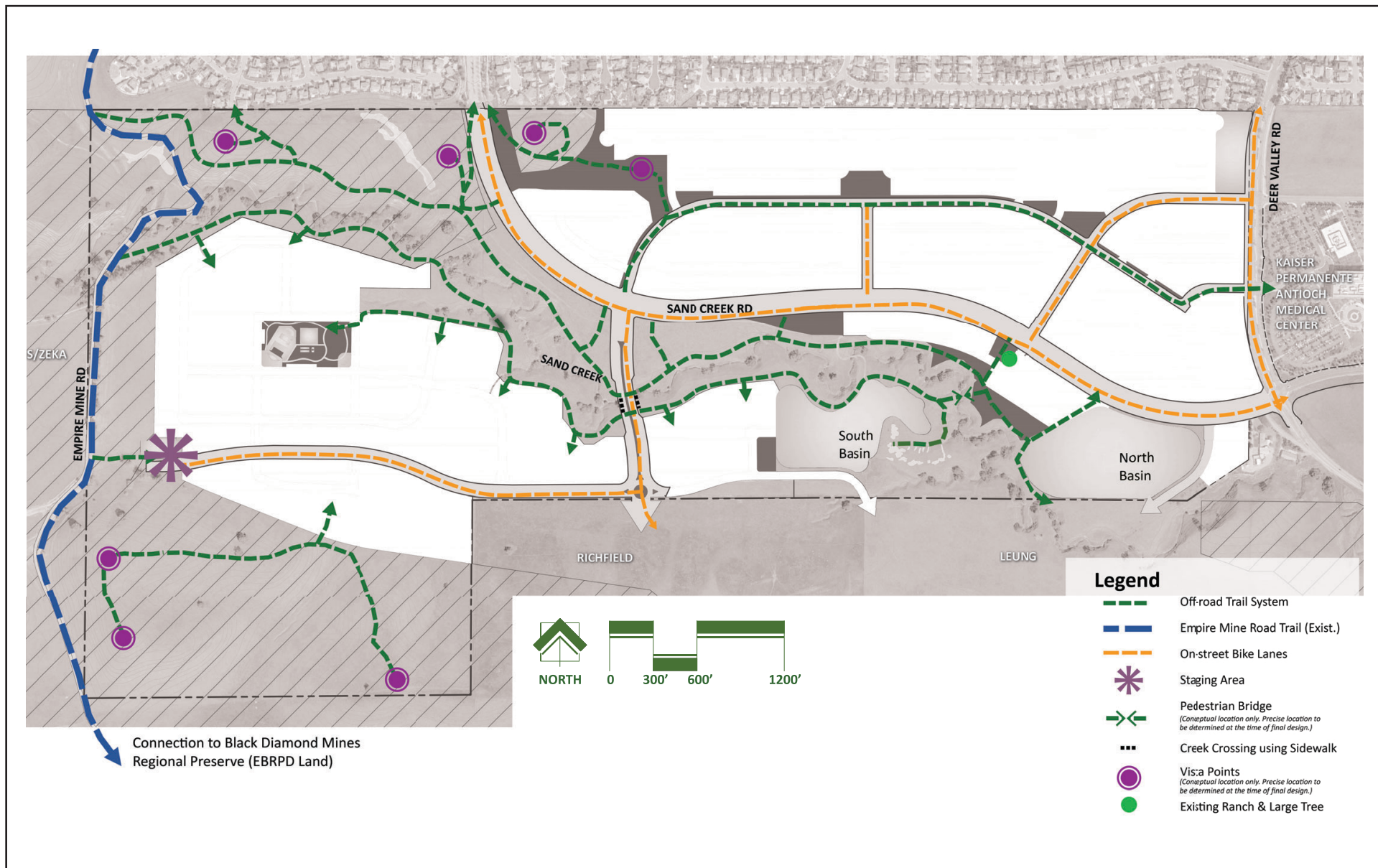
**Bicycles**

The proposed project includes Class II bicycle lanes to be constructed on Sand Creek Road, Deer Valley Road, and Streets A, B, and C. A number of off-street trails would also be constructed. The on-street Class II bicycle facilities are proposed to provide 8-foot wide bicycle lanes adjacent to 12-foot or 13-foot wide travel lanes.

MM TRANS-8b requires the project Applicant to prepare and submit plans depicting bicycle circulation facilities as final improvement plans for individual neighborhoods are processed through the City of Antioch.

**Pedestrians**

Several roadway types are proposed within the development, including arterial, collector, local and hillside roadways. Arterial roadways would provide a minimum 6-foot wide sidewalk on both sides of the street, except where a parallel Class I trail is provided. Collector and local roadways would provide a 5-foot wide sidewalk on both sides of the street where development is proposed; if development would only occur on one side of the street, the sidewalk would be placed adjacent to development, with a Class I trail provided on the opposite side of the street. Sidewalks on the hillside roadways are proposed to be 4-feet wide. The proposed sidewalk network would connect to the site to adjacent developments, providing continuous pedestrian connections in the area. The project would also construct a number of off-street trails, ranging from a 4-foot wide natural trail to a 10-foot wide asphalt trail with stabilized shoulders to accommodate emergency vehicle access.



Source: CBG Civil Engineers, January, 2020

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## Exhibit 3.14-21 Pedestrian and Bicycle Network

CITY OF ANTIOCH • THE RANCH PROJECT  
ENVIRONMENTAL IMPACT REPORT

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MM TRANS-8c requires the project Applicant to prepare and submit plans depicting pedestrian facilities as circulation facilities as final improvement plans for individual neighborhoods are processed through the City of Antioch.

***Level of Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

**MM TRANS-8a** The project Applicant shall consult with TriDelta Transit to determine if additional transit facilities shall be provided throughout the site. If transit stop locations are identified, the project Applicant shall include those locations on the improvement plans for the requisite tentative map being processed by the City. The improvement plans shall include pedestrian passages through cul-de-sacs and other potential barriers to minimize pedestrian walking distances to any transit stops identified.

**MM TRANS-8b** The project Applicant shall identify the bicycle circulation facilities on all final improvement plans submitted to the City. Such facilities may include a painted buffer between the bicycle lanes and the vehicular travel way, reducing the travel lane width to 11-feet each to allow for a 7-foot wide bicycle lane and a 3-foot wide buffer between the bicycle lanes and the vehicular travel-way on the proposed arterial streets. In addition, appropriate bicycle crossing treatments shall be provided at roundabouts to be constructed as part of the proposed project.

**MM TRANS-8c** The project Applicant shall identify pedestrian circulation facilities on all final improvement plans submitted to the City. These plans shall show primary pedestrian routes connecting neighborhood destinations and marked crosswalks at key uncontrolled pedestrian crossing locations. In addition, the plans shall demonstrate that signalized intersections provide crosswalks and pedestrian actuation. At roundabouts to be constructed as part of the project, appropriate pedestrian crossing treatments shall be provided.

***Level of Significance After Mitigation***

Less Than Significant

**3.14.5 - Cumulative Impacts**

This evaluation of transportation impacts is inherently cumulative, as it considers the impacts of the project in combination with past, present, and future projects. Refer to Table 3.14-7 for a list of the cumulative projects considered in this analysis. Refer to the conclusions of Impacts TRANS-1 through TRANS-8 for the analysis therein.

***Level of Cumulative Significance Before Mitigation***

Potentially Significant

***Mitigation Measures***

Implement MM TRANS-1a, MM TRANS-1b, MM TRANS-1c, MM TRANS-2, MM TRANS-3a, MM TRANS-3b, MM TRANS-3c, MM TRANS-3d, MM TRANS-3e, MM TRANS-3f, MM TRANS-7, MM TRANS-8a, MM TRANS-8b, MM TRANS-8c.

***Level of Cumulative Significance After Mitigation***

Significant and Unavoidable

## 3.15 - Utilities and Service Systems

### 3.15.1 - Introduction

This section describes existing conditions related to utilities and service systems (water, wastewater, stormwater, and solid waste) in the City of Antioch and project area as well as the relevant regulatory framework. This section also evaluates the possible impacts related to such utilities and service systems that could result from implementation of the proposed project. Information in this section is based, in part, on a project-specific Water Supply Assessment (WSA) (Appendix H), Preliminary Stormwater Control Plan (Appendix H), the City of Antioch Water System Master Plan Update, the 2015 Urban Water Management Plan (UWMP), the Delta Diablo Conveyance System Master Plan Update, and the City of Antioch General Plan and General Plan Environmental Impact Report (EIR). The following public comments were received during the EIR public scoping period related to utilities and service systems:

- East Bay Regional Parks District—The Draft EIR should include clear descriptions of all infrastructure improvements, including any off-site extension for public utilities.

### 3.15.2 - Environmental Setting

#### Water

##### ***Water Source and Supply***

##### *The City of Antioch*

The City of Antioch water system provides water service to all areas within the City limits. The City of Antioch is within the CCWD service area and purchases a majority of its water supply from the CCWD. CCWD has a contract with the United States Bureau of Reclamation (Bureau of Reclamation) to pump Central Valley Project water from three diversions along the Sacramento/San Joaquin Rivers Delta, which it then delivers to the City.<sup>1</sup> The City also gets recycled water from Delta Diablo Sanitation District (Delta Diablo), which is used for landscape irrigation throughout the City. Finally, the City has Pre-1914 water rights which entitles it to draw water from the Delta.

According to the City's 2015 UWMP, in 2015 the City provided approximately 4,521 million gallons (mg) of potable and raw water to over 31,798 connections. Table 3.15-1 summarizes the City of Antioch's current and projected normal year water supplies and sources.

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<sup>1</sup> West Yost Associates. 2015 Urban Water Management Plan, page 6-1.

**Table 3.15-1: City of Antioch Normal Year Water Supplies and Sources—Current and Projected**

Supply Source	Name	Actual 2015 MGPY	2020 MGPY	2025 MGPY	2030 MGPY	2035 MGPY	2040 MGPY
Purchased or Imported	Contra Costa Water District	3,915	4,099	4,309	4,538	4,785	5,044
Surface Water	San Joaquin River Intake	409	2,460	2,460	2,460	2,460	2,460
Recycled Water	Delta Diablo Sanitation District	79	326	489	489	489	489
Supply from Storage	City Municipal Reservoir	197	—	—	—	—	—
<b>Total</b>		4,600	6,885	7,258	7,487	7,734	7,993
Note: MGPY = million gallons per year Source: West Yost Associates. 2015 City of Antioch UWMP, May 2016.							

The City's 2015 UWMP assumes the City can pump from the Sacramento/San Joaquin Rivers Delta in normal and wetter precipitation years, during a single-year drought and in the first year of a multiple-year drought. The UWMP also assumes the City would not be able to pump in the second and third years of a multiple year drought. In addition, the City assumes that recycled water will be available under all hydrologic conditions. A summary of the City's projected water supply during Normal, Single Dry, and Multiple-Dry Years is shown in Table 3.15-2.

**Table 3.15-2: Bases of Water Year Data**

Year Type	Base Year	Available Supplies (mg)	Percent of Average Supply
Average Year	2000–2004	9,973	100 percent
Single Dry Year	1994	9,275	93 percent
Multiple Dry Years 1 <sup>st</sup> Year	1987	9,275	93 percent
Multiple Dry Years 2 <sup>nd</sup> Year	1988	6,682	67 percent
Multiple Dry Years 3 <sup>rd</sup> Year	1989	6,682	67 percent
Note: mg = million gallons Source: West Yost Associates. 2015 City of Antioch UWMP, May 2016.			

### Surface Water

The City's main water supply source is surface water from the Sacramento-San Joaquin Delta. The City purchases Central Valley Project water pumped from the Sacramento-San Joaquin River Delta by the CCWD, the City's wholesale supplier. The CCWD has a contract with the Bureau of Reclamation for 195,000 acre-feet per year (AFY) of Central Valley Project water. The CCWD water service contract with

the Bureau of Reclamation extends through February 2045. The City has contracted with the CCWD to provide its wholesale water supply through 2028. Even under drought conditions, the CCWD has consistently met its contractual obligations in selling the amount of water that the City of Antioch has elected to purchase. Perhaps more importantly, there is no quantity limitation on the City's appropriation from the Sacramento-San Joaquin River Delta given the City has pre-1913 water rights.

In 2018, 75 percent of the City's total water supply was provided by the CCWD, and approximately 25 percent of the City's supply was obtained from the City's intakes along the Sacramento/San Joaquin Rivers.

#### **Groundwater**

The City of Antioch does not utilize groundwater as part of its water supply and does not plan to pump groundwater in the future.<sup>2</sup>

#### *Project Site*

The project site has two active groundwater wells and two closed wells. The two active wells are used to provide water to the single-family residence and to water livestock.

#### **Recycled Water**

##### *The City of Antioch*

The City of Antioch utilizes recycled water purchased from Delta Diablo to irrigate four parks and its municipal golf course.<sup>3</sup> Recycled water use is not projected to increase beyond 489 million gallons per year (MGPY) through the year 2040 due to restrictions on the legal beneficial uses of recycled water.

#### *Project Site*

The project site does not utilize recycled water.

#### **Water Demand and Use**

##### *The City of Antioch*

The water demand projections in the City's 2015 UWMP included existing City water demands, future water demands for proposed developments within the existing City limits, and future water demands for future service areas outside the existing City limits. Total water use throughout the City service area is projected in the City's 2015 UWMP to increase from 4,600 MGPY in 2015 to 7,993 MGPY in 2040, an increase of 3,393 MGPY. Table 3.15-3 summarizes the Normal Year water supply and demand comparison.

**Table 3.15-3: Normal Year Water Supply and Demand Comparison**

Year	Supply Total (mg)	Demand Total (mg)	Difference (mg)
2020	6,885	6,885	0
2025	7,258	7,258	0

<sup>2</sup> West Yost Associates. 2015 Urban Water Management Plan. Page 6-4.

<sup>3</sup> West Yost Associates. 2015 Urban Water Management Plan. Page 1-1.

**Table 3.15-3 (cont.): Normal Year Water Supply and Demand Comparison**

Year	Supply Total (mg)	Demand Total (mg)	Difference (mg)
2030	7,487	7,487	0
2035	7,734	7,734	0
2040	7,993	7,993	0
Note: mg = million gallons Source: West Yost Associates. 2015 City of Antioch UWMP, May 2016.			

The water demand projection included in the City's 2015 UWMP includes the impacts of the City's water conservation plan, and assumes compliance with the Water Conservation Act of 2009, known as SB X7-7.

#### *Project Site*

Potable water demands for the proposed project are not specifically designated in the City's 2015 UWMP, but future water demands for the planned development area within the Sand Creek Focus Area are included in the 2015 UWMP; therefore, future water demands for the project area are accounted for in the City's 2015 UWMP.

### **Water Distribution**

#### *The City of Antioch*

The City's water distribution systems cover an area of 28.80 square miles and includes areas within the City limits. The 2015 UWMP identifies six primary pressure zones that provide water distribution for various areas in the City. Exhibit 3.15-1 shows the water service zones (Zones 1–IV East) within the City of Antioch.

#### *Project Site*

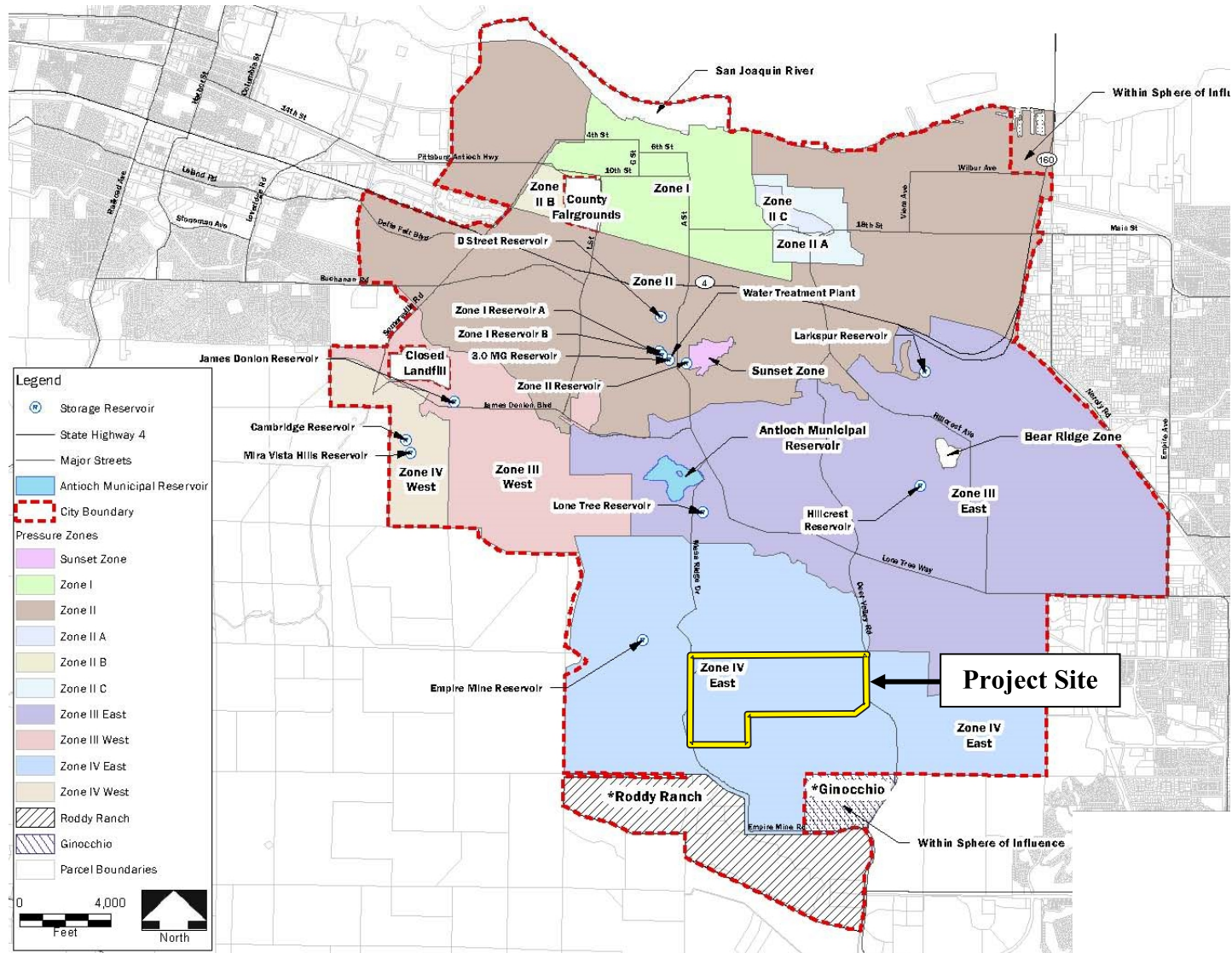
The project site is located in Zone IV East; no current water distribution infrastructure exists on-site.

### **Water Treatment**

#### *City of Antioch*

The City of Antioch Water Treatment Plant is located at 401 Putnam Street in the City of Antioch. The Antioch Water Treatment Plant treats raw water and delivers safe potable water to residential, industrial, commercial, and irrigation customers. The pipelines from the Contra Costa Canal to the Antioch Water Treatment Plant have a capacity over 60 million gallons per day (mgd), well above the maximum predicted future water demand of 7,933 mgd.<sup>4</sup> The California Department of Public Health requires that river water must be first pumped to the municipal reservoir before going to the Antioch Water Treatment Plant. The Water Treatment Plant has a maximum capacity of approximately 38 mgd. Treated water flows into two 1-million-gallon clear wells before entering the distribution system.

<sup>4</sup> City of Antioch. City of Antioch 2015 UWMP. Page 2-4.



Source: City of Antioch Water System Master Plan Update. August 2014

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## **Wastewater**

### *The City of Antioch*

The City maintains and owns the local sewage collection system and is responsible for the collection and conveyance of wastewater to the Delta Diablo Wastewater Treatment Plant (WWTP). Delta Diablo owns and operates the regional interceptors and wastewater treatment plant. The regional conveyance facilities transport wastewater to the Delta Diablo WWTP located at 2500 Pittsburg-Antioch Highway in Antioch. After secondary treatment, the effluent is either discharged through a deep-water outfall to the New York Slough, or further processed through the Delta Diablo's Recycled Water Facility to tertiary Title 22 recycled water standards and distributed for reuse.

### *Project Site*

The project site is located within the Delta Diablo WWTP service area.

## **Long-term Treatment Capacity Plans**

An EIR for the expansion of the WWTP capacity to an average dry weather flow of 22.7 mgd was completed in April 1988. However, the current WWTP National Pollutant Discharge Elimination System (NPDES) Permit limits average dry weather flow to 19.5 mgd.

## **Wastewater Generation**

### *The City of Antioch*

The Delta Diablo WWTP has a treatment capacity of 22.7 mgd and currently treats an average of 12.4 mgd. Wastewater generated by land uses in the City are conveyed via existing infrastructure to the Delta Diablo WWTP for treatment and then disposed of or further processed through the Delta Diablo's Recycled Water Facility to tertiary Title 22 recycled water standards and distributed for reuse as recycled water.

### *Project Site*

The project site contains one single-family residence that generates wastewater.

## **Stormwater**

### **Generation and Collection**

### *The City of Antioch*

The Central Valley Regional Water Quality Control Board (RWQCB) administers the NPDES stormwater permitting program and regulates stormwater in the Central Valley region. Antioch is a permittee (along with the cities of Brentwood and Oakley) under the Phase I Municipal Separate Storm Sewer System (MS4) Municipal Stormwater Program (Order No. R5-2010-0102). However, the City of Antioch has deferred the oversight of the NPDES program to the San Francisco RWQCB.

### *Project Site*

The project site is located in the Contra Costa Flood Control and Water Conservation District Drainage Area 104 for Sand Creek. Currently, the project site is almost entirely undeveloped with open-space and grassland. Almost all existing drainage on the project site consists of sheetflow over the terrain into Sand Creek. There are two exceptions found in areas north of Sand Creek. First, there

is a man-made ditch along the north central boundary of the project site that was constructed concurrently with the existing development to the north. This ditch currently conveys runoff from approximately 17 acres to the storm drain system located to the north of the project site. The second drainage pathway exception is an area along the north portion of the site that drains via sheet flow easterly to Deer Valley Road where it is intercepted by a ditch along the western edge of the roadway and conveyed into a 36-inch storm drain line that was constructed as part of the Kaiser medical complex. Runoff from this area (roughly 87.60 acres) is conveyed easterly along Wellness Way, to join an existing major trunk storm drain (double 84-inch pipes) that runs south to discharge into the Upper Sand Creek Detention Basin.

The project site's soils are classified as hydrologic soil groups (HSG) C and A under the Natural Resources Conservation Services (NRCS) hydrologic soil group system. The majority of the project site is classified as HSG C soils that are composed of: Capay clay (CaA), Rincon clay loam (RbA), Altamont clay (AbE), and Altamont-Fontana complex (AcF). These HSG C soils have a low soil permeability and have a very low potential for water to infiltrate the soil. There is a small section of HSG 'A' soils located in the southwest corner of the southern section of the site consisting of Briones loamy sand (BdE), but this area comprises only 1.5 percent of the project site and would not be developed. The areas mapped for the primary stormwater basins are in soil class 'C'; Capay clay for the southern basin and Rincon clay loam for the northern basin. A 2.80-acre section of off-site land to the north along Dallas Ranch Road currently drains to the site.<sup>5</sup>

## **Solid Waste**

### ***Generation and Collection***

#### *The City of Antioch*

Republic Services provides solid waste collection, disposal, recycling, and yard waste services to the City. Solid waste and recyclables from the City are taken to the Contra Costa Transfer and Recovery Station in Martinez. Reusable materials are extracted and the remaining solid waste is then transferred from the Transfer and Recovery Station to the Keller Canyon Landfill in Pittsburg.

#### *Project Site*

The project site only has one residence currently, and its solid waste, disposal, and recycling needs are served by Republic Services.

### ***Landfills***

#### *The City of Antioch*

The Keller Canyon Landfill site is 1,399 acres, 244 of which comprise the actual current disposal acreage. The landfill is permitted to accept 3,500 tons of waste per day and has a total estimated permitted capacity of approximately 75 million cubic yards, with only approximately 12 million cubic yards (16 percent of total capacity) used to date.

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<sup>5</sup> Carson, Barbee & Gibson, Inc. 2019. Preliminary Stormwater Control Plan. Page 7.

#### *Project Site*

The project site's single residence does not produce excessive solid waste, but any waste that is produced is transferred to the Keller Canyon Landfill.

### **3.15.3 - Regulatory Framework**

#### **Federal**

##### ***Safe Drinking Water Act***

The Safe Drinking Water Act authorizes the United States Environmental Protection Agency (EPA) to establish national standards for drinking water to protect against both naturally occurring and man-made contaminants. These standards set enforceable maximum contaminant levels in drinking water and require all water providers in the United States to treat water to remove contaminants, except for private wells serving fewer than 25 people. In California, the State Department of Health Services conducts most enforcement activities.

##### ***Clean Water Act (National Pollutant Discharge Elimination System)***

The Water Pollution Control Act of 1972, more commonly known as the Clean Water Act (CWA), regulates the discharge of pollutants into watersheds throughout the nation. Under the CWA, the EPA implements pollution control programs and sets wastewater standards.

The NPDES permit program was established within the CWA to regulate municipal and industrial discharges to surface waters of the United States. Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities. Wastewater discharge is regulated under the NPDES permit program for direct discharges into receiving waters and by the National Pretreatment Program for indirect discharges to a sewage treatment plant.

#### **State**

##### ***California Porter-Cologne Water Quality Control Act***

Under the Porter-Cologne Water Quality Control Act (Porter-Cologne), which was passed in California in 1969, the State Water Resources Control Board (State Water Board) has the ultimate authority over State water rights and water quality policy. Porter-Cologne also establishes nine RWQCBs to oversee water quality on a day-to-day basis at the local and regional level. The RWQCBs engage in a number of water quality functions in their respective regions and regulate all pollutant or nuisance discharges that may affect either surface water or groundwater.

##### ***California Urban Water Management Planning Act***

The Urban Water Management Planning Act (California Water Code §§ 10610–10656) requires that all urban water suppliers with at least 3,000 customers prepare UWMPs and update them every 5 years. The act requires that UWMPs include a description of water management tools and options

proposed to be used by the agency to maximize resources and minimize the need to import water from other regions. Specifically, UWMPs must:

- Provide current and projected population, climate, and other demographic factors affecting the supplier's water management planning;
- Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier;
- Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage;
- Describe plans to supplement or replace that source with alternative sources or water demand management measures;
- Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (associated with systems that use surface water);
- Quantify past and current water use;
- Provide a description of the supplier's water demand management measures, including schedule of implementation, program to measure effectiveness of measures, and anticipated water demand reductions associated with the measures; and
- Assess the water supply reliability.

### ***California Health and Safety Code***

Section 64562 of the California Health and Safety Code establishes water supply requirements for service connections to public water systems. Before additional service connections can be permitted, enough water must be available to the public water system from its water sources and distribution reservoirs to adequately, dependably, and safely meet the total requirements of all water users under maximum-demand conditions.

### ***California Green Building Standards Code***

The 2019 California Green Building Standards Code (California Code of Regulations [CCR] Part 11, Title 24) (CALGreen) was most recently updated in 2019, and these changes will go into effect on January 1, 2020.<sup>6</sup> CALGreen was developed to enhance the design and construction of buildings and sustainable construction practices through planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental air quality.

### ***California Senate Bills 610 and 221***

Senate Bill (SB) 610 and SB 221 (California Water Code § 10910(c)(2)) amended State law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 seek to promote more collaborative planning between local water suppliers and cities and counties by requiring that detailed information regarding water availability be provided to decision-makers prior to approval of specified large development projects. SB 610 requires that detailed information be included in a

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<sup>6</sup> California Building Standards Commission. 2019. Green Building Standards. Website: <https://codes.iccsafe.org/content/CAGBSC2019/cover>. Accessed December 20, 2019.

WSA, which is then included in the administrative record that serves as the evidentiary basis for an approval action by a city or county. SB 221 requires that the detailed information be included in a verification of water supply. Under SB 610, WSAs must be furnished to local governments for inclusion in any environmental documentation for certain projects (California Water Code § 10912(a)) and subject to the California Environmental Quality Act (CEQA).

California Water Code Section 10910(a) states any city or county that determines that a project, as defined in Section 10912, is subject to CEQA (Division 13 [commencing with Section 21000] of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

**California Water Code Section 10912(a)**

- (a) Project means any of the following:
- (1) A proposed residential development of more than 500 dwelling units.
  - (2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
  - (3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
  - (4) A proposed hotel or motel, or both, having more than 500 rooms.
  - (5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
  - (6) A mixed-use project that includes one or more of the projects specified in this subdivision.
  - (7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

Based on the following facts, SB 610 does apply to the proposed project.

- The City has determined that the proposed project is subject to CEQA and that an EIR is required.
- The proposed project includes both a residential development and a “Village Center” designated for commercial, office, and retail space, and therefore is a mixed-use project. The residential development portion of the proposed project includes 1,177 residential dwelling units and therefore meets the definition of a “project” as specified in Water Code Section 10912(a) paragraph (1) as defined for proposed residential developments. The proposed project, with the proposed “Village Center,” also meets the definition of a “project” as specified in Water Code Section 10912(a) paragraph (6) as defined for mixed-use projects. Therefore, according to Water Code Section 10910(a), a WSA is required for the proposed project.

**California Water Conservation Act**

*Assembly Bills 1668 and Senate Bill 606*

In May 2018, Governor Jerry Brown signed AB 1668 and SB 606, which requires the State Water Board and the California Department of Water Resources to adopt long-term urban water use efficiency standards, including standards for indoor residential use, outdoor residential use, water

losses and other uses by June 30, 2022. In addition, local water suppliers are required to calculate and comply with their urban water use objectives and report those objectives and actual use to the California Department of Water Resources. Local water suppliers that do not meet their water use objectives would be subject to enforcement starting in 2023. Starting in 2027, local water suppliers' failure to comply with the State Water Board's adopted long-term urban water use efficiency standards could result in fines. Urban water agencies will also be required to update their urban water management plans and must specify reliability of water supply, define the strategy for meeting water needs, and conduct tests to determine drought preparedness.

### ***California Model Water Efficient Landscape Ordinance***

The California Model Water Efficient Landscape Ordinance, administered by the California Department of Water Resources, was created in 1992, and updated in 2009 and again in 2015. The ordinance requires local agencies to implement water efficiency measures as part of its review of landscaping plans. Local agencies can either adopt the Model Water Efficient Landscape Ordinance or incorporate provisions of the ordinance into its own code requirements for landscaping. The City of Antioch has adopted the California Model Water Efficient Landscape Ordinance as contained in the City's Municipal Code Chapter 5 Article 9-5.1006.

### ***California Integrated Waste Management Act***

To minimize the amount of solid waste that must be disposed of by transformation and land disposal, the State Legislature passed Assembly Bill 939, the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. The legislation required each local jurisdiction in the State to set diversion requirements of 25 percent in 1995 and 50 percent in 2000; established a comprehensive Statewide system of permitting, inspections, enforcement, and maintenance for solid waste facilities; and authorized local jurisdictions to impose fees based on the types or amounts of solid waste generated. In 2007, amendments to the California Integrated Waste Management Act introduced a new per capita disposal and goal measurement system that moves the emphasis from an estimated diversion measurement number to using an actual disposal measurement number as a per capita disposal rate factor. As such, the new disposal-based indicator (pounds per person per year) uses only two factors: a jurisdiction's population (or in some cases employment) and its disposal as reported by disposal facilities.

## **Regional Central Valley**

### ***Central Valley Regional Water Quality Control Board***

The Central Valley RWQCB administers the NPDES stormwater permitting program and regulates stormwater in the Central Valley region, including eastern portions of Contra Costa County. Antioch is a permittee under the Phase I MS4 Municipal Stormwater Program. The Antioch Clean Water Program implements the City of Antioch-specific components of the Contra Costa Clean Water Program (CCCWP). In addition, the City maintains storm drain pipes and catch basins. Stormwater discharges from construction activities on 1 acre or more are regulated by the RWQCB and are subject to the permitting requirements of the NPDES General Permit for Discharges of Stormwater Runoff Associated with Construction Activity (General Construction Permit). The Central Valley RWQCB has jurisdiction over the City of Antioch, but the Central Valley RWQCB has deferred oversight of the City of Antioch to the San Francisco RWQCB.

The Central Valley RWQCB prepared the Sacramento and San Joaquin River Basin Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin hydrologic basins.<sup>7</sup> The Basin Plan contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the region and describes beneficial uses of major surface waters and their tributaries.

## Local

### *The City of Antioch General Plan*

#### Public Services and Facilities Element

- **Objective 8.4.1:** Ensure a water system capable of providing high quality water to existing and future residences, businesses, institutions, recreational facilities, and other uses within the City of Antioch during peak use conditions, with sufficient water in storage reservoirs for emergency and fire protection needs.
- **Policy 8.4.2a:** As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.
- **Policy 8.4.2b:** Ensure that adequate infrastructure is in place and operational prior to occupancy or new development, such that (1) new development will not negatively impact the performance of water facilities serving existing developed areas, and (2) the performance standards set forth in the Growth Management Element will continue to be met.
- **Objective 8.5.1:** Ensure a wastewater collection, treatment, and disposal system capable of providing sewer services to existing and future residences, businesses, institutions, recreational facilities, and other uses within the City of Antioch during peak use conditions.
- **Policy 8.5.2a:** As part of the design of sewer systems, provide adequate capacity for average and peak conditions.
- **Policy 8.5.2b:** Ensure that adequate infrastructure is in place and operational prior to occupancy of new development such that (1) new development will not negatively impact the performance of sewer facilities serving existing developed areas, and (2) the performance standards set forth in the Growth Management Element will continue to be met.
- **Objective 8.6.1:** Reduce the amount of solid waste requiring disposal at landfills, enhancing the potential for recycling of the City's solid wastes.
- **Policy 8.6.2j:** The City shall require all development projects to coordinate with appropriate departments and/or agencies to ensure that there is adequate waste disposal capacity to meet the waste disposal requirements of the project, and the City shall recommend that all development projects incorporate measures to promote waste reduction, reuse, recycling, and composting.

#### *City of Antioch 2015 Urban Water Management Plan*

The City of Antioch adopted a UWMP in 2015. The 2015 UWMP evaluates sources of the water supply for the City's project population and future water demand until 2040, the planning horizon.

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<sup>7</sup> California State Water Resources Control Board (State Water Board). 2018. Basin Planning. Website: [https://www.waterboards.ca.gov/centralvalley/water\\_issues/basin\\_plans/#basinplans](https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/#basinplans). Accessed: October 10, 2019.

### 3.15.4 - Impacts and Mitigation Measures

#### Significance Criteria

According to 2019 CEQA Guidelines Appendix G, to determine whether impacts related to utilities and service systems are significant environmental effects, the following questions are analyzed and evaluated. Would the proposed project:

- a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?
- b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?
- c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?
- d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?
- e) Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?

#### Approach to Analysis

Wastewater production was calculated and compared with Delta Diablo WWTP treatment capacity to determine whether wastewater treatment requirements would be exceeded. In addition, the demand for potable water (both with and without use of recycled water) was calculated to assist in determining whether sufficient water supply would be available. The City's wastewater discharge permitting and stormwater requirements were also reviewed.

The following evaluation discusses whether the proposed project would result in direct impacts on utilities and service systems such as existing wastewater and stormwater drainage facilities, water supply, or water treatment facilities. The evaluation also discusses whether the proposed project would result in indirect impacts on utilities and services systems, such as construction impacts from new stormwater drainage systems. The analysis included, but was not limited to, reviewing published data and material provided by the CCWD, the WSA prepared for the proposed project by West Yost Associates, CalRecycle, and the City of Antioch.

## Impact Evaluation

### ***Water, Wastewater, and Stormwater Facilities***

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**Impact UTIL-1:**      The project could require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.

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#### ***Construction***

##### *Water Supply*

The proposed project would require new on- and off-site potable water infrastructure to connect to the City's existing water lines. The proposed project would be designed to integrate with existing transmission mains and would complete a looped connection through the proposed project site. A point of connection would be located at the existing 20-inch water main in Deer Valley Road at the future intersection with the extension of Sand Creek Road. Other major streets throughout the proposed project site would contain approximately 8 to 12-inch water lines. The construction impacts for installing this infrastructure are studied and mitigated in the relevant impact analyses discussions throughout this Draft EIR, including Section 3.3, Air Quality; Section 3.4, Biological Resources; Section 3.7, Greenhouse Gas Emissions; Section 3.11, Noise; and Section 3.14, Transportation.

As discussed under Impact UTIL-2, the proposed project would not create the need for new water treatment facilities or result in insufficient water supply. Thus, there would be no need to construct new or expand existing water treatment facilities. Therefore, impacts related to need for relocation or construction of new or expanded water supply facilities would be less than significant.

##### *Wastewater Treatment*

As described in Chapter 2, Project Description, the proposed project would include the installation of all new infrastructure to serve the project, including a new sewer main, new sewer lines throughout the project site, and an off-site extension of the existing sewer line. All on- and off-site improvements would be within the public right-of-way or within public utility easements. The project's projected wastewater would be conveyed to the Delta Diablo WWTP by new sanitary sewer lines constructed within the project site and off-site improvement areas and connected to existing lines. The construction impacts of installing such infrastructure are evaluated Section 3.3, Air Quality; Section 3.4, Biological Resources; Section 3.7, Greenhouse Gas Emissions; Section 3.11, Noise; and Section 3.14, Transportation.

As described under Impact UTIL-3, the proposed project would generate approximately 258,940 gallons of residential wastewater per day (0.258 mgd), and approximately 5,000 gallons of commercial wastewater per day (0.005 mgd), while the fire station is anticipated to generate 4,465 gallons of wastewater per day (0.004 mgd), for a combined wastewater generation of 0.267 mgd. The Delta Diablo WWTP has a permitted capacity of 19.5 mgd, but only has an average daily flow of 12.4 mgd (a 7.1 mgd delta). Thus, the proposed project would generate less than 1 percent of the average daily flow and permitted capacity of the WWTP. As a result, the Delta Diablo WWTP would have sufficient capacity to serve all aspects of the proposed project, and a new or expanded wastewater treatment

facility would not be required. Therefore, impacts related to need for relocation or construction of new or expanded wastewater treatment facilities would be less than significant.

#### *Stormwater Drainage*

The proposed project could have a significant impact if it required the construction or expansion of new stormwater drainage facilities. The project site is mostly undeveloped and composed of pervious surfaces, such as grasses and vegetation. The proposed project would result in a total net increase of approximately 373.60 acres (7,731,723 square feet) of impervious surfaces compared to existing conditions. As a result, the proposed project could result in the need for new or expanded storm drainage facilities.

As discussed in Section 3.9, Hydrology and Water Quality, the proposed project would include five drainage management areas (DMAs). Each DMA would include Integrated Management Practices (IMPs) that provide full bioretention treatment of stormwater runoff, and include stormwater retention basins, specifically designed for the pertinent amount of impervious and pervious surfaces. The stormwater systems would be designed according to the County's hydrograph modification performance requirements. In addition, implementation of a Final Stormwater Control Plan and Operations & Maintenance (O&M) Plan would be submitted to the City and county for review would ensure the proposed project includes BMPs designed to prevent the significant release of stormwater pollutants consistent with all NPDES rules, regulations and procedures for municipal, construction, and industrial activities as promulgated by the State Water Board or the Central Valley RWQCB. Furthermore, consistent with General Plan Policies 8.7.2 and 11.4.2, the proposed project would be required to prepare a hydraulic study to assess the current streambed flow of Sand Creek and how the new infrastructure would affect the streambed and/or the 100-year floodplain, and including modification of the design of the pedestrian bridge, if needed, to clear span the creek would ensure that impacts related to storm drainage would be less than significant. Therefore, impacts related to the need for relocation or construction of new or expanded stormwater drainage facilities would be less than significant.

#### *Telecommunications*

There are no telecommunications facilities or infrastructure located on-site. However, the proposed project site is within the service areas of Comcast and AT&T. Together, the two companies would provide voice and data communication services to all development on-site. The proposed project would require connection to existing telecommunications facilities in the vicinity; all telecommunication lines would be underground and located within public utility easements. The construction impacts of installing such infrastructure are studied and mitigated via analysis in other sections of this Draft EIR, including but not limited to, Section 3.3, Air Quality; Section 3.4, Biological Resources; Section 3.7, Greenhouse Gas Emissions; Section 3.11, Noise; and Section 3.14, Transportation. Therefore, impacts related to need for relocation or construction of new or expanded telecommunications facilities would be less than significant.

#### *Electricity and Natural Gas*

The proposed project site is within the service area of Pacific Gas and Electric (PG&E). There are no existing electricity or natural gas facilities, or infrastructure located on-site. However, an existing and

abandoned petroleum gas pipeline traverses the project site and will be removed during the first phase of construction subject to all necessary local, State, and federal permits, subject to analysis and mitigation identified in the sections of this Draft EIR outlined below. (For further discussion, see Section 3.8, Hazards) Further, while the proposed project would not require that new off-site electricity or natural gas facilities be constructed because it is located in an urban area that already contains sufficient facilities, it would require that new connections and pipelines be laid on-site to connect to existing electricity and natural gas facilities on adjacent developed land. All electricity and natural gas lines would be located underground within public utility easements. The construction impacts of installing new electric and natural gas pipelines are studied and mitigated in other relevant impact sections of this Draft EIR, including but not limited to, Section 3.3, Air Quality; Section 3.4, Biological Resources; Section 3.6, Geology; Section 3.7, Greenhouse Gas Emissions; Section 3.8, Hazards; Section 3.11, Noise; and Section 3.14, Transportation. Therefore, impacts related to the need for relocation or construction of new or expanded electricity and natural gas facilities would be less than significant.

### ***Operation***

Impacts related to the need for relocation or construction of new or expanded water supply facilities, wastewater treatment facilities, telecommunications facilities, and electricity and natural gas facilities are limited to construction impacts. However, post-construction stormwater runoff after developments are constructed can include oils, trash, pesticides, and other pollutants. As discussed in Section 3.9 Hydrology and Water Quality, the proposed project would include stormwater facilities that would be designed to treat stormwater on-site and prevent the proposed project from creating a need for new or expanded stormwater facilities off-site. Therefore, impacts would be less than significant.

### ***Level of Significance***

Less Than Significant

### ***Water Supply***

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<b>Impact UTIL-2:</b>	<b>The proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.</b>
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### ***Construction***

During construction, water would be used for dust control, worker consumption, and other construction related activities. All water used during construction would be trucked in or tapped on-site from nearby water lines that would provide potable water from the CCWD. Construction water use would be limited to the construction period and therefore would not result in a permanent water demand. No respective construction impacts would occur.

### ***Operation***

The proposed project would consist of 1,177 residential units, a village center with commercial uses, parks, and public use space. A fire station would also be constructed by Contra Costa County Fire Protection District. As described under Section 3.12, Population and Housing, the proposed project

would result in approximately 3,931 new residents, and 54,000 square feet of commercial uses. As a result, the proposed project would create an additional need for potable water.

As noted above, the City purchases a majority of its water supply from the CCWD. The CCWD draws water from Rock Slough near Oakley, Old River near the Town of Discovery Bay, and Mallard Slough in Bay Point. The water is transported in the Contra Costa Canal, which starts at Rock Slough, then stretches west to Clyde, south to Walnut Creek, and north to Martinez. The CCWD also stores water in the Los Vaqueros Reservoir south of Brentwood, the Contra Loma Reservoir in Antioch, the Mallard Reservoir in Concord, and the Martinez Reservoir in Martinez. The CCWD canal water can be pumped to Antioch's Water Treatment Plant or the Municipal Reservoir, where the City treats and distributes potable water. The City of Antioch also has pre-1913 water rights and pumps surface water from the Sacramento-San Joaquin Delta. The City then treats the water at its water treatment plant and distributes the potable water to all customers within the City limits.

Under Normal and Single Dry Years, the City of Antioch water supply would consist of: 2,460 mg/year from the Sacramento and San Joaquin Rivers Delta, 326 MGPY of recycled water in 2020 and 489 MGPY of recycled water in 2025 and subsequent years, and purchased water from the CCWD are assumed to provide the remaining demand.<sup>8</sup> The City's Normal Year water supplies would be adequate to meet estimated Normal Year demands.<sup>9</sup> During the Single Dry Years, the City would use local water supplies first and then purchase water supplies from CCWD to minimize demand reductions by its customers.<sup>10</sup> As a result, the City's Single Dry Year water supplies are adequate to meet projected Single Dry Year demands. During Multiple Dry Years, the City's water supply would consist of the following:

- **First Dry Year**
  - City water supplies would be the same as Single Dry Year water supplies.
- **Second Dry Year**
  - No water supplies would be available from the Sacramento and San Joaquin Rivers Delta
  - 326 MGPY of recycled water in 2020 and 489 MGPY of recycled water in 2025 and subsequent years
  - Purchased water supplies from the CCWD would provide 100 percent of the City's normal year demand from 2020 to 2030, 98 percent of the City's normal year demand for 2035, and 94 percent of the City's normal year demand in 2040.
- **Third Year**
  - No water supplies would be available from the Sacramento and San Joaquin Rivers Delta
  - 326 MGPY of recycled water in 2020 and 489 MGPY of recycled water in 2025 and subsequent years
  - Purchased water supplies from the CCWD would provide 90 percent of the City's normal year demand from 2020 to 2030, 88 percent of the City's normal year demand for 2035, and 85 percent of the City's normal year demand in 2040.

<sup>8</sup> West Yost Associates. 2016. City of Antioch 2015 Urban Water Management Plan. Page 7-5.

<sup>9</sup> Ibid.

<sup>10</sup> West Yost Associates. 2016. City of Antioch 2015 Urban Water Management Plan. Page 7-6.

As described above, the City would have sufficient water supplies available during Normal, Single Dry Years, and Multiple Dry Years. In addition, the City's Multiple Dry Year demand would be reduced by up to 15 percent by 2040 with implementation of the City's Water Shortage Contingency Plan in order to meet the CCWD available water supply.<sup>11</sup>

Pursuant to Water Code Section 10910(a), the WSA prepared by West Yost Associates (Appendix H) identifies the water demand of the proposed project based on the City's water demand factors for single-family residences and age-restricted residences.<sup>12</sup> Table 3.15-4 summarizes the project's projected potable water demand.

**Table 3.15-4: Estimated Project Potable Water Demand**

Land Use Data				Potable Water Demand			
Proposed Land Use	Area (acres)	Quantity	Units	Water Use Factor <sup>7</sup>	Units	Average Water Demand (GPD)	Annual Water Demand (MGPY)
Low Density <sup>1</sup> (residential)	140.50	543.00	du	350	GPD/du	190,050	69.4
Medium Density <sup>1</sup> (residential)	38.00	212.00	du	350	GPD/du	74,200	27.1
Age-Restricted <sup>2</sup>	75.00	422.00	du	235	GPD/du	99,170	36.2
<b>Non-Residential Water Connections</b>							
Village Center <sup>3</sup> (commercial)	5.00	54,000	SF	0.2	GPD/SF	10,800	3.9
Fire Station <sup>4</sup>	2.00	1	Station	4,962	GPD	4,962	1.8
<b>Irrigated Areas</b>							
Parks <sup>5</sup>	20.00	—	—	4.3	AFY	76,837	28.0
Irrigated Landscaping <sup>5</sup>	2.50	—	—	2.37	AFY	5,283	1.9
<b>Non-Irrigated Areas</b>							
Open Space	229.50	—	—	0	AFY	0	0
Major Roadways	38.00	—	—	0	AFY	0	0
Staging Area	1.00	—	—	0	AFY	0	0
Unaccounted for Water <sup>6</sup>				—	—	—	9.7
<b>Total</b>	<b>551.50</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>178.1</b>

<sup>11</sup> West Yost Associates. 2016. City of Antioch 2015 Urban Water Management Plan. Page 7-7.

<sup>12</sup> West Yost Associates. 2016. 2015 City of Antioch Urban Water Management Plan. Table 3-2 and 4-3.

**Table 3.15-4 (cont.): Estimated Project Potable Water Demand**

Land Use Data				Potable Water Demand			
Proposed Land Use	Area (acres)	Quantity	Units	Water Use Factor <sup>7</sup>	Units	Average Water Demand (GPD)	Annual Water Demand (MGPY)
<p>Notes:</p> <p>AFY = acre-feet per year</p> <p>du = dwelling unit</p> <p>GPD = gallons per day</p> <p>GPD/du = gallons per day/per dwelling unit</p> <p>MGPY = million gallons per year</p> <p>SF = square feet</p> <p><sup>1</sup> Water Use Factor based on City of Antioch 2015 UWMP, Tables 3-2 and 4-3. Assumes 3.0 people per du (Antioch 2015 UWMP).</p> <p><sup>2</sup> Water Use Factor based on City of Antioch 2015 UWMP, Tables 3-2 and 4-3. Assumes 2.0 people per du (West Yost Associates estimate).</p> <p><sup>3</sup> Commercial water usage varies depending on tenants. Retail and office likely use 0.1 GPD/AFY, while restaurants would have much higher usage factors.</p> <p><sup>4</sup> The Fire Station would not be constructed by the Applicant, but would be constructed at a later date by Contra Costa County Fire Protection District. Nevertheless, impacts related to construction and operation are analyzed in this Draft EIR.</p> <p><sup>5</sup> Water Use Factor is derived in Table A-2. Assumes that all park and irrigated landscape acreage use the maximum applied water allowance.</p> <p><sup>6</sup> Residential Water Use Factor = (year 2020 projected residential water use)/(year 2020 projected population) x (people per du).</p> <p><sup>7</sup> Based on 5.5 percent of total water production (see City's 2015 UWMP, Table 4-3).</p>							

Using the 2015 UWMP water demand factors, the proposed project would result in an estimated annual potable water demand of 178.1 MGPY. By 2040, the 2015 UWMP estimates that total potable water use for the City of Antioch would be 7,504 MGPY.<sup>13</sup> As a result, the proposed project represents less than 1 percent of the City's projected water use. In addition, during dry years and multiple dry years the proposed project would still represent less than 1 percent of the total available water supply and demand. As described previously, the City would be able to provide sufficient water supply in normal, dry, and multiple dry years by using available local supplies and then in the second and third dry years all supplies would be purchased from CCWD.

Buildout of the Sand Creek Focus Area, including the proposed project site, is accounted for in the City's Water System Master Plan Update. The Water System Master Plan Update included the preparation of a Capital Improvement Program (CIP) that includes improvements necessary to provide safe and reliable water delivery throughout the City based on projected growth and associated increases in demand on the City's distribution system. As discussed previously, the CCWD would have sufficient supplies, even in the second and third dry years of a drought, to supply the City of Antioch with an adequate allocation to meet the needs of all Antioch residents. Accordingly, adequate water supplies would be available to serve the proposed project from existing and planned supplies. Therefore, impacts related to sufficient water supply availability would be less than significant.

<sup>13</sup> West Yost Associates. 2016. 2015 Urban Water Management Plan. Page 4-4. Table 4-4.

### ***Level of Significance***

Less Than Significant

### ***Wastewater Treatment Capacity***

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<b>Impact UTIL-3:</b>	<b>The project would result in a determination by the wastewater treatment provider, which serves or may serve the project, that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.</b>
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### ***Construction/Operation***

The proposed project could have a significant impact if the wastewater treatment provider (Delta Diablo) would not have sufficient capacity in the Delta Diablo WWTP to serve the proposed new uses in addition to the provider's existing commitments.

The proposed project consists of 1,177 residential units, a village center with commercial uses, parks, and public use space. Additionally, Contra Costa County Fire Protection District would construct a fire station on-site. As described under Section 3.12, Population and Housing, the proposed project would result in approximately 3,931 new residents. As a result, the proposed project would generate wastewater that would require treatment at the Delta Diablo WWTP. Based on a wastewater generation rate of 220 GPD per residential unit,<sup>14</sup> the project's residents would generate 258,940 gallons of wastewater per day or 0.258 mgd. The project also proposes 54,000 square feet of neighborhood commercial uses. Using the commercial wastewater generation rate of 1,000 gallons per day per acre,<sup>15</sup> the Village Center would generate an estimated 5,000 gallons of wastewater per day or (0.005 mgd). In addition, the fire station is conservatively estimated to generate 4,466 gallons of wastewater per day or (0.004 mgd) based on the estimated water demand rate. The average daily flow at the WWTP is 12.4 mgd and the permitted capacity is 19.5 mgd; thus, there is a remaining, unused treatment capacity of 7.1 mgd. As a result, the combined wastewater generation of the proposed project would be 0.267 mgd, far less than 1 percent of the average daily flow and the permitted capacity of the Delta Diablo WWTP.

Thus, the proposed project would not result in a need for new or expanded wastewater treatment facilities, and Delta Diablo can reasonably determine it could serve the proposed project's wastewater demands. Therefore, impacts related to wastewater treatment capacity would be less than significant.

### ***Level of Significance***

Less Than Significant

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<sup>14</sup> LSA Associates, Inc. 2003. Antioch General Plan Update EIR. Page 4.12-2.

<sup>15</sup> Ibid.

## Landfill Capacity

**Impact UTIL-4:** The project would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.

### Construction

During the proposed project's construction phase, the existing single-family residence, barn, and outbuildings would be removed, which would result in construction-related solid waste. Using the EPA's estimation of residential demolition debris,<sup>16</sup> demolition of the existing on-site single-family residence would create 160,540 pounds of solid waste.<sup>17</sup> Additionally, the EPA estimates that residential construction for the proposed project would generate an average of 8,112 pounds per dwelling unit and non-residential construction would generate 3.89 pounds per square foot. As a result, residential construction would generate an estimated 9,547,824 pounds<sup>18</sup> (4,773 tons) and non-residential construction would generate 210,060 pounds<sup>19</sup> (105 tons) of solid waste. Additionally, construction of the fire station would generate approximately 23,340<sup>20</sup> pounds of solid waste. The proposed project's construction waste would be generated over a period of several years during the different phases of construction and not occur at one time.

As discussed previously, solid waste and recyclables from the City are taken to the Contra Costa Transfer and Recovery Station in Martinez and then is transferred from the Transfer and Recovery Station to the Keller Canyon Landfill in Pittsburg. The landfill is permitted to accept 3,500 tons of waste per day and has a total remaining estimated capacity of approximately 63 million cubic yards.<sup>21</sup> As a result, the proposed project's total estimated construction waste would represent less than 1 percent of the total remaining capacity of the Keller Canyon Landfill. In addition, due to project phasing, the proposed project would not generate construction waste that would exceed the permitted daily capacity. Furthermore, as discussed under Impact UTIL-5, the project would comply with CALGreen, which requires at least 65 percent diversion of construction and demolition waste. Therefore, construction impacts related to landfill capacity would be less than significant.

### Operation

As discussed previously, Republic Services would provide solid waste collection, disposal, recycling, and yard waste services to the project site. Table 3.15-5 summarizes the daily and annual operational solid waste generation estimates for the proposed project.

<sup>16</sup> United States Environmental Protection Agency (EPA). 1998. Characterization of Building-related Construction and Demolition Debris, Table 5.

<sup>17</sup> Calculation: (1,396 sf [Estimated average size of residences demolished] x 115 pounds per square foot) = 160,540 pounds

<sup>18</sup> Calculation: (8,112 lbs/dwelling unit x 1,177 dwelling units) = 9,547,824 pounds

<sup>19</sup> Calculation: (3.89 lbs/square foot x 54,000 square foot Village Center) = 210,060 pounds

<sup>20</sup> Calculation: (3.89 lbs/square foot x [6,000 square feet of fire station use, based on size of Station 82]) = 23,340 pounds

<sup>21</sup> California Department of Resources Recycling and Recovery (CalRecycle). SWIS Facility Detail: Keller Canyon Landfill. Website: <https://www2.calrecycle.ca.gov/swfacilities/Directory/07-AA-0032>. Accessed June 17, 2019.

**Table 3.15-5: Project Operational Solid Waste Generation**

Land Use	Units	Approximate Waste Generation Rate	Approximate Waste Generation	
			Daily Total (tons)	Annual Total (tons)
Residential	3,931 residents	3 pounds/person/day <sup>1</sup>	5.9	2153.5
Commercial	54,000 square feet	5 pounds/1000 square-foot/day <sup>2</sup>	0.135	49.3
Fire Station	2.0 acres	2 cubic yards per week <sup>3</sup>	.04	15.6 <sup>a</sup>
<b>Notes:</b> <sup>1</sup> California Department of Resources Recycling and Recovery (CalRecycle). Jurisdiction Per Capita Disposal Trends 2015-2018. Accessed June 17, 2019. <sup>2</sup> California Department of Resources Recycling and Recovery (CalRecycle). Estimated Solid Waste Generation Rates. Access: <a href="https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates">https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates</a> . June 17, 2019. <sup>3</sup> Republic Services. 2019. Contra Costa County Fire Protection District Invoice. <sup>a</sup> Calculation: 2 cubic yards per week x 52 weeks = 104 cubic yards per year. 104 cubic yards x (300 pounds/per 1 cubic yards) = 31,200 pounds per year. (31,200 pounds per year)/2000 pounds per ton = 15.6 tons per year.				

As a result, the proposed project would generate an estimated 6 tons of solid waste per day and 2190.0 tons of solid waste a year. This waste volume represents less than 0.01 percent of the available landfill capacity at the Keller Canyon Landfill. Moreover, the values shown in the table are not adjusted to account for recycling, composting and waste reduction activities that would further divert waste from landfills (as required by compliance with General Plan Policy 8.6.2a—g), which means that the above-referenced figures are conservative and may over estimate the amount of solid waste to be generated by operation of the project.

As a result, the proposed project represents less than 1 percent of the total capacity of Keller Canyon Landfill, which contains sufficient capacity to serve the project. Therefore, operational impacts related to landfill capacity would be less than significant.

### ***Level of Significance***

Less Than Significant

### ***Solid Waste Regulations Consistency***

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**Impact UTIL-5:**      **The project would comply with federal, State, and local management and reduction statutes and regulations related to solid waste.**

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### ***Construction***

The proposed project would be required to dispose of demolition waste consistent with Article II: Construction and Demolition Debris Recycling of the Municipal Code. Consistent with CALGreen, the proposed project would be required to divert at least 75 percent construction and demolition waste. These measures would ensure compliance with the Integrated Waste Management Act by ensuring project construction waste is transferred to facilities that can adequately recycle solid waste. Thus, with compliance with existing City Municipal Code and the Integrated Waste Management Act, the

proposed project would comply with applicable solid waste regulations and statutes. Therefore, impacts related to solid waste regulations consistency are less than significant.

### **Operation**

Project operation would be required to comply with applicable State and local regulations related to solid waste such as the California Integrated Waste Management Act and Title 6 Chapter 3 of the City of Antioch Municipal Code. Adherence to the City Municipal Code would ensure sufficient solid waste collection and transportation is available to the proposed project, and would ensure that disposal sites contain sufficient capacity through permit review and inspections, and recycling programs are implemented in order to divert waste. As such, project operation would not impede the ability of the City to meet waste diversion requirements or cause the City to violate State and local statutes and regulations related to solid waste. Therefore, with compliance with existing State and City law requiring recycling and waste diversion from landfill requirements, operational impacts related to solid waste regulations consistency would be less than significant.

### **Level of Significance**

Less Than Significant

## **3.15.5 - Cumulative Impacts**

### **Water**

The geographic scope of the cumulative potable water analysis is the service area of the City of Antioch and the CCWD, which provides potable water to residents and businesses within the City. The CCWD considered the existing capacity and future demand for capacity to determine needed updates to water facilities. In the course of preparing the UWMP, the CCWD estimated water demand of future development in the service area and forecast the needed facility upgrades. The forecast included supply facility upgrades needed to accommodate growth in the County, including the City of Antioch.

Cumulative projects listed in Table 3-1 (refer to Chapter 3, Environmental Impacts Analysis, Table 3-1, Cumulative Projects) are located within the CCWD service area and would create water supply demand. In total, the cumulative projects would result in approximately 3,309 housing units and 182,000 square feet of commercial retail space. Table 3.15-6 summarizes the approximate cumulative water demand.

**Table 3.15-6: Cumulative Water Demand**

Land Use Data			Potable Water Demand			
Proposed Land Use	Quantity	Units	Water Use Factor <sup>2</sup>	Units	Average Water Demand (GPD)	Annual Water Demand (MGPY)
Low Density <sup>1</sup> (Single-family homes)	2,560	du	350	GPD/du	896,000	1,003.0
Medium Density <sup>1</sup> (Condos/Apartments)	676	du	350	GPD/du	236,600	265.0

**Table 3.15-6 (cont.): Cumulative Water Demand**

Land Use Data			Potable Water Demand			
Proposed Land Use	Quantity	Units	Water Use Factor <sup>2</sup>	Units	Average Water Demand (GPD)	Annual Water Demand (MGPY)
Age-Restricted <sup>2</sup>	63	du	235	GPD/du	14,805	16.5
<b>Non-Residential Water Connections</b>						
Village Center <sup>3</sup> (commercial)	617,600	SF	0.2	GPD/SF	123,520	138.4
Fire Station	1	Fire Station	4,962	GPD	4,962	1.8
<b>Total</b>					<b>1,261,082</b>	<b>1,424.7</b>
Notes: AFY = acre-feet per year du = dwelling unit GPD = gallons per day GPD/du = gallons per day/per dwelling unit MGPY = million gallons per year SF = square feet <sup>1</sup> Water Use Factor based on City of Antioch 2015 UWMP, Tables 3-2 and 4-3. Assumes 3.0 people per du (from Antioch 2015 UWMP). <sup>2</sup> Water Use Factor based on City of Antioch 2015 UWMP, Tables 3-2 and 4-3. Assumes 2.0 people per du (West Yost Associates estimate). <sup>3</sup> Commercial water usage varies depending on tenants. Retail and office likely use 0.1 GPD/AFY, while restaurants would have much higher usage factors.						

By 2040, the 2015 UWMP estimates that total potable water use for the City of Antioch would be 7,504 MGPY.<sup>22</sup> Additionally, the 2015 CCWD UWMP indicates that the total planned water supply in 2020 is anticipated to be 228,000 acre-feet.<sup>23</sup> As a result, cumulative projects represent 18 percent of the City of Antioch's water supply or less than 1 percent of the CCWD projected water supply in 2040.

The CCWD 2015 UWMP determined that the CCWD would be able to provide adequate water supplies to the City and cumulative projects area. The City would have adequate water supplies to serve the cumulative projects during normal and dry years. In addition, cumulative projects listed in Table 3-1, would be required to comply with provisions of the City Code, County Code and CALGreen related to water conservation. Therefore, the proposed project, in conjunction with identified cumulative projects in the City of Antioch and City of Brentwood, would result in a less than significant cumulative impact related to water supply and water supply facilities

## Wastewater

The geographic scope of the cumulative wastewater analysis is the service area of Delta Diablo, which provides wastewater collection and treatment services for the City of Antioch. Delta Diablo

<sup>22</sup> West Yost Associates. 2016. 2015 UWMP, page 4-4 Table 4-4.

<sup>23</sup> Contra Costa Water District (CCWD). 2015. Urban Water Management Plan.

considered the existing capacity and future demand for capacity to determine needed updates to wastewater and recycled water facilities. In the course of preparing the Sewer System Master Plan, Delta Diablo estimated wastewater generated from future development in the service area and forecast the needed facility upgrades.<sup>24</sup> The forecast included treatment facility upgrades needed to accommodate growth in the City and maintain compliance with applicable regulatory standards for wastewater treatment and discharge.

As discussed in this section, the Sewer System Master Plan determined that capacity exists to service the City and cumulative projects area demand with respect to wastewater treatment facilities. The NPDES permit for the WWTP allows an average dry weather flow of 19.5 mgd, while the current flow rate is 12.4 mgd, leaving sufficient capacity for the proposed project and cumulative projects in the vicinity. Buildout of the Sand Creek Focus Area, including the proposed project site, has been previously anticipated by the City. Per the General Plan EIR, a less-than-significant impact to wastewater facilities would occur with implementation of General Plan policies. Therefore, the proposed project, in conjunction with identified cumulative projects in City of Antioch would result in a less than significant cumulative impact related to wastewater generation and wastewater treatment facilities.

### **Storm Drainage**

The geographic scope for cumulative storm drainage is the areas that drain to the Contra Costa Clean Water Program's storm drainage system and to the San Joaquin River Delta. The cities of Antioch, Brentwood and Oakley are all covered under the same municipal storm water permit. Further, all jurisdictions much comply with the State's Construction General Permit.

Cumulative projects listed in Table 3-1 predominantly consist of commercial and residential uses to be located in the City of Antioch and City of Brentwood, which would all generate stormwater runoff. All cumulative projects listed would be required to obtain coverage under the Construction General Permit from the State Water Board, which would require preparation of a Storm Water Pollution Prevention Plan (SWPPP) that would control potential discharges of contaminants into Sand Creek and the San Joaquin River Delta. Operations of these cumulative projects would be required to comply with the East Contra Costa County Municipal NPDES Permit, the CCCWP, city ordinances regarding stormwater, and the General Plan policies and ordinance codes of the cities of Antioch and Brentwood. Consistent with measures in the City of Antioch Ordinance Code, Chapter 9, all development in the City is required to incorporate stormwater collection systems into the development, which would in turn ensure cumulative project operation would not create runoff that exceeds the capacity of existing or planned stormwater drainage systems such that new or expanded facilities would be required. Consistent with measures in the City of Brentwood Ordinance Code Title 14, all development in the City is required to incorporate stormwater collection systems into the development, which would in turn ensure cumulative project operation would not create runoff that exceeds the capacity of existing or planned stormwater drainage systems such that new or expanded facilities would be required. Therefore, the proposed project, in conjunction with identified cumulative projects, would result in a less than significant cumulative impact related to stormwater generation and stormwater drainage facilities.

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<sup>24</sup> Delta Diablo Sanitation District (Delta Diablo). 2018. Sewer System Management Plan, page 8-1.

## Solid Waste

As discussed previously, Republic Services would provide solid waste collection, disposal, recycling, and yard waste services to the project site, as well as cumulative projects in the Cities of Antioch and Brentwood. Cumulative projects listed in Table 3-1 consist predominantly of residential uses and commercial uses would generate solid waste that would increase demand on solid waste facilities to receive, process, and dispose solid waste.

As described previously, Keller Canyon Landfill has a remaining capacity of approximately 63 million cubic yards. The anticipated waste volume of cumulative projects development would be approximately 10,340<sup>25,26</sup> cubic yards per year, which is less than 1 percent of the landfill's maximum permitted capacity. Existing solid waste facilities have sufficient capacity to serve cumulative development anticipated in the County. Therefore, the project, in conjunction with identified cumulative projects, would result in a less than significant cumulative impact related to solid waste generation and landfill capacity.

### ***Level of Cumulative Significance***

Less Than Significant

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<sup>25</sup> Calculation: (3,309 cumulative households) x (12.23 lb/household/day)=40,469 lbs of solid waste/day = 14,771,185 lbs/year=48,761 cubic yards. Notes 1 ton=2,000 pounds; 1 ton=1.4 cubic yards.

<sup>26</sup> California Department of Resources Recycling and Recovery (CalRecycle). Solid Waste Generation Rates. Website: <https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates>.

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## CHAPTER 4: EFFECTS FOUND NOT TO BE SIGNIFICANT

### 4.1 - Introduction

This chapter is based on the Ranch Project Environmental Impact Report (EIR) Notice of Preparation (NOP), dated June 11, 2019, and contained in Appendix A of this EIR. The NOP was prepared to identify the potentially significant effects of the project and was circulated for public review between June 11, 2019, and July 11, 2019. In the course of the NOP evaluation, certain impacts were found to be less than significant, because construction and operation of the proposed project would not result in such impacts. This chapter provides a brief description of effects found not to be significant or less than significant, based on the NOP, NOP public comments received, and more detailed analysis conducted as part of the EIR preparation process. One NOP public comment letter was received related to Mineral Resources by Hanson Bridgett, LLP. Note that a number of impacts that are found to be less than significant are addressed in the various EIR topical sections (Sections 3.1 through 3.15) to provide more comprehensive discussion of why impacts are less than significant, in order to better inform decision-makers and the general public.

### 4.2 - Environmental Effects Found Not To Be Significant

#### 4.2.1 - Mineral Resources

There are no mineral resource recovery sites on or in the project vicinity. A Mineral Resource Zones and Resources Sectors map prepared by the California Geological Survey indicates that the project site is located in an area not containing any known mineral occurrences of undetermined mineral significance.<sup>1</sup> In addition, the Contra Costa County General Plan Conservation Element Figure 8-4 indicates that no mineral resource zones are located on the project site or within the City of Antioch.<sup>2</sup> The nearest regionally significant mineral resources that are currently mined include the following: a deposit of diabase, an intrusive igneous rock, in the Mount Zion area between Concord and Clayton, 9.50 miles from the project site; a deposit of domesine sandstone outside of Byron south of Camino Diablo and east of Vasco Road, 8.30 miles from the project site; and shale in the Port Costa area, 21.40 miles from the project site.<sup>3</sup> Furthermore, the Antioch General Plan EIR does not identify any areas within the City available for new development to contain known mineral resources that would be of value to the region or residents of the State.<sup>4</sup> As such, construction and operation of the proposed project would not result in the loss of a locally important mineral resource recovery site delineated by an applicable land use plan or the loss of availability of a known mineral resource of Statewide, regional, or local importance. Therefore, no impact to mineral resources would occur.

<sup>1</sup> California Department of Conservation. 1987. Mineral Resource Zones and Resource Sectors Contra Costa County. Website: <https://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=mlc>. Accessed June 24, 2019.

<sup>2</sup> Contra Costa County General Plan 2025. Conservation Element. Figure 8-4, Mineral Resource Areas. Website: <http://www.co.contra-costa.ca.us/DocumentCenter/View/30918/Ch8-Conservation-Element?bidId=>. Accessed June 18, 2019.

<sup>3</sup> Contra Costa County General Plan 2025. Conservation Element. Website: <http://www.co.contra-costa.ca.us/DocumentCenter/View/30918/Ch8-Conservation-Element?bidId=>. Accessed June 18, 2019.

<sup>4</sup> City of Antioch. 2003. General Plan EIR. Effects Found not to be Significant. Page 5–9. Accessed June 18, 2019.

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## CHAPTER 5: OTHER CEQA CONSIDERATIONS

### 5.1 - Significant Unavoidable Impacts

California Environmental Quality Act (CEQA) Guidelines Section 15126.2(a)(b) requires an Environmental Impact Report (EIR) to identify and focus on the significant environmental effects of the proposed project, including effects that cannot be avoided if the project were implemented.

Based on the analyses contained in this Draft EIR, the City has determined that the proposed project in conjunction with other cumulative development in the City of Antioch would result in project-level or cumulative-level significant and unavoidable impacts listed below.

- The proposed project would substantially degrade the existing visual character or quality of public views of the site and its surroundings.
- The proposed project would result in significant and unavoidable impacts related to operational criteria pollutant emissions in violation of an air quality standard.
- The proposed project would result in a cumulatively considerable net increase in operational related air pollutants, which would exceed the Bay Area Air Quality Management District (BAAQMD) threshold of significance for annual and daily operational emissions.
- Because the availability and feasibility of carbon credits is unknown at this time and the fate of PG & E and its renewable resources programs is uncertain, the proposed project would result in significant and unavoidable impacts related to operational greenhouse gas emissions.
- The proposed project would conflict with a program plan, ordinances, or policy of the circulation system under Existing Plus Project traffic conditions.
- The proposed project would conflict with a program plan, ordinances, or policy of the circulation system under Near Term traffic conditions.
- The proposed project would conflict with a program plan, ordinances, or policy of the circulation system related to freeways.
- The proposed project would conflict with a program plan, ordinances, or policy of the circulation system under Cumulative traffic conditions.
- The proposed project would be inconsistent with CEQA Guidelines Section 15064.3 subdivision (b).

### 5.2 - Growth-inducing Impacts

There are two types of growth-inducing impacts that a project may have: direct and indirect. To assess the potential for growth-inducing impacts, the project's characteristics that may encourage and facilitate activities that individually or cumulatively may affect the environment must be

evaluated (CEQA Guidelines § 15126.2(d)). CEQA Guidelines, as interpreted by the City, state that a significant growth-inducing impact may result if the proposed project would:

- Induce substantial population growth in an area (for example, by proposing new homes and commercial or industrial businesses beyond the land use density/intensity envisioned in the general plan);
- Substantially alter the planned location, distribution, density, or growth rate of the population of an area; or
- Include extensions of roads or other infrastructure not assumed in the general plan or adopted capital improvements project list when such infrastructure exceeds the needs of the project and could accommodate future developments.

Direct growth-inducing impacts occur when the development of a project imposes new burdens on a community by directly inducing population growth, or by leading to the construction of additional developments in the same area. Also included in this category are projects that remove physical obstacles to population growth (such as a new road into an undeveloped area or a wastewater treatment plant with excess capacity that could allow additional development in the service area). Construction of these types of infrastructure projects cannot be considered isolated from the development they facilitate and serve. Projects that physically remove obstacles to growth, or projects that indirectly induce growth may provide a catalyst for future unrelated development in an area such as a new residential community that requires additional commercial uses to support residents.

The project site is located within the southwestern portion of the City of Antioch, in Contra Costa County. Implementing the proposed project would directly induce growth within the City, but not in a manner that is beyond Citywide land use densities/intensities envisioned in the City of Antioch General Plan. The California Department of Finance (CDF) estimated that the total population in the City of Antioch as of January 1, 2019, is approximately 113,901. The City of Antioch General Plan Housing Element states that the Association of Bay Area Governments (ABAG) estimates that the City's population would increase by 2,299 persons to 116,200 by the year 2030. The proposed project would develop 1,177 units and would result in an estimated increase of 3,931 persons. This would represent an approximate 3 percent increase in overall population, which is considered to be a negligible increase.

In addition to residential units, direct growth from the proposed project would include ancillary and recreational facilities and a village center consisting of retail, commercial, and office space. This growth would add an estimated 108 jobs under the proposed project. Infrastructure services would be expanded to serve the proposed project, without significant excess capacity. Therefore, the proposed project would not encourage additional growth beyond what is already planned in the City of Antioch General Plan. As a result, the proposed project would create minimal direct growth that would be inconsistent with the CDF projected increase in population for Contra Costa County.

The proposed project would also not significantly and adversely affect the permanent jobs/housing balance. The project would create a minor amount of nonresidential development and jobs that

would not create a housing demand above what would otherwise occur in the County. However, the project would include 1,177 residential units and up to 3,931 residents.

The project site currently contains one single-family residence in addition to various barns and outbuildings. The proposed project would connect to existing water, wastewater, electricity, natural gas, and telecommunications facilities, to serve the new units within the project site. Furthermore, the proposed project would be consistent with the surrounding residential, open space, and mixed medical facility uses, and thus, would not trigger growth beyond that which is already contemplated by the City of Antioch General Plan. Therefore, the proposed project would not remove a barrier to growth or create an indirect increase in population.

Since the proposed project would not result in indirect growth, negatively alter the existing jobs/housing balance, or be inconsistent with the City of Antioch General Plan, the growth-inducing impact would be less than significant.

### 5.3 - Significant Irreversible Environmental Changes

As mandated by CEQA Guidelines Section 15126.2(c), the Draft EIR must address significant irreversible environmental changes that would result from implementation of the project. Specifically, such an irreversible environmental change would occur if:

- The project would involve a large commitment of nonrenewable resources;
- Irreversible damage can result from environmental accidents associated with the project; and
- The proposed consumption of resources is not justified (e.g., the project results in the wasteful use of energy). (Refer to Section 3.15, Utilities and Service Systems, which addresses this topic in accordance with CEQA Guidelines Appendix F). The proposed project involves the construction and operation of a master planned community. The proposed project would include 1,177 residential units consisting of a mix of Low Density (LD), Medium Density (MD), and Age Restricted (AR) housing. Average lot sizes for LD housing would range from 7,000 to 10,000 square feet. Average MD lot sizes would be approximately 4,500 square feet, and average lot sizes for the AR units would be approximately 5,000 square feet. Additionally, the proposed project would include a 5.00-acre village center, 3.00 acres of public use facilities including a fire station and trail staging areas, 20.00 acres of parks, and 229.50 acres of open space.

Construction debris recycling practices would be expected to allow for the recovery and reuse of building materials such as concrete, lumber, and steel and would limit disposal of these materials, some of which are non-renewable. Construction would include the use of building materials, such as petroleum-based products and metals that cannot reasonably be recreated. Construction also would involve significant consumption of energy, usually petroleum-based fuels that deplete supplies of nonrenewable resources. Construction of structures and infrastructure would consume energy and water; however, because of its temporary and one-time nature, construction under the proposed project would not represent a significant irreversible use of resources.

Once construction is complete, the land uses associated with the proposed project would use some nonrenewable fuels to heat and light structures and consume water. The new residential and recreational uses would be required to be built to and adhere to the latest adopted edition of the California Green Building Standards Code, which includes a number of standards that would reduce energy demand, water consumption, wastewater generation, and solid waste generation that would collectively reduce the demand for resources. This would result in the emission and generation of less pollution and effluent and lessen the severity of corresponding environmental effects. Thus, although the proposed project would result in an irretrievable commitment of non-renewable resources, energy for heat and light and water for irrigation and plumbing would not be consumed inefficiently, unnecessarily, or wastefully.

Furthermore, the proposed residential uses do not have the potential to cause significant environmental accidents through releases into the environment, as they would not involve large quantities of hazardous materials (see Section 3.8, Hazards, Hazardous Materials, and Wildfire). According to the California Department of Forestry and Fire Protection (CAL FIRE), the project site is not located in a Very High Fire Hazard Severity Zone, and the closest designated “High” fire hazard zone is located more than 7 miles southeast of the project site. Additionally, because the proposed project and surrounding areas are within a non-Very High Fire Hazard Severity Zone, the project site would not be prone to wildfire risk. As discussed in Section 3.13, Public Services and Recreation, the existing fire protection facilities would be adequate to serve the proposed project with implementation of all applicable mitigation, and the proposed project would not result in a significant and unavoidable impact related to the need for new or altered fire protection facilities. Thus, implementation of the project’s proposed residential and recreational uses do not have the potential to result in significant environmental accidents related to wildfire hazards with mitigation incorporated, (see Section 3.8, Hazards, Hazardous Materials, and Wildfire) and would not result in significant irreversible environmental changes.

## CHAPTER 6: ALTERNATIVES TO THE PROPOSED PROJECT

### 6.1 - Introduction

In accordance with California Environmental Quality Act (CEQA) Guidelines Section 15126.6, this Draft Environmental Impact Report (EIR) contains a comparative impact assessment of alternatives to the proposed project. The primary purpose of this section is to provide the decision makers and general public with a reasonable number of feasible project alternatives that could attain most of the basic project objectives, while avoiding or reducing any of the project's significant adverse environmental effects. Important considerations for these alternatives analyses are noted below (as stated in CEQA Guidelines § 15126.6).

- An EIR need not consider every conceivable alternative to a project;
- An EIR should identify alternatives that were considered by the lead agency, but rejected as infeasible during the scoping process;
- Reasons for rejecting an alternative include:
  - Failure to meet most of the basic project objectives;
  - Infeasibility; or
  - Inability to avoid significant environmental effects.

As has been previously stated, the Antioch City Council unanimously adopted the “West Sand Creek Tree, Hillside, and Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative” (the “West Sand Creek Initiative”) in July 2018. The West Sand Creek Initiative sought to amend the City's General Plan to update the Land Use Element to change the base land use designations on the Sand Creek Focus Area (project site) to restrict approximately 229.50 acres as a Restricted Development Area for Rural Residential, Agriculture, and Open Space land use designations, and allow development in a Limited Development Area with land use designations of Estate Residential, Low Density Residential, Medium Low Density Residential, Medium Density Residential, Convenience Commercial, Mixed Use, Public/Quasi Public, and Open Space. The West Sand Creek Initiative also sought to rezone the project site's Limited Development Area of approximately 322 acres from Study Area to the West Sand Creek Planned Development District. Finally, the West Sand Creek Initiative would have allowed up to 1,177 residential units in the Limited Development Area.

The West Sand Creek Initiative was invalidated by the trial court in November 2019. However, the project proponent plans to advance the land use objectives of the West Sand Creek Initiative for the proposed project.

As such, CEQA requires the City to analyze potential alternatives to the proposed project.

### 6.1.1 - Significant Unavoidable Impacts of the Proposed Project

The proposed project was analyzed for potentially significant impacts on each of the environmental issues discussed in Sections 3.1 through 3.14. The results of the analysis indicate that the proposed project would result in a significant unavoidable impact with respect to:

- **Impact AES-3:** The project would substantially degrade the existing visual character or quality of public views of the site and its surroundings.
- **Impact AIR-1:** The project would conflict with or obstruct implementation of the applicable air quality plan.
- **Impact AIR-2:** The project would result in a cumulatively considerable net increase of ROG for which the project region is in non-attainment under applicable air quality standards.
- **Impact GHG-1:** The project could generate direct and indirect greenhouse gas emissions that could result in a significant impact on the environment even with mitigation.
- **Impact TRANS-1:** The project could conflict with a program plan, ordinance, policy of the circulation system under Existing Plus Project traffic conditions.
- **Impact TRANS-2:** The project could conflict with a program, plan, ordinance, or policy of the circulation system under Near-term traffic conditions.
- **Impact TRANS-4:** The project would conflict with a program, plan, ordinance, or policy of the circulation system related to freeways.
- **Impact TRANS-5:** The project would be inconsistent with CEQA guidelines Section 15064.4 subdivision (b).

### 6.1.2 - Alternatives Considered but Rejected

As noted previously, the purpose of an alternatives analysis is to develop alternatives to the proposed project that substantially lessen at least one of the significant environmental effects identified as a result of the project, while still meeting most, if not all, of the basic project objectives. Alternatives that do not meet the basic project objectives must be rejected. The following project alternatives were considered but rejected for the reasons discussed below: (a) Off-site Alternative and (b) All Age Restricted Alternative.

The Off-site Alternative was considered but rejected mostly because the project Applicant owns the project site and purchased it to develop it in accordance with the City's existing General Plan (barring minor amendments). An Off-site Alternative was further infeasible as there is little to no developable land available within the City's Urban Limit Line that would allow for the buildout of the proposed project.

The All Age Restricted Alternative considered a development of entirely age-restricted (AR) single-family housing without any commercial development whatsoever. This alternative was considered but rejected on the grounds that it would not meet the project's proposed objectives of building out

a variety of housing types and densities, while also attempting to reduce small traffic trips that would be alleviated with the proposed Village Commercial Center.

### 6.1.3 - Alternatives to the Proposed Project

Pursuant to CEQA Guidelines Section 15126.6, this Draft EIR presents a range of reasonable alternatives to the proposed project for analysis and evaluation of their comparative merits. These alternatives are considered to cover the range of development alternatives that would meet the basic objectives of the project while lessening one or more of its significant impacts. CEQA Guidelines Section 15126.6(a) states that an EIR need not evaluate every conceivable alternative to a project. Information has been provided for each alternative that would allow meaningful comparison with the project. All of the alternatives analyzed in this chapter would feasibly avoid or reduce at least one of the significant impacts of the project.

CEQA requires that an EIR analyze a “no project” alternative (CEQA Guidelines § 15126.6(e)). Where, as here, this alternative means a proposed project would not proceed, the discussion “[sh]ould compare the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved” (CEQA Guidelines § 15126.6(e)(3)(B)). A “no project” alternative shall describe existing conditions at the time the Notice of Preparation is prepared, as well as what could reasonably be expected in the foreseeable future if the project is not approved, based on current plans and consistent with available infrastructure and community services.

The alternatives to the proposed project analyzed in this section are as follows:

- **Alternative 1: No Project/No Build:** Under the No Project Alternative, construction of the proposed 1,177-unit master-planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain on-site.
- **Alternative 2: Reduced Density:** Under the Reduced Density Alternative, 900 total dwelling units consisting of a maximum total of 478 single-family dwelling units and 422 AR units would be constructed on approximately 253.5 acres of the 551.50-acre site. This alternative would still include the 5.00-acre Village Center, as well as the fire station and 10.00 acres of proposed parks instead of 20.00 acres. The total amount of open space would be approximately 239.00 acres.
- **Alternative 3: Reduced Footprint:** Under the Reduced Footprint Alternative, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units would be constructed, along with a commercial center, fire station, and parks on land north of Sand Creek only. All bridges across the creek would be eliminated, as would the trail staging area and the detention basin south of the creek.
- **Alternative 4: Reduced Traffic:** Under the Reduced Traffic Alternative, 1,177 residential dwelling units would be constructed on 253.50 acres of the 551.50-acre site. This alternative would reduce the proposed low-density residential units from 543 to 218 and increase the proposed AR units from 422 to 747. The total amount of open space, parks, landscaping, the Village Center, and fire station site would remain the same as the proposed project.

## 6.2 - Project Objectives

As stated in Section 2, Project Description, the objectives of the proposed project are to:

- Develop a project consistent with the West Sand Creek Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative.
- Establish a 551.50-acre, well-planned community that incorporates the natural, historic, and physical elements of the land and the surrounding uses.
- Design a land use plan with a mix of uses complementary to existing neighborhoods and in symmetry with the larger Antioch community.
- Provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.
- Provide a Village Center adjacent to Deer Valley Road and across from the Kaiser Permanente Antioch Medical Center, functioning as a hub of activity and source of sales tax revenue.
- Preserve and protect the hills and hillsides on-site as permanent open space.
- Preserve and protect the Sand Creek corridor as permanent open space and provide public access with perimeter trails and crossings.
- Provide a pedestrian-friendly community that focuses on open space, parks, and trails to facilitate resident and visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system.
- Provide a land use plan with a balance of uses and density that results in an adequate tax base, which at project build-out generates financial resources to pay for public services and infrastructure without financial burden to existing residents.
- Provide a land use plan, design standards, and guidelines consistent with the City of Antioch General Plan goals and policies, that incorporate market-acceptable design features and promotes an attractive, well-maintained community.
- Establish a land use and circulation system that promotes convenient mobility, completes the extension of Dallas Ranch Road to Deer Valley Road, and provides modes of transportation within a setting that is safe, accessible, and convenient for all modes of travel.
- Provide a comprehensive infrastructure system, including parks, open space, stormwater quality facilities, public services, roadways, and utilities infrastructure sized to serve the proposed project and properties to the east and south in the Sand Creek Focus Area that complements the existing citywide infrastructure and ensures funding for the on-going maintenance needs of such infrastructure.

## 6.3 - Alternative 1—No Project/No Build Alternative

CEQA Guidelines Section 15126.6(e) requires EIRs to evaluate a “No Project Alternative,” which is defined as the “circumstance under which the project does not proceed.” Under Alternative 1, No

Project Alternative, construction of the proposed 1,177-unit master-planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain on-site.

### **6.3.1 - Impact Analysis**

#### **Aesthetics, Light, and Glare**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. The project would result in significant and unavoidable impacts related to aesthetics. Under Alternative 1, because development of the project site would not occur, there would be no impacts related to aesthetics. Because this alternative would not result in any impacts, Alternative 1 would have fewer impacts related to aesthetics compared to the project.

#### **Agriculture Resources and Forestry Resources**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. The project would result in less than significant impacts related to agriculture and forestry resources. Under Alternative 1, impacts related to agriculture and forestry resources would not occur, as development would not occur. Therefore, Alternative 1 would result in fewer impacts related to agriculture and forestry resources compared to the project.

#### **Air Quality**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Alternative 1 would not result in a change related to criteria pollutant and toxic air contaminant emissions, as there would be no associated impacts resulting from construction or operation of the project.

#### **Biological Resources**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Because ground disturbing activities would not occur, Alternative 1 would not result in impacts related to biological resources.

#### **Cultural Resources and Tribal Cultural Resources**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Because

ground disturbance resulting from the project would not occur, Alternative 1 would result in no impacts related to cultural and tribal cultural resources.

### **Geology and Soils**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Alternative 1 would not result in any impacts related to geology and soils, as no construction related ground disturbance would occur.

### **Greenhouse Gas Emissions and Energy**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Alternative 1 would not result in construction of the project; therefore, impacts related to greenhouse gas (GHG) emissions and energy over and above existing conditions would not occur under Alternative 1.

### **Hazards and Hazardous Material and Wildfire**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur and the project site would remain in its primarily undeveloped state with the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. The continued use of the site as a single-family residence and grazing land would not result in impacts to hazards or hazardous materials, however the risk of wildfire is equivalent to or higher than the project given the site is currently grassland and has no buffer between the adjacent open space, and the structures are older and without sprinkler systems.

### **Hydrology and Water Quality**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. Thus, there would not be any water quality concerns regarding construction activity. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. The lack of development under this alternative would not alter drainage patterns. Similarly, the use of groundwater for purposes of watering the cattle would remain the same. Thus, Alternative 1 would not result in any impacts related to hydrology and water quality above existing conditions.

### **Land Use and Planning**

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Thus, Alternative 1 would result in no impacts to land use and planning.

## Noise

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Because Alternative 1 would not result in any construction or housing, no new noise generation or vibration would occur, and this alternative would not have any noise impacts.

## Population and Housing

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. With the No Project/No Build Alternative, there would not be an increase in population, and therefore no impacts related to population and housing.

## Public Services and Recreation

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. The two groundwater wells would remain intact and operational and no new parks or open space trails would be developed. Alternative 1 would result in no impacts to public services or recreation.

## Transportation

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Because no new construction would occur under Alternative 1, there would not be any increased construction traffic in the area (Table 6-1), and the housing and population would not increase. Therefore, no impacts to transportation would result.

**Table 6-1: No Project, No Build Alternative Trip Generation**

Scenario	Daily Trips	AM Peak-hour	PM Peak-hour
No Project, No Build Alternative	0	0	0
Proposed Project	10,990	713	1,083
Source: Fehr & Peers 2020.			

## Utilities and Service Systems

Under Alternative 1, construction of the proposed 1,177-unit master planned community would not occur. The project site would remain in its primarily undeveloped state, and the existing single-family residence, barns, and outbuildings related to the cattle grazing operation would remain. Given no

new construction or development would occur under this alternative, no impacts to utilities, police, fire, library or park services would occur.

### **6.3.2 - Conclusion/Relationship to Project Objectives**

Alternative 1, the No Project/No Build Alternative, would leave the project site in its existing undeveloped condition, thus avoiding impacts caused by the demolition of the single-family residence, barns, and outbuildings on-site, and the grading and construction associated with the project. However, because development of the project would not occur, Alternative 1 would not meet any of the objectives of the proposed project.

## **6.4 - Alternative 2—Reduced Density Alternative**

Under the Reduced Density Alternative, 900 total dwelling units consisting of a maximum total of 478 single-family dwelling units and 422 AR units would be constructed on approximately 253.50 acres of the 551.50-acre site. This alternative would reduce the overall residential density of the site from 4.6 dwelling units per acre to 3.5 dwelling units per acre, but would still include the 5.00-acre commercial site, as well as the fire station and 10.00 acres of proposed parks instead of 20.00 acres. The total amount of open space would be approximately 239.00 acres (Exhibit 6-1). Alternative 2 would eliminate all medium-density dwelling units from the site plan and would require amendments to the City of Antioch General Plan and Zoning Code.

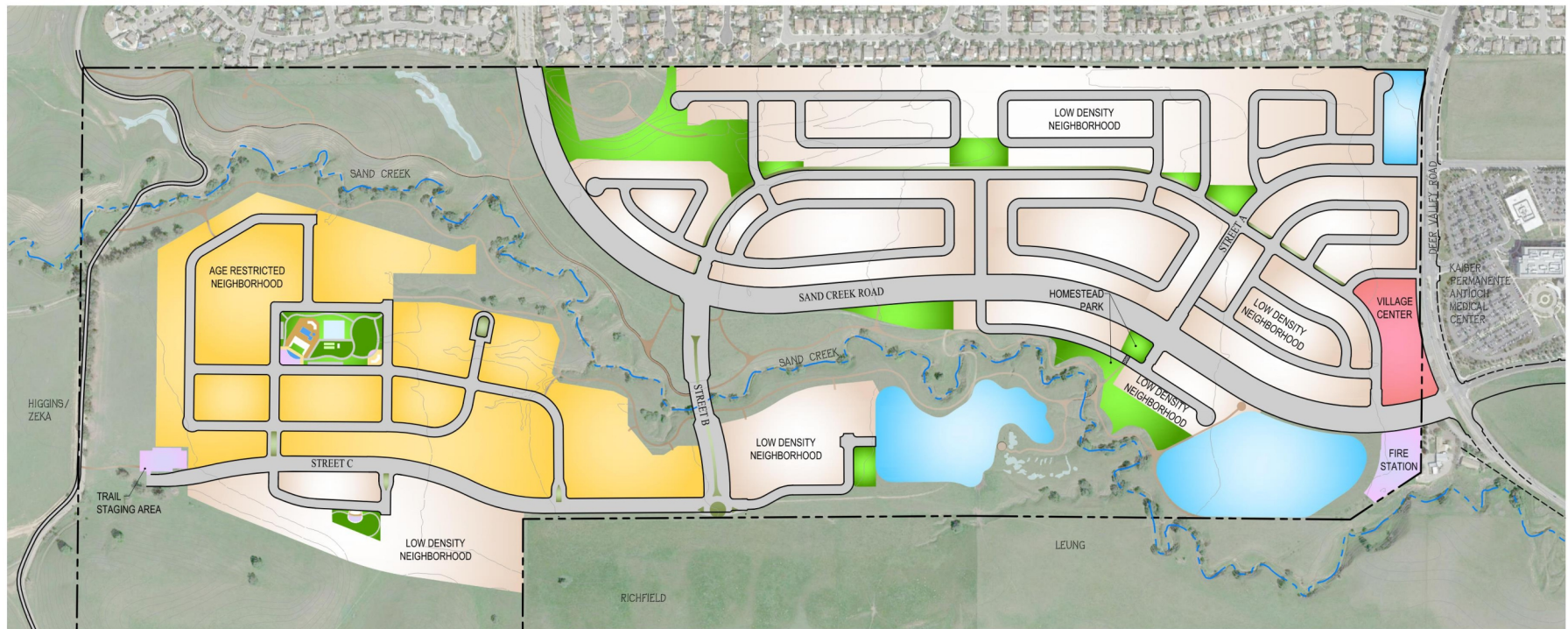
### **6.4.1 - Impact Analysis**

#### **Aesthetics, Light, and Glare**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. Under Alternative 2, project impacts related to visual character would be significant and unavoidable, similar to the proposed project because like the proposed project, it would significantly alter the landscape from rural grazing land to suburban homes, roadways, and other infrastructure. The buildout of Alternative 2 would have similar impacts as the project related to light and glare from homes and businesses, which could be mitigated in the same way the proposed project offers.

#### **Agriculture Resources and Forestry Resources**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. The proposed project's impacts related to agriculture and forestry resources would be less than significant since grazing land is not a protected agricultural resource. Under Alternative 2, impacts related to agriculture and forestry resources would also be less than significant, for the same reason.



PRODUCT & AREA SUMMARY							
TYPE	PRODUCT OR AREA TYPE	ACREAGE	% OVERALL	% RES ACREAGE	NET DENSITY (DU/AC)	AVERAGE LOT SIZE (SF)	% RES UNITS
	LOW DENSITY (LD)	178.5	32.4%	70.4%	2.7	10,000	53.1%
	AGE RESTRICTED (AR)	75	13.6%	29.6%	5.6	5,000	46.9%
	MEDIUM DENSITY (MD)	0	0.0%	0.0%	0.0	4,500	0.0%
	RESIDENTIAL TOTAL	253.5	46.0%	100.0%	3.5		100.0%
	VILLAGE CENTER	5	0.9%				
	PUBLIC USE (PQ)	3	0.5%				
	• FIRE STATION (PQ-F)	2	0.4%				
	• TRAIL STAGING AREA (PQ-S)	1	0.2%				
	PARKS (P)	10.5	1.9%				
	LANDSCAPE (L)	2.5	0.5%				
	OPEN SPACE (OS)	239	43.3%				
	MAJOR ROADWAYS	38	6.9%				
	TOTAL	551.5	100%				



Source: CBG Civil Engineers, February 26, 2020.



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## **Air Quality**

Where housing development is at issue, air quality impacts usually result from new vehicle trips associated with the development, as well as the temporary construction impacts. Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. The proposed project would have one significant and unavoidable air quality impact related to the emission of ROGs. Alternative 2 would have the same significant and unavoidable ROG emission impact despite the lower number of units proposed because while it would reduce the number of units being constructed, it would have the same construction footprint, and therefore would result in a similar level of area source emissions. The majority of operational ROG emissions from area sources is from consumer products. Specifically, the related area sources of ROG emissions include degreasers for the proposed parking lots and pesticide/fertilizers for the proposed public parks and landscaped areas.

## **Biological Resources**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed on the same number of acres and in the same footprint as the proposed project. The proposed project's impacts related to biological resources would be less than significant with mitigation. Under Alternative 2, impacts related to biological resources would have the same level of impacts and require the same level of regulatory permitting also be less than significant with mitigation, similar to the proposed project.

## **Cultural Resources and Tribal Cultural Resources**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. The proposed project's impacts related to cultural resources and tribal cultural resources would be less than significant with mitigation. Under Alternative 2, a similar project would be developed and, the same development footprint would be disturbed. Therefore, project impacts under Alternative 2 related to cultural and tribal cultural resources would be less than significant with mitigation, similar to the proposed project.

## **Geology and Soils**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. The proposed project's impacts related to geology and soils would be less than significant with mitigation. Similarly, under Alternative 2, impacts related to geology and soils would be less than significant with mitigation, since Alternative 2 would be constructed on the same project footprint.

## **Greenhouse Gas Emissions and Energy**

Under Alternative 2, while the overall construction footprint would be relatively the same as that of the proposed project, the reduced number of dwelling units and the associated reduction in project trips would be expected to result in reduce GHG emissions compared to the emissions estimated for the proposed project. However, this reduction would not necessarily reduce overall project operational emissions in the year 2030 to below the threshold of 2.6 metric ton carbon dioxide equivalent (MT CO<sub>2</sub>e)/year/service population and, therefore, mitigation would still be required. Mitigation Measure

(MM) GHG-1 requires the installation of solar panels, electric vehicle charging stations and the like; however, there is no guarantee these measures will reduce emissions to below the threshold. As such, this alternative's GHG impact is expected to also be significant and unavoidable.

### **Hazards, Hazardous Materials, and Wildfire**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. This alternative would encompass the same footprint as the proposed project, including the same emergency vehicle access. Although it would reduce the number of housing units by 277, the usage of the site would be substantially similar to that of the project—residential and commercial in nature, using the same fertilizers, etc. The proposed project's impacts related to hazards, hazardous materials, and wildfire would be less than significant with mitigation. Under Alternative 2, project impacts related to hazards, hazardous materials, and wildfire would also be less than significant with mitigation, similar to the proposed project.

### **Hydrology and Water Quality**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. Although the number of units constructed would be reduced, the project footprint would remain the same and thus, result in a substantially similar area of impervious surface. Also, Alternative 2 would still require three detention basins, with the same outfalls to Sand Creek. The proposed project's impacts related to hydrology and water quality would be less than significant. Under Alternative 2, project impacts related to hydrology and water quality would also be less than significant.

### **Land Use and Planning**

Project impacts related to land use and planning would be less than significant. Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed on the same development footprint as the project. Under Alternative 2, project impacts related to land use and planning would also be less than significant, but compared to the proposed project, Alternative 2 would not provide housing opportunities as responsive to the needs of Antioch, or the region and market conditions, to serve a range of family incomes and household types.

### **Noise**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. Project impacts related to noise would be less than significant with mitigation. Under Alternative 2, project impacts related to noise would also be less than significant with mitigation, similar to the proposed project.

### **Population and Housing**

Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed.

The proposed project would include demolition of the existing single-family home and outbuildings and construction of 1,177 dwelling units of different densities, thereby increasing the City's population by 3,931 people (assuming 3.34 persons per household). Because the proposed project would provide housing in an area of the City planned for development since at least 2008, and would help alleviate the dearth of housing in the area, the proposed project's impacts related to population and housing would be less than significant. While Alternative 2 would add 900 homes, they would only be low-density single-family homes, which does not provide a full range of housing options for buyers. Nevertheless, Alternative 2 would have a less than significant impact on population and housing because it would still add homes to the area.

### **Public Services and Recreation**

The proposed project would have significant and unavoidable impacts on public services and recreation as discussed in Chapter 3.13, Public Services and Recreation, of this Draft EIR. Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, a trail staging area, and 5.00 acres of commercial uses would be constructed. While this alternative would—like the proposed project—include the fire station site and the trail staging area, instead of 20.00 acres of park, 10.00 acres of park would be provided. Additionally, the connection of Sand Creek Road from the terminus of Dallas Ranch Road through to Deer Valley Road would be completed. Alternative 2 would include the trail staging and fire station site as noted above, and pay its applicable development impact fees for fire and police services. Thus, Alternative 2's impact to public services and recreation would be less than significant with mitigation, the same as the proposed project.

### **Transportation**

The proposed project would create 10,990 new traffic trips per day, and would result in significant and unavoidable impacts on freeway on and offramps, as well as a significant and unavoidable impact to the intersection of Deer Valley Road and Balfour Road, because such intersections are within other jurisdictions (i.e., California Department of Transportation [Caltrans] and City of Brentwood).

Additionally, the proposed project would contribute to an increase in vehicle miles traveled (VMT) on a per-capita basis as the project would result in a housing development that would require residents to travel longer-than-average distances to meet their daily needs. As no feasible mitigation has been identified that would reduce the VMT generated by the project to 15 percent less than the local or regional average, this would be a significant and unavoidable impact. The proposed project would improve emergency access through the southwestern portion of Antioch with the construction of the Sand Creek Road connection.

Under Alternative 2, a master planned community on the same footprint as the proposed project, consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, trail staging area, parks, and the Sand Creek Road connection, would be constructed. With 277 fewer dwelling units (and approximately 900 fewer residents), Alternative 2 would still result in an estimated 8,370 (Table 6-2) new traffic trips per day, causing similar significant and unavoidable impacts to freeway on and offramps and VMT as the proposed project.

**Table 6-2: Reduced Density Alternative Trip Generation**

Scenario	Daily Trips	AM Peak-hour	PM Peak-hour
Reduced Density Alternative	8,730	508	808
Proposed Project	10,990	713	1,083
Source: Fehr & Peers 2020.			

## Utilities and Service Systems

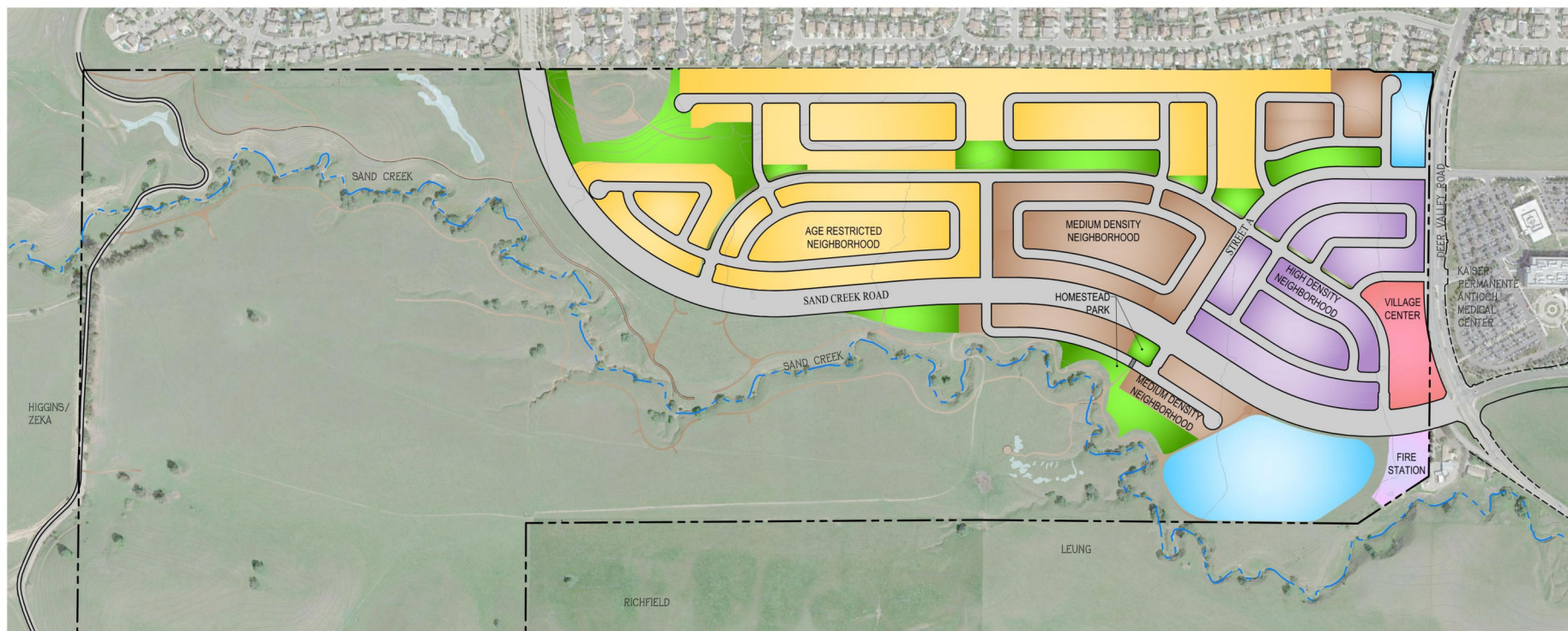
Project impacts related to utilities and service systems would be less than significant as there are sufficient electricity and natural gas supplies, water and sewer, and other services available to meet the needs of the proposed project with service providers nearby. Likewise, Under Alternative 2, a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, would be constructed. Given there would be fewer dwelling units built and thus, fewer residents, there would be less need and usage of utilities and services under Alternative 2. As such, project impacts related to utilities and service systems under Alternative 2 would be less than significant, similar to the proposed project.

## 6.4.2 - Conclusion/Relationship to Project Objectives

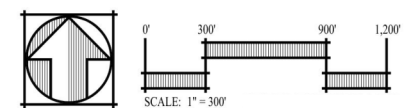
Alternative 2, the Reduced Density Alternative, would result in a master planned community consisting of up to 900 dwelling units, consisting of 478 units of low-density residential and 422 AR units, a trail staging area, fire station site, 10.00 acres of parks, and a Sand Creek Road connection. While Alternative 2 would meet the majority of the objectives of the project, due to the elimination of all medium-density dwelling units it would not provide the range of housing opportunities as the project responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types. Additionally, similar to the proposed project, Alternative 2 would require amendments to the City of Antioch General Plan and Zoning Code.

## 6.5 - Alternative 3—Reduced Footprint Alternative

Alternative 3, the Reduced Footprint Alternative, would allow a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, along with a commercial center, fire station, and parks on land north of Sand Creek only. All bridges across the creek would be eliminated, as would the trail staging area and the detention basin south of the creek. All low-density housing would similarly be eliminated (Exhibit 6-2). This alternative would replace all of the 543 low-density residential dwelling units with high-density dwelling units and increase the overall density of the site from 4.6 dwelling units per acre to 8.8 units per acre in order to obtain the full number of units.



PRODUCT & AREA SUMMARY								
TYPE	PRODUCT OR AREA TYPE	ACREAGE	% OVERALL	% RES ACREAGE	NET DENSITY (DU/AC)	AVERAGE LOT SIZE (SF)	TARGET # UNITS	% RES UNITS
	HIGH DENSITY (HD)	28	5.1%	19.9%	20	—	543	46.1%
	AGE RESTRICTED (AR)	75	13.6%	53.2%	5.6	5,000	422	35.9%
	MEDIUM DENSITY (MD)	38	6.9%	26.9%	5.6	4,500	212	18.0%
	RESIDENTIAL TOTAL	141	25.6%	100.0%	8.8		1,177	100.0%
	VILLAGE CENTER	5	0.9%					
	PUBLIC USE (PO) * FIRE STATION (PO-F)	2 2	0.4%	0.4%				
	PARKS (P)	20	3.6%					
	LANDSCAPE (L)	2.5	0.5%					
	OPEN SPACE (OS)	356	64.5%					
	MAJOR ROADWAYS	25	4.5%					
	TOTAL	551.5	100%					



Source: CBG Civil Engineers, February 26, 2020.



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## **Aesthetics, Light, and Glare**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—only north of Sand Creek. Under this Reduced Footprint Alternative, impacts related to the visual character of the project site would be significant and unavoidable, similar to the proposed project, because it would still convert half of the project site from grasslands to development. Thus, this alternative would not reduce impacts below the proposed project's aesthetic impacts.

## **Agriculture Resources and Forestry Resources**

The proposed project's impacts related to agriculture and forestry resources would be less than significant. Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. Under Alternative 3, impacts related to agriculture and forestry resources would also be less than significant, similar to the proposed project.

## **Air Quality**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. Project impacts related to the emission of ROGs would be significant and unavoidable with mitigation. While this Reduced Footprint Alternative might reduce the number of acres to be graded during construction, the operation of the alternative would result in similar significant and unavoidable ROG impacts. Under Alternative 3, impacts related to ROGs would be significant and unavoidable even with mitigation, similar to the proposed project.

## **Biological Resources**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—only north of Sand Creek. The proposed project's impacts related to biological resources would be less than significant with mitigation. The Reduced Footprint Alternative would not impact any of the biological resources south of Sand Creek as no development would occur there. However, this alternative would still impact a small area of the shining navarretia population requiring mitigation of that rare plant, as well as impact the isolated drainages along Deer Valley Road on the project site's eastern boundary line. All in all, Alternative 3 would have less than significant impacts to biological resources with mitigation, but fewer than the proposed project.

## **Cultural Resources and Tribal Cultural Resources**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within 141.00 acres of the 551.50-acre project site—only north of Sand Creek. The project site has archaeological and historical resources on it. There is no evidence or trace of tribal resources anywhere on the site or in the surrounding area. Alternative 3 would impact cultural resources the same as the project and any impact would be less than significant with mitigation, similar to the proposed project.

## Geology and Soils

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. The proposed project would develop north and south of the creek, while Alternative 3 would develop only north of Sand Creek. Thus, erosion impacts under the proposed project could be more extensive. Nevertheless, the proposed project would employ MM GEO-2 to address all erosion caused by the project. Any grading work and drainage improvements installed under Alternative 3 would have similar requirements to the proposed project. Similarly, regardless of where on the site homes are built, both under the proposed project and Alternative 3, a geotechnical report recommending any special requirements for foundations will be required to be prepared and reviewed by the City's building official. Thus, Alternative 3 would have similar impacts related to geology and soils to the proposed project.

## Greenhouse Gas Emissions and Energy

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. While the Reduced Footprint Alternative wouldn't extend to the south of Sand Creek, and may have less temporary construction impacts, 1,177 units would still be constructed, thus, introducing the same number of residents to the community. As such, this alternative's impacts with respect to operation would not be substantially different or lesser than the proposed project's GHG impacts.

## Hazards, Hazardous Materials and Wildfire

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—on areas north of Sand Creek. This alternative would continue to provide for the extension of Sand Creek Road to connect the terminus of Dallas Ranch Road through the site to Deer Valley Road. While constructing only north of the creek might seem less of a wildfire hazard, the site would still bound a grassland open space, and further, under Alternative 3 would include substantially more open space grassland which could be a wildfire hazard. Also, given the same number of residents would occupy the area, there would be similar impacts to hazards and hazardous materials. Accordingly, the Reduced Footprint Alternative would not reduce any of the hazards/wildfire impacts below that of the proposed project.

## Hydrology and Water Quality

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—only north of Sand Creek. The proposed project would not result in significant impacts to hydrology and water quality. While under Alternative 3, the land south of the creek would remain undeveloped, the soils in the area don't allow for substantial groundwater recharge. Similarly, erosion and water quality issues would still need to be addressed—although with one less drainage detention basin. Finally, there would not be any substantial risk of

flooding under either the project or Alternative 3. Fundamentally, impacts related to hydrology and water quality under Alternative 3 would be similar to the proposed project.

### **Land Use and Planning**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. The proposed project would allow for varied densities of housing, including executive housing, while Alternative 3 would only allow for medium and high-density housing. Both plans would include a 5.00-acre Village Center, a trail staging area, and fire station site. Both plans would require general plan and zoning amendments to ensure the exact uses would be permitted. As a result, Alternative 3, would have no fewer impacts related to land use and planning and impacts would be less than significant, similar to the proposed project.

### **Noise**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141 acres of the 551.50-acre project site. Project impacts related to noise would be less than significant with mitigation. Given Alternative 3 would not substantially vary from the proposed project operationally, it would not have fewer noise impacts than the project.

### **Population and Housing**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. The Reduced Footprint Alternative would require the relocation of the current tenant and would construct the same number of units as under the proposed project—just on a smaller footprint. Thus, this alternative's impacts on population and housing would be less than significant, similar to the project.

### **Public Services and Recreation**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—but all north of the creek. Despite the fact that no development would occur south of the creek, 20.00 acres of park would still be provided as shown on the Reduced Footprint Plan. Similarly, a fire station site would be provided. Project impacts related to public services and recreation would be less than significant with the implementation of mitigation. Under Alternative 3, impacts related to public services and recreation would be the same as the proposed project.

### **Transportation**

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—all north of Sand Creek. While fewer roadways would be constructed on the project site under this Reduced Footprint Alternative, the same number of

dwelling units and residents would be located at the site, generating approximately 9,830 daily vehicle trips (Table 6-3). Furthermore, the connection of Sand Creek Road from the terminus of Dallas Ranch Road through the site to Deer Valley Road would still occur to ensure proper traffic circulation throughout southwestern Antioch. Thus, the transportation impacts found to be significant and unavoidable under the proposed project, would be the same under Alternative 3.

**Table 6-3: Reduced Footprint Alternative Trip Generation**

Scenario	Daily Trips	AM Peak-hour	PM Peak-hour
Reduced Footprint Alternative	9,830	561	784
Proposed Project	10,990	713	1,083
Source: Fehr & Peers 2020.			

## Utilities and Service Systems

Under Alternative 3, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site—north of Sand Creek. As discussed in Chapter 3.15 of this Draft EIR, the proposed project’s impacts to utilities and service systems would be less than significant. Given the number of homes and population under Alternative 3 would be the same as under the proposed project, impacts related to utilities and service systems under alternative 3 would also be less than significant, similar to the proposed project.

### 6.5.1 - Conclusion/Relationship to Project Objectives

Under Alternative 3, the Reduced Footprint Alternative, a total of 1,177 units consisting of 543 high-density and 212 medium-density single-family dwelling units and 422 AR units, would be constructed within approximately 141.00 acres of the 551.50-acre project site. Under this Reduced Footprint Alternative, impacts related to the visual character of the project site would be significant and unavoidable, similar to the proposed project, because it would still convert half of the project site from grasslands to development. Likewise, because the same number of housing units and residents would be introduced to the area, impacts to air, GHGs, hazards, noise, traffic, and utilities would be the same as the project’s impacts. Impacts related to public services would be less than the proposed project. However, because the development footprint would be reduced, impacts to biological resources and open space would be less than the proposed project. Nevertheless, Alternative 3 would meet only some the objectives of the project, because it would eliminate the trail staging area, and thus not facilitate visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system. Further, it would not provide low-density, executive housing options.

## 6.6 - Alternative 4—Reduced Traffic Alternative

Alternative 4, the Reduced Traffic Alternative, 1,177 residential dwelling units would be constructed on 253.50 acres of the 551.50-acre site. This alternative would reduce the proposed low-density

residential units from 543 to 218 and increase the proposed AR units from 422 to 747. The overall density of the site would remain 4.6 dwelling units per acre. The total amount of open space, parks, landscaping, the Village Center, and fire station site would remain the same as the proposed project (Exhibit 6-3).

### **Aesthetics, Light, and Glare**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. The proposed project's impacts related to visual character of the site would be significant and unavoidable as it would convert the site from undeveloped grasslands to suburban development. Alternative 4 would include the same project footprint and develop the same number of parks, homes, and amenities. Thus, this alternative's impacts related to aesthetics, light and glare would be significant and unavoidable, similar to the proposed project.

### **Agriculture Resources and Forestry Resources**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. Project impacts related to agriculture and forestry resources would be less than significant for the reasons outlined in Chapter 3.2 of this Draft EIR. Similar to the proposed project, Alternative 4 would have less than significant impacts related to agriculture and forestry resources.

### **Air Quality**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. As discussed in Chapter 3.3, the proposed project would have significant and unavoidable air quality impacts related to ROG emissions from construction and operation of the proposed project. Under Alternative 4, it is anticipated that increasing the AR units by 325 could result in lower traffic, and thus, associated emissions. However, Alternative 4 would be expected to have the same significant and unavoidable ROG emission impact because it would have relatively the same construction footprint and therefore would result in a similar level of area source emissions. The majority of operational ROG emissions from area sources is from consumer products. Specifically, the related area sources of ROG emissions include degreasers for the proposed parking lots and pesticide/fertilizers for the proposed public parks and landscaped areas.

### **Biological Resources**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre site. Project impacts related to biological resources would be less than significant with mitigation. Because Alternative 4 would be built out with the same footprint as the proposed project, it would have the same biological resource impacts as the proposed project.

## **Cultural Resources and Tribal Cultural Resources**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. Project impacts related to cultural and tribal cultural resources would be less than significant with mitigation. Because Alternative 4 would be built out with the same footprint as the proposed project, it would have the same cultural and tribal resource impacts as the proposed project.

## **Geology and Soils**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre site. As discussed in Chapter 3. 6, the proposed project would have less than significant impacts (with mitigation) related to soils and geology. Because Alternative 4 would be built out with the same footprint as the proposed project, it would have the same geology and soils resource impacts as the proposed project.

## **Greenhouse Gas Emissions and Energy**

Under Alternative 4, the overall construction footprint would be relatively the same as that of the proposed project. Furthermore, the reduced number of dwelling units and the associated reduction in project trips would be minimal and would be expected to result in a minimal reduction in GHG emissions compared to the emissions estimated for the proposed project. Any reduction would not be expected to reduce overall project operational emissions in the year 2030 to below the threshold of 2.6 MT CO<sub>2</sub>e/year/service population and, therefore, mitigation would still be required. Mitigation measure GHG-1 requires the installation of solar panels, electric vehicle charging stations and the like; however, there is no guarantee these measures will reduce emissions to below the threshold. As such, this alternative's GHG impact is expected to also be significant and unavoidable.

## **Hazards and Hazardous Material and Wildfire**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site on the same footprint as the proposed project. Project related impacts to hazards, hazardous materials, and wildfire would be less than significant with mitigation. Because Alternative 4 would be built out with the same footprint and have the same number of units, it would have the impacts related to hazards, hazardous materials, and wildfire as the proposed project.

## **Hydrology and Water Quality**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site on the same footprint and with the same number of units, parks, fire station site and commercial center. Project related impacts to hydrology and water quality would be less than significant. Because Alternative 4 would be built out with the same footprint with the same impervious areas and number of units, it would have the same less than significant hydrological and water quality impacts, similar to the proposed project.

## **Land Use and Planning**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site on the same footprint and with the same number of units, parks, fire station site and commercial center. Project impacts related to land use and planning would be less than significant. Because Alternative 4 would be built out with almost identical land uses as the proposed project, it would have the same less than significant land use and planning impacts, similar to the proposed project.

## **Noise**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium, and 747 AR dwelling units would be constructed within the 551.50-acre project site. As discussed in Chapter 3.11, the proposed project's impacts related to noise would be less than significant with mitigation. Under Alternative 4, impacts related to noise would not substantially vary from those considered under the proposed project and would be less than significant with mitigation, similar to the proposed project.

## **Population and Housing**

As discussed in Chapter 3.12, the proposed project's related impacts to population and housing would be less than significant as it would not displace a substantial number of residents, demolish existing housing or result in unplanned population growth. Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. Because the same number of housing units would be constructed under Alternative 4, impacts related to population and housing would be less than significant, similar to the proposed project.

## **Public Services and Recreation**

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. A fire station site and Village Center area would also be provided. Project impacts related to public services and recreation would be less than significant with the implementation of mitigation. While there would be 325 more AR units built under Alternative 4, impacts related to police services and parks would likely be less than the proposed project, and the same or slightly higher with regard to fire services.

## **Transportation**

The proposed project would result in significant and unavoidable impacts to freeway on and offramps and intersections outside of Antioch due to approximately 10,990 vehicle trips per day. It would also result in significant and unavoidable VMT given commutes for working adults.

Alternative 4 proposes a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units. The purpose of this alternative was to attempt to reduce traffic impacts while still reaching a feasible number of dwelling units to support the necessary infrastructure for the project. With a majority of the housing being age-restricted, it is anticipated that vehicle trips would be reduced to 9,310 trips per day from 10,990 trips per day under the proposed project, approximately 1,680 fewer trips (Table 6-4). This level of trip reduction and change in housing types would not reduce

the significant transportation impacts expected to occur with the project to a less-than-significant level.

**Table 6-4: Reduced Traffic Alternative Trip Generation**

Scenario	Daily Trips	AM Peak-hour	PM Peak-hour
No Project, No Development Alternative	9,310	550	858
Proposed Project	10,990	713	1,083
Source: Fehr & Peers 2020.			

### Utilities and Service Systems

Under Alternative 4, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre project site. The 5.00-acre commercial site and fire station site would also be included in this alternative. Project impacts related to utilities and service systems would be less than significant. Under Alternative 4, a majority of the housing in the development would be for seniors aged 55 and older. Typically, these households contain fewer people and use less water, wastewater, energy, and the like. Thus, this alternative would have the same or fewer impacts related to utilities and service systems than the proposed project.

#### 6.6.1 - Conclusion

Under Alternative 4, the Reduced Traffic Alternative, a total of 1,177 units consisting of 218 low-density, 212 medium-density, and 747 AR dwelling units would be constructed within the 551.50-acre site. Because additional AR units would be added under this alternative, impacts such as traffic, police services, and wastewater needs would be less than the proposed project. Additionally, impacts related to public services and recreation would be less than significant with mitigation. However, Alternative 4 would not meet all objectives of the project because it would not provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.



Source: CBG Civil Engineers, February 26, 2020.

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## 6.7 - Environmentally Superior Alternative

CEQA Guidelines Section 15126(e)(2) requires identification of an environmentally superior alternative. If the No Project Alternative is environmentally superior, CEQA requires selection of the “environmentally superior alternative other than the No Project Alternative” from among the proposed project and the alternatives evaluated.

To identify the environmentally superior alternative in accordance with the CEQA Guidelines, Table 6-5 presents a comparison of the impacts related to the alternatives. As shown in Table 6-5, the No Project/No Build Alternative would result in no impacts caused by the construction and operation of the proposed project and would be the environmentally superior alternative. However, the No Project/No Build Alternative does not meet any of the project objectives. Thus, another environmentally alternative must be selected.

Alternative 2, the Reduced Density Alternative, would involve the construction of 900 residential dwelling units consisting of a maximum total of 478 single-family dwelling units and 422 AR units on approximately 253.5 acres of the 551.50-acre site. This alternative would reduce the overall residential density of the site from 4.6 dwelling units per acre to 3.5 dwelling units per acre by eliminating all medium-density dwelling units from the site plan. Alternative 2 would meet some, but not all, of the proposed project objectives because it would not provide the range of housing opportunities as the project and would not be as responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.

Alternative 3, the Reduced Footprint Alternative, would involve the construction of 1,177 residential dwelling units on approximately 141 acres of the 551.50-acre site. This alternative would replace all of the proposed project’s 543 low-density residential dwelling units with high-density dwelling units and increase the overall density of the site from 4.6 dwelling units per acre to 8.8 units per acre. Development of the Reduced Footprint Alternative would occur north of Sand Creek on approximately 195.5 acres and protect approximately 356 acres as open space in comparison with approximately 229.5 acres of open space in the proposed project. It would, therefore, reduce impacts to biological resources and some cultural resources. Alternative 3 would meet some, but not all objectives of the project, because it would eliminate the trail staging area and thus not facilitate visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system.

Alternative 4, the Reduced Traffic Alternative, would involve the construction of 1,177 residential dwelling units on 253.5 acres of the 551.50-acre site. This alternative would reduce the proposed low-density residential units from 543 to 218 and increase the proposed AR units from 422 to 747. The overall density of the site would remain 4.6 dwelling units per acre. While this alternative would reduce traffic trips by 1,680 trips per day, and thus, also reduce air and noise impacts, off-site traffic impacts would remain significant and unavoidable due to the fact that they would require the same improvements outside the jurisdiction of the City of Antioch. Alternative 4 would meet some, but not all objectives of the project, because it would not provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.

The environmentally superior alternative is Alternative 3, the Reduced Footprint Alternative, because this alternative would reduce biological and cultural resource impacts compared to the proposed project, while also meeting most of the project objectives, as shown in Table 6-6.

**Table 6-5: Summary of Alternatives**

Environmental Topic Area	Project	Alternative 1 No Project	Alternative 2 Reduced Density	Alternative 3 Reduced Footprint	Alternative 4 Reduced Traffic
Aesthetics, Light, and Glare	SU	NI	SU	SU	SU
Agriculture Resources and Forestry Resources	LTS	NI	LTS	LTS	LTS
Air Quality	SUM	SUM	SUM	SUM	SUM
Biological Resources	LTSM	NI	LTSM	LTSM	LTSM
Cultural Resources and Tribal Cultural Resources	LTSM	NI	LTSM	LTSM	LTSM
Geology and Soils	LTSM	NI	LTSM	LTSM	LTSM
Greenhouse Gas Emissions and Energy	SUM	NI	SUM	SUM	SUM
Hazards and Hazardous Materials and Wildfire	LTSM	NI	LTSM	LTSM	LTSM
Hydrology and Water Quality	LTS	NI	LTS	LTS	LTS
Land Use and Planning	LTS	NI	LTS	LTS	LTS
Noise	LTSM	NI	LTSM	LTSM	LTSM
Transportation	SUM	NI	SUM	SUM	SUM
Population and Housing	LTS	NI	LTS	LTS	LTS
Public Services and Recreation	LTSM	NI	LTSM	LTSM	LTSM
Utilities and Service Systems	LTS	NI	LTS	LTS	LTS
Notes: NI= No Impact LTS = less than significant LTSM = less than significant with mitigation incorporated SU = significant and unavoidable SUM = significant and unavoidable with mitigation incorporated Source: Compiled by FCS in 2019.					

**Table 6-6: Summary of Alternative’s Meeting of Project Objectives**

Objective	Project	No Project Alternative	Reduced Density Alternative	Reduced Footprint Alternative	Reduced Traffic Alternative
Develop a project consistent with the West Sand Creek Open Space Protection, Public Safety Enhancement, and Development Restriction Initiative.	All	None	Some	Some	Some
Establish a 551.50-acre, well-planned community, which incorporates the natural, historic, and physical elements of the land and the surrounding uses.	All	None	Some	Some	Some
Design a land use plan with a mix of uses complementary to existing neighborhoods and in symmetry with the larger Antioch community.	All	None	Some	Some	Some
Provide housing opportunities responsive to the needs of Antioch, the region and market conditions, to serve a range of family incomes and household types.	All	None	Some	Some	Some
Provide a Village Center adjacent to Deer Valley Road and across from the Kaiser Permanente Antioch Medical Center, functioning as a hub of activity and source of sales tax revenue.	All	None	Some	Some	Some
Preserve and protect the hills and hillsides on-site as permanent open space.	All	None	Some	Some	Some
Preserve and protect the Sand Creek corridor as permanent open space and provide public access with perimeter trails and crossings.	All	None	Some	Some	Some
Provide a pedestrian-friendly community that focuses on open space, parks, and trails to facilitate resident and visitor access to natural and historical experiences both on- and off-site in the East Bay Regional Parks system.	All	None	Some	Some	Some
Provide a land use plan with a balance of uses and density that results in an adequate tax base, which at project build-out generates financial resources to pay for public services and infrastructure without financial burden to existing residents.	All	None	Some	Some	Some
Provide a land use plan, design standards, and guidelines consistent with the City of Antioch General Plan goals and policies, that incorporate market-acceptable design features and promotes an attractive, well-maintained community.	All	None	Some	Some	Some

**Table 6-6 (cont.): Summary of Alternative’s Meeting of Project Objectives**

Objective	Project	No Project Alternative	Reduced Density Alternative	Reduced Footprint Alternative	Reduced Traffic Alternative
Establish a land use and circulation system that promotes convenient mobility, completes the extension of Dallas Ranch Road to Deer Valley Road, and provides modes of transportation within a setting that is safe, accessible, and convenient for all modes of travel.	All	None	Some	Some	Some
Provide a comprehensive infrastructure system, including parks, open space, stormwater quality facilities, public services, roadways, and utilities infrastructure sized to serve the proposed project and properties to the east and south in the Sand Creek Focus Area that complements the existing citywide infrastructure and ensures funding for the on-going maintenance needs of such infrastructure.	All	None	Some	Some	Some
Source: City of Antioch, 2019.					

## CHAPTER 7: PERSONS AND ORGANIZATIONS CONSULTED/LIST OF PREPARERS

### 7.1 - CEQA Lead Agency

#### 7.1.1 - City of Antioch

##### Community Development Department—Planning Division

Planning Manager..... Alexis Morris

##### Public Works Department

Director/City Engineer ..... Jon Blank, PE

### 7.2 - Other Agency CEQA Support

#### 7.2.1 - The City of Antioch Police Department

Administrative Lieutenant ..... Tarra Mendes

#### 7.2.2 - Contra Costa County Fire Protection District

Fire Chief..... Lewis Broschard

Interim Assistant Fire Chief..... Mike Quesada

#### 7.2.3 - Antioch Unified School District

Executive Assistant ..... Kellie Cavallaro

#### 7.2.4 - Contra Costa County Library

County Librarian ..... Melinda Cervantes

#### 7.2.5 - The City of Antioch Recreation Department

Director..... Nancy Kaiser

### 7.3 - Project Applicant

#### 7.3.1 - Richland Communities

Director, Land Entitlements..... Kyle Masters

Land Use and Permitting Counsel..... Kate J. Hart

## 7.4 - Consultants

### 7.4.1 - FirstCarbon Solutions (Environmental Impact Report)

Project Director ..... Mary Bean  
Project Manager..... Angela Wolfe  
Senior Noise Specialist ..... Phil Ault  
Noise Specialist ..... Eric Soycher  
Senior Cultural Resources Specialist ..... Dana DePietro, PhD, RPA  
Senior Air Quality Specialist ..... Jason Paukovits  
Air Quality Specialist ..... Kimber Johnson  
Biologist..... Robert Carroll  
Environmental Analyst ..... Brittany Hagen  
Environmental Analyst ..... Spencer Pignotti  
Environmental Analyst ..... Kathleen McCully  
Senior Editor..... Susie Harris  
Word Processor ..... Ericka Rodriguez  
GIS/Graphics ..... Karlee McCracken  
Reprographics ..... Octavio Perez

### 7.4.2 - ENGEO, Inc. (Geotechnical Report)

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Professional Engineer..... Cale Crawford, PE  
Engineer in Training..... Victoria Drake, EIT

### 7.4.3 - H.T Harvey & Associates (San Joaquin Kit Fox Survey)

Principal in Charge ..... Brian B. Boroski  
Senior Wildlife Ecologist..... Jeff Seay

### 7.4.4 - ECorp Consulting, Inc. (Biological Resources Assessment)

Biologist..... Ariel Miller  
Biologist..... Dustin Brown  
Biologist..... Clay DeLong  
Biologist..... Emily Mecke

### 7.4.5 - Live Oak Associates (Impacts to Waters of the United States)

Wildlife/Plant/Wetland Ecologist..... Jeff Gurule

### 7.4.6 - Monk & Associates (Rare Plant Surveys)

Biologist..... Sarah Lynch  
Biologist..... Christy Owens  
Biologist..... Bridgett Downs  
Biologist..... Sadie McGarvey

#### **7.4.7 - Madrone Ecological Consulting (Updated Biological Resources Assessment)**

Senior Biologist ..... Daria Snider  
Senior Biologist/Regulatory Specialist ..... Dustin Brown  
Senior Biologist ..... Bonnie Peterson, CPESC, QSP/QSD  
Biologist ..... Matthew Shaffer

#### **7.4.8 - Tom Origer & Associates (Cultural Resources Survey)**

Cultural Resources Specialist ..... Julianne Mercer  
Cultural Resources Specialist ..... Janine Origer  
Cultural Resources Specialist ..... Vicki Beard

#### **7.4.9 - Ed Brennan Consulting Arborist (Tree Survey)**

Consulting Arborist ..... Ed Brennan

#### **7.4.10 - West Yost Associates (Urban Water Management Plan, Water Supply Assessment)**

Project Manager ..... James Connell, PE  
QA/QC Review ..... Elizabeth Drayer, PE

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