PUBLIC DRAFT REPORT

Underground Flow Equalization System Project Environmental Impact Report

SCH# 2018092013

Prepared for

City of San Mateo

March 2019

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

Executive Summary

This Draft Environmental Impact Report (Draft EIR) has been prepared by the City of San Mateo (City) pursuant to Title 14 of California Code of Regulations (CCR) Section 15161 to identify and analyze the anticipated environmental impacts of the Underground Flow Equalization System (UFES or Project) at the San Mateo County Event Center site. The proposed Project is a component of the City's Clean Water Program (CWP), which consists of a series of capital projects to upgrade and increase the capacity of its wastewater collection system and wastewater treatment plant (WWTP). In 2015 and 2016, the City prepared a program-level California Environmental Quality Act (CEQA) review of the CWP, which was adopted by the City Council in June 2016 (2016 Final PEIR) (SCH. 2015032006). A key objective of the CWP is to help to increase the capacity of the City's collection system to eliminate sanitary sewer overflows (SSOs) and meet current and future regulatory requirements. A complete description of the proposed Project objectives is described in Chapter 1, *Introduction*, and a full Project description is provided in Chapter 2.

Project Description

The proposed Project consists of a concrete holding structure, pump station, odor control equipment room, diversion sewers, and force main. These facilities would be located underground. An electrical building with a 175-kilowatt (kW) emergency backup generator, access hatches, and vents for treated air would be located at or above ground level. The holding structure is a self-cleaning underground basin with a storage capacity of approximately 5.3 million gallons (MG). During storm events, diversion sewers would route wet weather flows from the existing sewers to the holding structure via two new diversion sewer pipelines. The holding structure would store excess flows up to 24 hours after the storm event subsides. An effluent pump station would then pump the stored water back into the collection system via an 18-inch-diameter pressure pipeline (force main) when the downstream collection system has available capacity. The holding structure would also be used by the City to temporarily divert and hold dry weather flows during routine operations and maintenance activities. The holding structure would include an odor control system to provide adequate capture and treatment of foul air associated with operation. The City would conduct routine checking and periodic maintenance of the holding structure and diversion sewers.

It is expected that Project construction would begin in the year 2020. The holding structure and diversion pipelines would be constructed simultaneously over an approximate 25-month period.

Summary of Impacts and Mitigation Measures

Potential environmental impacts are evaluated throughout Chapters 3 through 17 of this document and are summarized in **Table ES-1** at the end of this Executive Summary. Several types of impacts have the potential to occur during the construction and operation of the proposed Project. The majority of potential impacts can be mitigated to a less-than-significant level by following the detailed mitigation measures presented in this document, with the exception of noise and vibration impacts due to construction. Mitigation measures, including implementing construction noise minimization measures, operating a construction noise hot line, and resolving construction noise complaints, are proposed to reduce these impacts but they are anticipated to be significant after mitigation. Based on the analysis in Chapters 3 through 17, there are no other environmental effects that cannot be mitigated to a less-than-significant level.

Cumulative and growth-inducing impacts are discussed in Chapter 18. Similar to the proposed Project, all potential cumulative impacts would be reduced to a less-than-cumulatively-considerable level, except for construction noise and vibration. The proposed Project is expected to result in significant and unavoidable construction noise and vibration impacts, which could be cumulatively considerable. The proposed Project would not induce population growth or result in growth-inducing impacts.

Areas of Controversy

The proposed Project is in line with the City's CWP primary objective to help increase the capacity of its collection system to eliminate SSOs and meet current and future regulatory requirements. While implementation of the proposed Project is expected to help effectively meet this and other objectives detailed in Chapter 1, there are still several areas of controversy. Primarily, there is mixed community acceptance of additional construction in the general vicinity of the Project. The proposed Project would include construction of a new, underground holding structure over an approximate 2-year period. Concerns range from air quality, noise, subsidence, and traffic during construction to concerns about, contamination and odor during operations. For additional discussion, see the summary of scoping comments in Section 1.3 of this document.

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Chapter 3. Aesthetics		
Impact 3-1. Would the proposed Project have the potential to conflict with applicable zoning and other regulations governing scenic quality?	None required	No impact
Impact 3-2. Would the proposed Project have the potential to create a new source of substantial light or glare?	Mitigation Measure 3-3a. Design lighting to minimize impacts on adjacent areas.	Less than significant with mitigation
Chapter 4. Air Quality		
Impact 4-1. Would the proposed Project conflict with or obstruct implementation of an applicable air quality plan or result in a cumulatively considerable net increase of any criteria pollutant?	None required	Less than significant
Impact 4-2. Would the proposed Project expose sensitive receptors to substantial pollutant concentrations?	None required	Less than significant
Impact 4-3. Would the proposed Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	None required	Less than significant
Chapter 5. Biological Resources		
Impact 5-1. Would implementation of the proposed Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species?	None required	Less than significant
Impact 5-2. Would implementation of the proposed Project interfere with the movement of fish or wildlife species?	Mitigation Measure 10-1. Install and apply erosion control and stormwater best management practices during construction. Mitigation Measure 10-2. Obtain discharge permits to comply with discharge requirements. Mitigation Measure 5-2. Protection for Nesting Raptors and Other Native Birds.	Less than significant with mitigation

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Impact 5-3. Would implementation of the proposed Project require the removal of heritage trees and potentially conflict with the City of San Mateo Heritage Tree Ordinance?	Mitigation Measure 5-3. Obtain a street tree trimming/removal permit.	Less than significant with mitigation
Impact 5-4. Would implementation of the proposed Project conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other plan?	None required	No Impact
Chapter 6. Cultural Resources		
Impact 6-1. Would the proposed Project cause a substantial adverse change in the significance of a historic resource or archeological resource pursuant to CEQA §15064.5?	Mitigation Measure 6-1b. Halt construction if archaeological resources discovered; Mitigation Measure 6-1c. Conduct worker environmental awareness training Mitigation Measure 6-1d. Designate qualified archaeologist to conduct full-time monitoring of all ground-disturbing activities during construction.	Less than significant with mitigation
Impact 6-2. Would the proposed Project destroy a unique paleontological resource or site or unique geologic feature?	Mitigation Measure 6-2. Halt construction if paleontological resources are discovered.	Less than significant with mitigation
Impact 6-3. Would the proposed Project disturb human remains?	Mitigation Measure 6-3. Protect human remains upon discovery	Less than significant with mitigation
Chapter 7. Geology and Soils		
Impact 7-1. Would implementation of the proposed Project directly or indirectly cause potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic shaking, and/or seismic-related ground failure, including liquefaction and landslides?	None required	Less than significant
Impact 7-2. Would implementation of the proposed Project result in substantial soil erosion or loss of topsoil?	Mitigation Measure 7-2. Comply with regulations and policies for erosion control.	Less than significant with mitigation

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Impact 7-3. Would the proposed Project be located on a geologic unit or soil that is unstable or that would become unstable as a result of the Project, potentially resulting in onsite or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse?	Mitigation Measure 7-3a. Measures to Reduce Dewatering-related Settlements Mitigation Measure 7-3b. Measures to Reduce Shoring-related Settlements	Less than significant with mitigation
Impact 7-4. Would the proposed Project be located on expansive soils, creating substantial direct or indirect risks to property?	None required	Less than significant
Chapter 8. Greenhouse Gases		
Impact 8-1. Would the proposed Project generate GHG emissions either directly or indirectly that may have a significant effect on the environment?	None required	Less than significant
Impact 8-2. Would the proposed Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?	None required	Less than significant
Chapter 9. Hazards and Hazardous Materials		
Impact 9-1. Would construction of the proposed Project expose the public or the environment to hazardous materials through routine use, transport, or disposal of hazardous materials or reasonably foreseeable upset and accident conditions involving the release of hazardous materials?	None required	Less than significant
Impact 9-2. Would the proposed Project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?	Mitigation Measure 9-2. Perform a Phase II Assessment as needed and remediate, control, or dispose of contaminated materials as appropriate.	Less than significant with mitigation
Impact 9-3. Would construction and operation of the proposed Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or wastes within 0.25 mile of an existing school?	Mitigation Measure 9-2. Perform a Phase II Assessment as needed and remediate, control, or dispose of contaminated materials as appropriate.	Less than significant with mitigation

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Impact 9-4. Would implementation of the proposed Project interfere with an adopted emergency response plan or emergency evacuation plan?	Mitigation Measure 9-4. Coordinate emergency services during construction.	Less than significant with mitigation
Chapter 10. Hydrology and Water Quality		
Impact 10-1. Would the proposed Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	None required	Less than significant
Impact 10-2. Would the proposed Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	Mitigation Measure 10-2. Install and apply erosion control and stormwater best management practices during construction. Mitigation Measure 10-2a. Obtain a discharge permit to comply with discharge requirements.	Less than significant with mitigation
Impact 10-3. Would the proposed Project substantially alter the existing drainage pattern of the site or area or increase the amount of surface runoff, or provide substantial additional sources of polluted runoff; or impede or redirect flood flows?	Mitigation Measure 10-2. Install and apply erosion control and stormwater best management practices during construction	Less than significant with mitigation
Chapter 11. Land Use		
Impact 11-1. Would the proposed Project include development that could divide an established community?	None required	No impact
Impact 11-2. Would implementation of the Project 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?	Mitigation Measure 11-2. Obtain approval for a special use permit.	Less than significant with mitigation
Impact 11-3. Would implementation of the Project conflict with habitat or natural conservation plans?	None required	No Impact

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Chapter 12. Noise		
Impact 12-1. Would the proposed Project result in generation a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards or result in substantial temporary or periodic increases in ambient noise levels in the Project vicinity above existing levels?	Mitigation Measure 12-1a. Develop and implement construction noise minimization measures. Mitigation Measure 12-1b. Operate a construction noise hot line. Mitigation Measure 12-1c, Resolve construction noise complaints.	Significant and unavoidable impact
Impact 12-2. Would the proposed Project result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	None required	Less than significant
Impact 12-3. Would the proposed Project generate excessive ground-borne vibration or ground-borne noise levels?	Mitigation Measure 12-3. Incorporate vibration issues into Project construction. Mitigation Measure 12-3a. Assess and incorporate vibration monitoring and minimization measures as part of Project construction.	Less than significant with mitigation
Chapter 13. Population and Housing		
Impact 13-1. Would implementation of the proposed Project induce unplanned population growth?	None required	Less than significant
Impact 13-2. Would implementation of the proposed Project displace people or housing?	None required	Less than significant
Chapter 14. Public Services		
Impact 14-1. Would implementation of the proposed Project affect police or fire services?	Mitigation Measure 9-4. Coordinate emergency services during construction.	Less than significant with mitigation
Impact 14-2. Would implementation of the proposed Project affect hospitals, schools, and libraries?	None required	Less than significant

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Chapter 15. Recreation		
Impact 15-1. Would the proposed Project increase use of existing parks and recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	None required	Less than significant
Impact 15-2. Would the proposed Project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	None required	No Impact
Impact 15-3. Would the proposed Project affect use of existing parks or recreation facilities, inconsistent with applicable policies?	None required	Less than significant
Chapter 16. Transportation and Traffic		
Impact 16-1. Would construction of the proposed Project conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities, or conflict with or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?	Mitigation Measure 16-1. Prepare and implement a Traffic Management Plan.	Less than significant with mitigation
Impact 16-2. Would construction of the proposed Project conflict with an applicable congestion management program including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	Mitigation Measure 16-1. Prepare and implement a Traffic Management Plan.	Less than significant with mitigation
Impact 16-3. Would implementation of the proposed Project substantially increase hazards due to a geometric design feature (e.g., sharp curve or dangerous intersection) or incompatible uses?	Mitigation Measure 16-1. Prepare and implement a Traffic Management Plan.	Less than significant with mitigation

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Impact 16-4. Would implementation of the proposed Project result in inadequate emergency access?	Mitigation Measure 9-4. Coordinate emergency services during construction. Mitigation Measure 16-1. Prepare and implement a Traffic Management Plan.	Less than significant with mitigation
Impact 16-5. Would implementation of the proposed Project conflict with adopted policies, plans, or programs regarding public transit, bicycle, and pedestrian facilities or otherwise decrease the performance or safety of such facilities?	Mitigation Measure 16-1. Prepare and implement a Traffic Management Plan.	Less than significant with mitigation
Impact 16-6. Would operation of the proposed Project result in a significant traffic increase in conflicts with local plans, policies, and ordinances?	None required	Less than significant
Chapter 17. Utilities		
Impact 17-1. Would implementation of the proposed Project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	None required	No Impact
Impact 17-2. Would implementation of the proposed Project have insufficient water supplies available to serve the proposed Project and reasonably foreseeable future development during normal, dry, and multiple dry years?	None required	Less than significant

Table ES-1. Summary of Impacts and Mitigation Measures
Underground Flow Equalization System Project, Environmental Impact Report

Impacts	Mitigation Measures	Level of Significance
Impact 17-3. Would implementation of the proposed Project result in a determination by the wastewater treatment provider that serves or may serve the Project that it does not have adequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments?	None required	No Impact
Impact 17-4. Would the proposed Project 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?	None required	No Impact
Impact 17-5. Would implementation of the proposed Project result in wasteful, inefficient, or unnecessary consumption of energy or conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	None required	Less than significant

Notes:

BAAQMD	=	Bay Area Air Quality Management District
CEQA	=	California Environmental Quality Act
GHG	=	greenhouse gas
LOS	=	level of service

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Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
2016 Final PEIR	2016 Final Programmatic Environmental Impact Report
AADT	average annual daily trips
AB	Assembly Bill
AC Transit	Alameda-Contra Costa Transit District
ADWF	average dry weather flow
APE	Area of Potential Effect
ARB	California Air Resources Board
ASTM	ASTM International
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit
Bay Plan	San Francisco Bay Plan
BCDC	San Francisco Bay Conservation and Development Commission
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
BMSP	Bay Meadows Specific Plan
C/CAG	City/County Association of Governments
C/OS	Conservation, Open Space, and Parks and Recreation
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal Water	California Water Service Company
Cal/OSHA	California Department of Industrial Relations, Division of Occupational Safety and Health
CalEPA	California Environmental Protection Agency
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act

CESA	California Endangered Species Act
CFP	California Fully Protected
CFR	Code of Federal Regulations
CGP	Construction General Permit
CGS	California Geological Survey
CHRIS	Northwest Information Center California Historical Resources Information System
CIP	capital improvement program
CIPP	cured-in-place pipe
City	City of San Mateo
CMP	Congestion Management Program
CNDD	California Natural Diversity Database
CNEL	community noise equivalent level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2e	CO_2-equivalent
CRHR	California Register of Historical Resources
CRS	Cultural Resources Specialist
CSCSD	Crystal Springs County Sanitation District
CWA	Clean Water Act
CWP	Clean Water Program
dB	decibel
dBA	A-weighted decibel
DNL	day-night sound level
DPM	diesel particulate matter
DTSC	Department of Toxic Substances Control
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EMID	Estero Municipal Improvement District
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
Event Center	San Mateo County Event Center
FEMA	Federal Emergency Management Agency
FESA	federal Endangered Species Act
FHWA	Federal Highway Administration

FIRM	Flood Insurance Rate Map
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
GHG	greenhouse gas
gpm	gallons per minute
HAP	hazardous air pollutants
HCM	Highway Capacity Manual
I/I	infiltration and inflow
I-280	Interstate 280
ISO	Insurance Services Office
ITP	Incidental Take Permit
kW	kilowatts
L_{dn}	day-night sound level
L_{eq}	equivalent noise level
LOS	level of service
LU	Land Use
LUST	leaking underground storage tank
Lv	vibration level
MBTA	Migratory Bird Treaty Act
MG	million gallons
mgd	million gallons per day
MTC	Metropolitan Transportation Commission
$MTCO_2e$	metric tons of carbon dioxide equivalent
MTCO2e	metric tons of carbon dioxide equivalent
MUTCD	California Manual of Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NHTSA	National Highway Traffic Safety Administration
NMFS	National Oceanic and Atmospheric Administration’s National Marine Fisheries Service
NO_2	nitrogen dioxide
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O&M	operation and maintenance

OES	Office of Emergency Services
OSHA	Occupational Safety and Health Administration
Ox Mountain	Corinda Los Trancos Landfill
PA	Shoreview Area-specific
PCE	passenger car equivalents
PG&E	Pacific Gas and Electric
PM	particulate matter
PM_{10}	particulate matter with aerodynamic diameter equal to or less than 10 micrometers
$PM_{2.5}$	particulate matter with aerodynamic diameter equal to or less than 2.5 micrometers
ppm	parts per million
PPV	Peak Particle Velocity
PRC	Public Resources Code
Project or Proposed Project	Underground Flow Equalization System Project (at the San Mateo County Event Center site)
PWA	Public Works Administration
PWWF	peak wet weather flow
RCNM User Guide	FHWA Roadway Construction Noise Model User's Guide
REC	recognized environmental condition
Recology	San Mateo County
RethinkWaste	South Bayside Waste Management Authority
ROG	reactive organic gases
ROW	right-of-way
RPS	Renewables Portfolio Standard
RTIP	Regional Transportation Improvement Program
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SamTrans	San Mateo County Transit District
San Mateo	City of San Mateo
SB	Senate Bill
SBR	South Bay Recycling
SDC	Seismic Design Category
SEMS	Standard Emergency Management System
SFBAAB	San Francisco Bay Area Air Basin

SIP	state implementation plan
SMCCCD	San Mateo County Community College District
SMFC	San Mateo Fire Department
SMFCSD	San Mateo–Foster City School District
SMPD	San Mateo Police Department
SMUHSD	San Mateo Union High School District
SO_2	sulfur dioxide
SPAR	Site Plan and Architectural Review
SPRR	Southern Pacific Railroad
SR 92	State Route 92
SR	State Route
SSC	Species of Special Concern
SSMP	Sewer System Management Plan
SSO	sanitary sewer overflow
SWPPC	Stormwater Pollution Prevention Program construction
SWPPP	stormwater pollution prevention plan
SWRCB	California State Water Resources Control Board
TOD	Transit Oriented Development
UFES	Underground Flow Equalization System
US 101	U.S. Route 101
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WPA	Works Progress Administration
WWTP	wastewater treatment plant

CHAPTER 1

Introduction

The City of San Mateo (City or San Mateo) is implementing a series of capital projects to upgrade and increase the capacity of its wastewater collection system and wastewater treatment plant, referred to collectively as the Clean Water Program (CWP). A significant collection system project is the Underground Flow Equalization System Project (UFES or Project). This chapter provides background information on the CWP and the Project and describes the relevant California Environmental Quality Act (CEQA) environmental review processes.

1.1 Background

1.1.1 Wastewater Collection System

The City of San Mateo's wastewater collection system includes approximately 234 miles of sanitary sewer pipeline, 5,555 sewer manholes, and 26 pump stations. The system conveys wastewater from all properties located within the city's limits to the City's WWTP. The system also conveys wastewater from the collection systems serving the Town of Hillsborough, City of Belmont, Crystal Springs County Sanitation District (CSCSD), and other portions of unincorporated San Mateo County.

The existing collection system infrastructure faces a number of challenges. First, the sewer pipelines are very old. The system consists primarily of sewer pipes that were constructed between 1900 and 1960. The pipes have average life span of 50 to 60 years, so most are older than the expected average life span.

Second, although the City's current minimum sewer diameter standard is 8 inches, approximately 60 percent of the existing collection system was constructed prior to this standard and includes pipes with diameters of 6 inches or smaller. Sewer mains less than 8 inches in diameter are susceptible to blockages.

Third, the collection system relies on 26 pump stations, located mostly in the eastern (flatter) half of the City, to assist in the conveyance of wastewater to the WWTP. Some of the pump stations are undersized.

Finally, the system is prone to inflow and infiltration of groundwater and surface water, particularly during rain events. Approximately 78 percent (about 180 miles) of the City's collection system was installed before 1960, with 26 percent (approximately 60 miles) installed before 1940. Prior to 1940, pipelines were often constructed in short pipe segments, requiring a higher number of pipe joints through which tree roots and water infiltrate. Improvements in pipe joints occurred around 1960, reducing infiltration. However, inflow and infiltration remain a significant problem. These challenges leave the collection system susceptible to sanitary sewer overflows (SSOs) during periods of wet weather. The City's CWP includes a number of collection system projects, including the proposed Project, that are intended to eliminate SSOs by reducing inflow and infiltration and improving the system's capacity to handle the temporary spikes in wastewater flows that occur during wet weather.

1.1.2 Wastewater Treatment Plant

Under the City's current National Pollutant Discharge Elimination System (NPDES) permit, the WWTP is permitted to discharge 15.7 million gallons per day (mgd) for average dry weather flow (ADWF). The WWTP's current ADWF is approximately 11 mgd. Future dry weather flows and loads to the WWTP were projected using a per capita method, which assumes that flows and loads will increase proportionally to the anticipate increase in population. With a 2010 census-based service area population of approximately 143,100, and assuming a 16 percent increase in population over the planning period, the 2035 service area population is estimated to be 166,400. Using this method, ADWF for the year 2035 was estimated to be 13.9 mgd (Carollo Engineers, Inc., 2014). The WWTP influent loadings are expected to increase similarly. Therefore, the City does not anticipate increasing its permitted capacity for dry conditions over the 20-year planning period.

The permitted peak wet weather flow (PWWF) for the WWTP is 40 mgd, based on secondary treatment capacity. However, flows often exceed 40 mgd during peak wet weather events. When flows exceed 40 mgd, primary and secondary effluent are blended for discharge of up to 60 mgd, which is the outfall pipeline capacity limitation. This 60-mgd limitation and the insufficient capacity of portions of the City's collection system have historically caused backups in the system, resulting in SSOs.

By 2035, it is expected that the PWWF conveyed to the plant would be 98 mgd (Carollo Engineers, Inc., 2014).

1.1.3 City of San Mateo Clean Water Program

To manage the PWWF, projects are needed that increase pump station capacity, upsize pipelines, add relief lines in the collection system, provide temporary storage (equalization) in the collection system, and increase treatment capacity at the WWTP. The San Francisco Bay Regional Water Quality Control Board (RWQCB) regulates the operation of the sanitary sewer collection system and WWTP. In March 2009, the RWQCB issued a Cease and Desist Order jointly to the City of San Mateo, Town of Hillsborough, and the CSCSD mandating elimination of SSOs in the collection system and requiring specific corrective actions. In response, the City developed a sewer system management plan that focuses on operation and maintenance (O&M) of the treatment facilities and a capital improvement program (CIP) that primarily focuses on the collection system.

In 2015, the City initiated the CWP. The CWP is being implemented to address the expected PWWF of 98 mgd by upgrading the City's collection system and WWTP. UFES is a critical component of the CWP to provide sufficient capacity in the City's collection system to reduce SSOs.

1.2 Objectives

The proposed Project is in line with the CWP objectives, and specifically helps to increase the capacity of the City's collection system to eliminate SSOs and meet regulatory requirements. The following are objectives of the CWP:

- Provide adequate system capacity to efficiently convey and treat the PWWF.
- Meet current regulatory requirements regarding blending, SSOs, and infiltration and inflow (I/I) reduction.
- Meet anticipated future regulatory requirements, including total nitrogen and total phosphorous concentrations, pathogens, and recycled water use.
- Meet San Mateo's sustainability objectives, including more efficient use of energy and recycled water.
- Provide space planning to support implementation of projects addressing the objectives above within the limitations of the sites available for WWTP facilities.

The following are specific objectives of the proposed Project:

- Provide adequate system capacity to efficiently convey and treat the PWWF, including the proposed Project for wet weather flow equalization and optimization of the existing collection system performance.

- Meet current regulatory requirements regarding SSOs. The proposed Project provides storage for the flow that contributes to SSOs.
- Provide space planning to support implementation of projects addressing the objectives above within the limitations of the sites available for WWTP facilities. The proposed Project reduces the storage needed at the WWTP.
- Improve safety and reliability of the collection system and WWTP. The proposed Project will reduce discharge of raw sewage within San Mateo and to the Bay.

1.3 California Environmental Quality Act Environmental Review Process

In 2015 and 2016, the City prepared a program-level CEQA review of the CWP, which was adopted by the City Council in June 2016 (2016 Final PEIR) (SCH. 2015032006). The 2016 Final PEIR analyzed two alternative approaches for improving the collection system and corresponding new treatment processes at the WWTP.

In adopting the 2016 Final PEIR, the City Council selected the "In-System Storage Program" alternative as the City's preferred alternative. The proposed Project is among the collection system projects described for the in-system storage approach. [1]

The 2016 Final PEIR analyzed the proposed Project at a programmatic level. In other words, it identified several potential locations for the Project, provided criteria for the site selection process and described the size and features of the facility in general terms.

This Environmental Impact Report (EIR) is being prepared to evaluate project-level environmental impacts associated with the proposed Project. State CEQA Guidelines Section 15162, provides that a EIR is warranted if the lead agency determines, among other things, that substantial changes have occurred with respect to the project or with respect to the circumstances under which the project is undertaken that will require major revisions to the previous EIR due to new significant environmental effects or an increase in the severity of a previously identified effect; or new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, becomes available and shows that the currently proposed Project will have one or more significant effects not discussed in the previous EIR. This EIR is appropriate for project-level environmental review of the proposed Project. In particular, this EIR provides substantial new information related to implementation of the proposed Project.

A Notice of Preparation (NOP) of this Draft EIR was circulated to the California State Clearinghouse, EMID, Foster City, Town of Hillsborough, City of Belmont, CSCSD, County of San Mateo, California Department of Public Health, Bay Area Air Quality Management District (BAAQMD), California Department of Fish and Wildlife (CDFW), and San Francisco RWQCB. The NOP was released to the public on September 7, 2018, for a 30-day review period. In addition, the NOP was provided in the *Examiner, San Mateo Edition* and *Daily Journal*.

The NOP listed each issue identified as significant or potentially significant and that would, therefore, require analysis in the EIR. The purpose of the NOP was to solicit comments from the public and from public agencies on issues germane to that agency that should be considered in the EIR. The NOP included a description of the proposed Project, Project location, and the following list of resource areas proposed to be addressed in the EIR: Aesthetics, Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas, Hazardous Materials, Hydrology and Water Quality, Land Use,

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[1] In the 2016 Final PEIR, the UFES Project was called the In-System Storage Facility. See Section 2.2.1.4.

Noise, Population and Housing, Public Services, Recreation, Traffic, and Utilities. Members of the public were given an additional opportunity to comment on the scope of the EIR at a public scoping meeting on October 2, 2018, at San Mateo City Hall. Comments were received during the scoping meeting and four written comment letters were received during the scoping period. Comments are summarized below by topic:

- Consideration of background conditions
- Concern about water quality surrounding the Project site both from Project construction and operations, specifically from facility failure due to cracking
- Concern about air quality, including odor, fungus in the soil that may be released during excavation, and fugitive dust, surrounding the Project site, from both Project construction and operations
- Concern about noise from construction activities and O&M activities
- Risk of Project failure, including accidental spills and cracks in the Project, due to earthquakes and/or flooding
- Concern about hazardous chemicals use during Project O&M
- Concern about traffic impacts during construction
- Concern about loss of parking for major events at Event Center during construction
- Concern about subsidence in the Project area from groundwater extraction during construction
- Contamination in soils in the Project site
- Concern about public health issues due to Project construction and operations

1.4 Uses of this Document

Consistent with CEQA requirements, the intended uses of this document are to:

- Identify potential direct and indirect environmental impacts associated with the proposed Project.
- Describe mitigation measures that avoid potentially significant impacts or reduce them to a less-than-significant level.
- Identify and evaluate the potential for growth inducement due to the proposed Project.
- Discuss potential alternatives to the proposed Project.

After review, the City will consider this Draft EIR and, if approved, the Project would move forward for detailed design and construction.

In addition, the City and other Responsible Agencies with regulatory authority would use this document to provide required CEQA review for other discretionary decisions to support the Project. Specific approvals would depend on the project and location, and may include, but are not limited to, the following:

- City of San Mateo (special use permit, site plan and architectural review [SPAR], grading or building permits)
- San Mateo County (permanent easement)
- BAAQMD (authority to construct/permit to operate)

1.5 Public Review and Comment

California Code of Regulations (CCR) Section 15087 requires that a lead agency provide public notice of the availability of a Draft EIR at the same time it sends notice to the Office of Planning and Research. Notice was provided to the Office of Planning and Research and mailed directly to property owners within 1,000 feet of any proposed Project facility location as well as individuals and agencies that requested notice in writing and submitted written comments during the scoping period. Agencies and interested members of the public will have 40 days to review and provide comments on this Draft EIR.

Written comments on the Draft EIR will be accepted from March 6, 2019, to May 7, 2019, by email to info@cleanwaterprogramsanmateo.org or U.S. Mail to the following address:

Clean Water Program
San Mateo City Hall
Public Works Engineering PMO
330 W. 20th Avenue
San Mateo, CA 94403

A digital copy of the Draft EIR is available for download on the CWP website at http://www.cleanwaterprogramsanmateo.org/. Hard copies are available for viewing at the following locations:

- City Hall, 330 West 20th Avenue
- San Mateo Main Library, 55 West 3rd Avenue (Reference Desk)
- San Mateo Marina Branch Library, 1530 Susan Court (Reference Desk)
- San Mateo Wastewater Treatment Plant, 2050 Detroit Drive.

Referenced materials used in the preparation of the Draft EIR may be reviewed upon request to the City. CDs and hard copies are available for purchase.

A public meeting on the Draft EIR will be held April 9, 2019, at 7 p.m. at 330 West 20th Avenue, San Mateo, CA 94403.

1.6 References

Carollo Engineers, Inc. 2014. *City of San Mateo Integrated Wastewater Master Plan*. Prepared for City of San Mateo. October.

City of San Mateo. 2010. *City of San Mateo General Plan – Vision 2030*. Resolution No. 134-2010. Adopted by the City Council on October 18.

Pacific Municipal Consultants. 2015. *City of San Mateo Climate Action Plan*. Prepared for City of San Mateo. February.

Description of Project

The Underground Flow Equalization System Project would equalize wet weather flows by temporarily holding excess flows upstream of the WWTP and reduce storage requirements at the WWTP during wet weather events. The Project would be located in the southeast corner of the San Mateo County Event Center (Event Center) parking lot along Saratoga Drive, approximately 800 feet southeast from the Event Center buildings. Single- and multi-family residences are situated east and south of the Project site across Saratoga Drive and 28th Avenue, and the Bay Meadows Community Park is adjacent to the south side of the Project site. The Nueva School Bay Meadows Campus is located approximately 1,000 feet southwest of the Project site. The location of the holding structure was situated in an area that would optimize reduction of SSOs in a portion of the collection system where bottlenecking frequently occurs.

The Project consists of a concrete holding structure, pump station, diversion sewers and force main, and an odor control equipment room (see **Figure 2-1** showing the layout of proposed facilities). These facilities would be located underground. Access hatches, an emergency backup generator, and an electrical building and vents for treated air would be located at ground level.

2.1 Underground Wastewater Temporary Holding Structure

The holding structure would have a storage volume of approximately 5.3 million gallons (MG). During storm events, diversion sewers would route wet weather flows from the existing sewers to the holding structure via two new diversion sewer pipelines. The holding structure would store excess flows up to 24 hours after the storm event subsides (see **Figure 2-2**). An effluent pump station would pump the stored water back into the collection system via an 18-inch-diameter pressure pipeline (force main) when the downstream collection system has available capacity (see **Figure 2-3**). The holding structure would also be used by the City to temporarily divert and hold dry weather flows during routine operations and maintenance activities.

The holding structure would be approximately 200 feet long by 150 feet wide and consist of a reinforced concrete tank buried approximately 3 to 6 feet below ground surface (bgs). The structure would include parallel self-cleaning flushing channels that flow into an effluent channel and then into the influent/effluent sump in the bottom of the pump station. Up to nine 2,000-gallon buckets would be installed to clean the structure. The buckets would fill with clean water and then tip over, forming a flushing wave across the bottom of the structure. A typical storm would require the use of three tipping buckets. The tipping buckets would use clean water via a connection to the City's water system, or recycled water, if available in the future.

Minor appurtenances, access manholes or hatches, and vents for treated air would all be at or above the ground surface. It is anticipated that manholes and removable concrete slabs for access to the tipping buckets could cover approximately 2,800 square feet, and hatches to the effluent pumps and odor control equipment would total about 1,800 square feet, for a total of approximately 3,600 square feet of at-grade or aboveground appurtenances. The electrical equipment and generator would be located above ground in a dedicated electrical building approximately 600 square feet in size. The perimeter of the Project site along Saratoga Drive and adjacent to Bay Meadows Park would have a wall or fence and landscaping outside of the wall or fence to provide screening for the site.

2.2 Effluent Pump Station

The Project includes a new effluent pump station to pump diluted wastewater back into the S. Delaware Street sewer once downstream capacity is available. The effluent pump station would also be used to dispose of the flush water expended during the cleaning cycle. The effluent pump station would consist of two submersible solids-handling pumps, each sized to deliver approximately 2,100 gallons per minute (gpm) and would discharge into two 12-inch pipes that would converge into a 16-inch discharge header. The valves and header would be housed in a combined mechanical and odor control access vault below ground, also allowing access for maintenance. The discharge header would connect to the 18-inch force main pipe that would extend from the holding structure to the nearest manhole along S. Delaware Street.

The Project would also include a new 175-kilowatt (kW) emergency diesel generator to allow processes to continue during periods of power outages. Operation of the diesel generators would be limited to 50 hours per year for testing.

2.3 Diversion Sewers and Force Main

Diversion sewers are needed to convey the diluted wastewater from two locations to the holding structure and would consist of two new diversion sewer pipelines totaling approximately 3,430 feet. The branch 1 diversion sewer pipeline consists of approximately 2,200 feet of 36-inch-diameter pipe. The diversion structure would be located within S. Delaware Street, approximately 50 feet south of the Saratoga Drive and S. Delaware Street intersection. From this diversion point, the pipeline would slope in an easterly direction along Saratoga Drive to the holding structure.

The branch 2 diversion sewer pipeline consists of approximately 1,230 feet of 36-inch-diameter pipe. The diversion structure would be located in S. Delaware Street south of the intersection with 25th Avenue and convey flow from the diversion structure north in S. Delaware Street and discharge to the branch 1 sewer at the Saratoga Drive and S. Delaware Street intersection.

An existing sanitary sewer gravity pipe would be used to convey the diluted wastewater back to the S. Delaware Street sewer. The existing pipe will be converted into a force main using Cured-In-Place (Plastic) Pipe (CIPP) technology. Short sections of new force main pipe would be constructed to tie the existing gravity pipe into the holding structure and the existing sewer main in S. Delaware Street.

2.4 Odor Control

The holding structure would include an odor control system to provide adequate capture and treatment of foul air associated with operation. The system would consist of foul air fans that draw air from each of the chambers and media vessels containing granular activated carbon for adsorption of odorous compounds. In addition, the odor control system would include fiberglass-reinforced plastic ductwork for transmission of air, control dampers, and a controls system for operation and monitoring. Treated air would be discharged through an inconspicuous 10-foot-tall stack at grade or other architectural feature (see **Figure 2-4** showing an example of a carbon scrubber on a similar facility).

In addition to odor control, the holding structure would be operated in such a way to reduce the generation of odors. Within 24 hours of a wet weather event, the structure would be pumped out and flushed, reducing the time that stored waters can become anoxic, which would help prevent the generation of noxious odors such as hydrogen sulfide (see **Figure 2-5**). Even during times when the structure is empty and idle, there is still a risk of untreated air escaping. To prevent such an occurrence, the odor control system would continue to operate during dry weather at a reduced capacity to maintain a constant negative pressure within the tank.

2.5 Maintenance

The City would conduct routine checking and periodic maintenance of the holding structure and diversion sewers. The structure would be cleaned automatically with the tipping buckets after every storm that results in an overflow. Modeling projections estimated that the holding structure could be used up to 15 times per year, depending on weather conditions, and up to five times per year to accommodate maintenance on other collection system projects. Inspection of the interior of the structure from the surface following each event would occur to verify the tipping buckets are functioning properly and solids have been flushed from the interior. The structure interior may require additional cleaning to remove grease and other debris from the interior walls with high-pressure hoses, depending on frequency of use.

The effluent pump station would be inspected and tested after each event to ensure dewatering and cleaning was properly completed. Replacement parts such as cables or gaskets are expected to be needed approximately every 5 years, with pump replacement expected approximately every 25 years.

Diversion sewers between the diversion structures and holding structure would be cleaned semiannually and would be inspected every 5 years using closed-circuit television. Cleaning and inspection of the diversion structures are expected to occur semiannually.

Additionally, odor control facilities would be inspected weekly during the rainy season. Spent carbon media used in odor control devices can either be regenerated in place or replaced. It is expected that the carbon media would be replaced approximately every 5 years, or as needed based on media testing.

2.6 Project Construction

It is expected that Project construction would begin in 2020. The holding structure and diversion pipelines would be constructed simultaneously over an approximate 25-month period.

2.6.1 Underground Wastewater Temporary Holding Structure

Prior to construction, existing structures and pavement would be demolished or relocated. Up to 3 acres is expected for construction of the Project, including approximately 1 acre for the holding structure and up to 2 acres for equipment staging, soil stockpiling, and general construction activities. **Figure 2-6** provides a conceptual layout of construction disturbance areas.

2.6.1.1 Shoring Installation and Dewatering

Shoring would need to be installed around the perimeter of the area requiring excavation to support the excavation of the holding structure. Shoring would consist of sheet piles, soldier pile shoring installed with pile drivers, or secant pile shoring installed with a crane and an auger. Tiebacks may be required to support the shoring system and would be contained within the footprint of the final facility's permanent easement.

Prior to the start of excavation, up to 15 dewatering wells would be installed approximately 50 feet apart around the holding structure to reduce groundwater intrusion during excavation. The wells would lower the groundwater as the excavation proceeds. Monitoring wells would also be installed to monitor groundwater levels surrounding the Project site during dewatering. Once the bottom of the excavation is reached, a concrete pad would be poured to limit groundwater inflow from the bottom of the excavation for the holding structure. The purpose of the concrete pad would be to block the temporary flow of groundwater, although the pad would be left in place as the base for the construction of the concrete structure. Dewatering water would be disposed of in accordance with state and federal requirements.

2.6.2 Diversion Sewers and Force Main

It is expected that the diversion sewer pipeline would be installed via traditional open cut methods. Construction would require an approximate 10-foot buffer on either side of the trench. Trench dewatering is likely due to the depth of the sewer and the height of the groundwater table in the area. Depending on the soil and amount of water, the contractor may drill well points, which are shallow wells spaced along the pipeline to lower the groundwater level to just below the trench bottom, or pump groundwater directly out of the construction trench.

The force main will be an existing pipeline that will be rehabilitated in place using CIPP technology and will be completed using trenchless technology.

2.6.3 Construction Traffic

Construction traffic would access the holding structure site via Saratoga Drive from S. Delaware Street and/or Hillsdale Boulevard. Truck traffic exiting the site would use Saratoga Drive to Hillsdale Boulevard to access U.S. Route 101 (US 101). Construction vehicles would enter and exit the holding basin site via a newly constructed access drive on Saratoga Drive. Once construction is complete, the access drive would be the primary entry point for periodic City maintenance vehicles. Construction workers would park in a temporary construction easement area at the Event Center. Average daily construction activities would require 20 to 30 workers onsite and two to three major pieces of equipment (crane, excavators, pile installation equipment, or concrete pumpers).

Activities requiring maximum workers and truck traffic would include site excavation, backfill, and concrete pours. The maximum construction traffic on any given day could be up to 30 onsite workers (equivalent to 60 vehicle trips), plus approximately 100 truck trips for the delivery of concrete or hauling away excavated material, for a maximum daily total of 160 truck trips.
Diversion sewer pipeline and effluent force main construction would likely require a crew of about eight workers and up to approximately 30 truck trips per day hauling away excavated material and importing gravel for the pipeline bedding and backfill. Given that pipeline construction and holding structure construction could take place simultaneously, it is expected that as many as 206 vehicle trips could occur cumulatively each day during construction.

2.6.4 Disposal of Excavated Material

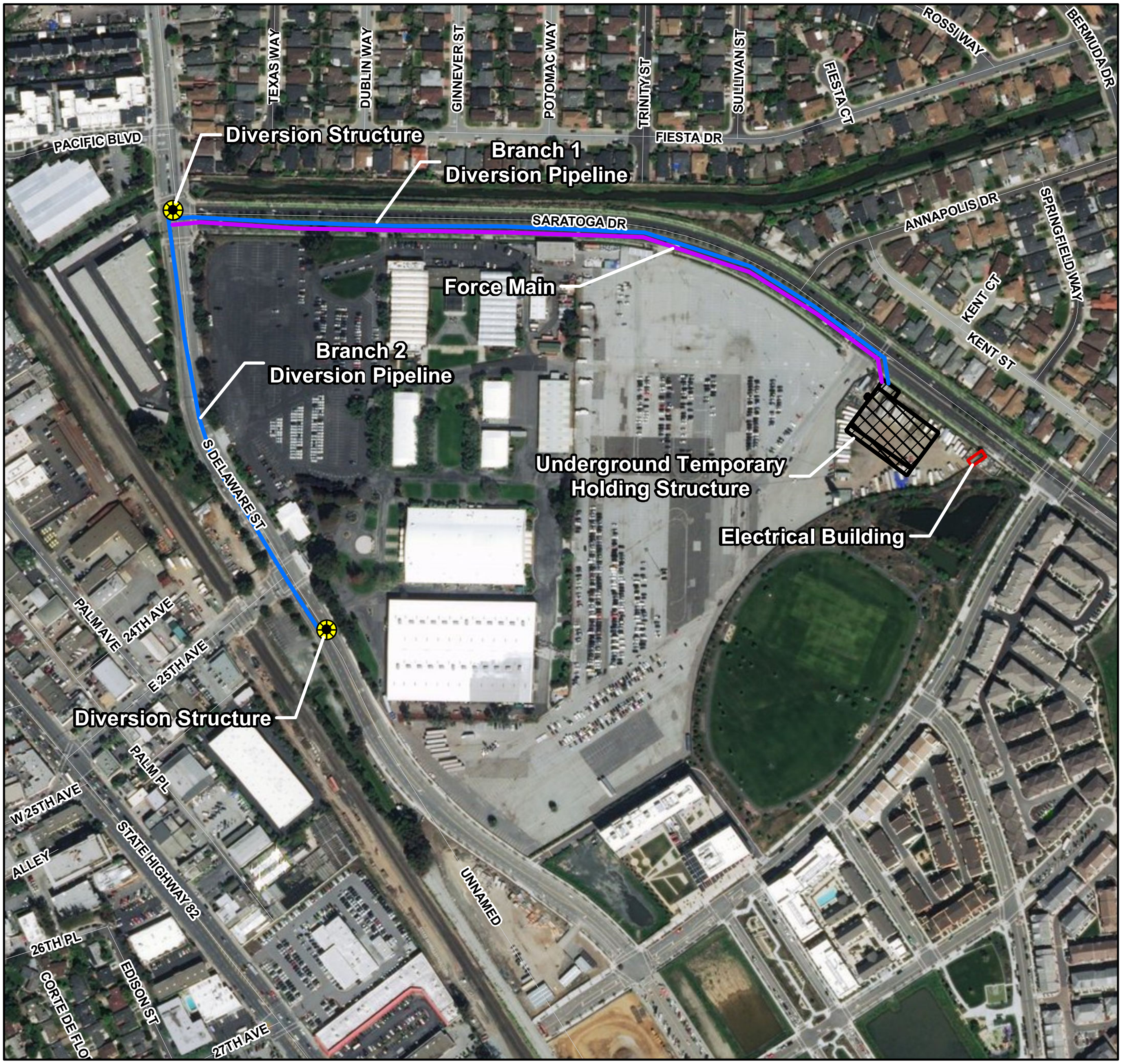
Construction of the Project would require removal of approximately 75,000 cubic yards of soil. Contaminated soil would be disposed of in accordance with state and federal regulations. Up to 60 percent of the construction debris would be reused, in accordance with the City’s municipal code. Remaining construction waste would be disposed of at an appropriate licensed facility.

2.6.5 Site Restoration

All areas disturbed by construction activities would be restored in compliance with applicable codes, ordinances, and plans. When feasible, existing walkways, landscape materials, and landscape irrigation systems would be preserved and protected during construction. New groundcovers, shrubs, trees, and irrigation systems would be provided, as necessary. Existing parking areas and sidewalks that were disturbed or removed to accommodate construction would be restored or replaced as necessary.

2.6.6 Construction Schedule

Construction is expected to begin in 2020 and last up to 25 months. It is assumed that all work would be conducted Monday through Friday, within a normal 8-hour shift between 7 a.m. and 7 p.m., and no construction activities would occur during the evening or weekends without prior approval by the City. A general construction schedule is provided in **Figure 2-7**.



Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

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Feet

VICINITY MAP

FIGURE 2-1
Underground Flow Equalization System
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

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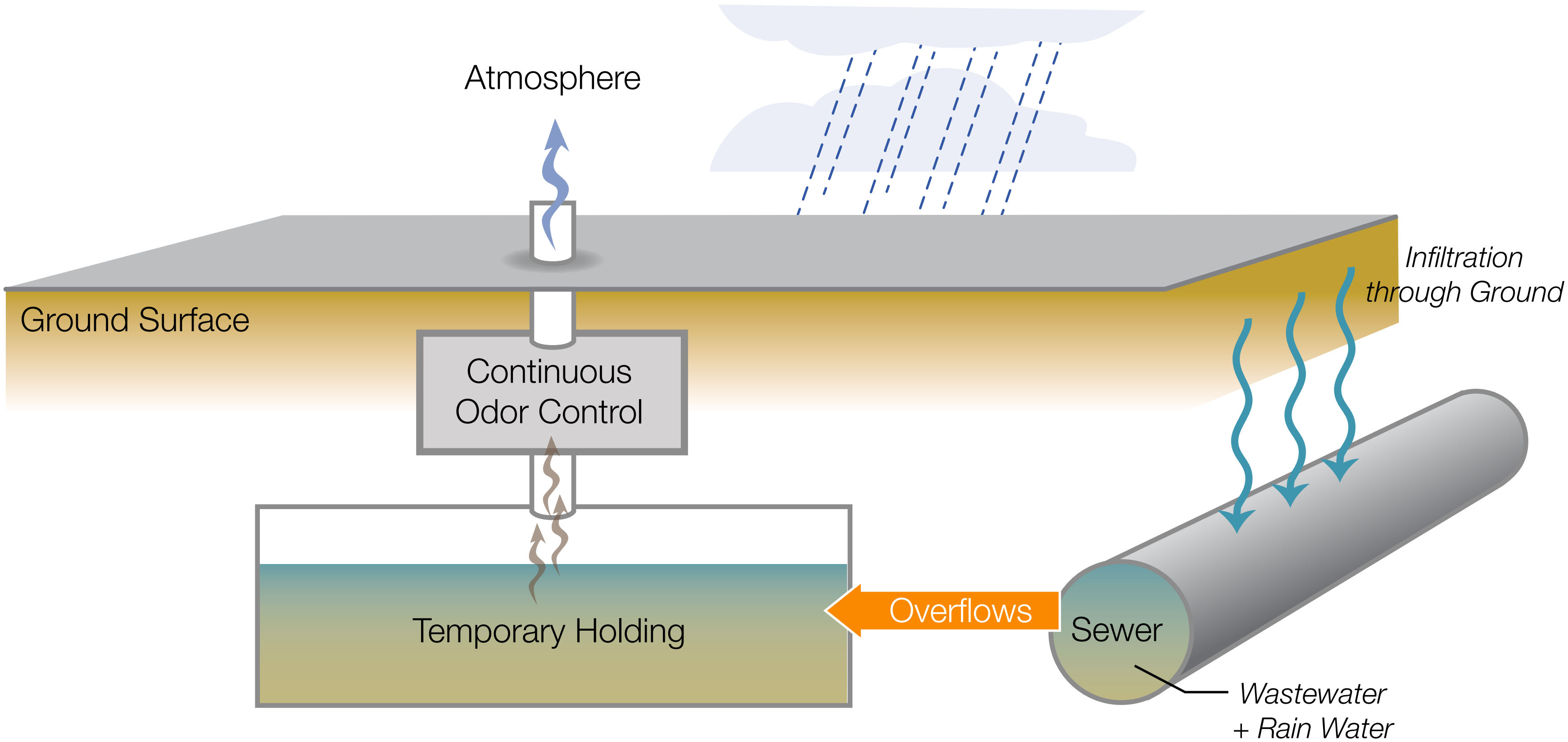


Figure 2-2
Wet Weather Operations
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

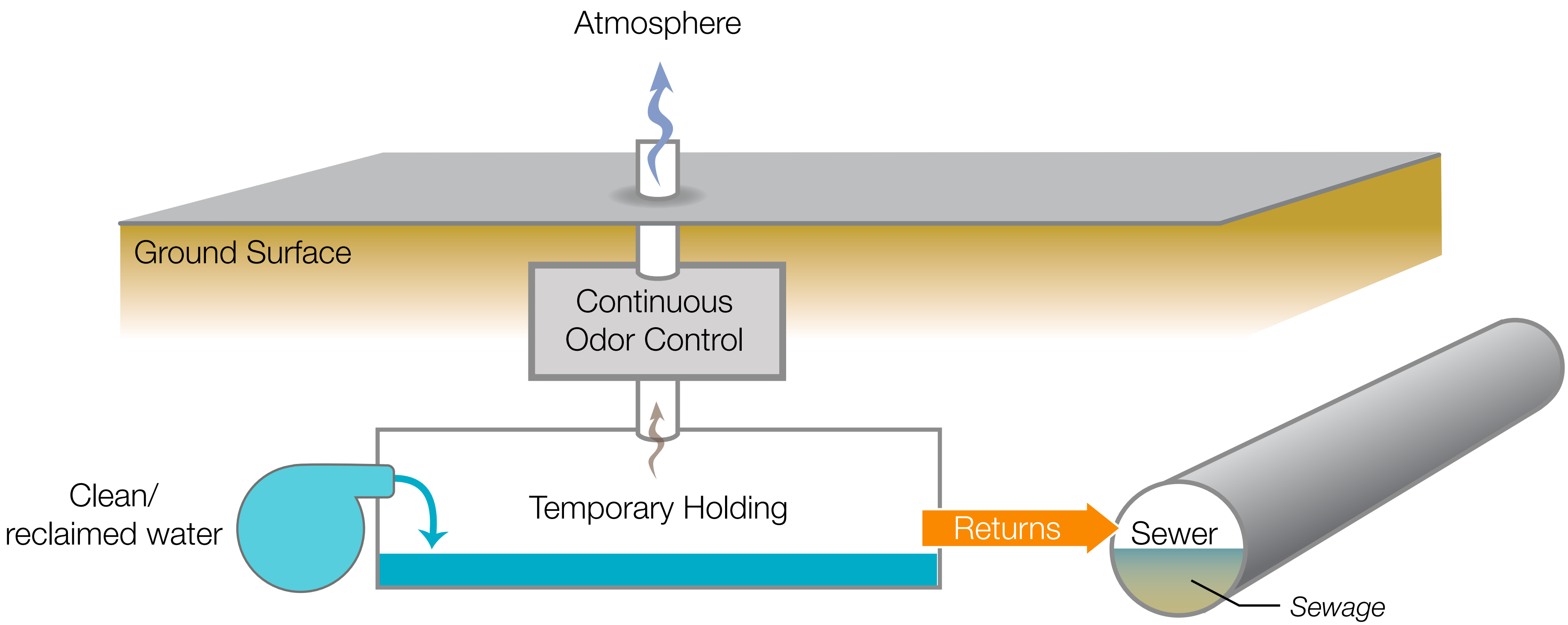


Figure 2-3
Post-Operations Self-Cleaning Mechanism
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

Carbon Odor Scrubber

Example of ground-level air-tight vault access hatch

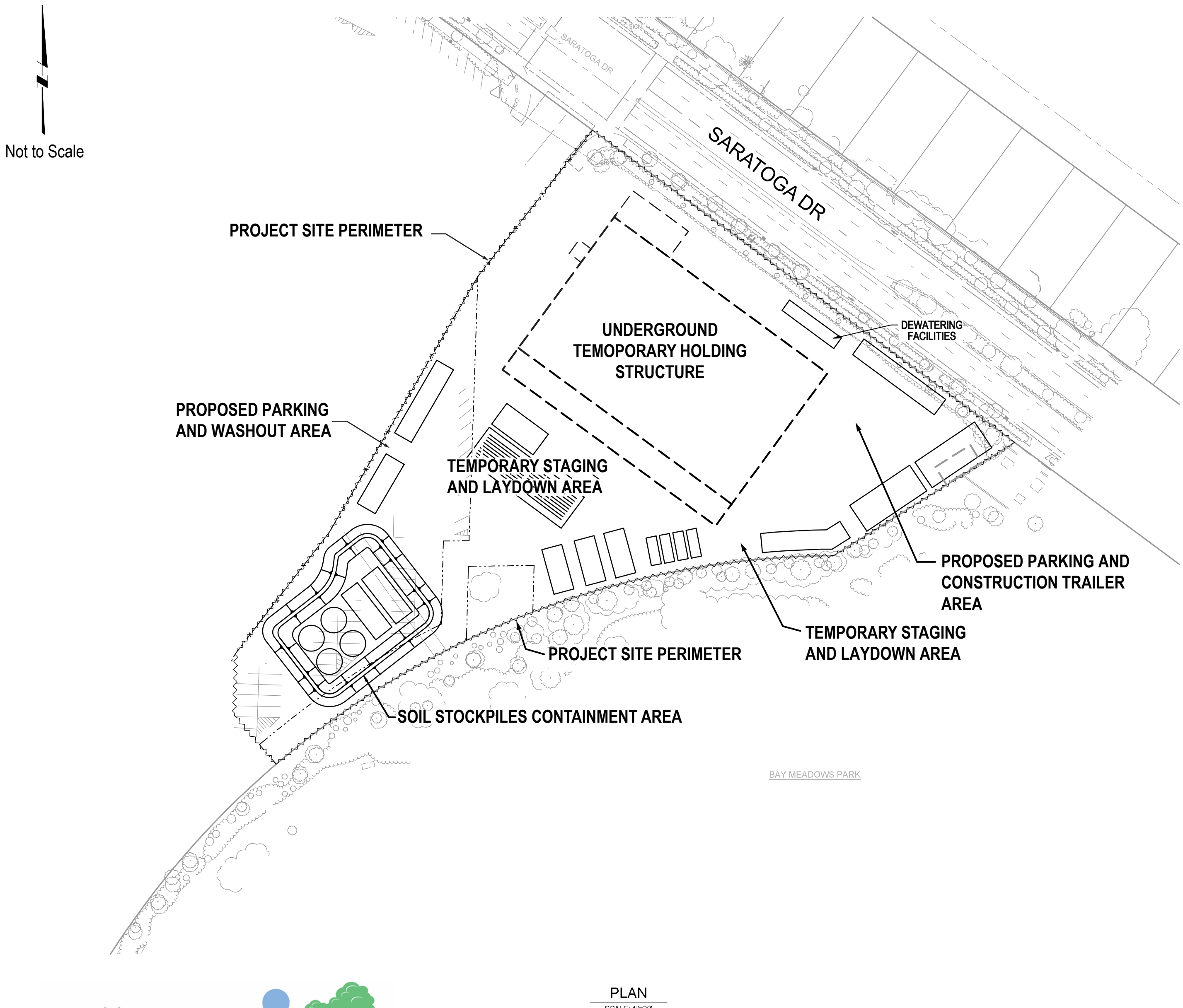
Tipping buckets flush solids and debris from holding structure to pumping system for removal

Holding structure captures solids and debris for treatment and disposal at the treatment plant

Interior holding structure after cleaning

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

Figure 2-5
Self-Cleaning Process
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program



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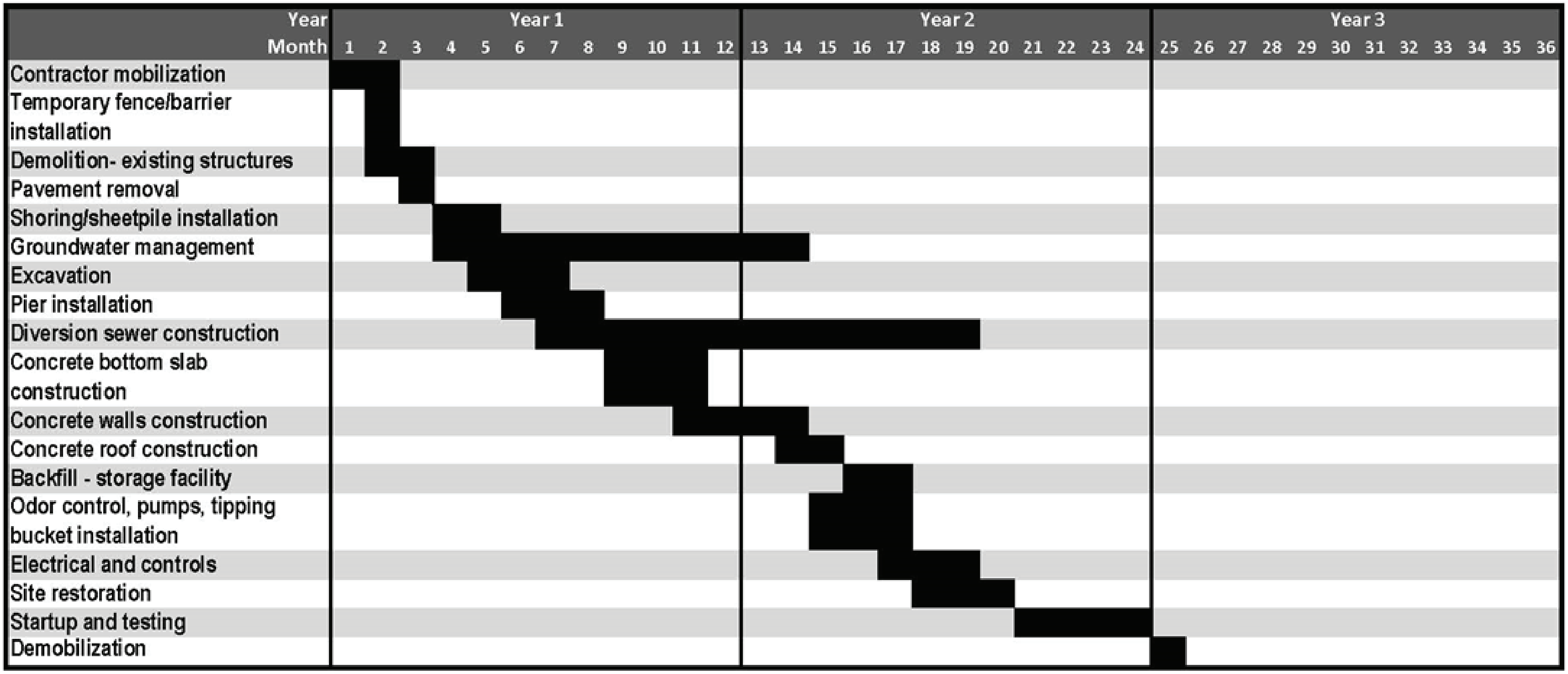
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

Figure 2-6
Conceptual Construction Layout
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

Source: Stantec, 2018. Civil Construction Staging and Easement Plan 60% Design. August 10.



CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 2-7
Construction Schedule
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

CHAPTER 3

Aesthetics

Aesthetic resources, or visual resources, are the natural and cultural features that can be seen and that contribute to the public's enjoyment of the environment. Visual resource impacts or impacts on the aesthetics of the natural and cultural environment are generally defined in terms of a project's physical characteristics and potential visibility, and the extent that the project would change the visual character and quality of the environment where it is located.

This chapter documents the existing visual conditions in the Project area and analyzes the potential for the proposed Project to affect the existing visual character and quality of the Project site and its surroundings. This chapter also describes the regulatory environment relevant to protection of aesthetic resources and identifies policies and regulations taken into consideration in the evaluation of potential visual effects. Finally, this chapter describes mitigation measures that would reduce potential impacts on visual resources, as applicable.

3.1 Concepts and Terminology Used in this Chapter

Concepts and terminology used in this analysis are summarized in this section. As defined primarily by the Federal Highway Administration (FHWA) (1988) and the Bureau of Land Management (BLM) (1980), these concepts are used throughout this chapter to describe existing conditions in representative views toward the Project site and, in concert with CEQA significance criteria, to identify potential effects on aesthetic resources.

Identifying visual resources and conditions involves the following three steps:

1. Objective identification of the visual features (visual resources) of the landscape;
2. Assessment of the character and quality of those resources relative to overall visual character of the region; and
3. Determination of the importance to people, or sensitivity, of views of visual resources in the landscape.

The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area (FHWA, 1988). Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public's concern for a particular viewshed. These concepts and terms are described in detail in the following sections and are incorporated into this chapter's discussions of existing conditions and potential effects on aesthetic resources.

3.1.1 Visual Character

Natural and human-made landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with landscape settlements and development, including roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character could vary significantly seasonally, even hourly, as weather, light, shadow, and other elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (U.S. Forest Service, 1995; FHWA, 1988). The appearance of the landscape is described in terms of the dominance of each of these components.

3.1.2 Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by FHWA, which employs the following concepts (FHWA, 1988; Jones et al., 1975):

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- Intactness is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes and in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

3.1.3 Visual Exposure and Sensitivity

The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (FHWA, 1988).

As a part of the process of identifying the importance of views of a resource, a viewshed can be broken into foreground, middleground, and background distance zones. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic regions or types of terrain, the standard foreground zone is 0.25 to 0.5 mile from the viewer, the middleground zone is from the foreground zone to 3 to 5 miles from the viewer, and the background zone is from the middleground to infinity (Jones et al., 1975).

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally assumed to be higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners. Sensitivity is assumed to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service, 1995; FHWA, 1988;).

3.1.4 Existing Setting

The proposed Project site is in the southeast portion of a parcel that is currently occupied by the Event Center for use as a parking lot and storage facility. The site includes two roads that surround the Event Center: S. Delaware Street and Saratoga Drive. The branches of the proposed diversion sewer pipelines would be constructed within the two existing roadways and extend to just south of E. 25th Avenue on the west and to the southeast corner of the Event Center property on the east. Existing aesthetic resources and views are described below.

3.1.5 Regional Setting

The City of San Mateo extends from San Francisco Bay to the foothills of the mountains that extend up and down the San Francisco Peninsula. Although predominantly urbanized, with a balance of commercial and residential uses, public parklands and undeveloped private lands dispersed throughout the City provide open space, wildlife habitat, recreational opportunities and, in some locations, relatively expansive views toward both the Bay and portions of the City. The low-elevation areas along the Bay shoreline are characterized visually by a variety of developments and uses adjacent to, and in some locations extending into, parklands and relatively undeveloped areas, some of which are public and others of which are privately owned. Commercial, industrial, office park, and multi-family uses in the east, near the western end of the San Mateo Bridge, yield to more single-family homes and neighborhood-scale commercial centers. The San Francisco Bay Trail (Bay Trail) extends along the entirety of the City's shoreline, as do large electrical transmission towers and roadways of varying service levels.

3.1.6 Existing Visual Character, Visual Quality, and Visual Sensitivity

Figure 3-1 is a map on an aerial photo base that depicts the Project site and its immediate surroundings. The Project site is currently used for storage as seen in the aerial photograph and can generally be characterized as a gravel parking/storage yard with stored vehicles, equipment, containers, and debris piles. The site is surrounded by opaque fencing and vegetation, including trees and hedges. Most of the parcel located west of the Project site is associated with the San Mateo County Event Center and its parking area. Existing views of the Project site are relatively low quality, consistent with a construction site/storage area and parking lot.

Saratoga Drive is located along the north and east sides of the Project site with Fiesta Gardens subdivision located beyond Saratoga Drive. The subdivision is mainly comprised of single-story residences, with the exception of a lone two-story residence located adjacent to Saratoga Drive. The subdivision is surrounded by a masonry wall with hedges and trees between the wall and the street, providing some visual enhancement for viewers both within the subdivision as well as those walking or driving on Saratoga Drive. Additionally, the neighborhood is partially separated from Saratoga Drive by Borel Creek, which runs north of Saratoga Drive for approximately 0.25 mile from Delaware Avenue. Views of the Project site from the subdivision and road are obscured by the wall and vegetation as well as the opaque fencing and vegetation surrounding the Project site. **Figure 3-2a** provides a view of the Project site as seen from the location on Saratoga Drive indicated as Viewpoint 1 on **Figure 3-1**.

Bay Meadows Community Park is located south and southwest of the Project site. The approximately 12-acre park provides a view of open space and vegetation, including a pond on the eastern side. Views of the park are seen almost exclusively from the areas south, southeast, and southwest of the park along E. 28th Avenue. The park provides moderate-quality views at street level for pedestrians and those traveling on E. 28th Avenue. Views from much of the north, west, and east are blocked by fences and vegetation. Views of the Project site from the park are also mostly blocked or obscured by fencing and vegetation associated with the park; however, some of the trailers and stored items are still visible above the fence line through the vegetation**. Figure 3-2b** provides a view toward the Project site as seen from a location on 28th Avenue indicated as Viewpoint 2 on **Figure 3-1**.

A residential subdivision with three-story multi-family buildings is located south-southeast of the Project, adjacent to E. 28th Avenue. The visual quality of these views is moderately low. Visible features of Bay Meadows Community Park indicate a formal park setting, but the individual components, in concert with the industrial and infrastructural uses apparent just beyond the park's boundaries, comprise an overall view with a moderately low degree of visual coherence and compositional harmony. This reflects the contrast evident in the visual character of the view.

The visual quality of the area where the diversion sewer pipelines would be installed is moderately low given that it includes densely developed areas, paved surfaces, and roadways, including the railroad and associated industrial nature of properties along S. Delaware Street to the west.

The Project site itself is not a feature of high visual interest and does not lie within views that are considered scenic vistas. The designated state scenic highway nearest to the Project site is Interstate 280 (I-280), which is approximately 3.25 miles west of the Project site, outside the San Mateo city limits. The Project site is not visible from the highway, nor are there any other scenic resources within the Project area.

3.2 Regulatory Framework

This section lists laws, ordinances, and regulations regarding aesthetics and visual resources that are directly applicable to the proposed Project. All such regulations are based on local guidelines; there are no applicable federal regulations regarding aesthetics or visual resources, and there are no officially designated state scenic highways or county-designated scenic routes in the vicinity of the Project area.

Applicable local regulations include relevant sections of the General Plan (City of San Mateo, 2010), and the *San Mateo City Charter and Municipal Code*, including the Zoning Ordinance (City of San Mateo, 2015).

3.2.1 General Plan – Policies and Guidance

Policies and guidance related to aesthetics and visual resources are found in the following sections of the General Plan:

- Section II, Land Use
- Section V, Urban Design
- Section VI, Conservation, Open Space, Parks and Recreation

These policies and guidance are discussed in the following sections.

3.2.1.1 General Plan – Section II, Land Use

Applicable land use (LU) and Shoreview Area-specific (PA) policies are cited below as they appear in the General Plan (City of San Mateo, 2010).

> **Policy LU 1.5: Building Height.** Maintain maximum building height limits contained in Appendix C [of the General Plan], and as specified in Policy LU 6A.2, closely matched with the Land Use categories and Building Intensity standards.
>
> Requests for height changes consistent with the height ranges for specific land uses as designated in Appendix C [of the General Plan], entitled "Building Height," may be considered by the City Council only when accompanied by a request for change in land use designation. Such requests may be approved only if the following findings are made:
>
> - The building has high design quality, which is enhanced by additional building height.
> - Increased building heights are visually related to surrounding building heights and promote the creation of a coherent City image.
> - Increased building heights will still provide for a variety of building heights in the vicinity of the project and the surrounding areas.
> - Increased building heights are compatible with surrounding land uses and will not create adverse shadow or visual impacts on surrounding residential uses.

- The City's infrastructure is adequate to accommodate the proposed development.
- Maximum height limits are intended to permit development which will not overburden the City's infrastructure or circulation system, which is consistent with the plan's intensity/density standards and is compatible with surrounding land uses, and which will preserve, to the extent feasible, the City's existing character. Height limits range from 25 feet to 90 feet and are contained in Appendices B and C.

3.2.1.2 General Plan – Section V, Urban Design

Urban design refers to the physical form and development of a city from the individual neighborhood to the overall cityscape. The Urban Design Element includes goals and policies related to the physical elements that make up the City and its natural setting and that make up the City's visual qualities. Applicable policies are cited below as they appear in the General Plan:

> **UD 1.2: Preservation of Natural Focal Points.** Preserve and enhance views of and access to the foothills and the Bay through the design of new development consistent with the *Shoreline Park Specific Plan* (City of San Mateo, 1971).
>
> By featuring the natural amenities of the foothills and Bay, San Mateo's identity can be strengthened. Where possible development should orient views and access to take advantage of these natural features.
>
> **UD 1.3: Gateways.** Develop gateways by creating strong architectural or landscape features exhibiting the character of San Mateo at the following locations: entrances to the Downtown, the north and south ends of El Camino Real (State Route 92), US 101 and 3rd Avenue, US 101 and Hillsdale Boulevard, and Mariner's Island Boulevard and J. Hart Clinton Drive at the border of Foster City.
>
> By developing gateway features, the entries to the City will be identified. Gateways may be constructed in a variety of ways: a prominent landscape or architectural feature, a notable open area or possibly an arch to pass through. All gateways should have some common element or feature to give San Mateo a unique and consistent image.

3.2.1.3 General Plan – Section VI, Conservation, Open Space, Parks and Recreation

The Conservation, Open Space, and Parks and Recreation (C/OS) Element sets forth the City's goals and policies regarding the development, management, and preservation of natural, cultural, and recreational resources within the City. The C/OS Element identifies Marina Lagoon, the Bay shoreline, and the City's creeks and channels as areas of scenic and cultural value. The segment of the Bay Trail that passes along San Mateo's shoreline is identified as a scenic pedestrian trail. Although no state- or county-designated scenic highways or roads are located within the site, J. Hart Clinton Drive is identified in the C/OS Element as similar to other county-designated scenic roads in the City because it offers "views of creeks, hillsides, the Bay, and San Francisco and East Bay skylines among other sights. Visual liabilities include inconsistent vegetation and poorly screened development" (City of San Mateo, 2010). Within the Project area, State Route 92 (SR 92) is the only county-designated scenic roadway. No officially designated scenic highways are located within San Mateo.

Applicable C/OS policies are cited below as they appear in the General Plan.

> **C/OS 2.1: Aesthetic and Habitat Values: Public Creeks.** Preserve and enhance the aesthetic and habitat values of San Mateo, Laurel, and Beresford creeks and other City-owned channels in all activities affecting these creeks.
>
> **C/OS 2.2: Aesthetic and Habitat Values: Private Creeks.** Preserve and enhance the aesthetic and habitat values of privately-owned sections of all other creeks and

channels, as shown in Figure C/OS-2, whenever cost-effective or whenever these values outweigh economic considerations.

San Mateo, Laurel, and Beresford creeks have been identified as having significant natural values. Policy 2.1 directs that aesthetic and habitat considerations be a part of all activities affecting these creeks; revegetation, erosion control, and adequate setbacks are among the possible actions. Further, while other City-owned channels have not been considered as providing much scenic or wildlife opportunities, significant potential exists; Policy 2.1 directs that these values be a part of channel management. Other creeks that cross through private property are worthy of protection and enhancement; implementation of such measures is promoted by Policy 2.2 with consideration of cost in the development process.

C/OS 9.1: Development Requirements. Require new developments to protect and enhance the character of scenic roadways and trails designated on Figure C/OS-4, including but not limited to treatment of signs and screening, land uses, and preservation of view corridors.

New development or redevelopment on parcels adjacent to scenic roadways or trails is an opportunity for design which protects the existing scenic qualities of the roadway or improves on those qualities. Policy 9.1 directs that developments avoid or mitigate adverse visual impacts which might be created particularly by grading, signage, and heights above the ridgeline.

3.2.2 City of San Mateo Zoning Ordinance

The Zoning Ordinance (Title 27 in the *City of San Mateo City Charter and Municipal Code* [Municipal Code] [City of San Mateo, 2015]), provides standards for the physical development of the City. Section 27.08.030 of the Zoning Ordinance establishes the City's SPAR process. The SPAR process is required for, among other development, any building; new parking lot; fence greater than 6 feet high; or an extension, alteration, or addition of or to an existing building or parking lot. In making its review, the Zoning Administrator, Development Review Board, and Planning Commission are guided by the standards adopted by the Planning Commission and City Council.

As specified in the Zoning Ordinance, the application shall be approved if the Zoning Administrator or Commission finds all the following to exist:

1. The structures, site plan, and landscaping are in scale and harmonious with the character of the neighborhood;
2. The development will not be detrimental to the harmonious and orderly growth of the City;
3. The development will not impair the desirability of investment or occupation in the vicinity, and otherwise is in the best interests of the public health, safety, or welfare;
4. The development meets all applicable standards as adopted by the Planning Commission and City Council, conforms with the General Plan, and will correct any violations of the Zoning Ordinance, building code, or other municipal codes that exist on the site;
5. The development will not adversely affect matters regarding police protection, crime prevention, and security.

All buildings, structures, landscaping, and other establishments shall be constructed in accordance with the approved drawings. The City Council shall review and make the final determination on all buildings exceeding 55 feet in height or where required by express General Plan provisions.

Chapter 27.59 of the Zoning Ordinance describes requirements for and restrictions on land use and development in the Shoreline District, which encompasses the Shoreline Park Specific Plan area (City of San Mateo, 1971). The Shoreline Zoning District is further described in Chapter 11, *Land Use*.

Chapter 27.74 of the Zoning Ordinance describes the requirements for special use permits. The zoning code identifies permitted uses for each land use type in the City. In addition, the Zoning Ordinance recognizes that other uses may be necessary or desirable in a given district and may influence neighboring uses or public facilities. For the protection of the community, these uses need to be carefully regulated with respect to location or operation. Such uses are classified as "special uses." Chapter 11 includes additional information about permitted uses and uses allowed under special use permits.

Chapter 27.06 of the Zoning Ordinance notes that "[e]very project which is fully or partially funded by the City and which is subject to Planning Commission review under 27.06.040" requires final approval by the City Council (City of San Mateo, 2015). These approvals include special use permits, SPAR, and Site Development Permits.

3.2.3 City of San Mateo Development Permit

Chapter 23.40 of the Municipal Code was adopted in part to preserve the natural scenic character of the City and maximize visually pleasant relationships with adjacent sites during development activities, including grading and removal of major vegetation. Based on the quantity of gradient, a site development permit is required for site development on private property and may also be used for review of public projects that require a planning application and public review. A permit would include requirements such as slope setback.

3.3 Assessment Methods and Thresholds of Significance

Based on existing conditions within the Project area and on proposed activities summarized in this chapter and detailed in Chapter 2, potential impacts on aesthetic and visual resources were identified and compared to CEQA criteria for thresholds of significance. Impacts on aesthetic resources may occur if the proposed Project would result in the following:

- A substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historical buildings within a state scenic highway
- Conflict with applicable zoning and other regulations governing scenic quality
- Create a new source of substantial light or glare

The Project site itself is not a feature of high visual interest and does not lie within views that are considered scenic vistas. The Project site is not visible from the nearest designated state scenic highway, nor are there any other scenic resources within the Project area. Because the Project would not result in adverse impacts to scenic vistas or to state designated scenic highways, no further evaluation is made of these two types of impacts.

3.4 Environmental Impacts

Impact 3-1. Would the proposed Project have the potential to conflict with applicable zoning and other regulations governing scenic quality?

During the Project construction period, construction workers, vehicles, and equipment, including heavy machinery, would be present at the Project site. Construction activities would include excavation for construction of the flow equalization facility site and installation of the facility's floor, walls, and roof. Construction of the diversion sewer pipelines would include open-cut methods along most of the alignment. The visual changes related to the construction activities would be greatest during excavation and installation of the diversion pipelines and temporary holding structure, which is expected to last approximately 18 months of the 25-month construction period.

The perimeters of the Project site along Saratoga Drive and Bay Meadows Community Park are surrounded by opaque fencing and vegetation, and existing views along the street level toward the location of the construction site would be limited for nearby residents, Bay Meadows Community Park users, and those driving near the Project site.

The construction activities would not be visible from most of the residences in the Fiesta Gardens subdivision located across Saratoga Drive east of the Project site because the majority are single-story residences oriented towards the subdivision's internal street system. The residences located directly across Saratoga Drive from the Project site back up to Saratoga Drive, and a high masonry wall runs along the back-lot lines, blocking views toward the Project site from the backyards. A single two-story, residence is located directly across Saratoga Drive near the eastern corner of the Project site. In addition to the masonry wall, taller vegetation also blocks most of the view of the Project site from the second story.

The three-story multi-family residential buildings located approximately 250 feet south of the Project site across E. 28th Avenue would have mostly limited views of the construction-period activities. Views of the construction activities from units on the first and second stories of these buildings would be substantially screened by the existing opaque fence along the site's southern perimeter and by the trees located within Bay Meadows Community Park and along E. 28th Avenue. The third-story residents would have more direct views of the Project site as compared to the first and second stories. Some of the construction activities would likely still be obscured by vegetation in the park, but not to the same degree that it blocks the lower levels. The views of construction activities would be a relatively small part of the overall view and would not dominate the view from these residences. In addition, the Project site currently has a utilitarian appearance and does not have a high level of visual quality, so the degree of change from the existing visual quality would not be large. Once Project construction is complete, the site would be paved and contain the minor appurtenances associated with the Project. Any affected surrounding areas would be restored to their current or similar conditions.

While park users and those traveling on the adjacent roadways would experience construction-related views, most views of the construction area would be obscured or blocked by fencing and vegetation, and construction would be temporary and transient within view of the roadways and park.

Given these factors and the relatively short duration of the most intensive construction activities (approximately 18 months), construction impacts on the visual character and quality of the site and its surroundings would be less than significant.

Once construction is complete, the new diversion sewer pipelines would be underground in streets or designated City rights-of-way (ROWs). The only new permanent aboveground structures associated with other components of the Project would be minor appurtenances, including access hatches, an electrical building, and an inconspicuous stack at grsade or other architectural feature for treated air. Additionally, the project would have a wall or fence and landscaping outside of the wall or fence to provide screening for the site." **Figure 3-3** shows aerial images of before and after construction views of a site where a similar project was developed. As comparison of the two images indicates, the surface of the site is relatively unchanged after completion of the project, with the only visible elements being the access hatches. The proposed Project will differ from the example in that it will have a one-story electrical building in a corner of the site, as indicated on **Figure 3-1.** The Project includes implementation of Final PEIR **Mitigation Measure 11-2, Obtain approval for a special use permit**. As part of this process, the Project would undergo Site Plan and Architectural Review, which ensures that the Project is constructed in accordance with City municipal codes, approved drawings, landscaping plans, and, as applicable, special use permit conditions. Operationally, the proposed Project would have a less-than-significant impact on the existing visual character and quality of the site and its surroundings and would not conflict with applicable zoning or regulations governing the site.

Impact 3-2. Would the proposed Project have the potential to create a new source of substantial light or glare?

Construction activities are scheduled to take place between 7 a.m. and 7 p.m. Therefore, illumination of work areas and vehicle headlights would be limited to early morning and early evening hours from late fall to early spring.

Daytime glare from construction vehicles would be screened from observers on Saratoga Drive and in Bay Meadows Community Park and other nearby ground-level locations by the existing opaque fencing. Incorporation of Final PEIR **Mitigation Measure 3-3a, Design lighting to minimize impacts on adjacent areas,** would further reduce impacts from construction lighting. Given the limited duration of the construction period, the limited times at which the lighting would be required, and the existing visual barriers that would attenuate offsite visibility, construction impacts on lighting and glare would be less than significant.

During Project operation, there would be limited need for aboveground lighting. Any required lighting would be designed in conformance with current lighting design standards, which specify restriction of lighting to areas where it is essential for operations and security, limitation of lighting levels to those required for operational and security needs, use of fixtures that are shielded to direct the light only to those areas where it is needed and that prevent light spill into the sky and offsite, and use of switches and motion sensors to restrict the use of lighting to only those times when it is required. Because the site is currently illuminated, and because any lighting that is required during Project operations will be designed to limit its potential for creating light spill or increasing ambient lighting levels in the surrounding areas, the Project's light impacts during the operational period will be less than significant. Incorporation of **Mitigation Measure 3-3a, Design lighting to minimize impacts on adjacent areas,** from the 2016 Final PEIR would further reduce impacts from lighting from operation of the Project.

3.5 Mitigation Measures

***Mitigation Measure* 11-2, Obtain approval for a special use permit** is described in Chapter 11.

Implementation of the following mitigation measure from the Final PEIR would ensure that potential lighting impacts on aesthetic and visual resources would remain at a less-than-significant level.

Mitigation Measure 3-3a. Design lighting to minimize impacts on adjacent areas.

Construction Lighting. Prior to site mobilization, the construction manager shall confirm that lighting for construction of proposed Project facilities is used in a manner that minimizes potential night lighting impacts, as follows:

a. All lighting shall be of minimum necessary brightness consistent with worker safety.

b. All fixed position lighting shall be shielded, hooded, and directed downward to minimize backscatter to the night sky and prevent light trespass (direct lighting extending outside the boundaries of the construction area).

c. Where feasible and safe, lighting shall be turned off when not in use, and motion detectors shall be used.

d. A lighting complaint resolution form shall be maintained by construction management to record all lighting complaints received and to document the resolution of that complaint.

e. All construction-related lighting shall be completely shielded or screened so it is not visible to surrounding residents.

Project Operation Lighting. Prior to the start of operation of the facility, the construction contractor shall design and install new permanent lighting for the facility such that: light bulbs and reflectors are not visible from public viewing areas; lighting does not cause reflected glare; and illumination of the Project, the vicinity, and the nighttime sky is minimized. To meet these requirements, the City or its design contractor shall confirm the following:

a. Lighting shall be designed so exterior light fixtures are hooded, with lights directed downward or toward the area to be illuminated and so that backscatter to the nighttime sky is minimized. The design of the lighting shall be such that the luminescence or light source is shielded to prevent light trespass outside the facility boundary.

b. All lighting shall be of minimum necessary brightness consistent with worker safety.

c. Where feasible and safe, lighting shall be kept off when not in use.

A lighting complaint resolution form shall be used by the Project operations to record all lighting complaints received and document the resolution of those complaints. All records of lighting complaints shall be kept in the onsite compliance file.

3.6 References

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Federal Highway Administration (FHWA). 1988. *Visual Impact Assessment for Highway Projects*. FHWA-HI-88-054. U.S. Department of Transportation.

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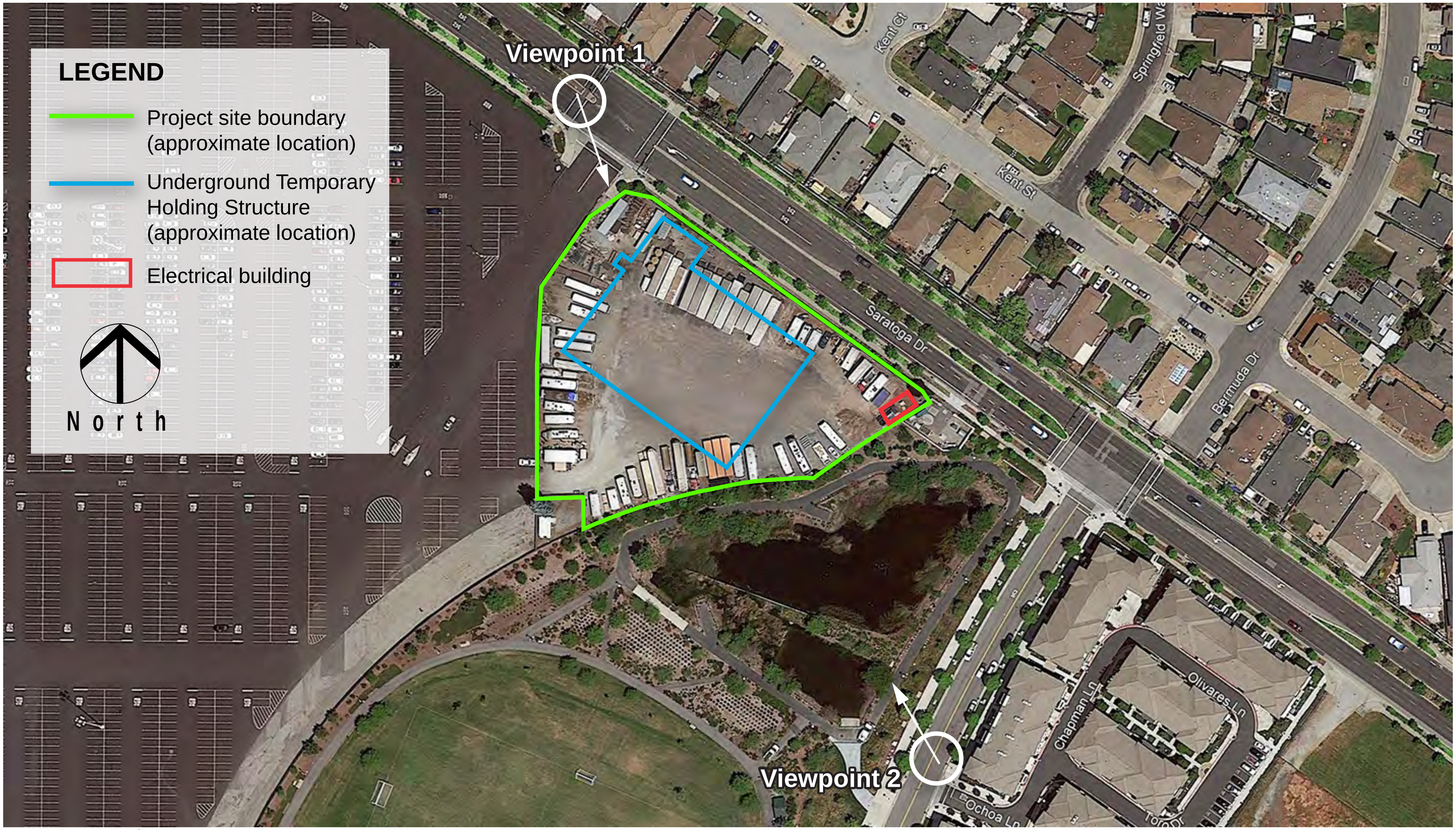

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CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

Figure 3-1
Project Visual Context and Locations of Photo Viewpoints
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

a. Viewpoint 1. View from Saratoga Drive looking East/Southeast toward the project site.

b. Viewpoint 2. View from East 28th Avenue in front of three-story multi-family buildings, looking North/Northeast across the Bay Meadows Community Park toward the project site.

Figure 3-2
Views Toward the Project Site from the Surrounding Area

a. Aerial view of the Genesee 1 Underground Flow Equalization Project Site before construction.

b. Aerial view of the Genesee 1 Underground Flow Equalization Project Site after construction of the project. Note that the surface of the site has been restored to almost exactly the same condition it was in before construction of the project took place.

Figure 3-3
Before and After Air Photos of the Genesee 1 Underground Flow Equalization Project Site

CHAPTER 4

Air Quality

This chapter describes the setting and potential air quality impacts of the Project's construction and operation. It discusses applicable federal and state air quality standards and current attainment status, identifies potential air quality impacts of the Project, and proposed mitigation measures, as applicable.

4.1 Existing Setting

4.1.1 Climate and Topography

Air quality is affected by both the pollutant emissions rate and locations, and by meteorological conditions that influence movement and dispersal of pollutants in the atmosphere. San Mateo has a Mediterranean climate with warm, dry summers and mild, damp winters. Westerly through northwesterly winds are most common in the area, reflecting the orientation of San Francisco Bay and the San Francisco Peninsula. Winds are lightest, on the average, in fall and winter, when every year there are periods of several days when winds are light and local pollutants can build up. During summer, inversions could be present more than 90 percent of the time in both morning and afternoon. In winter, inversions dominate during the morning but frequently dissipate by afternoon (City of San Mateo, 2009).

Topography can restrict horizontal dilution and mixing of pollutants by creating a barrier to air movement. The South Bay has significant terrain features that affect air quality. The Santa Cruz Mountains and Hayward Hills on opposite sides of the South Bay restrict horizontal dilution; these features also channel winds from the north to south, carrying pollution from the northern peninsula toward the City (City of San Mateo, 2009).

4.1.2 Attainment Status

The Project is located in the City of San Mateo, San Mateo County, which is part of the San Francisco Bay Area Air Basin (SFBAAB). The area is currently designated as nonattainment for ozone and particulate matter with aerodynamic diameter equal to or less than 2.5 micrometers ($PM_{2.5}$) under the National Ambient Air Quality Standards (NAAQS) and nonattainment for ozone, particulate matter with aerodynamic diameter equal to or less than 10 micrometers (PM_{10}), and $PM_{2.5}$ under the California Ambient Air Quality Standards (CAAQS) (BAAQMD, 2017). The area is designated as attainment/ unclassified for all other pollutants.

4.2 Regulatory Framework

4.2.1 Federal Regulations

4.2.1.1 Federal Clean Air Act and NAAQS

Federal air quality policies are regulated through the federal Clean Air Act (CAA). The U.S. Environmental Protection Agency (EPA) adopted the CAA in 1970 and its amendments in 1977 and 1990. Pursuant to the CAA, EPA has established nationwide air quality standards to protect public health and welfare with an adequate margin of safety. These federal standards, known as the NAAQS, represent the maximum allowable atmospheric concentrations and were developed for seven criteria pollutants: ozone, NO_2, CO, PM_{10} and $PM_{2.5}$, SO_2, and lead. The NAAQS represent safe levels of each pollutant to avoid specific adverse effects on human health and the environment. **Table 4-1** summarizes the NAAQS.

The 1977 CAA amendment required each state to develop and maintain a state implementation plan (SIP) for each criteria pollutant that violates the applicable NAAQS. The SIP serves as a tool to avoid and minimize emissions of pollutants that exceed ambient threshold criteria and to achieve compliance with the NAAQS. In 1990, the CAA was amended to strengthen regulation of both stationary and mobile emission sources for criteria pollutants. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of these standards.

Table 4-1. Ambient Air Quality Standards and Attainment Status
Underground Flow Equalization System Project, Environmental Impact Report

		CAAQS[a]		NAAQS[b]		
Pollutant	**Averaging Time**	**Standard**	**Status**	**Primary[c]**	**Secondary[d]**	**Status**
Ozone	8 hours	0.070 ppm	Nonattainment	0.070 ppm	0.070 ppm	Nonattainment
	1 hour	0.09 ppm		—	—	—
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	Nonattainment	—	—	—
	24 hours	50 µg/m^3		150 µg/m^3	150 µg/m^3	Unclassified
$PM_{2.5}$	Annual Arithmetic Mean	12 µg/m^3	Nonattainment	12 µg/m^3	15 µg/m^3	Attainment/ Unclassified
	24 hours	—		35 µg/m^3	35 µg/m^3	Nonattainment
CO	8 hours	9.0 ppm	Attainment	9 ppm	—	Attainment
	1 hour	20 ppm		35 ppm	—	
NO_2	Annual Arithmetic Mean	0.03 ppm	Attainment	0.053 ppm	0.053 ppm	Unclassified
	1 hour	0.18 ppm		0.100 ppm	—	
SO_2	24 hours	0.04 ppm	Attainment	—	0.5 ppm	Unclassified
	1 hour	0.25 ppm		0.075 ppm[g]	—	
Lead[e]	Calendar Quarter	—	Attainment	1.5 µg/m^3	1.5 µg/m^3	Attainment
	Rolling 3-month Average	—		0.15 µg/m^3	—	
	30-day Average	1.5 µg/m^3		—	—	
Visibility-Reducing Particles	8 hours	f	Unclassified	—	—	—
Sulfates	24 hours	25 µg/m^3	Attainment	—	—	—
Hydrogen Sulfide	1 hour	0.03 ppm	Unclassified	—	—	—
Vinyl Chloride[e]	24 hours	0.01 ppm	Unclassified	—	—	—

[a] California standards for ozone, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, and suspended particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles) are values that are not to be exceeded. All others are not to be equaled or exceeded.

[b] National standards other than ozone, PM, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[c] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Table 4-1. Ambient Air Quality Standards and Attainment Status
Underground Flow Equalization System Project, Environmental Impact Report

		CAAQS[a]		NAAQS[b]		
Pollutant	Averaging Time	Standard	Status	Primary[c]	Secondary[d]	Status

[e] The California Air Resources Board (ARB) has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. ARB made this determination following the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[f] Insufficient amount to produce an extinction coefficient of 0.23 per kilometer because of particles when the relative humidity is less than 70 percent.

[g] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion (ppb).

Notes:

$\mu g/m^3$ = micrograms per cubic meter.

ppm = parts per million

Source: BAAQMD, 2017a.

4.2.1.2 Hazardous Air Pollutants

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated that EPA regulates 188 air toxics, also known as hazardous air pollutants (HAP). Prior to the 1990 CAA Amendments, EPA created a program to establish national emission standards for HAPs. National emission standards were established for benzene, vinyl chloride, radionuclides, mercury, asbestos, beryllium, inorganic arsenic, radon 222, and coke oven emissions. In 1994, EPA began issuing the new standards, while national emission standards set before 1991 remain applicable. In addition, in February 2007, EPA finalized the rule entitled Control of Hazardous Air Pollutants from Mobile Sources, to reduce hazardous air pollutants from moveable sources.

4.2.2 State Regulations

4.2.2.1 California State Ambient Air Quality Standards

The California Air Resources Board (ARB) oversees California air quality policies (ARB, 2013). CAAQS were first established in 1969 pursuant to the Mulford-Carrell Act. These standards are generally more stringent than the NAAQS and include four additional pollutants: sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulates. Relevant CAAQS are listed in **Table 4-1**.

The California CAA, which was approved in 1988, requires each local air district in the state to prepare an air quality management plan (part of the SIP) that complies with the CAAQS. ARB has ultimate responsibility for the SIP for nonattainment pollutants but relies on each local air district to adopt mandatory statewide programs and provide tailored additional strategies for sources under its local jurisdiction.

4.2.2.2 Toxic Air Contaminants

ARB regulates the toxic air contaminant sources and emissions in California. The Air Toxics "Hot Spots" Information and Assessment Act (Assembly Bill [AB] 2588) was enacted in September 1987. AB 2588 requires that toxic air emissions from stationary sources (facilities) be quantified and compiled into an inventory, that risk assessments be conducted according to methods developed by the Office of Environmental Health Hazard Assessment, and that the public be notified of significant risks posed by nearby facilities. Since the amendment of the statute in 1992 by enactment of Senate Bill (SB) 1731, facilities that pose potentially significant health risks to the public are required to reduce those risks. ARB has also developed regulations and air toxic control measures for mobile and stationary sources to reduce toxic air contaminant emissions.

4.2.3 Local Regulations

The Project area is located in San Mateo County, which is within the SFBAAB under the jurisdiction of BAAQMD. BAAQMD is the local agency responsible for ensuring that federal and state ambient air quality standards are attained in the Project area; responsibilities include rulemaking, permitting, and enforcement activities affecting stationary sources in the Bay Area. Specific rules and regulations adopted by BAAQMD limit the emissions that can be generated by various activities and identify specific pollution reduction measures that must be implemented in association with various activities. These rules regulate not only emissions of the six criteria air pollutants but also toxic emissions and acutely hazardous non-radioactive materials emissions. Any sources of stationary emissions constructed as part of a project would be subject to the BAAQMD rules and regulations. Federal and state ozone plans rely on stationary source control measures in BAAQMD rules and regulations. Additionally, the BAAQMD's *California Environmental Quality Act Air Quality Guidelines* that were adopted in 2017 contain specific measures, *Basic Construction Mitigation Measures,* for reducing construction-related emissions from projects. These measures are recommended for all projects, regardless whether construction-related emissions exceed applicable thresholds of significance.

The *San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-hour National Ozone Standard* (BAAQMD, 2001) was prepared in response to federal planning requirements. BAAQMD also adopted the *Bay Area 2017 Clean Air Plan* (BAAQMD, 2017b), which provides an integrated, multi-pollutant control strategy to reduce emissions of ozone, particulates, air toxics, and GHGs. BAAQMD is currently designated as nonattainment for the federal 24-hour $PM_{2.5}$ standards; recent monitoring data indicate that $PM_{2.5}$ levels have decreased in the Bay Area air basin since 2011. On January 9, 2013, EPA issued a final rule to determine that the Bay Area has attained the federal 24-hour $PM_{2.5}$ standard. The Bay Area will continue to be nonattainment for the federal 24-hour $PM_{2.5}$ standard until a "redesignation request" and a "maintenance plan" are submitted to EPA and the agency approves the proposed redesignation (BAAQMD, 2017a).

BAAQMD is designated nonattainment for state PM_{10} standards and has implemented a particulate matter (PM) control program. The program includes emission limits for primary PM and PM precursors from stationary sources, wood smoke regulations, and PM control measures outlined in the *Bay Area 2010 Clean Air Plan* (BAAQMD, 2010a).

Although odors generally do not pose a health risk, they can be unpleasant and lead to complaints from the community (BAAQMD, 1999). Regulation 7, Odorous Substances (BAAQMD, 1982) applies to operating facilities and places general limitations on odorous substances and specific limitations on emissions of certain odorous compounds. Limitations are only applicable when BAAQMD receives 10 or more "confirmed" odor complaints within a 90-day period. A confirmed odor complaint is confirmed by a BAAQMD trained inspector. To be a confirmed odor complaint, a BAAQMD inspector must visit the complainant within 30 minutes and verify and confirm the source of the odor. Typically, a confirmed odor complaint is followed up with a BAAQMD Violation Notice. Once triggered, Regulation 7 limitations are enforced until no citizen complaints are received by the BAAQMD for 1 full year.

BAAQMD's Regulation 9, Rule 2, Inorganic Gaseous Pollutants – Hydrogen Sulfide limits ground-level concentrations of hydrogen sulfide to below 0.06 parts per million (ppm) averaged over 3 consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes in any 24-hour period (BAAQMD, 1979).

4.3 Assessment Methods and Thresholds of Significance

Under CEQA, project proponents are required to identify any significant environmental effects that would occur as a result of their actions. CEQA also requires that project proponents avoid or mitigate any impacts to the extent feasible. Impacts on air quality may occur if the proposed Project would result in the following:

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

Evaluation of impacts based on the two three criteria uses BAAQMD emissions limits of criteria pollutants of concern. BAAQMD published guidelines for evaluating, measuring, and mitigating projects' air quality impacts, including impacts from criteria air pollutants and toxic air contaminants for CEQA purposes (BAAQMD, 2017c). The thresholds of significance are shown in **Table 4-2** and are used for the impact analysis.

Table 4-2. Bay Area Air Quality Management District Air Quality CEQA Thresholds of Significance for Criteria Pollutants
Underground Flow Equalization System Project, Environmental Impact Report

Pollutant	Threshold of Significance for Construction Average Daily (lb/day)	Threshold of Significance for Operation	
		Average Daily (lb/day)	**Maximum Annual (tpy)**
ROG	54	54	10
NO_x	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
PM_{10} (fugitive dust)	Best Management Practices (BMPs)	None	
$PM_{2.5}$ (fugitive dust)	Best Management Practices (BMPs)	None	
Local CO	None	9.0 ppm (8-hour average); 20.0 ppm (1-hour average)	

Notes:
lb/day = pounds per day
NO_x = nitrogen oxide
tpy = tons per year
ROG = reactive organic gases
Source: BAAQMD (2017c)

To determine if the proposed Project would create objectionable odors affecting a substantial number of people, the BAAQMD 2017 CEQA guidelines were used. The 2017 CEQA guidelines address the significance of potential odor impacts, in this case for a wastewater pumping facility, as summarized below.

1. Projects that result in a significant new odor impact that are sited within a 1-mile distance (based on Table 3-3 of the 2017 BAAQMD guidelines) of an existing receptor.
2. A type of odor source with five or more confirmed complaints in the new source area per year, averaged over 3 years.

4.4 Environmental Impacts

Impact 4-1. Would the proposed Project conflict with or obstruct implementation of an applicable air quality plan or result in a cumulatively considerable net increase of any criteria pollutant?

The Project would involve several construction elements that have the potential to generate temporary air pollutants, including exhaust emissions from the construction equipment and vehicles, and fugitive dust emissions from earthmoving activities and vehicle travel on paved and unpaved roads.

The Project would be constructed over a 25-month period starting in 2020. Maximum daily construction emissions of reactive organic gases (ROG), NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$ were estimated using CALEEMOD version 2016.3.2 (California Air Pollution Control Officers Association, 2017).

The estimated average daily construction emissions for the Project are summarized in **Table 4-3**. **Appendix A** provides the construction calculations and assumptions used to assess air quality impacts.

Table 4-3. Estimated Average Daily Construction Emissions
Underground Flow Equalization System Project, Environmental Impact Report

	ROG	**CO**	**NO_x**	**SO_x**	**PM_{10} Fugitive**	**PM_{10} Exhaust**	**$PM_{2.5}$ Fugitive Dust**	**$PM_{2.5}$ Exhaust**
Construction year[a]	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**
Year 1	1.92	32.78	15.46	0.09	2.45	0.59	0.64	0.56
Year 2	1.98	35.26	16.18	0.11	2.79	0.55	0.75	0.52
Year 3	0.40	9.39	2.92	0.03	1.04	0.04	0.28	0.04
Thresholds of Significance	**54**	--	**54**	--	BMP	**82**	BMP	**54**
Exceeds threshold?	No	N/A	No	N/A	N/A	No	N/A	No

[a] Construction assumptions used for Project assessment assumed a start date of January 1, 2019, and a construction duration of 25 months.

As shown in **Table 4-3**, average daily construction equipment and vehicle exhaust emissions would be below the BAAQMD construction emission Thresholds of Significance. The Project will implement best management practices (BMPs) to minimize fugitive dust emissions during construction, including implementation of the BAAQMD's *Basic Construction Mitigation Measures*, and would comply with all other applicable state and local regulations.

Therefore, given construction emissions would be short term, lower than the BAAQMD CEQA significance thresholds, and comply with BAAQMD requirements, Project construction emissions would be less than significant.

Routine maintenance activities of the pipelines, temporary holding structure, odor control facilities, and pump stations would occur after wet weather events and as part of routine maintenance of the entire collection system. Inspection of the interior of the temporary holding structure from the surface following each event would occur to verify the tipping buckets are functioning properly and solids have been flushed from the interior. It is expected that wet weather events would occur approximately 15 times per year. Maintenance vehicles would consist of up to two City vehicles traveling to the site per inspection. Ongoing maintenance would include replacement of equipment necessary to maintain optimal operation approximately every 5 to 25 years (see Section 2.5, *Maintenance*). Given the limited number of maintenance vehicles and trips to the Project site, air emissions from maintenance activities would not significantly increase and impacts would be less than significant.

The Project also includes the installation of a new emergency diesel generator to allow processes to continue during periods of power outages. Normal operation of the diesel generator, including maintenance and testing, will be limited to 50 hours per year. **Table 4-4** details expected emissions associated with operation of the generator. As shown, operational emissions would be considerably lower than the thresholds, and would not result in a cumulatively considerable net increase of any criteria pollutant; therefore, impacts would be less than significant.

Table 4-4. Estimated Average Daily Operational Emissions
Underground Flow Equalization System Project, Environmental Impact Report

	ROG	**CO**	**NO_x**	**SO_x**	**PM_{10} Fugitive**	**PM_{10} Exhaust**	**$PM_{2.5}$ Fugitive Dust**	**$PM_{2.5}$ Exhaust**
Average Daily (lb/day)[b]	0.026	2.895	9.306	0.012	N/A	0.207	N/A	0.207
Threshold of Significance (lb/day)	54	--	54	--	--	82	--	54
Exceeds threshold?	**No**	**N/A[a]**	**No**	**N/A**	**N/A**	**No**	**N/A**	**No**
Maximum Annual (tpy)	0.0003	0.036	0.116	0.0002	N/A	0.003	N/A	0.003
Threshold of Significance (tpy)	10	--	10	--	--	15	--	10
Exceeds threshold?	**No**	**N/A**	**No**	**N/A**	**N/A**	**No**	**N/A**	**No**

[a] The BAAQMD CEQA threshold for localized CO concentrations is not applicable. The proposed Project would result in a less-than-significant impact to localized CO concentrations because operations of the proposed Project would meet the screening criteria for CO impacts in the 2017 BAAQMD CEQA guidelines, Section 3.3, Carbon Monoxide Impacts (BAAQMD 2017). The Project would not be one of the categories of projects subject to congestion management plans or programs. In addition, Project-related traffic volumes would be small and would not result in traffic-related impacts at local intersections. No further analysis is required.

[b] Emissions for the emergency diesel generator were conservatively assessed for a 350-kW generator; however, the expectation is that a 175-kW generator will be used for the Project.

Impact 4-2. Would the proposed Project expose sensitive receptors to substantial pollutant concentrations?

Exhaust emissions from construction equipment would contain toxic air contaminants, such as diesel particulate matter (DPM). The Project alignment would be near residential areas, parks, and schools. Therefore, during Project construction, some of the residential and other sensitive receptors may be exposed to emissions from the construction activities. The main pollutant of concern during Project construction would be DPM emitted from the diesel-powered construction equipment and heavy-duty haul trucks because long-term exposure to DPM has the potential to cause cancer and non-cancer chronic health effects. The construction activities and the associated emissions would be temporary and relatively short term and would be limited to a relatively small area where only a few pieces of construction equipment would be operating at any one time. As a result, long-term exposure of sensitive receptors to DPM from construction of the Project would not occur. In addition, implementation of the BAAQMD's *Basic Construction Mitigation Measures***,** such as minimizing idling times and maintaining equipment in good condition, would reduce the exposure of nearby sensitive receptors to the construction-related pollutants. Therefore, the Project would not expose sensitive receptors to substantial pollutant concentrations during construction.

Vehicle usage associated with Project operations would include regular maintenance activities by City staff and are expected to be minimal; therefore, emissions from maintenance vehicles during operations would be negligible. Expected emission from the backup generator would be well below the BAAQMD significance thresholds; therefore, operation of the Project would not expose sensitive receptors to substantial pollutant concentrations, and impacts would be less than significant.

Impact 4-3. Would the proposed Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Odor impacts are dependent on the distance, frequency, and intensity of the source as well as environmental factors such as wind speed and direction, air temperature, and atmospheric conditions. Sensitive receptors are located near the Project site. Sensitive receptors include residences, schools, parks, and other public facilities.

As discussed in Section 4.3.1, for potential odor sources locating near existing receptors, the determination of significance is based on the distance and frequency at which confirmed odor complaints from the public have occurred in the vicinity of a similar facility.

There is an existing pump station located near the current Project site (Bay Meadows Pump Station). However, no odor complaints have been received for this existing pump station.

The Project would include construction of odor control equipment (see Section 2.4, *Project Description*) that would reduce the potential for odor from the Project. Odor control would consist of foul air fans that draw air from each of the chambers and media vessels containing granular activated carbon for adsorption of odorous compounds. In addition, the odor control system would include fiberglass-reinforced plastic ductwork for transmission of air, control dampers, and a controls system for operation and monitoring. The odor control system would be designed to achieve the BAAQMD Regulation 7, Section 302 limit on odorous substances.

In addition to odor control, the temporary holding structure would be operated in such a way to reduce the generation of odors (see **Figure 2-7**). Within 24 hours of a wet weather event, the structure would be pumped out and flushed, reducing the time that stored waters can become anoxic, which would help prevent the generation of odorous compounds such as hydrogen sulfide. Even during times when the temporary holding structure is empty and idle, there is still a risk of untreated air escaping. To prevent such an occurrence, the odor control system would continue to operate at a reduced capacity to maintain a constant negative pressure within the structure.

Because the Project incorporates odor control per 2016 Final PEIR **Mitigation Measure 4-4**, which requires that the Project incorporate odor control systems for facilities with odor potential, odor-related impacts would be less than significant.

4.5 Mitigation Measures

All impacts to air quality would be less than significant and no mitigation measures are required.

4.6 References

Bay Area Air Quality Management District (BAAQMD). 1979. *Rule 9-2. Inorganic Gaseous Pollutants, Hydrogen Sulfide.* Adopted December 19. Amended March 17, 1982, and October 6, 1999.

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California Air Pollution Control Officers Association. 2017. *California Emission Estimator Model User's Guide* Version 2013.2. July.

California Air Resources Board (ARB). 2013. *Ambient Air Quality Standards*. http://www.arb.ca.gov/research/aaqs/aaqs2.pdf.

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CHAPTER 5

Biological Resources

This chapter evaluates the potential impacts of the proposed Project on biological resources. This chapter describes biological resources present or potentially present in the Project site and vicinity; discusses federal, state, and local regulations that may affect biological resources; identifies potential impacts that could occur from construction and operation of the Project; and proposes mitigation measures to reduce any potentially significant impacts to a less-than-significant level, as applicable.

5.1 Existing Setting

The Project site is in a developed urban area. Land use in the area consists of paved roadways; other transportation infrastructure, including railroads; residential, institutional, commercial, and industrial development; and landscaped parks and recreation areas. Biological resource surveys of the Project site and adjacent areas were completed on August 24, 2016, October 10, 2017, and January 11, 2018. Arborist tree field surveys were conducted January 17 through 19, 2018. The survey areas include all the proposed UFES facilities, including the temporary holding structure location and associated features, and the sewer diversion pipelines (**Figure 5-1**).

5.1.1 Regulated Habitats in the Project Area

There are no regulated habitats, including wetlands, present in the Project area. Aquatic/riparian habitat along Borel Creek, a channelized, earthen drainage along the north side of Saratoga Drive is located north of the proposed diversion pipelines (**Figure 10-1**), outside of the Project area. The Borel Creek channel daylights approximately 400 feet southwest of S. Delaware Street and continues east as an aboveground channel for approximately 1 mile to the confluence with Seal Slough. The channelized drainage is located within a 50-foot-wide corridor. Vegetation adjacent to the channel consists primarily of annual grasses and invasive weeds and grasses, various landscape trees and shrubs. The channel is largely open water along the southern edge with occasional narrow bands of emergent vegetation along the northern edge.

Borel Creek is tributary to Seal Slough, which flows through Marina Lagoon to south San Francisco Bay (a traditional navigable water body) and, therefore, it is likely jurisdictional as waters of the United States. The creek does not appear to be tidally influenced due to the presence of multiple water-level control structures in the slough. The channel is also considered to be waters of the State and is regulated by the San Francisco Bay RWQCB.

5.1.2 Special-Status Species in the Project Area

Special-status plant and animal species are afforded special recognition by federal, state, or local resource agencies or organizations. Special-status species have relatively limited distribution and generally require specialized habitat conditions. Special-status species are defined as follows:

- Listed, proposed, or candidate for listing under the state or federal Endangered Species Acts
- CDFW Species of Special Concern (SSC) and California Fully Protected (CFP) Species
- Included in the California Native Plant Society's Rare and Endangered Plant Inventory (Rare Plant Rank 1A, 1B, or 2)
- Species that receive consideration during environmental review under CEQA.

The CDFW maintains records in the California Natural Diversity Database (CNDDB) for the distribution and known occurrences of special-status species and sensitive habitats. The CNDDB was queried for all special-status species records within a 5-mile buffer of the Project (CNDDB, 2018). In addition, a search of the California Native Plant Society (CNPS) database was performed (CNPS, 2018) and the online database of federally listed species provided by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) (NMFS, 2016). Moreover, the U.S. Fish and Wildlife Service (USFWS) IPaC Information for Planning and Conservation online system was checked for species listings (USFWS, 2018a). Species identified in the database searches, and their potential to occur in the Project area, are listed in **Appendix B**.

The CNDDB lists 45 special-status species occurrences within a 5-mile radius of the Project location (see **Figures 5-2** and **5-3**). Several of these occurrences are based on collections that are more than 50 years old with vague location information. Some species are now extirpated due to development (see Table 1 in **Appendix B**) other species, such as the San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) and peregrine falcon (*Falco peregrinus anatum*), have been broadly mapped to include the entire San Mateo quadrangle. Because of the lack of suitable habitat and the surrounding highly developed urban landscape, special-status wildlife species are considered unlikely to occur at this location.

Wildlife observations at the time of the surveys were limited to common urban-adapted birds (e.g., house sparrow [*Passer domesticus*]). Various waterbird species were observed adjacent to the Project area within Borel Creek east of S. Delaware Street and the storm pond adjacent to Bay Meadows Park, including American coot (*Fulica Americana*), eared grebe (*Podiceps nigricollis*), snowy egret (*Egretta thula*), and mallard (*Anas platyrhynchos*). No mammals, amphibians, or reptiles were observed. Plant species observed during the site surveys included ruderal herbaceous species and ornamental trees and shrubs used for landscaping.

5.1.3 Heritage Trees and Street Trees in the Study Area

A certified arborist conducted a tree inventory and assessment within the Project area. Both heritage trees and street trees are located in the Project area. The majority of the street trees that were inventoried are located along the northern and eastern sides of Saratoga Drive. The others are in the center divider and near the southeastern corner of the proposed UFES holding structure area. The species of trees could not be determined during the tree survey. Two heritage horsetail trees are located west of S. Delaware Street on both sides of E. 25th Avenue (Stantec, 2018).

5.2 Regulatory Framework

This section discusses specific environmental review and consultation requirements and identifies permits and approvals that may be required from local, state, and federal agencies for the Project.

5.2.1 Federal Regulations

5.2.1.1 Endangered Species Act

Provisions of the federal Endangered Species Act (FESA), as amended (16 United States Code [USC] 1531), protect federally listed threatened and endangered species and their habitats from unlawful take. "Take" under FESA includes activities that "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or…attempt to engage in any such conduct." USFWS regulations define "harm" to include some types of "significant habitat modification or degradation." In the case of Babbitt, Secretary of Interior, et al., Petitioners v. Sweet Home Chapter of Communities for a Great Oregon, et al. (No. 94-859) (U.S. Supreme Court, 1995), the United States Supreme Court ruled on June 29, 1995, that "harm" may include habitat modification "...where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." FESA also governs the removal, possession, malicious damage, or destruction of endangered plants on federal land. Taking is allowed only when incidental to an otherwise legal activity through the ESA Section 7 process for federal agencies, and through the FESA Section 10 Habitat Conservation Plan process for private entities.

5.2.1.2 Clean Water Act, Section 401

The RWQCB has jurisdiction under Section 401 of the Clean Water Act (CWA) for activities that could result in a discharge of dredged or fill material to a water body. Projects that are regulated by the U.S. Army Corps of Engineers (USACE) must also obtain water quality certification from the RWQCB. The appropriate RWQCB regulates Section 401 requirements.

5.2.1.3 Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 USC 703–711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). The MBTA protects active nests from destruction, and all nests of species protected by the MBTA, whether active or not, cannot be possessed. The federal agency that addresses issues related to the MBTA is the USFWS. The overwhelming majority of birds found in the Project area are protected under the MBTA.

5.2.2 State Regulations

5.2.2.1 California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has responsibility for maintaining a list of endangered and threatened species (California Fish and Game Code 2070). CDFW maintains a list of “candidate species” that are under review for addition to the list of endangered or threatened species. CDFW also maintains lists of “species of special concern,” which serve as species watch lists. Pursuant to the requirements of CESA, an agency reviewing a proposed Project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the Project site and determine whether the proposed Project would have a potentially significant impact on such species. In addition, CDFW encourages informal consultation on any proposed Project that may affect a candidate species; however, this consultation is not required. State-listed species are fully protected under the mandates of CESA. “Take” of protected species, incidental to otherwise lawful management activities, may be authorized under California Fish and Game Code Section 206.591, in the form of an Incidental Take Permit. Project-related impacts on species on the CESA endangered or threatened list would be considered significant.

5.2.2.2 Waters of the State/Porter-Cologne Water Quality Control Act

Water quality in California is governed by the Porter-Cologne Water Quality Control Act. This law assigns overall responsibility for water rights and water quality protection to the State Water Resources Control Board (SWRCB) and directs the nine statewide RWQCBs to develop and enforce water quality standards within their boundaries. All waters of the United States that are within the borders of California are also “waters of the state” and fall under the jurisdiction of the SWRCB. Under California law, “waters of the state” means “any surface water or groundwater, including saline waters, within the boundaries of the state.” Therefore, water quality laws apply to surface water and groundwater. The RWQCB has jurisdiction under Section 401 of the CWA in the form of a Section 401 Water Quality Certification for activities that could result in a discharge of dredged or fill material to a water body. Federal authority (using a 401 certification) is exercised in the form of a Notice of Coverage, Waiver of Waste Discharge Requirements, when a project requires a Section 404 permit from the USACE. State authority (using Waste Discharge Requirements under the Porter-Cologne Act) is exercised when a Project is not subject to federal authority. Some wetlands are under RWQCB jurisdiction and waters that are not under USACE jurisdiction. RWQCB jurisdiction of other waters, such as streams and lakes, extends to all areas below the ordinary high water mark.

The SWRCB regulates discharges under the Porter-Cologne Act through issuance of National Pollutant Discharge Elimination System (NPDES) permits for point source discharges and Waste Discharge Requirements for non-point source discharges. Dischargers whose projects disturb 1 acre or more of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 acre or more, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity. The proposed Project would require development of a SWPPP.

5.2.2.3 Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900–1913) prohibits take, possession, or sale within the state of any plants with a CDFW designation of rare, threatened, or endangered. An exception in the act allows landowners, under specified circumstances, to take listed plant species, provided the owners first notify CDFW and give that agency at least 10 days to retrieve (and presumably replant) the plants before they are destroyed (Fish and Game Code Section 1913 exempts "the removal of endangered or rare native plants from a canal, lateral ditch, building site, or road, or other right of way"). Impacts of a project on these species are not considered significant unless the species are known to have a high potential to occur within the area of disturbance associated with construction of the proposed Project.

5.2.2.4 Birds of Prey

Under Section 3503.5 of the California Fish and Game Code, it is unlawful to take, possess, or destroy any birds in the orders of Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto. Some raptors may nest in urban environments, but nesting raptors are unlikely to occur in or near the Project site. Preconstruction nesting bird surveys would be conducted as described below.

5.2.2.5 Fully Protected Species

California statutes also accord "fully protected" status to specifically identified birds, mammals, reptiles, and amphibians. These species cannot be taken, even with an incidental take permit. Section 3505 of the California Fish and Game Code makes it unlawful to take "any aigrette or egret, osprey, bird of paradise, goura, numidi, or any part of such a bird." Section 3511 protects from take the following fully protected birds: (a) American peregrine falcon (*Falco peregrinus anatum*); (b) brown pelican (*Pelecanus occidentalis*); (c) California black rail (*Laterallus jamaicensis coturniculus*); (d) Ridgway's rail (formerly known as California clapper rail) (*Rallus longirostris obsoletus*); (e) California condor (*Gymnogyps californianus*); (f) California least tern (*Sterna albifrons browni*); (g) golden eagle; (h) greater sandhill crane (*Grus canadensis tabida*); (i) lightfooted clapper rail (*Rallus longirostris levipes*); (j) southern bald eagle (*Haliaeetus leucocephalus leucocephalus*); (k) trumpeter swan (*Cygnus buccinator*); (l) white-tailed kite (*Elanus leucurus*); and (m) Yuma clapper rail (*Rallus longirostris yumanensis*).

CDFW does not issue take permits, including Incidental Take Permits (ITP), for any of these fully protected species. Species with "fully protected" status and with potential to occur in the Project vicinity are described in **Appendix B**; no impacts by the Project on fully protected species are expected.

5.2.2.6 California Native Plant Society

CNPS is a non-governmental agency that classifies native plant species according to current population distribution and threat-level of extinction. CNPS maintains a list of plant species native to California that have low numbers, limited distribution, or are otherwise threatened with extinction. Potential impacts on populations of CNPS-listed plants receive consideration under CEQA review. Special-status species with potential to occur in the Project vicinity are described in **Appendix B**; no Project impacts on rare plants are expected to occur.

5.2.3 Local Regulations

5.2.3.1 General Plan

The General Plan includes a Conservation, Open Space, Parks, and Recreation Element that contains goals, objectives, policies, actions, and strategies applicable to biological resources. The General Plan goals and policies related to biological resources include the following:

- C/OS 1.1: Lagoon Habitat. Enhance the wildlife habitat value of Marina Lagoon, whenever possible, in conjunction with recreational use and flood control management activities.
- C/OS 1.5: Conversion of Incompatible Uses. Encourage the conversion of existing land uses which are not compatible with adjacent lagoon or wetlands to permitted compatible uses.
- C/OS 2.1: Aesthetic and Habitat Values -- Public Creeks. Preserve and enhance the aesthetic and habitat values of San Mateo, Laurel, and Beresford creeks and other City-owned channels in all activities affecting these creeks.
- C/OS 2.2: Aesthetic and Habitat Values – Private Creeks. Preserve and enhance the aesthetic and habitat values of privately owned sections of all other creeks and channels when cost effective or when these values outweigh economic considerations.
- C/OS 2.3: Hydrologic Impacts. Ensure that improvement to creeks and other waterways do not cause adverse hydrologic impacts on upstream or downstream portions of the subject creek; comply with Safety Element Policy S-2.1 regarding flood control.
- C/OS 2.4: New Creekside Development Requirements. Require that new Creekside development includes the following:
    a. Adequate setback from the creek bank for flood control as directed by the Safety Element Policy S-2.2.
    b. Protection or enhancement of riparian vegetation and water (including stormwater) quality.
    c. Dedication of maintenance/bank stabilization easement in exchange for City assumption of maintenance responsibility.
    d. Dedication of public access easement where possible and desirable.
- C/OS 6.1: Tree Preservation. Preserve heritage trees in accordance with the City Heritage Tree Ordinance.
- C/OS 6.2: Replacement Planting. Require significant replacement planting when the removal of heritage trees is permitted.
- C/OS 6.3: New Development Requirements. Require the protection of heritage trees during construction activity; require that landscaping, buildings, and other improvements located adjacent to heritage trees be designed and maintained to be consistent with the continued health of the tree.
- C/OS 6.4: Tree and Stand Retention. Retain the maximum feasible number of trees and preserve the character of stands or grove trees in the design of new or modified projects.

5.2.3.2 City of San Mateo Street Tree and Heritage Tree Ordinances

The City of San Mateo Street Trees Ordinance and Heritage Tree Ordinance (Chapters 13.35 and 13.52 of the Municipal Code [City of San Mateo, 2015]) provide for the protection of street trees and heritage trees. Street trees are trees located within the public ROW. The public ROW is typically the strip of land between the street and the sidewalk (planter strip) or the area just behind the sidewalk if a planter strip does not exist. According to the ordinance, no person may trim, remove, or plant a street tree without a permit from the Parks and Recreation Department. When a street tree removal permit is granted, the tree must be replaced.

Heritage trees defined as any bay (*Umbellularia californica*), buckeye (*Aesculus* spp.), oak (*Quercus* spp.), cedar (*Cedrus* spp.), or redwood (*Sequoia* spp.) tree that has a diameter of 10 inches or more measured at 48 inches above natural grade; or any tree with a trunk diameter of 16 inches or more measured at 48 inches above natural grade. A permit is required for (1) removing a heritage tree, (2) pruning more than one quarter of the crown of existing foliage, or (3) removing more than one third of the root system. A Heritage Tree Application is required for the permit and includes, among other things, the number and location of trees to be removed or pruned by types and the reason for removal or pruning of each. For construction work within a radius measured from the trunk center equal to 10 times the diameter of the tree trunk measured at 4 feet above grade, or other radius determined by the City during the development review process, a tree protection plan is to be prepared by a certified arborist prior to the issuance of a permit for a development project. Trees removed under jurisdiction of a planning approval pursuant to Chapter 27.71 must conform to the replacement conditions specified in the planning approval.

5.3 Assessment Methods and Thresholds of Significance

Potential impacts on biological resources were identified based on information collected during the August 24, 2016, October 10, 2017, January 11, 2018, and January 17-19, 2018, site surveys; data from the CNDDB, USFWS, NMFS, and CNPS searches; and information from the General Plan EIR.

Impacts on biological resources may occur if the proposed Project would result in the following:

- 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 CDFW or USFWS
- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFW or USFWS
- A substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal) through direct removal, filling, hydrological interruption, or other means
- 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 native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan

As described in Section 5.1.1, the Project area does not contain aquatic or riparian habitats or wetlands; therefore, impacts associated with these habitat types are not discussed further.

5.4 Environmental Impacts

Potential impacts of the proposed Project on biological resources are described in subsequent sections.

Impact 5-1. Would implementation of the proposed Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species?

Impacts on Developed Habitats

Permanent and temporary impacts would occur to approximately 4 acres of developed habitat associated with the temporary holding structure and associated facilities as well as trenching of the diversion sewer pipelines along roadways and other developed areas. Impacts that would be permanent in nature include grading and facilities construction and installation. Temporary construction-related impacts would include trenching and pipeline installation, removal of ruderal vegetation, and increases in noise or dust for short periods during construction. Developed habitats, such as those in the Project area, are common in the region and elsewhere in San Mateo County. Wildlife species that use developed areas for breeding or foraging have access to ample similar habitat in adjacent areas that would not be affected by construction. In addition, the Project area does not provide suitable habitat for special-status plant species. Therefore, impacts to developed habitat would be less than significant.

Impacts on Special-Status Plants and Wildlife

Special-status plant species have been documented within 5 miles of the Project site (**Appendix B**); however, none of the species would be expected to occur on the Project site because they require habitat types that are not present. Urban development and other habitat modification have resulted in unsuitable habitat for special-status plants that may have occurred in the region historically, including many of the plants that were associated with wetlands and other coastal habitats. No special-status plants are expected to occur in the Project footprint and impacts on rare plants similarly are not expected to occur.

Special-status wildlife species have also been documented to occur within 5 miles of the Project site (**Appendix B**). Most of the species would not be expected to occur within the Project area because of a lack of suitable habitat. Some urban-adapted avian species such as American peregrine falcon (*Falco peregrinus anatum*) may only occur as occasional visitors to the Project area and would likely avoid the area during the temporary construction. Following construction, the Project area would be restored similar to current conditions. The proposed Project would not impact Borel Creek, so no impacts to special-status aquatic species are expected to occur. Therefore, impacts to special status species would be less than significant.

Impact 5-2. Would implementation of the proposed Project interfere with the movement of fish or wildlife species?

While Borel Creek is near the Project area, no construction will occur in or adjacent to the creek. As described in Chapter 10, *Hydrology and Water Quality,* indirect impacts resulting from wind or rain erosion or accidental spills of construction materials could be conveyed into storm drains that connect to Borel Creek. Implementation of **Mitigation Measures 10-1, Install and apply erosion control and stormwater best management practices during construction, and 10-2, Obtain discharge permits to comply with discharge requirements,** would ensure that construction activities would not significantly degrade water quality in Borel Creek and downstream receiving waters, and impacts would be less than significant.

Birds protected under the MBTA and California Fish and Game Code have the potential to occur in the Project site. The nearest trees to the Project site are within Bay Meadows Community Park located directly adjacent to the southern boundary of the proposed Project, and along roadways and adjacent properties near proposed pipeline installations. These trees provide potential habitat for nesting birds. Construction activities, including unexpected tree removal or tree trimming, in the Project site could disrupt nesting birds and cause abandonment of nests or young, which is a potentially significant impact, particularly if a large number of bird nests are impacted. Implementation of **Mitigation Measure 5-2 Protection for nesting raptors and other native birds (consistent with Final PEIR Mitigation Measures 5-1a, 5-1b, and 5-1c)**, would reduce impacts to a less-than-significant level.

With implementation of **Mitigation Measure 5-2,** which is consistent with the mitigation measures for nesting birds in the Final PEIR, impacts of the proposed Project on nesting birds would be less than significant.

Impact 5-3. Would implementation of the proposed Project require the removal of street trees or heritage trees and potentially conflict with the City of San Mateo Street Tree and Heritage Tree Ordinances?

In compliance with Final PEIR **Mitigation Measure 5-5, Prepare and implement a tree protection plan for heritage trees**, a certified arborist conducted a tree inventory and assessment as described in Section 5.1.3 above. The proposed Project would not require the removal or trimming of heritage trees. Street tree trimming, or removal is not expected; however, if street tree trimming or removal is necessary, the contractor would be required to implement **Mitigation Measure 5-3, Obtain a street tree trimming/removal permit**. New trees, as well as other groundcovers and shrubs would be replaced, as required by the permit. With implementation of **Mitigation Measure 5-3,** impacts would be reduced to a less-than-significant level.

Impact 5-4. Would implementation of the proposed Project conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other plan?

The Project site is not located within the boundary of an adopted habitat conservation plan. Portions of the western part of the City are located within the Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area (City of San Mateo, 2009). However, the Project would not be located on serpentine soils (see Chapter 7) and, therefore, would not be located in the recovery plan area. No conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other plan would occur.

5.5 Mitigation Measures

Mitigation Measure 10-1. Install and apply erosion control and stormwater best management practices during construction is described in Chapter 10.

Mitigation Measure 10-2. Obtain discharge permits to comply with discharge requirements is described in Chapter 10.

The following measure shall be implemented to ensure the Project complies with the Migratory Bird Treaty Act and California Fish and Game Code and to avoid impacts on large numbers of common birds or any special-status birds:

Mitigation Measure 5-2. Protection for nesting raptors and other native birds (consistent with Final PEIR Mitigation Measures 5-1a, 5-1b, and 5-1c).

Construction during the nesting season should be avoided, if feasible (CDFW generally recognizes the period between February 1 and August 31 as nesting season). If construction during the nesting season is unavoidable, a preconstruction nesting bird survey shall be performed by a qualified biologist at least 14 days prior to construction if work activities are conducted between February 1 and August 31. Should an active nest for a protected species be observed prior to construction activities, disturbance-free buffers of 300 feet for raptors and 100 feet for non-raptors shall be implemented. Buffers shall be maintained until young have fledged (left the nest on their own), as determined by a qualified biologist, or the nest is no longer active due to non-construction-related reasons. If it is not practicable to avoid work in a buffer zone around an active nest, work activities shall be modified to minimize disturbance of nesting birds but may proceed in these zones at the discretion of a qualified biologist. The biologist, after consulting with CDFW for approval, shall monitor all work activities in these zones periodically when construction is occurring and assess their effect on the nesting birds. If the biologist determines that particular activities pose a high risk of disturbing an active nest, the biologist shall recommend additional, feasible measures to minimize the risk of nest disturbance. If work cannot proceed without disturbing the nesting birds, or signs of disturbance are observed by a monitor, work may be halted or redirected to other areas until the nesting and fledging is completed or the nest has otherwise failed for non-construction-related reasons. The biologist will contact the USFWS and the CDFW as needed could be contacted regarding alternate avoidance measures if halting or redirecting work is not feasible.

Mitigation Measure 5-3. Obtain a street tree trimming/removal permit.

A street tree trimming/removal permit would be obtained from the City's Department of Parks and Recreation if necessary. New trees, as well as other groundcovers and shrubs would be planted, as required by the permit.

5.6 References

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VICINITY MAP

LEGEND

Maximum Disturbance Footprint (Survey Area)

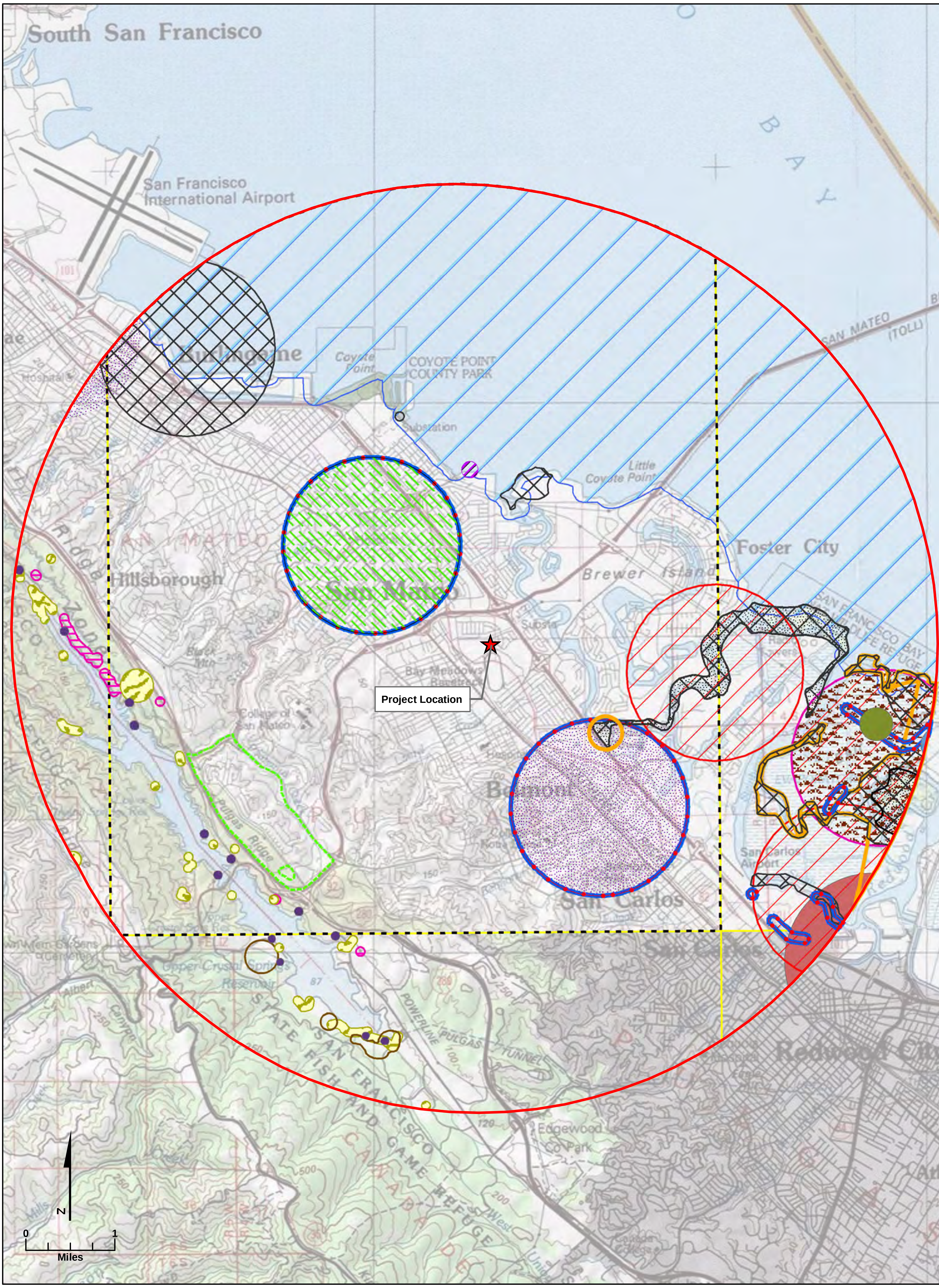
Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

0 200 400
Feet

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 5-1
Survey Area
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program



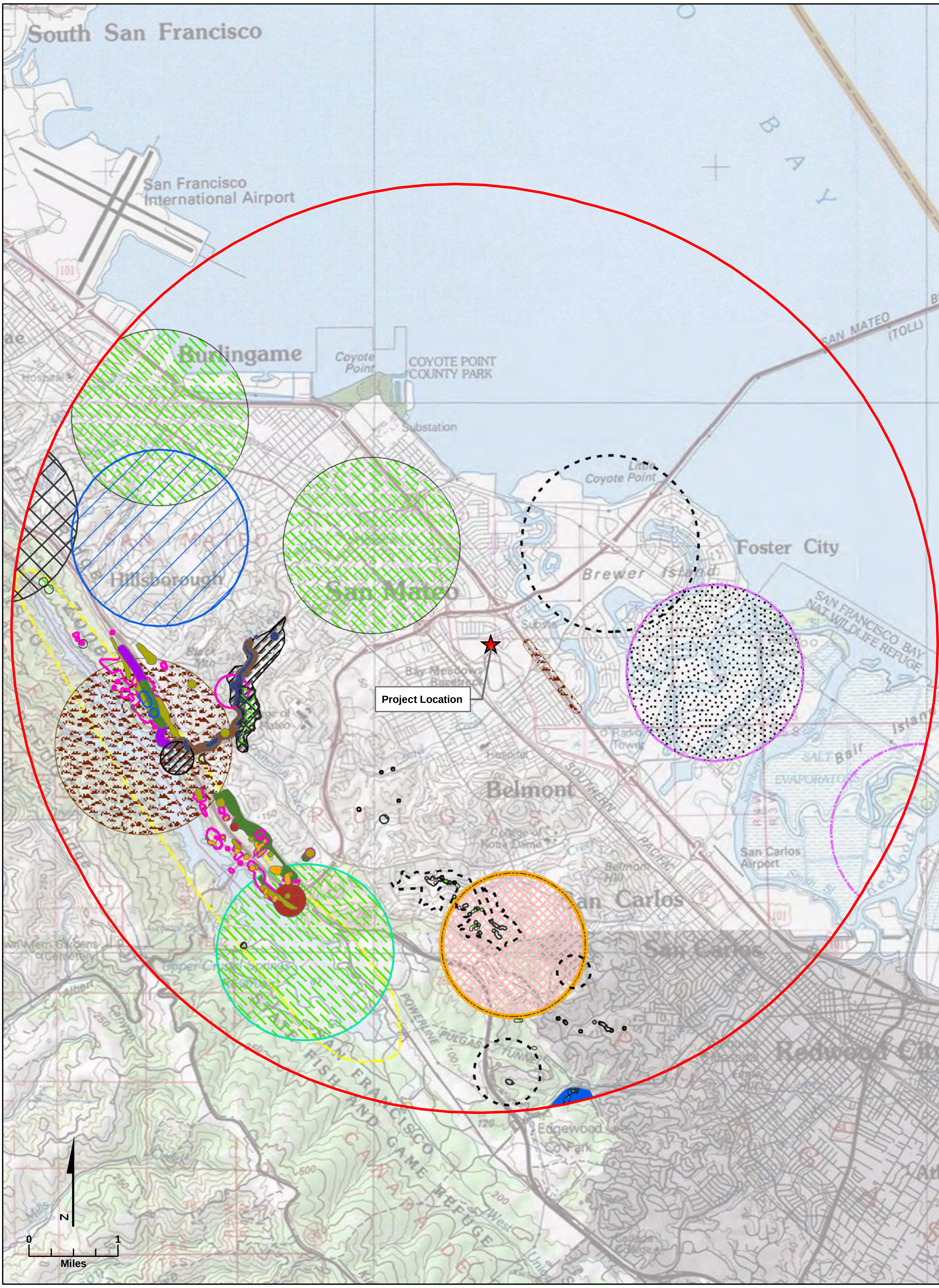
5-mile Buffer

CNDDB (Animals)

- Alameda song sparrow
- American peregrine falcon
- Bay checkerspot butterfly
- California Ridgway's rail
- California black rail
- California least tern
- California red-legged frog
- Myrtle's silverspot butterfly
- San Francisco dusky-footed woodrat
- San Francisco gartersnake
- burrowing owl
- longfin smelt
- marbled murrelet
- northern harrier
- pallid bat
- salt-marsh harvest mouse
- salt-marsh wandering shrew
- saltmarsh common yellowthroat
- short-eared owl
- western pond turtle
- western snowy plover
- white-tailed kite
- yellow rail

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 5-2
CNDDB Special-Status Animal Occurrences
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program



5-mile Buffer

CNDDB (Plants)

- Choris' popcornflower
- Crystal Springs fountain thistle
- Crystal Springs lessingia
- Franciscan onion
- Hillsborough chocolate lily
- Kings Mountain manzanita
- Marin western flax
- Point Reyes salty bird's-beak
- San Francisco collinsia
- San Francisco owl's-clover
- San Mateo thorn-mint
- San Mateo woolly sunflower
- arcuate bush-mallow
- bent-flowered fiddleneck
- chaparral ragwort
- coastal marsh milk-vetch
- fragrant fritillary
- saline clover
- short-leaved evax
- western leatherwood
- white-rayed pentachaeta
- woodland woollythreads

FIGURE 5-3
CNDDB Special-Status Plant Occurrences
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

Cultural, Paleontological, and Tribal Resources

This chapter evaluates potential impacts of the proposed Project on cultural and paleontological resources. Cultural resources are defined as buildings, sites, districts, structures, or objects having historical, architectural, archaeological, or cultural significance. Paleontological resources are defined as fossilized remains of vertebrate and invertebrate organisms, fossil tracks and trackways, and plant fossils. This section briefly describes the prehistoric and historic setting of the Project area and presents known cultural and paleontological resources and cultural resource sensitivity in the Project area. It identifies applicable federal, state, and local regulations; identifies potential impacts of construction and operation of the proposed Project; and proposes mitigation measures, where available and applicable, to reduce impacts on cultural and paleontological resources.

6.1 Existing Setting

The proposed Project would be constructed within the City of San Mateo and, therefore, existing setting information for San Mateo is presented. The existing setting is primarily summarized from the General Plan EIR (City of San Mateo, 2009) and the Citywide Archaeological Report (Chavez, 1983), and a cultural resource assessment that was conducted specifically within the Project boundaries (Jacobs, 2017). This chapter incorporates by reference all the sources from these documents. The reference documents are available from the City of San Mateo. The study area for this chapter includes all proposed disturbance areas, and a 0.5-mile buffer around the Project site.

6.1.1 Area of Potential Effects

The Area of Potential Effect (APE) for all Project elements includes a 25-foot-diameter area around the diversion sewer pipelines and the storage facility construction layout area (as shown in **Figures 2-1 and 2-6**), both of which were examined as part of this investigation.

The areas surveyed also include the vertical APE, with an average depth of 5 feet for the diversion sewer pipelines. According to City engineers, trenches would typically be between approximately 5 and 20 feet deep, and the width would be 2.5 times the pipe diameter. Pipes would range between 36 and 18 inches in diameter. It is assumed the new storage facility's reinforced concrete tank will be placed at about 60 feet bgs.

6.1.2 Prehistory

San Mateo is set between two primary physical features, San Francisco Bay to the east and a ridge of hills on the City's west side. Native American occupation and use of the general area appear to extend over 5,000 to 7,000 years and possibly longer. Evidence of early occupation along the Bayshore has been hidden by rising sea levels from about 15,000 to 7,000 years ago or has been buried by sediments caused by marsh infilling along estuary margins since about 7,000 years ago.

Early occupants concentrated on hunting, gathering various plant foods, and collecting shellfish. According to Chavez (1983), the prehistoric way of life in the San Mateo Peninsula can be characterized as a hunting and gathering network of subsistence systems. Seasonally, parties went out from the villages to temporary camps within their territory to exploit the various available resources through hunting and gathering techniques. Subsistence patterns included the exploitation of marine resources by gathering mussel and shellfish in season, fishing for trout and salmon, taking of seals, and hunting land mammals. Intensive use of plant foods included the common use of acorns through the leaching process.

Known sites in the vicinity generally consist of dark midden (culturally affected) soils containing large quantities of shell, primarily obtained from the Bayshore area. Most of the mound sites in the study area have been leveled and partially covered by roads, buildings, parking lots, and parks over the past 70 to 100 years.

6.1.3 Ethnography

The California Native Americans who occupied the Peninsula at the time of European contact are known as the Costanoan. The term Costanoan is derived from the Spanish word *Costanos*, meaning coast people. San Francisco Bay Area descendants of these people prefer the name Ohlone. Sources for Ohlone ethnographic data are limited primarily to European accounts during visits to the coast. Linguistic evidence suggests that the immediate ancestry of the historically known Ohlone people moved into the San Francisco region about A.D. 500. They likely migrated from the San Joaquin-Sacramento River Delta area. This theory of the arrival of Costanoan language in the San Francisco area is chronologically consistent with the appearance of Late Horizon artifact assemblages in San Francisco Bay Area archaeological sites.

The Costanoan transformed from hunters and gatherers to agricultural laborers who lived at the Franciscan missions and worked with former neighboring groups such as the Yokut, Miwok, and Patwin. After secularization of the missions between 1834 and 1836, some Native Americans returned to traditional religious and subsistence practices and others labored on Mexican *ranchos*. Thus, multi-ethnic Indian communities grew up in and around Costanoan territory and provided informant testimony to ethnologists from 1878 to 1933.

6.1.4 Historic Context

Spanish explorers in the late 1760s and 1770s were the first Europeans to traverse the San Francisco Peninsula. The first party, led by Gaspar de Portola and Father Juan Crespi, traveled up the coast in search of Monterey Bay but failed to recognize it based on previous descriptions. In fall 1769, they first sighted San Francisco Bay from a ridge on the Peninsula. Sergeant Jose Francisco Ortega scouted the area, although his exact route remains uncertain. The second exploratory party, led by Fernando Javier Rivera and Father Francisco Palou, reached the San Francisco Peninsula in late 1774. They selected the Palo Alto area for a mission site but continued to travel north to San Francisco. In 1776, Colonel Juan Bautista de Anza and Father Pedro Font traveled from Monterey to San Francisco to select the settlement sites. Between 1769 and 1823, 21 missions were established by the Franciscan priests along the California coast between San Diego and Sonoma.

During the Spanish Period (1769–1822), the philosophy of government was directed at founding presidios, missions, and pueblos, with the land held by the Crown, whereas the later Mexican policy stressed individual ownership of land. About 1793, an adobe was built on the north bank of San Mateo Creek along El Camino Real, the trail connecting the San Francisco outpost with Monterey (City of San Mateo, 2009). This outpost functioned as a way station between Santa Clara and Mission Dolores. The footprint of the building appears to have straddled the southeast corner of Baywood Avenue and El Camino Real. The outpost produced grain and other crops, cattle, and sheep. By 1800, 30 mission-trained Native Americans were living in and around the adobe.

During the Mexican Period (1822–1848), vast tracts of land were granted to individuals. The Mexican period in California was an outgrowth of the Mexican Revolution, and its accompanying social and political views affected the mission system. The missions were secularized in 1833 and their lands divided among the Californios as land grants called *ranchos*. On the Peninsula, 18 ranchos were granted from mission lands. The rancho system generally remained intact until 1862–1864, when a drought forced many landowners to sell or subdivide their holdings.

The American Period started after 1848, with the initial population explosion on the Peninsula associated with the California Gold Rush, followed later by the construction of the transcontinental railroad in the late 1860s. European immigration and the development of a prosperous dairy industry had an impact on population growth in the area. Until about World War II, San Mateo County had a substantial agricultural or rural land use pattern. Former ranchos underwent a transformation in concert with the growth of transportation systems, the City of San Francisco, and other towns to the south in San Mateo County.

The town of San Mateo began to develop in the 1860s. In May 1861, construction began on the railroad to link San Francisco with San José. Charles Polhemus, a director of the San Francisco-San José Railroad, which ran through San Mateo, had William Lewis plan the town in 1862; the first plat of San Mateo consisted of about 16 blocks around the railroad depot. The first building to be erected near the tracks was the train station, and soon after buildings were constructed in the area of Main Street and Railroad Avenue. This was the beginning of downtown San Mateo. The opening of railroad service in San Mateo attracted many San Franciscans to the area. San Mateo was incorporated as a town in 1894.

By the turn of the 20th century, San Mateo was a community made up of large estates and summer retreats for wealthy San Franciscans to escape inclement summers in the City. Several subdivisions were planned and constructed for the service industry that grew up around the estates. The population of the City in 1900 was 1,832. A trolley system, constructed to connect San Mateo to San Francisco, was completed in 1903. With a 40-minute runtime from south San Francisco to downtown San Mateo, the trolley allowed middle class people to live outside San Francisco and commute to work daily (Sustainable San Mateo County, 2015). The 1906 earthquake served to increase the population of San Mateo as the City received people displaced by the disaster. By 1910, the population of San Mateo had risen to 4,384 people and by 1920, the population increased to 5,979 (MTC-ABAG Library, 2015).

Called "the Coney Island of the west," Pacific City was meant to be a tourist destination for local residents as well as day trippers coming down the peninsula from San Francisco. In 1921, real estate investors purchased the 90 acres of land at Coyote Point, located in Burlingame, which is immediately north of San Mateo. At a cost of approximately $1 million, the massive amusement complex known as Pacific City was constructed and opened for business on July 1, 1922. The park boasted a 3,200-foot boardwalk with associated bathing beach, a 68-foot pier, a dance pavilion, a roller coaster, and other carnival attractions. On opening weekend, more than 100,000 people entered the park and over a million people visited during its first season. When attendance began to dwindle, the facility closed for maintenance and repair before the start of the next season. After its reopening in 1923, the county health department closed the bathing beach due to untreated sewage. This coupled with the inclement weather spelled the doom of the park. By the end of its second season, Pacific City was abandoned (Burlingame Historical Society, n.d.). By the late 1920s, these ongoing sewage problems spurred initiatives to clean up the shoreline (Macabee, 1933).

In 1930, the City's population had increased to 13,444 citizens. Although the City had a world-class transportation system, other civil infrastructure lagged. In 1933, the City had nine sewer outfalls. It was the Great Depression that offered the City an opportunity to grow. With the general collapse of the economy of the United States, President Franklin Delano Roosevelt instituted a range of programs aimed at boosting the country's workforce. These programs were known collectively as the New Deal, and they operated from 1933 until America's entry into World War II (Department of Geography, 2018. As a result of the New Deal, there were many improvements around the City, including a school, golf course, and the post office. Of the many federal programs initiated to help jump-start local economies and provide work for thousands of unemployed, the Federal Emergency Administration of Public Works (Public Works Administration, or PWA) was created under the National Industrial Recovery Act of 1933.

Rather than overseeing the direct hiring of the unemployed like the Works Progress Administration (WPA) or the Civilian Conservation Corps, the PWA funded important projects through the local governments themselves, including the 1936 sewage treatment plant for the City.

During and after World War II, San Mateo County experienced explosive growth in population and housing. During the war years, industries like ship building and steel production came to the county, fostering jobs and more people. After the war, commercial aviation, and later the electronics industry, drove economic and residential expansion in San Mateo. T**he population of the City increased to 41,782 in 1950, 69,870 by 1960, and 78,991 by 1970** (MTC-ABAG Library, 2015).

The increases in population brought a need for housing. Consequently, San Mateo's suburban growth resulted in two famous Mid-Century modern-style tract housing developments of the late 1950s and early 1960s, the Highlands and Nineteenth Avenue Park.

The two well-known San Mateo suburban residential developments, associated with Joseph Eichler, of the Highlands and Nineteenth Avenue Park display architectural distinction and are the best local examples of Mid-Century modern-style tract housing, influenced by the Usonian style. The San Mateo suburban residences feature the style-defining dominant horizontal lines, integrated windows, and either flat or very gently sloped gabled roofs with wide overhanging eaves. Eichler focused on fair housing and affordable construction throughout his career.

Born in New York City on June 25, 1900, Joseph Leopold Eichler attended college at New York University and went on to become a developer in California. During the mid-1940s, Eichler became intrigued with modernist design and was particularly influenced by the design of Frank Lloyd Wright. Beginning in 1949, Eichler became involved with building communities of homes and aligning himself with progressive California architects – first Anshen and Allen of San Francisco, then Jones and Emmons, and later Claude Oakland. Eichler strived at combining quality architectural design and economical construction, characterized as flair and affordability, for California's benign climate. He is best known for the many unique modernist homes he built. His list of accomplishments includes many housing developments in Northern California, including the San Francisco area and the Bay Area (Eichler Network, 2016; Weinstein, 2016).

In the San Mateo area, Eichler's development company often teamed up with the local contracting company of L.C. Smith. Known primarily as a paving company, L.C. Smith Co. specialized in roads, freeways, sidewalks, and parking lots (First Republic Bank, 2014). Many San Mateo neighborhoods still carry the stamp of the company's work. The ubiquitous L.C. Smith Co, Contractor, and date stamp appears on sidewalks throughout the City.

6.1.5 Known Cultural Resources in San Mateo

The General Plan EIR provides a summary of the Citywide cultural resources survey:

> *The 1983 survey concluded that while soil removal and construction have eliminated most above-ground shell mounds, good potential still exists for the presence of undisturbed subsurface archaeological deposits at surveyed sites. It was also concluded that high research potential exists for sites adjacent to San Mateo Creek. The "medium sensitivity" zone includes areas surrounding the high sensitivity areas and other locales where, while no sites are recorded, the settings are similar to those where recorded sites do occur. The majority of the City is in a "low sensitivity" zone wherein archaeological resources are not generally expected but may occur.*

6.1.6 Paleontological Setting

As stated in the General Plan EIR (San Mateo, 2009), there are no known paleontological resources in the City of San Mateo.

6.2 Regulatory Framework

6.2.1 State Regulations

6.2.1.1 California Register of Historical Resources

The California Register of Historical Resources (CRHR) is a guide to cultural resources that must be considered when a government agency undertakes a discretionary action subject to CEQA. CRHR helps government agencies identify and evaluate California's historic resources and indicates which properties are to be protected, to the extent prudent and feasible, from substantial adverse change [Public Resources Code [PRC] §5024.1(a)]. Resources listed in or eligible for listing in CRHR are to be considered during the CEQA process.

A cultural resource is evaluated under four CRHR criteria to determine its historical significance. For a resource to have historical significance, it must be in accordance with one or more of the following criteria [as defined in PRC §15064.5(a)(3)]:

i. Is associated with events that have made a significant contribution to the broad pattern of California's history and cultural heritage;
ii. Is associated with the lives of persons important in our past;
iii. 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
iv. Has yielded, or may be likely to yield, information important in prehistory or history.

Any resource that meets the above criteria, and retains sufficient historic integrity, is considered a historical resource under CEQA.

In addition to meeting one or more of the above criteria, CRHR requires that sufficient time must have passed to allow a "scholarly perspective on the events or individuals associated with the resource." Fifty years is used as a general estimate of the time needed to understand the historical importance of a resource [California Code of Regulations [CCR] Title 14(11.5) §4852 (d)(2)]. The Office of Historic Preservation recommends documenting, and taking into consideration during the planning process, any cultural resource that is 45 years or older.

CRHR also requires a resource to possess integrity, which is defined as "the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

Resources that are significant, meet the age guidelines, and possess integrity would generally be considered eligible for listing in the CRHR.

6.2.1.2 California Public Resources Code Section 21083.2

Section 21083.2 of the California PRC describes the CEQA requirements for evaluating whether a project may have a significant effect on archaeological or paleontological resources. CEQA defines a "unique archaeological resource" as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

CEQA further defines a "historical resource" as a resource that meets any of the following criteria:

- A resource listed in or determined to be eligible for listing in, the CRHR;
- A resource listed in a local register of historical resources, as defined in PRC §5020.1(k);
- A resource identified as significant (e.g., rated 1 through 5) in a historical resource survey that meets the requirements of PRC §5024.1(g); or
- Determined to be a historical resource by a project's lead agency.

Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered a historical resource.

If the cultural resource in question is an archaeological site, CEQA requires that the lead agency first determine if the site is a historic resource, as defined in CCR Title 14(3)§15064.5(a). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource. If the archaeological site does not qualify as a historical resource but does qualify as a unique archaeological site, then the archaeological site is treated in accordance with PRC §21083.2.

According to PRC §21083.2, if an impact on a historic or unique archaeological resource is significant, CEQA requires feasible measures to minimize the impact. Mitigation of significant impacts must lessen or eliminate the physical impact that a project will have on the resource. Generally, the use of drawings, photographs, and/or displays does not mitigate the physical impact on the environment caused by demolition or destruction of a historic resource. However, CEQA requires that all feasible mitigation be undertaken even if it does not mitigate impacts to a less-than-significant level.

CEQA Guidelines Section 15064.5(e) requires that excavation activities be stopped when human remains are uncovered, and that the county coroner assess the remains. If the coroner determines that the remains are those of Native Americans, the Native American Heritage Commission must be contacted within 24 hours. The lead agency must consult in a timely manner with the appropriate Native Americans, if any, identified by the Native American Heritage Commission.

6.2.1.3 California Health and Safety Code

Section 7050.5(b) of the California Health and Safety Code specifies the protocol when human remains are discovered:

> *In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.*

6.2.1.4 Assembly Bill 52

According to the introduction to Assembly Bill 52, on September 27, 2016, Appendix G in the CEQA Guidelines has been modified to address tribal resources. Tribal cultural resources are defined in as follows:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either determined to be eligible for inclusion in the CRHR or are included in a local register of historical resources, as defined in §5020.1(k) and PRC §21074.
- A resource determined by the lead agency, at its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Section 5024.1(c). These would be a cultural landscape that is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape, a historical resource, a unique archaeological resource, or a "non-unique" archaeological resources, as defined in PRC §21084.1 and §21083.2.

In addition, Assembly Bill 52 provides specific guidelines regarding tribal consultation, and states the lead agencies shall:

- Provide information to tribal governments early in the project planning process, to identify and address potential adverse impacts on tribal cultural resources.
- Conduct consultation with any California Native American tribe that requests consultation and is culturally and traditionally affiliated with the geographic area of a proposed project. According to PRC 21080.3.1, this consultation shall occur prior to the determination of whether a negative declaration, mitigated negative declaration, or environmental impact report is required for a project.
- Recognize that Native American prehistory, history, archaeology, cultural, and sacred places are essential elements in tribal traditions, heritages, and identities.
- Establish mitigation measures for tribal cultural resources that uphold to mitigation measures for historical and archaeological resources of preservation in place, if feasible.
- Recognize that Native Americans may have expertise regarding their tribal history and practices that concern the tribal cultural resources with which they are traditionally and culturally affiliated.

6.2.2 Local Regulations

6.2.2.1 City of San Mateo Zoning Code Requirements

Chapter 27.66, Historic Preservation, in the Municipal Code (City of San Mateo, 2015) requires review and approval through the City's SPAR process for projects resulting in exterior façade modification, exterior alteration, or building addition involving any individually eligible building for the National Register of Historic Places (NRHP). Review and approval are also required for other specifically identified buildings in the City's Downtown Specific Plan Area and all structures in the Downtown Historic District. Modifications are evaluated for conformance with applicable federal guidelines.

6.3 Assessment Methods and Thresholds of Significance

The following information was collected and reviewed to determine impacts to cultural resources.

6.3.1 Literature Review and Site Survey

A registered archaeologist conducted an archival literature review and a pedestrian survey for the Project Site. The literature review included a records search of the files at the Northwest Information Center California Historical Resources Information System (CHRIS). A 0.5-mile area around the Project site was included in the search. The CHRIS records search included all recorded archaeological sites, and all known cultural resource survey and excavation reports. The NRHP online database and the Office of Historic Preservation database, which includes sites listed on the California Register, California Historical Landmarks, and California Points of Historical Interest, were searched as well.

The records search revealed that one previous study has occurred within a 0.5-mile radius of the APE and could intersect with a diversion sewer pipeline.

On May 10 and 11, 2017, Jacobs conducted a pedestrian survey of the storage facility site and diversion sewer pipelines. Jacobs had full access to all properties. Potential historic or prehistoric archaeological resources observed are noted below. An intensive survey was conducted for all areas where ground visibility existed, including an examination of all undeveloped areas and all areas of disturbed soil.

6.3.2 Archaeological Survey Results

Systematic pedestrian cultural resource surveys of the area of the APE were conducted by a registered archaeologist.

The cultural survey areas were predominately within the built environment. Ground visibility throughout the survey corridor was generally poor because the APE contained roads, urban and residential development, recreational areas, utilities, and other construction. Where fallow fields, cut banks, and other soil exposures were encountered, soils were thoroughly assessed. The survey was conducted in 15-meter transects. Disturbances to the survey area have affected 100 percent of the horizontal and an unknown percentage of the vertical.

No archaeological resources were discovered as a result of the pedestrian survey.

6.3.3 Architectural Survey Results

Because the Project area is largely urban and developed, the surveyors conducted a reconnaissance windshield architectural survey for the diversion pipeline alignments. Review was conducted of San Mateo County assessor data to establish building dates. Historical topographic maps and aerial images were also used to establish general dates of construction. Project elements are located near areas with buildings 50 years or older, some of which may be eligible for the CRHR.

The storage facility and diversion sewer pipelines are located near the Fiesta Gardens area of San Mateo, on the grounds of the County Event Center and the former Bay Meadows Racetrack. Saratoga Drive is to the northeast and Event Center Drive appears to the northwest. Single-family residential buildings are north of the Project site, across Saratoga Drive. The area for the storage facility is a partially paved and gravel lot and is mostly bounded by opaque fencing. Within the fenced area is storage for recreational vehicles (RVs) and trailers.

Impacts on cultural resources may occur if the proposed Project would result in the following:

- Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature
- Disturb any human remains, including those interred outside of formal cemeteries
- Cause a substantial adverse change in the significance of a tribal cultural resource listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k)

- Cause a substantial adverse change to a California Native American Tribal resources, 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 PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of a tribal cultural resource

6.4 Environmental Impacts

Impact 6-1. Would the proposed Project cause a substantial adverse change in the significance of a historic resource or archeological resource pursuant to CEQA §15064.5?

No impacts to any historic buildings or structures would occur as a result of the proposed Project. All Project elements are located within a previously disturbed paved parking area and City streets and would not require the direct removal or alteration of any historic buildings, or their settings and viewsheds.

The archival review identified one known resource within the Project site. The archaeological survey did not identify any surface indicators of prehistoric and historic archaeological resources within the designated survey areas within the Project site. Though the site would be located in an area that is already disturbed, the Project site has a low to moderate sensitivity for intact buried deposits throughout the APE.

Additionally, prehistoric archaeological resources are known to occur in the general vicinity of the Project site, as the records search demonstrated. Therefore, there is some theoretical potential that prehistoric archaeological resources could be found in undisturbed soils during construction activities, such as grading and excavation.

San Mateo has developed specific conditions of project approval that address the potential for discovery of cultural resources. Implementation of Final PEIR **Mitigation Measure 6-1b, Halt construction if archaeological resources are discovered,** would provide for avoidance, recovery, or other mitigation of any unknown subsurface cultural resources encountered during construction activities at any location.

In addition to Final PEIR **Mitigation Measure 6-1b**, the City will implement Project-specific **Mitigation Measure 6-1c, Conduct worker environmental awareness training**, for all personnel before working at the Project site. The training will emphasize and educate workers regarding sensitivity for cultural resources on the site and procedures should cultural resources be encountered.

The City will also implement Project-specific **Mitigation Measure 6-1d, Designate a qualified archaeologist to conduct full-time monitoring of all ground-disturbing activities during construction**. Full-time monitoring would reduce impacts to archaeological deposits or human remains by allowing the archaeologist to evaluate inadvertent archaeological discoveries to determine their significance. If cultural resources are discovered during ground-disturbing activities, construction work in the vicinity of the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented; cultural resource mitigation measures will be consistent with guidance and standards in Section 15126.4 of the CEQA Guidelines.

With implementation of Final PEIR **Mitigation Measure 6-1b,** and Project-specific **Mitigation Measures 6-1c** and **6-1d** impacts of the proposed Project on cultural resources would be less than significant.

Impact 6-2. Would the proposed Project destroy a unique paleontological resource or site or unique geologic feature?

Although no paleontological resources are known in San Mateo, the potential does exist for unknown subsurface paleontological resources to be encountered during construction activities, such as grading and excavating. San Mateo has developed specific conditions of project approval that address the potential for discovery of paleontological resources as a result of development in the City. These conditions would be implemented as part of Final PEIR **Mitigation Measure 6-2, Halt construction if paleontological resources are discovered,** to reduce impacts of construction of the proposed Project to less than significant.

Impact 6-3. Would the proposed Project disturb human remains?

No known human remains existing onsite. In the event that human remains are discovered during Project excavation, in addition to following the City's standard project conditions, the construction contractor is required to follow California Health and Safety Code Section 7050.5(b), which specifies protocols if human remains are discovered. In the event that human remains are discovered, the City will implement Project-specific **Mitigation Measure 6-3, Protect human remains upon discovery.**

6.5 Mitigation Measures

6.5.1 Final PEIR Mitigation Measures

Implementation of the following mitigation measures from the Final PEIR, would ensure that potential impacts on cultural and historical resources would remain at a less-than-significant level.

Final PEIR **Mitigation Measure 6-1b. Halt construction if archaeological resources are discovered.**

In the event of the discovery of archaeological resources, the applicant shall be responsible for halting construction activities, notifying the chief of planning, and retaining a qualified archaeologist. The archaeologist would be required to evaluate the uniqueness of the find and to contact local Native American and historical organization and recommend a course of action.

Final PEIR Mitigation Measure 6-2. Halt construction if paleontological resources are discovered.

Should any potentially unique paleontological resources (e.g., fossils) be encountered during construction activities, work shall be halted immediately within 50 feet of the discovery. A qualified paleontologist shall determine the significance of the discovery, evaluate the uniqueness of the find, and prepare a written report documenting the find and recommending further courses of action. Depending on the significance of the discovery, the actions may include avoidance, preservation in place, excavation, documentation, recovery, or other measures determined by the paleontologist.

6.5.2 Project-Specific Mitigation Measures

Implementation of the following Project-specific mitigation measures would ensure that potential impacts on cultural and historic resources would remain at a less-than-significant level.

Mitigation Measure 6-1c. Conduct worker environmental awareness training.

A qualified Cultural Resources Specialist (CRS) will prepare the cultural resources portion of the Worker Environmental Awareness Program; Worker environmental awareness training will be required for all personnel before working at proposed construction sites. The training will emphasize and educate workers regarding sensitivity for cultural resources on the site and procedures should cultural resources be encountered.

Mitigation Measure 6-1d. Designate a qualified archaeologist to write a Monitoring Plan and to conduct full-time monitoring of all ground-disturbing activities during construction.

A qualified Cultural Resources Specialist (CRS) will complete a construction monitoring program to be implemented per recommendations. Monitoring and mitigation comprise a number of required activities that may prescribe measures to ensure avoidance of resources or compensate for the loss of significant cultural resources due to unavoidable impacts resulting from the exigencies of a project's construction. The objectives of monitoring are to protect extant historical resources and unique archaeological resources; to identify at the time of discovery any archaeological materials exposed during ground disturbance; and to protect such resources from damage until recommendations of eligibility for the CRHR can be made.

During all ground-disturbing activities, the contractor shall retain a qualified archaeologist to monitoring soil conditions prior to disposal.

If cultural resources are discovered during ground-disturbing activities, construction work in the vicinity of the discovery would cease, and the area would be protected by a 50-foot buffer until the find could be evaluated by a qualified archaeologist. Mitigation measures recommended by the archaeologist will be implemented; cultural resource mitigation measures will be consistent with guidance and standards in Section 15126.4 of the CEQA Guidelines.

Mitigation Measure 6-3. Protect human remains upon discovery.

If human remains are discovered, the discovery would be treated in accordance with the requirements of §750.5(b) of the California Health and Safety Code. Pursuant to §7050.5(c) of the California Health and Safety Code, if the coroner determines that the human remains are of Native American origin, San Mateo County would ensure that the discovery is treated in accordance with the provisions of §5097.98(a)–(d) of the California PRC.

6.5.3 Native American Consultation

Jacobs contacted NAHC on September 6, 2017, to request a Sacred Lands File Search that includes information about traditional cultural properties, such as cemeteries and sacred places in the Project area. NAHC responded on October 4, 2017, with a list of Native Americans interested in consulting on development projects. Each individual and group were contacted via a written letter on September 10, 2018, with follow-up calls on November 20, 2018, in compliance with Assembly Bill 52 (PRC Section 21080.3.1). No comments have been received.

6.6 References

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CHAPTER 7

Geology and Soils

This chapter identifies and evaluates the potential impacts of the proposed Project on geology, seismicity, and soil resources. The chapter includes a description of local topography, geology, seismicity, and soil resources; summarizes applicable state, local, and regional plans and programs, objectives, and policies; identifies potential impacts related to geology and soils; and details proposed mitigation measures to reduce potentially significant impacts, as applicable.

7.1 Existing Setting

The proposed Project would be constructed within the City of San Mateo; therefore, existing setting within the City is presented when localized information specific to the Project area is unavailable.

7.1.1 Geology and Topography

The City of San Mateo is located on the west side of San Francisco Bay, within the Coast Ranges geomorphic province of California. The Coast Ranges geomorphic province extends from near the Oregon border southward to the Santa Barbara area; the San Francisco Bay separates the northern and southern Coast Ranges (Schoenherr, 1995). The Coast Ranges consists of northwest-to-southeast-trending ridges and valleys associated with faulting and folding (Schoenherr, 1995). The City is situated on the northeasterly flank of the central Santa Cruz Mountains but is separated from the mountain range by the San Andreas Fault and associated rift valley, which run subparallel to the fault. Geologic formations within and near the City include the Santa Clara formation, which is typified by conglomerate sandstone and mudstone, and the Franciscan formation, which is also typified by sandstone and mudstone as well as metamorphic constituents (City of San Mateo, 2009 and 2010; USGS and CGS, 1987). Although the Franciscan formation may include units with serpentinite, there are no such units located within the Project area (see **Figure 7-1** and **Appendix C** [Brabb, et al., 1988]).

Near the shoreline are Bay muds and reclaimed lands, which extend to near US-101, where the historical shoreline existed prior to filling the Bay (City of San Mateo, 2009 and 2010). The Project site is located on a geologic unit comprised of artificial fill; nearby geologic units are shown on **Figure 7-1**, and descriptions of the geologic units are provided in **Appendix C** (Brabb, et al., 1988).

Landforms within the City are varied and include uplands, hillsides, valley, and alluvial fans (City of San Mateo, 2009 and 2010). Western areas contain broad uplands and hills that have been extensively uplifted and dissected by the drainage canyons of Laurel Creek and San Mateo Creek. Because the Project would be located on filled lands that have been previously developed and disturbed, the topography does not vary at the Project location; the grade at the site is less than 1 percent.

7.1.2 Geologic Hazards

The San Francisco Bay Area (Bay Area) is in a very seismically active region, with a high risk of geologic hazards that stem largely from movement of the earth's crust along well-defined active fault zones of the San Andreas Fault system (City of San Mateo, 2009). The San Andreas Fault is a northwest-southeast-trending fault zone located approximately 4 miles west of the Project site. The Hayward fault is located approximately 15 miles northeast of the site (USGS, 2017). The United States Geological Survey (USGS) and the California Geological Survey (CGS) have not identified active (with evidence of rupture within the last 11,000 years) or inactive (older features with no evidence of recent rupture) faults located in the City (USGS, 2006). The City is not within an Alquist-Priolo Earthquake Hazard Zone. Geologic hazards associated with seismic activity that could potentially affect the Project are described in the following sections.

7.1.2.1 Ground Shaking

Ground shaking from earthquakes can cause extensive damage to property and people. Factors that determine the amount of damage caused from ground shaking are interrelated and include the magnitude and depth of the earthquake, distance from the fault, duration of shaking, type of bedrock and soils, and topography, among others. The entire Bay Area, including the City of San Mateo and the Project site, is subject to strong ground shaking during earthquakes (City of San Mateo, 2009) (see **Figure 7-2**). Historically, there have been several strong earthquakes in the vicinity, including the magnitude 6.9 Loma Prieta earthquake in October 1989 and the magnitude 7.8 San Francisco earthquake in 1906, both of which occurred on the San Andreas Fault system. Ground shaking from these events was felt over large distances, and areas underlain by unconsolidated sediments experienced greater structural damage than areas underlain by bedrock. There are no mapped active or potentially active faults underlying the City; however, because of its proximity to the San Andreas Fault Zone, the Hayward Fault Zone, and other active faults, San Mateo could experience very intense ground shaking during a large earthquake. According to the 2008 Uniform California Earthquake Rupture Forecast (USGS, 2015) there is a 63 percent probability of a magnitude 6.7 or greater earthquake in the Bay Area within 30 years, with the greatest probabilities of earthquakes on the Hayward-Rogers Creek Fault and the San Andreas Fault. Therefore, San Mateo is very likely to experience very strong ground shaking from earthquakes in the future.

7.1.2.2 Landslides

Weak rocks and steep slopes are basic geologic characteristics that contribute to slope instability, including landslides. In susceptible areas, landslides can be triggered by earthquakes and high rainfall. In the City, the risk of landslides is greatest in the western hilly areas where landslides have occurred previously and in areas where slopes have been modified by grading (City of San Mateo, 2009 and 2010). Despite recorded historic landslides, slope instability is not widespread in the City (City of San Mateo, 2009 and 2010); however, during a major earthquake or heavy rainfall, landslides could occur where grading has steepened the natural slopes, contributing to slope instability (City of San Mateo, 2009 and 2010). As discussed in Section 1.1.1, the Project site is located on relatively flat terrain; the nearest topographically prominent feature is a golf course, located approximately 1.25 mile from the Project site.

7.1.2.3 Liquefaction

Liquefaction is the transformation of saturated, unconsolidated, granular material from a solid state to a semi-liquid state because of increased pore pressure that reduces the material's strength. During liquefaction, soil becomes fluid-like and mobile, and permanent displacement of the ground can occur, resulting in damage to utilities and structures (Association of Bay Area Governments [ABAG], 2001). Increased pore pressure in unconsolidated materials is caused by ground shaking during large earthquakes. Liquefaction can cause foundation failures in buildings and other facilities because of the reduction of foundation bearing strength. The potential for liquefaction depends on the duration and intensity of earthquake shaking, particle size distribution of the soil, density of the soil, and groundwater elevation. Areas at risk of liquefaction typically have a high groundwater table with underlying low- to medium-density, granular sediments, particularly younger alluvium and artificial fill. In San Mateo, the potential for liquefaction exists in areas with fill material and alluvium; **Figure 7-3** shows areas within the Project area that have potential for liquefaction (City of San Mateo, 2009).

7.1.2.4 Lateral Spreading

Lateral spreading is a ground failure that involves displacement of large blocks of ground down gentle slopes or toward stream channels. The potential for lateral spreading is highest in areas underlain by loose, saturated, liquefiable materials, especially where bordered by steep banks. In San Mateo, lateral spreading is possible along the banks of drainage courses that are not constrained in concrete channels and/or by other protective measures (City of San Mateo, 2009). Borel Creek, also known as the 19th

Avenue Channel, is located approximately 500 feet from the temporary holding structure and greater than 70 feet from the diversion pipelines along Saratoga Drive. The channel is not concrete-lined, but is an artificial stream channel unit (see **Figure 7-1**) which generally has minimal potential for geologic hazards to occur (see **Appendix C**). The soil materials above the bottom of the channel encountered in the borings along Borel Creek are non-liquefiable clay, and the risk of lateral spreading causing damage is low.

7.1.2.5 Subsidence

Subsidence, or ground settlement caused by lowering of the groundwater level, may occur if dewatering of temporary excavations impact the groundwater level surrounding proposed excavations. The magnitude of subsidence is dependent upon the minimum historical groundwater elevation surrounding the Project, and the magnitude of groundwater drawdown below the minimum historical level. The type of dewatering system is a significant factor because it will determine the magnitude of groundwater drawdown and the zone of influence around the Project. The dewatering system would be coordinated with the shoring system to limit drawdown of groundwater beneath adjacent properties, and to prevent pumping of soil fines with the discharge water.

7.1.3 Soils

The general Project area contains soil types that vary with landscape position (see **Figure 7-4**). The proposed Project, including the temporary holding facility and all the diversion pipelines would be located on soils mapped as Urban Land-Orthents reclaimed complex (Kashiwagi and Hokholt, 1991; Map Unit 134). These lands were once part of San Francisco Bay and tidal flats and were filled as the area was developed. Soil composition is variable because the fill material used for reclamation varied in composition. Areas within Map Unit 134 may have a groundwater table that is tidally influenced and is estimated to fluctuate between 30 to 60 inches bgs. These soils are prone to settlement and liquefaction (see **Figure 7-3**).

Portions of the Project area comprise soils that have been cut and filled for development (Kashiwagi and Hokholt, 1991; Map Units 121 and 124) (see **Figure 7-4**), such as construction of roads and buildings. The City recently conducted a geotechnical analysis of the Project site (see **Appendix D**). The analysis consisted of exploratory borings within both the diversion pipeline alignment and holding structure location. The results of the analysis indicated that the soil conditions along the diversion pipelines include artificial fill, bay mud, course-grained alluvium, medium-grained alluvium, and fine-grained alluvium; and the location of the holding structure consisted of artificial fill (which included both sandy clay and clayey sand), bay mud, natural alluvial soil deposits (consisting of medium stiff-to-stiff lean clay and sandy clay), clayey sand, and very stiff to hard sandy to gravelly clay, followed by hard lean and sandy clay (ENGEO, 2018).

Urban lands are covered by asphalt, concrete, buildings and other structures, and urban soils contain fill material, similar to Orthents. These soils are largely placed and graded under engineering controls. Where slopes are relatively flat, the erosion hazard is slight because of the low velocity of runoff.

Some soil types in the Project area have physical properties that could limit construction. Such limitations include the erosion potential, shrink-swell behavior, and settlement. Settlement is the typically gradual drop in elevation of a ground surface caused by settling or compacting of soils under the weight of fill material or building loads. Settlement may continue over a long period. The degree of settlement is primarily influenced by the thickness of the compressible soils (e.g., Bay mud), site history, characteristics of fill material, and characteristics of building loads. Settlement is not always uniform; differential settlement is uneven, causing different parts of a structure to settle at different rates and magnitudes. Differential settlement could potentially occur in areas with non-uniform fill material, such as the filled Bay lands (City of San Mateo, 2009).

Erosion is the process whereby soil particles become detached and are transported by wind or water. Rates of erosion can vary, depending on several factors including soil texture, structure, amount of soil cover, and slope factors. The urbanized, relatively flat area surrounding the proposed Project site has a low erosion hazard.

Expansive soils exhibit a cycle of shrinking and swelling (contraction and expansion) with drying and wetting. This occurs in fine-textured soils containing expansive clay minerals. Structures built on expansive soils can be damaged over time, and foundations can crack or shift. Proper engineering during Project construction can mitigate this potential problem. Some of the fill material used to fill the Bay in the Project area consists of expansive clay, generally associated with Bay mud, and is likely to be encountered around the Project site during construction.

7.2 Regulatory Framework

This section describes the federal and state laws and regulations, and local policies and ordinances that are applicable to implementation of the UFES Project with respect to geology and soil resources.

7.2.1 Federal Regulations

7.2.1.1 Clean Water Act

The federal CWA, as amended, is the fundamental federal law for regulating discharges of waste into waters of the United States. This regulation is described in detail in Section 10, Hydrology and Water Quality.

7.2.2 State Regulations

7.2.2.1 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act provides for protection of the quality of all waters of the State of California. This regulation is described in detail in Section 10, *Hydrology and Water Quality*.

7.2.2.2 Seismic Hazards Mapping Act of 1990

The Seismic Hazards Mapping Act of 1990 (PRC, Chapter 7.8, Sections 2690–2699.6) directs the Department of Conservation, CGS to identify and map areas prone to earthquake hazards, including liquefaction, earthquake-induced landslides, and amplified ground shaking. In addition, the act requires local permitting agencies to regulate certain development projects within these hazard zones. Before a local development permit is issued for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted, and appropriate mitigation measures incorporated into the Project design.

7.2.2.3 Alquist-Priolo Earthquake Fault Zoning Act of 1972

The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo) prohibits the siting of structures for human occupancy across traces of active faults that represent a potential hazard to structures because of surface faulting or fault creep. Alquist-Priolo only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. Alquist-Priolo requires the State Geologist to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for use in planning and controlling new or renewed construction. All land division and most structures for human occupancy are regulated by local agencies within the Earthquake Fault Zones; however, local agencies can be more restrictive than state laws.

Before a project can be permitted within an Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults. An evaluation and written report for the specific site must be prepared by a licensed geologist. If an active fault is found, structures for human occupancy must be set back from the fault (generally 50 feet) (CGS, 2015).

7.2.2.4 California Building Code

The California Building Code (CBC) is codified in 24 CCR Part 2. The California Building Standards Commission administers Title 24. The CBC establishes minimum standards to safeguard public health, safety, and general welfare through structural strength, means of egress facilities, and general stability. The CBC regulates and controls the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. In addition, the CBC contains requirements that are based on the American Society of Civil Engineers Minimum Design Standards 7-05, including requirements for general structural design and a means for determining earthquake loads and other loads (e.g., flood and wind) for inclusion in structural design. CBC provisions apply to the construction, alteration, movement, replacement, and demolition of every building, structure, and appurtenance connected or attached to such buildings or structures throughout California. The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients used to determine a Seismic Design Category (SDC) for projects. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site; classifications range from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are determined in accordance with the SDC.

7.2.3 Local Regulations

7.2.3.1 Association of Bay Area Governments Manual of Standards for Erosion and Sediment Control

The *Manual of Standards for Erosion and Sediment Control* (ABAG, 1995) provides policy guidance, legal guidelines, and technical standards to control erosion and sediment control impacts for urban and developing areas, with an emphasis on construction erosion management.

7.2.3.2 City of San Mateo Site Development Code

The City of San Mateo Site Development Code (Chapter 23.40 of the Municipal Code [City of San Mateo, 2015]) establishes administrative procedures, regulations, required approvals, and performance standards for site grading, construction on slopes, and removal of major vegetation. Its intent is to minimize adverse impacts on people and property as the result of development. The code provides an exemption from applying for and obtaining a site development permit for various types of projects, including excavation below finished grade for installation of sewer facilities and excavations by public companies or the City within public utility easements, streets, ROWs, or property owned in fee title by the utility company for the purpose of maintaining or installing new facilities, either above ground or below ground [Section 23.40.030(d) of the Municipal Code]. Therefore, construction of the proposed Project may be exempt from requirements of the Site Development Code.

7.2.3.3 General Plan – Safety and Hazardous Waste Management

The following applicable safety and hazardous waste policies are listed as they appear in the General Plan (City of San Mateo, 2010):

> **Policy S 1.1: Geologic Hazards.** Require site-specific geotechnical and engineering studies, subject to the review and approval of the City Engineer and Building Official, for development proposed on sites identified in Figure S-2 [of the City's General Plan] as having moderate or high potential for ground failure. Permit development in areas of potential geologic hazards only where it can be demonstrated that the project will not

be endangered by, nor contribute to, the hazardous condition on the site or on adjacent properties.

Policy S 1.3: Erosion Control. Require erosion control measures for all development sites where grading activities are occurring, including those having landslide deposits, past erosion problems, the potential for storm water quality impacts, or slopes of 15% or greater which are to be altered. Control measures shall retain natural topographic and physical features of the site if feasible.

7.3 Assessment Methods and Thresholds of Significance

Potential impacts on geology and soil resources were evaluated by using existing information regarding the geologic, soil, and seismic characteristics of the Project area and overlaying Project features on maps of geological and soil constraints.

Impacts related to geology and soil resources may occur if the Project would result in the following:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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.
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Substantial soil erosion or the loss of topsoil
- A project being 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 onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse
- A project being 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

7.4 Environmental Impacts

Impact 7-1. Would implementation of the proposed Project directly or indirectly cause potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic shaking, and/or seismic-related ground failure, including liquefaction and landslides?

There are no active faults or potentially active faults within the Project area, according to published geologic maps, and the Project area is not within an Alquist-Priolo Earthquake Fault Study Area. The San Andreas Fault is approximately 4 miles west of the Project site, and the Hayward Fault is approximately 15 miles northeast of the site (City of San Mateo, 2009). There is no evidence of surface rupturing at the Project site during the last 1 million years, and inactive faults show no evidence of recent motion. Therefore, impacts related to rupture of a known earthquake fault resulting from implementation of the proposed Project are considered to be less than significant.

The entire Bay Area is susceptible to strong ground shaking during major earthquakes because of the proximity to active earthquake faults. Ground shaking is amplified and lasts longer where soils are unconsolidated or saturated with water, such as the eastern portion of the City near San Francisco Bay where soils are comprised of Bay muds (City of San Mateo, 2009 and 2010). Ground shaking impacts would be less severe in upland areas underlain by hard bedrock (City of San Mateo, 2009). In the Project area, ground shaking intensity is potentially very strong or violent (see **Figure 7-2**). Damage to buildings and utilities would likely be greatest in areas underlain by alluvial deposits, Bay mud, and artificial fill, such as those in the vicinity of the proposed Project site (ABAG, 2015).

Ground shaking associated with earthquakes could affect the Project by causing breakage to diversion pipelines, the holding structure, or the pump station. The Project structures, including the holding structure, pump station, odor control equipment room, and diversion pipelines, would be unoccupied, with only occasional occupancy by operations staff for maintenance and related activities.

The Project site is located in an area identified as having moderate to high liquefaction potential (see **Figure 7-3**). Consistent with **Final PEIR Mitigation Measure 7-1**, the City conducted a site-specific evaluation of the Project site to identify potential seismic hazards that could occur due to a nearby moderate to major earthquake. The local soil conditions beneath the proposed Project that are presented in the geotechnical report consist mainly of fine-grained soil that has low susceptibility to liquefaction (**Appendix D**). Some thin layers of liquefiable sand were encountered around the Diversion Sewer Branch 1 but are above the level of the pipeline. Proposed Project facilities are unlikely to be damaged by earthquake-induced liquefaction. Pipeline breaks resulting from ground displacement in liquefiable areas during earthquakes are common; however, the estimated seismic-induced settlement in the Project area was 0.25 inch (ENGEO, 2018), which is unlikely to cause significant damage to the Project facilities. The diversion pipelines associated with the Project would be installed at a depth that is less prone to displacement. The risk of damage to the Project from seismic-related ground failure would be less than significant as it would be prevented through implementation of the recommendations identified in the geotechnical report (ENGEO, 2018) that was prepared for the Project.

Impact 7-2. Would implementation of the proposed Project result in substantial soil erosion or loss of topsoil?

The proposed Project would include a new underground temporary holding structure, pump station, odor control equipment room, and associated diversion pipelines. Construction activities in an urbanized area and within City ROWs, including roadways, would limit disturbance acreage to the excavation footprint and thereby limit the risk of erosion. Soils within the relatively flat areas in the Project area have low erosion hazard, further reducing erosion risk (see **Figures 7-1** and **7-4**). See **Appendix C** for erosion hazards associated with geologic units and soils in the Project area.

Construction of new pipeline sections and storage facilities would require soil trenching and excavation. If not properly managed, substantial erosion of stockpiled soils could occur, and sediment could be transported into storm drains or sensitive receiving waters. During implementation of the Project, and other projects within the CWP, to the extent feasible, soil materials may be stored in a central location where they could be effectively managed. This would aid stockpile management and reduce the risk of erosion and sediment transport outside of Project work areas.

Coverage under the State's Construction General Permit (CGP) is required for projects that disturb 1 acre or more of land. Although the proposed Project is within a paved, urbanized area, land disturbance would likely be greater than 1 acre, and CGP coverage would, thus, be required. General Plan Policy 1.3 also requires erosion control measures for all development sites where grading activities occur, including those having the potential for stormwater quality impacts. Therefore, even projects with land disturbance acreage less than 1 acre would be required to implement appropriate erosion and sediment control measures where there is risk of erosion and/or impacts on water quality. The *Manual of Standards for Erosion and Sediment Control* (ABAG, 1995) provides guidance and technical standards for erosion and sediment control measures during construction; conformance to the standards would provide further control of erosion and topsoil loss.

Implementation of the Final PEIR **Mitigation Measure 7-2, Comply with regulations and policies for erosion control,** would reduce impacts of the Project to a less-than-significant level. Compliance with the CGP and local policies for implementing appropriate erosion control measures, including appropriate management of soil stockpiles, would minimize erosion and topsoil loss.

Impact 7-3. Would the proposed Project be located on a geologic unit or soil that is unstable or that would become unstable as a result of the Project, potentially resulting in onsite or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse?

The Project area contains mapped geologic units or soils that are unstable and have a moderate to high potential for liquefaction, as shown in **Figure 7-3**. These areas are also prone to settlement, both seismic-induced (i.e., areas with a high water table, non-uniform fill material, and liquefiable soils) and from subsidence during construction dewatering if dewatering is not controlled adequately to limit excessive lowering of groundwater beyond the excavation. Lateral spreading may also occur in areas underlain by loose, saturated, liquefiable materials, especially where bordered by unsupported sloping ground. In the vicinity of the Project area, the area along Borel Creek has a low potential for lateral spreading. Landslides would not be anticipated to occur in the Project area due to lack of slopes.

The proposed Project could have geological, seismic, and soil impacts given the potential for liquefaction and settlement. As per Final PEIR **Mitigation Measure 7-1,** a geotechnical investigation was conducted to identify site-specific geotechnical and engineering methods (**Appendix D**), which are subject to the review and approval of the city engineer and building official, for development projects planned in areas with moderate or high potential for ground failure. The investigation identified general construction recommendations, including following the latest CBC and State of California Department of Transportation earthquake design requirements, such that implementation of the Project would not cause or contribute to increased instability of the soils or geologic unit and impacts would be less than significant.

The Project includes the use of dewatering wells within the vicinity of the temporary holding structure to reduce groundwater levels in areas that require excavation. Lowering groundwater levels around the exterior of the excavation can result in settlement of surrounding infrastructure such as utilities, manholes, pavement, sidewalks, and nearby buildings and non-building structures. For the proposed Project, additional considerations include potential groundwater drawdown impacts to surface water features such as nearby ponds and wetlands within the adjacent Bay Meadows Park, as well as the less visible hydrostatic groundwater levels in the surrounding area.

Dewatering has the potential to induce settlement of the ground surface because of an increase in the effective stress in the subsurface soil due to removal of buoyancy of the soil particles. The increased stress causes the soil grains to rearrange and become denser, resulting in subsidence or ground settlement. Areas close to the groundwater drawdown zone are most susceptible to these risks; however, dewatering activities necessary for construction within the excavation limits could affect groundwater levels beyond the excavation. If static groundwater levels around the exterior of the shoring system drop excessively, settlement is more likely to occur.

The bay mud and alluvial deposits within the upper 15 feet bgs have the greatest potential for consolidation from a drop in groundwater levels. A dewatering monitoring program will be implemented to prevent excessive groundwater drawdown. For this Project, a drawdown more than of 5 feet below the historical low groundwater table measured from monitoring wells located 50 feet from the edge of the excavation is considered excessive. Dewatering pump rates will be reduced to allow recharge of groundwater if excessive groundwater drawdown is measured in the observation wells during construction.

Mitigation Measure 7-3a, Measures to reduce dewatering-related settlements, would be implemented to reduce impacts from dewatering-related settlement to a less-than-significant level.

Excavation of the temporary holding structure would also require the installation of a shoring system to prevent the exterior walls of the excavated area from collapsing. Depending on the method of installation of the shoring system and the type of shoring, localized settlement can occur due to response to lateral deformations of the shoring system. This type of settlement is limited to areas within a distance equal to the depth of the excavation.

Mitigation Measure 7-3b, Measures to reduce shoring-related settlements, would be implemented to reduce impacts from shoring-related settlement to a less-than-significant level.

Project-specific geotechnical and engineering methods to minimize risks from ground shaking, landslides, or liquefaction to a level meeting City requirements, CBC earthquake design requirements, and other building safety codes, combined with implementation of **Mitigation Measures 7-1a and 7-1b** would reduce exposure of people or structures to potential adverse effects from liquefaction and settlement as a result of the Project to a less-than-significant impact.

Impact 7-4. Would the proposed Project be located on expansive soils, creating substantial direct or indirect risks to property?

The Project area is urbanized and is predominantly comprised of land that has previously been cut and filled for development, including areas within City streets where the diversion pipelines would be located. Engineered fill is well graded and would not shrink or swell. However, expansive clay soil, generally associated with Bay mud used for fill material, is likely to be encountered around the Project site during construction.

As required by Final PEIR **Mitigation Measure 7-1,** a geotechnical investigation was conducted (ENGEO, 2018) to identify site-specific geotechnical and engineering methods, which are subject to the review and approval by the City Engineer and Building Official, for development projects planned in areas with moderate or high potential for ground failure. By implementing geotechnical and engineering recommendations identified in the geotechnical report, and by following CBC earthquake design requirements, implementation of the Project would not cause or contribute to increased risk to property and impacts would be less than significant.

7.5 Mitigation Measures

7.5.1 Final PEIR Mitigation Measures

Implementation of the following mitigation measures from the Final PEIR, would ensure that potential impacts on geology and soil resources would remain at a less-than-significant level.

Mitigation Measure 7-2. Comply with regulations and policies for erosion control.

The City of San Mateo and its construction contractors shall develop prior to start of construction and implement a project-specific SWPPP for construction projects with a land disturbance area equal to or greater than 1 acre. For projects with disturbance area less than 1 acre in size, a site-specific Erosion and Sediment Control Plan shall be prepared. For projects with any land disturbance, construction shall comply with the San Mateo Site Development Code and shall incorporate an effective combination of erosion and sediment control measures that are identified in ABAG and/or California Stormwater Quality Association guidance manuals. Construction erosion and sediment control BMPs typically include, but are not limited to, the following measures:

- Scheduling site grading during the non-rainy season (April 15 to October 15), where possible
- Segregation of topsoil during rough grading
- Temporary soil stabilization during site grading and active construction

- Permanent post-construction site soil stabilization
- Erosion and sediment controls during construction dewatering activities
- Control of site run-on and runoff to isolate the work area and prevent onsite or offsite erosion and sediment transport during construction
- Dust suppression
- Stockpile management; in accordance with City standard construction practices, materials shall be stockpiled at central location(s) instead of within work areas, where feasible

7.5.2 Project-Specific Mitigation Measures

Implementation of the following Project-specific mitigation measures would ensure that potential impacts on geology and soil resources would remain at a less-than-significant level.

Mitigation Measure 7-3a, Measures to reduce dewatering-related settlements.

Measures to reduce impacts from dewatering-related settlements could include, but are not limited to, the following:

- Prior to construction, install piezometers outside the limits of excavation; take continuous readings to create a historical baseline of the hydrostatic groundwater level and to measure the seasonal fluctuations.
- Specify groundwater drawdown thresholds within observation wells (piezometers) installed around the excavation and enforceable actions in the contract documents. Specify early-alert values that trigger corrective action requirements, as well as dewatering shut-down values. From preliminary review of the geotechnical data, these early alert values are anticipated to be on the order of 5 feet of drawdown below historical low groundwater level in observation wells located 50 feet from the edge of the excavation. In the event that groundwater drawdown reaches the threshold, the dewatering rate will be reduced or potentially discontinued until additional mitigation measures are implemented, or further analyses of the measured settlement data for the threshold drawdown show no detrimental effects are likely.
- Require installation of a watertight temporary shoring system.
- Require a groundwater cutoff extending a minimum of 15 feet below the base of the excavation, or as required to penetrate low-permeability soil layers that limit drawdown outside of the Project area.
- Prohibit dewatering wells outside of the excavation limits.
- Limit the dewatering inside the excavation so it draws the groundwater table down to allow for construction, but will be limited to minimize drawdown outside the excavation shoring.
- Perform construction period monitoring (weekly, daily, or continuously) to measure movement – settlement and tilt in the vicinity of the construction site. Movement in permanent and critical structures, such as pipelines and buildings, located within an approximate 100-foot radius of the construction zone should be monitored.
- Perform construction period monitoring (weekly, daily, or continuously) to measure existing building movement – settlement and tilt.
- Perform post-construction monitoring. Groundwater levels should be monitored approximately quarterly for 1 to 2 years following construction to document post-construction groundwater levels

Mitigation Measure 7-3b, Measures to reduce shoring-related settlements.

Measures to reduce impacts from shoring-related settlements could include, but are not limited to, the following:

- Implement pre- and post-construction surveys to document the condition of specific buildings and structures located within a potential zone of influence or a specific distance from the edge of the excavation. Critical or major utilities, sensitive or historic buildings, and nearby homes may also be included in the surveys. A pre-construction survey provides a record of the existing conditions of the structures prior to construction. A post-construction survey and report documents the post-construction conditions and any changes in condition that occurred during the construction period. These surveys help to differentiate between construction related impacts and pre-existing conditions. (Building owners and tenants may be unaware of the condition of their buildings prior to construction. Construction activity can alert an owner or tenant to a previously unrecognized crack or tilt in the foundation even though it may have been pre-existing.) The surveys may be used to establish agreements with neighbors prior to construction. They also may form the basis for repairs if movement occurs beyond an agreed upon threshold.
- Require the shoring system to be designed to be rigid. Include a maximum calculated deflection limit as part of the contract document requirements.
- Require the shoring system to be designed using at-rest soil pressures instead of active pressures. Consider requiring the shoring system to be designed to resist additional pressures that could result from earthquake loading.
- Specify maximum vibration limits and enforceable actions in the contract documents. Specify monitoring requirements along with early-alert and shutdown values that trigger corrective action requirements.
- Perform continuous vibration monitoring during periods of shoring installation. Provide monitors within the construction site and at pre-determined locations in-between the construction site and the nearest permanent structures to measure vibration magnitudes.
- Specify maximum lateral deflection limits for the shoring elements and enforceable actions in the contract documents. Specify monitoring requirements along with early-alert and values that trigger corrective action requirements.
- Perform construction period monitoring (weekly, daily, or continuously) to measure shoring displacements and the potential effects to the nearby area. Require monitors for shoring deformation such as inclinometers and survey prisms.
- Perform construction period monitoring (weekly, daily, or continuously) to measure existing building movement – settlement, tilt, and vibration.
- Perform post-construction monitoring. Neighboring structures should be monitored approximately quarterly for 1 to 2 years following construction to ensure post-construction movement is minimal.

7.6 References

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Legend

- Diversion Structure
- Road
- Watercourse
- Diversion Pipeline
- 10' Construction Buffer
- Underground Temporary Holding Structure

Geologic Units

- Qhaf - Alluvial Fan Deposits (Holocene)
- Qhasc - Artificial Stream Channel
- Qhb - Flood Basin Deposits (Holocene)
- Qpaf - Alluvial Fan Deposits (Pleistocene)
- af - Artificial Fill (Historic)

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

N

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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Geologic Units, U.S. Geological Survey, California Geological Survey, 2000

FIGURE 7-1
Project Area Geology
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

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Legend

- Diversion Structure
- Diversion Pipeline
- Watercourse
- Road
- 10' Construction Buffer
- Underground Temporary Holding Structure

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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

FIGURE 7-2
Project Area Shaking Intensity
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

Legend

- Diversion Structure
- Diversion Pipeline
- Watercourse
- Road
- 10' Construction Buffer
- Underground Temporary Holding Structure

Liquefaction Potential

- High
- Moderate

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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FIGURE 7-3
Project Area Liquefaction Potential
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

Legend

- Diversion Structure
- Diversion Pipeline
- Watercourse
- Road
- 10' Construction Buffer
- Underground Temporary Holding Structure

Soil Map Unit Symbol

- 121
- 124
- 131
- 134

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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CLEANWATERPROGRAM
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FIGURE 7-4
Project Area Soils
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

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CHAPTER 8

Greenhouse Gases

This section describes the regulatory background and existing conditions related to GHG emissions. It discusses the estimated GHG emissions of the proposed Project, the potential impacts of the emissions, and mitigation to reduce impacts as applicable.

8.1 Existing Setting

Various gases in the earth's atmosphere play an important role in moderating the earth's surface temperature. Solar radiation enters the earth's atmosphere from space, and a portion of the radiation is absorbed by the earth's surface. The earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. GHGs are transparent to solar radiation but are effective in absorbing infrared radiation. Consequently, radiation that would otherwise escape back into space is retained, resulting in a warming of the earth's atmosphere. This phenomenon is known as the greenhouse effect.

GHGs include both naturally occurring and anthropogenic gases that trap heat in the earth's atmosphere. GHGs include, but are not limited to, CO_2, methane, nitrous oxide, hydrochlorofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Although there is disagreement as to the speed of global warming and the extent of the impacts attributable to human activities, much of the scientific community now agrees that there is a direct link between increased emissions of GHGs and long-term global temperatures and other climate-related effects.

The accumulation of GHGs in the atmosphere influences the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century attributable to an increase in GHG concentrations from human activities. The climatic changes associated with this global warming, such as sea level rise, drought, and extreme weather events, are predicted to produce economic and social consequences across the globe. This section describes the existing conditions and regulatory background for GHG emissions.

Different GHGs are described using CO_2-equivalent (CO_2e) as a common unit. For any type and quantity of GHG, CO_2e indicates the amount of CO_2 that would have the equivalent global warming impact.

In the United States, the main source of GHG emissions is electricity generation, followed by transportation. In California, however, transportation sources (e.g., passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest category of GHG-emitting sources. In 2015, the most recent year for which data are provided, the annual California statewide GHG emissions were 440.4 million metric tons of CO_2e. The transportation sector accounts for about 39 percent of the statewide GHG emissions inventory. The industrial sector accounts for about 23 percent of the total statewide GHG emissions inventory. The dominant GHG emitted is CO_2, primarily from fossil fuel combustion (approximately 84 percent of the total inventory) (ARB, 2018).

According to BAAQMD, GHG emissions in 2011 were 86.6 million metric tons of CO_2e, approximately 39.7 percent of which was from the transportation sector and 14 percent was from electricity use/ cogeneration. The dominant GHG emitted was CO_2, primarily from fossil fuel combustion (BAAQMD, 2015).

The City updated its 2005 GHG inventory in its Climate Action Plan (CAP) (Pacific Municipal Consultants, 2015). In 2005, the City's community-wide GHG emissions totaled 804,290 metric tons of carbon dioxide equivalent (MTCO2e) for the sectors as shown in **Table 8-1**. The sector with the largest portion of emissions was on-road transportation, which produced 464,070 $MTCO_2e$, or 58 percent of all community emissions. The next largest sector, commercial/industrial built environment, produced

144,790 $MTCO_2e$, or 18 percent of the total. Water and wastewater (3,030 $MTCO_2e$) each comprised less than 1 percent of total emissions.

Table 8-1. San Mateo 2005 Community-Wide GHG Emissions
Underground Flow Equalization System Project, Environmental Impact Report

Sector	$MTCO_2e$	Percentage
On-road transportation	464,070	58
Commercial/industrial built environment	144,790	18
Residential built environment	136,790	17
Solid waste generation	26,960	3
Off-road equipment	11,690	1
Landfill	7,020	1%
Point sources	6,070	1
Caltrain	3,870	Less than 1
Water and wastewater	3,030	Less than 1
Total	**804,290**	**100**

Source: Pacific Municipal Consultants, 2015.

The City's GHG inventory of 2010 indicates that the GHG emissions were 9 percent below 2005 levels. The three largest sources of emissions (on-road transportation, commercial/industrial built environment, and residential built environment) all had lower emissions in 2010 than in 2005, along with the landfill and solid waste generation sectors. Emission levels increased in four remaining sectors, most noticeably in the off-road equipment sector, although the relatively small size of these sources meant that they had only a limited impact on communitywide emissions. The relative distribution of emissions within the sectors did not change in a meaningful way from 2005 to 2010 (Pacific Municipal Consultants, 2015).

8.2 Regulatory Framework

8.2.1 Federal Plans, Policies, and Regulations

Various programs and regulations exist at the federal level to improve vehicle fuel economy, increase energy efficiency, and reduce GHG emissions.

EPA authority to regulate GHG emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs must meet the definition of air pollutants under the existing CAA and be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, EPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six GHGs constitute a threat to public health and welfare. Thus, it was the Supreme Court's interpretation of the existing Act and EPA's assessment of the scientific evidence that formed the basis for EPA's regulatory actions.

EPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010 (Center for Climate and Energy Solutions, 2014). The EPA and the NHTSA are taking coordinated steps to enable the production of a new generation of "clean" vehicles with reduced GHG emissions and improved fuel efficiency for on-road vehicles and engines. The next steps include developing the first GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations.

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce GHG emissions by an estimated 960 million metric tons and save 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012 through 2016).

On August 28, 2012, EPA and NHTSA issued a joint final rulemaking to extend the national program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model years 2017 through 2025 standards, projections are that approximately 4 billion barrels of oil would be saved and 2 billion metric tons of GHG emissions would be eliminated.

The complementary EPA and NHTSA standards that make up the Heavy-Duty National Program apply to combination tractors (semi-trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards would cut GHG emissions and domestic oil use significantly. The agencies estimate that the combined standards would reduce CO_2 emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model years 2014 to 2018 heavy duty vehicles.

In 2014, EPA finalized Tier 3 Motor Vehicle Emission and Fuel Standards to reduce air pollution from passenger cars and trucks. In 2015, EPA and NHTSA proposed model years 2018 to 2027 GHG emissions and fuel economy standards for medium- and heavy-duty vehicles (EPA, 2018).

8.2.2 State Plans, Policies, and Regulations

With the passage of several pieces of legislation, including State Senate and Assembly Bills and Executive Orders (EOs), California launched an innovative and proactive approach to address GHG emissions and potential climate change-related impacts. California laws and EOs have been developed to define various aspects of GHG record keeping and implementation of GHG emission reduction measures, such as the California Renewables Portfolio Standard Program and the Low Carbon Fuel Standard. Other laws and plans, such as AB 32, SB 32, the Climate Change Scoping Plan, the Climate Change Adaptation Strategy, and CEQA guidance, define the regulatory setting for projects that emit GHGs in California, and describe regulatory agency goals for statewide GHG emissions reductions and climate change adaptation.

The legislation includes the following:

- AB 1493, Vehicular Emissions: Greenhouse Gases, 2002: This bill requires ARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009 model year.
- EO S-3-05 (June 1, 2005): The goal of this EO is to reduce California's GHG emissions to (1) year 2000 levels by 2010, (2) year 1990 levels by the 2020, and (3) 80 percent below year 1990 levels by 2050. In 2006, this goal was further reinforced with the passage of AB 32.
- AB 32, The Global Warming Solutions Act of 2006: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." In December 2008, ARB approved the initial Scoping Plan, which included a suite of measures to sharply cut GHG emissions. Key elements of the initial Scoping Plan included the following:
  - Expand and strengthen energy efficiency programs, including building and appliance standards.

  - Increase electricity generation from renewable resources to at least 33 percent of the statewide electricity mix by 2020.
  - Establish targets for passenger vehicle-related GHG emissions for regions throughout California and pursue policies and incentives to achieve those targets. Included with this strategy is support for the development and implementation of a high-speed rail system to expand mobility choices and reduce GHG emissions.
  - Adopt and implement measures pursuant to existing State laws and policies, including California's clean car standards and the Low Carbon Fuel Standard.
  - Develop a cap-and-trade program to ensure the target is met, while providing flexibility to California businesses to reduce emissions at low cost.

- In May 2014, ARB approved the first update to the Climate Change Scoping Plan (First Update). The First Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The First Update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the initial Scoping Plan. It also evaluates how to align the State's "longer-term" GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.
- EO S-20-06 (October 18, 2006): This EO establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency and State agencies regarding climate change.
- EO S-01-07 (January 18, 2007): This EO set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.
- SB 97, Chapter 185, 2007, Greenhouse Gas Emissions: SB 97 required the Governor's Office of Planning and Research to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective March 18, 2010.
- SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region must then develop a "Sustainable Communities Strategy" that integrates transportation, land use, and housing policies to plan for the achievement of the emissions target for their region.
- SB 391, Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.
- Renewables Portfolio Standard (RPS): Established in 2002 under SB 1078, accelerated in 2006 under Senate Bill 107, and expanded in 2011 under SB 2, California's RPS is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020.
- SB 605, Chapter 523, 2014, required ARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016.
- On April 29, 2015, the governor issued EO B-30-15 establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. All State agencies with jurisdiction over sources of GHG emissions were directed to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 targets. ARB was directed to update the AB 32 Scoping Plan to reflect the 2030 target. The mid-term target would help frame the suite of policy measures, regulations,

planning efforts, and investments in clean technologies and infrastructure needed for ongoing emissions reductions, and laws to support these goals followed.

- SB 350, Chapter 547, 2015, establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030.
- SB 1383, Chapter 395, 2016, signed by the governor on September 19, 2016, requires ARB, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The new law also requires reductions of organic waste at landfills to 50 percent below 2014 standards by 2020, and to 75 percent below 2014 by 2025. These latter targets are aggregate statewide and need not be met by each jurisdiction.
- In 2016, the California Legislature voted to extend the State's GHG emission reduction targets, while simultaneously passing an ARB reform bill. SB 32 (Chapter 249, 2016), the California Global Warming Solutions Action of 2006: Emissions Limit, establishes a new target for GHG emissions reductions in the State at 40 percent of 1990 levels by 2030. This new target passed exactly one decade after AB 32, which required ARB to work to reduce California's statewide GHG emissions to 1990 levels by 2020. SB 32 was tied to AB 197 (Chapter 250, 2016), a measure to increase legislative oversight of ARB, creating a Joint Legislative Committee on Climate Change Policies to ascertain facts and make recommendations to the Legislature concerning the State's programs, policies, and investments related to climate change. The bills became effective on January 1, 2017.
- On January 20, 2017, ARB released "The 2017 Climate Change Scoping Plan Update, the Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target" (ARB, 2017a). The proposed framework includes the following elements:
  - 50 percent renewable energy
  - 50 percent reduction in statewide vehicular petroleum use
  - Doubling of energy efficiency in existing buildings
  - Carbon sequestration in California's land base
  - Aggressive reductions in short-lived climate pollutants, such as black carbon, fluorinated gases, and methane
- EO S-13-08 (2008) required the California Natural Resources Agency to prepare the State's strategy to organize State government adaptation programs. The 2009 California Climate Adaptation Strategy report summarized the best-known science on climate change impacts in the State (in the areas of public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture; forestry, and transportation and energy infrastructure) to assess vulnerability, and outlined possible solutions that could be implemented within and across State agencies to promote resiliency. In 2014, the California Natural Resources Agency issued an updated plan titled Safeguarding California: Reducing Climate Risk. In 2016, the California Natural Resources Agency released Safeguarding California: Implementation Action Plans in accordance with EO B-30-15, including an in-depth evaluation for the Water Sector (California Natural Resources Agency, 2016).
- During preparation of a 2017 update to the Safeguarding California Plan, the California Natural Resources Agency released a high-level policy document showing preliminary recommendations for the State's plan to protect California's people, natural resources, and built environment from climate change. To safeguard California's built environment, recommendations related to water management include flood preparation, groundwater management for drought resiliency, supply

diversification, water use efficiency, improvement of water storage capacity, climate considerations in water management decisions, protection and restoration of water resources and the ecosystems dependent on them, and other measures to improve California's climate change resilience.

- In considering when to disclose projected quantitative GHG emissions, California has not established a significance threshold for cumulative emissions from temporary mobile sources such as construction equipment. AB 32 established 25,000 metric tons/year as the threshold for mandatory emissions reporting for stationary sources, but this threshold does not apply to mobile sources.
- The California Air Pollution Control Officers Association (CAPCOA) has issued Guidance Documents on Addressing GHGs under CEQA (2008) and Quantifying GHG Mitigation Measures (2010).

8.2.3 Local Climate Action Plans, Policies, and Regulations

San Mateo's CAP is a comprehensive strategy to reduce GHG emissions and streamline the environmental review of GHG emissions of future development projects in the City (Pacific Municipal Consultants, 2015). The CAP identifies a strategy, reduction measures, and implementation actions the City will use to achieve the GHG emissions reduction target of 15 percent below 2005 emissions levels by 2020.

8.3 Assessment Methods and Thresholds of Significance

BAAQMD has developed specific GHG guidelines for compliance with CEQA (BAAQMD, 2017), which provide criteria on how to assess and mitigate Project-related GHG impacts.

Under CEQA, GHG emissions impacts may occur if the proposed Project would result any of the following:

- GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of GHGs

BAAQMD does not have an adopted Threshold of Significance for construction-related GHG emissions. However, the BAAQMD's CEQA Guidelines suggest that the lead agency quantify and disclose GHG emissions that would occur during construction and make a determination on the significance of these construction-generated GHG emission impacts in relation to meeting applicable GHG reduction goals.

In May 2017, BAAQMD adopted CEQA thresholds of significance for operational-related GHG emissions. The BAAQMD thresholds for operational GHG emissions that are applicable to the proposed Project are as follows: compliance with a qualified GHG Reduction Strategy; or annual emissions less than 1,100 metric tons/year of CO2e (BAAQMD, 2017).

GHG impacts were evaluated based on whether the GHG emissions may have a significant impact on the environment; more specifically, if the GHG emissions would hinder or delay California's ability to meet the GHG reduction targets set in AB 32 and SB 32, or if the Project would hinder or delay the City's GHG emission reduction goals in the CAP (Pacific Municipal Consultants, 2015).

8.4 Environmental Impacts

This section describes GHG and climate change impacts associated with construction and operation of the proposed Project. The analysis was based on the anticipated activities and associated GHG emission changes.

Impact 8-1. Would the proposed Project generate GHG emissions either directly or indirectly that may have a significant effect on the environment?

The GHG impacts for the Project were evaluated based on whether the GHG emissions would hinder or delay California's ability to meet the GHG reduction targets set in applicable State plans and in the region's climate action plan.

GHG emissions increases would occur during construction from the construction equipment and vehicles. During operation, direct emissions of GHG from the WWTP may increase. Underground Flow Equalization System operation would also increase the electricity usage due to the upgraded WWTP with its greater level of treatment facilities to pump wet weather flows and would result in indirect GHG emissions from power generation.

Although a quantitative threshold is not used, for information purposes, construction emissions of GHG were estimated. GHG emissions from the construction equipment and vehicles from the proposed Project construction were estimated using CalEEMod (California Air Pollution Control Officers Association, 2016). The same construction assumptions used for the air quality impact analysis were used for the GHG emission estimate.

Table 8-2 shows the total annual expected GHG emissions expected from construction of the proposed Project.

Table 8-2. Construction GHG Emissions
Underground Flow Equalization System Project, Environmental Impact Report

Construction Year	$MTCO_2e$ per Year
Year 1	1,541
Year 2	1,823
Year 3	49

Note:
Emissions were modeled using CalEEMod.

GHG emissions from construction would be temporary. Implementation of BMPs listed in BAAQMD's *Basic Construction Mitigation Measures*, such as minimizing idling times and maintaining equipment in good condition, would further reduce construction-related GHG emissions.

Operation of the proposed Project would result in direct GHG emissions from operation of the backup generator and maintenance vehicles, and indirect emissions associated with electricity usage. **Table 8-3** shows the expected direct GHG emissions from operation of the proposed Project.

Table 8-3. Operational GHG Emissions
Underground Flow Equalization System Project, Environmental Impact Report

	$MTCO_2e$ per Year
Project Operations	16.3
BAAQMD Threshold	**1,100**
Exceeds threshold?	No

Note:
Emissions were modeled using CalEEMod.

As shown in **Table 8-3**, direct GHG emissions from operation would be negligible. Indirect GHG emissions would occur due to the additional power usage that would be required to pump wet weather flows from the temporary holding structure. Indirect GHG emissions may slightly increase from operation of the proposed Project in comparison to existing condition. However, the Project would use the electricity from the California's power grid. The new Renewables Portfolio Standard (RPS) signed under SB 2 in 2011 preempts ARB's 33 percent Renewable Electricity Standard and applies to all electricity retailers in the State, including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. As mandated by the new RPS, all these entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020. In 2015, SB 350 established targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030. Therefore, the electricity consumed by the Project from California's power grid would be cleaner into the future, and the GHG emissions associated with Project electricity use would decrease over time.

In summary, the proposed Project would result in temporary GHG emissions from construction equipment and vehicles. Indirect operational emissions may increase because of the increased electricity needs, but operations would be consistent with the State and local GHG reduction strategies, the proposed Project would result in a less-than-significant GHG-related impacts.

Impact 8-2. Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

The Project would be consistent with applicable federal, State, and local plans, policies, and regulations. The City of San Mateo's CAP (Pacific Municipal Consultants, 2015) set local GHG emission reduction goals. Based on the City's GHG emission inventory, the water and wastewater sectors combined contribute less than 1 percent of the total GHG inventory of the City. The proposed Project would fall under the classification of a wastewater project. Operation of the proposed Project would represent a negligible percent of the City's GHG inventory. Therefore, the GHG emission changes associated with this Project would not affect or hinder the City's ability to meet the plan's GHG reduction goals.

Additionally, operation of the proposed Project would use electricity from the State's power grid that complies with the RPS, SB 350, and AB 32 and SB 32 GHG reduction strategies and targets. Therefore, the Project's GHG emissions would not hinder or otherwise conflict with the applicable plans, policies, or regulations to reduce GHG emissions.

8.5 Mitigation Measures

All impacts to GHGs would be less than significant and no mitigation measures are required.

8.6 References

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CHAPTER 9

Hazards and Hazardous Materials

This chapter describes the regulatory background and existing conditions related to hazards and hazardous materials. It discusses the hazards and hazardous materials associated with the proposed Project, the potential impacts on public health and safety through exposure to hazards and hazardous materials. Mitigation to reduce impacts are presented as applicable.

9.1 Existing Setting

A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency, or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Title 22 CCR Section 66260.10:

> *…A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed.*

As described in Section 2.3, the Project site is located at the Event Center between Saratoga Drive, 28th Avenue, and S. Delaware Street in the City of San Mateo. The main components of UFES would be located on the southeast corner of the parcel currently occupied by the Event Center. The diversion sewer lines would be located in roadways that surround the parcel, including Saratoga Drive and S. Delaware Street. The southeast corner of the parcel, where construction would occur, is currently a gravel parking/storage yard with stored trailers, trucks, and large metal storage containers. The site is relatively flat with an elevation of approximately 11 feet above mean sea level. Geologic conditions are described as historic artificial fill that consists of loose to very well consolidated gravel, sand, and silt/clay. Groundwater depth and flow in the site vary from approximately 4 to 7 feet bgs (ENGEO, 2018).

In accordance with **Mitigation Measure 9-3** of the 2016 Final PEIR, a Phase I Environmental Site Assessment (ESA) was conducted for the site by ENGEO (see **Appendix E**). The purpose of the ESA was to identify recognized environmental conditions (RECs) associated with the site. Additionally, the Phase I ESA complies with standards of ASTM International (ASTM) for property transfers.

Site reconnaissance and review of environmental records conducted for the Phase I ESA did not indicate or identify the presence of RECs, controlled RECs, or historic RECs[2] associated with the site (ENGEO, 2017).

Environmental databases that were queried for the Phase I ESA identified a former leaking underground storage tank (LUST) case associated with the Event Center property, approximately 850 feet northwest of the Project site. The LUST was removed in 1997. The San Mateo County Groundwater Protection

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[2] "As defined in the ASTM Standard Practice E 1527-13, an REC is the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."

"A controlled REC is an REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls."

"A historic REC is a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls."

Program issued a Closure memorandum on January 28, 2002. The Phase I ESA concluded that the LUST is a low risk for the Project site (ENGEO, 2017).

9.2 Regulatory Framework

Hazardous materials use, transportation, and disposal are governed by laws and regulations at all levels of government.

9.2.1 Federal Regulations

The EPA is the lead federal agency that regulates hazardous waste handling, transport, generation, and disposal. The EPA delegates permitting and compliance assurance to the state. **Table 9-1** lists federal regulatory agencies that oversee hazardous materials handling and hazardous waste management, and the statutes and regulations they administer.

Table 9-1. Summary of Federal Regulations for Hazardous Waste
Underground Flow Equalization System Project, Environmental Impact Report

Regulatory Agency	Authority	Summary
EPA	Clean Water Act	Requires a National Pollutant Discharge Elimination System permit to discharge water.
	Clean Air Act (42 USC 7401 et seq., as amended)	Regulates accidental releases of hazardous materials through hazard assessments and response programs.
	Resource Conservation and Recovery Act	Regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. DTSC is authorized to implement the state's hazardous waste management program for the EPA.
	Toxic Substances Control Act 1976 (15 USC 2605)	Requires reporting, record keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures.
	Comprehensive Environmental Response, Compensation and Liability Act	Provides funding to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.
U.S. Department of Transportation	Hazardous Materials Transport Act – CFR 49	Regulates the transportation of hazardous materials, types of hazardous materials, and vehicle marking during transport.
OSHA	Occupational Safety and Health Act (29 CFR 1910)	Protects workers by setting standards related to safety and health.

Notes:

CFR = Code of Federal Regulations

DTSC = Department of Toxic Substances Control

OSHA = Occupational Safety and Health Administration

USC = United States Code

9.2.2 State Regulations

The California Environmental Protection Agency (CalEPA) and the State Water Resources Control Board (SWRCB) (2015) establish rules governing the use of hazardous materials and management of hazardous waste. Applicable state laws are summarized in **Table 9-2**.

Table 9-2. Summary of California Regulations for Hazardous Waste
Underground Flow Equalization System Project, Environmental Impact Report

Regulatory Agency	Authority	Summary
CalEPA through the San Mateo County Public Health Department	Certified United Program Agency under the California Health and Safety Code	The San Mateo County Public Health Department has been certified by CalEPA to implement the following five state environmental programs within the local agency's jurisdiction: 1. Hazardous Material Business Plan 2. Hazardous Waste Generators and Onsite Treatment Program 3. Underground Storage Tanks 4. California Accidental Release Program 5. Aboveground Petroleum Storage Tank Program
California Highway Patrol	California Vehicle Code	Designates routes to be used for the transportation of inhalation hazards.
Department of Industrial Relations	California Occupational Safety and Health Act	Requires employee training, safety equipment, prevention, and hazardous substance exposure warnings. Requires employer to monitor exposure to listed hazardous substances and notify employees of exposure.
State Office of Emergency Services	Hazardous Materials Release Response Plans and Inventory Law (also known as the Business Plan Act)	Requires the preparation of hazardous materials business plans that include an inventory of hazardous materials that are handled, their storage locations, an emergency response plan, employee safety training, and emergency response procedures.
California Office of Environmental Health Hazard Assessment	Safe Drinking Water and Toxic Enforcement Act	Protects drinking water from chemical contamination.
	Aboveground Petroleum Storage Act	An inspection program for aboveground storage tanks. Requires owners or operators of aboveground petroleum storage tanks to file a storage statement and implement measures to prevent spills.

9.2.3 Local Regulations, Policies, and Programs

Local regulations, policies, and programs for hazardous materials management are determined by the County of San Mateo and the City of San Mateo.

9.2.3.1 San Mateo County Hazardous Materials Business Plan Program

The San Mateo County Hazardous Materials Business Plan Program (County of San Mateo, 2016) requires that businesses create a hazardous materials business plan for safe storage and use of chemicals. The plans are used by "firefighters, health officials, planners, public safety officers, health care providers and others" during emergencies to "prevent or lessen damage to the health and safety of people and the environment when a hazardous material is released."

9.2.3.2 Fire Code

The *San Mateo City Code and Municipal Code* (City of San Mateo, 2015), includes a building and construction fire code for all development and construction activities within the City. The fire code requires compliance with the California Fire Code and Uniform Fire Code.

9.2.3.3 General Plan

The *City of San Mateo General Plan – Vision 2030* (General Plan) (City of San Mateo, 2010) includes the following policies related to the use, storage, and disposal of hazardous wastes:

> ***S 5.1: County Cooperation.*** *Cooperate with the County of San Mateo in the regulation of hazardous materials and transportation of such material in San Mateo.*

S 5.2: County Hazardous Waste Management Plan. *Adopt by reference all goals, policies, implementation measures, and supporting data contained in the San Mateo County Hazardous Waste Management Plan.*

S 5.3: On-site Waste Treatment. *Promote on-site treatment of hazardous wastes by waste generators to minimize the use of hazardous materials and the transfer of waste for off-site treatment.*

S 5.4: Transportation Routes. *Restrict the transportation of hazardous materials and waste to truck routes designated in Circulation Policy C-1.3 and limit such transportation to non-commute hours.*

S 5.10: Contaminated Sites. *Require the clean-up of contaminated sites indicated on the Hazardous Waste and Substances Sites List published by the Department of Toxic Substance Control and/or the Health Department in conjunction with substantial site development or redevelopment, where feasible.*

S 5.11: Cost Recovery. *Require San Mateo County businesses which generate hazardous waste or applicants for hazardous waste management facilities to pay necessary costs for implementation of the HWMP programs and for application costs, and to pay for costs associated with emergency response services in the event of a hazardous material release, to the extent permitted by law.*

9.3 Assessment Methods and Thresholds of Significance

The analysis of impacts was derived from of the results of the Phase I ESA, including government database searches such as those maintained by EPA and Department of Toxic Substances Control (DTSC), as well as information about existing hazardous materials protocol/practices at the Project site.

Impacts related to hazards and hazardous materials may occur if the proposed Project would result in the following:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials
- 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
- Release hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment
- For a project located within 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, result in a safety hazard for people residing or working in the project area
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires

There are no airports within 2 miles of the site. Construction activities within the site would not be within an area addressed by an airport land use plan and would not create a significant safety hazard. Therefore, no hazards associated with airports would occur, and this issue is not discussed further.

The site is located within a highly urbanized area and is not adjacent to wildlands; therefore, no hazards associated with wildland fires would occur, and this issue is not discussed further.

9.4 Environmental Impacts

Impact 9-1. Would construction of the proposed Project expose the public or the environment to hazardous materials through routine use, transport, or disposal of hazardous materials or reasonably foreseeable upset and accident conditions involving the release of hazardous materials?

Construction of the proposed Project would include the use, transport, storage, and disposal of hazardous materials. The proposed Project would temporarily require the use of vehicles and other construction equipment that would use hazardous materials such as fuels, lubricants, and solvents. Accidental releases of small quantities of these materials could expose people and the environment to hazardous materials. However, the handling and storage of these materials would be in accordance with all DTSC, EPA, Occupational Safety and Health Administration (OSHA), and fire department regulations, and would comply with measure S 5.4 of the General Plan (City of Mateo, 2010).

Compliance with regulatory requirements would reduce potential impacts associated with the use, transport, and disposal of hazardous materials during construction for the Project to less than significant.

Operation of the proposed Project would require the occasional use of small quantities of hazardous materials, such as diesel fuel for the backup generators and lubricants for the temporary holding structure cleaning equipment (tipping buckets). Existing City of San Mateo plans and programs to store and handle hazardous materials, including a hazard communication program, hazardous materials business plan, and spill prevention, control, and countermeasures plan, would be updated as required by regulation and would continue to be implemented for the proposed Project. Potential impacts from use, storage, transport, and disposal of these materials would be less than significant. No mitigation would be required.

Impact 9-2. Would the proposed Project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment?

As previously discussed, the Phase I ESA that was conducted on the Project site concluded that there are no RECs. However, unexpected hazardous materials could be encountered during construction. If unexpected hazardous materials are encountered or suspected, **Mitigation Measure 9-2, Perform a Phase II Assessment as needed and remediate, control, or dispose of contaminated materials as appropriate**, would be implemented as needed to determine the extent and nature of the contamination. Contaminated material would be removed and disposed according to applicable federal, state, and local regulations. Therefore, with implementation of **Mitigation Measure 9-2**, both proposed Project construction and operation impacts related to hazardous materials resulting in hazards to the public or environment would be less than significant.

Impact 9-3. Would construction and operation of the proposed Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or wastes within 0.25 mile of an existing school?

The Nueva School Bay Meadows Campus is located within 0.25 mile southwest of the Project site. As discussed for Impacts 9-1 and 9-2, the use, storage, and transport of hazardous materials related to construction and operation of the proposed Project would comply with existing regulations, programs, and plans, including a hazardous materials business plan and spill prevention control and countermeasures plan as applicable. Accidental releases of any fuels, oils, and lubricants would be contained within the work sites and addressed in accordance with all DTSC, EPA, OSHA, and fire department regulations. Additionally, as discussed in Chapter 10, *Hydrology and Water Quality*, a stormwater pollution prevention plan (SWPPP) will be prepared and implemented to avoid/address potential construction-related impacts. Safety training and emergency response procedures would be employed during construction and operation and would be updated regularly to account for changes in hazardous materials use. Therefore, potential impacts from the use of these materials during construction and operation of the Project would be less than significant.

As discussed for Impact 9-2, no RECs were discovered in the Project area. With implementation of **Mitigation Measure 9-2,** any unexpected contaminated soil and groundwater would be identified and safely removed and disposed. Therefore, impacts as a result of hazardous emissions, handling of acutely hazardous materials, substances, or wastes within 0.25 mile of an existing school would be less than significant.

Impact 9-4. Would implementation of the proposed Project interfere with an adopted emergency response plan or emergency evacuation plan?

The City has a multi-hazard functional plan (City of San Mateo, 1995) as required by the California Emergency Services Act, and a local hazard mitigation plan (ABAG, 2010), as required by the Federal Emergency Management Agency (FEMA). These plans include information related to the City's response to hazardous materials releases. First responders frequently conduct drills simulating emergencies, including hazardous materials releases. The City's Emergency Operations Center, which is located at the City of San Mateo Police Department (SMPD) at 200 Franklin Parkway, would serve as the communication headquarters for emergency responses. Emergency supplies and equipment are stored at the Emergency Operations Center. SMPD and the San Mateo Fire Department would act jointly as incident command, unless the release occurred on a state highway under the authority of the California Highway Patrol. The Belmont–San Carlos Fire Department is able to provide assistance through a fully equipped hazardous materials response vehicle.

As discussed in Chapter 14 – *Public Services*, construction of the new diversion sewer pipelines within roadways could interfere with emergency access and evacuation. However, construction of pipeline sections would be temporary, lasting up to approximately 13 months, and detours would be provided during Project construction. In addition, with implementation of Final PEIR **Mitigation Measure 9-4, Coordinate emergency services during construction**, the City would follow its standard measures to coordinate in advance with the SMPD and establish signage and detours so that emergency access is maintained during the temporary construction activities. With implementation of Final PEIR **Mitigation Measure 9-4**, impacts of the proposed Project on emergency services would be less than significant.

9.5 Mitigation Measures

9.5.1 Final PEIR Mitigation Measure

Implementation of the following mitigation measure from the Final PEIR would ensure that potential impacts related to hazards and hazardous materials would be less than significant.

Mitigation Measure 9-4. Coordinate emergency services during construction.

For Project work areas located in or near roadways, or that may otherwise interfere with emergency access, the City shall follow its standard measures to coordinate in advance with the SMPD and establish signage and detours so that emergency access, including police and fire access, is maintained during temporary construction activities. Signage and notifications to the public regarding parking, driving, and pedestrian access disruptions shall be made. Emergency personnel and coordination centers shall be notified of construction locations and schedules prior to start of construction.

9.5.2 Project-Specific Mitigation Measure

Implementation of the following Project-specific mitigation measure would ensure that potential impacts related to hazards and hazardous materials would be less than significant.

Mitigation Measure 9-2. Perform a Phase II ESA as needed prior to construction and remediate, control, or dispose of contaminated materials as appropriate.

Where unexpected contamination is encountered or suspected, sampling shall be performed under a Phase II ESA, as appropriate, and recommendations for reducing or eliminating the mechanisms of contamination shall be provided. Recommendations may include removing the contaminated soil and disposing of it at a licensed facility in accordance with all regulations.

9.6 References

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CHAPTER 10

Hydrology and Water Quality

This chapter evaluates the potential impacts of the proposed Project on hydrology and water quality. Existing hydrology and water quality in the Project area are described as well as the applicable regulatory framework, potential impacts, and measures to mitigate the impacts to a less-than-significant level as applicable.

10.1 Existing Setting

The Project site is in a developed urban area. Onsite vegetation is limited to ornamental trees and shrubs along landscaped medians and sidewalks. Water features nearest to the Project site are limited to Borel Creek (also known as the 19th Avenue Channel), Seal Slough, which leads to Marina Lagoon and the South Francisco Bay (**Figure 10-1**).

Several other creeks are located within and around the City of San Mateo, including San Mateo Creek, which forms the northern boundary of the City with the Town of Hillsborough, and Laurel Creek, which runs along the southern boundary with the City of Belmont. Other notable creeks are scenic Edgewood Creek, which parallels Edgewood Road as it crosses private property; Madera Creek, which runs from the hills in western San Mateo to Borel Creek; and relatively natural Beresford Creek, which flows from the canyons south of Campus Drive to Borel Creek (City of San Mateo, 2010).

10.1.1 Precipitation

The regional climate is temperate and sub-humid and is modified greatly by marine influence. Summer fog is common in this area. Annual temperatures range from an average maximum of 66.8 degrees Fahrenheit (°F) to an average minimum of 47.1°F. The average total mean annual precipitation for the San Mateo area is 20.16 inches, and the mean freeze-free period is about 250 to 300 days (City of San Mateo, 2009).

10.1.2 Watersheds

San Mateo County encompasses four hydrologic basins and 34 watersheds, all of which ultimately drain west to the Pacific Ocean or east to San Francisco Bay. The City of San Mateo includes four major drainage basins (the San Mateo Creek complex, North San Mateo complex, Marina Lagoon complex, and the 3rd and Detroit watershed), each composed of numerous stream channels, culverts, and storm drainage piping systems. The Marina Lagoon complex is further divided into four minor drainage basins; therefore, there are a total of seven major and minor drainages basins (both artificial and natural) within the City (City of San Mateo, 2009).

Laurel Creek, 19th Avenue, 16th Avenue, and Mariner's Island drain to Marina Lagoon and the remaining three drain to the Bay either by gravity or pumping (City of San Mateo, 2009). The Project site is located within the 19th Avenue Drain watershed.

10.1.3 City Drainage System

Most of the open channels carry only seasonal flows. Water quality in the area creeks and channels has not been specifically characterized but is generally thought to be poor because of intercepted urban runoff, which typically carries high concentrations of oil, grease, and metals. In addition, some of the creeks and channels in the service area drain undeveloped areas upstream, often resulting in higher levels of coliform bacteria and suspended solids (EDAW, Inc., 2004).

The City's service area captures and conveys stormwater and flood waters through a system that includes the following:

- 130 miles of storm drains
- 20 miles of open creeks and drainage channels
- 1 flood control lagoon
- 9 pumping stations
- 3 miles of bay front levee

10.1.4 Groundwater

Groundwater in the Project area is part of the San Mateo Plain groundwater subarea, which is in the larger South Bay Groundwater Basin. Groundwater throughout the area is ample, with groundwater flows typically traveling northeasterly, originating in the Coastal Range and flowing toward San Francisco Bay. Local variations in groundwater flow occur in relation to topography, geology, and the geometry of local aquifers. Approximately 16 groundwater wells are operated throughout the City, supplying limited supplies of groundwater for domestic use and irrigation by private, commercial, and government users. Varying groundwater quality and physical entrapment of groundwater within discontinuous and fine-grained sediments, however, limit the use of groundwater as a primary source of water supply in the City.

Groundwater studies were completed for the Bay Meadows Project, which is located south of the proposed Project site. Groundwater has been encountered at depths of approximately 10 to 13.5 feet in the Bay Meadows area. In later studies, groundwater was encountered at depths of 7 to 10 feet. During subsequent geotechnical investigations of the Bay Meadows area, groundwater was encountered at depths from 4 to 19 feet below the existing grade (EDAW, Inc., 2004). A more recent study of the Project site reported groundwater levels ranged between 3.7 and 6.9 feet bgs at the temporary holding structure site (ENGEO, 2018). Groundwater levels beneath the Project site fluctuate seasonally due to tidal action, precipitation, temperature, irrigation, and other factors (ENGEO, 2018).

10.1.5 Flooding

Since 2001, FEMA has issued Flood Zone maps for San Mateo designating certain sections of the City as "high risk." These high-risk areas are required to carry flood insurance if properties have a federally backed mortgage. As development in San Mateo has continued, FEMA has reevaluated the high-risk maps and made adjustments to rate maps. The most recent Flood Zone Map for San Mateo was revised and official as of July 2015 (City of San Mateo, 2015a). According to the most recent Flood Zone Map, the proposed Project is located in Zone X, a zone of minimal flood hazard, which is outside of the 100-year flood hazard area and higher than the elevation of the 0.2-percent-annual-chance flood (City of San Mateo, 2015a; FEMA, 2017).

Though San Mateo is near San Francisco Bay, it is not subject to risk of flooding from tsunami or tidal action because the potential for tsunami or extreme tidal fluctuations is low in the Bay. In addition, the City's levees are structurally stable and have a low probability of failure, though dike failure would only flood a minor portion of the proposed Project area along its eastern edge and flooding would only affect areas below an elevation of 104.7 feet (see Figure 4.8-2 in the General Plan EIR). The proposed Project site is, however, within the area of potential inundation in the event of a failure of Crystal Springs Dam and Laurel Creek Dam. Crystal Springs Dam, which retains the water supply for San Francisco and most cities within San Mateo County, and Laurel Creek Dam, which provides important flood control for the City of San Mateo, both have an extremely low risk of failure.

10.2 Regulatory Framework

The proposed Project is subject to all federal, state, and local regulations pertaining to water quality, pollutant emissions, and drainage. Regulations pertaining to hydrology and water quality in the proposed Project area are discussed in the following sections.

10.2.1 Federal Regulations

The federal CWA, as amended, is the fundamental federal law for regulating discharges of waste into waters of the United States. Section 402 of the CWA provides NPDES requirements, which have been established for stormwater discharges from a range of industrial discharge categories, including construction activities. The EPA has delegated administrative authority for implementing the NPDES program to the State of California. The SWRCB and nine RWQCBs have authority to implement the CWA in California. In San Mateo, the San Francisco Bay RWQCB oversees implementation of the NPDES program. Construction projects with disturbance areas greater than 1 acre would require coverage under the State's Construction General Permit (CGP) (CAS0000001, Order 2009-0009-DWQ as amended by Orders 2010-0014-DWQ and 2012-0006-DWQ). The permit requires development and implementation of a site-specific SWPPP, which must include BMPs to provide an effective combination of erosion and sediment controls.

The proposed Project is subject to federal regulations governing discharge from point sources and "wet weather point sources," such as urban storm sewer systems and construction sites, as defined in Sections 1311-1330 of the CWA (33 USC 26, Subchapter III).

10.2.2 State Regulations

The Porter-Cologne Water Quality Control Act provides for protection of the quality of all waters of the State of California. The act gives the California SWRCB and RWQCBs regulatory authority to establish water quality standards and implementation plans to achieve those standards.

The SWRCB and RWQCBs are responsible for preserving, enhancing, and restoring the quality of California's water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper water resource allocation and efficient use, for the benefit of present and future generations (SWRCB, 2015). The SWRCB makes statewide regulations governing water use and point source and non-point source pollutant discharges; the RWQCBs work in regions of the state to implement SWRCB policies and regulations, while also establishing additional region- and area-specific regulations and policies to achieve water quality goals. Operation of the City's sanitary sewer collection system and WWTP is regulated by the San Francisco Bay RWQCB. The City's collection system has a history of wet weather SSOs that result in the discharge of untreated or partially treated wastewater. In March 2009, the RWQCB issued a Cease and Desist Order jointly to the City of San Mateo, the Town of Hillsborough, and the CSCSD mandating elimination of SSOs in the collection system and requiring specific corrective actions.

10.2.3 Local Regulations

10.2.3.1 San Mateo Countywide Water Pollution Prevention Program

Water pollution degrades surface waters, making them unsafe for drinking, fishing, swimming, and other activities. The San Mateo Countywide Water Pollution Prevention Program was established in 1990 to reduce the pollution carried by stormwater into local creeks, San Francisco Bay, and the Pacific Ocean. The program is a partnership of the City/County Association of Governments of San Mateo County, each incorporated city and town in the county, and San Mateo County, which share a common NPDES permit. The federal CWA and the Porter-Cologne Water Quality Control Act require that large urban areas discharging stormwater into San Francisco Bay or the Pacific Ocean have an NPDES permit to prevent harmful pollutants from being dumped or washed away by stormwater runoff into the stormwater system and then discharged into local water bodies.

The Stormwater Management Plan outlines the priorities, key elements, strategies, and evaluation methods for the San Mateo Countywide Water Pollution Prevention Program. The comprehensive program includes pollution reduction activities for construction sites, industrial sites, illegal discharges and illicit connections, new development, and municipal operations. The program also includes a public education effort, target pollutant reduction strategy, and monitoring program.

10.2.3.2 San Mateo City Charter and Municipal Code

Ordinances addressing stormwater management and controlling non-stormwater discharge in the City of San Mateo are contained in Title 7, Chapter 39, Stormwater Management and Discharge Control, of the City's Municipal Code (City of San Mateo, 2015b). Included in the Code is the City's requirement for a Stormwater Pollution Prevention Program construction (SWPPC) permit. The permit regulates the discharge into the City's stormwater system and is in coordination with the San Mateo Countywide Water Pollution Prevention program discussed in Section 10.2.3.1.

10.3 Assessment Methods and Thresholds of Significance

This impact analysis focuses on potential effects on drainage, flooding, and water quality associated with implementation of the proposed Project. The analysis was made by using available information regarding the water quality and hydrologic characteristics of the Project area, subsurface testing, proposed Project plans, and applicable regulations and guidelines. Impacts on hydrology and water quality may occur if the proposed Project would result in the following:

- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin
- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface water or groundwater quality
- 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 surface, in a manner which would: substantially increase the rate or amount of surface runoff, result in flooding or substantial erosion or siltation onsite or offsite, or 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 impede or redirect flood flows
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

The City of San Mateo is not subject to risk of inundation by seiche or tsunami. Proposed facilities would be below ground and not subject to mudflows. Impacts associated with inundation by seiche, tsunami, or mudflow are not discussed further. Additionally, the Project does not include long-term groundwater pumping as part of Project implementation and, therefore, would not obstruct implementation of a sustainable groundwater management plan, and, thus, is not discussed further.

10.4 Environmental Impacts

Impact 10-1. Would the proposed Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?

Excavation during construction of the temporary holding structure, pump station, odor control equipment room, and associated diversion sewer lines could result in excavation in the water table, which would require dewatering. Dewatering during excavation may result in impacts on groundwater supplies. However, dewatering would be required only during the initial phases of excavation and construction and would not occur for substantial periods of time. Because of the short duration of dewatering, the volume of groundwater removed would be expected to be minor. As described in Section 10.1.4, groundwater throughout the area is ample but is not widely used as a water source due to quality and accessibility. Impacts of construction of the proposed Project on groundwater supplies would be less than significant.

Operation of the proposed Project would not use groundwater resources. The proposed Project would result in negligible to no increase in impervious surfaces because the ground surface would be returned generally to pre-Project conditions. Impacts to groundwater supplies from operation of the proposed Project would be less than significant.

Impact 10-2. Would the proposed Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, or conflict with or obstruct implementation of a water quality control plan?

Construction of the proposed Project would entail excavation, grading, and other earth-disturbing activities that would expose and disturb soils, resulting in the potential for increased erosion by wind or rainfall. Stormwater could convey eroded sediment into storm drains connecting to Borel Creek that could result in siltation and increase nutrient loading and total suspended solids concentrations in Borel Creek and downstream receiving waters. Materials used during construction, including drilling muds and paving materials, as well as activities such as equipment refueling and maintenance, have the potential to discharge construction pollutants such as gasoline, oil, rubber particles, herbicides, paint, adhesives, and tar into storm drains that drain to nearby Borel Creek and degrade water quality. Discharges into storm drains during excavation may contain chemical constituents and sediment that could degrade water quality in Borel Creek and downstream receiving waters such as Marina Lagoon if discharged improperly.

Implementation of Final PEIR **Mitigation Measure 10-2, Install and apply erosion control and stormwater best management practices during construction,** and Project-specific **Mitigation Measure 10-2a, Obtain discharge permits to comply with discharge requirements,** would ensure that construction activities would not significantly degrade water quality in Borel Creek and downstream receiving waters, and impacts would be less than significant.

Operation of the proposed Project would substantially improve water quality by controlling wet weather flow rates to the WWTP, resulting in improved water quality discharge from the plant into the Lower San Francisco Bay. The proposed Project would also provide additional storage and conveyance capacity in the collection system, which will help the City to meet current regulatory requirements regarding SSOs, reducing the discharge of raw sewage in the surrounding area, including Lower San Francisco Bay, thereby resulting in improved water quality.

Impact 10-3. Would the proposed Project 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 surface, in a manner which would: substantially increase the rate or amount of surface runoff, result in flooding or substantial erosion or siltation onsite or offsite, or 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 impede or redirect flood flows?

Construction of the proposed Project could result in temporary changes in localized drainage patterns that could change surface runoff and affect stormwater facilities or offsite water quality. Implementation of Final PEIR **Mitigation Measure 10-2, Install and apply erosion control and**

stormwater best management practices during construction, would prevent surface runoff from discharging into storm drains, thereby reducing any effects of increased runoff volumes to a less than significant level.

Once construction is completed, the Project area would be restored to pre-Project conditions, and would not result in changes to drainage patterns. In addition, the majority of the new facilities would be below ground and would not affect drainage patterns, and the Project site will be paved with pervious concrete so stormwater runoff will not be increased.

Neither construction nor operation of the proposed Project would alter the course of a stream or river.

With implementation of Final PEIR **Mitigation Measure 10-2, *Install and apply erosion control and stormwater best management practices during construction***, effects of the proposed Project on drainage patterns and surface runoff would be minor, and impacts on flooding, erosion, and stormwater drainage system capacity would be less than significant.

10.5 Mitigation Measures

10.5.1 Final PEIR Mitigation Measure

Implementation of the following mitigation measure from the Final PEIR would ensure that potential impacts on hydrology and water quality would remain at a less-than-significant level.

Mitigation Measure 10-2. Install and apply erosion control and stormwater best management practices during construction.

Applicable erosion control and stormwater BMPs shall be installed and maintained during construction for all earth-disturbing activities. Construction activities shall be required to comply with all RWQCB regulations and procedures for discharging wastewater, including dewatering discharges, as detailed in the SWPPP prepared for each project and as required under Chapter 7.39 of the Municipal Code (City of San Mateo, 2015b). Applicable BMPs to reduce erosion and siltation and protect water quality can include, but are not limited to: designate construction access routes; stabilize construction access points; stabilize cleared and excavated areas by providing vegetative buffer strips, plastic coverings, and applying ground base on areas to be paved; protect adjacent properties and waterways by installing sediment barriers, filters, or vegetative buffer strips; prevent surface runoff from discharging into storm drains; use sediment controls and filtration to remove sediment from water generated by dewatering; and avoid refueling and vehicle maintenance on construction sites as feasible.

10.5.2 Project-Specific Mitigation Measures

Implementation of the following Project-specific mitigation measure would ensure that potential impacts on hydrology and water quality would be less than significant.

Mitigation Measure 10-2a. Obtain discharge permits to comply with discharge requirements.

The City or its contractors shall obtain and comply with discharge permits as appropriate for discharge of dewatering water.

10.6 References

City of San Mateo. 2009. *Draft Environmental Impact Report for the City of San Mateo General Plan Update*. July 27.

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______. 2015a. City of San Mateo FEMA Flood Zones website. http://www.cityofsanmateo.org/index.aspx?nid=1797. Accessed January 23, 2018.

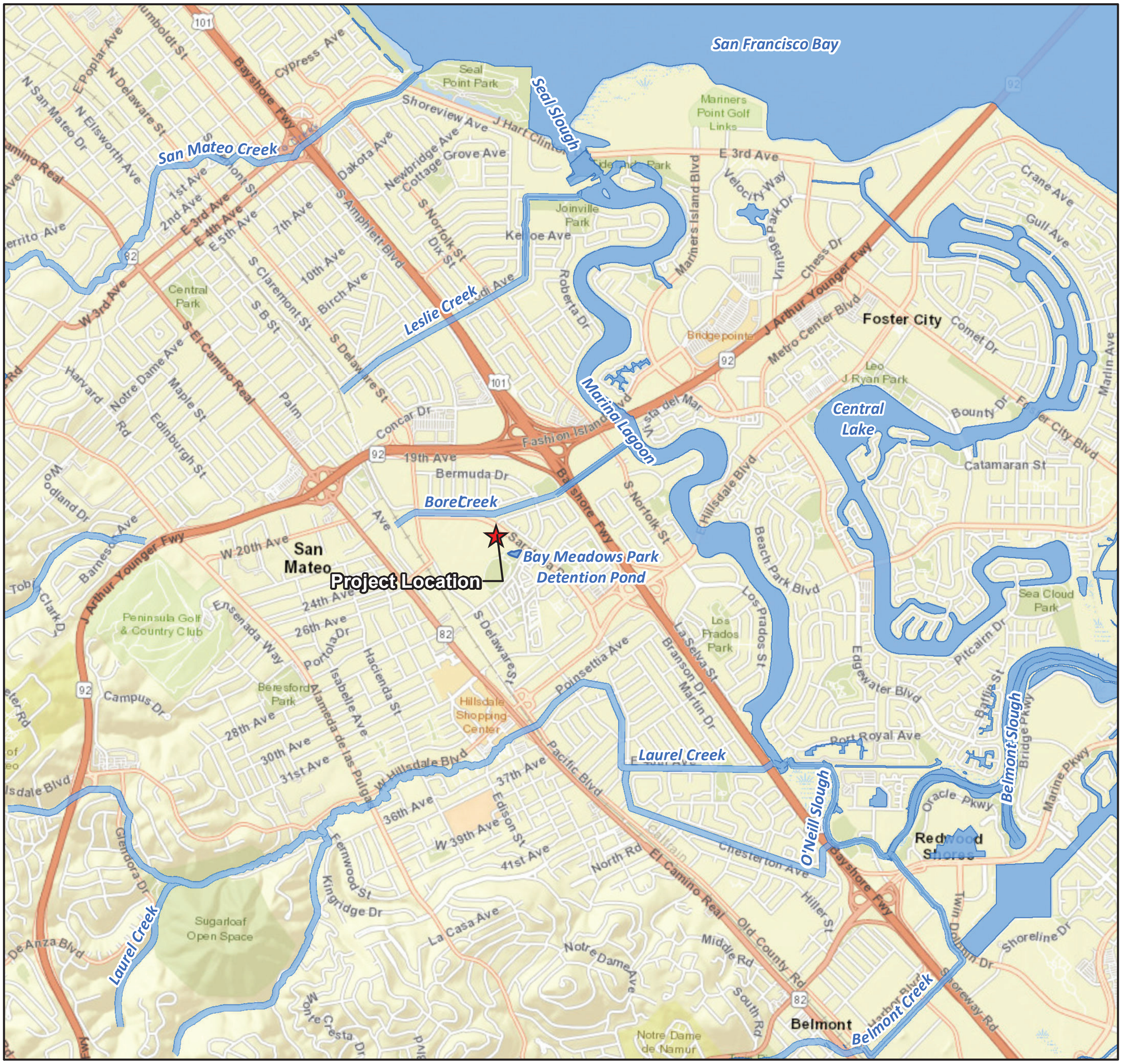
______. 2015b. *San Mateo City Charter and Municipal Code*. Available at http://qcode.us/codes/sanmateo/. Effective as of September 17.

EDAW, Inc. 2004. *San Mateo Corridor Plan and Bay Meadows Specific Plan Amendment EIR*.

ENGEO. 2018. Basin 2 and 3 Collection System Improvements Underground Flow Equalization System Facility and Diversion Sewers San Mateo, California - Geotechnical Sampling Data Report. August 28.

Federal Emergency Management Agency (FEMA). 2017. FEMA's National Flood Hazard Layer (Official). https://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cbe088e7c8704464aa0fc34eb99e7f30. Accessed December 29.

State Water Resources Control Board (SWRCB). 2015. “About the Water Board” website. http://www.swrcb.ca.gov/about_us/.



VICINITY MAP

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 10-1
Water Features
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

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CHAPTER 11

Land Use

This chapter identifies applicable federal, state, and local regulations; identifies potential impacts of construction and operation of the proposed Project; and proposes mitigation measures as applicable, to reduce potentially significant impacts on land uses.

11.1 Existing Setting

The proposed Project site is located within the City of San Mateo and is, therefore, under the jurisdiction of the City's planning regulations; the Project parcel is owned by San Mateo County. The City of San Mateo occupies approximately 15.7 square miles in central San Mateo County. It is bordered by San Francisco Bay and the City of Foster City on the east, the City of Burlingame and the Town of Hillsborough to the north, Highlands-Baywood Park and I-280 to the west, and the City of Belmont to the south (see **Figure 2-1**). San Mateo is an urbanized area and is largely built out, with only a few individual areas left undeveloped that are not otherwise classified as open space or environmental preserves. Currently, collection system pipelines and pump stations are located primarily underground in existing streets or dedicated ROWs that are typically paved or covered with ruderal or landscaped vegetation.

The Project site is located at the Event Center parking lot and roadways that surround the parcel include Saratoga Drive and S. Delaware Street. The proposed temporary holding structure and associated proposed Project components would be located in the southeast corner of the parcel in an area currently serving as a gravel parking/storage yard with stored vehicles, equipment, containers, and debris piles. The property land use designation is major institution/special facility and zoned Agriculture (A) by the City of San Mateo (see **Figures 11-1** and **11-2**).

No portion of the Project site is located on unique or prime farmland or is currently used for agricultural purposes (California Department of Conservation, 2015). The Project site is not under a Williamson Act contract.

11.2 Regulatory Framework

This section summarizes existing land use regulations that would apply to the Project site. Land use is regulated primarily at the local level.

11.2.1 General Plan – Land Use

The General Plan (City of San Mateo, 2010) describes the long-term goals and policies for development and provides the framework for all zoning and land use decisions within the City. The General Plan identifies a land use category for each parcel that includes specific permitted uses of the parcel.

In 2004, voters in San Mateo approved Measure P, an extension of Measure H, a 1991 amendment to the General Plan. These measures state that requests for height changes consistent with height ranges for specific land uses may be considered by the City Council only when accompanied by a request for a change in land use designation and subject to certain findings (City of San Mateo, 2004). The City Council may not amend the General Plan inconsistent with the purposes, intent, or operative provisions of these initiatives, including provisions reducing maximum height limits.

The land use designation for the San Mateo County Event Center is a "Major Institution/special facility." Allowed uses for this parcel are private and public institutional, educational, recreational, and community service uses that include the San Mateo County Hospital, San Mateo Event Center, Peninsula

Gold and Country Club, and the College of San Mateo (City of San Mateo, 2010). According to San Mateo General Plan Figure LU-4, the building height limit for the parcel is 45 feet. The land uses for the Project site and surrounding areas are shown in **Figure 11-1**.

11.2.2 General Plan Goals and Policies

The General Plan contains goals and policies and the land use framework described in Section 11.2.1 to help guide development within San Mateo. Goals and policies applicable to land use for the Project site and the proposed activities are cited below, in part or in whole.

> **GOAL 1e:** Provide adequate transportation, utilities, cultural, educational, recreational, and public facilities, and ensure their availability to all members of the community.
>
> **GOAL 1i:** Consider the effects of Climate Change on the City of San Mateo. Incorporate Sustainability into the City's policies, work programs, and standard operations.
>
> **LU 1.1: Planning Area Growth and Development to 2030.** Plan for land uses, population density, and land use intensity as shown on the Land Use, Height and Building Intensity, and City Image Plans for the entire planning area. Design the circulation system and infrastructure to provide capacity for the total development expected in 2030. Review projections annually and adjust infrastructure and circulation requirements as required if actual growth varies significantly from that projected.

11.2.3 Zoning

The City of San Mateo Zoning Ordinance, Title 27 of the Municipal Code (City of San Mateo, 2015), regulates certain items, such as building height and setback, to promote public health and safety, conserve property values, protect the character and stability of neighborhoods, reduce land use conflicts, and support other community goals. The Project site is currently zoned as Agriculture. This includes all uses commonly classified as agriculture, horticulture, or forestry, including crop and tree farming, and nursery operation; horse racetracks; public parks and recreation areas; golf courses; and public utility facilities (City of San Mateo, 2015; Title 27–Zoning).

Chapter 27.74 of the Zoning Ordinance describes the requirements for special use permits. The zoning code identifies permitted uses for each land use type in the City. In addition, the Zoning Ordinance recognizes that other uses may be necessary or desirable in a given district but may have influence upon neighboring uses or public facilities; these uses need to be carefully regulated with respect to location or operation for the protection of the community. Such uses are classified as "special uses."

Chapter 27.06 of the Zoning Ordinance notes that "[e]very project which is fully or partially funded by the City and which is subject to Planning Commission review under 27.06.040" requires final approval by the City Council (City of San Mateo, 2015). These approvals include special use permits, SPAR, and site development permits.

11.2.4 City of San Mateo Development Permit

Chapter 23.40 of the Municipal Code was adopted in part to protect public and private lands from erosion, earth movement, and flooding; to preserve the natural scenic character of the City; and to maximize visually pleasant relationships with adjacent sites during development activities, including grading and removal of major vegetation. Depending on the quantity of grading, a site development permit is required for site development on private property and may also be used for review of public projects that require a planning application and public review.

11.3 Assessment Methods and Thresholds of Significance

Impacts on land use may occur if the proposed Project would result in the following:

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

11.4 Environmental Impacts

Impact 11-1. Would the proposed Project include development that could physically divide an established community?

The only new permanent aboveground structures associated with the proposed Project would be minor appurtenances, including access hatches, electrical building, and vents for treated air. The new diversion sewer pipelines would be underground in streets or designated City ROW. The holding structure portion of the proposed Project would be in the southeast corner of the parcel, which is currently a gravel parking/storage yard. Construction and operation of the holding structure would not substantially change the general nature of the Project site or the surrounding community and, therefore, would not divide an established community. Construction of diversion sewers in the roadways surrounding the parcel may require short-term road closures of up to several weeks, but the closures would not be permanent and, consequently, would not result in the division of an established community, and there would be no impacts.

Impact 11-2. Would implementation of the proposed Project conflict with conflict with any land use plan, policy, or regulation including the City of San Mateo land use and zoning regulations?

The land use designation for the Project site is "major institution/special facility" (City of San Mateo, 2015) and is zoned Agriculture (A) by the City of San Mateo. Under this zoning, "Public Utility Facilities" are identified as a permitted use. However, consistent with Final PEIR **Mitigation Measure 11-2, Obtain approval for a special use permit**, a Special Use Permit from the City's Planning Department under City of San Mateo Ordinance 27.60.040(a)(2), will be obtained. Because a Special Use Permit would be acquired prior to the start of construction, and the zoning was not adopted for avoiding or mitigating an environmental effect, the proposed Project would not conflict with applicable land use plans, policies, or regulations and, thus, would result in a less-than-significant impact.

Impact 11-3. Would implementation of the proposed Project conflict with habitat or natural conservation plans?

As discussed in Chapter 5, Impact 5-6, the Project site is not located within the boundary of an adopted habitat conservation plan. Portions of western San Mateo are located within the Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area (City of San Mateo, 2010). However, the proposed Project would not be located on serpentine soils (see Chapter 7) and, therefore, would not be in the recovery plan area. There would be no conflict with provisions of an adopted habitat conservation plan, natural community conservation plan, or other plan, and there would be no impacts.

11.5 Mitigation Measures

Implementation of the following mitigation measures from the Final PEIR would ensure that potential impacts on land use would remain at a less-than-significant level.

Final PEIR Mitigation Measure 11-2, Obtain approval for a special use permit.

The City of San Mateo Department of Public Works shall apply for a special use permit prior to approval of any project on a parcel where wastewater collection, pumping, or treatment facilities are not a regularly permitted use. Permit applications shall be reviewed and approved by the Planning Commission and City Council if all conditions are met.

11.6 References

California Department of Conservation. 2015. Farmland Mapping and Monitoring Program website. http://www.conservation.ca.gov/DLRP/fmmp/Pages/Index.aspx. Accessed October 16.

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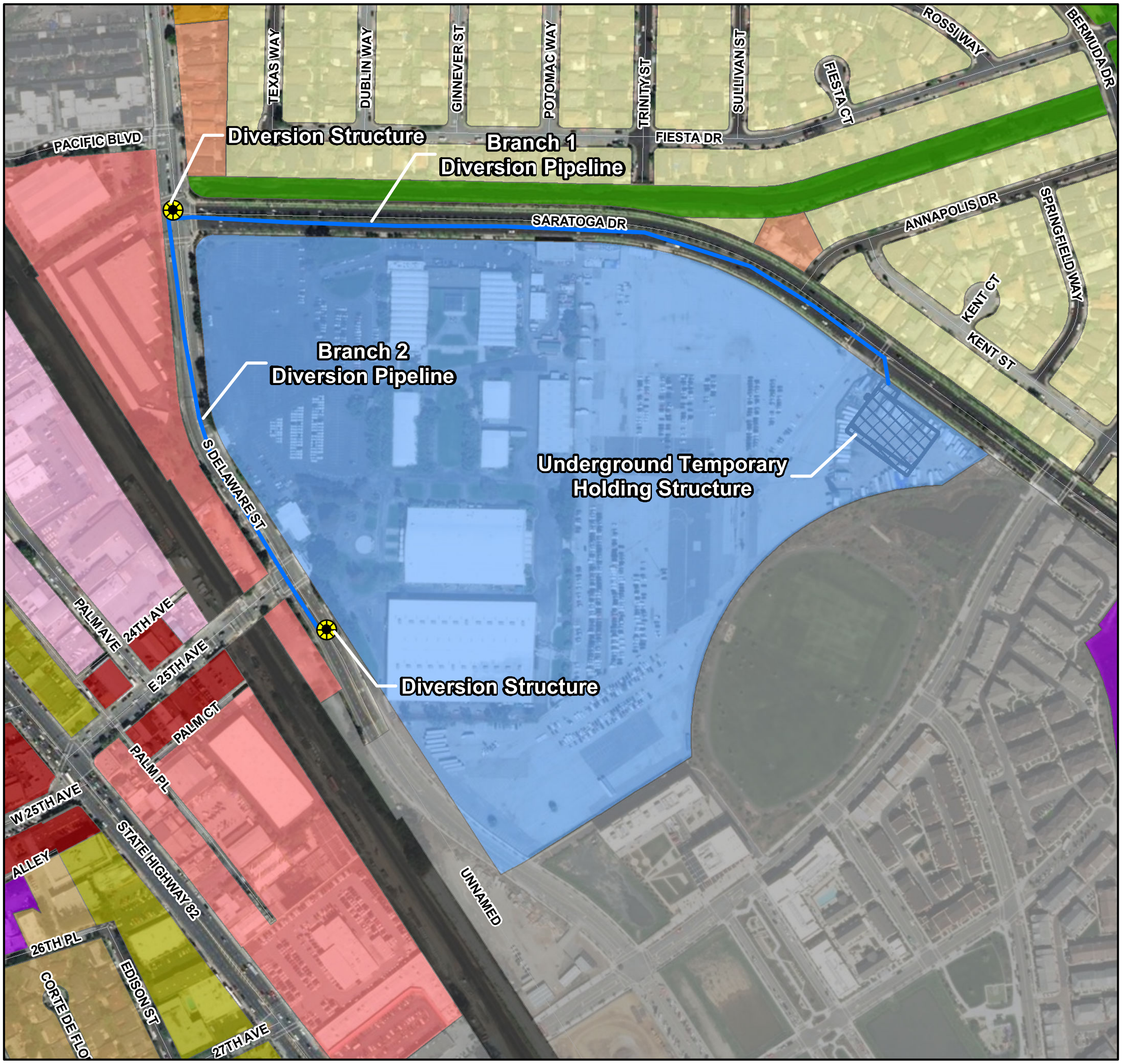

LEGEND

Land Use Designation

- Neighborhood Commercial
- Regional/Community Commercial
- Regional/Community Commercial/ High Density Multi-Family
- Service Commercial
- Executive Office
- Single Family
- Low Density Multi-Family
- Medium Density Multi-Family
- High Density Multi-Family
- Parks/ Open Space
- Major Institution/ Special Facility
- Transit-Oriented Development
- Transportation Corridor

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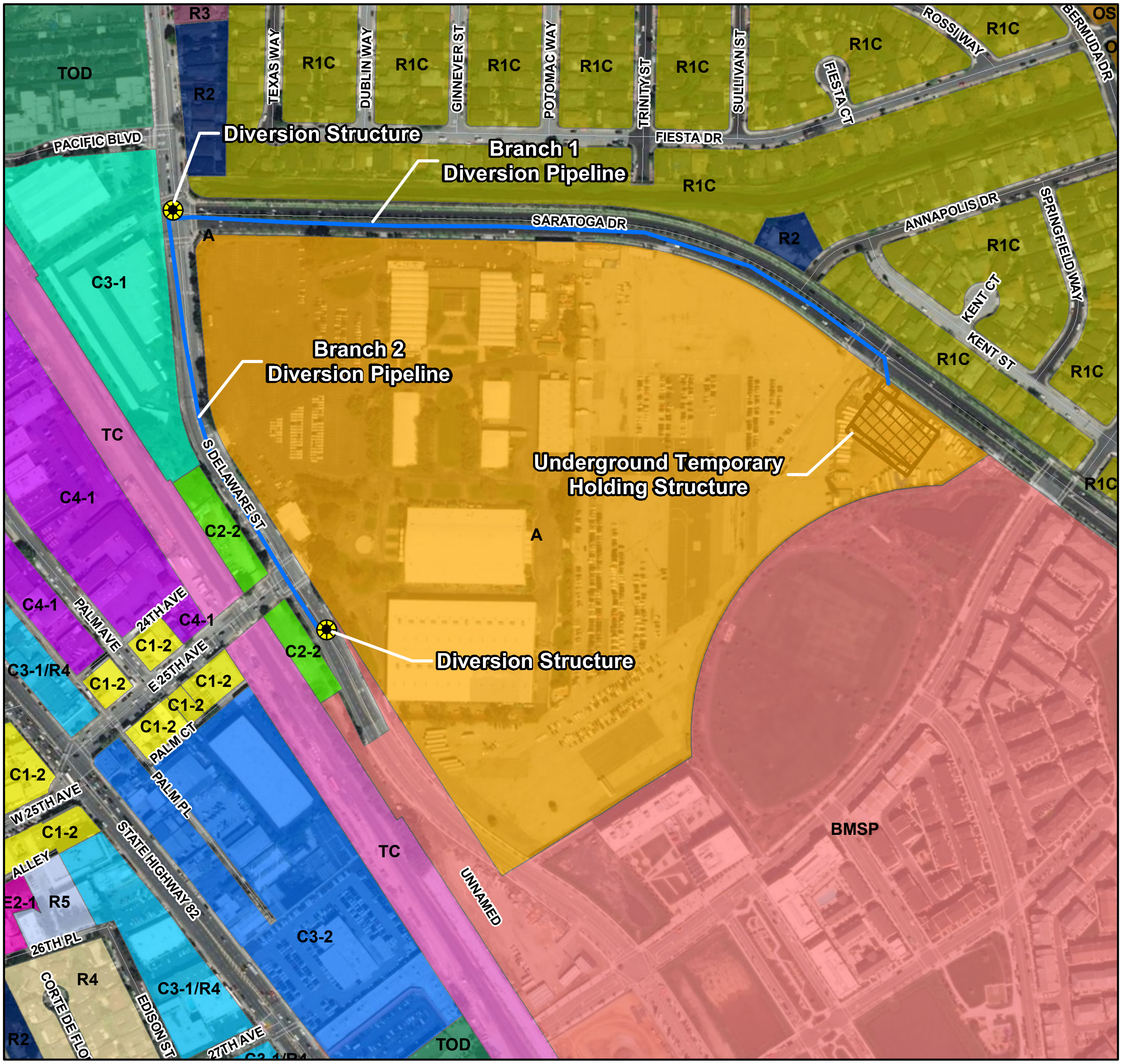
VICINITY MAP

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 11-1
Land Use Designation
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program



LEGEND

- A, Agricultural
- BMSP, Bay Meadows Specific Plan
- C1-2, Neighborhood Commercial - General Provisions
- C2-2, Regional/Community Commercial
- C3-1, Regional/Community Commercial
- C3-1/R4, Regional/Community Commercial - Multiple Family Dwellings (High Density)
- C3-2, Regional/Community Commercial
- C4-1, Service Commercial
- E2-1, Executive Office
- OS, Open Space
- R1C, One Family Dwelling "C"
- R2, Two Family Dwellings
- R3, Multiple Family Dwellings (Med. Density)
- R4, Multiple Family Dwellings (High Density)
- R5, Multiple Family Dwellings (High Density)
- TC, Transportation Corridor
- TOD, Transit Oriented Development

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VICINITY MAP

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

FIGURE 11-2
Zoning Designation
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

CHAPTER 12

Noise

This chapter evaluates the potential noise impacts caused by construction and operation of proposed Project. The chapter summarizes the relevant existing setting and regulatory framework, identifies the thresholds of significance, and identifies impacts and mitigation measures as applicable related to potential noise generation.

12.1 Fundamentals of Acoustics

Acoustics is the study of sound, and noise is defined as unwanted sound. Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Acoustical terms used in this section are summarized in **Table 12-1**.

Table 12-1. Definitions of Acoustical Terms
Underground Flow Equalization System Project, Environmental Impact Report

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient noise level is typically defined by the L_{eq} level.
Background Noise Level	The underlying ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically make up the background. The background level is generally defined by the L_{90} percentile noise level.
Intrusive	Noise that intrudes over and above the existing ambient noise level at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal content, the prevailing ambient noise level as well as the sensitivity of the receiver. The intrusive level is generally defined by the L_{10} percentile noise level.
Sound Pressure (Noise) Level Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
A-Weighted Sound Pressure (Noise) Level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound (noise) levels in this report are A-weighted.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level, on an equal energy basis, during the measurement period.
Percentile Noise Level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{90})
Day-Night Noise Level (L_{dn} or DNL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels from 10:00 p.m. to 7:00 a.m.

The most common metric of sound is the overall A-weighted decibel (dBA), a sound level measurement adopted by regulatory bodies worldwide. The A-weighting network measures sound similar to how a person perceives or hears sound. There is consensus that A-weighting is appropriate for estimating the hazard of noise-induced hearing loss. With respect to other effects, such as annoyance, A-weighting is acceptable largely if middle- and high-frequency noise is present; however, if the noise is unusually high at low frequencies or contains prominent low-frequency tones, the A-weighting may not give a valid measure.

A-weighted sound levels are typically measured or presented as equivalent noise level (L_{eq}), which is defined as the average noise level on an equal-energy basis for a stated period of time and is commonly used to measure steady-state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by $L_{xx,}$ where xx represents the percentile of time the sound level is exceeded. The L_{90} measurement represents the noise level that is exceeded during 90 percent of the measurement period, which typically represents a continuous noise source. Similarly, L_{10} represents the noise level exceeded for 10 percent of the measurement period.

Some metrics used in determining the impact of environmental noise consider the different response that people have to daytime and nighttime noise levels. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises. To account for human sensitivity to nighttime noise levels, the day-night sound level (L_{dn} or DNL) was developed. L_{dn} is a noise index that accounts for the greater annoyance of noise during the nighttime hours.

L_{dn} values are calculated by averaging hourly L_{eq} sound levels for a 24-hour period and apply a weighting factor of 10 decibels to nighttime L_{eq} values. The weighting factor, which reflects the increased sensitivity to noise during nighttime hours, is added to each hourly L_{eq} sound level before the 24-hour L_{dn} is calculated. For the purposes of assessing noise, the 24-hour day is divided into two time periods, with the following weightings:

- Daytime: 7 a.m. to 10 p.m. (15 hours) weighting factor of 0 dB
- Nighttime: 10 p.m. to 7 a.m. (9 hours) weighting factor of 10 dB

The two time periods are averaged to compute the overall L_{dn} value. For a continuous noise source, the L_{dn} value is computed by adding 6.4 dBA to the overall 24-hour noise level (L_{eq}). For example, if the expected continuous noise level from a noise source is 60.0 dBA, the resulting L_{dn} from the facility would be 66.4 dBA.

The effects of noise on people can be listed in three general categories:

1. Subjective effects of annoyance, nuisance, and dissatisfaction
2. Interference with activities such as speech, sleep, and learning
3. Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the third category. No completely satisfactory way exists to measure the subjective effects of noise or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individual thresholds of annoyance and habituation to noise. Thus, one way of determining a person's subjective reaction to a new noise is by comparing it to the existing, ambient environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

Table 12-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

Table 12-2. Typical Sound Levels Measures in the Environment and Industry
Underground Flow Equalization System Project, Environmental Impact Report

Noise Source at a Given Distance	A-Weighted Noise Level (dB)	Noise Environments	Subjective Impression
Shotgun (at shooter's ear)	140	Aircraft carrier flight deck	Painfully loud
Civil defense siren (at 100 feet)	130		
Jet takeoff (at 200 feet)	120		Threshold of pain
Loud rock music	110	Rock music concert	
Pile driver (at 50 feet)	100		Very loud
Ambulance siren (at 100 feet)	90	Boiler room	
Pneumatic drill (at 50 feet)	80	Noisy restaurant	
Busy traffic; hair dryer	70		Moderately loud
Normal conversation (at 5 feet)	60	Data processing center	
Light traffic (at 100 feet); rainfall	50	Private business office	
Bird calls (distant)	40	Average living room, library	Quiet
Soft whisper (at 5 feet); rustling leaves	30	Quiet bedroom	
	20	Recording studio	
Normal breathing	10		Threshold of hearing

Source: Beranek, 1998.

12.2 Existing Setting

12.2.1 Existing Noise Levels and Sensitive Receptors

The proposed Project would be constructed entirely within the City of San Mateo. The Project area is located in a mix of low-, medium-, and high-density residential neighborhoods and office and commercial centers combined with parks and open spaces. Noise-sensitive receptors, such as schools, hospitals, and residences, are located in the Project vicinity. The nearest sensitive receptors are low-density residential structures located within approximately 35 feet of the diversion pipeline and force main proposed in Saratoga Drive. The proposed holding structure is approximately 100 feet from the nearest sensitive receptors (low-density residences) located northeast and adjacent to Saratoga Drive. The nearest school is the Nueva School, located approximately 1,000 feet southeast of the proposed diversion pipeline and structure in S. Delaware Street. The nearest medical facility is the Brookside Skilled Nursing Hospital, located over 0.25 mile southwest of the proposed diversion pipeline and structure in S. Delaware Street.

The Project site, primarily the diversion pipelines that are proposed on S. Delaware Street, is located within 250 feet of the Caltrain/Southern Pacific Railroad rail line.

The Noise Element in the *City of San Mateo General Plan – Vision 2030* (General Plan) (City of San Mateo, 2010) describes noise exposure in the City as follows:

> *"...[noise] is dominated by traffic on highways and major arterial roads and trains on the Southern Pacific (SPRR)/Caltrain rail line. Aircraft activity associated with San Francisco International Airport does not significantly affect noise levels in San Mateo, although some neighborhoods in the northeastern portion of the City are impacted by the airport approach path. Localized noise sources include the San Mateo County Fairgrounds, when events are being held. Generally, noise created by manufacturing uses does not have a major impact on the community, although occasional complaints are received from neighbors immediately adjacent to the manufacturing sites."*

The Project area is located outside of the San Francisco International Airport's community noise equivalent level (CNEL) 65 dBA noise contour (SFO, 2019).

Traffic noise levels at 50 feet (L_{dn}, or DNL) are provided in Table 4.6-1 of the City's *General Plan Update Draft Environmental Impact Report* (City of San Mateo, 2009). Major streets located in the Project area and their L_{dn} include:

- S. Delaware Street between approximately 19th Avenue and Saratoga Avenue – L_{dn} at 50 feet ranges from 64.3 to 65.3 dBA
- Hillsdale Boulevard between approximately El Camino Real and U.S. Route 101 (US 101) – L_{dn} at 50 feet ranges from 69.0 to 69.4 dBA
- US 101 through all of San Mateo (with 10-foot-tall sound walls) – L_{dn} at 50 feet of 84.9 dBA
- State Route 92 (SR 92) between approximately El Camino Real and US 101 – L_{dn} at 50 feet of 81.4 dBA

Analysis provided in the City's *General Plan Update Draft Environmental Impact Report* states that 92 commuter trains pass through San Mateo each weekday, and two freight trains operate six times per week between 7 p.m. and 10 p.m. from Sunday through Friday (City of San Mateo, 2009). Noise levels attributed to trains in the City were mainly due to the train's warning horn at grade crossings and stations (City of San Mateo, 2009).

Existing noise contours throughout the City are shown on Figure 4.6-2 of the *General Plan Update Draft Environmental Impact Report* (City of San Mateo, 2009). **Figure 12-1** shows the noise contours within the Project site. As shown, most of the Project area is located within the 60- to 64-dBA Ldn contour, though all the proposed diversion sewer pipelines would be located within the 65- to 69-dBA Ldn contour. Existing noise Ldn contours along the rail line corridor range from 70 dBA to greater than 75 dBA.

12.3 Regulatory Framework

The following sections describe the federal, state, and local noise regulations applicable to the proposed Project.

12.3.1 Federal Regulations

12.3.1.1 U.S. Environmental Protection Agency

EPA guidelines (1974) assist state and local governments in developing state and local laws, ordinances, regulations, and standards for noise. Because local regulations apply to the proposed Project, the EPA guidelines are not applicable.

12.3.1.2 Occupational Safety and Health Administration

Onsite and occupational noise levels are regulated through the OSHA. The noise exposure level of workers is regulated at 90 dBA over an 8-hour work shift to protect hearing (29 CFR 1910.95). Onsite operational noise levels will generally range from 70 to 85 dBA. Areas where noise levels exceed 85 dBA will be posted as high-noise level areas, and hearing protection will be required when entering or working in those areas. The proposed Project will implement a hearing conservation program for applicable employees and maintain exposure levels below 90 dBA.

12.3.2 State Regulations

12.3.2.1 California Department of Industrial Relations, Division of Occupational Safety and Health

The California Department of Industrial Relations, Division of Occupational Safety and Health (also known as Cal/OSHA) enforces state noise regulations that are the same as the federal OSHA regulations described previously. Agency regulations are contained in the California Code of Regulations, Title 8, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq.

12.3.2.2 California Vehicle Code

Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and county sheriff offices.

12.3.3 Local Regulations

12.3.3.1 General Plan

The City's Noise Element in the General Plan (City of San Mateo, 2010) establishes goals, objectives, and policies that address how potential noise associated with long-term land uses are evaluated within the City's jurisdiction. The City established land use compatibility guidelines for various land uses in Tables N-1 and N-2 of the General Plan; these are summarized in **Table 12-3**.

Table 12-3. City of San Mateo Noise Sensitive Land Use Compatibility Guidelines for Community Noise Environments
Underground Flow Equalization System Project, Environmental Impact Report

Land Use Category	Normally Acceptable Sound Level	Conditionally Acceptable Sound Level	Normally Unacceptable Sound Level
Single-Family Residential	50 to 59	60 to 70	Greater than 70
Multi-Family Residential	50 to 59	60 to 70	Greater than 70
Hotels, Motels, and Other Lodging Houses	50 to 59	60 to 70	Greater than 70
Long-Term Care Facilities	50 to 59	60 to 70	Greater than 70
Hospitals	50 to 59	60 to 70	Greater than 70
Schools	50 to 59	60 to 70	Greater than 70
Multi-Family Common Open Space Intended for the Use and Enjoyment of Residents	50 to 67	---	Greater than 67
Parks and Playgrounds	50 to 65	---	Greater than 65

Sound levels are shown in Ldn, A-weighted decibels, except for Parks and Playgrounds, which is shown in Leq, A-weighted decibels.

The following noise policies are excerpted from the General Plan Noise Element:

> *N 1.1: Interior Noise Level Standard. Require submittal of an acoustical analysis and interior noise insulation for all "noise sensitive" land uses listed in Table N-1 that have an exterior noise level of 60 dBA (L_{dn}) or above, as shown on Figure N-1. The maximum interior noise level shall not exceed 45 dBA (L_{dn}) in any habitable rooms.*

N 1.2: Exterior Noise Level Standard. …. Maximum exterior noise should not exceed 67 dBA (L_{dn}) for residential uses and should not exceed 65 dBA (L_{eq}) during the noisiest hour for public park uses.

N 2.1: Noise Ordinance. Continue implementation and enforcement of the City's existing noise control ordinance:

> *a) which prohibits noise that is annoying or injurious to neighbors of normal sensitivity, making such activity a public nuisance, and*
>
> *b) restricts the hours of construction to minimize noise impact.*

N 2.2: Minimize Noise Impact. Protect all "noise-sensitive" land uses listed in Tables N-1 and N-2 from adverse impacts caused by the noise generated on-site by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit long-term exposure increases of 3 dBA (L_{dn}) or greater at the common property line, or new uses which generate noise levels of 60 dBA (L_{dn}) or greater at the property line, excluding existing ambient noise levels.

N 2.3: Minimize Commercial Noise. Protect land uses other than those listed as "noise sensitive" in Table N-1 from adverse impacts caused by the on-site noise generated by new developments. Incorporate necessary mitigation measures into development design to minimize noise impacts. Prohibit new uses that generate noise levels of 65 dBA (L_{dn}) or above at the property line, excluding existing ambient noise levels.

12.3.3.2 San Mateo Municipal Code

Chapter 7.30 of the San Mateo City Charter and Municipal Code (Municipal Code) (City of San Mateo, 2017) establishes maximum permissible noise levels for various noise zones and land uses. The noise zones and the maximum permissible noise levels are shown in **Table 12-4**.

Table 12-4. San Mateo Municipal Code Maximum Permissible Noise Levels
Underground Flow Equalization System Project, Environmental Impact Report

Noise Zone	Description	Time Period	Noise Level (dBA)
1	All property in any single family residential zone (including adjacent parks and open space) as designated on the City's zoning map prepared pursuant to the provisions of Title 27, or any revisions thereto.	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	50 60
2	All property in any commercial/mixed residential, multi-family residential, specific plan district, or public utility district as designated.	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	55 60
3	All property in any commercial or central business district as designated on the City's zoning map prepared pursuant to the provisions of Title 27, or any revisions thereto.	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	60 65
4	All property in any manufacturing or industrial zone as designated on the City's zoning map prepared pursuant to the provisions of Title 27, or any revisions thereto.	Anytime	70

Source: City of San Mateo, 2017.

In addition, Chapter 7.30 of the Municipal Code states it is unlawful for any person to operate or cause to be operated any source of sound at any location within the City or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured on any other property to exceed:

- The noise level standard for that property as specified in above for a cumulative period of more than 30 minutes in any hour
- The noise level standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour
- The noise level standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour
- The noise level standard plus 15 dBA for a cumulative period of more than 1 minute in any hour
- The noise level standard or the maximum measured ambient noise level, plus 20 dBA for any period of time

If the measured ambient noise level for any area is higher than the standard established above, then the ambient noise level shall be the base noise level standard. In such cases, the noise levels shall be increased in 5-dBA increments above the ambient noise level.

The Municipal Code states that utility and street repairs, street sweepers, garbage services, emergency response warning noises, emergency generators and fire alarm systems are exempt from this chapter. Section 7.30.060(e) of the Municipal Code also notes that construction, alteration, repair, or land development activities that are authorized by a valid City permit shall be allowed on weekdays between 7 a.m. and 7 p.m., on Saturdays between 9 a.m. and 5 p.m., and on Sundays and holidays between 12 noon and 4 p.m., or at such other hours as may be authorized or restricted by the permit, if they meet at least one of the following noise limitations:

- No individual piece of equipment shall produce a noise level exceeding 90 dBA at a distance of 25 feet. If the device is housed within a structure or trailer on the property, the measurement shall be made outside the structure at a distance as close to 25 feet from the equipment if possible.
- The noise level at any point outside of the property line boundary of the Project shall not exceed 90 dBA.

In addition, Section 7.30.070 of the Municipal Code allows exceptions if the applicant can show to the City Manager, or the manager’s designee, that a diligent investigation of available noise abatement techniques indicates that immediate compliance with the requirements would be impractical or unreasonable. A permit to allow exception from the provisions may be issued, with appropriate conditions to minimize the public detriment caused by such exceptions. The duration of the permit will be as short as possible, but in no case for longer than 6 months. These permits are renewable upon showing good cause and shall be conditioned by a schedule for compliance and details of compliance methods in appropriate cases.

Chapter 23.06 (Administrative Code) of the Municipal Code identifies the conditions under which construction work outside of regularly allowed hours may occur (City of San Mateo, 2017). Specifically, Section 23.06.061 of the Municipal Code states:

> *As a condition of approval of a planning application issued pursuant to Title 26 and Title 27 of this code, a condition may be established which authorizes an exemption from the hours of work designated in Section 23.06.060 if the Building Official finds that:*
>
> *(a) The following criteria are met:*
>
> *(1) Permitting extended hours of construction will decrease the total time needed to complete the project, thus mitigating the total amount of noise associated with the project as a whole; or*
>
> *(2) An emergency situation exists where the construction is necessary to correct an unsafe or dangerous condition resulting in obvious and eminent peril to public health and safety. If such a condition exists, the City may waive any of the remaining requirements outlined below.*

(b) *The exemption will not conflict with any other conditions of approval required by the City to mitigate significant impacts.*

(c) *The contractor or owner of the property will notify residential and commercial occupants of property adjacent to the construction site of the hours of construction activity which may impact the area. This notification must be provided three days prior to the start of the construction activity.*

(d) *The approved hours of construction activity will be posted at the construction site in a place and manner that can be easily viewed by an interested member of the public.*

(e) *The Building Official may revoke the exemption at any time if the contractor or owner of the property fails to abide by the conditions of the exemption or if it is determined that the peace, comfort and tranquility of the occupants of adjacent residential or commercial properties are impaired because of the location and nature of the construction.*

A Waiver of Work Hours application can be submitted for staff approval for nighttime work. A letter of notification must be sent to the residents in the surrounding neighborhood (City of San Mateo, 2016).

12.4 Assessment Methods and Thresholds of Significance

12.4.1 Noise

The analysis of impacts was based on noise levels of typical construction equipment that is expected to be used to construct both the temporary holding structure and the diversion facilities. The expected equipment noise levels listed in the *FHWA Roadway Construction Noise Model User's Guide* (RCNM User Guide) (FHWA, 2006) were used for this evaluation. The RCNM User's Guide provides the most recent comprehensive assessment of noise levels from construction equipment. Given the linear nature of highway and pipeline construction, the method developed by FHWA can be reasonably applied to pipeline construction activities.

Equipment noise levels from Table 1 in the RCNM User Guide are shown in **Table 12-5**, which provides typical range and usage factors for general construction equipment and activities consistent with the FHWA Roadway Construction Noise Model. All listed noise levels are maximum A-weighted sound pressure levels at a reference distance of 50 feet. The acoustical usage factor is the fraction of time that the equipment generates noise at the maximum level. The model calculates the total noise level at the receptor by determining the noise from each piece of equipment, taking into account the reduction of noise with distance due to geometric divergence, and logarithmically adding the contribution of each piece of equipment to get the total noise anticipated from all the construction equipment. Geometric divergence is the primary mechanism of noise reduction close to a noise source. At farther distances, additional attenuation (e.g., ground effects and atmospheric attenuation) can be significant. This excess attenuation is not accounted for in the FHWA model; therefore, the model output presented in **Table 12-5** below should be considered conservatively high.

Table 12-5. Construction Equipment Noise Levels from the RCNM User Guide
Underground Flow Equalization System Project, Environmental Impact Report

Equipment Description	Acoustical Usage Factor (%)	Specified L_{max} at 50 feet (dBA)	Actual Measured L_{max} at 50 feet (dBA)	Number of Actual Data Samples
All Other Equipment Greater than 5 Horsepower	50	85	N/A	0
Auger Drill Rig	20	85	84	36

Table 12-5. Construction Equipment Noise Levels from the RCNM User Guide
Underground Flow Equalization System Project, Environmental Impact Report

Equipment Description	Acoustical Usage Factor (%)	Specified L_{max} at 50 feet (dBA)	Actual Measured L_{max} at 50 feet (dBA)	Number of Actual Data Samples
Backhoe	40	80	78	372
Bar Bender	20	80	N/A	0
Blasting	N/A	94	N/A	0
Boring Jack Power Unit	50	80	83	1
Chain Saw	20	85	84	46
Clam Shovel (dropping)	20	93	87	4
Compactor (ground)	20	80	83	57
Compressor (air)	40	80	78	18
Concrete Batch Plant	15	83	N/A	0
Concrete Mixer Truck	40	85	79	40
Concrete Pump Truck	20	82	81	30
Concrete Saw	20	90	90	55
Crane	16	85	81	405
Dozer	40	85	82	55
Drill Rig Truck	20	84	79	22
Drum Mixer	50	80	80	1
Dump Truck	40	84	76	31
Excavator	40	85	81	170
Flat Bed Truck	40	84	74	4
Front End Loader	40	80	79	96
Generator	50	82	81	19
Generator (less than 25 kilovolt-amperes, VMS signs)	50	70	73	74
Gradall	40	85	83	70
Grader	40	85	N/A	0
Grapple (on backhoe)	40	85	87	1
Horizontal Boring Hydraulic Jack	25	80	82	6
Hydra Break Ram	10	90	N/A	0
Impact Pile Driver	20	95	101	11
Jackhammer	20	85	89	133
Man Lift	20	85	75	23
Mounted Impact Hammer (hoe ram)	20	90	90	212

Table 12-5. Construction Equipment Noise Levels from the RCNM User Guide
Underground Flow Equalization System Project, Environmental Impact Report

Equipment Description	Acoustical Usage Factor (%)	Specified L_{max} at 50 feet (dBA)	Actual Measured L_{max} at 50 feet (dBA)	Number of Actual Data Samples
Pavement Scarifier	20	85	90	2
Paver	50	85	77	9
Pickup Truck	40	55	75	1
Pneumatic Tools	50	85	85	90
Pumps	50	77	81	17
Refrigerator Unit	100	82	73	3
Rivet Buster/Chipping Gun	20	85	79	19
Rock Drill	20	85	81	3
Roller	20	85	80	16
Sand Blasting (single nozzle)	20	85	96	9
Scraper	40	85	84	12
Shears (on backhoe)	40	85	96	5
Slurry Plant	100	78	78	1
Slurry Trenching Machine	50	82	80	75
Soil Mix Drill Rig	50	80	N/A	0
Tractor	40	84	N/A	0
Vacuum Excavator (Vac-truck)	40	85	85	149
Vacuum Street Sweeper	10	80	82	19
Ventilation Fan	100	85	79	13
Vibrating Hopper	50	85	87	1
Vibratory Concrete Mixer	20	80	80	1
Vibratory Pile Driver	20	95	101	44
Warning Horn	5	85	83	12
Welder/Torch	40	73	74	5

Source*:* FHWA, 2006.

N/A = not applicable

As described in the RCNM User Guide, the average noise level from each piece of equipment is determined by the following formula for geometric spreading:

Reference Noise Level – 20*log (distance to receptor/50) + 10*log (usage factor %/100)

The total noise level is determined in the model adding of the decibel contribution for each piece of equipment. Additional details are provided in the RCNM User Guide.

Review of the table of construction equipment noise levels indicates that the loudest equipment generally emits noise in the range of 80 to 90 dBA at 50 feet. Noise at any specific receptor is dominated by the closest and loudest equipment. The types, numbers, and duration of equipment anticipated to be used during construction of the proposed Project near any specific receptor location will vary over time.

The construction noise estimate was based on conservative assumptions of multiple pieces of loud equipment operating close to each other. This is believed to be a conservative, yet realistic, scenario for typical construction activities (unique activities such as pile driving are limited to daytime hours and considered separately). Assumptions include the following:

- One piece of equipment generating a reference noise level of 85 dBA (at 50 feet with a 40 percent usage factor located at the edge of the construction area
- Two pieces of equipment generating reference 85-dBA noise levels located 50 feet farther away from the edge of construction
- Two more pieces of equipment generating reference 85-dBA noise levels located 100 feet farther away the edge of construction

Expected average construction equipment noise levels at various distances, based on this scenario, are presented in **Table 12-6**. This extrapolation likely overstates noise impacts because it only considers geometric spreading and does not account for atmospheric absorption, ground effects, or other noise attenuation mechanisms.

Table 12-6. Average Construction Equipment Noise Levels Versus Distance
Underground Flow Equalization System Project, Environmental Impact Report

Distance from Construction Boundary (feet)	**Anticipated Construction Activities L_{eq} Noise Level (dBA)**
50	83
100	79
200	74
400	69
800	63
1,600	58

12.4.2 Vibration

Activities that result in excessive vibration may be annoying and in extreme cases, damage property. Operations will utilize equipment that is designed to produce low levels of vibration, and offsite vibration from equipment operations is not expected; therefore, operations are not discussed further in this section. To assess potential vibration impacts from construction activities, the Federal Transit Administration (FTA) guidance manual (FTA, 2006) methodology was used.

Vibration can be described in many ways using various metrics. Consistent with the FTA guidance, Peak Particle Velocity (PPV) was used to assess the potential for damage from vibration associated with the installation of shoring and pile driving activities. PPV is typically used to assess building damage and is measured in inches per second. PPV is "the maximum instantaneous positive or negative peak of the vibration signal" (FTA, p. 7-3). Vibration Velocity Level (Lv or VdB) is the root mean square (short-term average) velocity vibration expressed in decibel notation rather than inches per second. VdB is used by FTA to assess the potential for human annoyance for transit projects.

Table 12-7 provides the typical vibration levels from various construction equipment as established by FTA. As indicated, a typical impact pile driver could have a PPV of 0.644 in/sec or a VdB of 112 at a distance of 25 feet.

Table 12-7. Vibration Source Levels for Construction Equipment
Underground Flow Equalization System Project, Environmental Impact Report

Equipment		PPV at 25 ft (in/sec)	Approximate VdB at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Notes:
FTA = Federal Transit Administration
VdB = vibration velocity levels
PPV = peak particle velocity
Source: FTA Manual, Table 12-2, 2006.

Table 12-8 provides the criteria for damage from construction activities as established by FTA. As shown, the potential threshold for damage from vibration depends on the type of structure.

Table 12-8. Construction Vibration Damage Criteria
Underground Flow Equalization System Project, Environmental Impact Report

Building Category		PPV (inch/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

Notes:
FTA = Federal Transit Administration
VdB = vibration velocity levels
PPV = peak particle velocity
Source: FTA, 2006.

Table 12-9 shows that the typical sonic pile driver operated at a distance of 25 feet results in a PPV that does not exceed the 0.2 in/sec damage criteria for non-engineered timber or masonry structures. Using the above upper range for an impact pile driver and typical values for a sonic pile driver, the following PPV and VdB at various distances has been tabulated.

Table 12-9. Predicted Vibrations from Pile Driving Equipment at Various Distances
Underground Flow Equalization System Project, Environmental Impact Report

Distance (ft.)	PPV (Upper Range, Impact)	PPV (Typical Sonic)	VdB (Upper Range, Impact)	VdB (Typical Sonic)
50	0.537	0.060	103	84
75	0.292	0.033	98	79
100	0.190	0.021	94	75
125	0.136	0.015	91	72
150	0.103	0.012	89	70
175	0.082	0.009	87	68
200	0.067	0.008	85	66
225	0.056	0.006	83	64

The FTA Manual uses VdB to discuss the human response to vibration from transit operations. Figure 12-2 shows typical levels of ground-borne vibration and the approximate human response on a scale from 50 VdB (typical background vibration) to 100 VdB. The threshold of human perception is around 65 VdB (FTA, p. 7-5). The manual notes that “there has been relatively little research into human response to vibration,” and that “complaints have been associated with measured vibration that is lower than the perception threshold” (FTA p. 7-6). The FTA concludes that 75 VdB is the “approximate dividing line between barely perceptible and distinctly perceptible” and notes that “many people find transit vibration at this level annoying.”

Caltrans has also published a *Transportation and Construction Vibration Guidance Manual* (Caltrans, 2013). Caltrans has not established a standard for vibration, but rather it presents a range of potential criteria. For continuous vibration from traffic, the CEC Staff’s proposed criteria of a PPV of 0.2 in/sec is indicated in the Caltrans guidance to be “annoying” but not “unpleasant” and a level of 0.1 in/sec is indicated as “Begins to Annoy.” It is also noted that “thresholds for perception and annoyance are higher for transient vibration than for continuous vibration.” Pile driving is the activity that with the greatest likelihood to create perceptible offsite vibrations. Pile driving does not represent a continuous source of vibration and is also a short-term daytime construction activity; therefore, it is not unreasonable to expect people to be less sensitive to it and for a higher threshold be considered.

The proposed Project would cause a significant impact related to noise if it would result in the following:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the General Plan or noise ordinance, or applicable standards of other agencies
- A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project
- Generation of excessive ground-borne vibration or ground-borne noise levels
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project

- 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 would expose people residing or working in the Project area to excessive noise levels

The Project area is not located within an airport land use plan area or within 2 miles of a public airport or private airstrip; therefore, noise impacts related to airports are not discussed further.

12.5 Environmental Impacts

Impact 12-1. Would the proposed Project result* in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the General Plan or noise ordinance, or applicable standards of other agencies*?

As presented in Chapter 2, construction of the proposed Project would last up to 25 months in duration. The diversion pipelines and other temporary holding structure components would be constructed simultaneously. Construction of the diversion pipelines is expected to last approximately 13 months, with the location of construction activities progressing along the pipeline footprint. The typical construction duration for new portions of the pipeline would be approximately 3 to 5 days for a 500-foot segment, thus the period of greatest potential noise generation from pipeline construction near any one sensitive receptor would be limited in duration.

Construction activities specific to the temporary holding structure and associated facilities would have the greatest potential to generate substantial noise and would be anticipated to span approximately 18 months in duration. Pile driving activities could be required for the foundation of the holding structure and the installation of shoring is expected to support the excavation of the temporary holding structure and other underground structures. Shoring could consist of sheet piles, soldier pile shoring installed with pile drivers, or secant pile shoring installed with a crane and an auger. These activities would be localized within the construction disturbance area of the holding structure and associated components throughout the duration of construction. **Tables 12-5** and **12-6** present typical construction equipment sound levels.

As indicated in **Table 12-5**, pile drivers may result in a measured noise level of 101 dBA at 50 feet or 107 dBA at 25 feet. Pile driving sound levels would be expected to decrease at a rate of 6 dBA per doubling of distance.

Sound barriers are a common noise minimization measure that may be implemented to address construction noise concerns, such as pile driving. Noise walls interrupt noise propagation and create an "acoustic shadow zone." The sound pressure level is lower in the shadow zone than in the respective unobstructed free field. Permanent noise barriers typically consist of earthen berms, freestanding walls (usually concrete), a combination of berms and walls, or pre-engineered panels. The effectiveness of these barriers depends on two primary design features:

1. The barrier must be high enough to break the line of sight between the observer and the noise source and long enough to prevent noise leaks around the ends.
2. Noise must not be transmitted through the barrier.

The effectiveness of a noise barrier is quantified by its field insertion loss, which is the difference in the noise levels at the same location before and after the barrier is constructed.

Plywood walls, mass-loaded vinyl (vinyl impregnated with metal), and hay bales have been used to create temporary walls around noisy equipment or site perimeters. The barrier should be tall enough to block the line of sight to the noise-generating portion of Project area. For most diesel-powered equipment, the wall would have to be tall enough to block the line of sight to the engine exhaust. A barrier wall constructed of ¾-inch plywood that minimizes open spaces (gaps) may achieve a 5- to 10-dBA reduction; a practical limit of barrier effectiveness is typically 20 dBA.

Section 7.30.060(e) of the Municipal Code allows permitted construction or land development activities on weekdays between 7 a.m. and 7 p.m., provided (1) individual construction equipment does not exceed 90 dB at a distance of 25 feet (equivalent to 84 dBA at 50 feet), or (2) Project-related construction noise outside the property line does not exceed 90 dB (equivalent to 84 dBA at 50 feet). The analysis summarized in **Table 12-6** predicts the average construction equipment noise level to be 83 dBA at 50 feet and noting the 90 dBA at 25 feet is equivalent to 84 dBA at the typical reference distance of 50 feet. A review of **Table 12-5** indicates that the noise level for many individual pieces of construction equipment would be below the 90-dBA threshold. However, individual construction equipment could generate noise that exceeds 90 dBA at 25 feet and may exceed 90 dBA at property line depending on where they operate, which is a potentially significant impact.

Noise related to construction activities will be short term, temporary, and limited to daytime hours in compliance with Section 7.30.060(e) of the Municipal Code. It is assumed that all work would typically be conducted Monday through Friday, within a normal shift between 7 a.m. and 7 p.m. Construction activities may occur during the weekends within the hours allowed per the City's municipal code. Any work outside of the allowed construction hours would not be done without prior approval by the City.

Compliance with the City's Municipal code and implementation of Final PEIR **Mitigation Measure 12-1a, Develop and implement construction noise minimization measures**, **Mitigation Measure 12-1b, Operate a construction noise hot line**, and **Mitigation Measure 12-1c, Resolve construction noise complaints** would help minimize noise impacts from construction of the Project. However, construction activities may still temporarily exceed 90 dBA at the property line, even with mitigation implemented.

Though temporary in nature, certain equipment or activities may cause significant and unavoidable noise impacts during Project construction.

Impact 12-2. Would the proposed Project result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?

The General Plan (City of San Mateo, 2010) defines a substantial or significant increase as an increase in the existing L_{dn} of at least 3 dBA at noise-sensitive receptors such as residences, hotels/motels/lodging, long-term care facilities, hospitals, schools, and multi-family common open-space areas. A project would also be considered to a have a significant impact if it generates noise levels above an L_{dn} of 60 dBA at noise-sensitive receivers and above L_{dn} 65 dBA in commercial areas. Operational and maintenance activities may result in minor short-term increases in noise levels due to workers and maintenance vehicles and equipment being used onsite. Noise associated with maintenance activities would not substantially exceed current noise levels from the existing uses on the property. Additionally, once maintenance activities are complete, workers and equipment would leave the site, and there would not be permanent change to existing noise levels.

The temporary holding structure would include new pumps to empty the holding structure after use; these pumps would be below ground, and noise would not be discernible at the property line surrounding the Project area; therefore, impacts would be less than significant.

Impact 12-3. Would the proposed Project generate excessive ground-borne vibration or ground-borne noise levels?

Construction of diversion sewer pipelines would be within 50 feet of residences, and construction activities for the temporary holding structure would be over 100 feet from the nearest residence. Construction will include the installation of shoring around the holding structure excavation site and piles to support the holding structure foundation which could generate localized ground-borne vibration. Shoring installation is expected to utilize vibratory methods, and foundation piles are expected to be installed via impact pile driving.

As indicated in **Tables 12-8** and **12-9** above, the potential for damage to structures from impact pile driving is limited to areas very close to the activity (within 100 feet), and given the nearest residence is more than 100 feet from impact pile driving, the damage criteria are not expected to be exceeded.

Additionally, the proposed Project would implement Final PEIR **Mitigation Measure 12-3**, **Incorporate vibration issues into Project construction** which would help reduce the effects of offsite vibration. Additionally, consistent with **Mitigation Measure 7-1** from the Final PEIR, the City has conducted site-specific geotechnical studies of the Project site and will use that information to incorporate measures to reduce the potential for damage to nearby structures as a result of vibrations or ground displacement during construction.

Mitigation Measure 12-3a, Assess and incorporate vibration monitoring and minimization measures as part of Project construction has been added to Final PEIR Mitigation Measure 12-3 as a site-specific minimization measure to further reduce impacts from construction activities. Even with vibration reduction measures incorporated, temporary construction activities may at times be perceptible and be potentially annoying to individuals offsite. However, given the distance from the construction activity to the nearest sensitive receptor and the short duration of construction activities resulting in vibration, impacts would be less than significant.

12.6 Mitigation Measures

12.6.1 Final PEIR Mitigation Measures

Implementation of the following mitigation measures from the Final PEIR, would reduce potential impacts on noise; however, impacts are expected to remain significant and unavoidable.

Mitigation Measure 12-1a. Develop and implement construction noise minimization measures. General noise minimization measures available to reduce sound levels from construction activities include but are not limited to the following:

- Specify general construction noise mitigation measures that require the contractor to use equipment that is in good working order, adequately muffled, and maintained in accordance with the manufacturers' recommendations.
- Use semi-permanent stationary equipment (e.g., generators and lights) with "quiet" packages (as available) and stationing it as far from sensitive areas as possible.
- During construction, erect temporary barriers using materials such as intermodal containers or frack tanks, plywood walls, mass-loaded vinyl (vinyl impregnated with metal), or hay bales. Barriers shall be erected as close as safely feasible to the noise source. Barriers shall be used when equipment is expected to exceed 90 dBA at the property plane, based on actual measured noise levels for the specific equipment, as cited in *Roadway Construction Noise Model User's Guide* (FHWA, 2006). The barrier shall be designed to provide sufficient attenuation to reduce noise to less than 90 dBA at the property plane, as feasible.

If a diligent investigation of available noise abatement techniques indicates that immediate compliance with the requirements would be impractical or unreasonable, the contractor shall obtain an exceptions permit per Section 7.30.070 of the Municipal Code. The permit shall be issued by the City Manager, or the manager's designee, with appropriate conditions to minimize the public detriment caused by such exceptions. The duration of the permit shall be as short as possible, but in no case for longer than 6 months.

Mitigation Measure 12-1b. Operate a construction noise hot line. The City shall establish a telephone number for use by the public to report any significant undesirable noise conditions associated with construction and demolition of the proposed Project. If the telephone is not staffed 24 hours per day, the City shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the Project site during construction and demolition so that it is visible to passersby. This telephone number shall be maintained during Project construction.

Mitigation Measure 12-1c. Resolve construction noise complaints. Throughout construction of the proposed Project, all legitimate Project-related noise complaints shall be documented, investigated, evaluated, and resolved as feasible. The City or its authorized agent shall be responsible for the following:

- Use the Noise Complaint Resolution Form typically suggested by the California Energy Commission, or a functionally equivalent procedure, to document and respond to each noise complaint.
- Attempt to contact the person(s) making the noise complaint within 24 hours.
- Conduct an investigation to attempt to determine the source of noise related to the complaint.
- If the noise complaint is legitimate, implement feasible measures to reduce the noise.

Mitigation Measure 12-3. Incorporate vibration issues into proposed Project construction. As part of the final design effort, the potential for construction activities to result in excess vibration shall be assessed and site-specific minimization measures for the proposed Project implemented as necessary.

12.6.2 Project-Specific Mitigation Measures

Implementation of the following Project-specific mitigation measure would ensure that potential impacts on noise would be less than significant.

Mitigation Measure 12-3a. Assess and incorporate vibration monitoring and minimization measures as part of Project construction. As part of the final design effort, the potential for pile-driving in the vicinity of sensitive vibration receivers to result in excess vibration shall be assessed based on factors including soils, hammer type (e.g., impact, vibratory), and location and type of nearby structures. Vibration monitoring will be conducted during pile driving activities, or in response to a complaint, to confirm that vibration levels are within acceptable guidelines. Site-specific minimization measures such as modifying the type of hammer or reducing hammer energy will be implemented as necessary to reduce the potential effects of offsite vibration. Monitoring may be reduced or eliminated when it has been established that these measures, if required, are effective for the site-specific conditions.

12.7 References

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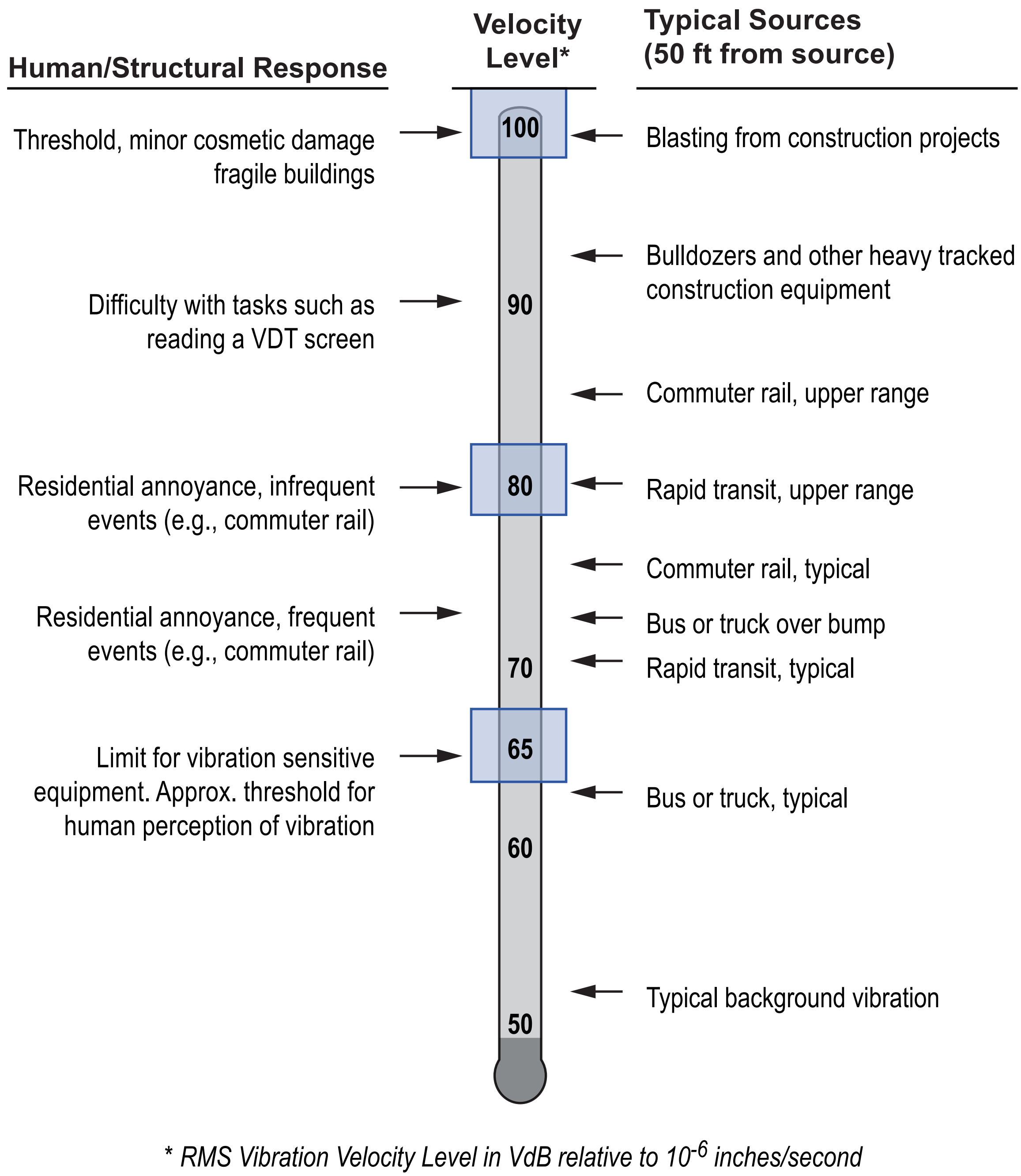
U.S. Environmental Protection Agency (EPA). 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*. EPA-550/9-74-004. March.

0 500 1,000
Feet

N

Source: City of San Mateo, 2009.

FIGURE 12-1
Project Area Noise Contours
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program



Source: FTA 2006, Figure 7

Figure 12-2
Typical Levels of Ground-Borne Vibration
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

CHAPTER 13

Population and Housing

This chapter describes the setting and the potential population and housing impacts of the proposed Project. It describes existing conditions related to population and housing and associated regulatory frameworks. It also analyzes the potential impacts of the proposed Project and assesses the mitigation measures proposed, as applicable.

13.1 Existing Setting

The City of San Mateo occupies approximately 15.7 square miles (City of San Mateo, 2015a). The City is bordered by San Francisco Bay and urban and suburban development on all sides. Population growth has generally remained slow, mainly due to the lack of vacant land available for development. The General Plan (City of San Mateo, 2015a) includes population and household projections through 2030. Growth is expected to continue at an approximate rate of 18 percent, from an estimated 2015 population of 108,500 to an estimated 2030 population of 119,800. The number of households in 2030 is projected to be 46,770, up 11.6 percent from an estimated total of 41,880 households in 2015 (City of San Mateo, 2015a). The population and housing increases would be a result of increased infill development and the development of Bay Meadows Phase II and the Rail Corridor Area (City of San Mateo, 2015a).

In 2004, the City introduced Voter Initiative Measure P, a reauthorization of Measure H, originally approved by the voters in 1991 (City of San Mateo, 2004). The purpose of Measure P was to maintain "the San Mateo General Plan so as to preserve the livability and suburban character of the City of San Mateo by essentially maintaining height limits and densities established by San Mateo voters in 1991, while providing for the level of economic growth projected in the San Mateo General Plan and increasing the City's commitment to providing its fair share of affordable housing." In general, Measure P permits residential development at a range of densities from 9 to 50 units net per acre, with the higher end of the density range to be used only for projects that provide substantial public benefits. Residential development is also allowed in commercial districts. Measure P includes a requirement for inclusionary housing administered by the City's Below Market Rate Housing Program.

13.2 Regulatory Framework

13.2.1 State Regulations

The California Government Code Section 65580–65589.8 addresses housing needs in California. The code provides direction for local governments in planning for housing needs and states, in part, the following:

- The availability of housing is of vital statewide importance, and the early attainment of decent housing and a suitable living environment for every Californian, including farmworkers, is a priority of the highest order.
- The provision of housing affordable to low- and moderate-income households requires the cooperation of all levels of government.
- Local and state governments have a responsibility to use the powers vested in them to facilitate the improvement and development of housing to make adequate provision for the housing needs of all economic segments of the community.

- The legislature recognizes that in carrying out this responsibility, each local government also has the responsibility to consider economic, environmental, and fiscal factors and community goals set forth in their general plan and to cooperate with other local governments and the state in addressing regional housing needs.
- Counties and cities should recognize their responsibilities in contributing to the attainment of the state housing goal.
- Counties and cities will prepare and implement housing elements which, along with federal and state programs, will move toward attainment of the state housing goal.

Government Code Section 65400 requires each governing body (i.e., city council or board of supervisors) to prepare an annual report on the status and progress in implementing the jurisdiction's housing element of their general plan, as overseen by the California Housing and Community Development Department.

13.2.2 Local Regulations

13.2.2.1 General Plan

The General Plan policies that address housing and population are included in its Housing Element, which was adopted in 2015 and amended later the same year (City of San Mateo, 2015b). Policies in the Housing Element include the following:

- H 2.2: Jobs/Housing Balance – Maintain an overall balance of housing and employment within the community over the term of the plan.
- H 2.5: Distribution of Low- and Moderate-Income Housing – Attempt to distribute low- and moderate-income housing developments throughout the City. Encourage the mixing of market-rate and low/moderate-income units where feasible.
- H 2.6: Rental Housing – Encourage development of rental housing for households unable to afford ownership housing.
- H 2.10: Housing Densities – Maintain a density range, with densities at the higher end of the range to be considered based on provision of public benefits such as affordable housing, increased open space, public recreational facilities, or offsite infrastructure improvements, or location adjacent or near (generally within a 0.5-mile walking distance) transit nodes.

13.3 Assessment Methods and Thresholds of Significance

Impacts on population or housing may occur if the proposed Project would result in the following:

- Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure).
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

13.4 Environmental Impacts

Impact 13-1. Would implementation of the proposed Project induce unplanned population growth?

The City's WWTP has an ADWF permitted capacity of 15.7 mgd. Projected future dry weather flows assume that flows and loads will increase proportionally to anticipated increases in population. However, the permitted capacity of the WWTP would not increase beyond current levels.

By increasing the capacity of the City's collection system, the proposed Project would enable the WWTP to more reliably meet the 15.7-mgd ADWF; however, because the permitted ADWF would not change, the proposed Project would not induce population growth and there would be no impacts.

Impact 13-2. Would implementation of the proposed Project displace housing or people?

Proposed facilities would be underground and would not displace housing or people. Excavation required for construction of the diversion sewer pipelines would occur within road ROWs and could cause temporary interruptions to site access within adjacent neighborhoods. However, the effects would be temporary, and would not displace people within the Project area, therefore, impacts would be less than significant.

13.5 Mitigation Measures

All impacts to population and housing would be less than significant and no mitigation measures are required.

13.6 References

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CHAPTER 14

Public Services

This chapter describes the public services for the Project area. For this analysis, public services are defined as police protection, fire protection, schools, libraries, and hospitals. Applicable plans and policies related to public services are presented and potential impacts that could result from implementation of the proposed Project as well as mitigation measures to reduce impacts, as applicable are identified.

14.1 Existing Setting

14.1.1 San Mateo Police Department

SMPD provides law enforcement services to the entire City of San Mateo. The SMPD station is located at 200 Franklin Parkway in San Mateo. Mutual and automatic aid agreements with the San Mateo County Sheriff's Department, which is located at 400 County Center in Redwood City, and the police departments in Foster City, Belmont, and Hillsborough augment the City's ability to respond to calls in the jurisdictional boundary areas and to emergency events.

SMPD has 117 sworn police officers and 39 full-time civilian employees who provide police services and public safety dispatching to approximately 100,000 residents for the City (City of San Mateo, 2017).

14.1.2 San Mateo Consolidated Fire Department

San Mateo Consolidated Fire Department (SMCFD) provides fire protection services, including fire prevention and investigations; special operations and training in the Cities of Foster City, San Mateo, and Belmont. Within the City limits of San Mateo, there are six fire stations covering a service area of 15.7 square miles.

SMCFD provides for the safety, health, and well-being of all individuals, property, and the environment through a comprehensive range of programs designed to respond to threats from fire hazards. Its primary activity is response to requests for medical assistance and structure fires. SMCFD has a combined operations staff consisting of 10 engine companies, two truck companies, and 39 daily line personnel. Daily staffing consists of one fire chief, one deputy fire chief, one fire marshal, three operational battalion chiefs and two administrative battalion chiefs. All fire stations are staffed 24 hours per day, 365 days per year. Each station has one fire engine staffed with one fire captain and two firefighter/engineers.

14.1.3 Schools and Libraries

The City of San Mateo is served by three public school districts: San Mateo–Foster City School District (SMFCSD), which serves grades pre-kindergarten through grade 8; San Mateo Union High School District (SMUHSD), which serves grades 9–12; and the San Mateo County Community College District (SMCCCD), which serves high school graduates and anyone over 18. In addition, several private schools are located in the City. The schools closest to the Project site are the Nueva School Bay Meadows Campus, located south of the Event Center parking lot, and the George Hall Elementary School, located approximately 0.75 mile south of the Project site.

14.1.3.1 San Mateo–Foster City School District

SMFCSD operates 20 schools in San Mateo, Foster City, and an unincorporated area west of San Mateo. The district has a total enrollment of approximately 12,500 students (SMFCSD, 2018).

14.1.3.2 San Mateo Union High School District

SMUHSD serves the communities of San Mateo, Burlingame, Foster City, Hillsborough, Millbrae, and San Bruno. SMUHSD operates six high schools, a credit recovery school, a middle college program, and an adult school, serving a total of approximately 9,000 students (SMUHSD, 2018).

14.1.3.3 San Mateo County Community College District

SMCCCD operates three colleges: Skyline College in San Bruno; Cañada College in Redwood City; and the College of San Mateo in San Mateo. Together, they serve approximately 45,000 students (SMCCCD, 2018).

14.1.3.4 City of San Mateo Library Department

The City's Library Department oversees three public libraries: Main Library, Hillsdale Library, and Marina Library (City of San Mateo, 2018). The nearest library, the Hillsdale Library, is approximately 1 mile southwest of the Project site.

14.2 Regulatory Framework

14.2.1 State Regulations

14.2.1.1 Emergency Response and Evacuation Plans

The State of California passed legislation authorizing the Office of Emergency Services (OES) to prepare a Standard Emergency Management System (SEMS), which sets forth measures by which a jurisdiction should handle emergency disasters. Non-compliance with SEMS could result in the state withholding disaster relief from the non-complying jurisdiction in the event of an emergency disaster. The San Mateo County Sheriff's Office in cooperation with OES and the Department of Homeland Security prepared an emergency operations plan to incorporate and coordinate all City facilities and personnel into an efficient organization capable of responding effectively to any emergency. The plan addresses emergency organization, assigns tasks, specifies policies and general procedures, and provides for coordination of planning efforts of the various emergency staff and service elements using the SEMS program as a guideline.

14.2.2 Local Regulations

14.2.2.1 General Plan

The General Plan (City of San Mateo, 2009) contains several polices that apply to public services:

> **LU 4.8: Library Resources and Services.** Continue to maintain a comprehensive collection of resources and services to help the community discover, enjoy, connect, and learn in an ever-changing world while offering quality library services and programs to a diverse community promoting literacy and ongoing learning.
>
> **LU 4.10: Police Station.** Provide Police Station facilities to meet the facility requirements through 2030. Completed in 2009, the new San Mateo Police Station facility consists of a two-story, 45,000-square-foot main building and includes various functional ancillary and service areas and parking. The new station houses the City's Emergency Operation Center and Dispatch Center. The new police station uses sustainable or "green" technology, incorporating many energy-saving features that will save the City energy costs compared to conventional buildings.
>
> **LU 4.11: Fire Stations.** Maintain a high level of service by modernizing fire stations. Provide new stations and improvements to existing stations and training facilities to meet equipment, staffing, and training requirements, as well as Essential Services Building Requirements.

LU 4.17: Library Service. Maintain a materials budget, staffing, and service hours for the City's library system that are adequate to meet the community needs, provide current and adequate materials, and meet the continuing changes in information technology.

LU 4.29: Effective Police Services. Maintain facilities, equipment, and personnel to provide an effective police force to serve existing and future population and employment as identified in the Land Use Element.

14.3 Assessment Methods and Thresholds of Significance

To evaluate potential impacts on public services, the locations of public service facilities were compared to the location of the proposed Project. Applicable policies were reviewed. Impacts on public service resources may occur if the proposed Project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

- Police protection
- Fire protection
- Hospitals
- Schools
- Libraries

14.4 Environmental Impacts

Impact 14-1. Would implementation of the proposed Project affect police or fire services?

The proposed Project would entail underground infrastructure and, thus, is not expected to increase the number of calls, which would affect the ability of the police and fire departments to provide adequate emergency services to their service areas.

Construction of the new diversion sewer pipelines would occur in roadways and could require the temporary intermittent closure of up to two lanes of traffic. The lane closures could temporarily affect emergency access by emergency vehicles and access to police or fire stations. However, construction of pipeline sections would last up to approximately 13 months. Additionally, implementation of Final PEIR **Mitigation Measure 9-4, Coordinate emergency services during construction** would result in less-than-significant impacts of the proposed Project on emergency services.

Impact 14-2. Would implementation of the proposed Project affect hospitals, schools, and libraries?

The proposed Project would entail underground infrastructure and, thus, would not affect long-term access to area hospitals, schools, and libraries. Further, as described in Impact 13-1, Project implementation would not induce population growth that would necessitate building more public facilities.

Although Project construction would temporarily limit access on roadways near the Project site, coordination with the appropriate authorities would occur prior to road closures, and routing detours would be implemented so access to- and operations of hospitals, schools, and libraries would not be affected. Impacts would be less than significant.

14.5 Mitigation Measures

Mitigation Measure 9-4. Coordinate emergency services during construction is described in Chapter 9.

14.6 References

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San Mateo Union High School District (SMUHSD). 2018. "Our District" website. Accessed at: https://www.smuhsd.org/domain/46. Accessed January 4.

CHAPTER 15

Recreation

This chapter evaluates the potential impacts of the proposed Project on recreational facilities near the Project site. This chapter describes recreational facilities present in the Project area; discusses local regulations related to recreation; identifies potential impacts that could occur from Project construction and operation; and proposes mitigation measures, as applicable.

15.1 Existing Setting

The City of San Mateo Department of Parks and Recreation maintains parks and recreation facilities throughout the City that provide more than 200 acres of open space and recreation fields (see **Figure 15-1**). The parks and facilities vary in size and the types of services provided to the public, and include the following (City of San Mateo, 2010):

- Mini Parks – The smallest parks, usually less than 1 acre, are located throughout the City and are generally limited in facilities to a single use. The general service radius of a mini-park is 0.25 mile.
- Neighborhood Parks – These parks may be up to 6 acres in size and are optimally at least 4 acres. Neighborhood parks typically service multiple uses such as multi-purpose turf area, playground equipment, picnic and seating areas, opportunity for passive enjoyment of landscape, and a multi-use court. The general service radius of a neighborhood park is 0.33 mile.
- Community Parks – These are major, multi-use facilities that are intended to address City-wide as well as neighborhood recreation needs. Community parks are typically at least 5 acres in size and contain uses such as athletic game facilities, community centers, large group picnic areas, swimming pools, outdoor performing facilities, and tennis or game courts. The service radius of community parks ranges from 1 mile to the entire City.
- Regional Parks – These are major facilities such as Shoreline Park and Laurelwood/Sugarloaf Mountain that meet City-wide recreation needs and draw significant use from people outside the City.

Bay Meadows Community Park is a 12-acre park located adjacent to the Project site that includes amenities such as a pond, league-size soccer field, picnic tables, a passive lawn area, and a loop walking path (Canzian, 2015). The park is used regularly both during the weekdays and weekends for sanctioned sporting activities such as soccer, lacrosse, and baseball, and other non-sanctioned recreational activities. Weekend activities at the park can include movie nights, festivals, and barbecues. The pond serves as a stormwater storage facility for the area and the soccer field serves as dry storage for excess stormwater flows.

Fiesta Meadows Park is a 4.7-acre park located in the Fiesta Gardens neighborhood (Canzian, 2015), located approximately 0.25 mile northeast of the Project site. This neighborhood park includes picnic tables, a soccer field, and an asphalt perimeter pathway.

Paddock Park is a 1.2-acre park located approximately 0.25 mile south of the Project site. The park features a playground, picnic tables, restrooms, an open lawn area, and a basketball half court (City of San Mateo, 2018).

Landing Green Park is a 1.5-acre linear park located approximately 0.25 mile southwest of the Project site. The park features a dining terrace, social lounge, bocce court, succulent garden, a central flexible lawn, children’s play garden, and a large-scale modernist sculpture (CMG, 2018).

15.2 Regulatory Framework

No state or federal parks or recreation facilities are located in or adjacent to the Project site. Therefore, this section summarizes local regulations related to recreational facilities and parks. Applicable local regulations include relevant sections of the General Plan (City of San Mateo, 2010) and the City's Zoning Ordinance (City of San Mateo, 2015).

15.2.1 City of San Mateo General Plan

General plan goals and policies applicable to recreation facilities and parks include those listed below as they appear in the General Plan (City of San Mateo, 2010).

15.2.1.1 Environmental Stewardship

Goal 2: Conserve and manage the City's natural resources to ensure that current and future generations will enjoy the environmental, social, and economic benefits derived from our urban forest, parks, and open spaces.

C/OS 10.1: Public Open Space Design. Review planning applications for opportunities to promote exceptional design and use of public open spaces in new developments and new public buildings.

15.2.1.2 Parks and Recreation

Goal 5: Provide a comprehensive park and recreation system of programs and facilities based on the needs of the City's residents for all ages and interests by including active, passive, social, educational, and cultural opportunities that insure access for all.

Goals 7: Maintain and upgrade park infrastructure to optimize its value in meeting community recreation needs and cost effectiveness of its operations.

Goal 8: Support the continued utilization of school sites to augment City recreation facilities, meet community needs, and encourage school agencies to adopt reasonable user fees and operating practices that allow continued community access.

C/OS 12.1: Balanced Park System. Provide the appropriate mix of parkland that balances the needs of active and passive facilities, formal and informal uses, and that are accessible to all residents, and meet existing and future recreation needs.

C/OS 12.1: Facility Standards. Adopt and use the Parks and Recreation Facility Standards to assess the adequacy of existing facilities, designing, developing and redeveloping sites, and acquiring or accepting new sites.

C/OS 12.3: Maximizing Park Assets. Create an asset management plan that identifies the highest and best use of undeveloped parcels or underutilized areas within existing parks to insure they are best positioned to meet current and future needs and where appropriate, consider options for non-park uses. Ensure that appropriate value or credit is restored to the park system for loss of land.

15.2.2 City of San Mateo Zoning Ordinance

The current zoning of parcels on which Project facilities would be constructed is discussed in Chapter 11. Title 13 of the City's Zoning Ordinance (City of San Mateo, 2015) addresses parks and recreation, including hours of access, park impact fees for residential development, park use fees, and closure of parks and recreational areas.

15.3 Assessment Methods and Thresholds of Significance

The assessment of impacts was based on consideration of Project construction and operation activities and how they might affect use of parks and recreation facilities in the Project area.

Impacts on recreational resources may occur if the Project would result in the following:

- 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.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.
- Conflict with any applicable recreation land use plan, policy, or regulation of an agency with jurisdiction over the program (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for avoiding or mitigating an environmental effect.

15.4 Environmental Impacts

Impact 15-1. Would the proposed Project result in increased use of existing parks and recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Construction of the proposed Project would occur over an approximate 25-month period and could require up to 30 construction workers at any given time. The need for construction workers is expected to be met from the local Bay Area workforce; workers would be expected to commute daily to the worksites and return home at the end of each workday. Therefore, the minor increase in construction workers within the City is not expected to increase the use of existing parks and recreation facilities compared to current levels.

Construction of the diversion pipelines could require temporary intermittent closures of one or more lanes of Saratoga Drive and S. Delaware Street for up to several days. The lane closures would not prevent access to local parks or recreational facilities. Use of nearby parks, including those identified in Section 15.1, may temporarily increase due to road closures and traffic detours; however, closures would be temporary in duration, and substantial or accelerated deterioration of alternate parks and recreation facilities used during construction is not expected.

As discussed in Impact 13-1, the proposed Project would not change the currently permitted ADWF of the WWTP and, therefore, would not induce population growth beyond what is currently planned that could place demand on parks and recreation facilities. Implementation of the proposed Project may result in a minor, temporary increase of parks and recreation facilities near the Project area during construction but would not result in substantial or accelerated deterioration of parks and recreation facilities. Impacts would be less than significant.

Impact 15-2. Would the proposed Project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?

The proposed Project entails the construction and operation of wastewater collection and conveyance facilities; it does not include any recreational facilities.

As described under Impact 13-1, the proposed Project would not induce population growth beyond what is currently planned; therefore, the proposed Project would not generate demand for new or expanded recreational facilities. No impacts would occur.

Impact 15-3. Would the proposed Project affect use of existing parks or recreation facilities, inconsistent with applicable policies?

As discussed in Impact 15-1, construction of the diversion pipelines would require temporary, intermittent closures of one or more lanes of Saratoga Drive and S. Delaware Street. The lane closures may limit vehicle access to Bayside Meadows Community Park. However, access would continue to be provided to foot traffic, vehicle traffic could be limited on a temporary and intermittent basis but would not limit vehicle traffic to other nearby parks identified in Section 15.1. The Project, therefore, would not conflict with applicable policies.

Therefore, implementation of the proposed Project would not alter existing recreational facilities such that they would be inconsistent with applicable policies. Impacts would be less than significant.

15.5 Mitigation Measures

All impacts to recreation would be less than significant and no mitigation measures are required.

15.6 References

Canzian, Sheila/Director of Parks and Recreation, City of San Mateo. 2015. Personal communication with Andrea Gardner/Jacobs. August 3.

City of San Mateo. 2010. City of San Mateo General Plan – Vision 2030. Available at https://www.cityofsanmateo.org/2021/2030-General-Plan. Adopted October 18.

______. 2015. *San Mateo City Charter and Municipal Code*. Available at http://qcode.us/codes/sanmateo/. Effective as of September 17.

______. 2018. Paddock Park. Available at https://www.cityofsanmateo.org/3348/Paddock-Park. Accessed September 6.

CMG. 2018. Bay Meadows Landing Green. Available at https://www.cmgsite.com/project/bay-meadows/bay-meadows-landing-green/. Accessed September 6.

Legend

- Diversion Structure
- Diversion Pipeline
- Watercourse
- 10' Construction Buffer
- Park
- Underground Temporary Holding Structure

Source: City of San Mateo, 2016.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CLEANWATERPROGRAM
PROTECTING THE BAY FOR A SUSTAINABLE FUTURE

N

0 150 300
Feet

FIGURE 15-1
San Mateo Parks and Recreation Facilities
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

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CHAPTER 16

Transportation and Traffic

This chapter addresses the potential effects of construction and operation of the proposed Project on transportation and traffic. The chapter describes the existing roadways, bicycle, pedestrian, and transit facilities in the Project study area; discusses applicable state and local regulations; identifies potential impacts that could occur from construction and operation; and proposes mitigation measures, as applicable.

16.1 Existing Setting

The proposed Project is located at the Event Center located between Saratoga Drive, 28th Avenue, and S. Delaware Street in the City of San Mateo. The Event Center is a venue consisting of 195,000 square feet of buildings and 48 acres of parking and outside activity space. It is bordered by multi-family and single-family residences to the north and northeast, the San Mateo Bay Meadows Community Park and Nueva High School to the southeast, and industrial developments and a railroad track to the west. The temporary holding structure would be located at the east corner of the site adjacent to the Bay Meadows Community Park and Saratoga Drive. Construction traffic would access the temporary holding structure site via SR 92 to S. Delaware Street to Saratoga Drive, or via Hillsdale Boulevard to Saratoga Drive. Truck traffic exiting the site would use Saratoga Drive to Hillsdale Boulevard to access US 101. A description of the highways and local roads is provided below.

16.1.1 Regional and Local Roadways

US 101 is an eight-lane, north-south freeway near the Project. US 101 extends northward through San Francisco and southward through San José. Access to the site will be provided via the full interchange at Hillsdale Boulevard. US 101 carries 238,000 average annual daily trips (AADT) between SR 92 and Hillsdale Boulevard (California Department of Transportation [Caltrans], 2016). US 101 is a City-designated truck route.

SR 92 is a four- to six-lane, east-west highway that provides access to the Project site via S. Delaware Street. SR 92 extends from Half Moon Bay in west San Mateo County to Hayward in Alameda County. SR 92 carries 108,000 AADT between S. Delaware Street and US 101 (Caltrans, 2016), and is a City-designated truck route.

SR 82 (S. El Camino Real) is an east-west state highway that begins at I-880 in San José to the south to I-280 in San Francisco to the north. SR 82 follows the San Francisco Peninsula and parallels the Caltrain Line along much of the route. Locally, SR 82 is referred to as El Camino Real. Within San Mateo, SR 82 is a four- to six-lane arterial and carries between 35,500 to 41,000 AADT between Hillsdale Avenue and SR 92 (Caltrans, 2016). SR 82 is a City-designated truck route.

Caltrans and the City of San Mateo recently modified the interchange between SR 82 and SR 92 to reduce traffic congestion, bottlenecks, weaving, and queuing spillback at the on and off ramps. Existing ramps were widened and reconfigured from a full cloverleaf to a partial cloverleaf. Pedestrian and bicycle improvements were also included (City of San Mateo, 2018).

25th Avenue is an east-west street between S. Delaware to the east and Alameda de las Pulgas to the west. 25th Avenue is a two-lane residential street between Alameda de las Pulgas and Hacienda Street. East of Hacienda Street, 25th Avenue is two to four lanes, with angled parking, and provides access to a two-block-long commercial district. 25th Avenue terminates at S. Delaware Street at the entrance to the Event Center. No vehicle access to the Event Center entrance is provided at this location; however, foot traffic is permitted. 25th Avenue, between SR 82 (El Camino Real) and S. Delaware Street, is a City-designated truck route.

19th Avenue is located north of the Project site and east of the railroad tracks, is a one-way eastbound street. Between S. Delaware Street and the SR 92 on-ramp, 19th Avenue is a City-designated truck route.

Saratoga Drive is a northwest-southeast divided arterial located between Santa Clara Way to the south and S. Delaware Street on the northwest. The Event Center borders the south side of Saratoga Drive between S. Delaware Street and 28th Street. Access to the temporary holding structure area will be provided from the existing driveway on Saratoga Drive.

S. Delaware Street is a north-south divided arterial. Between SR 92 and 28th Avenue, S. Delaware Street has two lanes in each direction. S. Delaware Street is a City-designated truck route between S. Gary Way and E. 25th Avenue. SR 92 eastbound on- and off-ramps are provided at S. Delaware Street near 19th Avenue. Westbound on- and off-ramps are located at Concar Drive, approximately 350 feet west of S. Delaware Street. On-street parking is provided intermittently.

Hillside Boulevard is an east-west arterial. A full-access interchange is provided at Hillside Boulevard and US 101. Hillsdale Boulevard is a designated truck route between SR 82 (El Camino Real) and S. Norfolk Street. A Class III signed bike route is located on Hillsdale Boulevard between S. Norfolk Street and Edison Street (see below). West of Edison, a Class II bike lane is provided. The Hillsdale Caltrain Station, the most heavily used station in the City, provides transit access to several major destinations, including the Hillsdale Shopping Mall, Bay Meadows Phase II Specific Plan transit-oriented development, and the Event Center. Hillsdale Station is located on the west side of the railroad tracks, on El Camino Real, north of Hillsdale Boulevard (City of San Mateo, 2010).

16.1.2 Bicycle Facilities

The City has installed approximately 40 miles of bikeways, including 12 miles of Class I multiuse paths (separated path), 13 miles of Class II bike lanes (on-street striped bike lane), and 15 miles of Class III bike routes (signed bike route only, no striping).

Near the proposed Project, a Class II bike lane is located on both sides of S. Delaware Street, from 19th Avenue to just south of 25th Avenue. South of 25th Avenue, the bike lane becomes a Class I bike path through the Bay Park Meadows area. South of Bay Meadows Community Park, there is a signed Class III bike route to south of Hillsdale Boulevard. A Class II bike lane is also provided on Saratoga Drive between Hillsdale Boulevard and S. Delaware Street. Class III bike routes are provided on Hillsdale Boulevard between Edison Street and S. Norfolk Street and on 25th Avenue between S. Delaware Street and Hacienda Street (Alta Planning + Design, 2011).

16.1.3 Pedestrian Facilities

Pedestrian facilities near the proposed Project consist of continuous sidewalks on all major arterials, nearby Class I bike paths, and crosswalks at signalized intersections.

16.1.4 Transit Service

San Mateo County Transit District (SamTrans) and the Peninsula Corridor Joint Powers Board (Caltrain) provide transit service throughout San Mateo County and into adjoining San Francisco and Santa Clara counties. The Redi-Wheels program operated by SamTrans and private taxi companies provides paratransit services (City of San Mateo, 2010). The Alameda-Contra Costa Transit District (AC Transit) serves 13 cities and adjacent unincorporated areas in Alameda and Contra Costa counties.

16.1.4.1 Bus Service

Several SamTrans routes operate in San Mateo, with major transfer points at the downtown San Mateo Caltrain Station in the northern portion of the City and SR 82 (El Camino Real) and Hillsdale Boulevard near the proposed Project. Express lines operate daily to San Francisco during the morning and return in the evening. Most of the local routes are in midtown, extending in a north–south direction on arterials such as El Camino Real, Alameda de las Pulgas, S. Delaware Street, and S. Norfolk Street. Service is also provided on Hillsdale Boulevard, SR 92, Parrott Drive, and Polhemus Road to the outlying east–west regions (City of San Mateo, 2010).

SamTrans Route 292 provides bus service on Saratoga Drive and S. Delaware Street, near the proposed Project. SamTrans Routes 57, 250, 251, 256, 292, and 398 and AC Transit Line M also run on Hillsdale Boulevard near the Project site (SamTrans, 2018).

16.1.4.2 Shuttle Service

Free commuter shuttles are available at the Hillsdale Caltrain Station and within the Bridgepointe business area. The shuttles operate between transit stations and major employment areas during commuting hours. The Norfolk Area Shuttle serves the areas in the vicinity of SR 92 between Delaware Street and S. Norfolk Street. The Campus Drive Area Shuttle operates between the Hillsdale Station and the Campus Drive office development. The Mariners Island Area Shuttle operates from the Hillsdale Station, serving businesses on Saratoga Drive before continuing to Foster City, near SR 92. The Mariners Island Area Shuttle stops along Mariners Island Boulevard, adjacent to the Bridgepointe Shopping Center in San Mateo. The North Foster City Shuttle also serves the Bridgepointe Shopping Center area. The shuttle takes riders to Millbrae Station for Bay Area Rapid Transit (BART) and Caltrain connections (City of San Mateo, 2010).

16.1.4.3 Commuter Rail

Caltrain provides regional commuter rail throughout the Bay Area. There are three Caltrain stations in San Mateo: Downtown, Hayward Park, and Hillsdale. The Downtown Station is located at 2 North B Street, north of First Avenue. The Hayward Park Station is located near SR 92 and Concar Drive, on the east side of the railroad tracks. The Hillsdale Station, the most heavily used station in the City, provides transit access to several major destinations, including the Hillsdale Shopping Mall, Bay Meadows Phase II Specific Plan transit-oriented development, and the San Mateo County Events Center. Hillsdale Station is located on the west side of the railroad tracks, on SR 82 (El Camino Real), north of Hillsdale Boulevard (City of San Mateo, 2010).

16.2 Regulatory Framework

Transportation-related regulations and policies applicable to the proposed Project include the Caltrans policy on level of service (LOS) (Caltrans, 2002), the City/County Association of Governments (C/CAG) of San Mateo County Congestion Management Program (CMP), and the Circulation Element of the General Plan (City of San Mateo, 2010). The regulations are described in the following sections.

16.2.1 State Regulations

16.2.1.1 California Department of Transportation

Caltrans is responsible for planning, designing, constructing, operating, and maintaining all state-owned roadways. Federal standards for interstate highways are implemented in California by Caltrans. Near the Project site, Caltrans operates and maintains US 101, SR 92, and SR 82, which provide regional access to San Mateo and the neighboring cities.

According to the *Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002), "Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing State highway facility is operating at less than the appropriate target LOS, the existing LOS should be maintained." In addition, a proposed Project may have a significant transportation or circulation effect if it will result in a safety hazard to pedestrians or motorists.

16.2.2 Local Regulations

16.2.2.1 City/County Association of Governments of San Mateo County

C/CAG of San Mateo County is the designated Congestion Management Agency working on issues that affect the quality of life in San Mateo County and the 20 cities and towns under its membership. This includes transportation, air quality, stormwater runoff, airport/land use compatibility planning, hazardous waste, solid waste and recycling. C/CAG is responsible for programming funding for all transportation programs in San Mateo County. As the Congestion Management Agency for San Mateo County, C/CAG is required to prepare and adopt a CMP on a biennial basis. The purpose of the CMP is to identify strategies to respond to future transportation needs, develop procedures to alleviate and control congestion, and promote countywide solutions. The CMP is required to be consistent with the Metropolitan Transportation Commission (MTC) planning process that includes regional goals, policies, and projects for the Regional Transportation Improvement Program (RTIP) (C/CAG, 2018).

16.2.2.2 General Plan – Circulation

The General Plan (City of San Mateo, 2010) provides the framework for all zoning and land use decisions within the City. State law requires that the General Plan include a comprehensive, long-term plan for a city's physical development. City policy requires that the General Plan be periodically reviewed and updated. The 2010 update extends of the General Plan to the year 2030 (City of San Mateo, 2010).

The Circulation Element of the General Plan describes existing and proposed roadways and other transportation such as public transit, bikeways, pedestrian routes, and parking facilities. It analyzes traffic conditions and needed improvements so that existing and projected circulation needs may be adequately met (City of San Mateo, 2012).

The Circulation Element identifies City goals to make it convenient for residents to travel to work and school, obtain services, shop, and recreate without always using single-occupant vehicle trips. The Circulation Element focuses on improving public transit, bikeways, pedestrian routes, roadways, and parking facilities. The Circulation Element includes goals and policies to reduce single-occupant vehicle trips and embraces a "complete streets" approach by considering all modes of transportation by addressing pedestrian and bicycle master planning, bike parking facilities, and transit improvements. Other important components of the Circulation Element address the Transportation Fee Ordinance, high-speed rail, transit-oriented development, transportation demand measures, and the establishment of a Transportation Management Association to reduce vehicle trips, encourage transit use, and promote bicycle and pedestrian accessibility and funding. The Rail Corridor Plan focuses high-density development along public transit routes. Goal 2 of the Circulation Element and its associated policies are relevant to the proposed Project:

GOAL 2: Maintain a street and highway system which accommodates future growth while maintaining acceptable LOS.

Policy C 2.1: Acceptable Levels of Service. Maintain a LOS no worse than mid LOS D, average delay of 45.0 seconds, as the acceptable LOS for all intersections within the City.

Policy C 2.7: Exceeding the Acceptable Level of Service. In addition to paying the transportation impact fee, a development project may be required to fund offsite circulation improvements which are needed as a result of project-generated traffic, if:

- The LOS at the intersection drops below mid-level LOS D (average delay of more than 45 seconds) when the project traffic is added, and
- An intersection that operates below its LOS standard under the base year conditions experiences an increase in delay of four or more seconds, and
- The needed improvement of the intersection(s) is not funded in the applicable 5-year City Capital Improvement Program from the date of application approval

16.3 Project-Related Construction Activities

It is expected that Project construction would begin in 2020. The holding structure and diversion pipelines would be constructed simultaneously over an approximate 25-month period. It is assumed that all work would be conducted Monday through Friday, between 7 a.m. and 7 p.m., and no construction activities would occur during the evening or weekends without prior approval by the City.

Construction traffic would access the holding structure site via Saratoga Drive from S. Delaware Street. Truck traffic exiting the site would use Saratoga Drive to Hillsdale Boulevard to access US 101 (see **Figure 16-1**). Construction workers would park in a temporary construction easement area at the Event Center.

16.3.1 Project Construction Trips

Traffic-generating construction activities would consist of the daily arrival and departure of construction workers and trucks hauling equipment and materials to and from the work site. The Project construction trips are summarized in **Table 16-1**. Construction of the temporary holding structure and the pipeline could occur simultaneously, resulting in a combined peak of 271 daily vehicle trips.

Table 16-1. Estimated Daily Construction Trips (One-Way Trips)
Underground Flow Equalization System Project, Environmental Impact Report

Daily Trips	Temporary Holding Structure	Pipeline	Combined Trips
Truck Trips	100	30	130
PCE (1.5)	150	45	195
Workforce Trips*	60	16	76
Total Trips	**210**	**61**	**271**

PCE = Passenger Car Equivalents

*Assumes two trips per worker (one incoming and one outgoing) and 30 daily workers for temporary holding structure construction and eight daily workers for pipeline construction.

For construction of the temporary holding structure, an average of 20 to 30 workers would be required onsite daily and two to three major pieces of equipment (crane, excavators, pile installation equipment, or concrete pumpers). During peak construction, including site excavation, backfill, and concrete pours, it assumed that there would be a maximum of 30 onsite construction workers per day, resulting in 30 daily round trips (60 one-way trips) to staging areas. Carpooling will be encouraged; however, this maximum number has been used as a conservative analysis. Up to 100 truck trips per day would also be generated for the delivery of concrete and/or removing excavated material. For purposes of this analysis, the truck trips were converted to passenger car equivalent (PCE) trips at a ratio of 1.5 passenger cars for each truck, consistent with the Highway Capacity Manual (HCM) 2010 guidelines.

Diversion sewer pipeline and effluent force main construction would likely require a crew of about eight workers and up to approximately 30 truck trips per day.

16.3.2 Proposed Roadway and Intersection Closures during Construction

Table 16-2 presents the anticipated roadway and intersections closures required during construction. Durations of closures will range from one month to six months.

Table 16-2. Anticipated Roadway and Intersection Closures
Underground Flow Equalization System Project, Environmental Impact Report

Roadways	Extent From	Extent To	Closure Type
S. Delaware Street	Saratoga Drive	25th Avenue	Half Closure (west side)
S. Delaware Street	Nueva School Driveway	25th Avenue	Half Closure (west side)
Saratoga Drive	S. Delaware Street	Fairground Driveway	Half Closure (south side)
Intersections			
S. Delaware Street/Saratoga Drive			Half Intersection Closure (Delaware)
S. Delaware Street/Saratoga Drive			Half Intersection Closure (Saratoga)
Saratoga Drive/Fairground Driveway			Half Intersection Closure (Saratoga)
S. Delaware Street/28th Avenue			Center Intersection Closure
S. Delaware Street/25th Avenue			Half Intersection Closure (Delaware)

16.4 Assessment Methods and Thresholds of Significance

AADT volumes were obtained from Caltrans (2016) for US 101, SR 92, and SR 82 (see Section 16.1.1) and the potential daily increase in traffic on these highways was evaluated for Project conditions. Daily roadway volumes were not available for local roadways in the City. However, Hillsdale Boulevard, Saratoga Drive, and S. Delaware Street are identified as arterials, which are defined in the City of San Mateo Circulation Element as roadways with between 10,000 and 50,000 daily vehicles. A.M. and P.M. peak hour intersection LOS information was obtained from the City of San Mateo Circulation Element (City of San Mateo, 2010).

16.4.1 Intersection Level of Service

LOS is a qualitative description of traffic operating conditions that range from LOS A (free-flow conditions with little or no delay) to LOS F (forced-flow conditions with extreme delays). The City of San Mateo Circulation Element (City of San Mateo, 2010) includes baseline (2005) and future (2030) LOS analysis for 60 signalized intersections throughout the City. The intersection LOS is evaluated based on vehicle seconds of delay. The City of San Mateo General Plan Circulation Element Policy 2.1 establishes mid-LOS D, average delay less than 45 seconds, as the acceptable LOS at signalized intersections (City of San Mateo, 2010). General descriptions of LOS and the corresponding control delays are provided in **Table 16-3**.

Table 16-3. LOS Criteria for Signalized Intersection Operations
Underground Flow Equalization System Project, Environmental Impact Report

LOS	Control Delay (seconds per vehicle)	Traffic Flow Characteristics
A	≤10.0	Very low delay occurring with exceptionally favorable progression or short cycle lengths. Most vehicles arrive during the green indication and travel through the intersection without stopping.
B	>10.0 and ≤20.0	Operations with low delay occurring with highly favorable progression or short cycle lengths.
C	>20.0 and ≤35.0	Operations with average delays with favorable progression or moderate cycle lengths. Individual cycle failures begin to appear.
D	>35.0 and ≤55.0	Operations with longer delays due to a combination of ineffective progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and individual cycle failures are noticeable.
E	>55.0 and ≤80.0	Operations with high delay values indicating unfavorable progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent.
F	>80.0	Operation with unacceptable delays to most drivers occurring due to very high V/C ratios, very poor progression, and long cycle lengths. Most cycles fail to clear the queue.

Source: City of San Mateo, 2010
Notes:
> = greater than
≤ = less than or equal to
V/C = volume to capacity

Table 16-4 summarizes the intersection LOS for the A.M. and P.M. peak hours for the baseline and future conditions for the intersections within the vicinity of the Project site. This is the most current data available for the Project area. As shown in **Table 16-4**, in 2005, all the surrounding intersections operated at an acceptable LOS and are forecast to continue to operate at an acceptable LOS through 2030.

Table 16-4. Peak Hour Intersection Level of Service
Underground Flow Equalization System Project, Environmental Impact Report

	Year 2005 Conditions				Year 2030 Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
S. Delaware St./ Concar Dr.	29.5	C	35.6	D	27.6	C	42.3	D
Concar Dr/Grant St.	19.9	B	22.0	C	16.9	B	20.7	C
SR 92 WB Ramps/Concar Dr.	10.5	B	10.8	B	18.9	B	16.4	B
S. Delaware St./ 19th Ave.	23.5	C	27.3	C	29.1	C	50.3	D
S. Delaware St/Saratoga Dr.	15.7	B	19.4	B	18.4	B	20.1	C
S. Delaware St./25th Ave.	10.5	B	10.4	B	9.8	A	11.1	B
El Camino Real/25th Ave.	23.1	C	24.8	C	21.8	C	22.2	C
El Camino Real/28th Ave.	8.1	A	9.0	A	23.0	C	23.3	C

Table 16-4. Peak Hour Intersection Level of Service
Underground Flow Equalization System Project, Environmental Impact Report

	Year 2005 Conditions				Year 2030 Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
Intersection	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
El Camino Real/Hillsdale Ramps	37.3	D	40.1	D	41.5	D	38.5	D
Saratoga Dr./Franklin Pkwy.	10.4	B	4.6	A	19.0	B	12.8	B
Saratoga Dr./Hillsdale Blvd.	31.7	C	33.1	C	33.0	C	33.9	C
NB 101/Hillsdale Blvd.	21.2	C	23.7	C	25.9	C	25.9	C
SB 101/Hillsdale Blvd.	4.1	A	15.4	B	6.1	A	17.0	B

Source: City of San Mateo, 2010.

Impacts on transportation and traffic may occur if the proposed Project would result in the following:

- Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities, or conflict with or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities or otherwise decrease the performance or safety of such facilities.

16.5 Environmental Impacts

Impact 16-1: Would construction of the proposed Project conflict with a program plan, ordinance or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities, or conflict with or be inconsistent with CEQA Guidelines section 15064.3 (b)?

Construction of the Project would result in a temporary short-term increase in local traffic as a result of construction-related workforce traffic, and equipment and material deliveries. Construction would occur within and/or across several roadways (see **Table 16-2**), which would temporarily disrupt existing transportation and circulation in the vicinity. Project construction for the entire Project is expected to last up to 25 months. Construction of the diversion pipelines is expected to last approximately 13 months, with the location of construction activities progressing along the pipeline footprint. The typical construction duration for new portions of the pipeline would be approximately one week for a 500-foot segment. Construction activities specific to the temporary holding structure and associated facilities are expected to last approximately 18 months.

Traffic-generating construction activities would consist of the daily arrival and departure of construction workers to the site; trucks hauling equipment and materials to the work site; and hauling excavated materials from the site. Potential increases in vehicle trip generation would vary based on the construction activity, equipment needs, and other factors. The majority of the Project's construction-related trips (vehicle and truck trips) would occur on US 101, SR 92, SR 82, S. Delaware Street, Hillsdale Boulevard, and Saratoga Drive. Except for Saratoga Drive, all these roads are City-designated truck routes. Construction vehicles would enter and exit the holding basin site via a newly constructed access drive on Saratoga Drive to reduce impacts to traffic entering and existing the Event Center. Once construction is complete, the access drive would be the primary entrance point for periodic City maintenance vehicles.

For the purposes of this analysis, it is conservatively assumed that there would be a maximum of 271 daily trips to/from the site. The site is located less than 1 mile from the highways; thus, travel on local roads would be minimal. The daily Project trips equate to an increase of 0.1 percent on US 101, 0.3 percent on SR 92, and 0.8 percent on SR 82. Hillsdale Boulevard, Saratoga Drive, and S. Delaware Street are designated arterials, which are defined as roadways with between 10,000 and 50,000 daily vehicles. The estimated additional trips to these roadways represent an increase of less than 3 percent. Additionally, based on the City of San Mateo Circulation Element, the surrounding intersections currently operate at an acceptable LOS and are forecast to continue to operate at an acceptable LOS through 2030 (City of San Mateo, 2010). The negligible increase in Project-related traffic would be temporary and would not represent a substantial contribution to the traffic volume on the existing regional and local roadways or result in reduced capacity or congestion. Furthermore, the number of truck and worker trips will be dispersed throughout an entire day, further minimizing impacts.

Short-term full or partial road closures (**Table 16-2**) will be required to allow for certain construction activities and to maintain public safety. As part of Project execution, the City will implement Final PEIR **Mitigation Measure 16-1, Prepare and implement a traffic management plan (TMP),** and will include traffic controls and other traffic safety measures to maintain proper traffic flow during temporary construction activities. The TMP would be prepared by a licensed transportation engineer and coordinated with and approved by the City of San Mateo.

Transit service and bike facilities are also located along the truck routes and along some of the proposed road closures. Implementation of the TMP will minimize impacts to public transit and non-motorized travel by maintaining access to transit, bicycle, and pedestrian facilities along the Project construction area or by providing an alternative route during full road closures. The TMP would include procedures for notifying and coordinating with all affected agencies, including SamTrans and AC Transit, in advance of construction activities. Applicable county, state, and federal regulation, ordinances, and restrictions will be identified and complied with prior to and during construction.

With implementation of Final PEIR **Mitigation Measure 16-1**, there would be no conflicts with a program plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, nor would the Project be in conflict with CEQA Guidelines section 15064.3 (b), taking into account all modes of transportation, and impacts would be less than significant.

Impact 16-2: Would construction of the proposed Project conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

C/CAG is the designated congestion management agency for San Mateo County and US 101, SR 92, and SR 82 (El Camino Real) are part of the CMP road network. US 101, within the Project vicinity, has a LOS standard of LOS E to F. According to the 2017 CMP, US 101, between SR 92 and Whipple Avenue, is operating below standard during the morning and afternoon peak hours. SR 92 within the Project vicinity (between I-280 and US 101) has a standard of LOS D to E and is also operating below standard during the morning and afternoon peak hours. SR 82 (El Camino Real) has a standard of LOS E and is operating above standard (C/CAG, 2018).

As described for Impact 16-1, construction of the Project would result in an increase in local traffic. However, the Project-added trips represent a temporary minimal increase in traffic compared to the existing volumes on US 101, SR 92, and SR 82, and no changes to the existing LOS are anticipated. Final PEIR **Mitigation Measure 16-1** would include recommendations for appropriately managing traffic during the construction period, including construction schedule restrictions, such as limiting construction traffic during peak hours. The TMP will also include a Transportation Demand Management Program in compliance with the C/CAG Guidelines for Trip Reduction. Therefore, with implementation of Final PEIR **Mitigation Measure 16-1,** the Project would not conflict with an applicable Congestion Management Program, or other standards or travel demand measures, for designated roads or highways. Impacts would be less than significant.

Impact 16-3: Would implementation of the proposed Project substantially increase hazards due to a geometric design feature (e.g., sharp curve or dangerous intersection) or incompatible uses?

Project construction will not permanently alter any public roadways or intersections, including access to the Project site, nor will it introduce a design feature or incompatible uses to the Project area. Construction access to the Project site would be separated from the existing public access at the Event Center. The Event Center hosts many events throughout the year. However, most events are on the weekends, and given weekend construction is not expected, there would be no overlap with construction traffic. Nonetheless, as part of the TMP, coordination with the Event Center will be required to minimize potential conflicts with public access, particularly during large weekday events. In addition, coordination with Nueva School, located on the corner of 28th Street and S. Delaware Street, will be necessary to minimize potential conflicts with students and faculty entering and exiting the high school. With implementation of Final PEIR **Mitigation Measure 16-1**, impacts would be minimized to less than significant.

Street improvement plans for all work in public ROWs will be prepared by a licensed transportation engineer and approved by the Public Works Department. Because of the Project's anticipated truck traffic, some streets may need to be restored or reconstructed. Road repairs will be coordinated with and approved by the City Engineer.

Impact 16-4: Would implementation of the proposed Project result in inadequate emergency access?

Implementation of the Project has the potential to result in inadequate emergency access due to road and lane closures. However, Final PEIR **Mitigation Measures 9-4 and 16-1** would be implemented to minimize impacts on emergency access, including notifying emergency responders prior to construction and providing access for emergency vehicles to and around construction areas. All applicable local, state, and federal traffic control measures would be implemented for the safety of local traffic and construction traffic. With implementation of Final PEIR **Mitigation Measures 9-4 and 16-1**, impacts on emergency access would be less than significant.

Impact 16-5: Would implementation of the proposed Project conflict with adopted policies, plans, or programs regarding public transit, bicycle, and pedestrian facilities or otherwise decrease the performance or safety of such facilities?

Implementation of the Project has the potential to conflict with adopted policies, plans, or programs regarding public transit, bicycle, and pedestrian facilities or otherwise decrease the performance or safety of such facilities due to the anticipated lane and road closures. Sidewalks and bicycle facilities are located along the truck routes. SamTrans and AC Transit also operate near the Project and Project construction could temporarily disrupt transit service.

Implementation of Final PEIR **Mitigation Measure 16-1** would minimize impacts on public transit and non-motorized travel by maintaining access to transit, bicycle, and pedestrian facilities along the Project construction area or by providing an alternative route during full road closures. The TMP would include procedures for notifying and coordinating with all affected agencies, including SamTrans and AC Transit, in advance of construction activities. With implementation of Final PEIR **Mitigation Measure 16-1**, impacts on policies, plans, or programs supporting alternative transportation would be less than significant.

Impact 16-6. Would operation of the proposed Project result in a significant traffic increase in conflicts with local plans, policies, and ordinances?

The City would conduct routine checking and periodic maintenance of the holding structure and diversion sewers. Once constructed, there would very minimal, if any, increase in the number of existing permanent staff and would not result in a substantial increase to the Project site in the number of trucks currently required for O&M activities. No significant impacts on traffic or circulation would occur, and impacts would be less than significant.

16.6 Mitigation Measures

Implementation of the following mitigation measures from the Final PEIR, would ensure that potential impacts on traffic and transportation would remain at a less-than-significant level.

Mitigation Measure 9-4. Coordinate emergency services during construction is described in Chapter 9.

Mitigation Measure 16.1. Prepare and implement a traffic management plan.

Construction of some of the proposed Project would require temporary lane closures, traffic detours, and the use of oversized equipment. Implementation of the proposed Project shall include a TMP that would minimize impacts on through traffic as a result of construction activities. The TMP would be prepared in accordance with the *California Manual of Uniform Traffic Control Devices* (MUTCD) Caltrans, 2014b) and all applicable requirements of the San Mateo Department of Public Works Conditions of Approval. The TMP shall be approved by the City of San Mateo Department of Public Works prior to construction and implemented at all times during construction of the Project. The City of San Mateo and its contractors shall cooperate with other communities to obtain the necessary approvals.

The TMP shall be prepared by a qualified transportation engineer and include recommendations for appropriately managing traffic during the construction period by implementing measures such as construction schedule restrictions, signage, and flaggers. Such measures would promote traffic movement during construction to avoid substantial LOS degradation (i.e., LOS levels that are less than the City's adopted LOS threshold).

The TMP would include but not be limited to the following measures:

- To the extent possible, minimize closures of travel lanes or disruptions to street segments and intersections during trenching activities within road rights-of-way or while utilities are being connected.
- Prepare temporary traffic control plans for each site location. In accordance with the San Mateo Public Works Department Conditions of Approval, prior to issuance of a permit, the contractor shall submit applicable pedestrian or traffic detour plans, to the satisfaction of the City Engineer, for all lane or sidewalk closures. The detour plan shall comply with Part 6, Temporary Traffic Control, of the MUTCD, and standard construction practices. The temporary traffic control plans will identify the need for flaggers for directing traffic, temporary signage, lighting, traffic control devices, and other measures, if required.
- Identify oversize and overweight load haul routes. Transporters will comply with state and county regulations for transportation of oversized and overweight loads on all state and county roads. Such regulations typically include provisions for time of day, pilot cars, law enforcement escorts, speed limits, flaggers, and warning lights. In accordance with the San Mateo Public Works Department Conditions of Approval, for material delivery vehicles equal to or larger than two-axle, six-tire,

single-unit truck size (as defined by Federal Highway Administration Standards), the contractor will submit a truck hauling route that conforms to City of San Mateo Municipal Code Section 11.28.040 for the approval by the City Engineer. Contractors will be prohibited from using trucks with “compression release engine brakes” on residential streets. The contractor will submit a letter to, and obtain approval from, the Department of Public Works confirming the intention to use the hauling route prior to the issuance of any City permits. All material hauling activities shall comply with applicable City ordinances and conditions of approval.

- Schedule deliveries of heavy equipment and construction materials during periods of minimum traffic flow. In accordance with the San Mateo Public Works Department Conditions of Approval, earth hauling and materials delivery to and from the site, including truck arrivals and departures to and from the site, will be prohibited (to the extent possible) between the weekday hours of 4 p.m. to 5:30 p.m. Signs outlining these restrictions will be posted at conspicuous locations on site.
- Limit construction activities (to the extent feasible) to the weekday between 7 a.m. and 7 p.m. and between 7 a.m. and 5 p.m. for work within City ROWs.
- Post the approved hours of construction activity at the construction site in a place and manner that can be easily viewed by any interested member of the public.
- Determine the need for construction work hours and arrival and departure times outside peak traffic periods.
- Determine the need for construction scheduling outside of legal holidays and special events to avoid affecting large fluxes in traffic volumes. In accordance with the San Mateo Public Works Department Conditions of Approval, within the vicinity of Hillsdale Mall and within the downtown area during the holiday season (November 20 to January 1), there shall be no construction activities within rights-of-way that would create lane closures, eliminate parking, create pedestrian detours, or other activities that may create a major disturbance, as determined by the City Engineer. Prohibition on El Camino Real will be along its entire length within the City limits. For Hillsdale Shopping Center, construction prohibition streets shall include Hillsdale Boulevard between US 101 and SR 92, 31st Avenue between El Camino Real and Hacienda Street, and Edison Street and Hacienda Street in the vicinity of the shopping center. The limits of the downtown area shall be defined as: between El Camino Real on the west and Delaware Street on the east, Tilton Avenue on the north, and 5th Avenue on the south. The prohibition shall also include the 3rd and 4th Avenue corridors between Delaware Street and US 101.
- Identify vehicle safety procedures for entering and exiting site access roads.
- Notify and coordinate with emergency responders regarding potential road closures prior to construction.
- Provide access for emergency vehicles to and around the Project site.
- Maintain access to adjacent properties. In accordance with the San Mateo Public Works Department Conditions of Approval the contractor will notify residential and commercial occupants of properties adjacent to the construction site of the hours of construction activity which may impact the area. The notifications will be provided 3 days prior to the start of the extended construction activity.
- Notify and coordinate with transit operators regarding potential road closures prior to construction.
- Maintain access to transit, bicycle, and pedestrian facilities along Project routes.
- Notify and coordinate with mail service and waste haulers regarding potential road closures prior to construction.

- Provide a construction-parking plan that minimizes the effect of construction worker parking in the neighborhood. Include an estimate of the number of workers that will be present on the site during the various phases of construction, indicate where sufficient off-street parking will be used, and identify all locations for offsite material deliveries. The plan will be approved by the City Engineer prior to issuance of City permits and will be complied with at all times during construction.
- Implement a Transportation Demand Management Program using programs in compliance with the City/County Association of Governments of San Mateo County Guidelines for Trip Reduction. These programs, will be on-going throughout Project construction. The plan may include those actions listed in the Project trip reduction plan, including secure bicycle storage, shower changing facilities, guaranteed ride home program, information on transportation alternatives, carpool matching program, preferential parking for carpools/vanpools, employee transportation coordinator, TMA participation, parking reduction, carsharing, shuttle participation, flexible work hours/ telecommuting, and an option to participate in the Caltrain GO Pass Program.

Signs would be provided to control traffic and assist with safety along the proposed Project access routes and at designated road crossings. These signs will adhere to the MUTCD and will include regulatory signs (e.g., stop, speed limits, and yield) and warning signs and construction signs (e.g., temporary lane closures and flaggers). All signs will be maintained throughout Project construction.

Public information will be distributed by using local news television and radio broadcasts, informational flyers and mailers, websites, and other outreach options. Signs would be installed, and public notices would be distributed regarding construction work before disruptions occur; the notifications would identify detours to maintain access. In addition, flagmen or escort vehicles would control and direct traffic flow, and work would be scheduled during periods of minimum traffic flow.

16.7 References

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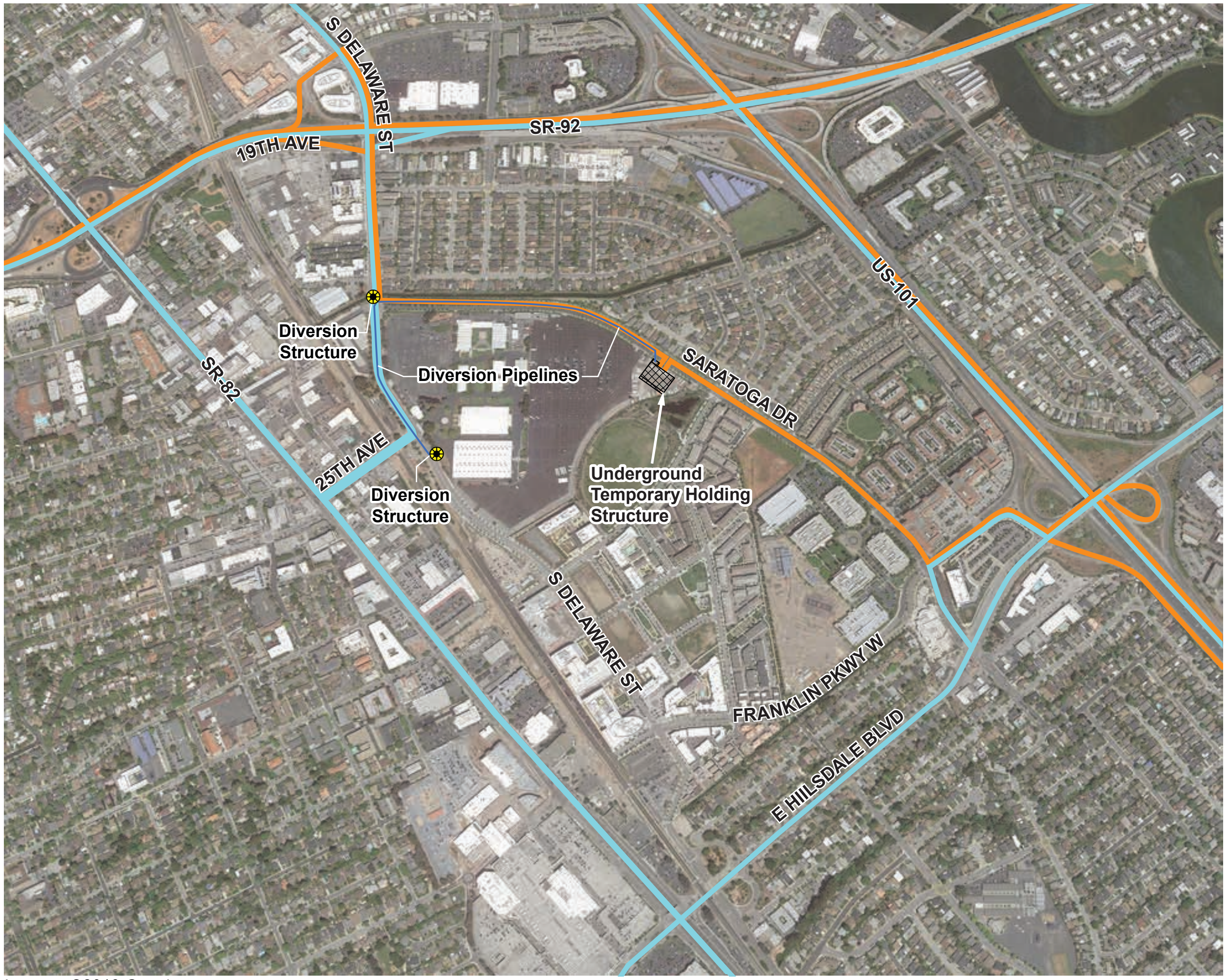

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LEGEND

Existing Designated City Truck Access Route

Proposed UFES Construction Access Route

Figure 16-1
Proposed and Existing Access Routes
Underground Flow Equalization System,
Environmental Impact Report
City of San Mateo Clean Water Program

CHAPTER 17

Utilities

This chapter discusses potential impacts on utilities, including water, solid waste, wastewater, and electricity and gas. It includes descriptions of existing utilities, regulatory frameworks, and potential impacts on each utility resulting from implementation of the proposed Project as well as mitigation measures as applicable.

17.1 Existing Setting

17.1.1 Water

San Mateo is supplied with water primarily by California Water Service Company (Cal Water), an investor-owned water utility. The City is located within Cal Water's Mid-Peninsula District, which includes the cities of San Mateo and San Carlos as well as adjacent unincorporated areas of San Mateo County. A small part of eastern San Mateo receives water service from EMID. These agencies procure water supply and own and maintain the delivery infrastructure, including potable water pipelines and pump stations.

17.1.2 Solid Waste

The South Bayside Waste Management Authority, also known as RethinkWaste, is a joint powers authority of 12 public agencies in southern and central San Mateo County that provides solid waste, waste reduction, and recycling services to member agencies.

Recology San Mateo County (Recology) is the franchise waste hauler for the City of San Mateo (RethinkWaste, 2018a). Recology provides recycling, compost, and garbage collection services to residences and businesses in the City. Garbage, recyclables, and compost are picked up once a week. South Bay Recycling (SBR) provides recycling services for materials collected in San Mateo (RethinkWaste, 2018b). SBR operates the Shoreway Environmental Center, a recycling and transfer station facility in San Carlos, under contract with RethinkWaste. Shoreway serves as a regional solid waste and recycling facility for the receipt, handling, and transfer of refuse, recyclables, and organic materials collected from the RethinkWaste service area, including the City of San Mateo. Residential and commercial solid waste recyclables and organic materials collected by Recology are taken to the Shoreway for consolidation by type and then loaded into large transfer trailers for shipment to either a landfill or recycling facilities (RethinkWaste, 2018c).

Solid waste for landfill disposal is sent to Corinda Los Trancos Landfill (also known as Ox Mountain) located off SR 92 in Half Moon Bay; this is the only active landfill in San Mateo County. The Corinda Los Trancos Landfill is operated by Browning-Ferris Industries of California, Inc. As of March 2017, the landfill had a remaining capacity of approximately 22 million cubic yards out of a permitted capacity of 60.5 million cubic yards (San Mateo County Environmental Health, 2018; CalRecycle, 2018). The remaining capacity is expected to last through 2034, with the next permit review date of June 2022 (CalRecycle, 2017).

Construction and demolition waste and other types of construction materials are sent to the Zanker Road recycling facility in San Jose. Compostable materials such as yard trimmings and food scraps are sent to the Newby Island and Grover composting facilities in San Jose and near Tracy, respectively (RethinkWaste, 2018c).

17.1.3 Wastewater

Existing wastewater collection and treatment in San Mateo are provided by the City's WWTP, located at 2050 Detroit Drive near J. Hart Clinton Drive at Marina Lagoon. The City's collection system includes approximately 234 miles of sanitary sewer pipeline, 5,555 sewer manholes, and 26 pump stations. The City's WWTP also treats wastewater from the following surrounding communities: Foster City and EMID, Town of Hillsborough, City of Belmont, CSCSD, and other portions of unincorporated San Mateo County. All these communities are responsible for collecting and conveying their wastewater to the WWTP.

The WWTP has a permitted capacity of 15.7 mgd for ADWF. The current ADWF is approximately 11 mgd and is expected to increase to 13.9 mgd by 2035, based on the modest growth anticipated in the City's service area (Carollo Engineers, Inc., 2014).

The PWWF for the WWTP is 40 mgd, based on secondary treatment capacity. However, flows often exceed 40 mgd during peak wet weather events. When flows exceed 40 mgd, primary and secondary effluent are blended for discharge of up to 60 mgd, which is the outfall capacity limitation. This 60-mgd limitation and the insufficient capacity of portions of the City's collection system have historically caused backups in the system, resulting in SSOs.

The WWTP is approximately 1.4 miles northeast of the Project site.

17.1.4 Energy – Electricity and Natural Gas

Electrical and natural gas service in San Mateo is provided by Pacific Gas and Electric (PG&E). In 2016, PG&E's power mix consisted of non-emitting nuclear generation (24 percent), renewable resources including solar, wind, geothermal, biomass, and small hydroelectric (33 percent), large hydroelectric facilities (12 percent), natural gas/other (17 percent), and unspecified/untraceable (14 percent) (PG&E, 2018). The total electricity generated and procured by PG&E in 2016 was 68,441 gigawatt-hours (PG&E, 2016).

PG&E is continuing to add renewable energy to its power mix, with a goal of 33 percent renewables by the end of 2020 (PG&E, 2016). PG&E can also purchase power from customers who install eligible renewable generation up to 1.5 megawatts in size. PG&E is also continuing to invest in conventional generation facilities such as combined-cycle natural gas power plants.

17.2 Regulatory Framework

17.2.1 State Regulations

17.2.1.1 California Water Code

The California Water Code requires all urban water suppliers that provide water for municipal purposes either directly or indirectly to more than 3,000 customers (or supply more than 3,000 acre-feet of water annually) to prepare urban water management plans at least every 5 years. The plans describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation, and demand management activities. Components of a plan may vary according to individual community or area characteristics and its capability to efficiently use and conserve water. The plans address measures for residential, commercial, governmental, and industrial water demand management.

17.2.1.2 California Integrated Waste Management Act

The California Integrated Waste Management Act, also known as Assembly Bill 939, requires each jurisdiction in the State to divert 25 percent of its solid waste from landfill or transformation facilities by 1995 and 50 percent by 2000. Accepted diversion methods include source reduction, recycling, and composting activities. The act also requires each county to prepare a countywide integrated waste management plan, which is the primary planning document for solid waste management in each county.

17.2.2 Local Regulations

Title 15 of the Municipal Code provides requirements and procedures for applicants seeking a franchise for electric or gas transmission or distribution (City of San Mateo, 2017).

The San Mateo City Council passed an ordinance amending the Municipal Code to require that certain construction and demolition projects achieve waste diversion rates of up to 60 percent. The ordinance requires that a construction and demolition recycling and waste reduction plan along with a security deposit be submitted as a condition of a building permit. The City provides a list of construction salvage and recycling centers to support construction waste diversion. The ordinance also requires that documentation of compliance with the required diversion rate be submitted upon completion of the final inspection as a condition of refunding the deposit. Specific diversion requirements include the following:

- A minimum recycling rate of 60 percent is required for all new construction and demolition projects.
- A minimum recycling rate of 50 percent is required for alteration projects covered by the ordinance.
- For all projects, at least 25 percent of diverted material shall come from waste that excludes soil, concrete, asphalt, and other non-structural debris.

Several of the goals and policies in the General Plan (City of San Mateo, 2010) are applicable to the provision of utilities, including the following:

> **GOAL 4a: Facilities.** Seek to provide a safe and predictable supply of water, and provide storm drainage, sewer and flood control facilities adequate to serve existing needs, the projected population, and employment growth, and to reduce the associated life safety and health risks to acceptable levels.
>
> **LU 4.4: Water Supply.** Seek to ensure a safe and predictable water system for existing and future development by taking the following actions:
>
> - As a high priority, work with Cal Water and EMID and adjacent jurisdictions to develop supplemental water sources and conservation efforts.
> - Strongly encourage water conservation by implementing pro-active water conservation methods, including requiring all new development to install low volume flush toilets, low-flow shower heads, and utilize drip irrigation while promoting high-efficiency washing machines and establishing an education program to improve water conservation practices.
> - Investigate the feasibility of developing capacity to use recycled wastewater, stormwater runoff, graywater and groundwater that will enable reuse of water for irrigation purposes, freeing comparable potable water supplies for other uses.
>
> **LU 4.28: Peakload Water Supply.** Seek to ensure that the Cal Water and EMID provide and maintain a water supply and distribution system, which provides an adequate static pressure to deliver a minimum fire hydrant flow of 2,500 gallons per minute to all areas of the City, except where a lesser flow is acceptable as determined by the Fire Chief. Ensure that new development does not demand a fire flow in excess of that available.
>
> **LU 4.31: Solid Waste Disposal.** Continue to support programs to reduce solid waste materials in landfill areas in accordance with State requirements.
>
> **LU 4.32: Recycling.** Support programs to recycle solid waste in compliance with State requirements. Require provisions for onsite recycling for all new development.

PA 4.7: Wastewater Treatment Plant. Maintain the WWTP as designated in Policy LU-4.5.

LU 4.7: Sewer System. Provide a sewer system which safely and efficiently conveys sewage to the wastewater treatment plant. Implement the Sewer System Management Plan (SSMP) to ensure proper maintenance, operations and management all parts of the wastewater collection system.

1. Comprehensive Sewer System Study. As a high priority, maintain the comprehensive sewer system study to assess the efficiency and integrity of the sewer lines and facilities, and develop a Capital Improvement Program to make any necessary improvements.
2. Sewer Requirements for New Development. Require new major multi-family and commercial developments to evaluate the main sewer lines in the Project vicinity that will be utilized by the new development and make any improvements necessary to convey the additional sewage flows.

17.3 Assessment Methods and Thresholds of Significance

Impacts on utilities may occur if the proposed Project would:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects
- Have insufficient water supplies available to serve the proposed Project and reasonably foreseeable future development during normal, dry, and multiple dry years
- Result in a determination by the wastewater treatment provider that serves or may serve the Project that it does not have adequate capacity to serve the proposed Project’s projected demand in addition to the provider’s existing commitments
- 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
- Not comply with federal, state, and local statutes and regulations related to solid waste
- Result in wasteful, inefficient, or unnecessary consumption of energy or conflict with or obstruct a state or local plan for renewable energy or energy efficiency

17.4 Environmental Impacts

Impact 17-1. Would implementation of the proposed Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Minor disruptions in sewage or treatment service may occur during construction, and localized sewage service near the Project may need to be temporarily suspended for up to a few hours; however, service interruptions would be infrequent and short in duration (up to a few hours). Wastewater treatment service would otherwise be maintained during construction of the Project. No additional wastewater treatment facilities would be required during construction to maintain service.

The current permitted ADWF capacity of the WWTP is 15.7 mgd. The WWTP is currently undergoing an expansion to meet peak wet weather flows. However, the permitted capacity would not change with implementation of the Project. The Project would enable the WWTP to continue to serve the existing permitted capacity. In addition, the Project would increase the system capacity to efficiently convey and treat wet weather flows. No additional or expanded wastewater treatment facilities are expected to be needed after the Project is complete and no impacts would occur.

Except for minor aboveground structures to provide access, most of the proposed Project would be below ground. The existing site where the holding structure will be located is aggregate; however, once completed, the Project site will be paved with pervious concrete so stormwater runoff will not be increased. Because the site is already developed, the Project would not convert vegetated land to impervious surfaces (pavement and facilities) that would increase stormwater runoff. No new or expanded stormwater facilities would be needed after implementation of the Project and no impacts would occur.

Impact 17-2. Would implementation of the proposed Project have insufficient water supplies available to serve the proposed Project and reasonably foreseeable future development during normal, dry and multiple dry years?

Construction of the Project may require the use of water for dust control and for certain types of pipeline construction. However, the amount of water needed would be minor and would be met with existing water supplies. Construction impacts would be less than significant.

The underground wastewater temporary holding structure would be equipped with self-cleaning flushing channels. Nine 2,000-gallon buckets would be installed to clean the facility. The buckets would fill with clean water and then tip over forming a flushing wave across the bottom of the facility. A typical storm would require the use of three tipping buckets, requiring approximately 6,000 gallons of water for a single use. It is expected that the holding structure would be used approximately 15 times per year, and up to five times per year to allow the City to conduct maintenance on other collection system projects, resulting in an expected total use of approximately 120,000 gallons per year. Cleaning water would be met by existing water supplies and would not require a new or expanded entitlement; therefore, impacts would be less than significant.

Impact 17-3. Would implementation of the proposed Project result in a determination by the wastewater treatment provider that serves or may serve the Project that it does not have adequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments?

Because the proposed Project is a component of the City's CWP, it is being constructed to provide adequate system capacity to efficiently convey and treat expected PWWFs. Because the existing system would remain in use during construction, except for minor disruptions in sewage or treatment service, the wastewater treatment capacity would be unchanged and no impacts would occur.

Impact 17-4. Would the proposed Project 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?

Implementation of the Project would result in the generation of construction and demolition waste, including concrete, asphalt, used sewage pipes, soil, and used equipment. Construction and demolition projects in San Mateo are required to achieve a minimum recycling rate of 60 percent. Construction waste that is not recycled could be diverted to Corinda Los Trancos Landfill or Dumbarton Quarry. Corinda Los Trancos is located approximately 7.5 miles west of the Project site. As of March 2017, Corinda Los Trancos Landfill had a remaining permitted capacity of more than 22 million cubic yards, and accepts construction/demolition, mixed municipal sludge (biosolids), asbestos, tires, and other waste types (San Mateo County; CalRecycle, 2018). Dumbarton Quarry is located approximately 12.5 miles east of the Project site. The site is currently under reclamation to backfill the quarry site, and is accepting fill material (Pacific States, 2017). Hazardous materials generated during construction would be disposed of at an appropriate licensed facility.

The identified landfills have sufficient capacity to accept the solid waste generated by the Project. Furthermore, generation and disposal of all solid wastes associated with the Project would comply with federal, state, and local statutes and regulations and no impacts would occur.

Impact 17-5. Would implementation of the proposed Project result in wasteful, inefficient, or unnecessary consumption of energy?

Implementation of the Project would result in the use of energy for construction, primarily the use of gasoline and diesel fuel to power construction equipment. Construction activities would occur over a 25-month period. As described in Chapter 16, it is estimated that peak construction activities would generate up to 271 daily trips and as many as 76 worker trips. However, these peaks would not be continuous through the overall construction period. BAAQMD's *Basic Construction Mitigation Measures* includes measures such as reduced idling times, which would reduce energy use by construction equipment and conserve fuels. Impacts of the use of energy during construction of the Project would be less than significant.

Implementation of the Project would result in the use of energy for operation, through electricity use for wastewater conveyance. In addition, a new 350-kW emergency diesel generator would be used to allow processes to continue during periods of power outages. However, operation of the diesel generator would be limited to 50 hours per year and would not result in a substantial increase of diesel fuel.

PG&E is continuing to invest in renewable and conventional energy production, and future energy supplies would be expected to be sufficient to meet the increased Project energy use. The maximum energy use estimated for the Project would be up to approximately 15 megawatt hours per year, less than 0.00002 percent of PG&E's current generation and procurement. The increased use of energy by the proposed Project would not require new or improved electric transmission infrastructure, nor conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Impacts of the use of energy during operation of the proposed Project would be less than significant.

17.5 Mitigation Measures

All impacts to utilities would be less than significant and no mitigation measures are required.

17.6 References

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CHAPTER 18

Other Required California Environmental Quality Act Considerations

18.1 Cumulative Impacts

This chapter summarizes the cumulative impacts associated with implementation of the proposed Project.

18.1.1 Introduction

Cumulative impact analysis is an important component of the environmental documentation and approval process and is required by CEQA. Cumulative impacts could occur when the effects of the proposed Project are combined with other planned and foreseeable projects such that environmental impacts are more intense or longer in duration.

According to State CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects past projects, the effects of other current projects, and the effects of possible future projects. As stated in State CEQA Guidelines Section 15355, cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. In addition, Section 15130(b) identifies that the following elements are necessary for an adequate cumulative analysis:

- Either:
  - A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or,
  - A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.
- A definition of the geographic scope of the area effected by the cumulative effect and a reasonable explanation of the geographic limitation used;
- A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative impacts.

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider that effect significant but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

18.1.2 Cumulative Setting

The geographic area for the cumulative analysis considers the nature of the potential impacts that could result from construction and operation of the proposed UFES Project and other projects. The majority of impacts are *construction* impacts that would occur at or near the Project site. Therefore, construction of projects in the area of the proposed UFES Project are considered in the analysis.

The cumulative impacts analysis focuses on the environmental resources analyzed in Chapters 3 through 17 of this document. Additional information about the setting for each of these resources can be found in each of the individual resource chapters. The cumulative setting conditions are based on the existing land uses within the Project area, which exist as a result of past and present development activity. In addition, consideration was given to new development projects that may occur during the proposed Project implementation period. Although the exact nature and extent of these future projects is not known, the general character of foreseeable future development is expected to be consistent with approved land use plans that apply to the area (primarily the City of San Mateo General Plan) and similar in nature to current development projects. Because most construction-related projects result in localized impacts, the geographical scope of the projects that were considered was limited to those that occur within approximately 1 mile of the Project site. Foreseeable future projects are generally expected to include the following.

- Other CWP projects – Projects associated with the CWP are expected to occur over the next 10 to 20 years throughout the City's collection system, as well as at the WWTP, which is located approximately 1.5 miles northeast of the Project site. Collection system projects include improvements to existing sewer lines and pump stations. Construction of these improvements would generally last approximately 6 to 12 months. Construction of the new WWTP is expected to last approximately 5 years.
- Other general municipal projects - Consistent with typical utility operations, routine maintenance work and minor capital improvement projects are expected to occur throughout the City; for example, small water pipeline installations, storm drain repairs, and road resurfacing. Some of these activities may occur at the same time as construction of the proposed Project; however, the scale of these individual projects would be small.
- Hillsdale Shopping Center - Currently under construction. This project consists of the partial demolition of existing structures, and addition of a new outdoor plaza consisting of new shops, restaurants, and entertainment venues including a new luxury cinema.
- Franklin Templeton Office – Currently under construction. This project entails the completion of the Franklin Templeton Investments Global Headquarters campus and consists of the construction of two 122,630-square-foot four-story office buildings totaling 245,260 square feet on the parcels west of the existing Franklin Templeton buildings. The project includes below-grade and at-grade parking providing a total of 274 new parking spaces, bicycle parking at-grade and bicycle racks in the underground parking garages, and related site improvements. Access to the proposed building would be provided by the existing driveways on Franklin Parkway and Saratoga Drive.
- 477 E. Hillsdale Blvd. – Currently under pre-application review by City Planning. A Planning Pre-Application is under review for the demolition of the existing Hillsdale Inn motel and a self-service car wash and the development of a new 151-unit apartment complex with resident lobbies, business lounge, community rooms, and fitness room on 3.06 acres.
- Hampton Inn and Suites Hotel – City Planning has approved the application. This project consists of the demolition of an existing Best Western Hotel, and the construction of new 182-room/suite Hampton Inn & Suites Hotel (86,859 square feet, five-stories), and 146 ground-level parking spaces.

- Atria Hillsdale Renovation – Currently under construction. This project includes the construction of a new building to house 40 Memory Care residents at the location of the existing single-story Skilled Nursing Facility, which is currently vacant. The new building would be connected to the adjacent existing three-story (105 beds) Assisted Living building via a new shared main entrance. The existing Assisted Living Facility currently houses 145 residents. The proposed project would move 40 beds to the new Memory Care facility and keep 105 beds in the Assisted Living facility.
- 6-1, 2, and 3 Waters Park Drive (PA18-013) – Application currently under review by City Planning. The project consists of the demolition of all existing offices and construction of 190 residences, including mix of two-story detached single-family residences, three- and four-story attached townhomes and flats, and new publicly accessible, trail along Borel Creek.
- Concar Passages (PA17-083) - Application Under Review by City Planning. This project includes the demolition of existing commercial buildings on site and construction of 961 multi-family dwelling units and 32,000 square feet of commercial/retail space (including retention of Trader Joe's and 7-Eleven). The site is approximately 14.5 acres and currently occupied by the Concar Shopping Center, Shane Jewelers, and 7-Eleven. The project includes 73 housing units, daycare facility, and over 3 acres of open space and recreational areas.
- Station Park Green Development – Currently under construction. This project includes the construction of a mixed-use transit-oriented development with office, retail residential and public use facilities, including parks. The project is comprised of up to 599 dwelling units, a minimum of 25,0000 square feet of retail space, a minimum of 10,000 square feet of office space, and at least 2 acres of open space on S. Delaware Street and Concar Drive.
- 1650 S. Delaware (PA17-066) - City Planning has approved the application. This project consists of the demolition of the existing office building, removal of the existing 26 trees on the site, and construction an approximately 123,241 square foot five-story structure for 73 residential apartment units, including an at-grade parking garage containing 98 vehicular parking spaces and 96 long-term bicycle spaces.
- Bay Meadows Transit-Oriented Development – Currently under construction. The development consists of ongoing continued buildout of the Bay Meadows project, which is occurring on 83 acres of the former Bay Meadows racetrack. Most development permits were approved in 2008, and the community is partially built. At buildout, the community is expected to consist of over 1,000 residential units with integrated office and retail sites.
- Hillsdale Terraces - City Planning has approved the application. This project includes the demolition of existing structures to construct a new five-story structure with 68 to 74-unit residential condominiums and a three-level below-grade parking garage.
- BRIDGE Housing, 2775 S. Delaware Street – City Planning has approved the application. This project includes the construction of a 68-unit affordable housing apartment complex with a lobby, community room, multi-purpose room, laundry facility, and podium court. The project is located on a 1-acre site within the Bay Meadows development adjacent to the Nueva School.
- 1 Carey School Lane (PA18-029) – Currently under pre-application review by City Planning. This project would consist of the demolition of the existing one-story classroom building and construction of a new two-story classroom and multi-purpose room building. Site improvements to existing courtyard would also be included.
- 1495 S. El Camino Real (PA17-030) - Currently under pre-application review by City Planning. This project would consist of the demolition of the existing single-story office building and construction of retail building with one level of below-grade parking.

18.1.3 Cumulative Analysis

The cumulative impacts analysis is based on the analysis of environmental resources in Chapters 3 through 17 of this document, together with the potential effects from the projects discussed above.

18.1.4 Aesthetics

Visible components of the proposed Project would be related to temporary construction activities and limited permanent at-grade and aboveground facilities. The extent of other potential development in this area is not expected to further degrade views, as all projects that include large, aboveground features would follow the City's processes for design review as part of the City's special use permit process. This process would help minimize the potential for aesthetic impacts through local review of architectural design, landscaping, lighting, surface painting, and similar architectural and landscape treatments.

18.1.5 Air Quality

The majority of air emissions associated with the Proposed Project would be construction-related and would cease upon Project completion. In general, operation of the proposed Project as well as other potential development would be consistent with the Association of Bay Area Governments growth projections used in the preparation of regional air plans (e.g., Bay Area 2010 Clean Air Plan). The extent of potential development in the vicinity of the proposed Project is not expected to further contribute to odor generation. There would be no cumulative impacts as a result of these activities.

Other development in the area may contribute to VOC emissions, but would be subject to BAAQMD permitting requirements for new sources. For all projects occurring in the area, construction equipment would be required to be licensed for use in California pursuant to ARB emissions standards, and standard dust control measures would be implemented during construction pursuant to the BAAQMD CEQA guidelines. Therefore, the proposed Project's cumulative contribution to air quality impacts from VOCs and during construction would not be at a cumulatively considerable level.

18.1.6 Biological Resources

Development of the proposed Project would occur in an urbanized area, with little potential for impacts to biological resources. Mitigation measures will be implemented to avoid impacts to nesting birds and, prior to construction beginning, the City will obtain any necessary permits for tree trimming or removal. Other potential development projects occurring in nearby areas would also have limited potential for biological resources impacts due to the urban nature of the surrounding area and limited habitat present. Although the potential for habitat loss appears to be minimal, there is some potential for localized impacts from construction disturbance in a similar manner from construction of other projects in the area; therefore, pre-construction surveys with avoidance and minimization measures will be implemented, consistent with City policies, code provisions, and standard conditions of project approval. With implementation of these measures, the proposed Project's cumulative contribution to biological resources impacts would not be at a cumulatively considerable level.

18.1.7 Cultural Resources

Development of the proposed Project would occur in an urbanized area that has been previously disturbed; however, previous cultural surveys indicate the likely presence of undisturbed subsurface archaeological deposits in some portions of the City. Implementation of the proposed Project, in combination with cumulative development, would increase the potential to disturb these undiscovered cultural resources. Pre-construction surveys with avoidance and minimization measures will be implemented, consistent with City policies, code provisions, and standard conditions of project approval. With implementation of these measures, the proposed Project's cumulative contribution to cultural resources impacts would not be at a cumulatively considerable level.

18.1.8 Geology and Soils

Geotechnical impacts related to expansive soils and seismic hazards are site-specific rather than cumulative in nature. However, subsidence related to construction dewatering and lateral spreading are potentially significant cumulative impacts. Like the proposed Project, all development would be subject to uniform site development and construction standards appropriate for regional geology and soil conditions. A geotechnical analysis and report has been completed according to Final PEIR **Mitigation Measure 7-1**. The report provides considerations and recommendations to avoid or minimize potential hazards. Additionally, measures have been included to reduce localized settlement impacts from dewatering and shoring-related settlement. Therefore, with implementation of the recommended measures provided in the geotechnical reports and mitigation measures, the proposed Project's cumulative contribution to geotechnical impacts would not be at a cumulatively considerable level. For an additional discussion of erosion and sediment control, see Hydrology and Water Quality below.

18.1.9 Greenhouse Gases

The majority of GHG emissions associated with the Proposed Project would be construction-related and would cease upon Project completion. In general, operation of the proposed Project as well as other potential development would be consistent with the ABAG growth projections and would use electricity from the California power grid. In this manner, all projects are expected to comply with the RPS and AB 32 scoping plan requirements. There would be no cumulative impacts as a result of these activities.

For all projects occurring in the Project area, construction equipment would be required to comply with standard best management practices pursuant to the BAAQMD CEQA guidelines, including minimizing idling times and maintaining equipment in good condition. Therefore, the proposed Project's cumulative contribution to greenhouse gas impacts during construction would not be at a cumulatively considerable level.

18.1.10 Hazards and Hazardous Materials

Impacts from hazards and hazardous materials are site-specific rather than cumulative in nature. Like the proposed Project, all projects that include the routine use, storage, transport, and disposal of hazardous construction materials would follow DTSC, EPA, OSHA, and San Mateo Fire Department requirements, including preparation of a hazardous communication program, hazardous materials business plan, and spill prevention and countermeasures plan. Therefore, there would be no cumulative impact.

18.1.11 Hydrology and Water Quality

Excavation in the water table requiring dewatering would occur for the proposed Project as well as other projects in the area. Dewatering would be temporary and short term during construction, and therefore, the volume of water to be removed is expected to be minor. Groundwater in the area is ample and is not used as a primary water source.

Development of the proposed Project and other projects in the area could result in erosion and siltation, with subsequent water quality impacts. This is expected to occur primarily during construction, as the operation of the projects in the area are not expected to substantially change from current conditions. For all projects occurring in the area, similar water quality effects could occur during construction and additional effects could occur from rainfall onto developed sites after construction is finished. All projects would follow the San Mateo Countywide Water Pollution Prevention Program, including provisions of its Stormwater Management Plan, including pollution reduction activities for construction sites. Each project would be required to prepare a stormwater pollution prevention plan to address specific, onsite pollutant sources and controls during and after construction. Therefore, the proposed Project's cumulative contribution to water quality impacts during and after construction would not be at a cumulatively considerable level.

18.1.12 Land Use

The proposed Project will require a Special Use Permit related to potential land use impacts. All development projects in the area would be required to follow the City's processes for special use permit and/or design review. This process would help minimize the potential for land use and community impacts through local review of architectural design, landscaping, lighting, surface painting, and similar architectural and landscape treatments. Therefore, there would be no cumulative impact.

18.1.13 Noise

Construction of the proposed Project and other projects in the area could result in significant and unavoidable noise impacts. All projects, like the proposed Project, would be required to follow the City's processes for special use permit and/or design review, which is expected to include review for consistency with noise standards in Chapter 7.30 of the San Mateo Municipal Code. All projects would follow the construction noise restrictions in Chapter 7.30 of the Municipal Code, including weekday and weekend construction hour limits, but it is not clear that impacts could be reduced to a less than cumulatively considerable level. As part of City processes for special use permit and/or design review, the proposed Project would implement **Mitigation Measure 12-1**, which includes construction noise minimization measures, noise hotlines, and noise complaint resolution processes. However, mitigation measures would not reduce the significant and unavoidable impact that results from construction of the proposed Project; therefore, the cumulative impact would be temporary but could result in significant and unavoidable noise impacts.

18.1.14 Population and Housing

The proposed Project would not induce population and housing growth and would not displace housing or people. Because the Project would have no impact, it would not contribute to cumulative impacts.

18.1.15 Public Services

The proposed Project does not contain features that would increase demand for police, fire, hospital, school, or library service during operations. For example, the proposed Project would not induce population and housing growth. During construction, some public services could be disrupted as the result of roadway construction (e.g., temporary rerouting of emergency access). However, service disruptions would typically be no more than a few days for a given project. All projects would implement standard measures to coordinate in advance with emergency service providers and other public services and utilities to establish signage and detours to maintain emergency access or otherwise minimize service interruptions. Therefore, there would be no cumulative impact.

18.1.16 Recreation

The proposed Project does not contain features that would increase demand for recreation facilities. For example, the Project would not induce population and housing growth. During construction, access to some parks and recreation facilities could be disrupted as the result of roadway construction. These types of temporary impacts would be temporary and site-specific rather than cumulative in nature. Like the proposed Project, all projects would implement standard measures to coordinate in advance with City parks services to ensure that detours are provided, and park users are aware of the temporary disruptions, as feasible. Therefore, there would be no cumulative impact.

18.1.17 Transportation and Traffic

The proposed Project does not contain features that would increase long-term demand for transportation services and facilities – there would be no population growth inducement and operations (e.g., staff levels) would be similar to existing levels. However, the proposed Project would increase vehicle use during construction activities, and also would require street and lane closures that would hinder full use of the local transportation system. For all projects occurring in the area, similar types of transportation effects could occur during construction. This is a potentially significant cumulative impact.

All projects would include general safety standards for traffic control, including measures to ensure traffic safety, bicycle and pedestrian access, and coordination with transit and emergency service providers. Though construction related traffic impacts would be temporary and short term, construction traffic associated with the proposed Project could be cumulatively considerable, when combined with construction traffic associated with surrounding projects. As part of mitigation measure 16-1, a TMP shall be prepared and approved by the City of San Mateo Department of Public Works prior to construction and implemented at all times during construction of the Project. The TMP will include provisions to limit construction activities to avoid peak hours and schedule deliveries and construction materials to periods of minimum traffic flow, as well as implement a Transportation Demand Management Program. Though there will be periods of higher traffic volumes, construction-related traffic related to the proposed Project will cease upon Project completion. Project operations will not result in a higher traffic volume within the Project area. Thus, implementation of the TMP would ensure that the contribution from implementation of the proposed Project to transportation impacts would not be at a cumulatively considerable level.

18.1.18 Utilities

The proposed Project does not contain features that would increase demand for water, solid waste, or wastewater during operations. For example, the Project would not induce population and housing growth. Although the proposed Project would result in a slight increased use of electricity during operation, this increase can be easily accommodated by existing and planned energy supplies. PG&E continues to invest in renewable and conventional energy production and future energy supplies to meet regional energy needs, including those of other potential projects. During construction, some utilities could be disrupted from construction within roadways. These types of temporary impacts would be site-specific rather than cumulative in nature. Like the proposed Project, all projects would implement standard measures to coordinate in advance with utility providers to avoid or minimize service interruptions. Therefore, there would be no cumulative impact.

18.2 Growth-Inducing Impacts

CEQA Guidelines Section 15126.2(d) requires that an EIR identify the likelihood that a proposed project could “foster” or stimulate “…economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.” The City and its satellite collection systems are subject to Cease and Desist Order No. R2-2009-0020, which requires elimination of SSOs and upgraded sewer capacity. The proposed Project is a component of the CWP, which is necessary to comply with Cease and Desist Order No. R2-2009-0020.

The existing WWTP is permitted to treat an average dry weather flow (ADWF) of 15.7 mgd and currently has sufficient hydraulic capacity to support this flow. The Project would not result in a change to the existing ADWF, but rather would provide adequate system capacity to efficiently convey PWWF and reduce SSOs in the City’s collection system; thus, the Project would not induce population growth.

18.3 Significant Irreversible Environmental Changes

CEQA Guidelines Section 15126.2(c) requires agencies to consider to the fullest extent possible irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented. Nonrenewable resources committed for construction of the proposed Project might be irreversible, because commitments of such resources might permanently remove the resources from further use. CEQA requires an evaluation of irretrievable resources to assure that consumption is justified. For example, cultural resources are nonrenewable; therefore, any destruction or loss of those resources is irreplaceable.

The proposed Project would result in the use of construction materials that could not be restored (e.g., metal materials; excavation and/or importing of soils and rocks; and energy used to manufacture, transport, or install the new pipelines) and the use of nonrenewable resources (e.g., fuel) to operate construction equipment. In addition, operation of the facilities would result in minor use of energy resources (e.g., fossil fuels and electricity). Consumption of these nonrenewable energy resources would be minimal and would not represent a significant impact on irreversible and irretrievable environmental commitments.

18.4 Significant and Unavoidable Impacts

CEQA Guidelines Section 15126.2(b) requires agencies to describe the significant environmental effects that cannot be avoided if the proposed Project is implemented. Based on the analysis in Chapters 3 through 17, one environmental effect was identified as significant and unavoidable:

- Impact 12-1. Construction of the proposed Project could result in generation of noise levels in excess of standards. On occasion, individual construction equipment could generate noise that exceeds 90 dBA at 25 feet and may exceed 90-dBA at property line depending on where they operate, which is a potentially significant impact. Though temporary, impacts from construction would be significant and unavoidable, depending on the equipment type and location used, for the Project.

All other environmental effects would be mitigated to a less-than-significant level.

CHAPTER 19

Alternatives

19.1 Introduction

CEQA requires that a lead agency evaluate the comparative effects of a range of reasonable alternatives to the proposed program that would feasibly attain most of the primary objectives of the program but would avoid or substantially lessen any of the significant effects of the program [CEQA Guidelines, Section 15126.6(a)]. Section 15126.6 also states that an environmental impact report (EIR) is required to set forth only those alternatives necessary to permit a reasoned choice. Significant effects of the alternatives shall be discussed but, in less detail, than those of the Project.

The EIR is required to assess the identified alternatives and determine which among the alternatives (including the proposed Project) is the environmentally superior alternative. One of the alternatives assessed must be the “No Project” alternative. If the No Project alternative is identified as the environmentally superior alternative, then another of the remaining alternatives must be identified as the environmentally superior alternative.

19.2 Final PEIR Program Alternatives

The 2016 Final PEIR evaluated two CWP alternatives: the In-System Storage Program and Full Conveyance Program. When the San Mateo City Council approved the Final PEIR, the In-System Storage Program Alternative was selected as the preferred alternative. The Project is a necessary component of the Program Alternative, specifically as part of the City’s collection system. As part of the In-System Storage Program Alternative, the Final PEIR described 12 potential locations for one or more storage basin(s) but none was independently evaluated in the Final PEIR at the Project-level. Since approval of the Final PEIR, the City continued to investigate basin options and conduct additional refinement of the collection system projects.

19.3 Project Alternatives

The City considered different temporary storage options in the *Alternatives Analysis Report Basin 2 and 3 Collection System Improvements* (Alternatives Report) by Stantec, Inc, 2017 (Stantec, 2017). The Alternatives Report began with the 12 holding structure options from the Final PEIR and added one option that had previously been eliminated during Final PEIR development, for a total of 13 potential alternatives. These alternatives were evaluated in conjunction with the proposed relief sewer and pump stations projects within the same hydraulic basins. Evaluation of the results from the hydraulic analysis, combined with factors related to the feasibility of the facilities and public input, reduced the number of potential alternatives to five potential basin locations (one alternative included two holding structures) plus one tunnel alternative for a total of five potential alternatives (including the proposed Project) (see **Figure 19-1** for a conceptual layout of Project alternatives). The City conducted further alternative refinement of the five alternatives that was based on a series of technical, environmental, and social criteria for a basis of comparison. This additional refinement resulted in one feasible alternative: the Project alternative.

The focus of this chapter is on the No Project alternative and the four other storage alternatives: three flow equalization basin alternatives and the storage tunnel alternative.

19.3.1 No Project Alternative

The No Project Alternative assumes that the Project is not approved, and proposed construction activities associated with Project implementation would not occur; therefore, construction impacts associated with temporary impacts on traffic, air quality, noise, and use of energy and materials would not occur.

However, if the Project is not approved, wet-weather SSOs would continue to occur. The City of San Mateo and its partner agencies would continue to be in violation of the Cease and Desist Order related to the SSOs. Stormwater quality and Bay water quality would be negatively affected. The CWP and Project objectives would not be met. Although some impacts would be avoided, the No Project alternative would result in potentially significant impacts that would not occur with the Project.

19.3.2 Temporary Holding Structure Alternatives

As previously discussed, the City conducted an alternatives analysis for collection system improvements in two of the five basins (Basins 2 and 3) that comprise the wastewater collection system. The report evaluated four alternatives for one or more temporary holding structures: San Mateo Department of Public Works Corporation Yard, Fiesta Meadows Park, San Mateo County Event Center (proposed Project),[3] and Hillsdale Plaza/San Mateo County Event Center.

The alternatives were analyzed in the Alternatives Report using three criteria: technical, environmental, and social to determine conformance with the desired criteria. Once the alternatives were ranked, a score was assigned for each alternative. The alternatives report narrowed the selection to two alternatives, the Corporation Yard and Event Center, and ultimately the City determined that the Event Center was the most feasible alternative.

The storage facilities were all similar in concept and size, ranging from 5.0 to 5.2 MG. The major differences between the alternatives were their locations and the configuration of the diversion pipelines. Construction methods would generally be the same for all the alternatives, and construction impacts would all be similar to those described for the proposed Project, with the following exceptions:

- The Fiesta Meadows Park alternative would be located in Fiesta Meadows Park, a 4.7-acre park located in the Fiesta Gardens neighborhood. This neighborhood park is located on Bermuda Drive within the Fiesta Meadows Neighborhood and includes picnic tables, a soccer field, and an asphalt perimeter pathway. During the entire 25-month construction period, access to the park would be prohibited, causing impacts to the park's recreational users. Additionally, the primary access route to the construction site would be via Bermuda Avenue, which is classified as "local street." Local streets typically have up to 1,000 daily vehicle trips, are "designed to serve only adjacent land uses, and are intended to protect residents from through traffic impacts" (San Mateo, 2010).
- Hillsdale Plaza/San Mateo County Event Center alternative would include two storage facilities at two different locations: a 3.6-MG basin at Hillsdale Plaza and a 1.5-MG basin at the Event Center for a combined total holding capacity of 5.1 MG. Traffic estimates for this alternative would be considerably higher, an approximate 35 percent increase over other alternatives, which would also result in increased construction-related air and GHG emissions. Additionally, though each holding basin would be smaller than the proposed Project, both sites would require similar construction equipment and durations as the proposed Project, essentially doubling the construction impacts for this alternative.

[3] The Alternatives report described the San Mateo County Event Center as the "Expo Center." This is the alternative that was selected for the proposed Project.

Zoning and General Plan designations vary among Project alternatives. **Table 19-1** provides the zoning designations for the Project alternatives.

Table 19-1. Current Zoning - Project Alternatives
Underground Flow Equalization System Project, Environmental Impact Report

Location	Zoning	Permitted Uses
San Mateo Department of Public Works Corporation Yard	TOD – Transit Oriented Development	Uses designated in the Rail Corridor Plan Land Use Plan. Non-designated uses that the Planning Commission concludes are so similar to any specifically permitted use, as designated in the Rail Corridor Plan Land Use Plan, so as to be virtually identical thereto in terms of impact and land use requirements may also be allowed as special uses, subject to review and approval as a special use permit by the Planning Commission.
Fiesta Meadows Park	OS – Open Space	Parks, playgrounds, community centers, and facilities that are publicly owned; vacant land for open space preservation. Public utility facilities are allowed if a special use permit is approved.
Hillsdale Plaza/San Mateo County Event Center	TOD/A	See definitions under the Corporation Yard and Event Center options.
Storage Tunnel	TOD or BMSP	See definition under Corporation Yard for TOD. Bay Meadows Specific Plan ensures that the Bay Meadows Race Track, Practice Track, and Bar Area is developed in a comprehensively planned manner, compatible with adjacent residential neighborhoods and consistent with the City's quality of life goals. All uses in the BMSP District are subject to the conditions of use specified in the Bay Meadows Specific Plan, including, but not limited to, off-street parking and loading, setbacks, building heights, and floor area ratio requirements.

In terms of the zoning designations, the Corporation Yard and Hillsdale Plaza/Event center alternatives are zoned Transit Oriented Development (TOD), which is not compatible with the intended use. These options would require amendments to the City's General Plan and Zoning Code. All other holding structure alternatives would be allowed under a special use permit from the City's Planning Department.

19.3.3 Delaware Storage Tunnel Alternative

The Delaware Storage Tunnel alternative would consist of a 6,155-foot by 12-foot-diameter pipeline approximately 50 feet below Delaware Avenue between Concar Drive and E. 31st Avenue. The tunnel would require construction of three permanent access shafts in or near Delaware Avenue for maintenance; construction of diversion structures and sewers for influent/effluent to be diverted into and out of the tunnel; effluent pump stations to allow the tunnel to be emptied; and odor control facilities.

Most of the tunnel would be constructed below grade via a tunnel bore machine; therefore, this alternative would have a smaller construction footprint relative to the footprint for the holding structure alternatives. Launch and receiving sites would be required for tunnel construction, which would be situated in parcels adjacent to Delaware Avenue. A third access shaft would be situated within Delaware Avenue, near or in the intersection of 28th Avenue. Given that, long-term closures of portions of Delaware Avenue and/or 28th Avenue could be required during construction, causing potentially significant disruptions to local traffic.

Construction-related haul trucks to remove and dispose of material to accommodate the tunnel, and resulting construction-related air and GHG emissions, would be comparable to the proposed Project. This alternative has a construction duration similar to the proposed Project; however, construction would occur on an ongoing 24-hour basis and could cause nighttime lighting and noise impacts to adjacent neighborhoods.

Odor control facilities and effluent pump stations would be required at all three shafts and cleaning the tunnel would require a considerably larger flushing chamber, or the tunnel would require manual cleaning using hoses. The cost for this alternative would be more than double that of the holding structure alternatives.

The launch and receiving sites would require approximately 0.5 acre per site of permanent footprint to accommodate at-grade and aboveground features, which would preclude any other development on the parcels. The launch site would be located on a parcel that is zoned TOD and the receiving pit would be located on a parcel that is zoned Bay Meadows Specific Plan (BMSP). Neither the launch nor the receiving pit would be compatible with the zoning codes and would require amendments to the City's General Plan and Zoning Code to accommodate the intended use.

19.4 Alternatives Summary

The No Project alternative would avoid or substantially lessen the significant and unavoidable construction noise impact. However, it would not meet any Project objectives, and would result in the continuance of SSOs to occur, resulting in significant water quality impacts and conflict with regulatory requirements.

All the other alternatives would meet the Project objectives in that, they all would provide storage within the City's collection system and help reduce the occurrence of SSOs. The temporary holding structure alternatives would have similar-to-higher construction-related impacts, including similar impacts to noise associated with the installation of shoring and foundation piles. Two of the holding structure alternatives would not be compatible with the City's Land Use and zoning designations and would require an amendment to the City's General Plan and zoning code.

The tunnel alternative would not require the installation of foundation piles; however, nighttime construction noise impacts would occur due to 24-hour construction. Therefore, this alternative could potentially result in significant construction noise. Additionally, this alternative could result in significant impacts to traffic due to the need for the long-term partial closure of Delaware Avenue and/or 28th Avenue and impacts to and nighttime lighting and glare due to 24-hour construction. Additionally, the permanent at-grade/aboveground features for this alternative would not be compatible with existing zoning designations.

Because all other alternatives would result in similar or greater impacts than the proposed Project and would not substantially lessen or reduce potential impacts from the proposed Project, no other alternatives were determined to be environmentally superior; therefore, no other alternatives were carried forward for further analysis.

19.5 References

Stantec, Inc. 2017. *Alternatives Analysis Report, Basins 2 and 3 Collection System Improvements*. March.

City of San Mateo. 2010. *Circulation Element, City of San Mateo General Plan*. October.

Figure 19-1. Approximate Locations of Project Alternatives
Underground Flow Equalization System, Environmental Impact Report
City of San Mateo Clean Water Program

Appendix A
Air Emissions Calculations

Summary of Construction Emissions

Annual Emissions (Calculated by CalEEMod)

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5	CO2e
Year	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	tons/yr	MT/yr
2019	0.350	5.983	2.822	0.016	0.446	0.108	0.117	0.101	1541.299
2020	0.362	6.436	2.953	0.019	0.509	0.100	0.138	0.096	1823.960
2021	0.006	0.141	0.044	0.001	0.016	0.001	0.004	0.001	49.339

Average Daily Emissions

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5	CO2e
Year	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
2019	1.92	32.78	15.46	0.09	2.45	0.59	0.64	0.56	9309.39
2020	1.98	35.26	16.18	0.11	2.79	0.55	0.75	0.52	11016.64
2021	0.40	9.39	2.92	0.03	1.04	0.04	0.28	0.04	3625.72

Summary of Operational Emissions- Emergency Generator (Diesel)

Generator size	469	hp	24.9	gallon/hour
Operating Hours (routine testing and maintenance)	2	hours/day		
	50	hours/year		

Generator Criteria Pollutants Emissions(2021 and beyond)

	ROG	CO	NOX	SO2	PM10	PM2.5
Emission factor (g/hp-hr)	0.012	1.4	4.5	0.006	0.1	0.1
Daily Emissions (lb/day)	0.026	2.895	9.306	0.012	0.207	0.207
Annual Emissions (tons/year)	0.0003	0.036	0.116	0.0002	0.003	0.003

Note:

Emergency generator emissions were estimated based on the operating hours of routine testing and maintenance.

Criteria pollutants emission factors were based on Technical Spec Sheet of Caterpillar C13 350 ekW generator.

Generator GHG Emissions (2021 and beyond)

	CO2	CH4	N2O	CO2e
Emission Factor (g/gallon)	10210	0.41	0.08	10242.7
Metric ton/year	12.711	0.0005	0.0001	12.8
Global Warming Potential	1	28	265	

Note:

Greenhouse gas emission factors of the generator was obtained from EPA Greenhouse Gas Emission Factors https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdffactors_mar_2018_0.pdf)

Electricity Usage GHG Emissions (2021 and beyond)

	CO2	CH4	N2O	CO2e
Emission Factors (lb/MWH)	527.86	0.033	0.004	529.8
Metric ton/year	3.56	0.00	0.000	3.6
Global Warming Potential	1	28	265	

Note:

1. GHG emission factors were from EPA eGrid, Subregion Emissions – Greenhouse Gases (eGRID2016), for WECC California.
2. The global warming potential was from the IPCC Fifth Assessment Report, 2014 (AR5)
2. Power demand total increase 14,848 KWH/year

Breakdown:

Dewatering Pumps: 300 KWh

Odor Control: 8760 KWh

Electrical Building HVAC: 2372 KWh

Mechanical Vault Ventilation: 3416 KWh

Total GHG Emissions

	CO2e (Metric tons/year)
Generator	12.8
Electricity Usage	3.6
Total GHG Emissions	**16.3**

In-System Storage Facility Project, San Mateo County Event Center

Bay Area AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	0.00	1000sqft	4.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2021

Utility Company

CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default

Project Characteristics -

Land Use - project specific

Construction Phase - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - added using default

Off-road Equipment -

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Off-road Equipment - project specific

Trips and VMT - project specific

Demolition - estimated based on 4000 cy debris X 0.5 ton/cy

Grading - project specific

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2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3499	5.9827	2.8220	0.0162	0.4464	0.1076	0.5540	0.1167	0.1014	0.2181	0.0000	1,537.7737	1,537.7737	0.1410	0.0000	1,541.2991
2020	0.3616	6.4355	2.9529	0.0192	0.5092	0.1001	0.6093	0.1375	0.0958	0.2333	0.0000	1,820.7572	1,820.7572	0.1281	0.0000	1,823.9596
2021	5.9400e-003	0.1409	0.0438	5.1000e-004	0.0156	5.5000e-004	0.0161	4.2400e-003	5.3000e-004	4.7700e-003	0.0000	49.2878	49.2878	2.0400e-003	0.0000	49.3388
Maximum	**0.3616**	**6.4355**	**2.9529**	**0.0192**	**0.5092**	**0.1076**	**0.6093**	**0.1375**	**0.1014**	**0.2333**	**0.0000**	**1,820.7572**	**1,820.7572**	**0.1410**	**0.0000**	**1,823.9596**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3499	5.9827	2.8220	0.0162	0.4464	0.1076	0.5540	0.1167	0.1014	0.2181	0.0000	1,537.7733	1,537.7733	0.1410	0.0000	1,541.2987
2020	0.3616	6.4355	2.9529	0.0192	0.5092	0.1001	0.6093	0.1375	0.0958	0.2333	0.0000	1,820.7568	1,820.7568	0.1281	0.0000	1,823.9592
2021	5.9400e-003	0.1409	0.0438	5.1000e-004	0.0156	5.5000e-004	0.0161	4.2400e-003	5.3000e-004	4.7700e-003	0.0000	49.2878	49.2878	2.0400e-003	0.0000	49.3388
Maximum	**0.3616**	**6.4355**	**2.9529**	**0.0192**	**0.5092**	**0.1076**	**0.6093**	**0.1375**	**0.1014**	**0.2333**	**0.0000**	**1,820.7568**	**1,820.7568**	**0.1410**	**0.0000**	**1,823.9592**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio- CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2019	3-31-2019	0.2078	0.2078
6	4-1-2020	6-30-2020	0.1172	0.1172
7	7-1-2020	9-30-2020	0.2422	0.2422
		Highest	0.2422	0.2422

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	1. Contractor Mobilization	Site Preparation	1/1/2019	2/28/2019	5	43	
2	3. Demolition of existing structure	Demolition	2/1/2019	3/31/2019	5	41	
3	2. Temp Install fencing and barrier	Site Preparation	2/1/2019	2/28/2019	5	20	
4	4. Remove pavement	Site Preparation	3/1/2019	3/31/2019	5	21	
5	5. Shoring installation	Site Preparation	4/1/2019	5/31/2019	5	45	
6	6. Excavation	Site Preparation	5/1/2019	7/31/2019	5	66	
7	7. Pier installation	Site Preparation	6/1/2019	8/31/2019	5	65	
8	8. Diversion sewer installation	Site Preparation	7/1/2019	7/31/2020	5	285	
9	10. Concrete walls	Building Construction	11/1/2019	2/28/2020	5	86	
10	11. Concrete roof	Building Construction	2/1/2020	3/31/2020	5	42	
11	13. Mechanical work	Building Construction	3/1/2020	5/31/2020	5	65	
12	12. Backfill	Grading	4/1/2020	5/31/2020	5	43	
13	14. Electrical work	Building Construction	5/1/2020	7/31/2020	5	66	
14	15. Re paving	Paving	6/1/2020	8/31/2020	5	66	
15	9. Concrete bottom Slab	Building Construction	9/1/2020	11/30/2020	5	65	
16	16. Demobilization	Building Construction	1/1/2021	1/31/2021	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1. Contractor Mobilization	Tractors/Loaders/Backhoes	1	8.00	165	0.37
3. Demolition of existing structure	Excavators	1	8.00	164	0.38

2. Temp Install fencing and barrier	Excavators	1	8.00	164	0.38
4. Remove pavement	Excavators	1	8.00	164	0.38
4. Remove pavement	Tractors/Loaders/Backhoes	1	8.00	165	0.37
5. Shoring installation	Bore/Drill Rigs	2	8.00	115	0.50
5. Shoring installation	Cranes	2	8.00	260	0.29
5. Shoring installation	Excavators	1	8.00	300	0.38
6. Excavation	Cranes	1	4.00	260	0.29
6. Excavation	Excavators	2	8.00	300	0.38
7. Pier installation	Cranes	1	4.00	260	0.29
8. Diversion sewer installation	Excavators	1	8.00	300	0.38
8. Diversion sewer installation	Excavators	1	2.00	164	0.38
8. Diversion sewer installation	Generator Sets	1	8.00	84	0.74
8. Diversion sewer installation	Tractors/Loaders/Backhoes	1	4.00	165	0.37
9. Concrete bottom Slab	Cranes	1	4.00	260	0.29
9. Concrete bottom Slab	Pumps	2	8.00	60	0.74
10. Concrete walls	Cranes	1	4.00	260	0.29
10. Concrete walls	Pumps	2	8.00	60	0.74
11. Concrete roof	Cranes	1	4.00	260	0.29
11. Concrete roof	Pumps	2	8.00	60	0.74
12. Backfill	Excavators	1	8.00	300	0.38
12. Backfill	Excavators	1	8.00	164	0.38
12. Backfill	Tractors/Loaders/Backhoes	1	8.00	165	0.37
15. Re paving	Cement and Mortar Mixers	4	6.00	9	0.56
15. Re paving	Pavers	1	7.00	130	0.42
15. Re paving	Rollers	1	7.00	80	0.38
15. Re paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
1. Contractor Mobilization	Excavators	1	8.00	164	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1. Contractor Mobilization	2	20.00	0.00	240.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
3. Demolition of existing structure	1	20.00	0.00	400.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
2. Temp Install fencing and barrier	1	20.00	0.00	400.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
4. Remove pavement	2	20.00	0.00	75.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
5. Shoring installation	5	20.00	0.00	1,600.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
6. Excavation	3	20.00	0.00	5,628.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
7. Pier installation	1	20.00	0.00	1,000.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
8. Diversion sewer installation	4	20.00	0.00	2,033.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
9. Concrete bottom Slab	3	20.00	0.00	4,210.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
10. Concrete walls	3	20.00	0.00	4,309.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
11. Concrete roof	3	20.00	0.00	3,505.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
13. Mechanical work	0	20.00	0.00	1,500.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
12. Backfill	3	20.00	0.00	2,400.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
14. Electrical work	0	20.00	0.00	1,000.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
15. Re paving	7	20.00	0.00	300.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT
16. Demobilization	0	20.00		520.00	30.00	7.30	50.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 1. Contractor Mobilization - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.1243	0.1451	2.3000e-004		6.1300e-003	6.1300e-003		5.6400e-003	5.6400e-003	0.0000	20.3846	20.3846	6.4500e-003	0.0000	20.5458
Total	**0.0121**	**0.1243**	**0.1451**	**2.3000e-004**	**0.0000**	**6.1300e-003**	**6.1300e-003**	**0.0000**	**5.6400e-003**	**5.6400e-003**	**0.0000**	**20.3846**	**20.3846**	**6.4500e-003**	**0.0000**	**20.5458**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3700e-003	0.0764	0.0157	2.2000e-004	5.0600e-003	3.4000e-004	5.4100e-003	1.3900e-003	3.3000e-004	1.7200e-003	0.0000	21.5176	21.5176	9.3000e-004	0.0000	21.5408
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5700e-003	2.9200e-003	0.0285	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	6.0000e-005	2.5600e-003	0.0000	8.3777	8.3777	2.1000e-004	0.0000	8.3830
Total	**5.9400e-003**	**0.0793**	**0.0442**	**3.1000e-004**	**0.0145**	**4.0000e-004**	**0.0149**	**3.9000e-003**	**3.9000e-004**	**4.2800e-003**	**0.0000**	**29.8953**	**29.8953**	**1.1400e-003**	**0.0000**	**29.9237**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0121	0.1243	0.1451	2.3000e-004		6.1300e-003	6.1300e-003		5.6400e-003	5.6400e-003	0.0000	20.3846	20.3846	6.4500e-003	0.0000	20.5458
Total	**0.0121**	**0.1243**	**0.1451**	**2.3000e-004**	**0.0000**	**6.1300e-003**	**6.1300e-003**	**0.0000**	**5.6400e-003**	**5.6400e-003**	**0.0000**	**20.3846**	**20.3846**	**6.4500e-003**	**0.0000**	**20.5458**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.3700e-003	0.0764	0.0157	2.2000e-004	5.0600e-003	3.4000e-004	5.4100e-003	1.3900e-003	3.3000e-004	1.7200e-003	0.0000	21.5176	21.5176	9.3000e-004	0.0000	21.5408
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5700e-003	2.9200e-003	0.0285	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	6.0000e-005	2.5600e-003	0.0000	8.3777	8.3777	2.1000e-004	0.0000	8.3830
Total	**5.9400e-003**	**0.0793**	**0.0442**	**3.1000e-004**	**0.0145**	**4.0000e-004**	**0.0149**	**3.9000e-003**	**3.9000e-004**	**4.2800e-003**	**0.0000**	**29.8953**	**29.8953**	**1.1400e-003**	**0.0000**	**29.9237**

3.3 3. Demolition of existing structure - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0214	0.0000	0.0214	3.2400e-003	0.0000	3.2400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5500e-003	0.0571	0.0694	1.1000e-004		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	9.8665	9.8665	3.1200e-003	0.0000	9.9446
Total	**5.5500e-003**	**0.0571**	**0.0694**	**1.1000e-004**	**0.0214**	**2.7500e-003**	**0.0242**	**3.2400e-003**	**2.5300e-003**	**5.7700e-003**	**0.0000**	**9.8665**	**9.8665**	**3.1200e-003**	**0.0000**	**9.9446**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9500e-003	0.1273	0.0261	3.7000e-004	8.4400e-003	5.7000e-004	9.0100e-003	2.3200e-003	5.5000e-004	2.8700e-003	0.0000	35.8626	35.8626	1.5500e-003	0.0000	35.9013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-003	2.7900e-003	0.0272	9.0000e-005	8.9900e-003	6.0000e-005	9.0500e-003	2.3900e-003	5.0000e-005	2.4400e-003	0.0000	7.9881	7.9881	2.0000e-004	0.0000	7.9930
Total	**7.3500e-003**	**0.1301**	**0.0533**	**4.6000e-004**	**0.0174**	**6.3000e-004**	**0.0181**	**4.7100e-003**	**6.0000e-004**	**5.3100e-003**	**0.0000**	**43.8507**	**43.8507**	**1.7500e-003**	**0.0000**	**43.8943**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0214	0.0000	0.0214	3.2400e-003	0.0000	3.2400e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.5500e-003	0.0571	0.0694	1.1000e-004		2.7500e-003	2.7500e-003		2.5300e-003	2.5300e-003	0.0000	9.8665	9.8665	3.1200e-003	0.0000	9.9446
Total	**5.5500e-003**	**0.0571**	**0.0694**	**1.1000e-004**	**0.0214**	**2.7500e-003**	**0.0242**	**3.2400e-003**	**2.5300e-003**	**5.7700e-003**	**0.0000**	**9.8665**	**9.8665**	**3.1200e-003**	**0.0000**	**9.9446**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9500e-003	0.1273	0.0261	3.7000e-004	8.4400e-003	5.7000e-004	9.0100e-003	2.3200e-003	5.5000e-004	2.8700e-003	0.0000	35.8626	35.8626	1.5500e-003	0.0000	35.9013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-003	2.7900e-003	0.0272	9.0000e-005	8.9900e-003	6.0000e-005	9.0500e-003	2.3900e-003	5.0000e-005	2.4400e-003	0.0000	7.9881	7.9881	2.0000e-004	0.0000	7.9930
Total	**7.3500e-003**	**0.1301**	**0.0533**	**4.6000e-004**	**0.0174**	**6.3000e-004**	**0.0181**	**4.7100e-003**	**6.0000e-004**	**5.3100e-003**	**0.0000**	**43.8507**	**43.8507**	**1.7500e-003**	**0.0000**	**43.8943**

3.4 2. Temp Install fencing and barrier - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7100e-003	0.0278	0.0339	5.0000e-005		1.3400e-003	1.3400e-003		1.2400e-003	1.2400e-003	0.0000	4.8129	4.8129	1.5200e-003	0.0000	4.8510
Total	**2.7100e-003**	**0.0278**	**0.0339**	**5.0000e-005**	**0.0000**	**1.3400e-003**	**1.3400e-003**	**0.0000**	**1.2400e-003**	**1.2400e-003**	**0.0000**	**4.8129**	**4.8129**	**1.5200e-003**	**0.0000**	**4.8510**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9500e-003	0.1273	0.0261	3.7000e-004	8.4400e-003	5.7000e-004	9.0100e-003	2.3200e-003	5.5000e-004	2.8700e-003	0.0000	35.8626	35.8626	1.5500e-003	0.0000	35.9013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6600e-003	1.3600e-003	0.0133	4.0000e-005	4.3900e-003	3.0000e-005	4.4100e-003	1.1700e-003	3.0000e-005	1.1900e-003	0.0000	3.8966	3.8966	1.0000e-004	0.0000	3.8991
Total	**5.6100e-003**	**0.1287**	**0.0393**	**4.1000e-004**	**0.0128**	**6.0000e-004**	**0.0134**	**3.4900e-003**	**5.8000e-004**	**4.0600e-003**	**0.0000**	**39.7592**	**39.7592**	**1.6500e-003**	**0.0000**	**39.8003**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7100e-003	0.0278	0.0339	5.0000e-005		1.3400e-003	1.3400e-003		1.2400e-003	1.2400e-003	0.0000	4.8129	4.8129	1.5200e-003	0.0000	4.8510
Total	**2.7100e-003**	**0.0278**	**0.0339**	**5.0000e-005**	**0.0000**	**1.3400e-003**	**1.3400e-003**	**0.0000**	**1.2400e-003**	**1.2400e-003**	**0.0000**	**4.8129**	**4.8129**	**1.5200e-003**	**0.0000**	**4.8510**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.9500e-003	0.1273	0.0261	3.7000e-004	8.4400e-003	5.7000e-004	9.0100e-003	2.3200e-003	5.5000e-004	2.8700e-003	0.0000	35.8626	35.8626	1.5500e-003	0.0000	35.9013
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6600e-003	1.3600e-003	0.0133	4.0000e-005	4.3900e-003	3.0000e-005	4.4100e-003	1.1700e-003	3.0000e-005	1.1900e-003	0.0000	3.8966	3.8966	1.0000e-004	0.0000	3.8991
Total	**5.6100e-003**	**0.1287**	**0.0393**	**4.1000e-004**	**0.0128**	**6.0000e-004**	**0.0134**	**3.4900e-003**	**5.8000e-004**	**4.0600e-003**	**0.0000**	**39.7592**	**39.7592**	**1.6500e-003**	**0.0000**	**39.8003**

3.5 4. Remove pavement - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0600e-003	0.0000	1.0600e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.9000e-003	0.0607	0.0709	1.1000e-004		2.9900e-003	2.9900e-003		2.7500e-003	2.7500e-003	0.0000	9.9553	9.9553	3.1500e-003	0.0000	10.0340
Total	**5.9000e-003**	**0.0607**	**0.0709**	**1.1000e-004**	**1.0600e-003**	**2.9900e-003**	**4.0500e-003**	**1.1000e-004**	**2.7500e-003**	**2.8600e-003**	**0.0000**	**9.9553**	**9.9553**	**3.1500e-003**	**0.0000**	**10.0340**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.4000e-004	0.0239	4.8900e-003	7.0000e-005	1.5800e-003	1.1000e-004	1.6900e-003	4.4000e-004	1.0000e-004	5.4000e-004	0.0000	6.7242	6.7242	2.9000e-004	0.0000	6.7315
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7400e-003	1.4300e-003	0.0139	5.0000e-005	4.6100e-003	3.0000e-005	4.6400e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	4.0915	4.0915	1.0000e-004	0.0000	4.0940
Total	**2.4800e-003**	**0.0253**	**0.0188**	**1.2000e-004**	**6.1900e-003**	**1.4000e-004**	**6.3300e-003**	**1.6600e-003**	**1.3000e-004**	**1.7900e-003**	**0.0000**	**10.8157**	**10.8157**	**3.9000e-004**	**0.0000**	**10.8255**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0600e-003	0.0000	1.0600e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.9000e-003	0.0607	0.0709	1.1000e-004		2.9900e-003	2.9900e-003		2.7500e-003	2.7500e-003	0.0000	9.9553	9.9553	3.1500e-003	0.0000	10.0340
Total	**5.9000e-003**	**0.0607**	**0.0709**	**1.1000e-004**	**1.0600e-003**	**2.9900e-003**	**4.0500e-003**	**1.1000e-004**	**2.7500e-003**	**2.8600e-003**	**0.0000**	**9.9553**	**9.9553**	**3.1500e-003**	**0.0000**	**10.0340**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.4000e-004	0.0239	4.8900e-003	7.0000e-005	1.5800e-003	1.1000e-004	1.6900e-003	4.4000e-004	1.0000e-004	5.4000e-004	0.0000	6.7242	6.7242	2.9000e-004	0.0000	6.7315
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7400e-003	1.4300e-003	0.0139	5.0000e-005	4.6100e-003	3.0000e-005	4.6400e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	4.0915	4.0915	1.0000e-004	0.0000	4.0940

Total	2.4800e-003	0.0253	0.0188	1.2000e-004	6.1900e-003	1.4000e-004	6.3300e-003	1.6600e-003	1.3000e-004	1.7900e-003	0.0000	10.8157	10.8157	3.9000e-004	0.0000	10.8255

3.6 5. Shoring installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0404	0.4892	0.3801	7.3000e-004		0.0212	0.0212		0.0195	0.0195	0.0000	65.5383	65.5383	0.0207	0.0000	66.0567
Total	**0.0404**	**0.4892**	**0.3801**	**7.3000e-004**	**0.0000**	**0.0212**	**0.0212**	**0.0000**	**0.0195**	**0.0195**	**0.0000**	**65.5383**	**65.5383**	**0.0207**	**0.0000**	**66.0567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0158	0.5092	0.1043	1.4800e-003	0.0338	2.2900e-003	0.0360	9.2800e-003	2.1900e-003	0.0115	0.0000	143.4503	143.4503	6.1900e-003	0.0000	143.6051
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7300e-003	3.0600e-003	0.0298	1.0000e-004	9.8700e-003	6.0000e-005	9.9300e-003	2.6200e-003	6.0000e-005	2.6800e-003	0.0000	8.7674	8.7674	2.2000e-004	0.0000	8.7729
Total	**0.0195**	**0.5122**	**0.1342**	**1.5800e-003**	**0.0436**	**2.3500e-003**	**0.0460**	**0.0119**	**2.2500e-003**	**0.0142**	**0.0000**	**152.2177**	**152.2177**	**6.4100e-003**	**0.0000**	**152.3779**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0404	0.4892	0.3801	7.3000e-004		0.0212	0.0212		0.0195	0.0195	0.0000	65.5382	65.5382	0.0207	0.0000	66.0566
Total	**0.0404**	**0.4892**	**0.3801**	**7.3000e-004**	**0.0000**	**0.0212**	**0.0212**	**0.0000**	**0.0195**	**0.0195**	**0.0000**	**65.5382**	**65.5382**	**0.0207**	**0.0000**	**66.0566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0158	0.5092	0.1043	1.4800e-003	0.0338	2.2900e-003	0.0360	9.2800e-003	2.1900e-003	0.0115	0.0000	143.4503	143.4503	6.1900e-003	0.0000	143.6051
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7300e-003	3.0600e-003	0.0298	1.0000e-004	9.8700e-003	6.0000e-005	9.9300e-003	2.6200e-003	6.0000e-005	2.6800e-003	0.0000	8.7674	8.7674	2.2000e-004	0.0000	8.7729
Total	**0.0195**	**0.5122**	**0.1342**	**1.5800e-003**	**0.0436**	**2.3500e-003**	**0.0460**	**0.0119**	**2.2500e-003**	**0.0142**	**0.0000**	**152.2177**	**152.2177**	**6.4100e-003**	**0.0000**	**152.3779**

3.7 6. Excavation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.5700e-003	0.0000	5.5700e-003	8.0000e-004	0.0000	8.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0292	0.3305	0.2129	7.5000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	67.5504	67.5504	0.0214	0.0000	68.0847
Total	**0.0292**	**0.3305**	**0.2129**	**7.5000e-004**	**5.5700e-003**	**0.0115**	**0.0170**	**8.0000e-004**	**0.0106**	**0.0114**	**0.0000**	**67.5504**	**67.5504**	**0.0214**	**0.0000**	**68.0847**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0556	1.7910	0.3670	5.2100e-003	0.1187	8.0400e-003	0.1268	0.0326	7.6900e-003	0.0403	0.0000	504.5865	504.5865	0.0218	0.0000	505.1309
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4700e-003	4.4800e-003	0.0438	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	9.0000e-005	3.9300e-003	0.0000	12.8588	12.8588	3.2000e-004	0.0000	12.8669
Total	**0.0610**	**1.7954**	**0.4107**	**5.3500e-003**	**0.1332**	**8.1300e-003**	**0.1413**	**0.0365**	**7.7800e-003**	**0.0443**	**0.0000**	**517.4453**	**517.4453**	**0.0221**	**0.0000**	**517.9978**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.5700e-003	0.0000	5.5700e-003	8.0000e-004	0.0000	8.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0292	0.3305	0.2129	7.5000e-004		0.0115	0.0115		0.0106	0.0106	0.0000	67.5503	67.5503	0.0214	0.0000	68.0846
Total	**0.0292**	**0.3305**	**0.2129**	**7.5000e-004**	**5.5700e-003**	**0.0115**	**0.0170**	**8.0000e-004**	**0.0106**	**0.0114**	**0.0000**	**67.5503**	**67.5503**	**0.0214**	**0.0000**	**68.0846**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0556	1.7910	0.3670	5.2100e-003	0.1187	8.0400e-003	0.1268	0.0326	7.6900e-003	0.0403	0.0000	504.5865	504.5865	0.0218	0.0000	505.1309
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.4700e-003	4.4800e-003	0.0438	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	9.0000e-005	3.9300e-003	0.0000	12.8588	12.8588	3.2000e-004	0.0000	12.8669
Total	**0.0610**	**1.7954**	**0.4107**	**5.3500e-003**	**0.1332**	**8.1300e-003**	**0.1413**	**0.0365**	**7.7800e-003**	**0.0443**	**0.0000**	**517.4453**	**517.4453**	**0.0221**	**0.0000**	**517.9978**

3.8 7. Pier installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5400e-003	0.0929	0.0642	1.1000e-004		3.7400e-003	3.7400e-003		3.4400e-003	3.4400e-003	0.0000	9.4715	9.4715	3.0000e-003	0.0000	9.5464
Total	**7.5400e-003**	**0.0929**	**0.0642**	**1.1000e-004**	**0.0000**	**3.7400e-003**	**3.7400e-003**	**0.0000**	**3.4400e-003**	**3.4400e-003**	**0.0000**	**9.4715**	**9.4715**	**3.0000e-003**	**0.0000**	**9.5464**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.8700e-003	0.3182	0.0652	9.3000e-004	0.0211	1.4300e-003	0.0225	5.8000e-003	1.3700e-003	7.1700e-003	0.0000	89.6564	89.6564	3.8700e-003	0.0000	89.7532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3900e-003	4.4200e-003	0.0431	1.4000e-004	0.0143	9.0000e-005	0.0144	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.6640	12.6640	3.2000e-004	0.0000	12.6719
Total	**0.0153**	**0.3226**	**0.1083**	**1.0700e-003**	**0.0354**	**1.5200e-003**	**0.0369**	**9.5900e-003**	**1.4500e-003**	**0.0110**	**0.0000**	**102.3205**	**102.3205**	**4.1900e-003**	**0.0000**	**102.4251**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5400e-003	0.0929	0.0642	1.1000e-004		3.7400e-003	3.7400e-003		3.4400e-003	3.4400e-003	0.0000	9.4715	9.4715	3.0000e-003	0.0000	9.5464
Total	**7.5400e-003**	**0.0929**	**0.0642**	**1.1000e-004**	**0.0000**	**3.7400e-003**	**3.7400e-003**	**0.0000**	**3.4400e-003**	**3.4400e-003**	**0.0000**	**9.4715**	**9.4715**	**3.0000e-003**	**0.0000**	**9.5464**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.8700e-003	0.3182	0.0652	9.3000e-004	0.0211	1.4300e-003	0.0225	5.8000e-003	1.3700e-003	7.1700e-003	0.0000	89.6564	89.6564	3.8700e-003	0.0000	89.7532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3900e-003	4.4200e-003	0.0431	1.4000e-004	0.0143	9.0000e-005	0.0144	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.6640	12.6640	3.2000e-004	0.0000	12.6719
Total	**0.0153**	**0.3226**	**0.1083**	**1.0700e-003**	**0.0354**	**1.5200e-003**	**0.0369**	**9.5900e-003**	**1.4500e-003**	**0.0110**	**0.0000**	**102.3205**	**102.3205**	**4.1900e-003**	**0.0000**	**102.4251**

3.9 8. Diversion sewer installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0649	0.6304	0.5603	1.3400e-003		0.0298	0.0298		0.0286	0.0286	0.0000	118.5835	118.5835	0.0281	0.0000	119.2854
Total	**0.0649**	**0.6304**	**0.5603**	**1.3400e-003**	**2.4000e-004**	**0.0298**	**0.0300**	**4.0000e-005**	**0.0286**	**0.0286**	**0.0000**	**118.5835**	**118.5835**	**0.0281**	**0.0000**	**119.2854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.3000e-003	0.2996	0.0614	8.7000e-004	0.0371	1.3500e-003	0.0385	9.6900e-003	1.2900e-003	0.0110	0.0000	84.4205	84.4205	3.6400e-003	0.0000	84.5116
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0109	8.9700e-003	0.0875	2.8000e-004	0.0290	1.8000e-004	0.0291	7.7000e-003	1.7000e-004	7.8700e-003	0.0000	25.7177	25.7177	6.4000e-004	0.0000	25.7337

Total	**0.0202**	**0.3086**	**0.1489**	**1.1500e-003**	**0.0661**	**1.5300e-003**	**0.0676**	**0.0174**	**1.4600e-003**	**0.0189**	**0.0000**	**110.1382**	**110.1382**	**4.2800e-003**	**0.0000**	**110.2453**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						tons/yr								MT/yr		
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0649	0.6304	0.5603	1.3400e-003		0.0298	0.0298		0.0286	0.0286	0.0000	118.5833	118.5833	0.0281	0.0000	119.2853
Total	**0.0649**	**0.6304**	**0.5603**	**1.3400e-003**	**2.4000e-004**	**0.0298**	**0.0300**	**4.0000e-005**	**0.0286**	**0.0286**	**0.0000**	**118.5833**	**118.5833**	**0.0281**	**0.0000**	**119.2853**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						tons/yr								MT/yr		
Hauling	9.3000e-003	0.2996	0.0614	8.7000e-004	0.0371	1.3500e-003	0.0385	9.6900e-003	1.2900e-003	0.0110	0.0000	84.4205	84.4205	3.6400e-003	0.0000	84.5116
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0109	8.9700e-003	0.0875	2.8000e-004	0.0290	1.8000e-004	0.0291	7.7000e-003	1.7000e-004	7.8700e-003	0.0000	25.7177	25.7177	6.4000e-004	0.0000	25.7337
Total	**0.0202**	**0.3086**	**0.1489**	**1.1500e-003**	**0.0661**	**1.5300e-003**	**0.0676**	**0.0174**	**1.4600e-003**	**0.0189**	**0.0000**	**110.1382**	**110.1382**	**4.2800e-003**	**0.0000**	**110.2453**

3.9 8. Diversion sewer installation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						tons/yr								MT/yr		
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0691	0.6553	0.6457	1.5500e-003		0.0303	0.0303		0.0291	0.0291	0.0000	135.3356	135.3356	0.0322	0.0000	136.1411
Total	**0.0691**	**0.6553**	**0.6457**	**1.5500e-003**	**2.4000e-004**	**0.0303**	**0.0306**	**4.0000e-005**	**0.0291**	**0.0291**	**0.0000**	**135.3356**	**135.3356**	**0.0322**	**0.0000**	**136.1411**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.9000e-003	0.3215	0.0689	1.0000e-003	0.0379	1.2400e-003	0.0392	9.9800e-003	1.1900e-003	0.0112	0.0000	96.6838	96.6838	4.1600e-003	0.0000	96.7877
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0116	9.1900e-003	0.0912	3.2000e-004	0.0336	2.1000e-004	0.0338	8.9200e-003	1.9000e-004	9.1200e-003	0.0000	28.8693	28.8693	6.5000e-004	0.0000	28.8856
Total	**0.0215**	**0.3307**	**0.1601**	**1.3200e-003**	**0.0715**	**1.4500e-003**	**0.0729**	**0.0189**	**1.3800e-003**	**0.0203**	**0.0000**	**125.5531**	**125.5531**	**4.8100e-003**	**0.0000**	**125.6733**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.4000e-004	0.0000	2.4000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0691	0.6553	0.6457	1.5500e-003		0.0303	0.0303		0.0291	0.0291	0.0000	135.3354	135.3354	0.0322	0.0000	136.1409
Total	**0.0691**	**0.6553**	**0.6457**	**1.5500e-003**	**2.4000e-004**	**0.0303**	**0.0306**	**4.0000e-005**	**0.0291**	**0.0291**	**0.0000**	**135.3354**	**135.3354**	**0.0322**	**0.0000**	**136.1409**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.9000e-003	0.3215	0.0689	1.0000e-003	0.0379	1.2400e-003	0.0392	9.9800e-003	1.1900e-003	0.0112	0.0000	96.6838	96.6838	4.1600e-003	0.0000	96.7877
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0116	9.1900e-003	0.0912	3.2000e-004	0.0336	2.1000e-004	0.0338	8.9200e-003	1.9000e-004	9.1200e-003	0.0000	28.8693	28.8693	6.5000e-004	0.0000	28.8856
Total	**0.0215**	**0.3307**	**0.1601**	**1.3200e-003**	**0.0715**	**1.4500e-003**	**0.0729**	**0.0189**	**1.3800e-003**	**0.0203**	**0.0000**	**125.5531**	**125.5531**	**4.8100e-003**	**0.0000**	**125.6733**

3.10 10. Concrete walls - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0194	0.1792	0.1586	2.7000e-004		9.7800e-003	9.7800e-003		9.5800e-003	9.5800e-003	0.0000	23.6257	23.6257	3.1400e-003	0.0000	23.7043
Total	**0.0194**	**0.1792**	**0.1586**	**2.7000e-004**		**9.7800e-003**	**9.7800e-003**		**9.5800e-003**	**9.5800e-003**	**0.0000**	**23.6257**	**23.6257**	**3.1400e-003**	**0.0000**	**23.7043**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0213	0.6856	0.1405	1.9900e-003	0.0795	3.0800e-003	0.0826	0.0209	2.9500e-003	0.0238	0.0000	193.1648	193.1648	8.3400e-003	0.0000	193.3732
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5700e-003	2.9200e-003	0.0285	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	6.0000e-005	2.5600e-003	0.0000	8.3777	8.3777	2.1000e-004	0.0000	8.3830
Total	**0.0248**	**0.6885**	**0.1690**	**2.0800e-003**	**0.0889**	**3.1400e-003**	**0.0921**	**0.0234**	**3.0100e-003**	**0.0264**	**0.0000**	**201.5425**	**201.5425**	**8.5500e-003**	**0.0000**	**201.7562**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0194	0.1792	0.1586	2.7000e-004		9.7800e-003	9.7800e-003		9.5800e-003	9.5800e-003	0.0000	23.6257	23.6257	3.1400e-003	0.0000	23.7043
Total	**0.0194**	**0.1792**	**0.1586**	**2.7000e-004**		**9.7800e-003**	**9.7800e-003**		**9.5800e-003**	**9.5800e-003**	**0.0000**	**23.6257**	**23.6257**	**3.1400e-003**	**0.0000**	**23.7043**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0213	0.6856	0.1405	1.9900e-003	0.0795	3.0800e-003	0.0826	0.0209	2.9500e-003	0.0238	0.0000	193.1648	193.1648	8.3400e-003	0.0000	193.3732
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5700e-003	2.9200e-003	0.0285	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	6.0000e-005	2.5600e-003	0.0000	8.3777	8.3777	2.1000e-004	0.0000	8.3830
Total	**0.0248**	**0.6885**	**0.1690**	**2.0800e-003**	**0.0889**	**3.1400e-003**	**0.0921**	**0.0234**	**3.0100e-003**	**0.0264**	**0.0000**	**201.5425**	**201.5425**	**8.5500e-003**	**0.0000**	**201.7562**

3.10 10. Concrete walls - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0176	0.1636	0.1536	2.7000e-004		8.5800e-003	8.5800e-003		8.4000e-003	8.4000e-003	0.0000	23.4885	23.4885	3.0200e-003	0.0000	23.5640
Total	**0.0176**	**0.1636**	**0.1536**	**2.7000e-004**		**8.5800e-003**	**8.5800e-003**		**8.4000e-003**	**8.4000e-003**	**0.0000**	**23.4885**	**23.4885**	**3.0200e-003**	**0.0000**	**23.5640**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0196	0.6347	0.1361	1.9700e-003	0.0795	2.4500e-003	0.0820	0.0209	2.3400e-003	0.0232	0.0000	190.8605	190.8605	8.2100e-003	0.0000	191.0658
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2700e-003	2.5800e-003	0.0256	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	5.0000e-005	2.5600e-003	0.0000	8.1136	8.1136	1.8000e-004	0.0000	8.1182
Total	**0.0228**	**0.6373**	**0.1617**	**2.0600e-003**	**0.0889**	**2.5100e-003**	**0.0914**	**0.0234**	**2.3900e-003**	**0.0258**	**0.0000**	**198.9741**	**198.9741**	**8.3900e-003**	**0.0000**	**199.1839**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0176	0.1636	0.1536	2.7000e-004		8.5800e-003	8.5800e-003		8.4000e-003	8.4000e-003	0.0000	23.4884	23.4884	3.0200e-003	0.0000	23.5639
Total	**0.0176**	**0.1636**	**0.1536**	**2.7000e-004**		**8.5800e-003**	**8.5800e-003**		**8.4000e-003**	**8.4000e-003**	**0.0000**	**23.4884**	**23.4884**	**3.0200e-003**	**0.0000**	**23.5639**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0196	0.6347	0.1361	1.9700e-003	0.0795	2.4500e-003	0.0820	0.0209	2.3400e-003	0.0232	0.0000	190.8605	190.8605	8.2100e-003	0.0000	191.0658
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2700e-003	2.5800e-003	0.0256	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	5.0000e-005	2.5600e-003	0.0000	8.1136	8.1136	1.8000e-004	0.0000	8.1182
Total	**0.0228**	**0.6373**	**0.1617**	**2.0600e-003**	**0.0889**	**2.5100e-003**	**0.0914**	**0.0234**	**2.3900e-003**	**0.0258**	**0.0000**	**198.9741**	**198.9741**	**8.3900e-003**	**0.0000**	**199.1839**

3.11 11. Concrete roof - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0172	0.1598	0.1500	2.7000e-004		8.3800e-003	8.3800e-003		8.2000e-003	8.2000e-003	0.0000	22.9422	22.9422	2.9500e-003	0.0000	23.0160
Total	**0.0172**	**0.1598**	**0.1500**	**2.7000e-004**		**8.3800e-003**	**8.3800e-003**		**8.2000e-003**	**8.2000e-003**	**0.0000**	**22.9422**	**22.9422**	**2.9500e-003**	**0.0000**	**23.0160**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0318	1.0325	0.2214	3.2000e-003	0.0739	3.9900e-003	0.0779	0.0203	3.8100e-003	0.0242	0.0000	310.4972	310.4972	0.0134	0.0000	310.8311
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1900e-003	2.5200e-003	0.0250	9.0000e-005	9.2100e-003	6.0000e-005	9.2700e-003	2.4500e-003	5.0000e-005	2.5000e-003	0.0000	7.9249	7.9249	1.8000e-004	0.0000	7.9294
Total	**0.0350**	**1.0350**	**0.2464**	**3.2900e-003**	**0.0832**	**4.0500e-003**	**0.0872**	**0.0228**	**3.8600e-003**	**0.0267**	**0.0000**	**318.4221**	**318.4221**	**0.0135**	**0.0000**	**318.7604**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0172	0.1598	0.1500	2.7000e-004		8.3800e-003	8.3800e-003		8.2000e-003	8.2000e-003	0.0000	22.9422	22.9422	2.9500e-003	0.0000	23.0159
Total	**0.0172**	**0.1598**	**0.1500**	**2.7000e-004**		**8.3800e-003**	**8.3800e-003**		**8.2000e-003**	**8.2000e-003**	**0.0000**	**22.9422**	**22.9422**	**2.9500e-003**	**0.0000**	**23.0159**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0318	1.0325	0.2214	3.2000e-003	0.0739	3.9900e-003	0.0779	0.0203	3.8100e-003	0.0242	0.0000	310.4972	310.4972	0.0134	0.0000	310.8311
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1900e-003	2.5200e-003	0.0250	9.0000e-005	9.2100e-003	6.0000e-005	9.2700e-003	2.4500e-003	5.0000e-005	2.5000e-003	0.0000	7.9249	7.9249	1.8000e-004	0.0000	7.9294
Total	**0.0350**	**1.0350**	**0.2464**	**3.2900e-003**	**0.0832**	**4.0500e-003**	**0.0872**	**0.0228**	**3.8600e-003**	**0.0267**	**0.0000**	**318.4221**	**318.4221**	**0.0135**	**0.0000**	**318.7604**

3.12 13. Mechanical work - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0136	0.4419	0.0947	1.3700e-003	0.0317	1.7100e-003	0.0334	8.7000e-003	1.6300e-003	0.0103	0.0000	132.8804	132.8804	5.7200e-003	0.0000	133.0233
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9400e-003	3.9100e-003	0.0387	1.4000e-004	0.0143	9.0000e-005	0.0143	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.2647	12.2647	2.8000e-004	0.0000	12.2717
Total	**0.0186**	**0.4458**	**0.1335**	**1.5100e-003**	**0.0459**	**1.8000e-003**	**0.0477**	**0.0125**	**1.7100e-003**	**0.0142**	**0.0000**	**145.1451**	**145.1451**	**6.0000e-003**	**0.0000**	**145.2949**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0136	0.4419	0.0947	1.3700e-003	0.0317	1.7100e-003	0.0334	8.7000e-003	1.6300e-003	0.0103	0.0000	132.8804	132.8804	5.7200e-003	0.0000	133.0233
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9400e-003	3.9100e-003	0.0387	1.4000e-004	0.0143	9.0000e-005	0.0143	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.2647	12.2647	2.8000e-004	0.0000	12.2717
Total	**0.0186**	**0.4458**	**0.1335**	**1.5100e-003**	**0.0459**	**1.8000e-003**	**0.0477**	**0.0125**	**1.7100e-003**	**0.0142**	**0.0000**	**145.1451**	**145.1451**	**6.0000e-003**	**0.0000**	**145.2949**

3.13 12. Backfill - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0178	0.1777	0.1924	4.4000e-004		7.6600e-003	7.6600e-003		7.0500e-003	7.0500e-003	0.0000	38.3864	38.3864	0.0124	0.0000	38.6968

Total	**0.0178**	**0.1777**	**0.1924**	**4.4000e-004**	**0.0000**	**7.6600e-003**	**7.6600e-003**	**0.0000**	**7.0500e-003**	**7.0500e-003**	**0.0000**	**38.3864**	**38.3864**	**0.0124**	**0.0000**	**38.6968**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0218	0.7070	0.1516	2.1900e-003	0.0506	2.7300e-003	0.0534	0.0139	2.6100e-003	0.0165	0.0000	212.6086	212.6086	9.1500e-003	0.0000	212.8373
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2700e-003	2.5800e-003	0.0256	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	5.0000e-005	2.5600e-003	0.0000	8.1136	8.1136	1.8000e-004	0.0000	8.1182
Total	**0.0251**	**0.7096**	**0.1772**	**2.2800e-003**	**0.0601**	**2.7900e-003**	**0.0629**	**0.0164**	**2.6600e-003**	**0.0191**	**0.0000**	**220.7222**	**220.7222**	**9.3300e-003**	**0.0000**	**220.9554**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0178	0.1777	0.1924	4.4000e-004		7.6600e-003	7.6600e-003		7.0500e-003	7.0500e-003	0.0000	38.3864	38.3864	0.0124	0.0000	38.6968
Total	**0.0178**	**0.1777**	**0.1924**	**4.4000e-004**	**0.0000**	**7.6600e-003**	**7.6600e-003**	**0.0000**	**7.0500e-003**	**7.0500e-003**	**0.0000**	**38.3864**	**38.3864**	**0.0124**	**0.0000**	**38.6968**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0218	0.7070	0.1516	2.1900e-003	0.0506	2.7300e-003	0.0534	0.0139	2.6100e-003	0.0165	0.0000	212.6086	212.6086	9.1500e-003	0.0000	212.8373
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	3.2700e-003	2.5800e-003	0.0256	9.0000e-005	9.4300e-003	6.0000e-005	9.4900e-003	2.5100e-003	5.0000e-005	2.5600e-003	0.0000	8.1136	8.1136	1.8000e-004	0.0000	8.1182
Total	**0.0251**	**0.7096**	**0.1772**	**2.2800e-003**	**0.0601**	**2.7900e-003**	**0.0629**	**0.0164**	**2.6600e-003**	**0.0191**	**0.0000**	**220.7222**	**220.7222**	**9.3300e-003**	**0.0000**	**220.9554**

3.14 14. Electrical work - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.0700e-003	0.2946	0.0632	9.1000e-004	0.0211	1.1400e-003	0.0222	5.8000e-003	1.0900e-003	6.8900e-003	0.0000	88.5869	88.5869	3.8100e-003	0.0000	88.6822
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0200e-003	3.9700e-003	0.0393	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	8.0000e-005	3.9300e-003	0.0000	12.4534	12.4534	2.8000e-004	0.0000	12.4605
Total	**0.0141**	**0.2986**	**0.1025**	**1.0500e-003**	**0.0356**	**1.2300e-003**	**0.0368**	**9.6500e-003**	**1.1700e-003**	**0.0108**	**0.0000**	**101.0404**	**101.0404**	**4.0900e-003**	**0.0000**	**101.1426**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.0700e-003	0.2946	0.0632	9.1000e-004	0.0211	1.1400e-003	0.0222	5.8000e-003	1.0900e-003	6.8900e-003	0.0000	88.5869	88.5869	3.8100e-003	0.0000	88.6822
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0200e-003	3.9700e-003	0.0393	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	8.0000e-005	3.9300e-003	0.0000	12.4534	12.4534	2.8000e-004	0.0000	12.4605
Total	**0.0141**	**0.2986**	**0.1025**	**1.0500e-003**	**0.0356**	**1.2300e-003**	**0.0368**	**9.6500e-003**	**1.1700e-003**	**0.0108**	**0.0000**	**101.0404**	**101.0404**	**4.0900e-003**	**0.0000**	**101.1426**

3.15 15. Re paving - 2020

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0255	0.2385	0.2347	3.7000e-004		0.0130	0.0130		0.0121	0.0121	0.0000	30.9967	30.9967	9.0300e-003	0.0000	31.2224
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0255**	**0.2385**	**0.2347**	**3.7000e-004**		**0.0130**	**0.0130**		**0.0121**	**0.0121**	**0.0000**	**30.9967**	**30.9967**	**9.0300e-003**	**0.0000**	**31.2224**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7200e-003	0.0884	0.0190	2.7000e-004	6.3300e-003	3.4000e-004	6.6700e-003	1.7400e-003	3.3000e-004	2.0700e-003	0.0000	26.5761	26.5761	1.1400e-003	0.0000	26.6047
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0200e-003	3.9700e-003	0.0393	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	8.0000e-005	3.9300e-003	0.0000	12.4534	12.4534	2.8000e-004	0.0000	12.4605
Total	**7.7400e-003**	**0.0923**	**0.0583**	**4.1000e-004**	**0.0208**	**4.3000e-004**	**0.0212**	**5.5900e-003**	**4.1000e-004**	**6.0000e-003**	**0.0000**	**39.0295**	**39.0295**	**1.4200e-003**	**0.0000**	**39.0651**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0255	0.2385	0.2347	3.7000e-004		0.0130	0.0130		0.0121	0.0121	0.0000	30.9966	30.9966	9.0300e-003	0.0000	31.2223
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0255**	**0.2385**	**0.2347**	**3.7000e-004**		**0.0130**	**0.0130**		**0.0121**	**0.0121**	**0.0000**	**30.9966**	**30.9966**	**9.0300e-003**	**0.0000**	**31.2223**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7200e-003	0.0884	0.0190	2.7000e-004	6.3300e-003	3.4000e-004	6.6700e-003	1.7400e-003	3.3000e-004	2.0700e-003	0.0000	26.5761	26.5761	1.1400e-003	0.0000	26.6047
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0200e-003	3.9700e-003	0.0393	1.4000e-004	0.0145	9.0000e-005	0.0146	3.8500e-003	8.0000e-005	3.9300e-003	0.0000	12.4534	12.4534	2.8000e-004	0.0000	12.4605
Total	**7.7400e-003**	**0.0923**	**0.0583**	**4.1000e-004**	**0.0208**	**4.3000e-004**	**0.0212**	**5.5900e-003**	**4.1000e-004**	**6.0000e-003**	**0.0000**	**39.0295**	**39.0295**	**1.4200e-003**	**0.0000**	**39.0651**

3.16 9. Concrete bottom Slab - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0266	0.2473	0.2322	4.1000e-004		0.0130	0.0130		0.0127	0.0127	0.0000	35.5058	35.5058	4.5700e-003	0.0000	35.6200
Total	**0.0266**	**0.2473**	**0.2322**	**4.1000e-004**		**0.0130**	**0.0130**		**0.0127**	**0.0127**	**0.0000**	**35.5058**	**35.5058**	**4.5700e-003**	**0.0000**	**35.6200**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0382	1.2402	0.2659	3.8400e-003	0.0888	4.7900e-003	0.0936	0.0244	4.5800e-003	0.0290	0.0000	372.9509	372.9509	0.0160	0.0000	373.3520
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9400e-003	3.9100e-003	0.0387	1.4000e-004	0.0143	9.0000e-005	0.0143	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.2647	12.2647	2.8000e-004	0.0000	12.2717
Total	**0.0431**	**1.2441**	**0.3046**	**3.9800e-003**	**0.1031**	**4.8800e-003**	**0.1080**	**0.0282**	**4.6600e-003**	**0.0329**	**0.0000**	**385.2157**	**385.2157**	**0.0163**	**0.0000**	**385.6237**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0266	0.2473	0.2322	4.1000e-004		0.0130	0.0130		0.0127	0.0127	0.0000	35.5058	35.5058	4.5700e-003	0.0000	35.6199
Total	**0.0266**	**0.2473**	**0.2322**	**4.1000e-004**		**0.0130**	**0.0130**		**0.0127**	**0.0127**	**0.0000**	**35.5058**	**35.5058**	**4.5700e-003**	**0.0000**	**35.6199**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0382	1.2402	0.2659	3.8400e-003	0.0888	4.7900e-003	0.0936	0.0244	4.5800e-003	0.0290	0.0000	372.9509	372.9509	0.0160	0.0000	373.3520
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.9400e-003	3.9100e-003	0.0387	1.4000e-004	0.0143	9.0000e-005	0.0143	3.7900e-003	8.0000e-005	3.8700e-003	0.0000	12.2647	12.2647	2.8000e-004	0.0000	12.2717
Total	**0.0431**	**1.2441**	**0.3046**	**3.9800e-003**	**0.1031**	**4.8800e-003**	**0.1080**	**0.0282**	**4.6600e-003**	**0.0329**	**0.0000**	**385.2157**	**385.2157**	**0.0163**	**0.0000**	**385.6237**

3.17 16. Demobilization - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.4600e-003	0.1397	0.0323	4.7000e-004	0.0110	5.2000e-004	0.0115	3.0200e-003	5.0000e-004	3.5200e-003	0.0000	45.4647	45.4647	1.9600e-003	0.0000	45.5136
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4800e-003	1.1300e-003	0.0115	4.0000e-005	4.6100e-003	3.0000e-005	4.6300e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	3.8231	3.8231	8.0000e-005	0.0000	3.8251
Total	**5.9400e-003**	**0.1409**	**0.0438**	**5.1000e-004**	**0.0156**	**5.5000e-004**	**0.0161**	**4.2400e-003**	**5.3000e-004**	**4.7700e-003**	**0.0000**	**49.2878**	**49.2878**	**2.0400e-003**	**0.0000**	**49.3388**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.4600e-003	0.1397	0.0323	4.7000e-004	0.0110	5.2000e-004	0.0115	3.0200e-003	5.0000e-004	3.5200e-003	0.0000	45.4647	45.4647	1.9600e-003	0.0000	45.5136
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4800e-003	1.1300e-003	0.0115	4.0000e-005	4.6100e-003	3.0000e-005	4.6300e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	3.8231	3.8231	8.0000e-005	0.0000	3.8251
Total	**5.9400e-003**	**0.1409**	**0.0438**	**5.1000e-004**	**0.0156**	**5.5000e-004**	**0.0161**	**4.2400e-003**	**5.3000e-004**	**4.7700e-003**	**0.0000**	**49.2878**	**49.2878**	**2.0400e-003**	**0.0000**	**49.3388**

Appendix B
Species Database Search Results and Potential to Occur

Scientific Name	Common Name	Status*				Habitat	Potential for Occurrence
		Federal	State	CDFW	CNPS		
Plants							
Acanthomintha duttonii	San Mateo thorn-mint	E	E	-	1B.1	Chaparral, valley and foothill grassland, coastal scrub. Serpentine soils.	No suitable habitat is present.
Allium peninsulare var. *franciscanum*	Franciscan onion	-	-	-	1B.2	Cismontane woodland, valley and foothill grassland. Clay soils; often on serpentine. Dry hillsides.	No suitable habitat is present.
Amsinckia lunaris	Bent-flowered fiddleneck	-	-	-	1B.2	Cismontane woodland, valley, and foothill grassland.	No suitable habitat is present.
Androsace elongata ssp. *acuta*	California androsace	-	-	-	4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, and valley and foothill grassland.	No suitable habitat is present.
Arabis blepharophylla	Coast rockcress	-	-	-	4.3	Rocky, broad-leafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub.	No suitable habitat is present.
Arctostaphylos andersonii	Anderson's manzanita	-	-	-	1B.2	Broadleaved upland forest, chaparral, North Coast coniferous forest. Open sites, redwood forest.	No suitable habitat is present.
Arctostaphylos franciscana	Franciscan manzanita	-	-	-	1B.1	Serpentine outcrops in chaparral.	No suitable habitat is present.
Arctostaphylos imbricata	San Bruno Mountain manzanita	-	E	-	1B.1	Chaparral, coastal scrub.	No suitable habitat is present.
Arctostaphylos montana ssp. ravenii	Presidio manzanita	E	E	-	1B.1	Chaparral, coastal prairie, coastal scrub.	No suitable habitat is present.
Arctostaphylos montaraensis	Montara Manzanita	-	-	-	1B.2	Chaparral, coastal scrub.	No suitable habitat is present.
Arctostaphylos pacifica	Pacific manzanita	-	E	-	1B.2	Coastal scrub.	No suitable habitat is present.
Arctostaphylos regismontana	Kings Mountain manzanita	-	-	-	1B.2	Broadleaved upland forest, chaparral, North Coast coniferous forest. Granitic or sandstone outcrops.	No suitable habitat is present.
Astragalus nuttallii var. *nuttallii*	Ocean bluff milk-vetch	-	-	-	4.2	Coastal bluff scrub, coastal dunes.	No suitable habitat is present.
Astragalus pycnostachyus var. *pycnostachyus*	Coastal marsh milk-vetch	-	-	-	1B.2	Coastal dunes, coastal salt marshes.	No suitable habitat is present.
Astragalus tener var. *tener*	Alkali milk-vetch	-	-	-	1B.2	Alkali playa, valley and foothill grassland, vernal pools. Low ground, alkali flats, and flooded lands. In annual grassland or in playas or vernal pools.	No suitable habitat is present.
Calandrinia breweri	Brewer's calandrinia	-	-	-	4.2	Sandy or loamy disturbed sites and burns. Chaparral or coastal scrub.	No suitable habitat is present.
Calochortus umbellatus	Oakland star-tulip	-	-	-	4.2	Often serpentinite. Broad-leafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, and valley and foothill grassland.	No suitable habitat is present.
Castilleja ambigua var. *ambigua*	Johnny-nip	-	-	-	4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, and vernal pools margins.	No suitable habitat is present.
Centromadia parryi ssp. *congdonii*	Congdon's tarplant	-	-	-	1B.2	Valley and foothill grassland. Alkaline soils, sometimes described as heavy white clay.	No suitable habitat is present.
Centromadia parryi ssp. *Parryi*	Pappose tarplant	-	-	-	1B.2	Coastal prairie, meadows and seeps, coastal salt marsh, valley and foothill grassland. Vernally mesic, often alkaline sites.	No suitable habitat is present.
Chloropyron maritimum ssp. *palustre*	Point Reyes salty bird's-beak	-	-	-	1B.2	Coastal salt marsh.	No suitable habitat is present. Possibly extirpated from area.
Chorizanthe cuspidata var. *cuspidata*	San Francisco Bay spineflower	-	-	-	1B.2	Coastal bluff scrub, coastal dunes, coastal prairie, coastal scrub. Closely related to C. pungens. Sandy soil on terraces and slopes.	No suitable habitat is present.
Chorizanthe robusta var. *robusta*	Robust spineflower	E	-	-	1B.1	Cismontane woodland, coastal dunes, coastal scrub. Sandy terraces and bluffs or in loose sand.	No suitable habitat is present.
Cirsium andrewsii	Franciscan thistle	-	-	-	1B.2	Coastal bluff scrub, broadleaved upland forest, coastal scrub.	No suitable habitat is present.
Cirsium fontinale var. *fontinale*	Crystal Springs fountain thistle	E	E	-	1B.1	Valley and foothill grassland, chaparral. Serpentine seeps and grassland	No suitable habitat is present.
Cirsium occidentale var. *compactum*	Compact cobwebby thistle	-	-	-	1B.2	Chaparral, coastal dunes, coastal prairie, coastal scrub.	No suitable habitat is present.

Scientific Name	Common Name	Status*				Habitat	Potential for Occurrence
		Federal	State	CDFW	CNPS		
Cirsium praeteriens	Lost thistle	-	-	-	1A	Little information exists on this plant; it was collected from the Palo Alto area at the turn of the 20th century.	Species is considered extinct in California.
Collinsia corymbosa	Round-headed Chinese-houses	-	-	-	1B.2	Coastal dunes.	No suitable habitat is present.
Collinsia multicolor	San Francisco collinsia	-	-	-	1B.2	Closed-cone coniferous forest, coastal scrub. On decomposed shale (mudstone) mixed with humus.	No suitable habitat is present.
Cypripedium fasciculatum	Clustered lady's-slipper	-	-	-	4.2	Typically, serpentinite seeps and streambanks. Lower montane coniferous forest and North Coast coniferous forest.	No suitable habitat is present.
Dirca occidentalis	Western leatherwood	-	-	-	1B.2	Broad-leafed upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, North Coast coniferous forest, riparian forest, riparian woodland.	No suitable habitat is present.
Elymus californicus	California bottle-brush grass	-	-	-	4.3	Broad-leafed upland forest, cismontane woodland, North Coast coniferous forest, and riparian woodland.	No suitable habitat is present.
Equisetum palustre	Marsh horsetail	-	-	-	3	Marshes and swamps.	No suitable habitat is present.
Eriophyllum latilobum	San Mateo woolly sunflower	E	E	-	1B.1	Cismontane woodland. Often on road cuts, found on and off serpentine.	No suitable habitat is present.
Eryngium aristulatum var. *hooveri*	Hoover's button-celery	-	-	-	1B.1	Vernal pools. Alkaline depressions, vernal pools, roadside ditches, and other wet places near the coast.	No suitable habitat is present. Species considered possibly extirpated from the area.
Eryngium jepsonii	Jepson's coyote thistle				1B.2	Often in clay soils. Valley and foothill grassland and vernal pools.	No suitable habitat is present.
Erysimum franciscanum	San Francisco wallflower	-	-	-	4.2	Often serpentinite or granitic, sometimes roadsides. Chaparral, coastal dunes, coastal scrub, and valley and foothill grassland.	No suitable habitat is present.
Fritillaria biflora var. *ineziana*	Hillsborough chocolate lily	-	-	-	1B.1	Cismontane woodland, valley and foothill grassland. Mostly on serpentine.	No suitable habitat is present.
Fritillaria lanceolata var. *tristulis*	Marin checker lily	-	-	-	1B.1	Coastal bluff scrub, coastal prairie, coastal scrub.	No suitable habitat is present.
Fritillaria liliacea	Fragrant fritillary	-	-	-	1B.2	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine; various soils reported though usually clay, in grassland.	No suitable habitat is present.
Gilia capitata ssp. *chamissonis*	Blue coast gilia	-	-	-	1B.1	Coastal dunes, coastal scrub.	No suitable habitat is present.
Gilia millefoliata	Dark-eyed gilia	-	-	-	1B.2	Coastal dunes.	No suitable habitat is present.
Grindelia hirsutula var. *maritima*	San Francisco gumplant	-	-	-	3.2	Sandy or serpentinite soils. Coastal bluff scrub, coastal scrub, and valley and foothill grassland.	No suitable habitat is present.
Helianthella castanea	Diablo helianthella	-	-	-	1B.2	Broadleaved upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually in chaparral/oak woodland interface in rocky azonal soils. Often in partial shade.	No suitable habitat is present.
Hemizonia congesta ssp. *congesta*	White seaside tarplant	-	-	-	1B.2	Coastal scrub, valley and foothill grassland. Grassy valleys and hills; often in fallow fields	No suitable habitat is present.
Hesperevax sparsiflora var. *brevifolia*	Short-leaved evax	-	-	-	1B.2	Coastal bluff scrub, coastal dunes.	No suitable habitat is present.
Hesperolinon congestum	Marin western flax	T	T	-	1B.1	Chaparral, valley and foothill grassland.	No suitable habitat is present.
Heteranthera dubia	Water star-grass	-	-	-	2B.2	Requires a pH of 7 or higher, usually in slightly eutrophic waters. Marshes and swamps (alkaline, still or slow-moving water).	No suitable habitat is present.
Horkelia cuneata ssp. *sericea*	Kellogg's horkelia	-	-	-	1B.1	Closed-cone coniferous forest, coastal scrub, chaparral. Old dunes, coastal sandhills, openings.	No suitable habitat is present.
Horkelia marinensis	Point Reyes horkelia	-	-	-	1B.2	Coastal dunes, coastal prairie, coastal scrub. Sandy flats and dunes near coast; in grassland or scrub communities.	No suitable habitat is present.
Iris longipetala	Coast iris	-	-	-	4.2	Mesic, coastal prairie, lower montane coniferous forest, meadows and seeps.	No suitable habitat is present.
Lasthenia californica ssp. *macrantha*	Perennial goldfields	-	-	-	1B.2	Coastal bluff scrub, coastal dunes, and coastal scrub.	No suitable habitat is present.

Scientific Name	Common Name	Status* Federal	State	CDFW	CNPS	Habitat	Potential for Occurrence
Lasthenia conjugens	Contra Costa goldfields	E	-	-	1B.1	Valley and foothill grasslands, vernal pools, woodlands. Extirpated from most of its range. Vernal pools, swales, low depressions, in open grassy areas. Blooms March to June.	No suitable habitat is present.
Leptosiphon ambiguus	Serpentine leptosiphon	-	-	-	4B.2	Usually serpentinite soils. Cismontane woodland, coastal scrub, valley and foothill grassland.	No suitable habitat is present.
Leptosiphon rosaceus	Rose leptosiphon	-	-	-	1B.1	Coastal bluff scrub.	No suitable habitat is present.
Lessingia arachnoidea	Crystal Springs lessingia	-	-	-	1B.2	Coastal sage scrub, valley and foothill grassland, cismontane woodland. Grassy slopes on serpentine, sometimes on roadsides.	No suitable habitat is present.
Lessingia germanorum	San Francisco lessingia	E	E	-	1B.1	Coastal scrub.	No suitable habitat is present.
Lessingia hololeuca	Woolly-headed lessingia	-	-	-	3	Typically, clay and serpentinite soils. Broad-leafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland.	No suitable habitat is present.
Lilium maritimum	Coast lily	-	-	-	1B.1	Sometimes roadside, broad-leafed upland forest, closed-cone coniferous forest, coastal prairie, coastal scrub, marshes and swamps (freshwater), North Coast coniferous forest.	No suitable habitat is present. This species is presumed extirpated south of Sonoma County.
Limnanthes douglasii ssp. *ornduffii*	Ornduff's meadowfoam	-	-	-	1B.1	Agricultural fields, meadows, and seeps.	No suitable habitat is present.
Lupinus arboreus var. *eximius*	San Mateo tree lupine	-	-	-	3.2	Chaparral and coastal scrub.	No suitable habitat is present.
Malacothamnus aboriginum	Indian Valley bush-mallow	-	-	-	1B.2	Cismontane woodland, chaparral, Granitic outcrops and sandy bare soil, often in disturbed soils.	No suitable habitat is present.
Malacothamnus arcuatus	Arcuate bush-mallow	-	-	-	1B.2	Chaparral. Gravelly alluvium.	No suitable habitat is present.
Malacothamnus davidsonii	Davidson's bush-mallow	-	-	-	1B.2	Coastal scrub, riparian woodland, chaparral. Sandy washes.	No suitable habitat is present.
Malacothamnus hallii	Hall's bush-mallow	-	-	-	1B.2	Chaparral. Some populations on serpentine.	No suitable habitat is present.
Micropus amphibolus	Mt. Diablo cottonweed				3.2	Typically, in rocky terrain in broad-leafed upland forest, chaparral, cismontane woodland, and valley and foothill grassland.	No suitable habitat is present.
Monardella sinuata ssp. *nigrescens*	Northern curly-leaved monardella	-	-	-	1B.2	Sandy, chaparral (SCR Co.), coastal dunes, coastal scrub, lower montane coniferous forest (SCR Co., ponderosa pine sandhills)	No suitable habitat is present.
Monolopia gracilens	Woodland woollythreads	-	-	-	1B.2	Chaparral, valley and foothill grasslands (serpentine), cismontane woodland, broad-leafed upland forests, North Coast coniferous forest; on grassy sites, sandy to rocky substrates.	No suitable habitat is present.
Navarretia myersii ssp. *myersii*	Pincushion navarretia	-	-	-	1B.1	Vernal pools. Clay soils within non-native grassland.	No suitable habitat is present.
Pedicularis dudleyi	Dudley's lousewort	-	R	-	1B.2	Chaparral, North Coast coniferous forest, valley and foothill grassland. Deep shady woods of older coast redwood forests; also in maritime chaparral.	No suitable habitat is present.
Pentachaeta bellidiflora	White-rayed pentachaeta	E	E	-	1B.1	Valley and foothill grassland.	No suitable habitat is present.
Plagiobothrys chorisianus var. *chorisianus*	Choris' popcorn-flower	-	-	-	1B.2	Chaparral, coastal scrub, coastal prairie. Mesic sites.	No suitable habitat is present.
Polemonium carneum	Oregon polemonium	-	-	-	2.2	Coastal prairie, coastal scrub, lower montane coniferous forest.	No suitable habitat is present.
Potentilla hickmanii	Hickman's cinquefoil	E	E	-	1B.1	Coastal bluff scrub, closed-cone coniferous forest, meadows and seeps (vernally mesic), marshes and swamps (freshwater).	No suitable habitat is present.
Ranunculus lobbii	Lobb's aquatic buttercup	-	-	-	4.2	Mesic habitats in cismontane woodland, North Coast coniferous forest, valley and foothill grassland, and vernal pools.	No suitable habitat is present.
Senecio aphanactis	Chaparral ragwort	-	-	-	2B.2	Chaparral, cismontane woodland, coastal scrub; sometimes alkaline.	No suitable habitat is present.
Silene scouleri ssp. *scouleri*	Scouler's catchfly	-	-	-	2B.2	Coastal bluff scrub, coastal prairie, and valley and foothill grassland.	No suitable habitat is present.
Silene verecunda ssp. *verecunda*	San Francisco campion	-	-	-	1B.2	Sandy, coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. Often found on mudstone, shale, or rocky outcrops.	No suitable habitat is present.
Streptanthus albidus ssp. *peramoenus*	Most beautiful jewel-flower	E	-	-	1B.2	Valley and foothill grassland. Serpentine outcrops on ridges and slopes	No suitable habitat is present.

Scientific Name	Common Name	Status* Federal	Status* State	Status* CDFW	Status* CNPS	Habitat	Potential for Occurrence
Stuckenia filiformis ssp. *alpina*	Slender-leaved pondweed	-	-	-	2.2	Marshes and swamps. Shallow, clear water of lakes and drainage channels.	No suitable habitat is present. Extirpated from the area. Nearest known occurrence is 20 miles southwest of site from in the Franklin Point quadrangle.
Suaeda californica	California seablite	E	-	-	1B.1	Marshes and swamps. Margins of coastal salt marshes.	No suitable habitat is present. Extirpated from the area. Most recent occurrences within the vicinity were wetland enhancement projects; in 2008 near Robert's Landing, 10.3 miles northeast of the site and at Pier 94 in 2009, 11.9 miles north of the site.
Trifolium amoenum	Showy rancheria clover	E	-	-	1B.1	Valley and foothill grasslands, coastal bluff scrub. Sometimes on serpentine soil, open sunny sites, swales. Most recently sighted on roadside and eroding cliff face.	No suitable habitat is present. Only occurrence found in the vicinity occurred in 1907 near Coloma, approximately 11.9 miles northwest of the site.
Trifolium hydrophilum	Saline clover	-	-	-	1B.2	Occurs in marshes and swamps, vernal pools, and valley and foothill grassland. Mesic, alkaline sites.	No suitable habitat is present. Only occurrence found in the vicinity was a collection from 1886 near Belmont Slough, 3.2 miles southwest of the site.
Triphysaria floribunda	San Francisco owl's-clover	-	-	-	1B.2	Coastal prairie, valley, and foothill grassland.	No suitable habitat is present. Extirpated from the area.
Triquetrella californica	Coastal triquetrella	-	-	-	1B.2	Coastal bluff scrub, coastal scrub valley, and foothill grasslands.	No suitable habitat is present.
Tropidocarpum capparideum	Caper-fruited tropidocarpum	-	-	-	1B.1	Valley and foothill grassland. Alkaline Clay.	No suitable habitat is present.
Usnea longissima	Methuselah's beard lichen	-	-	-	4.2	On tree branches; usually on old growth hardwoods and conifers. Broad-leafed upland forest and North Coast coniferous forest.	No suitable habitat is present.
Invertebrates							
Callophrys mossii bayensis	San Bruno elfin butterfly	E	-	-	-	Coastal, mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on steep, north-facing slopes within the fog belt. Larval host plant is Sedium spathulifolium.	No suitable habitat is present.
Euphydryas editha bayensis	Bay checkerspot butterfly	T	-	-	-	Native grasslands on outcrops of serpentine soil. Plantago erecta is the primary host plant; Orthocarpus densiflorus and Orthocarpus purpurscens are the secondary host plants.	No suitable habitat is present.
Plebejus icarioides missionensis	Mission blue butterfly	E	-	-	-	Inhabits grasslands of the San Francisco Peninsula. Distribution is limited by larval host lupine plants.	No suitable habitat is present.
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	E	-	-	-	Restricted to the foggy, coastal dunes/hills of the Point Reyes peninsula; extirpated from coastal San Mateo County.	No suitable habitat is present. Extirpated from coastal San Mateo County.
Fish							
Acipenser medirostris	Green sturgeon	T	-	SSC	-	The green sturgeon is an anadromous fish that spawns in large rivers. In California, green sturgeon spawn primarily in the Klamath and Trinity rivers, but a small number is known to spawn in the Sacramento River. Most spawning in the Sacramento River occurs above Hamilton City, and may range as far north as Keswick Dam. Spawning in the Sacramento River occurs between March and July, when water temperatures are 8° to 14° C. Spawning occurs in deep (greater than 3 meters) water with a swift current. Preferred spawning substrate is large cobble but may include clean sand to bedrock.	No suitable habitat is present. Borel Creek is typically shallow and subject to low flows, resulting in low dissolved oxygen and warmer water temperatures—both of which are unsuitable habitat for the species. Additionally, water level control and pump structures, including the Marina Lagoon Pump Station and a water control structure on/near the O'Neil Slough/Bay Trail, downstream of the Project site, present fish passage barriers and prevent the creek from being tidally influenced.
Hypomesus transpacificus	Delta smelt	T	-	-	-	Delta smelt primarily inhabit the brackish waters of Sacramento-San Joaquin River Delta. Most spawning occurs in backwater sloughs and channel edgewaters.	No suitable habitat is present.
Oncorhynchus mykiss irideus	Steelhead - central California coast DPS	T	-	SSC	-	From Russian River, south to Soquel Creek and to, but excluding, Pajaro River. Also San Francisco and San Pablo Bay basins.	No suitable habitat is present. Borel Creek is typically shallow and subject to low flows, resulting in low dissolved oxygen and warmer water temperatures—both of which are unsuitable habitat for the species. Additionally, water level control and pump structures, including the Marina Lagoon Pump Station and a water control structure on/near the O'Neil Slough/Bay Trail, exist downstream of

Scientific Name	Common Name	Status* Federal	State	CDFW	CNPS	Habitat	Potential for Occurrence
							the Project site, present fish passage barriers and would prevent steelhead from accessing the Project area.
Spirinchus thaleichthys	Longfin smelt	C	T	SSC	-	Euryhaline, nektonic, and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15-30 ppt but can be found in completely freshwater to almost pure seawater.	No suitable habitat is present.
Amphibians/Reptiles							
Chelonia mydas	Green sea turtle	T	-	-	-	Generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The turtles are attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting. Strong nesting site fidelity and often make long-distance migrations between feeding grounds and nesting beaches. Hatchlings have been observed to seek refuge and food in Sargassum rafts.	No suitable habitat is present.
Emys marmorata	Western pond turtle	-	-	SSC	-	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg laying.	No suitable habitat is present. Roads, walls, long culverted portions of the creek, and other infrastructure separate the site from potentially suitable habitat upstream of the site. In 2006, there were three observations of the species in Lower and Upper Crystal Springs Reservoir, roughly 3.5 miles southwest of the site. No suitable basking or breeding sites are present in Borel Creek and no individual or population of this species would persist in the creek.
Rana draytonii	California red-legged frog	T	-	SSC	-	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	No suitable breeding or refuge habitat present in or near the site. Developed areas of San Mateo to represent barriers to dispersal from potential breeding sites in the vicinity.
Thamnophis sirtalis tetrataenia	San Francisco garter snake	E	E	CFP	-	Vicinity of freshwater marshes, ponds and slow-moving streams in San Mateo County and extreme northern Santa Cruz County.	No breeding habitat present in or near the site. Developed areas of San Mateo to represent barriers to dispersal from potential breeding sites in the vicinity.
Birds							
Asio flammeus	Short-eared owl	-	-	SSC	-	Found in swamp lands, both fresh and salt; lowland meadows; grasslands, irrigated alfalfa fields.	No suitable habitat is present.
Athene cunicularia	Burrowing owl	-	-	SSC	-	Open, dry annual or perennial grasslands with low-growing vegetation and on the margins of disturbed/developed habitats. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	No suitable habitat is present.
Brachyramphus marmoratus	Marbled murrelet	T	E	-	-	Majority of their lives on the ocean but come inland to nest. Generally, nest in old-growth forests, characterized by large trees, multiple canopy layers, and moderate to high canopy closure. In California, nests are typically found in coastal redwood and Douglas-fir forests. These forests are located close enough to the marine environment for the birds to fly to and from nest sites.	No suitable habitat is present.
Charadrius alexandrinus nivosus	Western snowy plover	T	-	SSC	-	Sandy beaches, salt pond levees, and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	No suitable habitat is present.
Circus hudsonius	Northern harrier	-	-	SSC	-	Coastal salt and freshwater marshes, nesting and foraging habitats in grasslands, and agricultural fields	No suitable habitat is present.
Coturnicops noveboracensis	Yellow rail	-	-	SSC	-	Extensive wet sedge meadows, scrub-shrub wetlands, and sand ridges with young to mature woody growth.	No suitable habitat is present.
Elanus leucurus	White-tailed kite	-	-	SSC	-	Found in savanna, open woodlands, marshes, desert grassland, partially cleared lands, and cultivated fields. Generally, avoids areas with extensive winter freezes, but rainfall and humidity vary greatly throughout this bird's range.	No suitable habitat is present.
Falco peregrinus anatum	American peregrine falcon	D	D	CFP	-	Near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.	Low potential to occur near structures or foraging in open areas within the Project vicinity.

Scientific Name	Common Name	Status*				Habitat	Potential for Occurrence
		Federal	State	CDFW	CNPS		
Geothlypis trichas sinuosa	Saltmarsh common yellowthroat	-	-	SSC	-	Found in woody swamp, brackish marsh, and freshwater marsh. Builds open-cup nests that are well concealed, typically near the ground in grasses, herbaceous vegetation (poison hemlock, cattails, tules), and some shrubs (e.g., coyote brush).	Marginal habitat is present in Borel Creek, but the creek generally lacks adequate emergent vegetation used by this species for nesting. The *sinuosa* subspecies is unlikely to occur near the Project site; may occur as an occasional forager during non-breeding periods.
Laterallus jamaicensis coturniculus	California black rail	-	T	CFP	-	Freshwater marshes, wet meadows, and shallow margins of saltwater marshes. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	No suitable habitat is present.
Melospiza melodia pusillula	Alameda song sparrow	-	-	SSC	-	Resident of salt marshes bordering south arm of San Francisco Bay. Inhabits Salicornia marshes; nests low in Grindelia bushes (high enough to escape high tides) and in Salicornia.	No suitable habitat is present.
Rallus longirostris obsoletus	Ridgway's rail (formerly California clapper rail)	E	E	CFP	-	Salt water and brackish marshes with tidal sloughs. Associated with abundant growths of pickleweed but feeds away from cover on invertebrates from mud-bottomed sloughs.	No suitable habitat is present.
Sternula antillarum browni	California least tern	E	E	CFP	-	Nests along the coast from San Francisco Bay south to northern Baja California, Mexico, on wide-open, bare, sparsely vegetated, flat substrates such as sand beaches, alkali flats, landfills, or paved areas.	No suitable habitat present.
Mammals							
Antrozous pallidus	Pallid bat	-	-	SSC	-	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	No suitable habitat is present.
Dipodomys venustus	Santa Cruz kangaroo rat	-	-	-	-	Silverleaf manzanita mixed chaparral in the Zayante Sand Hills ecosystem of the Santa Cruz mountains.	No suitable habitat is present.
Neotoma fuscipes annectens	San Francisco dusky-footed woodrat	-	-	SSC	-	Evergreen or live oaks and other thick-leaved trees and shrubs. Well known for their large terrestrial stick houses typically built against or straddling a log or exposed roots of a standing tree, and are often located in dense brush. Nests are also placed in the crotches and cavities of trees and in hollow logs.	No suitable habitat is present.
Reithrodontomys raviventris	Salt marsh harvest mouse	E	E	CFP	-	Only found in the saline emergent wetlands of San Francisco Bay and its estuaries. Pickleweed is primary habitat. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	No suitable habitat is present. This species is considered extirpated north of San Mateo bridge.
Sorex vagrans halicoetes	Salt marsh wandering shrew	-	-	SSC	-	Salt marshes of the south arm of San Francisco Bay.	No suitable habitat is present.

*Status:

Federal Designations:

(E) Federally Endangered, (T) Federally Threatened, (C) Candidate, (D) Delisted

State Designations:

(E) State Endangered, (T) State Threatened, (R) State Rare,

California Department of Fish and Wildlife (CDFW) Designations:

(SSC) Species of Special Concern, (CFP) Fully Protected Species

California Native Plant Society (CNPS) California Rare Plant Rank:

(1A) Presumed extinct in California; (1B) Rare, threatened, or endangered in California and elsewhere; (2) Rare, threatened, or endangered in California, but more common elsewhere; (3) More information is needed; (4) Limited distribution, watch list
Threat Rank:

- 0.1 Seriously threatened in California (more than 80% of occurrences threatened/high degree and immediacy of threat).
- 0.2 Fairly threatened in California (20 to 80% occurrences threatened/moderate degree and immediacy of threat).
- 0.3 Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat or no current threats known).

Appendix C
Geologic Unit Descriptions

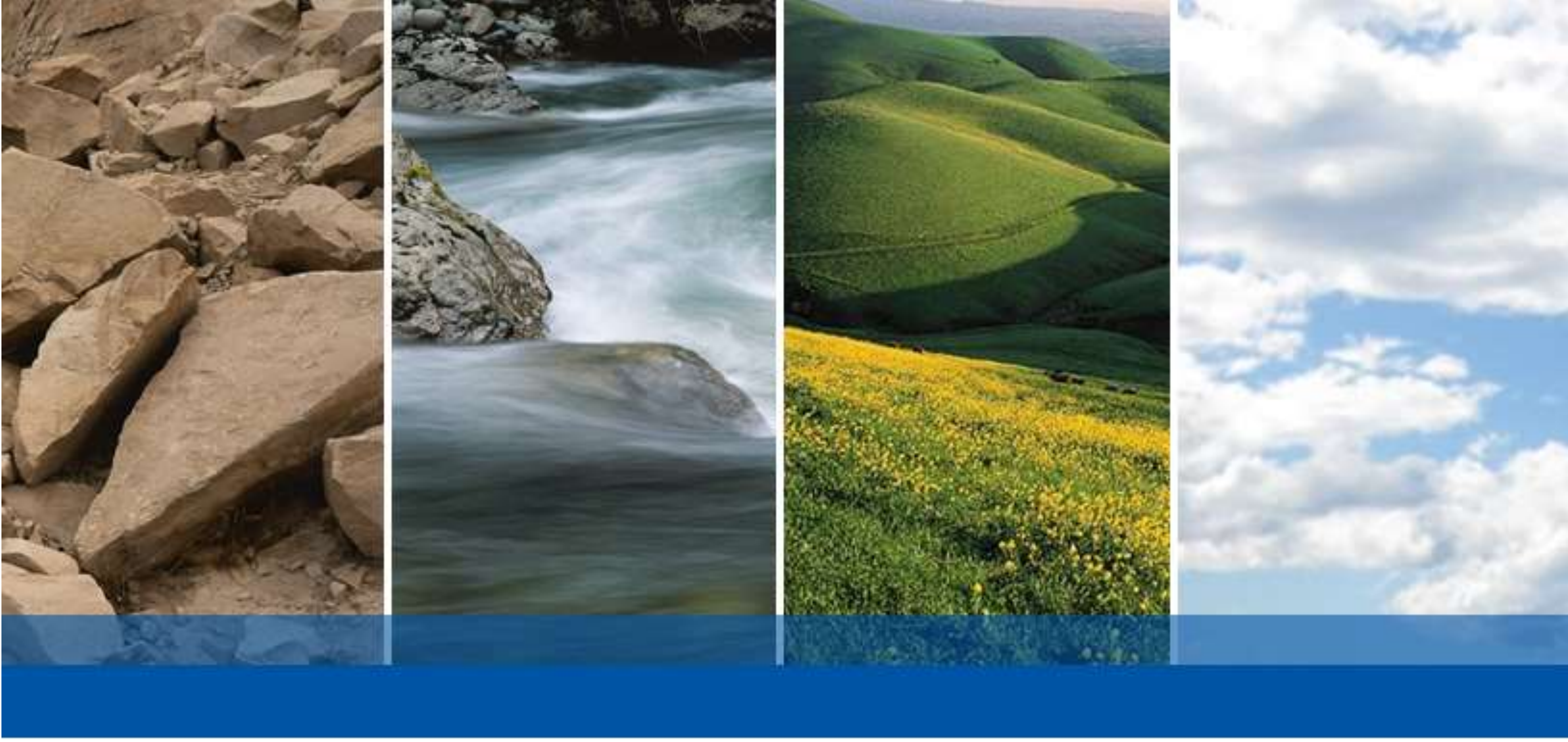
Appendix C. Geologic Unit Descriptions. Geologic descriptions are from E.E. Brabb et al. (1998). Seismic and soil interpretations are from City of San Mateo (2009).

Geologic Unit	Description	Seismically Induced Ground Shaking	Liquefaction	Ground Subsidence and Settlement	Erosion	Corresponding Soil Map Units
af	Artificial fill (Historic)--Loose to very well consolidated gravel, sand, silt, clay, rock fragments, organic matter, and man-made debris in various combinations. Thickness is variable and may exceed 30 m in places. Some is compacted and quite firm, but fill made before 1965 is nearly everywhere not compacted and consists simply of dumped materials	Very strong to extremely strong for 8.3 magnitude earthquake on San Andreas Fault	No hazard in engineered fills. Possible hazard in uncontrolled fill on Bay mud. Hazard somewhat greater in areas on or near filled tidal channels.	No hazard in properly engineered and constructed fills. Common hazard in poorly constructed or uncontrolled fills. Somewhat greater hazard in areas of filled tidal channels.	Slope protection generally required on fill slopes	134
alf	Artificial levee fill (Historic)--Man-made deposit of various materials and ages, forming artificial levees as much as 6.5 m high. Some are compacted and quite firm, but fills made before 1965 are almost everywhere not compacted and consist simply of dumped materials. The distribution of levee fill conforms to levees shown on the most recent U.S. Geological Survey 7.5-minute quadrangle maps	Very strong to extremely strong for 8.3 magnitude earthquake on San Andreas Fault	No hazard in engineered fills. Possible hazard in uncontrolled fill on Bay mud. Hazard somewhat greater in areas on or near filled tidal channels.	No hazard in properly engineered and constructed fills. Common hazard in poorly constructed or uncontrolled fills. Somewhat greater hazard in areas of filled tidal channels.	Slope protection generally required on fill slopes	134
Qhsc	Stream channel deposits (Holocene)--Poorly to well-sorted sand, silt, silty sand, or sandy gravel with minor cobbles. Cobbles are more common in the mountainous valleys. Many stream channels are presently lined with concrete or rip rap. Engineering works such as diversion dams, drop structures, energy dissipaters and percolation ponds also modify the original channel. Many stream channels have been straightened, and these are labeled Qhasc. This straightening is especially prevalent in the lower reaches of streams entering the estuary. The mapped distribution of stream channel deposits is controlled by the depiction of major creeks on the most recent U.S. Geological Survey 7.5-minute quadrangles. Only those deposits related to major creeks are mapped. In some places these deposits are under shallow water for some or all of the year, as a result of reservoir release and annual variation in rainfall.	Very strong to extremely strong for 8.5 magnitude earthquake on San Andreas Fault	Generally low	Unlikely	Generally low, but locally high along active stream channels; may rill in cuts	134
Qhbm	Bay mud (Holocene)-- Water-saturated estuarine mud, predominantly gray, green and blue clay and silty clay underlying marshlands and tidal mud flats of San Francisco Bay, Pescadero, and Pacifica. The upper surface is covered with cordgrass (Spartina sp.) and pickleweed (Salicornia sp.). The mud also contains a few lenses of well-sorted, fine sand and silt, a few shelly layers (oysters), and peat. The mud interfingers with and grades into fine-grained deposits at the distal edge of Holocene fans, and was deposited during the post-Wisconsin rise in sea-level, about 12 ka to present. Mud varies in thickness from zero, at landward edge, to as much as 40 m near north County line	Extremely strong for 8.5 magnitude earthquake on San Andreas	Generally moderate; locally high where shallow, clean sand beds exist	Likely where drained; differential settlement from compaction of loose or soft sediment possible under surcharge of fill.	Generally low.	134
Qhb	Basin deposits (Holocene)--Very fine silty clay to clay deposits occupying flat-floored basins at the distal edge of alluvial fans adjacent to the bay mud (Qhbm). Also contains unconsolidated, locally organic, plastic silt and silty clay deposited in very flat valley floors	Fair to good stability. Landslides along creek banks possible; unlikely on flat ground.	Generally low; potential liquefiable where shallow, well sorted silt or sand beds occur and are saturated.	Unlikely	Generally low, but locally high along active stream channels.	121, 131
Qhaf	Alluvial fan and fluvial deposits (Holocene)--Alluvial fan deposits are brown or tan, medium dense to dense, gravely sand or sandy gravel that generally grades upward to sandy or silty clay. Near the distal fan edges, the fluvial deposits are typically brown, never reddish, medium dense sand that fines upward to sandy or silty clay	Extremely strong for 8.5 magnitude earthquake on San Andreas	Generally low; potential liquefiable where shallow, well sorted silt or sand beds occur and are saturated.	Unlikely	Generally low, but locally high along active stream channels; may rill in cuts	132, 121
Qcl	Colluvium (Holocene)--Loose to firm, friable, unsorted sand, silt, clay, gravel, rock debris, and organic material in varying proportions	Very strong to extremely strong 8.5 magnitude earthquake on San Andreas	Generally low, but liquefiable when saturated	Unlikely unless seismically induced or loaded; will compact slowly over long periods of time if undisturbed.	Generally moderate; but locally severe gullying may occur in cuts.	
Qpaf	Alluvial fan and fluvial deposits (Pleistocene)--Brown dense gravelly and clayey sand or clayey gravel that fines upward to sandy clay. These deposits display variable sorting and are located along most stream channels in the county. All Qpaf deposits can be related to modern stream courses. They are distinguished from younger alluvial fans and fluvial deposits by higher topographic position, greater degree of dissection, and stronger soil profile development. They are less permeable than Holocene deposits, and locally contain fresh water mollusks and extinct late Pleistocene vertebrate fossils. They are overlain by Holocene deposits on lower parts of the alluvial plain, and incised by channels that are partly filled with Holocene alluvium on higher parts of the alluvial plain. Maximum thickness is unknown but at least 50 m.	Extremely strong for 8.5 magnitude on San Andreas; ground amplification possible during earthquake.	Generally low; potentially liquefiable where shallow, well sorted silt and sand beds occur.	Unlikely	Generally low.	
QTsc	Santa Clara Formation (lower Pleistocene and upper Pliocene)--Gray to red-brown poorly indurated conglomerate, sandstone, and mudstone in irregular and lenticular beds. Conglomerate consists mainly of subangular to subrounded cobbles in a sandy matrix but locally includes pebbles and boulders. Cobbles and pebbles are mainly chert, greenstone, and graywacke with some schist, serpentinite, and limestone. On Coal Mine Ridge, south of Portola Valley, conglomerate contains boulders of an older conglomerate as long as one meter. Gray to buff claystone and siltstone beds on Coal Mine Ridge contain carbonized wood fragments as large as 60 cm in diameter. Included in Santa Clara Formation are similar coarse-grained clastic deposits near Burlingame. Thickness of Santa Clara Formation is variable but reaches a maximum of about 500 m along Coal Mine Ridge	Strong to extremely strong for 8.3 magnitude earthquake on San Andreas	No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	
QTm	Merced Formation (lower Pleistocene and upper Pliocene)--Medium-gray to yellowish gray and yellowish orange, medium- to very fine-grained, poorly indurated to friable sandstone, siltstone, and claystone, with some conglomerate lenses and a few friable beds of white volcanic ash. In many places sandstone is silty, clayey, or conglomeratic. Some of the conglomerate, especially where fossiliferous, is well cemented. Volcanic ash is in beds as much as 2 m thick and consists largely of glass shards. In type section of Merced Formation, the ash was originally reported by Sarna-Wojcicki (1976) to be 1.5+0.8 m.y. old, but more recent work by Sarna-Wojcicki and others (1991) indicates that the formation contains both the 738+3 ka Bishop ash and the 435 ka Rockland ash (Sarna-Wojcicki, oral comm., 1997). Merced Formation is about 1525 m thick in the sea cliffs north of Mussel Rock	Strong to extremely strong for 8.3 magnitude earthquake on San Andreas	No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	
fs	Sandstone--Greenish-gray to buff, fine- to coarse-grained sandstone (graywacke), with interbedded siltstone and shale. Siltstone and shale interbeds constitute less than 20 percent of unit, but in places form sequences as much as several tens of meters thick. In many places, shearing has obscured bedding relations; rock in which shale has been sheared to gouge constitutes about 10 percent of unit. Gouge is concentrated in zones that are commonly less than 30 m wide but in places may be as much as 150 m wide. Total thickness of unit is unknown but is probably at least many hundreds of meters	Strong to extremely strong for 8.3 magnitude earthquake on San Andreas	No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	

Appendix C. Geologic Unit Descriptions. Geologic descriptions are from E.E. Brabb et al. (1998). Seismic and soil interpretations are from City of San Mateo (2009).

Geologic Unit	Description	Seismically Induced Ground Shaking	Liquefaction	Ground Subsidence and Settlement	Erosion	Corresponding Soil Map Units
fg	Greenstone--Dark-green to red altered basaltic rocks, including flows, pillow lavas, breccias, tuff breccias, tuffs, and minor related intrusive rocks, in unknown proportions. Unit includes some Franciscan chert and limestone bodies that are too small to show on map. Greenstone crops out in lenticular bodies varying in thickness from a few meters to many hundreds of meters		No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	
fc	Chert--White, green, red, and orange chert, in places interbedded with reddish-brown shale. Chert and shale commonly are rhythmically banded in thin layers, but chert also crops out in very thick layers. In San Carlos, chert has been altered along faults to tan- to buff-colored clay. Chert and shale crop out in lenticular bodies as much as 75 m thick; chert bodies are commonly associated with Franciscan greenstone.		No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	
fsr	Sheared rock (melange)--Predominantly graywacke, siltstone, and shale, substantial portions of which have been sheared, but includes hard blocks of all other Franciscan rock types. Total thickness of unit is unknown, but is probably at least several tens of meters		No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	
sp	Serpentinite		No hazard.	Unlikely	Generally low; locally moderate to where natural surface disturbed or removed, particularly where highly fractured or weathered.	

Appendix D
Basin 2 and 3 Collection System Improvements Underground Flow Equalization System and Diversion Sewers Geotechnical Interpretive Report



BASIN 2 AND 3 COLLECTION SYSTEM IMPROVEMENTS UNDERGROUND FLOW EQUALIZATION SYSTEM AND DIVERSION SEWERS

SAN MATEO, CALIFORNIA

GEOTECHNICAL INTERPRETIVE REPORT

SUBMITTED TO
City of San Mateo
℅ Margaret M. Regan
Stantec
2121 N. California Boulevard, Suite 600
Walnut Creek, CA 94596

PREPARED BY
ENGEO

May 21, 2018

PROJECT NO.
13231.000.001

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GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
13231.000.001

May 21, 2018

City of San Mateo
℅ Margaret M. Regan
Stantec
2121 N. California Boulevard, Suite 600
Walnut Creek, CA 94596

Subject: Basin 2 and 3 Collection System Improvements
Underground Flow Equalization System (UFES) and Diversion Sewers
San Mateo, California

GEOTECHNICAL INTERPRETIVE REPORT

Dear Ms. Regan:

With your authorization, we prepared this geotechnical interpretive report for the Underground Flow Equalization System (UFES) and Diversion Sewers of the Basin 2 and 3 Collection System Improvements in San Mateo, California. We submitted a draft geotechnical sampling data report the UFES and Diversion Sewers in March 2018. This report presents our conclusions and recommendations regarding the proposed storage tank facility and diversion sewers based on the data presented in the data report.

Based on our interpretation, the proposed UFES and Diversion Sewers are feasible from a geotechnical standpoint, provided the recommendations and design criteria presented in this report are incorporated into the project design plans and specification as well as implemented during construction.

We are pleased to have been of service to you on this project and are prepared to consult further with you and your design team as the project progresses.

Sincerely,

ENGEO Incorporated

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REVISION RECORD

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0	April 20, 2018	Original - DRAFT	All
1	May 21, 2018	Original – FINAL	All

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1.0 INTRODUCTION

1.1 AUTHORIZATION

We performed the geotechnical sampling services in general accordance with the scope of services outlined in Change Order 1 of Task Order T10509240-104975-OM dated July 10, 2017, and the applicable Geotechnical and Environmental Exploration Work Plan.

Based on directions from Stantec, ENGEO prepared this report for the Underground Flow Equalization System (UFES) and Diversion Sewers. A draft geotechnical data report was prepared in March 2018, presenting geotechnical sampling procedures and results. This geotechnical interpretive report was prepared in general accordance with the City of San Mateo Collection System Design Standard CSDS13 V2.

1.2 PURPOSE AND SCOPE

ENGEO prepared this geotechnical interpretive report to present our geotechnical recommendations for design and construction of the UFES and Diversion Sewers. The scope of services completed includes the following:

- Geotechnical data analysis.
- Interpretation of geotechnical data.
- Report preparation summarizing our conclusions and recommendations.

This interpretive report was prepared for the exclusive use of the City of San Mateo and their consultants for design of this project. In the event that any changes are made in the character, design or layout of the project, the City of San Mateo or ENGEO must be contacted to review the conclusions and recommendations contained in this interpretive report to evaluate whether modifications are recommended.

1.3 PROJECT LOCATION

The project site for the UFES and Diversion Sewers is situated within the eastern trailer parking lot for the San Mateo County Event (Expo) Center. The Diversion Sewer Branches 1 to 3, which will be connected to the UFES, are situated within the Expo Center and in public roadways including Saratoga Drive and S. Delaware Street located in San Mateo, California.

Table 1.3-1 identifies the UFES (storage tank) and diversion sewer branch segments included in this interpretive report. The SST-14 Glendora and Shasta Relief segment, SST-3 Delaware Street Relief segment, and the remaining Conveyance Pipelines and Pump Stations are included under separate reports.

TABLE 1.3-1: Summary of UFES and Diversion Sewers

PROJECT ID	PROJECT LOCATION
UFES	San Mateo County Event Center (Expo), East Trailer Parking Lot
Diversion Sewer Branch 1	Saratoga Drive and S. Delaware Street
Diversion Sewer Branch 2	S. Delaware Street and San Mateo County Event Center
Diversion Sewer Branch 3	S. Delaware Street

1.4 PROJECT DESCRIPTION

According to the San Mateo Basin 2 and 3 Collection System project plan sheets prepared by Stantec, the UFES is approximately 205 feet long by 145 feet wide, and is conceptually planned to be an underground storage tank extending approximately 50 to 60 feet below existing ground surface (bgs). The locations of the UFES and the Diversion Sewers vary in surface elevation from approximately 100 feet (SM+100)[1] in the north project area to approximately 110 feet (SM+100) in the south project area.

Three diversion sewer branches (Diversion Sewer Branches 1 to 3) are planned to connect the UFES (storage facility) to the existing collection system. The proposed diversion sewer branches include the installation of new pipelines up to 36 inches in diameter. The three proposed diversion sewer branches are approximately between 1,120 to 3,000 lineal feet for each branch segment. The diversion pipeline inverts are currently planned to extend approximately 10 to 24 feet bgs with a slope gradient that varies from roughly 0.2 to 2.5 percent toward the UFES.

2.0 SUMMARY OF GEOLOGIC SAMPLING DATA

2.1 GEOTECHNICAL SAMPLING SUMMARY

The geotechnical field exploration for the UFES and Diversion Sewers was performed from October 12 to November 19, 2017. An ENGEO representative observed the drilling and Cone Penetration Test (CPT) probe activities and logged the subsurface conditions at each location. A truck-mounted drill rig and crew were retained to advance the borings using mud rotary and hollow stem auger drilling methods. The borings were advanced to depths ranging from approximately 33½ to 151½ feet bgs. For the CPTs, a truck-mounted vehicle with crew were retained to advance the probes to depths ranging from approximately 91½ to 100¼ feet bgs. Vibrating wire piezometers (VWP) were installed at select geotechnical borings during the field exploration program to monitor the groundwater fluctuations near the installed locations (Table 2.2.2-2). One standpipe well was installed at boring 1-EXPO-TNK-B2 within the UFES site.

2.1.1 Diversion Sewers Subsurface Profile

Through a combination of exploratory boreholes and review of published geologic information (Pampeyan, 1994), the following subsurface conditions at the site were identified. The soil conditions along the Diversion Sewers are anticipated to include artificial fill (Qf_1), bay mud (Qm), course-grained alluvium (Qac), medium-grained alluvium (Qam), and fine-grained alluvium (Qaf).

Table 2.1.1-1 provided below, summarizes the geologic stratigraphy encountered within the Diversion Sewer exploration locations from the ground surface to the bottom of the exploration. A description of the geologic units is included within the UFES and Diversion Sewers geotechnical data report.

TABLE 2.1.1-1: Geologic Units Encountered During Field Exploration

PROJECT ID	GEOLOGIC UNIT (PAMPEYAN, 1994)
Diversion Sewer Branch 1	Qf_1, Qm, Qam, Qaf
Diversion Sewer Branch 2	Qf_1, Qm, Qac, Qam, Qaf
Diversion Sewer Branch 3	Qf_1, Qam

[1] Project Datum is noted as City of San Mateo Datum + 100 feet (SM+100) in this report.

Based on laboratory testing on select soil samples, the general engineering properties of the soil stratum tested are summarized below. No samples were retrieved for artificial fill, so no lab testing was performed. Additionally, one sample of coarse-grained alluvium was retrieved within Boring 1-EXPO-BR2-B2 at a depth of 35 feet; however, no lab testing was performed on the sample due to the proposed shallower depth of the pipeline alignment.

TABLE 2.1.1-2: Summary of Soil Properties along Diversion Sewers

TESTED PROPERTIES	ASTM	NUMBER OF TESTS	RANGE OF RESULTS
Bay Mud (Qm)			
Moisture Content	D2216	1	87%
Total Unit Weight	D7263	1	94.1 pcf
Sieve Analysis	D422	0	Not tested
Plastic and Liquid Limits	D4318	1	Plastic Limit: 39 Liquid Limit: 127 Plasticity Index: 88
Unconfined Compressive Strength	D7012	0	Not tested
Undrained Shear Strength (Vane Shear Test)	D4648	1	152 psf
Medium-Grained Alluvium (Qam)			
Moisture Content	D2216	28	13.5 to 24.6%
Total Unit Weight	D7263	27	104.5 to 122 pcf
Sieve Analysis	D422	10	Fines (Clay & Silts): 12 to 83%
Plastic and Liquid Limits	D4318	8	Plastic Limit: 21 to 51 Liquid Limit: 14 to 19 Plasticity Index: 5 to 32
Unconfined Compressive Strength	D7012	6	0.95 to 3.01 tsf
Undrained Shear Strength (Isotropic Unconsolidated Undrained Triaxial Test)	D2850	5	473.5 to 3482 psf
Undrained Shear Strength (Vane Shear Test)	D4648	1	966 psf
Fine-Grained Alluvium (Qaf)			
Moisture Content	D2216	1	20.1%
Total Unit Weight	D7263	1	106.4 pcf
Sieve Analysis	D422	1	Fines (Clay & Silts): 57%
Plastic and Liquid Limits	D4318	0	Not tested
Unconfined Compressive Strength	D7012	0	Not tested
Undrained Shear Strength	D2850, D4648	0	Not tested

The geologic units, associated thickness, and approximate geologic contacts are presented on the diversion pipeline profiles shown on Sheets 8 through 17.

2.1.2 UFES Subsurface Profile

Exploratory borings were drilled within the proposed tank site within the RV parking lot on the eastern side of the San Mateo Event Center. In general, the borings within the tank site encountered approximately 5 feet of artificial fill, which consisted of sandy clay and clayey sand. Beneath the artificial fill, approximately 1½ to 2 feet of Bay Mud was encountered. Underlying the Bay Mud, the borings encountered natural alluvial soil deposits consisting of medium stiff-to-stiff lean clays and sandy clays to a depth of approximately 35 feet bgs, followed by stiff to very stiff lean and fat clays to a depth of approximately 50 feet bgs. A layer of medium dense to very dense clayey sand, and very stiff to hard sandy to gravelly clay was encountered in each of the borings starting at about 50 feet bgs, and varied in thickness ranging from 15 to 26 feet. Below the more granular layer, hard lean and sandy clay was encountered to the maximum depth explored of 151½ feet. The CPT probes indicated similar subsurface profiles.

The UFES exploration locations and associated cross-sections are presented on Sheets 5 to 7 and the geotechnical laboratory test results are presented in Appendix G of the UFES and Diversion Sewers geotechnical sampling data report.

2.2 GROUNDWATER CONDITIONS

2.2.1 At Time of Drilling

The following table summarizes groundwater measurements taken when groundwater was encountered during hollow-stem auger drilling operations and CPT probe operations. For the mud-rotary boreholes drilled for the UFES (1-EXPO-TNK-B1 through B4), groundwater was not measured at the time of drilling due to the drilling method.

TABLE 2.2.1-1: Groundwater Level Encountered at Time of Drilling/Probing

BOREHOLE ID	APPROXIMATE DEPTH TO GROUNDWATER AT TIME OF DRILLING (feet)	INTERPRETED GROUNDWATER ELEVATION AT TIME OF DRILLING (feet, SM+100)
1-EXPO-BR1-B1	10.5	92.5
1-EXPO-BR1-B2	10	91
1-EXPO-BR1-B3	9	96
1-EXPO-BR1-B4	10	95
1-EXPO-BR2-B1	10	95
1-EXPO-BR2-B2	14	91
1-EXPO-BR2-B3	20	87
1-EXPO-BR3-B1	15	92
1-EXPO-BR3-B2	10	100
1-EXPO-TNK-CPT3	7.5	93.5

2.2.2 Post-Installation Groundwater Monitoring

In February 2018, data from the standpipe well installed at Boring 1-EXPO-TNK-B2, and from the vibrating wire piezometers installed at select borings within the UFES and Diversion sewers were obtained.

Table 2.2.2-1 presents groundwater measurements from the standpipe well and the interpreted groundwater measurements for select vibrating wire piezometers. The remaining data collected from the VWPs will be presented in a separate report.

TABLE 2.2.2-1: Groundwater measurements from standpipe well and vibrating wire piezometer (November 17, 2017 to February 27, 2018)

BOREHOLE ID	SENSOR DEPTH OR SCREENED DEPTH (feet, bgs)	RANGE OF GROUNDWATER DEPTH* (feet)	INTERPRETED RANGE OF GROUNDWATER ELEVATION (feet, SM+100)	AVERAGE TEMPERATURE AT SENSOR DEPTH (°C)
1-EXPO-BR1-B3	34	4.8 to 6.1	98.9 to 100.2	19.3
1-EXPO-BR2-B2	30	5.7	99.3	20.3
1-EXPO-BR3-B1	30	9.6 to 11.9	95.1 to 97.4	19.0
1-EXPO-TNK-B1	65	13.2 to 15.1	85.9 to 87.8	20.2
1-EXPO-TNK-B2	55 to 70	4.3 to 6	96.7 to 95	--
1-EXPO-TNK-B3	32	2.7 to 3.9	97.1 to 98.3	19.7
1-EXPO-TNK-B4	20	4.9 to 6.8	94.2 to 96.1	21.6
1-EXPO-TNK-B4	45	3.3 to 4.6	96.4 to 97.7	19.8

GeoTracker, a website maintained by the State of California, identified wells located within a 1-mile radius of the property. The wells reported depths to groundwater between approximately 2 to 40 feet bgs, with groundwater flow direction generally to the north and northeast. Groundwater levels in borings from projects in the vicinity ranged from 7.5 to 20 feet below the ground surface.

Fluctuations in groundwater levels occur seasonally and over a period of years because of variations in tidal action, precipitation, temperature, irrigation, and other factors. In addition, the measurements performed on the days of our exploration may not represent a fully equilibrated groundwater level due to the less permeable clayey soils encountered.

3.0 SUMMARY OF GEOTECHNICAL CONSIDERATIONS

3.1 SEISMIC DESIGN

The subject project site was evaluated with respect to known geologic hazards common to the San Francisco Bay Region. Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. The common secondary seismic hazards include ground shaking, ground lurching, soil liquefaction, and lateral spreading. The following discussion of these hazards, as they apply to the subject storage tank and diversion pipelines, is based on our understanding of the regional seismicity, review of readily available geologic reports and maps, and subsurface conditions.

3.1.1 Ground Rupture

The project site is not located within a currently designated State of California Earthquake Fault Zone, and no known active faults are mapped on the site. The nearest known active fault is the San Andreas fault, located about 3.3 miles west of the project site limits. Major active faults in the region are shown on Sheet 4. Based on these findings, the risk of faulting occurring within the project limits is considered low.

3.1.2 Design Ground Motion

An earthquake of moderate to high magnitude generated by the nearby active faults, similar to those that have occurred in the past, could cause considerable ground shaking at the site. To mitigate the ground shaking effects, the proposed UFES and Diversion Sewers should be designed using sound engineering judgment and the latest California Building Code (CBC) and State of California Department of Transportation (Caltrans) requirements as a minimum, when applicable.

The 2016 CBC utilizes design criteria set forth in the 2010 ASCE 7 Standard. Based on the subsurface conditions encountered, we characterized the site as Site Class D in accordance with the 2016 CBC.

Additionally, in-situ shear wave velocity measurements from a seismic cone penetrometer testing for the upper 100-ft of the site profile resulted in an average shear wave velocity of approximately 945 feet per second, which classifies as a Site Class D soil. A Risk Category III was assigned to the site, as provided by Stantec. We provide the 2016 CBC seismic design parameters in Table 3.1.2-1 below, which include design spectral response acceleration parameters based on the mapped Risk-Targeted Maximum Considered Earthquake (MCER) spectral response acceleration parameters.

TABLE 3.1.2-1: 2016 CBC Seismic Design Parameters, Latitude: 37.54703 **Longitude:** -122.2981

PARAMETER	VALUE
Site Class	D
Mapped MCE_R Spectral Response Acceleration at Short Periods, S_S (g)	1.86
Mapped MCE_R Spectral Response Acceleration at 1-second Period, S_1 (g)	0.86
Site Coefficient, F_A	1.0
Site Coefficient, F_V	1.5
MCE_R Spectral Response Acceleration at Short Periods, S_{MS} (g)	1.86
MCE_R Spectral Response Acceleration at 1-second Period, S_{M1} (g)	1.30
Design Spectral Response Acceleration at Short Periods, S_{DS} (g)	1.24
Design Spectral Response Acceleration at 1-second Period, S_{D1} (g)	0.86
Mapped MCE Geometric Mean (MCE_G) Peak Ground Acceleration, PGA (g)	0.73
Site Coefficient, F_{PGA}	1.0
MCE_G Peak Ground Acceleration adjusted for Site Class effects, PGA_M (g)	0.73

3.1.3 Liquefaction and Seismic Settlement

Liquefaction is a phenomenon wherein saturated cohesionless soils lose their inherent shear strength due to increased pore water pressures, which may be induced by reversing cyclic shear stresses associated with earthquakes. Low-relative-density cohesionless soils, shallow groundwater, and long-duration and high-acceleration seismic shaking are some of the factors that cause liquefaction. Surface manifestation of liquefaction is generally observed when saturated liquefiable material is present within about 50 feet from the ground surface.

Based on our review of the liquefaction hazards map by the California Geological Survey (CGS), the UFES and Diversion Sewers are located in an area identified as having a potential susceptibility to liquefaction. The liquefaction hazards map is included on Sheet 3.

We performed our analyses using a peak ground acceleration value (PGA) of 0.73g as outlined in the 2016 California Building Code, and a moment magnitude of 7.9 based on the theoretical rupture of the San Andreas Fault. The design groundwater table was established between 3 to 5 feet below existing grades depending on location, shown in Section 3.2.

According to Bray and Sancio (2006), fine-grained soils with a plasticity index (PI) less than or equal to 12 and moisture content and liquid limit ratio (wc/LL) of greater than 0.85 can undergo cyclic mobility and are susceptible to liquefaction. Based on our laboratory results, fine-grained soils with a PI less than or equal to 12 yielded a liquid limit ratio less than 0.85. Therefore, the risk of cyclic softening and liquefaction of fine-grained soils is considered low.

3.1.3.1 Liquefaction Analysis for Diversion Sewers

For Diversion Sewers Branches 1 to 3, liquefaction analysis of the borings was performed using triggering and settlement analysis methodologies outlined by Youd et al. (2001) and Idriss and Boulanger (2008), respectively. The analyses indicated that the well-graded sand layer in Diversion Sewer Branch 1 is potentially liquefiable, while the soil profile along Branches 2 and 3 do not appear to be liquefiable. Based on our analysis, we estimated the following potential liquefaction induced settlements for the susceptible Diversion Sewer.

TABLE 3.1.3.1-1: Estimated Potential Settlement Due to Liquefaction – Diversion Sewers

PROJECT ID	SOIL TYPE	POTENTIAL LIQUEFIABLE LAYER DEPTH RANGE (FEET)	ESTIMATED TOTAL SETTLEMENT (INCHES)	APPROXIMATE PIPE INVERT DEPTH (FEET, BGS)
Diversion Sewer Branch 1	SW	12 to 15	¼	17 to 24

As noted in Table 3.1.3.1-1, the proposed pipe invert depth of Diversion Sewer Branch 1 is deeper than the bottom of the liquefiable soil; therefore, the risk of liquefaction-induced settlement under Diversion Sewer Branch 1 pipeline will be low.

3.1.3.2 Liquefaction Analysis for UFES

To evaluate the liquefaction potential for the UFES site, liquefaction analyses utilizing the data obtained from the CPT probes was performed. Considering the planned excavation depth of 50 to 60 feet for UFES construction, any potentially liquefiable soils within the upper 50 feet of the tank footprint will be mitigated.

For depths below 50 feet, the liquefaction potential at the UFES site was evaluated using the CPT data and the computer program, CLiq Version 2.1.6.11, assuming an I_c cutoff of 2.60, and using methods developed by Idriss and Boulanger (2008) and Robertson (2009). The liquefaction analysis using CLiq indicates that some approximately 1 to 3 feet thick medium dense layers of silty and clayey sand and sandy and clayey silt below 50 feet bgs and below the groundwater table are considered potentially liquefiable when subject to strong ground shaking. Confirmation samples in the potentially liquefiable layers were collected and laboratory testing was performed, including Plasticity Index (PI), Fines Content, and Moisture Content to further evaluate the liquefaction potential based on methods developed by Bray and Sancio (2006). The test results indicated that the silty and clayey sand/sandy and clayey silt generally contains over 35 percent of fines (Passing #200) and the fines exhibit PIs ranging from 12 to 33. Based on these factors, the risk of cyclic softening and liquefaction of the silty and clayey sand/sandy and clayey silt layers is considered low. The results of the liquefaction analysis are presented in Appendix A.

3.2 GROUNDWATER CONDITIONS

As discussed previously, the groundwater levels encountered in boreholes, CPTs, vibrating wire piezometers, and the standpipe piezometer ranges from approximately 5 to 12 feet below ground surface within the Diversion Sewers and between 3 to 15 feet below ground surface within the UFES. We recommend the following design groundwater levels, ranging from 3 to 5 feet below grade, for the UFES and Diversion Sewers.

TABLE 3.2-1: Design Groundwater Level within UFES and Diversion Sewers

PROJECT ID	DESIGN DEPTH TO GROUNDWATER (FEET, BGS)
UFES	3
Diversion Sewer Branch 1	5
Diversion Sewer Branch 2	5
Diversion Sewer Branch 3	5

3.2.1 Artesian Conditions

An assessment for artesian conditions was also performed as part of this study. Artesian conditions occur when groundwater is confined under pressure between two layers of relatively impermeable strata. When the upper confining layer is penetrated, the water will rise above the level at which it was first encountered. If the gradient is sufficiently high, the groundwater may rise above the ground surface.

Based on the vibrating wire piezometer readings, potentially semi-confined artesian conditions were encountered at 1-EXPO-TNK-B1 at 65 feet bgs (El. 36 feet, SM+100), which is installed within the clayey sand, sandy clay and gravelly clay layer between two less permeable clay layers. The pressure head within this semi-confined sandy and gravelly clay layer (El. 27 to 52 feet, SM+100) is approximately 3 to 4 feet lower than the local groundwater level. Therefore, the local groundwater level is recommended in Table 3.2-1 to be used as the design groundwater level.

3.2.2 Soil Permeability and Groundwater Flow

As mentioned in the geotechnical data report for the UFES and Diversion Sewers, packer tests were performed at Borehole 1-EXPO-TNK-B4. Two single packer tests were performed at depth intervals 15 to 20 feet bgs and 41 to 50 feet bgs to measure groundwater flow rates.

Based on the results of the packer tests in Borehole 1-EXPO-TNK-B4, the clayey sand to sandy clay deposits encountered between 15 and 20 feet bgs had a field measured flow rate of approximately 0.35 gallons per minute (gal/min) or 1.9 cubic meters per day (m^3/day), and a horizontal permeability of approximately $2.4\text{x}10^{-4}$ centimeters per second (cm/s). The clayey sand deposits encountered between 41 and 50 feet bgs had a field measured flow rate range of approximately 1.0 to 1.5 gal/min or 5.5 to 8.2 m^3/day, and a horizontal permeability range of approximately $2\text{x}10^{-4}$ cm/s to 1.6 $\text{x}10^{-4}$ cm/s.

Permeability laboratory tests were performed on three samples obtained from the upper 20 feet. Soils encountered in the upper 20 feet of the UFES consisted of artificial fill (clayey sands and sandy clay) and Bay Mud. The vertical permeability measured is approximately 10^{-6} to 10^{-7} cm/s.

Based on the laboratory permeability test results and the in-situ packer test results, the vertical and horizontal permeability and the groundwater flow rate of site soils are low.

3.3 EXISTING FILL

As previously discussed, the UFES and Diversion Sewers are underlain by existing artificial fill extending from the ground surface to depths of approximately 5 feet overlying alluvial or bay mud deposits. The existing artificial fill typically consists of soft to medium stiff sandy clays (CL) and clayey gravelly sand (SC).

3.4 EXPANSIVE SOILS

Soils samples from the upper 10 feet were tested for Plasticity Index (PI) with values ranging from 5 to 32, indicating that these materials ranged from low to high expansion potential. Highly expansive soils are most prevalent within the norther portion of the project site, including Diversion Sewer Branches 1 and 2, and the UFES site, associated with bay mud (Qm). Expansive soils tend to shrink and swell when subject to fluctuations in moisture.

3.5 COMPRESSIBLE SOILS

As previously discussed, Diversion Sewer Branches 1 and 2, and the UFES site are underlain by very soft to stiff clay Bay Mud deposits up to 10 feet in thickness. At this time, the proposed Diversion Sewer Branch 1 and 2 pipelines and the proposed bottom of the UFES are planned to extend below the compressible Bay Mud soils. Since the compressible soils will be excavated and removed during construction within the alignment of the improvements, the risk of load-induced settlement on the improvements are considered low.

3.6 CORROSIVE SOILS

A total of seven samples were collected and transported under proper chain-of-custody to CERCO Analytical, Inc. for corrosivity testing. Samples were tested for redox potential, pH, resistivity, sulfide, soluble sulfate, and chloride ion concentrations. The results of each of these tests, organized by depth, are summarized below.

TABLE 3.6-1: Summary of Corrosivity Testing Results

BOREHOLE ID AND DEPTH	USCS SOIL TYPE	REDOX POTENTIAL (mV)	pH	RESISTIVITY* (ohms-cm)	SULFIDE (mg/kg)	SOLUBLE SULFATE * (mg/kg)	CHLORIDE ION* (mg/kg)
1-EXPO-BR2-B2 @ 5.5’	CL	380	7.59	1,100	N.D.	19	110
1-EXPO-TNK-B3 @ 6’	CH	260	6.78	380	N.D.	N.D.	580
1-EXPO-BR3-B1 @ 15	CL	400	7.96	390	N.D.	160	500
1-EXPO-BR1-B4 @15.5’	CH	470	8.04	730	N.D.	100	34
1-EXPO-TNK-B2 @ 21’	CH	370	7.71	130	N.D.	330	2,100
1-EXPO-TNK-B4 @ 36’	CH	280	7.15	220	N.D.	250	1,400
1-EXPO-TNK-B1 @ 55.5’	CH	380	7.67	470	N.D.	28	430

*Results reported on a wet weight basis
N.D. – None detected above reporting limits

Based on the resistivity measurements on samples obtained along the pipeline alignment and within the UFES site, the soils are considered to be “corrosive” to “very corrosive” to buried metal piping (NCHRP, 1978). All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron pipelines should be protected against corrosion. A corrosion consultant should provide specific design recommendations on corrosion protection for the buried storage tank and diversion branch pipelines.

The reported sulfate concentration result ranged from non-detect to 330 mg/kg. The 2016 CBC references the 2014 American Concrete Institute Manual, ACI 318-14, Section 19.3.1, for concrete durability requirements. ACI Table 19.3.1.1 provides guidelines to characterize the potential exposure for sulfate attack and associated recommendations for concrete in contact with soil based upon the exposure risk. In accordance with the criteria presented in Table 19.3.1.1 of the ACI 318-14, the test results are classified in the “not applicable” sulfate exposure range. Considering the “not applicable” sulfate exposure, the building code specifies a minimum concrete compressive strength of 2,500 psi. Additionally, for hydraulic structures, ACI 350-06 is the governing standard. In accordance with Table 4.3.1 of ACI 350-06, the test results are classified in the “negligible” sulfate exposure, and specifies a maximum water-cement ratio of 0.45. Although there is no requirement for cement type at this exposure range, a Type II (MH) and Type V cement can also be used. It should be noted, however, that the structural engineering design requirements for concrete may result in more stringent concrete specifications.

It should be noted that testing was not completed in near-surface soils, nor was it completed for all depths of potential embedment. Once more specifics of the proposed improvements are known, additional testing and/or guidance regarding the exposure risk for sulfates can be provided. Steel reinforcement in concrete should be provided with adequate cover in accordance with the CBC, as a minimum, and the structural engineering design requirements, which might result in more stringent concrete specifications once the final disposition of potential concrete elements are known.

4.0 ENGINEERING CONSIDERATIONS – PIPELINE

4.1 OPEN CUT TRENCHING METHOD

Open-cut trenching is a conventional method to install pipelines. This method consists of excavating a trench along the pipeline alignment, placing the pipe on stable base subgrade material, dewatering and trench supporting (as necessary), and backfilling the excavation. Open cut pipeline installation is feasible for the Diversion Sewers.

The main disadvantages of open cut pipeline installation are the need for shoring, dewatering static or perched groundwater, and offhaul of dewatering liquids and soil along the alignment. Significant disturbance and potential settlement to overlying streets or surface conditions along the alignment may occur.

If this method is selected, the pipelines should be installed by a qualified Contractor experienced in such installation methods. Additional recommendations can be provided once a final alignment has been designed and if this method is selected.

4.2 TRENCHLESS PIPELINE INSTALLATION

It is our understanding that a portion of Diversion Branch 1 pipeline, near the intersection of South Delaware Boulevard and Saratoga Drive, is proposed to be installed using microtunneling, which is a trenchless pipeline installation method.

As shown on Sheet 17, and Civil Plans for the In-System Storage Package, prepared by Stantec and dated January 30, 2018, the proposed section of Diversion Sewer Branch 1 will be installed within the public right-of-way and below an existing culvert crossing under Borel Creek, parallel to Saratoga Drive. The proposed pipeline section will be installed in variable fine-grained and alluvial deposits (Qaf) and medium-grained alluvial deposits (Qam) beneath the existing artificial fill and Bay Mud layers and groundwater table.

As shown on the plan sheets, the pipe invert is at an elevation of approximately 85 feet (SM+100). Based on the soil conditions encountered within nearby borings 1-EXPO-BR1-B4, 1-EXPO-BR3-B1, and 1-B12 and 1-B21, the proposed trenchless pipeline section will go through silty lean clay with variable amounts of sand, and silty sand. The results from our laboratory testing indicate the fines (clays and silts) within the silty sand is approximately 12 percent and within the lean clay is approximately 64 percent. The plasticity index of the lean clay ranged from 10 to 31, indicating a range of low to high expansion potential. We recommend a total unit weight of 130 pounds per square foot (psf) for the lean clay and silty sand soil. Additionally, the undrained shear strength of the lean clay generally ranged from 500 to 800 psf.

Mixed-face and change-in-face conditions between fine-grained silts and clays and granular soils with varying amounts of gravel should be anticipated. There is a risk of the microtunnel boring machine **(**MTBM) becoming stuck at these transition zones. However, selection of an appropriate MTBM cutter head to handle these soil conditions should minimize this risk.

Microtunneling is a trenchless installation method where a guided pipe advancement tunneling process is used. The pipeline is advanced directly behind and attached to a remotely controlled, laser-guided, slurry-based microtunnel boring machine (MTBM) that provides continuous support to the excavation face. This method requires construction of launching and receiving pits and the launching pits must be designed to accommodate specified jacking loads. Microtunneling is feasible for this area of Diversion Sewer Branch 1.

The launching and receiving pits for the trenchless installation can be designed for active lateral equivalent fluid pressures provided in the table below.

TABLE 4.2-1: Trenchless Installation Design Parameters for Diversion Sewer Branch 1

LATERAL EARTH PRESSURE	DESIGN PARAMETER
Active Earth Pressure:	60 pcf (drained conditions). Active earth pressures should be used where existing buildings and critical utilities are situated outside a 1:1 line of projection extending up from the bottom of the wall.
Passive Earth Pressure:	250 pcf, acting as equivalent fluid weight.

The trenchless technology used should maintain line and grade for the pipeline within tolerances desired for this project and should avoid impacts to overlying existing improvements. The actual improvements and selected trenchless installation method should be designed and installed by a qualified Contractor and designer experienced in such installation methods.

4.3 DIVERSION SEWER PIPELINES

The Diversion Sewer pipeline inverts are currently proposed at approximately 10 to 24 feet below existing grade. Below is a summary of subsurface conditions on the Diversion Sewers.

TABLE 4.3-1: Summary of Subsurface Conditions for Diversion Sewers

PROJECT ID	STATION	PIPE INVERT ELEVATION (FEET,SM+100)	SOIL TYPE
Diversion Sewer Branch 1	10+00 to 14+60, 18+00 to 20+00	80.5 to 81	Fine-grained alluvium
	14+60 to 18+00, 20+00 to 40+07	81 to 86.5	Medium-grained alluvium
Diversion Sewer Branch 2	10+00 to 30+60	80.5 to 94.5	Medium-grained alluvium
Diversion Sewer Branch 3	10+00 to 13+00, 16+45 to 18+00	86 to 87	Fine-grained alluvium
	13+00 to 16+45, 18+00 to 21+90.11	86 to 87.5	Medium-grained alluvium

4.3.1 Soil Loads

The proposed pipeline should be designed to resist loads imposed by overlying soil cover and from vehicle or construction traffic. Soil loads may be calculated using a total unit weight up to 135 pounds per cubic foot (pcf) and a buoyant unit weight of 75 pcf for fill and alluvial soils.

4.3.2 Modulus of Soil Reaction

Provided the site earthwork is conducted in accordance with the recommendations in this report, the modulus of soil reaction in the table below can be used for the pipeline design. The modulus of soil reaction given in Table 4.3.2-1 is based on soil conditions encountered during the field exploration and also assumes a required relative compaction of not less than 85 percent.

TABLE 4.3.2-1: Modulus of Soil Reaction

SOIL BACKFILL TYPE	DEPTH OF COVER (FEET)	MODULUS OF SOIL REACTION (PSI)
Site Soils	2-5	700
	5-10	1,000
	10-15	1,050
	15-20	1,100
Import Granular Material	--	1,000

4.4 MANHOLES AND JUNCTION BOXES

Based on the soil conditions encountered along the planned diversion sewer pipeline depths, manholes and junction boxes are anticipated to be bottomed/supported on fine- to medium-grained alluvium. An allowable bearing capacity of 2,500 pounds per square foot (psf) can be considered in the design of manholes and junction boxes founded on the alluvial soils. Earth pressures for the design of walls are presented in Section 6.2.1.

4.5 BUOYANCY

The pipeline, manholes, and junction boxes should be designed for buoyancy effects considering a design groundwater depth of 5 feet. Where buoyancy effects are determined to be high, concrete collars or tie downs should be used to resist uplift.

5.0 ENGINEERING CONSIDERATIONS – UFES

5.1 EXCAVATION AND GROUNDWATER

Groundwater is relatively shallow throughout the UFES site. Design considerations addressed later in this report include construction dewatering, hydrostatic uplift forces, waterproofing, and wall drainage.

5.2 BUOYANCY

We understand that the UFES will go through cycles of filling and emptying. The UFES will be subject to buoyant uplift forces when tank water levels are low. The structural engineer may consider the following forces to resist buoyancy upload forces:

- Weight of the empty UFES structure.
- Weight of the soil projected vertically from the edge of tank wall footings. Estimate a unit weight of wall backfill of 125 pcf.
- Skin friction on piles constructed at the bottom of the tank (See Section 7.0 for details)

6.0 CONSTRUCTION AND EARTHWORK CONSIDERATIONS

Provided below are general construction recommendations for the project.

6.1 PRECONSTRUCTION AND CONSTRUCTION SETTLEMENT SURVEYS

A preconstruction survey and construction surveys are recommended to monitor for potential movements of existing structures or improvements that may be affected by construction activities. Existing structures and improvements may experience movement as a result of shoring installation, dewatering, or pipeline installation. For this project, a minimum frequency of at least weekly is suggested during construction. If excess movement is noted, work should be stopped immediately and the Engineer should be notified.

Moreover, the locations and depths of the existing utilities located adjacent to or over the proposed pipeline should be evaluated such that they are not undermined or damaged during construction. Protection of existing utility crossings in trenches should also be considered. Critical utilities should be protected through cradling while less critical utilities could span trenches unprotected.

6.2 EXCAVATION AND SHORING

Shoring is required for sections of the sanitary sewer pipes with vertical excavations greater than 4 feet and for the UFES excavation. The Contractor should be familiar with applicable local, state, and federal regulations, including the current Occupational Safety and Health Administration

(OSHA) Excavation and Trench Safety Standards. It is the responsibility of the Contractor to provide stable, safe trench and construction slope conditions and to follow OSHA safety requirements. Since excavation procedures may be dangerous, it is also the responsibility of the Contractor to provide a trained "competent person" as defined by OSHA to supervise all excavation operations, ensure that all personnel are working in safe conditions and have thorough knowledge of OSHA excavation safety requirements.

Shoring systems should be designed by a qualified registered engineer. Variation in hydrostatic pressures or surcharges may require an increase in design pressures and distribution. The design of the shoring should be sufficiently rigid to prevent detrimental movement of the temporary shoring and possible damage of pavements, sidewalks, or adjacent utilities. Appropriate safety factors against overturning and sliding should be incorporated into the design calculations.

Excavated soils, construction materials or other items imposing a surcharge should be stockpiled at least 20 feet away or at least a 1:1 setback, whichever is greater, from the edge of excavations to reduce potential adverse effect on slope or trench stability. We recommend that no vertical trench excavations be left open overnight without adequate shoring. Once shoring has been removed, the contractor should backfill the excavation to within 4 feet of the ground surface before the end of the day.

6.2.1 Diversion Sewers Excavation

Excavations ranging from 10 to 24 feet deep are anticipated along the diversion sewer pipeline alignment within roadways. The specified clearance between the Diversion Sewer pipeline alignments and other utilities is 3 feet in several locations. Based on soil and groundwater conditions, the use of trench boxes, hydraulic shoring, shields with plates, or a cross-brace strut and lagging system appear to be suitable shoring options for the Diversion Sewers.

The temporary shoring design may be designed for active lateral equivalent fluid pressures provided in the table below.

TABLE 6.2.1-1: Temporary Shoring Design Parameters for Diversion Sewers 1, 2 and 3

TEMPORARY SHORING DESIGN ELEMENT	DESIGN PARAMETER
Active Earth Pressure:	60 pcf (drained conditions). Active earth pressures should be used where existing buildings and critical utilities are situated outside a 1:1 line of projection extending up from the bottom of the wall.
Passive Earth Pressure:	250 pcf, acting as equivalent fluid weight.

Surcharge loads from structures, stockpiles, and vehicles should be included in shoring design if the surcharge loading is situated within 20 feet of the top of the trench or within a 1:1 line of projection extending from the bottom of the trench, whichever is farther. The surcharge should be taken as one-half of any vertical surcharge loads and should be applied as a uniform lateral load. A minimum lateral surcharge load equal to 72 psf, as prescribed in the Caltrans Trenching and Shoring Manual, should be considered for traffic loading, where applicable.

The final temporary shoring design will be based on the contractor's means and methods of construction, including equipment and available shoring materials, as well as other general conditions defined by the project team.

6.2.2 UFES Excavation

The UFES excavation is expected to be approximately 145 feet wide, 205 feet long and 50 to 60 feet below existing grade. Typical shoring for large and deep excavations including driven sheet piles, cross-lot/internal braces and anchored soldier piles and lagging walls. For the proposed UFES excavation, an anchored soldier piles and lagging wall system is anticipated to be more cost effective.

The temporary shoring may be designed for active lateral equivalent fluid pressures provided in the table below. When permanent shoring systems are planned, at-rest pressures provided below should be considered. For thickness and depth of soil layers presented in Table 6.2.2-1, refer to Sheets 6 and 7.

TABLE 6.2.2-1: Temporary and Permanent Shoring Design Parameters for UFES

SOIL LAYER	AT-REST UNDRAINED PRESSURES (pcf)	ACTIVE UNDRAINED PRESSURES (pcf)
Artificial Fill /Young Bay Mud	110	100
Lean Clay and Sandy Clay (medium stiff to very stiff)	100	90
Lean Clay and Fat Clay (stiff to very stiff)	100	80
Clayey Sand, Sandy to Gravelly Clay (medium dense/very stiff to very dense/hard)	90	80
Lean Clay and Sandy Clay (hard)	100	60

6.2.2.1 Anchored Soldier Beam and Lagging Wall

Anchored soldier beam and lagging shoring walls are commonly designed and constructed in accordance with the Federal Highway Administration (FHWA) Geotechnical Engineering Circular No. 4 (FHWA-IF-99-015). Soldier beams usually consist of steel beams such as wide flange sections installed in drilled shafts. The drilled shaft diameter and spacing will depend on the structural shape and diameter of the ground anchor. The spacing between drilled shafts (center to center) will depend on capacity requirements. The drilled shafts should be backfilled with lean-mix concrete from the level of the excavation subgrade to the existing ground surface to allow for easy removal, which will be required for lagging and anchor installation. Unless the structural engineer determines otherwise, lean-mix concrete is commonly used to backfill the portion of the shafts from the bottom of the hole to the excavation subgrade depending on the capacity requirements of the embedded portion of the shoring wall. Photographs 6.2.2.1-1 and 6.2.2.1-2 below show an anchored soldier beam and lagging wall system being installed in San Francisco for a 55 feet deep basement. A cement deep soil mixing (CDSM) cut-off wall described in Section 6.3.2 below was installed at this San Francisco site prior to installation of soldier beam, lagging and tieback anchors.

PHOTOGRAPH 6.2.2.1-1: A solider pile and lagging shoring system with tieback anchors for a 55 feet deep excavation in San Francisco. CDSM columns were pre-installed to control water inflow. Interior dewatering wells are installed within the excavation to keep the excavation dry.

Lagging for a temporary shoring wall may consist of timber and should be placed from the top-down as soon as possible after excavation to minimize erosion of materials into them excavation.

Ground anchors, also commonly referred to as tiebacks, are structural elements installed in grout-filled holes drilled into soil and are used to transmit applied tensile loads into the ground. The drilling method used for the installation of ground anchors should consider the potential for caving of the drilled holes. Typical tieback inclinations range between 15 and 30 degrees below the horizontal. Ground anchor inclinations up to 45 degrees below the horizontal can generally be installed by most contractors. For preliminary design and cost estimate, the bonded zone of the ground anchors cab be assumed to locate behind a potential failure plane, drawn from the heel of the wall at a 30-degree angle from vertical. This plane roughly corresponds to the active earth pressure wedge for the site alluvial deposits. The vertical position of ground anchors will depend on capacity requirements and constructability. The horizontal spacing of the ground anchors should be large enough to avoid group effects of anchors.

For preliminary design and cost estimating purposes, an ultimate (unfactored) bond strength of 2.0 ksf for gravity-grouted anchors in soil (fill and alluvium) may be assumed. Also, a minimum of 15 feet of overburden soil should be present at the center of the ground anchor bond zone for the development of the ground anchor strength for gravity-grouted anchors. If this minimum coverage cannot be maintained, the ultimate bond strength should be reduced accordingly. Ground anchor bond strengths will depend on the construction method used for ground anchor installation.

PHOTOGRAPH 6.2.2.1-2: Installation of tieback anchors within a solider pile and lagging shoring system.

Construction activities should also include sacrificial and proof anchor testing. The contractor should consider at least eight sacrificial tiebacks for the UFES excavation to confirm the ultimate bond strengths. The procedures for this testing should generally conform to those discussed in FHWA-IF-99-015. Additional proof testing should be performed on a minimum of 5 percent of the production anchors (tiebacks). It is typical for contract specifications to allow for modification of the design based on higher demonstrated ultimate bond strengths from field verification testing.

When tiebacks extend beyond the property limits, authorization from neighboring property owners will be required prior to construction. Neighboring property owner may request de-tensioning of tieback anchors upon completion of the final structural wall. Alternatively, internal bracing systems can be installed in areas when tieback anchors cannot be installed, similar to a system shown on Photograph 6.2.2.1-3.

PHOTOGRAPH 6.2.2.1-3: Internal braces installed at the corner of the excavation where tiebacks cannot be installed due to utility conflicts.

6.3 TEMPORARY DEWATERING

As discussed in Section 3.2, the design groundwater levels for the UFES and Diversion Sewers segments range from 3 to 5 feet below grade. Dewatering systems implemented within the project should be selected so as to impose minimal impact on the groundwater level surrounding the proposed excavations. The dewatering system should be designed to prevent pumping soil fines with the discharge water. Uncontrolled dewatering could cause settlement of the general area and affect existing improvements in the vicinity of the site. It should be noted that existing utilities may be bedded in gravel, which may conduct groundwater to the trench excavation.

6.3.1 Diversion Sewers Trench Dewatering

The groundwater level at the Diversion Sewer trench locations should be maintained below the bottom of the trenches for the duration of utility installation. The selection of equipment and method should be determined by the contractor. Moist to saturated subgrade conditions should be anticipated at the bottom of the utility trench.

6.3.2 UFES Excavation Dewatering

The high groundwater at the UFES site has been recently measured at approximately 3 feet below the ground surface at Elevation 98 feet (SM+100). It is likely that groundwater levels could vary from these elevations.

Laboratory test results indicated measured vertical permeability is approximately 10^{-6} to 10^{-7} cm/s. Field packer tests performed at 41 to 50 feet below the ground surface yielded a horizontal permeability in the range of 1.0 to 1.5 gallons per minute. The recorded flow rates within the tank excavation are expected to be low and can be controlled by perimeter well points. Alternatively, a slurry cut off wall can be constructed along the excavation perimeter to reduce the amount of groundwater seepage into the excavation. Slurry cut off walls for deep excavation commonly utilize Cement Deep Soil Mixing (CDSM) construction methods. We anticipate the slurry cut-off wall to extend 15 to 25 feet below the bottom of the excavation.

Dewatering should be performed in a manner such that water levels are maintained not less than two feet below the bottom of excavation prior to and continuously during shoring installation. As the excavation progresses, it may be necessary to dewater the soils ahead of the excavation, such as by continuous pumping from sumps, to control the tendency for the bottom of the excavation to heave under hydrostatic pressures and to reduce inflow of water or soil beneath temporary shoring.

Groundwater levels outside of the shoring system should not be allowed to drop significantly. Lowering of groundwater levels outside of the excavation could result in settlement of surrounding improvements. Special attention should be given to the dewatering efforts to minimize potential groundwater impacts to the nearby ponds and wetlands within the adjacent Bay Meadows Park. Piezometers should be installed outside the shoring system to monitor groundwater drawdown.

6.4 TRENCH AND EXCAVATION BACKFILL

Utility trenches and excavations should be constructed in accordance with the City of San Mateo Standard Trench Detail and recommendations provided in this report, as appropriate. Where conflict occurs, please consult with the Geotechnical Engineer for clarification.

6.4.1 Selection of Materials

With the exception of construction debris (wood, brick, asphalt, concrete, metal, etc.), trees, organically contaminated materials (soil which contains more than 3 percent organic content by weight), and environmentally impacted soils (if any), the site soils are suitable for use as engineered fill within the trench zone or for backfilling the annulus outside the storage tank. Oversized soil or rock materials (those exceeding two-thirds of the lift thickness or 3 inches in dimension, whichever is less) should be removed from the fill and broken down to meet this requirement or otherwise off-hauled.

For import material used for Diversion Sewer pipe zone backfill, we recommend it consist of quarry fines, fine- to medium-grained sand, or a well-graded mixture of sand and gravel and that this material not be used within 2 feet of finish subgrades. This material should be compacted to at least 90 percent relative compaction at a moisture content of not less than optimum and comply with the grading requirements in the following table.

TABLE 6.4.1-1: Pipe Zone Backfill

BACKFILL TYPE	GRADATION (ASTM D-421)	
	SIEVE SIZE	PERCENT PASSING
Quarry Fines*	3-inch	100
	No. 4	35-100
	No. 30	20-100

BACKFILL TYPE	GRADATION (ASTM D-421)	
	SIEVE SIZE	PERCENT PASSING
Sand	No. 4	90-100
	No. 200	0-5
Sand and Gravel Mix	2-inch	100
	No. 50	0-100
	No. 100	0-8
	No. 200	0-4

*Sand equivalent shall be not less than 20

Trench zone backfill (i.e. material placed between the pipe zone backfill and the ground surface) may consist of excavated soil or, if required, imported aggregate base compacted in accordance with the recommendations for engineered fill. Control density fill is also suitable for pipe zone and trench zone backfill. Engineered fill and backfill shall comply with the grading requirements shown in the following table.

TABLE 6.4.1-2: Trench Zone Backfill - Engineered Fill

	US STANDARD SIEVE	PERCENTAGE PASSING
GRADATION (ASTM D-421)	3-inch	100
	No. 4	35-100
	No. 30	20-100
PLASTICITY (ASTM D-4318)		Plasticity Index < 12
ORGANIC CONTENT (ASTM D-2974)		Less than 2 percent

The Geotechnical Engineer should be informed when import soil materials are planned for the site. Import materials should be submitted to, and approved by, the Geotechnical Engineer prior to delivery at the site and should conform to the requirements provided in the Supplemental Recommendations (Appendix C).

If multiple backfill types are used for the project, consideration should be given to using materials with similar unit weights to reduce potential settlement due to difference in material weight.

6.4.2 Fill Placement and Compaction

Loose soils found in excavation trenches should be removed to expose a firm undisturbed bottom, moisture conditioned and recompacted. If a yielding or soft bottom is encountered, the contractor may consider overexcavating 12 inches, placing stabilization fabric such as Mirafi 600X or geogrid such as BX1200 or TX160, and backfilling with compacted ¾- to 1½-inch clean crushed rock wrapped in a 6-ounce filter fabric. Other approaches may be acceptable and ENGEO should be consulted if alternative approaches are desired. Once a suitable firm base is achieved, fills should be placed in thin lifts with the lift thickness not to exceed 10 inches or the depth of penetration of the compaction equipment used, whichever is less. Lightweight equipment should be used when working in soft to medium stiff materials.

The following compaction control requirements should be applied to general fills comprised of onsite soils:

Test Procedures:	ASTM D-1557
Required Moisture Content:	Not less than 3 percentage points above optimum moisture content
Required Relative Compaction:	Not less than 90 percent

The following compaction control requirements should be applied to import fill material (quarry fines, sand), soil fill materials with low expansion potential (PI<12), or chemically treated soils:

Test Procedures:	ASTM D-1557
Required Moisture Content:	Not less than optimum moisture content
Required Relative Compaction:	Not less than 92 percent

The following compaction control requirements should be applied to Caltrans Class 2 aggregate base:

Test Procedures:	ASTM D-1557
Required Moisture Content:	Not less than optimum moisture content
Required Relative Compaction:	Not less than 95 percent

Backfill materials placed within the upper 12 inches below roadway subgrade should be compacted to at least 95 percent relative compaction at a moisture content of at least optimum moisture. Relative compaction refers to in-place dry density of the fill material expressed as a percentage of the maximum dry density based on ASTM D-1557. Optimum moisture is the moisture content corresponding to the maximum dry density.

Compaction of trench backfill by jetting should not be allowed.

6.4.3 Construction Monitoring and Testing

It is important that all construction activities be done under the observation of the Geotechnical Engineer's field representative, in accordance with the recommendations contained herein and in the Supplemental Recommendations in Appendix C.

7.0 FOUNDATION RECOMMENDATIONS – UFES

We recommend the proposed UFES structure to be supported on a stiff structural mat foundation. Piles can be included to resist buoyant uplift forces, as discussed in Section 5.3.

7.1 STRUCTURAL REINFORCED MAT FOUNDATION

Depending on the final design depth of the UFES, the mat foundation may be founded on lean clay and fat clay (El. 56 to 70) or Clayey Sand, Sandy Clay and Gravelly Clay (El. 48 to 58). Average bearing pressure for these two founding soil layers are shown below.

TABLE 7.1-1: Mat Foundation Design Parameters

ANTICIPATED SOIL CONDITIONS AT BOTTOM OF FOUNDATION	ALLOWABLE BEARING PRESSURE (PSF)	COEFFICIENT OF FRICTION	PASSIVE PRESSURE (PCF)
Lean Clay and Fat Clay (El. 56 to 70, SM+100)	2,500	0.30	300
Clayey Sand, Sandy to Gravelly Clay (El. 48 to 58, SM+100)	3,000	0.35	350

Resistance to lateral loads may be provided by frictional resistance between the foundation concrete and the subgrade soils, passive earth pressure acting against the side of the foundation and passive earth pressure against the below grade perimeter walls.

Prior to foundation construction, the upper 12 inches of the foundation subgrade should be scarified and recompacted in accordance with Section 6.4.2.

7.1.1 Waterproofing

As stated previously, we recommend the design groundwater level for the UFES to be 3 feet bgs (El. 98 feet, SM+100). Because the proposed foundation will extend below the groundwater level, waterproofing the base of the mat and the perimeter walls are recommended. The waterproofing should be designed by a consultant that specialized in permanent waterproofing construction and placed in accordance with manufacturer's specifications.

7.2 PILE FOUNDATIONS

To resist uplift forces, the proposed UFES structure can be supported on precast, prestressed concrete piles driven to competent soils as recommended below. Precast, pre-stressed concrete piles will derive their vertical capacity primarily from skin friction within the stiff soil layers at the proposed base of the UFES. The following recommendations were based on an estimated top of pile at El. 54 feet (SM+100).

Alternatively, drilled in-place piles such as auger cast piles (ACP), Fundex or Tubex piles may be considered for uplift resistance if noise and vibration from pile driving is not acceptable. These low vibration piles are proprietary and should be designed by a design-build or specialty contractor. ENGEO should be provided the opportunity to review the pile design to confirm assumed soil profile, soil shear strengths and downdrag forces are in conformance with site conditions.

7.2.1 Vertical Pile Capacities

For precast concrete piles, the analysis performed assumed two pile types (14- and 16-inch-square piles). A chart showing the allowable vertical pile capacity vs. depth of each pile type from 50 feet bgs (El. 51 feet, SM+100) is provided in Appendix B. For piles in cohesive soils, the FHWA recommends to calculate vertical pile capacities using the alpha method. Based on the soil conditions encountered and laboratory test results, the following adhesion values can be used to calculate the vertical pile capacities.

TABLE 7.2.1-1: Adhesion Parameters at UFES Site

APPROXIMATE DEPTH TO BOTTOM OF SOIL LAYER BELOW GROUND SURFACE (FEET)	SOIL TYPE	ADHESION (PSF)
20 to 40	Lean Clay and Fat Clay (stiff to very stiff)	950
40 to 65	Clayey Sand, Sandy to Gravelly Clay (medium dense/very stiff to very dense/hard)	1,300
65+	Lean Clay and Sandy Clay (hard)	1,300

The vertical allowable capacities and embedment lengths in the table below include a Factor of Safety of 2.0 for skin friction, and the uplift allowable capacities include a Factor of Safety of 1.5.

TABLE 7.2.1-2: Allowable Vertical Capacities and Embedment Lengths

PILE TYPE	RECOMMENDED PILE LENGTH (PILE TIP ELEVATION*), FEET	ALLOWABLE VERTICAL CAPACITY (KIPS) DEAD PLUS LIVE LOADS	ALLOWABLE UPLIFT CAPACITY (KIPS) DEAD PLUS LIVE LOADS
14-inch Diameter	17 (El. 34 ft.)	100	140
	22 (E. 29 ft.)	150	200
	27 (El. 24 ft.)	200	265
16-inch Diameter	15 (El. 36 ft.)	100	130
	20 (El. 31 ft.)	150	200
	25 (El. 26 ft.)	200	275

* Datum = City of San Mateo Datum + 100 feet (SM+100), where top of pile is assumed at El. 51 feet, SM+100

7.2.2 Corrosion Protection

As discussed above, some site soils are considered “very corrosive” to buried metal and steel embedded in a concrete mortar coating. For preliminary design and planning purposes, all concrete located at or below grade be designed for “moderate” sulfate exposure conditions. A corrosion consultant should be retained to provide specific design recommendations for corrosion protection. In addition, the structural engineering design requirements may result in more stringent concrete specifications.

7.2.3 Pile Load Tests

When a large number of piles are planned, performing a pile load test prior to production pile installation can aid in optimizing pile foundation design and likely reduce foundation costs by reducing pile lengths. Pile load tests are optional and can be performed if desired by the owner to further optimize the pile foundation design.

The load test should be performed in accordance with ASTM D1143 (Reapproved 1994) *Standard Test Method for Piles Under Static Axial Compressive Load*, *Standard Loading Procedure.* The contractor is responsible for the design, operation, and safety of the load test system. This includes supplying and installing the necessary components including the dial gauges and reference beams.

ENGEO and the structural engineer should be retained to review the load test program prior to mobilization of pile test equipment to the site. We should also be retained to monitor and evaluate the entire pile load test, including test pile installation. Load test piles should not be used as production piles. Following our analysis of the load testing, we will consult with you and the structural engineer to establish the minimum pile lengths necessary to achieve the desired pile capacities.

7.2.4 Production Pile Installation

Production piles should be driven using the same hammer and system as the indicator and load test piles. The data obtained from the indicator pile program, load tests, wave equation analysis, and this geotechnical report will be used to develop pile-driving criteria for production piles. ENGEO should be retained to observe and record the results of all production pile driving.

8.0 TANK WALL RECOMMENDATIONS - UFES

8.1 LATERAL SOIL PRESSURES

Based on the soil conditions encountered and laboratory test results, the following lateral earth pressures can be used for the permanent UFES perimeter walls, assuming a permanent shoring system is not constructed. For thickness and depth of soil layers presented in the table below, refer to Sheets 6 and 7.

TABLE 8.1-1: Lateral Earth Pressures for UFES Perimeter Walls

SOIL LAYER	AT-REST UNDRAINED PRESSURES (pcf)
Artificial Fill /Young Bay Mud	110
Lean Clay and Sandy Clay (medium stiff to very stiff)	100
Lean Clay and Fat Clay (stiff to very stiff)	100
Clayey Sand, Sandy to Gravelly Clay (medium dense/very stiff to very dense/hard)	90
Lean Clay and Sandy Clay (hard)	100

8.2 SEISMIC DESIGN CONSIDERATIONS

Where seismic evaluation is performed, the tank should be designed with an additional dynamic increment combined with active equivalent pressures and can be calculated as follows:

$$\Delta P = 15 \times H^2$$

We developed the dynamic increment formula using site soil conditions and methodologies outlined by Seed and Whitman (1970) and Monobe-Okabe (1926, 1929). A groundwater level corresponding to a depth of 3 feet below final grade should be assumed for the seismic condition. H is the retained height of the tank wall (in feet) and ΔP is the active incremental seismic force in pounds per foot of wall. The dynamic increment should be added in an inverted triangular distribution loading pattern.

8.3 TANK BACKFILL PLACEMENT

All backfill should be placed in accordance with recommendations provided previously for fill placement. Light equipment should be used during backfill compaction adjacent to tank walls to minimize possible overstressing of the walls. Provided that the fill placement and compaction specifications provided in Section 6.4.2 are followed, we estimate that settlement of the engineered backfill around the UFES will be small and therefore a downward drag coefficient of backfill on the tank wall can be neglected.

9.0 PAVEMENT DESIGN

Preliminary pavement design is provided based on assumed Traffic Index and subgrade resistance values (R-value). The Traffic Index should be determined by the Civil Engineer or appropriate public agency. The following preliminary pavement sections for new construction have been determined based on an assumed R-value of 5 and in accordance with the design methods contained in Topic 633 of Caltrans Highway Design Manual (including the asphalt factor of safety).

TABLE 9.0-1: Flexible Pavement Design

TRAFFIC INDEX (TI)	R-VALUE OF 5 (UNTREATED SUBGRADE)	
	AC (INCHES)	AB (INCHES)
5.0	3.0	10.0
6.0	3.5	13.0
7.0	4.0	16.0
8.0	5.0	18.0

Notes: AC is asphalt concrete
AB is aggregate base Class 2 Material with minimum R = 78

For pavement repairs in trenches, refer to the City Standard Details for minimum pavement sections.

Pavement construction and all materials (hot mix asphalt and aggregate base) should comply with the requirements of the Standard Specifications of the State of California Division of Highways, City of San Mateo requirements and the following minimum requirements.

- All pavement subgrades should be scarified to a depth of 10 to 12 inches below finished subgrade elevation, moisture conditioned to at least optimum moisture content, and compacted to at least 95 percent relative compaction and in accordance with City of San Mateo requirements.

- Aggregate base materials should meet current Caltrans Standard Specifications for Class 2 aggregate base and should be compacted to at least 95 percent of maximum dry density at a moisture content of at least optimum.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate base materials are placed and compacted. Proof-rolling with a heavy wheel-loaded piece of construction equipment should be implemented after preparation and compaction of the subgrade soils and again after placement and compaction of the aggregate base. Yielding materials should be appropriately mitigated, with suitable mitigation measures developed in coordination with the client, contractor and Geotechnical Engineer.

- Adequate provisions must be made such that the subgrade soils and aggregate base materials are not allowed to become saturated.

- All vertical concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate base materials. An undercurb drain could also be considered to help collect and transport subsurface seepage.

10.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents a broad characterization of subsurface conditions. It is the responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including but not limited to developers, owners, buyers, architects, engineers, and designers. The limited environmental exploration performed was intended to provide preliminary testing to determine potential presence of hazardous materials that may be encountered during pipeline trenching activities.

ENGEO strived to perform its professional services in accordance with generally accepted geotechnical and environmental engineering principles and practices currently employed in the area; no warranty is expressed or implied. There are risks of earth movement and property damages inherent in building on or with earth materials. ENGEO is unable to eliminate all risks or provide insurance; therefore, is unable to guarantee or warrant the results of its services.

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Actual field or other conditions may necessitate clarifications, adjustments, modifications or other changes to this document. Therefore, ENGEO should be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include onsite construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

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FIGURES

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

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SHEET NUMBER	TITLE
1	COVER SHEET
2	REGIONAL GEOLOGIC MAP
3	SEISMIC HAZARD ZONE MAP
4	REGIONAL FAULTING AND SEISMICITY
5	EXPO CENTER - STORAGE TANK SITE
6	CROSS SECTION A-A'
7	CROSS SECTION B-B'
8	DIVERSION SEWER - BRANCH 1
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15	DIVERSION SEWER - BRANCH 3
16	DIVERSION SEWER - BRANCH 3
17	DIVERSION SEWER - BRANCH 1 - TRENCHLESS

HORIZONTAL SCALE: 1"=150'

0 150 300

SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST
AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

COVER SHEET

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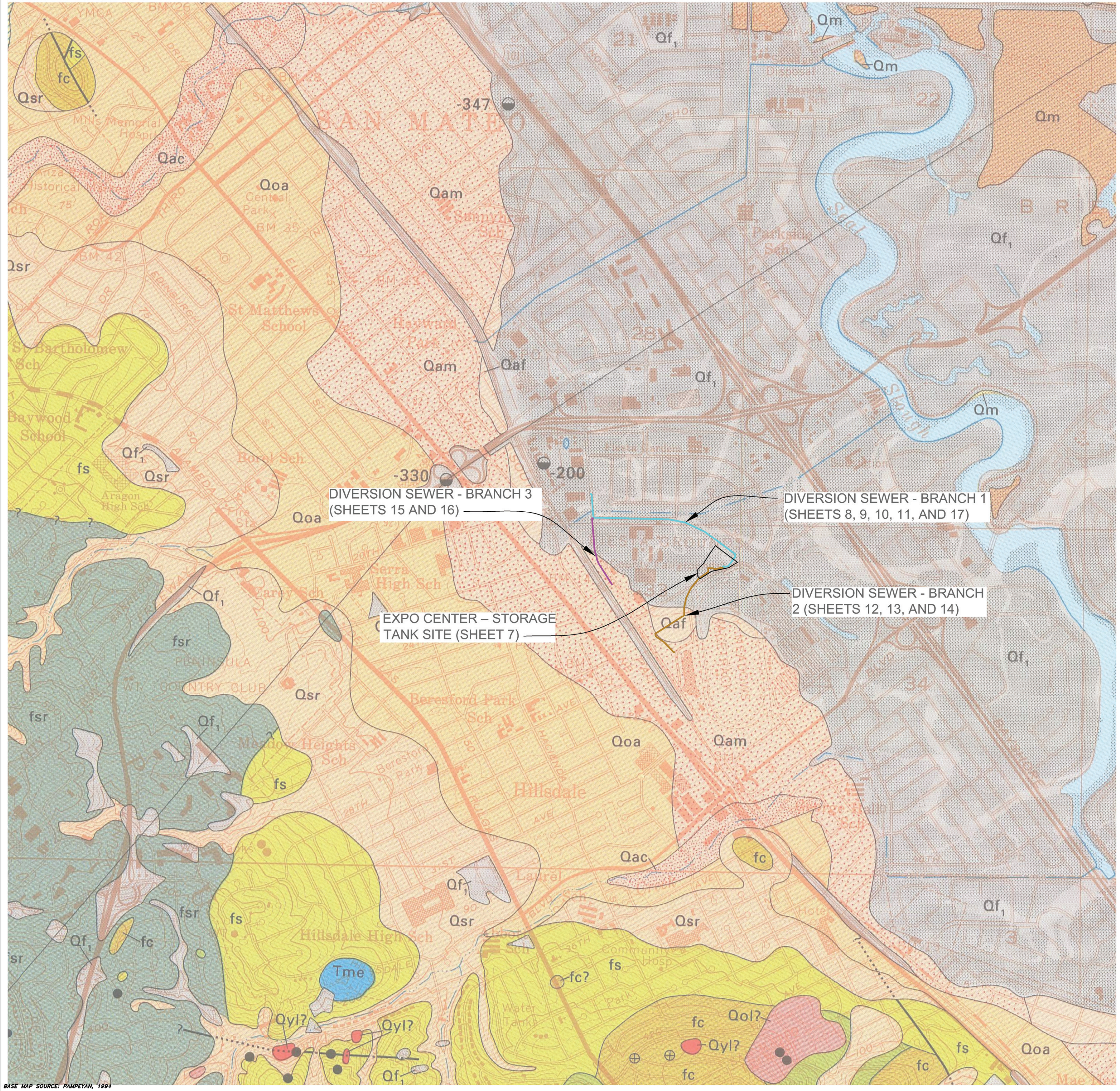

BASE MAP SOURCE: PAMPEYAN, 1994

EXPLANATION

——— – – – –	GEOLOGIC CONTACT-DASHED WHERE GRADATIONAL OR APPROXIMATELY LOCATED
Qf^1	ARTIFICIAL FILL
Qyl	YOUNGER LANDSLIDE DEPOSITS (HOLOCENE)
Qm	BAY MUD (HOLOCENE)
Qsr	SLOPE WASH, RAVINE FILL AND COLLUVIUM (HOLOCENE)
Qac	COURSE-GRAINED ALLUVIUM (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

HORIZONTAL SCALE: 1"=800'

0 800 1,600

SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

REGIONAL GEOLOGIC MAP

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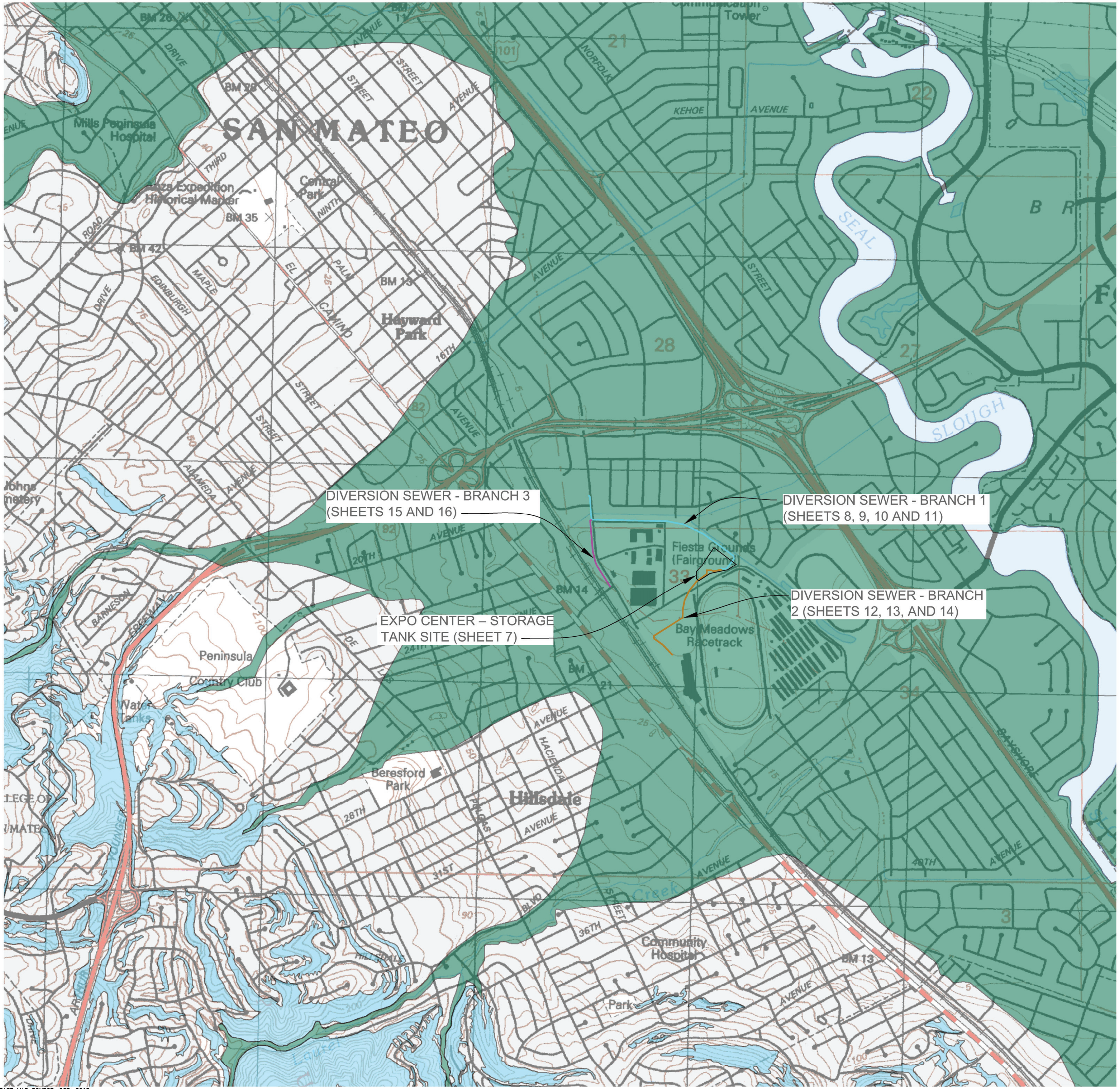

EXPLANATION

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

HORIZONTAL SCALE: 1"=800'

0 800 1,600
SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

SEISMIC HAZARD ZONE MAP

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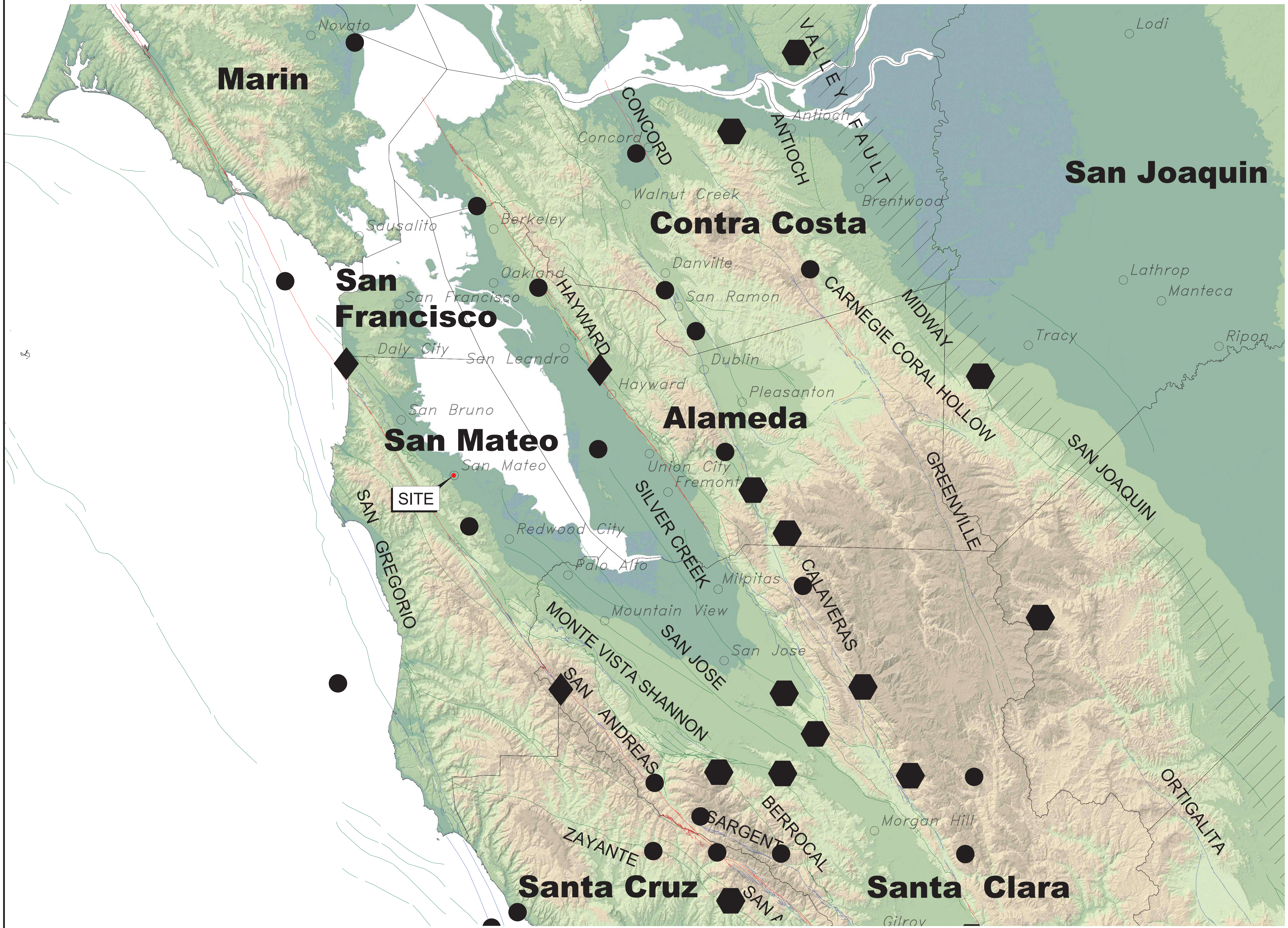
SHEET 3 OF 17



EXPLANATION

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6
- HISTORIC FAULT
- HOLOCENE FAULT
- QUATERNARY FAULT
- HISTORIC BLIND THRUST FAULT ZONE

HORIZONTAL SCALE: 1" = 7 MILES

0 7 14

SCALE IN MILES

BASE MAP SOURCE:
COLOR HILLSHADE IMAGE BASED ON THE NATIONAL ELEVATION DATASET (NED) AT 30 METER RESOLUTION
U.S.G.S. QUATERNARY FAULT DATABASE, NOVEMBER, 2010
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800–2000)

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

REGIONAL FAULTING AND SEISMICITY

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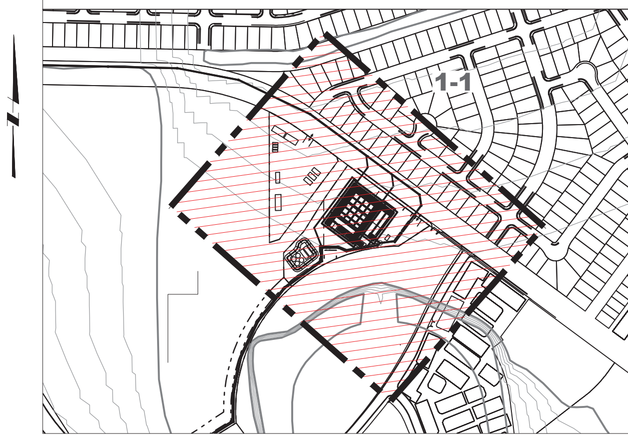

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-TNK-B4	BORING (ENGEO, 2018)
1-EXPO-TNK-CPT4	CONE PENETRATION TEST (ENGEO, 2018)
	PREVIOUS BOREHOLE OR CONE PENETRATION TEST - ADVANCED FOR BAY MEADOWS (LANGAN, 1995, 1996, 1999, 2000, 2002, 2007)
VWP	VIBRATING WIRE PIEZOMETER
SP	STANDPIPE WELL
B B'	CROSS SECTION LOCATION

HORIZONTAL SCALE:

0 30 60

SCALE IN FEET

PLAN 1-1

STORAGE TANK SITE

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CITY OF SAN MATEO CALIFORNIA INCORPORATED 1894

EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

TANK EAST OPTION 1 CONSTRUCTION LAYOUT

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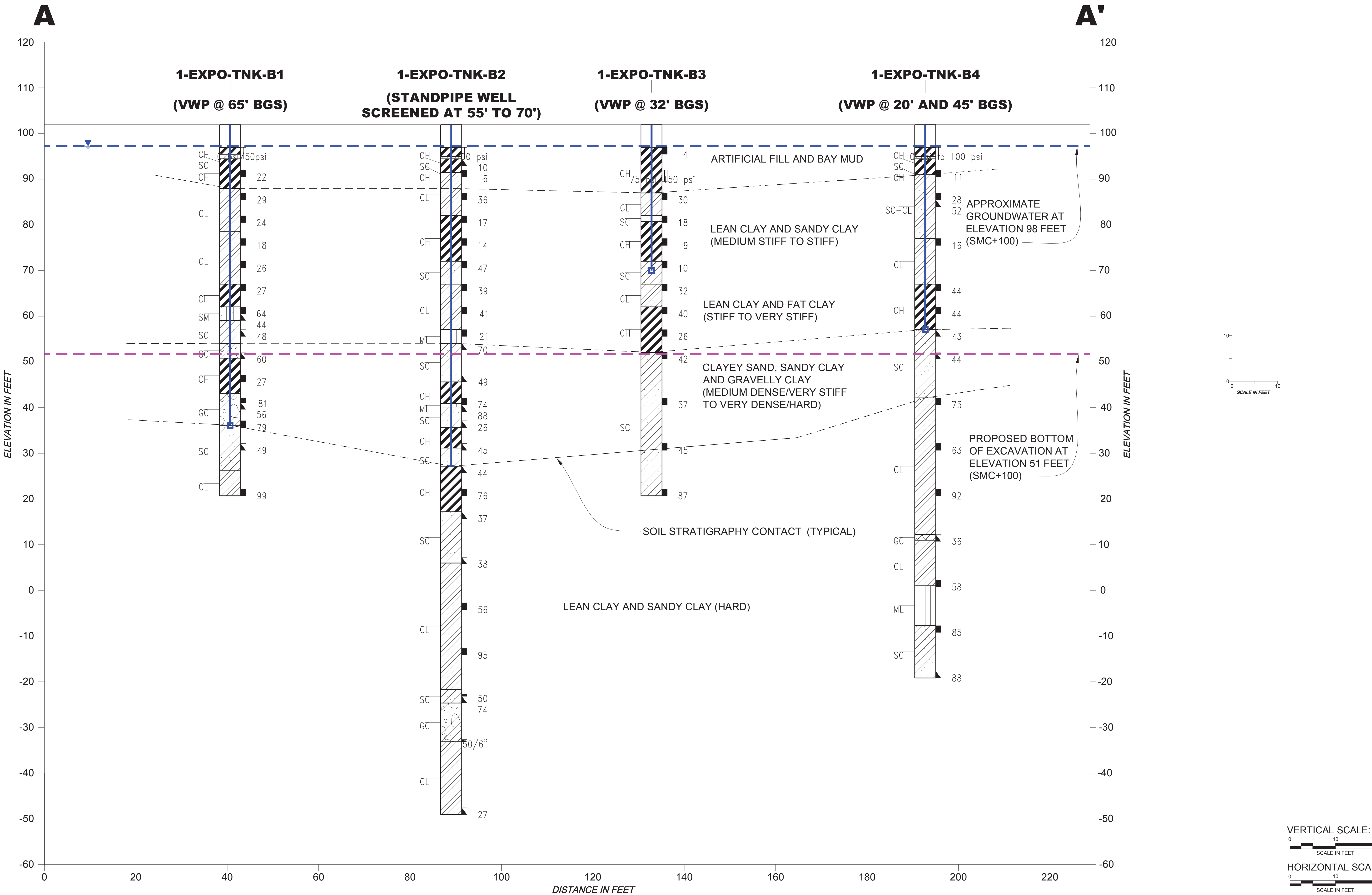

SECTION A-A'

SCALE: 1"=10'

VERTICAL SCALE: 0 10 20 SCALE IN FEET

HORIZONTAL SCALE: 0 10 20 SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

CROSS SECTION A-A'

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SCALE: AS SHOWN

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SHEET 6 OF 17

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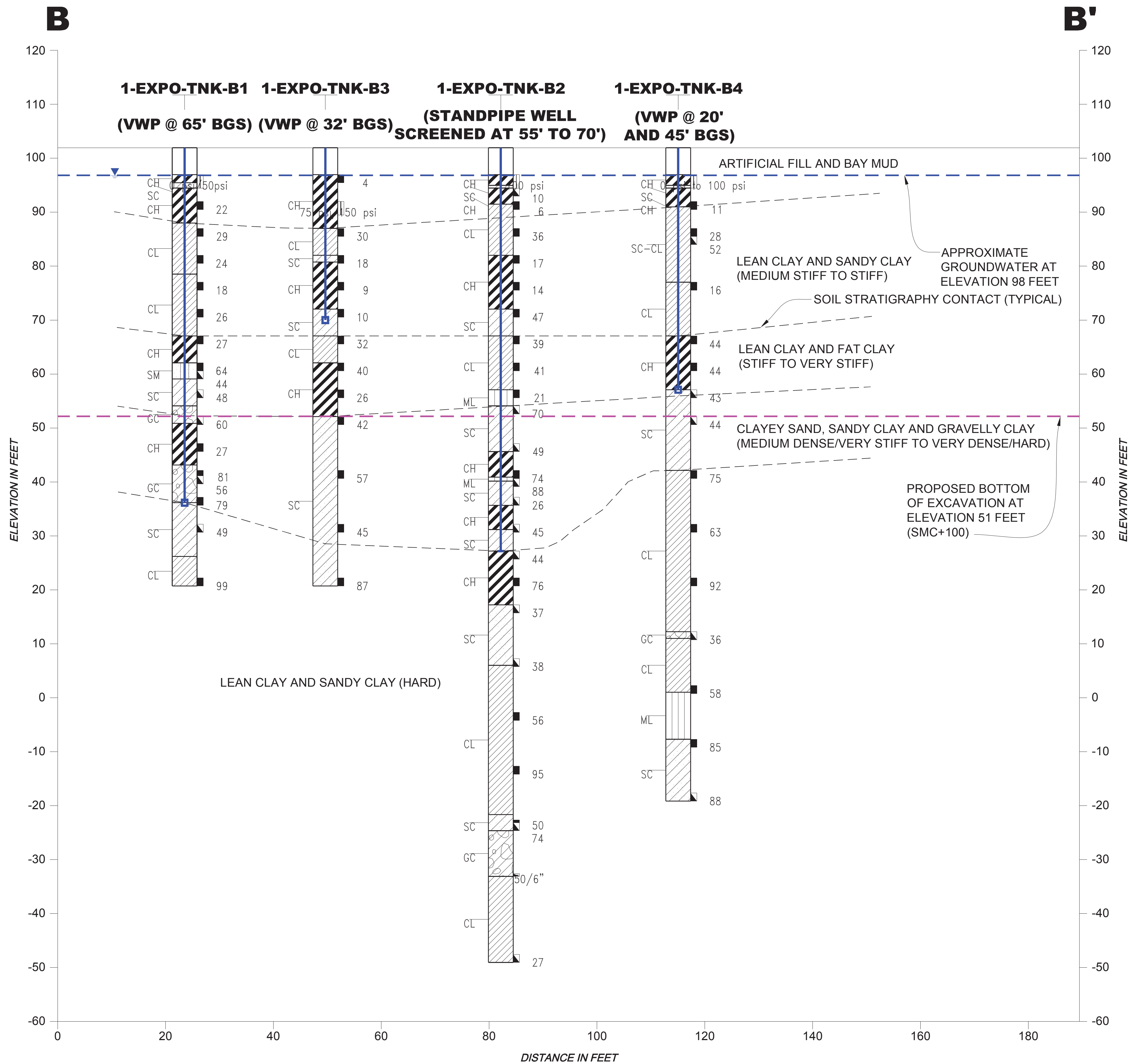

SECTION B-B'

SCALE: 1"=10'

VERTICAL SCALE: 0 10 20 SCALE IN FEET

HORIZONTAL SCALE: 0 10 20 SCALE IN FEET

EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

CROSS SECTION B-B'

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CHECKED BY: S. BARUA

SCALE: AS SHOWN

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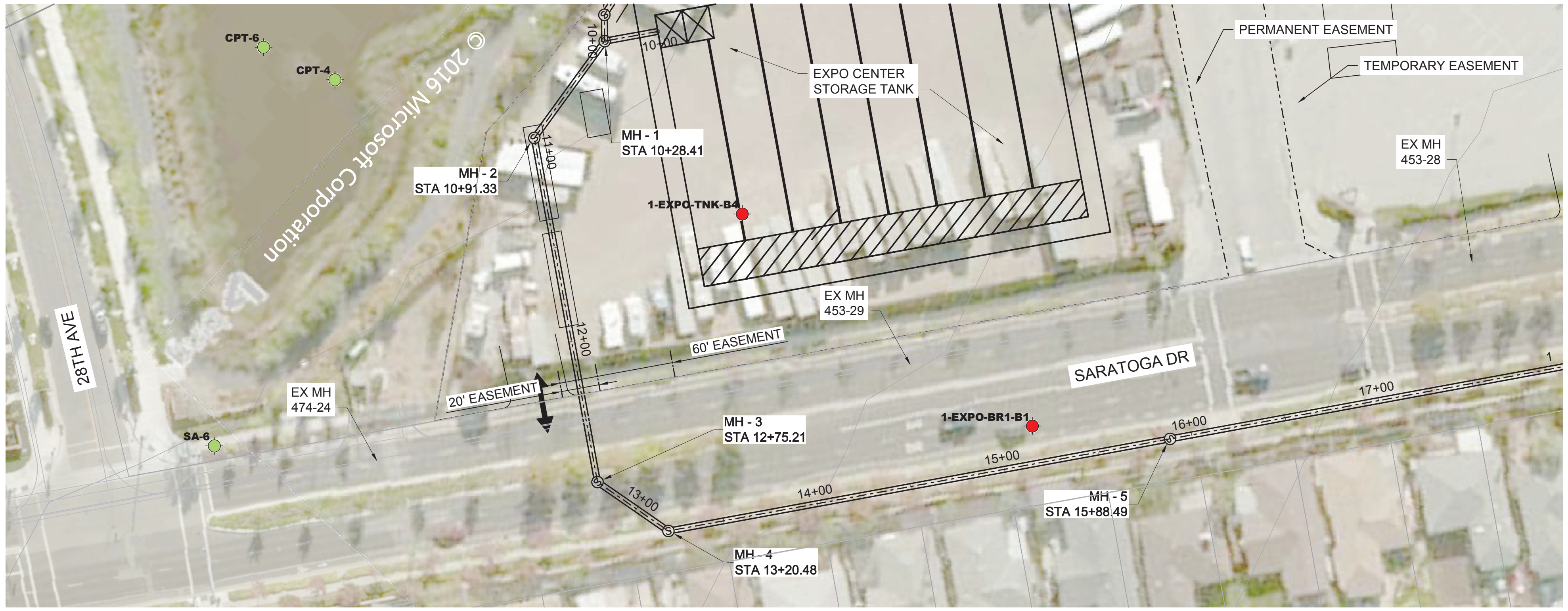
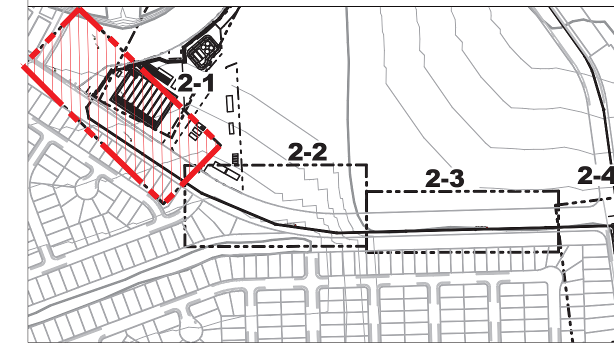


PLAN 2-1

DIVERSION SEWER BRANCH 1 - STATION 10+00 TO 18+00

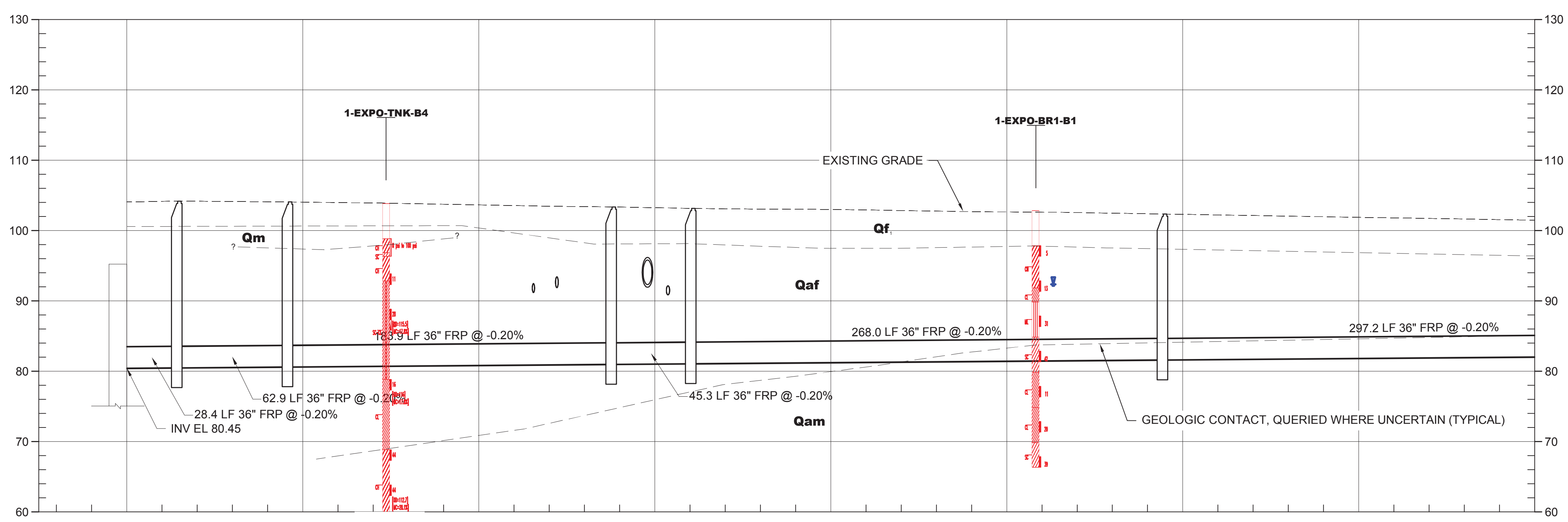
KEY PLAN



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR1-B1	BORING (ENGEO, 2018)
	PREVIOUS BOREHOLE OR CONE PENETRATION TEST - ADVANCED FOR BAY MEADOWS (LANGAN, 1995, 1996, 1999, 2000, 2002, 2007)
Qf	ARTIFICIAL FILL
Qm	BAY MUD (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

BRANCH 1 PLAN AND PROFILE STA 10+00 TO 18+00

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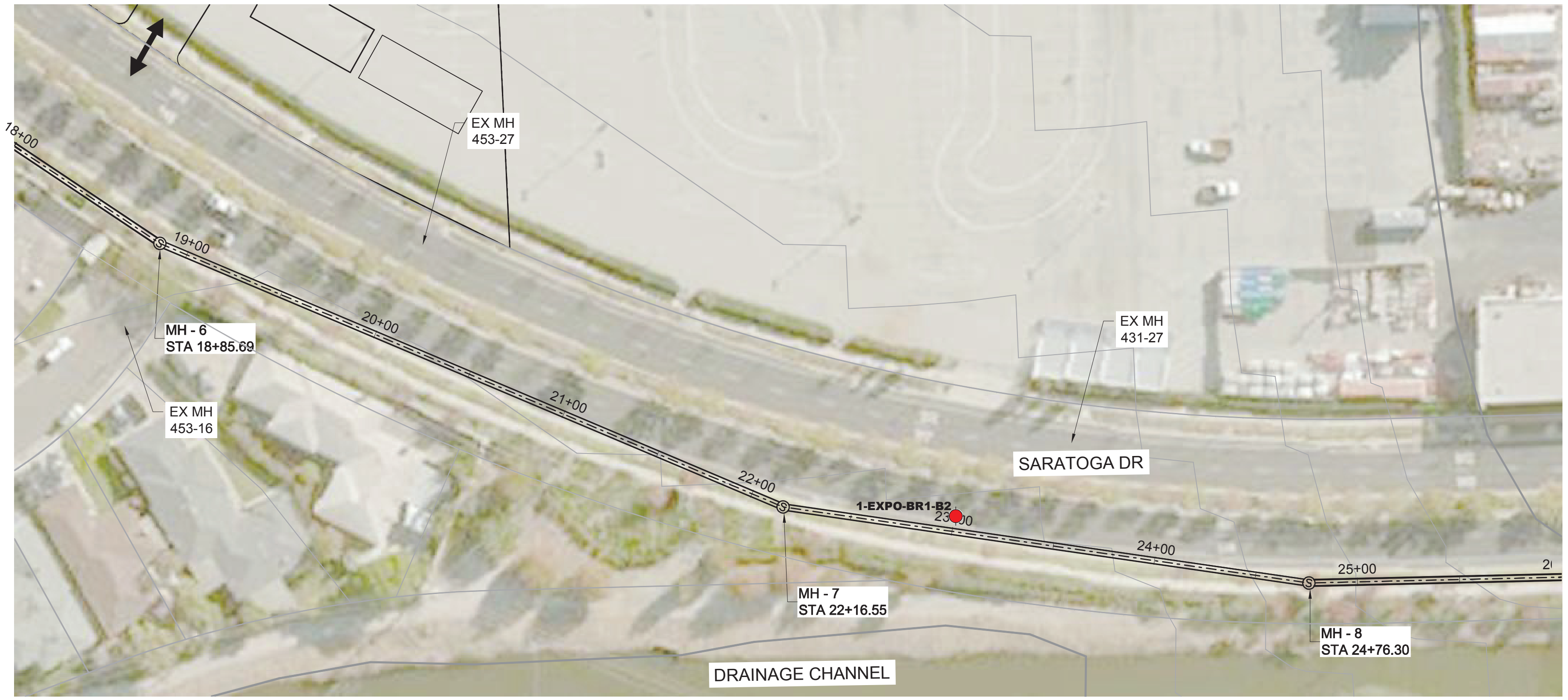
DRAWN BY: G. JAFFE DATE:
CHECKED BY: S. BARUA DATE:
SCALE: AS SHOWN
PROJECT NO: 13231.000.001

SHEET 8 OF 17

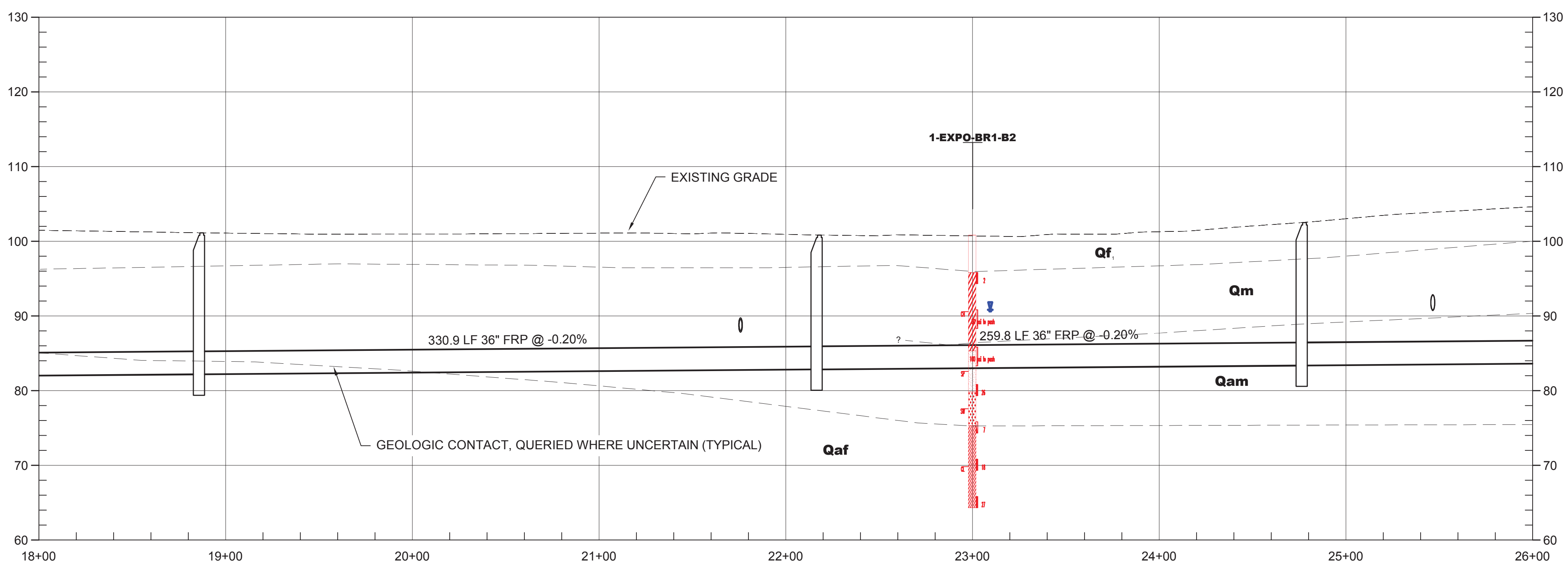
BY: GARY JAFFE

DWG FILE: G:\Active Projects_12000 To 13999\13231\13231000001\DRAFTING\CAD Files\EXPO Tank And Diversion Sewers\ENGEO-SM-2-2-C-EXPO_EAST-0118.dwg



PLAN 2-2

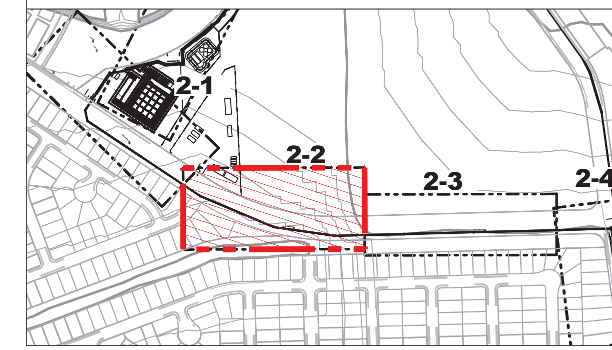
DIVERSION SEWER BRANCH 1 STATION 18+00 TO 26+00



PROFILE

SCALE: 1"=40' HORIZONTAL
SCALE: 1"=10' VERTICAL

KEY PLAN



EXPLANATION
ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR1-B2	BORING (ENGEO, 2018)
Qf	ARTIFICIAL FILL
Qm	BAY MUD (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

BRANCH 1 PLAN AND PROFILE STA 18+00 TO 26+00

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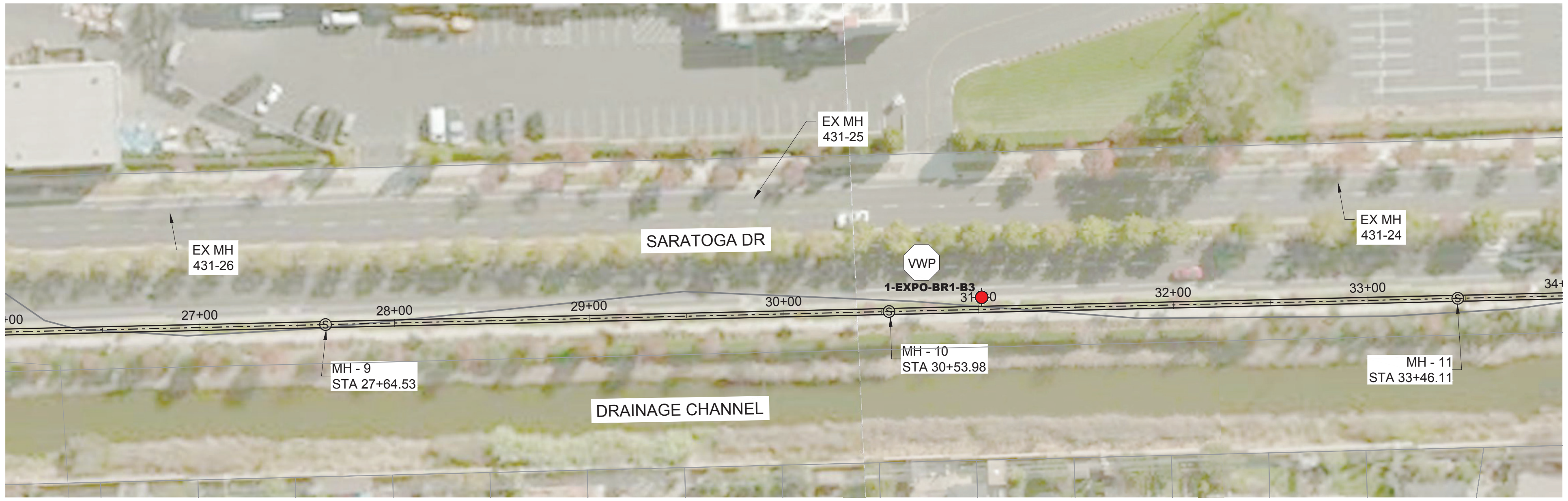
BY: GARY JAFFE



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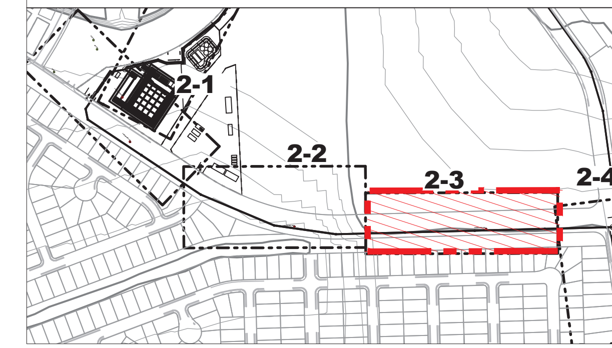


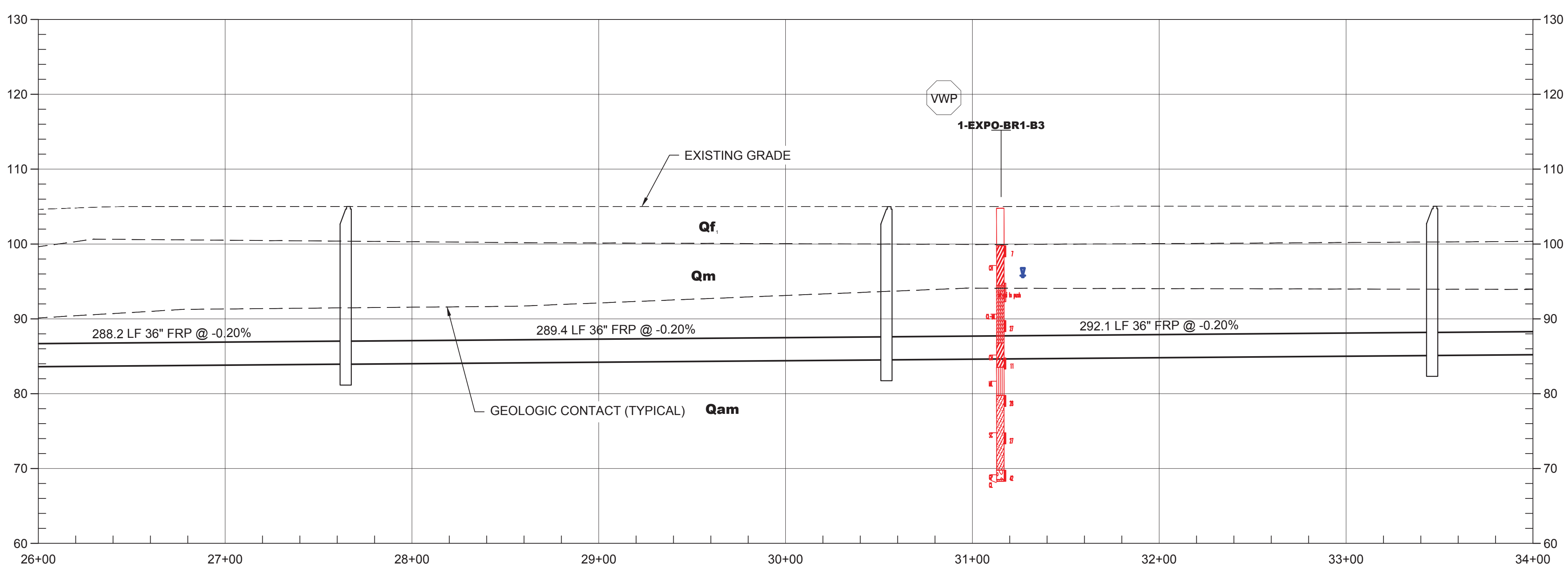
EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR1-B3	BORING (ENGEO, 2017)
VWP	VIBRATING WIRE PIEZOMETER
Qf	ARTIFICIAL FILL
Qm	BAY MUD (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)

PLAN 2-3

DIVERSION SEWER BRANCH 1 STATION 26+00 TO 34+00



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

VERTICAL SCALE: 1" = 10'

0 10 20 SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'

0 40 80 SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 1 PLAN AND PROFILE STA 26+00 TO 34+00

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CHECKED BY: S. BARUA

SCALE: AS SHOWN

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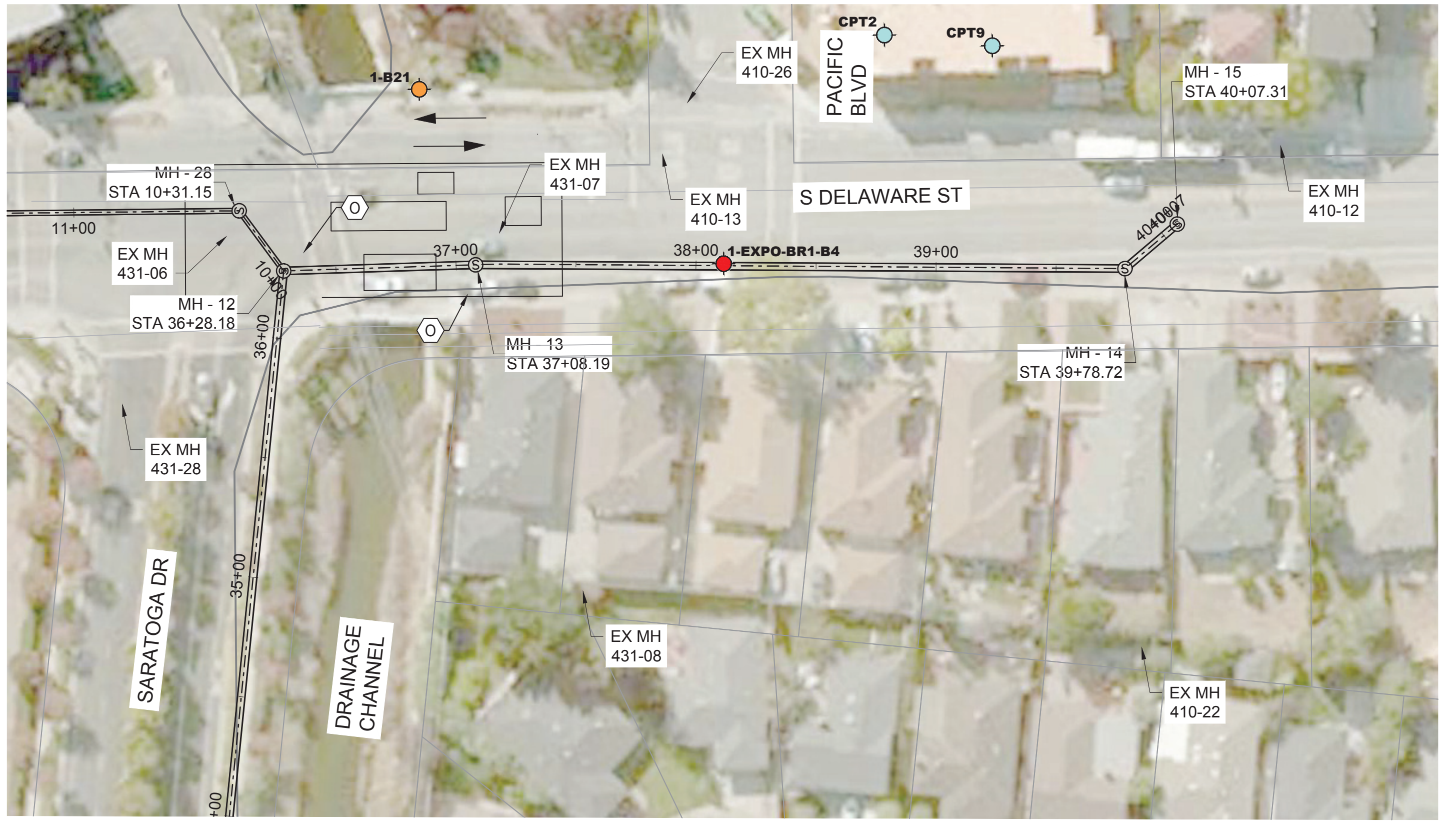
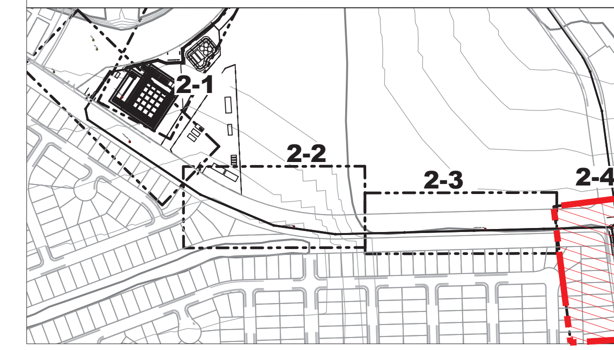
BY: GARY JAFFE



PLAN 2-4

DIVERSION SEWER BRANCH 1 STATION 34+00 TO 40+00

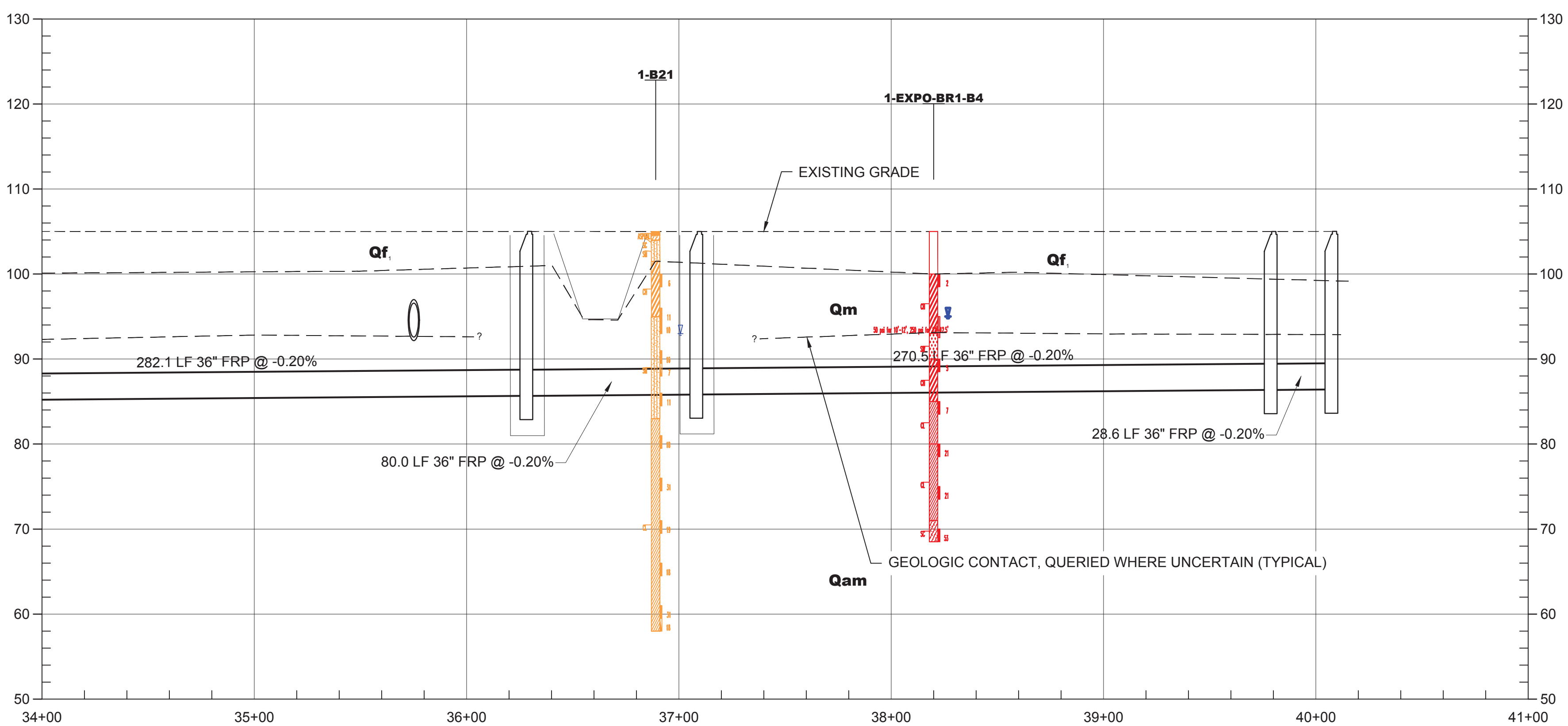
KEY PLAN



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR1-B4	BORING (ENGEO, 2017)
1-B21	PREVIOUS BORING - ADVANCED FOR SOUTH TRUNK SANITARY SEWER RELIEF LINE (ENGEO, 2010)
CPT9	PREVIOUS CONE PENETRATION TEST - ADVANCED FOR 2090 SOUTH DELAWARE STREET (ENGEO, 2012)
Qf	ARTIFICIAL FILL
Qm	BAY MUD (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

VERTICAL SCALE: 1" = 10'

0 10 20 SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'

0 40 80 SCALE IN FEET

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BRANCH 1 PLAN AND PROFILE STA 34+00 TO 40+00

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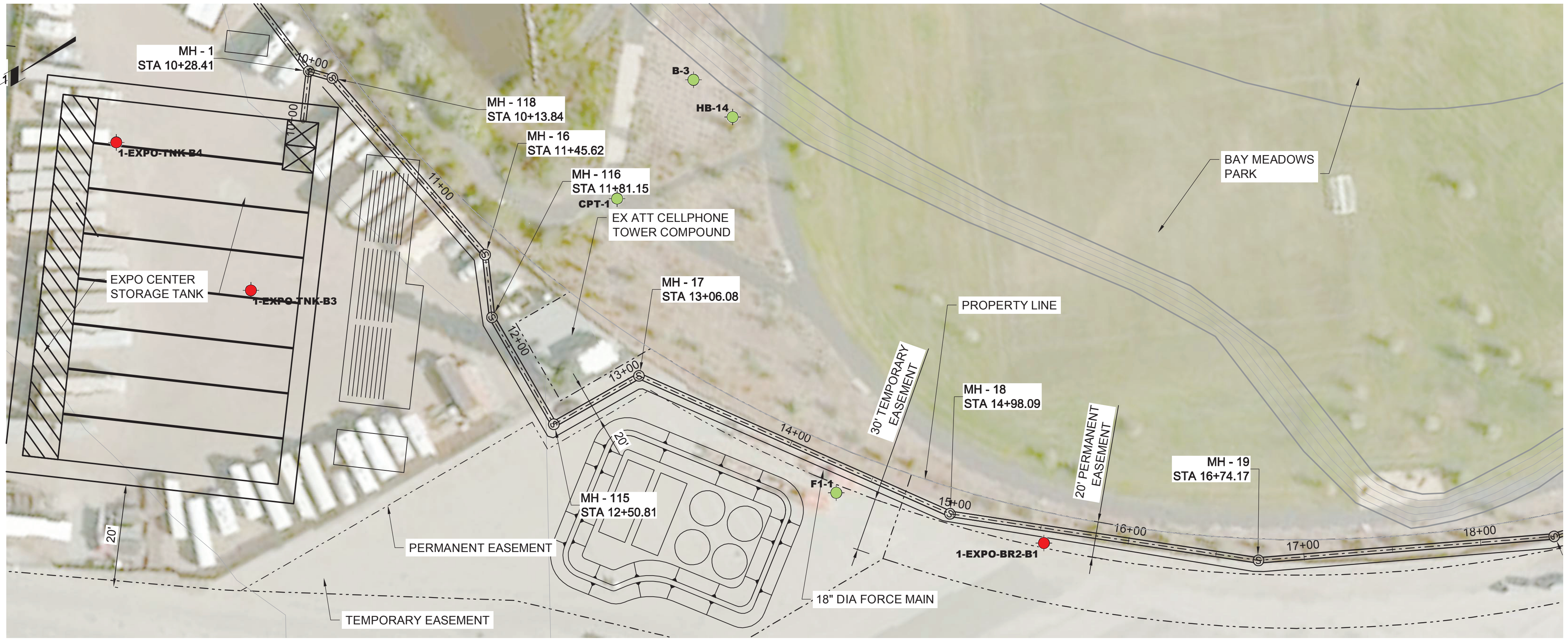
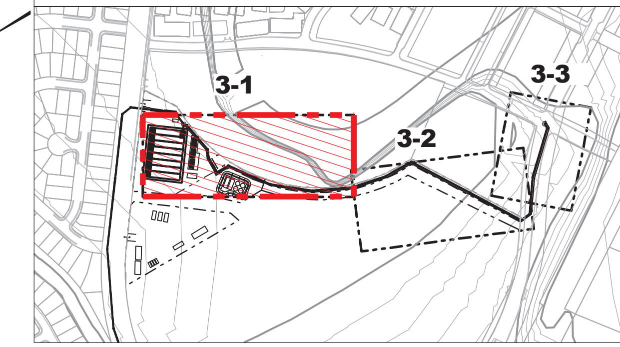


PLAN 3-1

DIVERSION SEWER BRANCH 2 STATION 10+00 TO 19+00

KEY PLAN



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

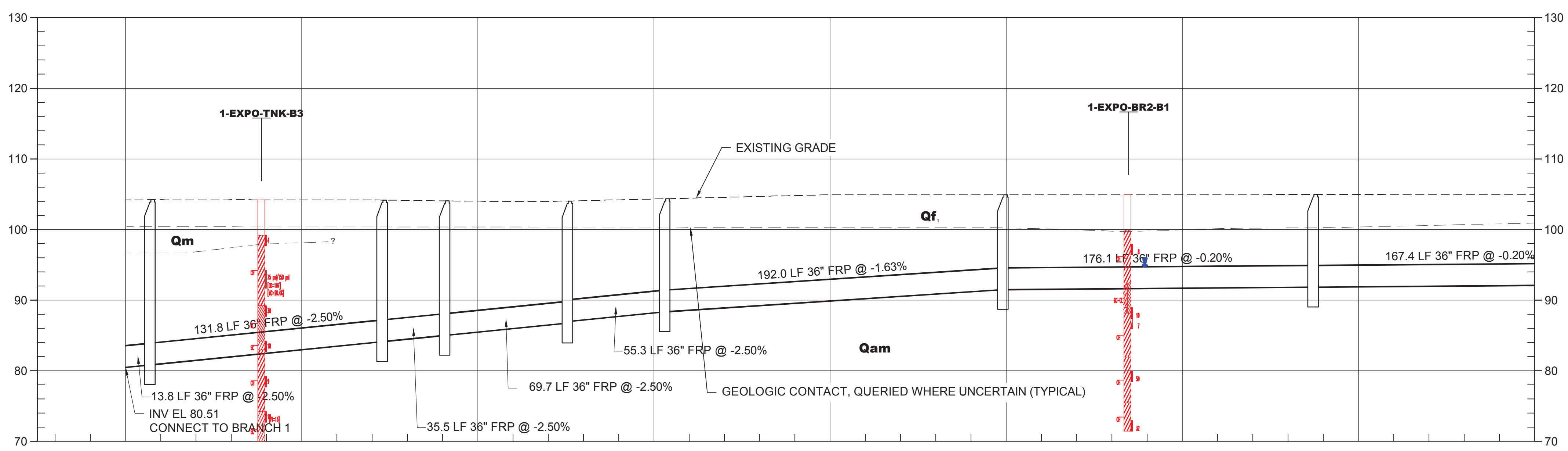
1-EXPO-BR2-B1 BORING (ENGEO, 2018)

PREVIOUS BOREHOLE OR CONE PENETRATION TEST - ADVANCED FOR BAY MEADOWS (LANGAN, 1995, 1996, 1999, 2000, 2002, 2007)

Qf ARTIFICIAL FILL

Qm BAY MUD (HOLOCENE)

Qam MEDIUM-GRAINED ALLUVIUM (HOLOCENE)



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

EXPO CENTER STORAGE FACILITY - EAST AND DIVERSION SEWERS

GEOTECHNICAL PLAN SET

BRANCH 2 PLAN AND PROFILE STA 10+00 TO 19+00

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PROJECT ENGINEER DATE

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BY: GARY JAFFE

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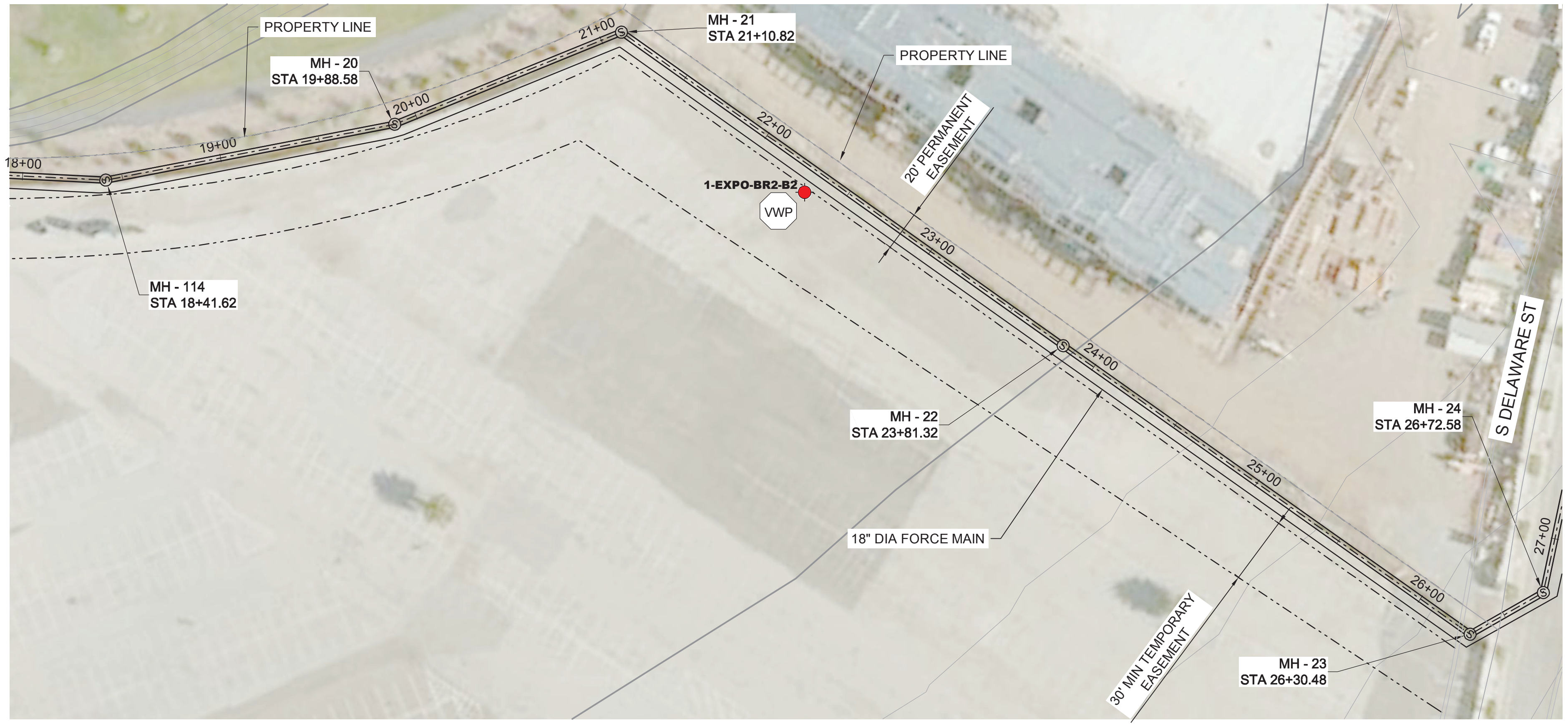
BY: GARY JAFFE



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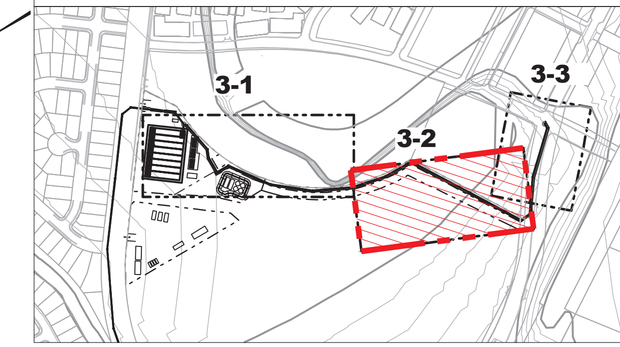
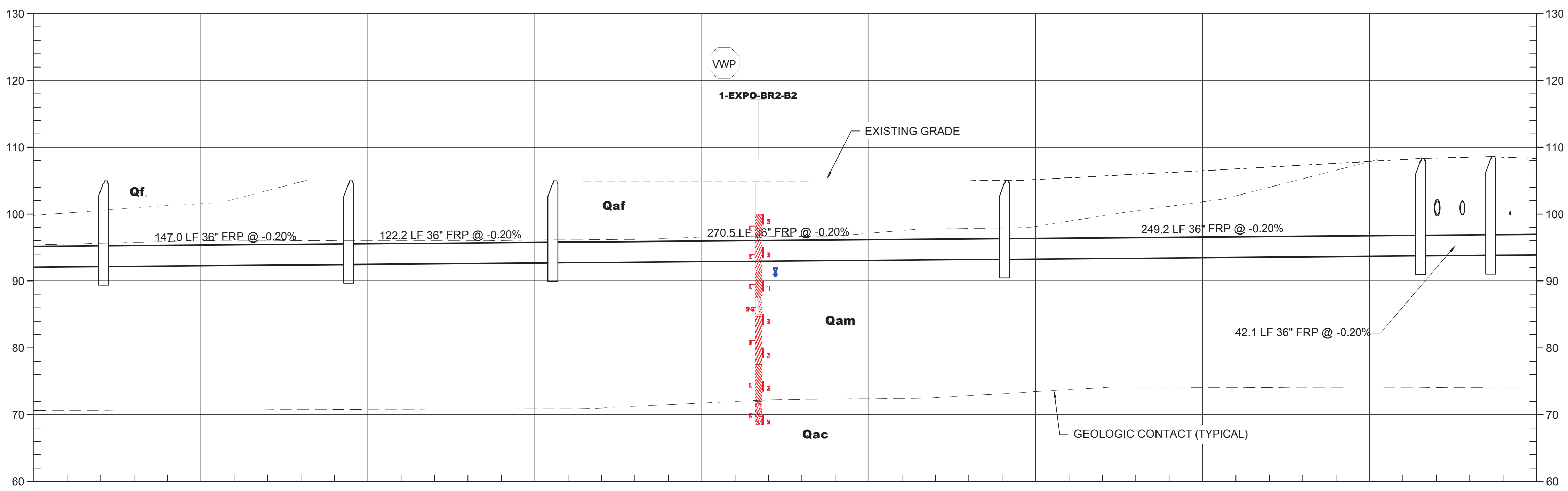


EXPLANATION
ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR2-B2	BORING (ENGEO, 2018)
VWP	VIBRATING WIRE PIEZOMETER
Qf	ARTIFICIAL FILL
Qac	COARSE-GRAINED ALLUVIUM (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

PLAN 3-2

DIVERSION SEWER BRANCH 2 STATION 18+00 TO 27+00



PROFILE

SCALE: 1"=40' HORIZONTAL
SCALE: 1"=10' VERTICAL

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 2 PLAN AND PROFILE STA 18+00 TO 27+00

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SENIOR ENGINEER
PROJECT ENGINEER

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SCALE: AS SHOWN
PROJECT NO:

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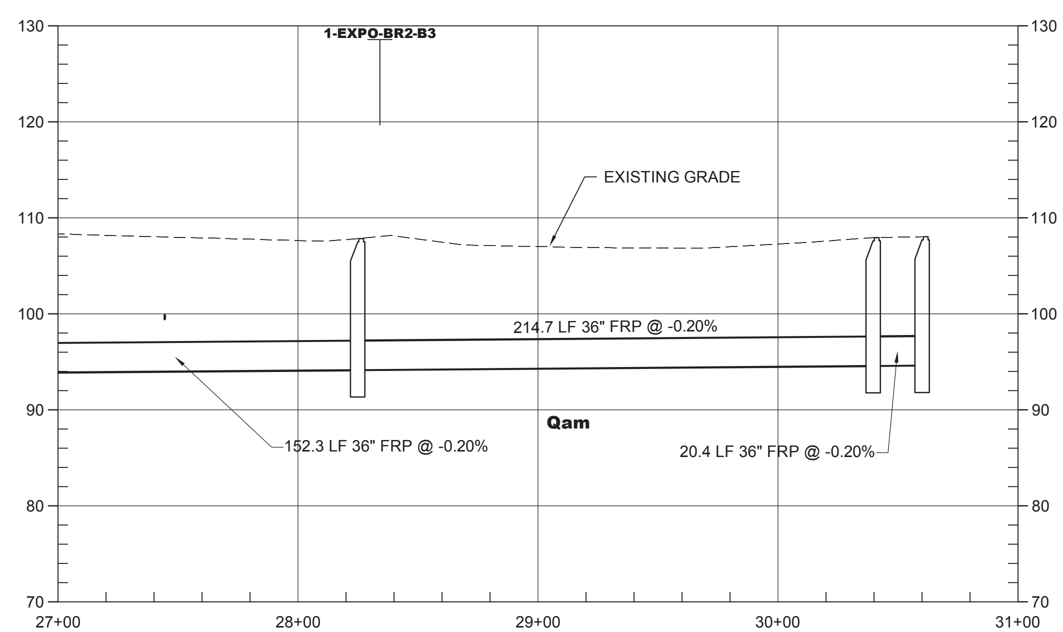
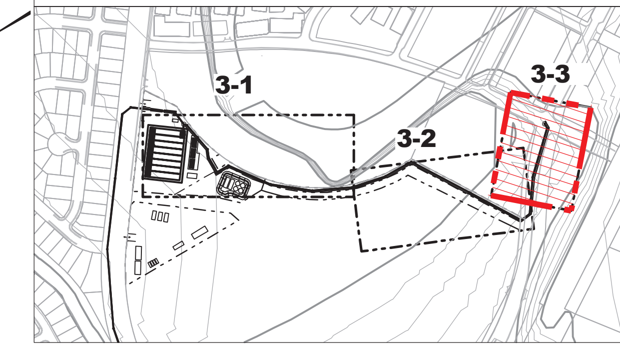
PLAN 3-3
DIVERSION SEWER BRANCH 2 STATION 27+00 TO 31+00



PROFILE
SCALE: 1"=40' HORIZONTAL
SCALE: 1"=10' VERTICAL

KEY PLAN



EXPLANATION
ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR2-B1	BORING (ENGEO, 2018)
	PREVIOUS BOREHOLE OR CONE PENETRATION TEST - ADVANCED FOR BAY MEADOWS (LANGAN, 1995, 1996, 1999, 2000, 2002, 2007)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 2 PLAN AND PROFILE STA 27+00 TO 31+00

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BY: GARY JAFFE

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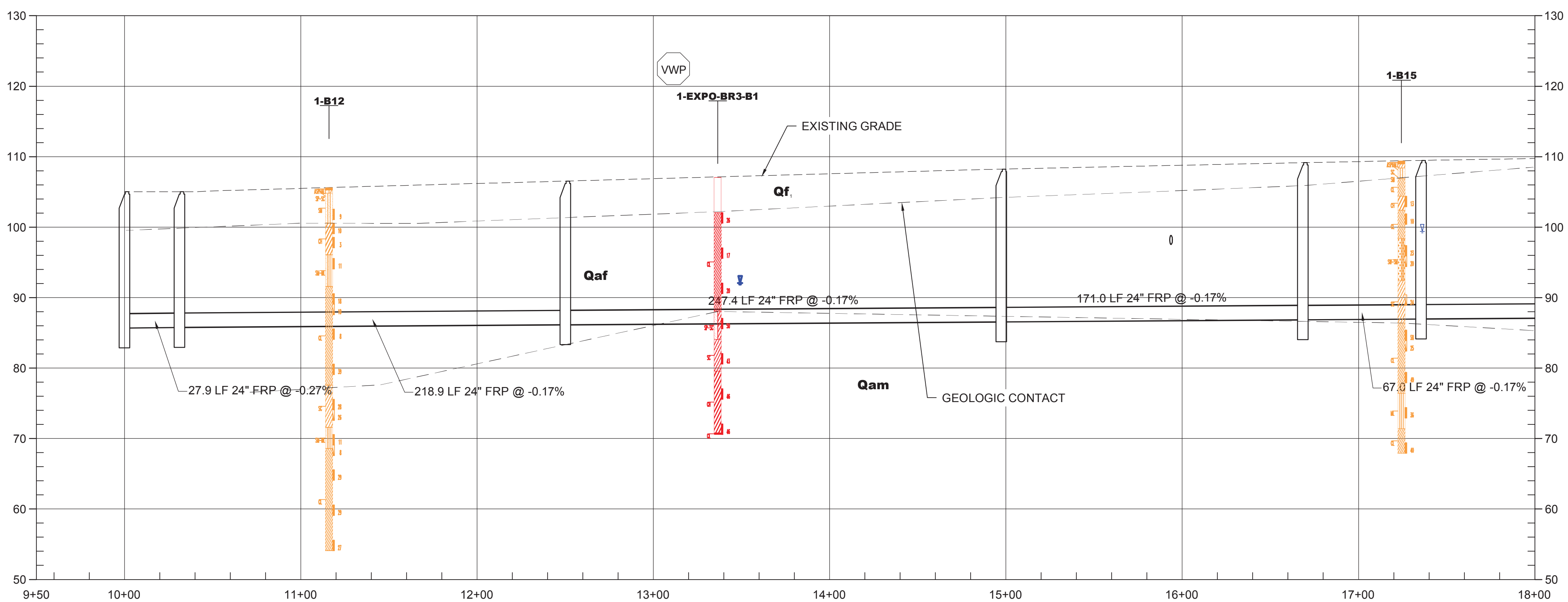
BY: GARY JAFFE

PLAN 4-1

DIVERSION SEWER BRANCH 3 STATION 10+00 TO 18+00



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

KEY PLAN

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR3-B1	BORING (ENGEO, 2017)
	PREVIOUS BORING OR CONE PENETRATION TEST - ADVANCED FOR SOUTH TRUNK SANITARY SEWER RELIEF LINE (ENGEO, 2010)
VWP	VIBRATING WIRE PIEZOMETER
Qf	ARTIFICIAL FILL
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 3 PLAN AND PROFILE STA 10+00 TO 18+00

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PROJECT NO:

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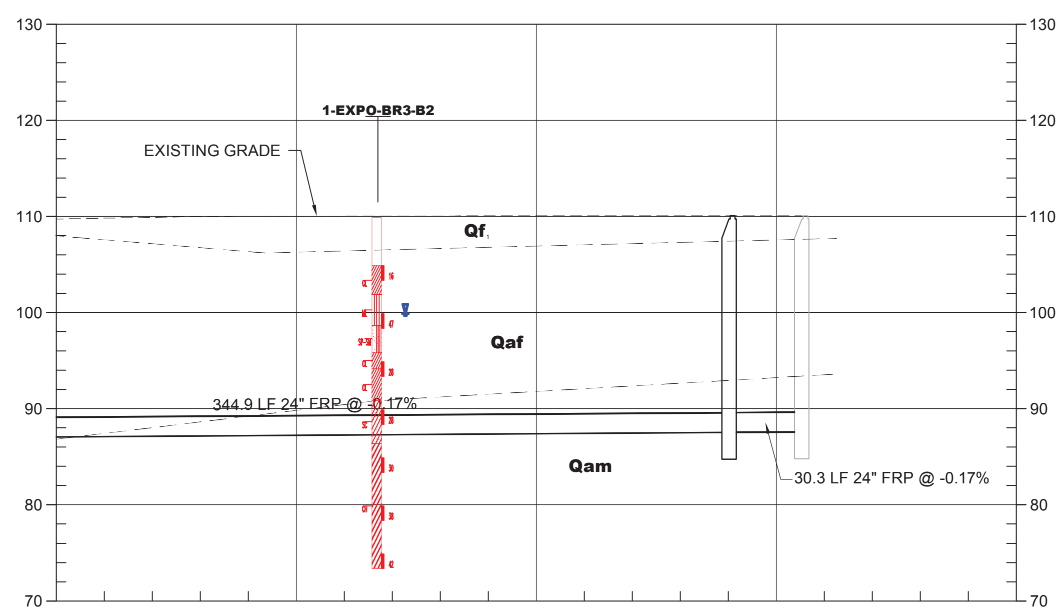
DWG FILE: G:\Active Projects_12000 To 13999\13231\13231000001\DRAFTING\CAD Files\EXPO Tank And Diversion Sewers\ENGEO-SM-2-4-C-EXPO_EAST-0118.dwg

PLAN 4-2

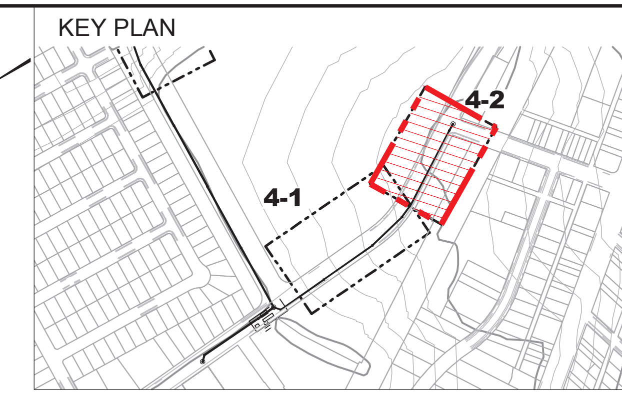
DIVERSION SEWER BRANCH 3 STATION 18+00 TO 22+00



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR3-B2	BORING (ENGEO, 2017)
Qf	ARTIFICIAL FILL
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

VERTICAL SCALE: 1" = 10'
0 10 20
SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'
0 40 80
SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 3 PLAN AND PROFILE STA 18+00 TO 22+00

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BY: GARY JAFFE

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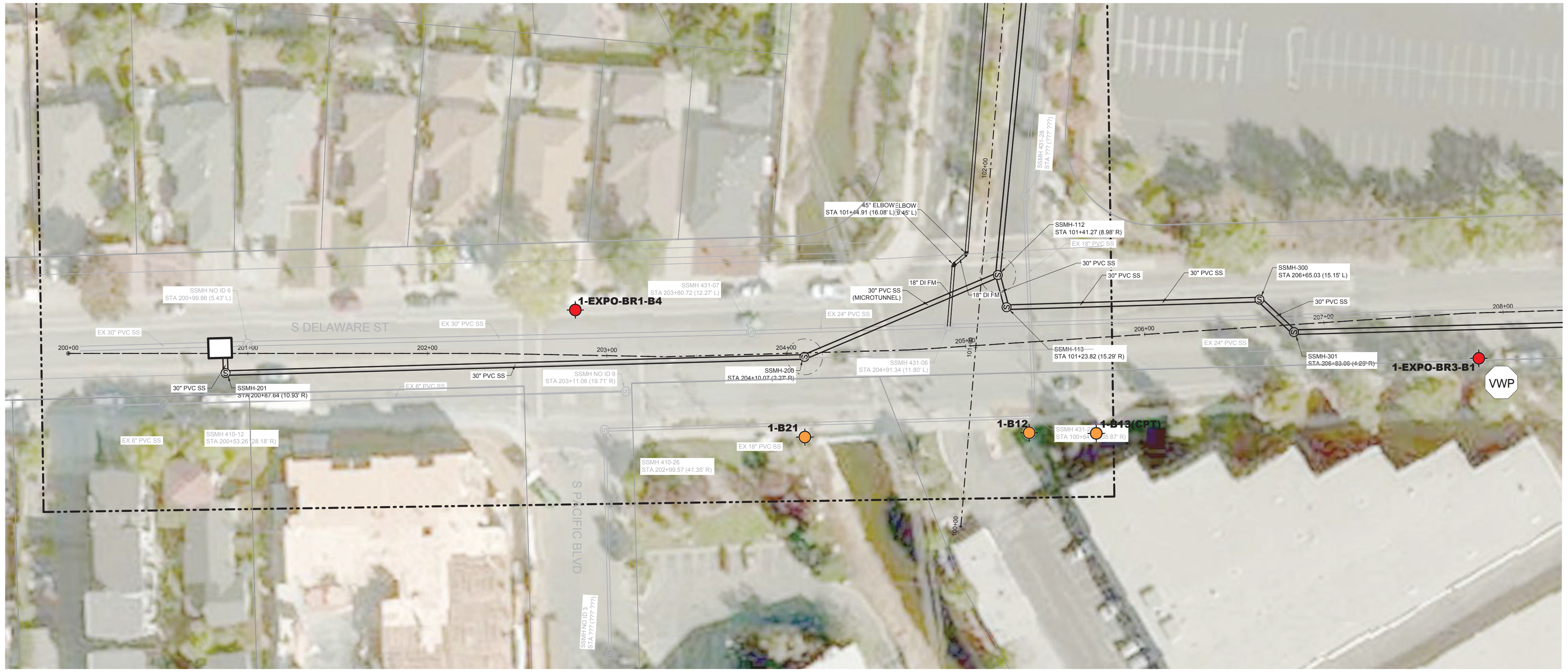
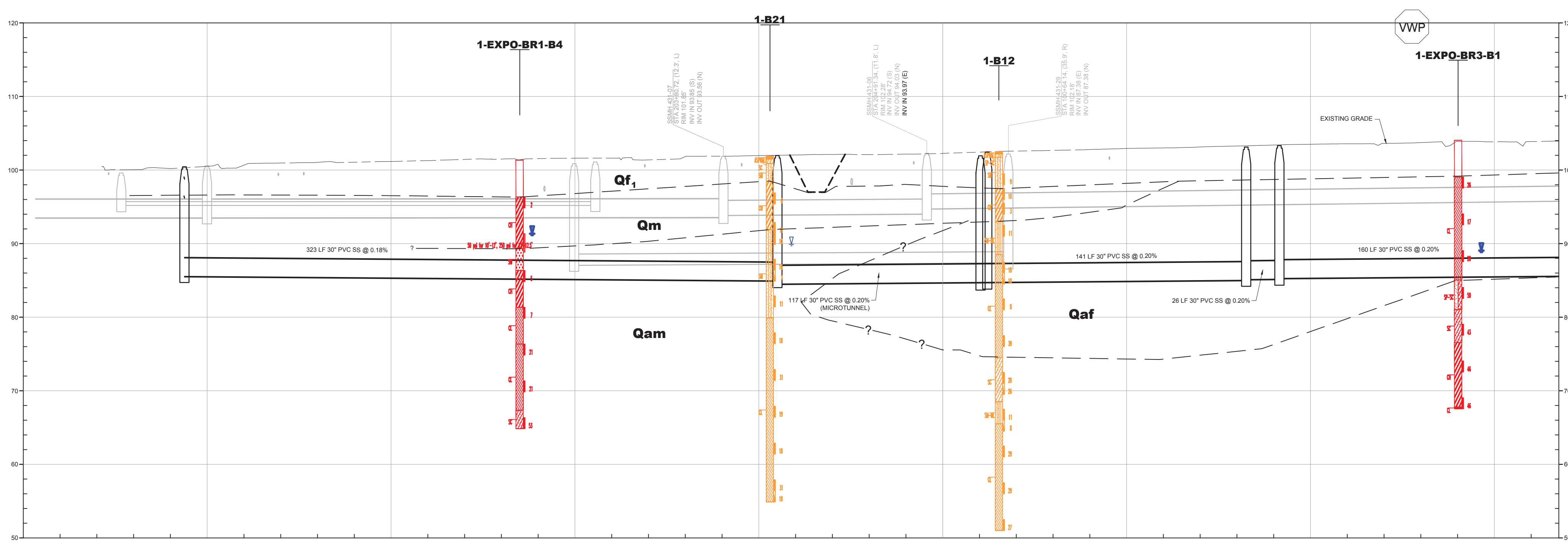
BY: STEPHEN PATTERSON



PLAN 5-1

DIVERSION SEWER BRANCH 1 STATION 200+00 TO 208+35



PROFILE

SCALE: 1"=40' HORIZONTAL

SCALE: 1"=10' VERTICAL

EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

1-EXPO-BR1-B4	BORING (ENGEO, 2017)
1-B21	PREVIOUS BORING - ADVANCED FOR SOUTH TRUNK SANITARY SEWER RELIEF LINE (ENGEO, 2010)
VWP	VIBRATING WIRE PIEZOMETER
Qf_1	ARTIFICIAL FILL
Qm	BAY MUD (HOLOCENE)
Qam	MEDIUM-GRAINED ALLUVIUM (HOLOCENE)
Qaf	FINE-GRAINED ALLUVIUM (HOLOCENE)

VERTICAL SCALE: 1" = 10'

0 10 20 SCALE IN FEET

HORIZONTAL SCALE: 1" = 40'

0 40 80 SCALE IN FEET

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GEOTECHNICAL PLAN SET

BRANCH 1 TRENCHLESS PLAN AND PROFILE STA 200+00 TO 208+35

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SENIOR ENGINEER DATE

PROJECT ENGINEER DATE

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BOOK NO: DATE:

DRAWN BY: G. JAFFE DATE:

CHECKED BY: S. BARUA DATE:

SCALE: AS SHOWN

PROJECT NO: 13231.000.001

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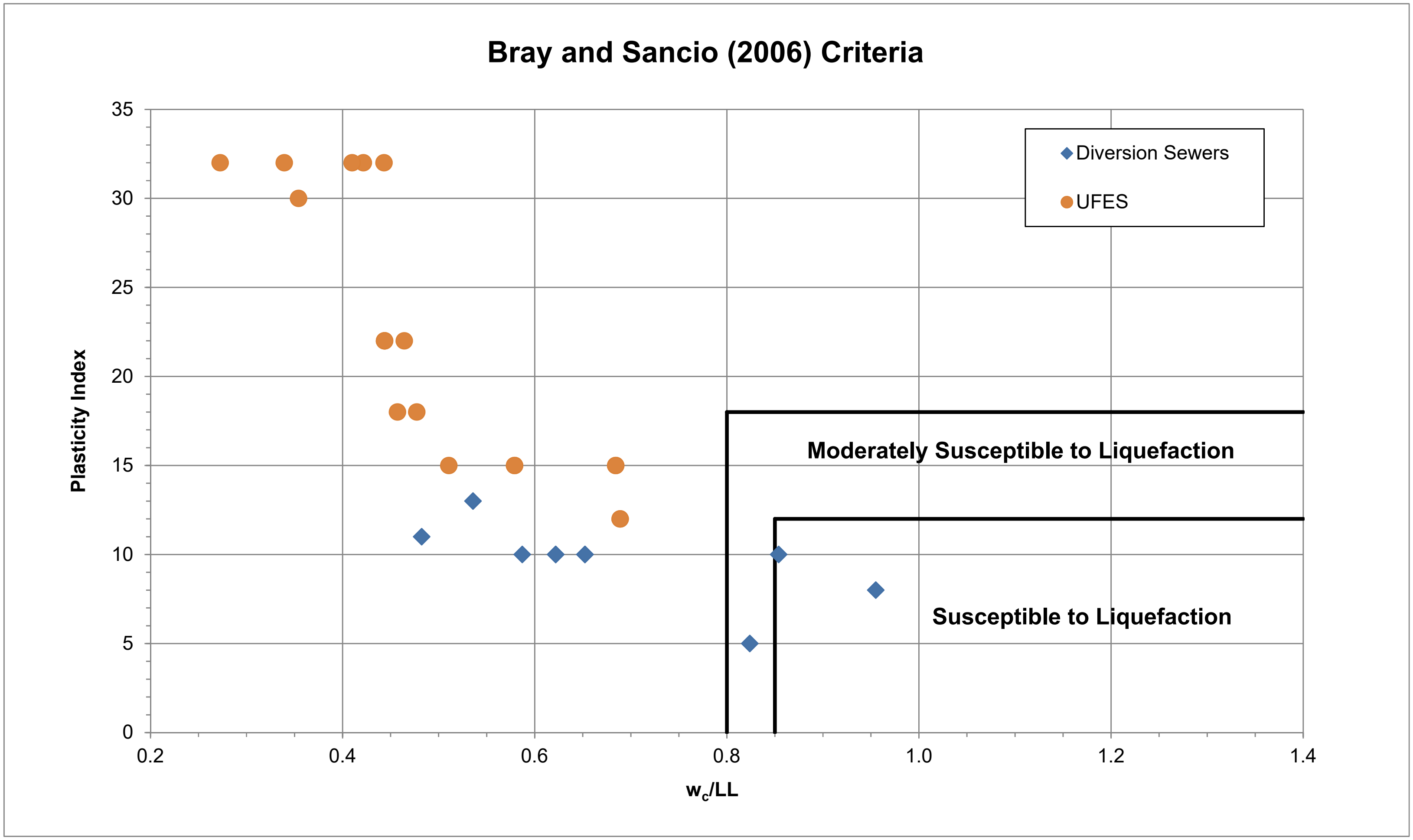
APPENDIX A

LIQUEFACTION ANALYSIS

Appendix A: Bray and Sancio Methodology for Liquefaction Susceptibility



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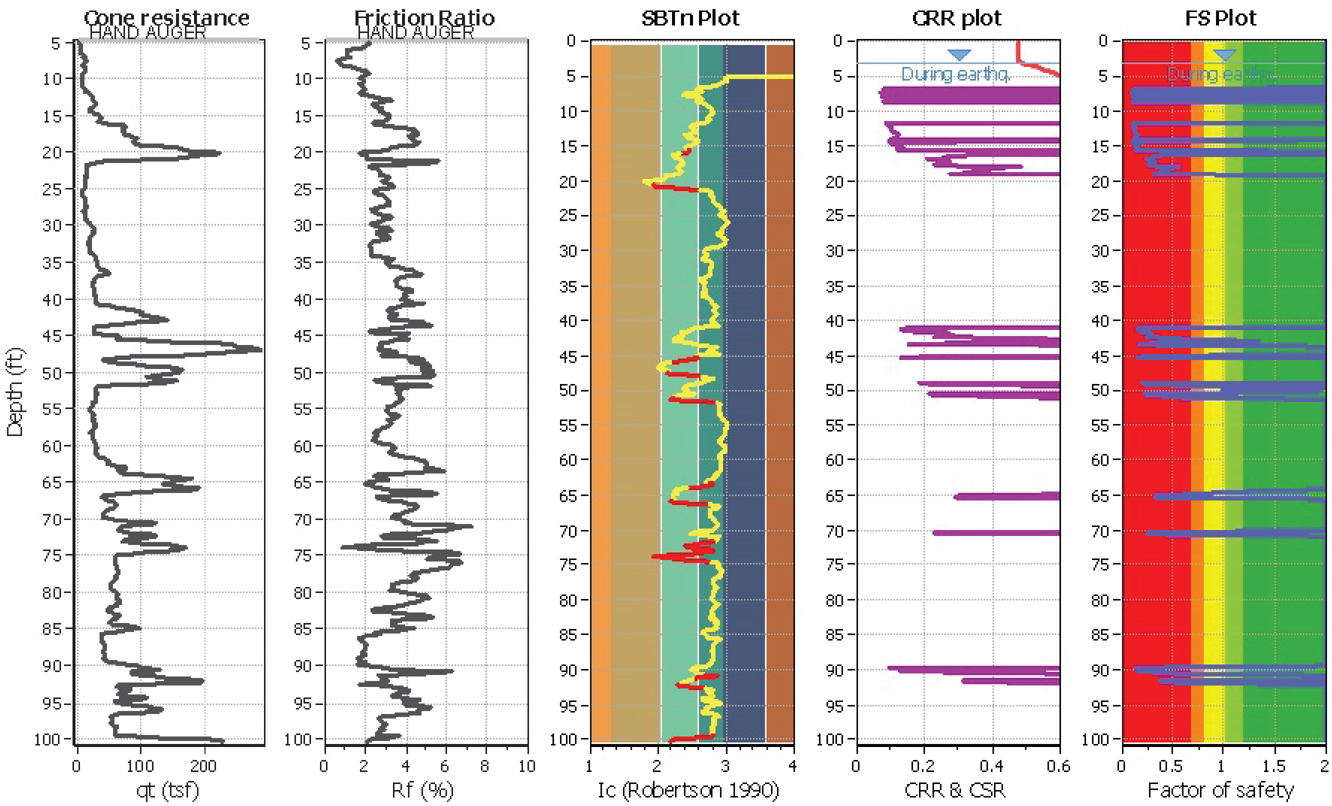
LIQUEFACTION ANALYSIS REPORT

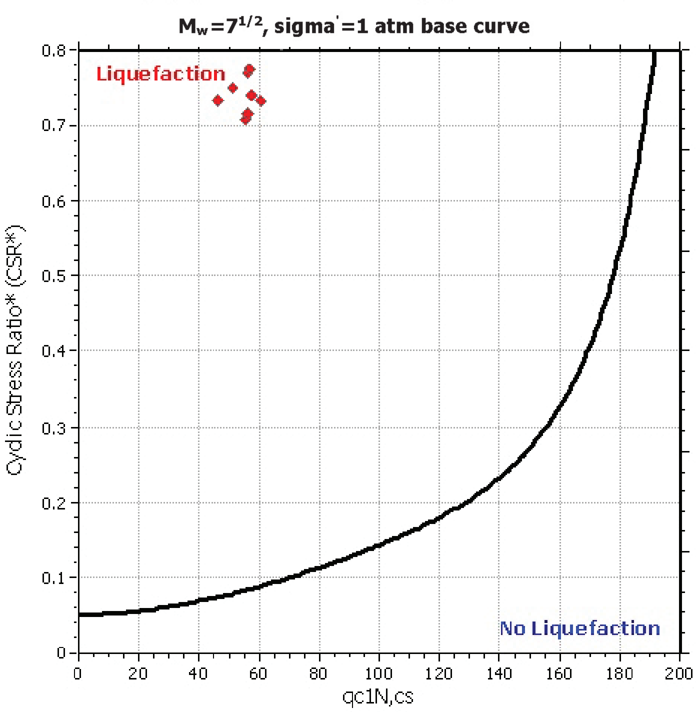
Project title : San Mateo Basin 2&3 **Location :**

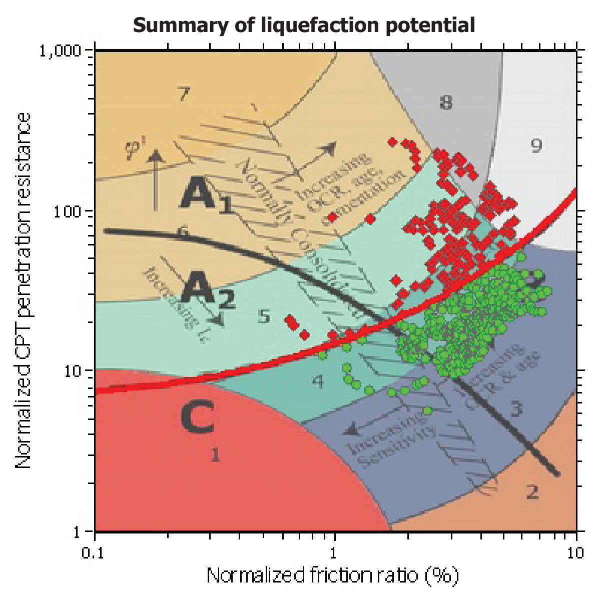
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

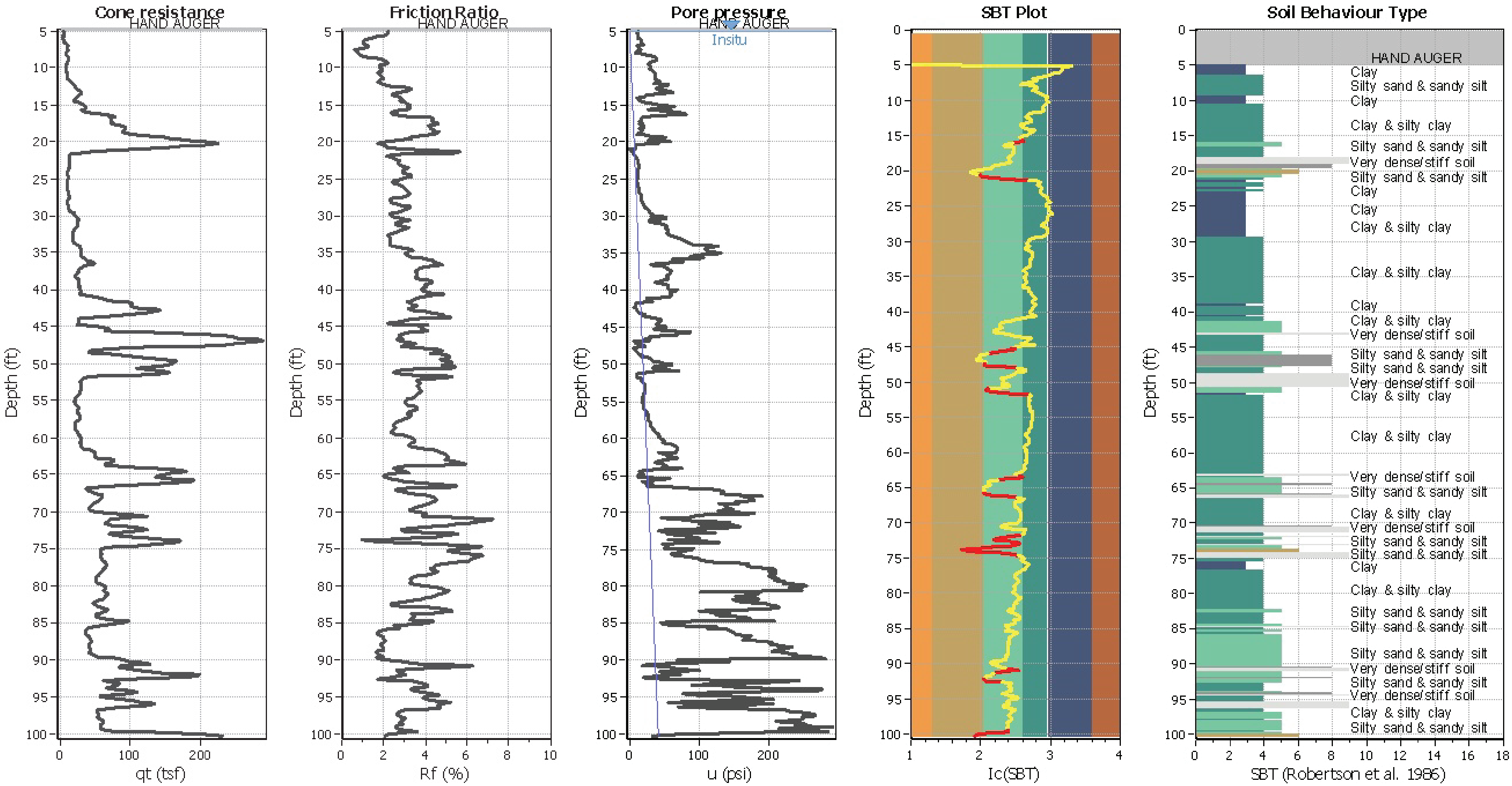






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



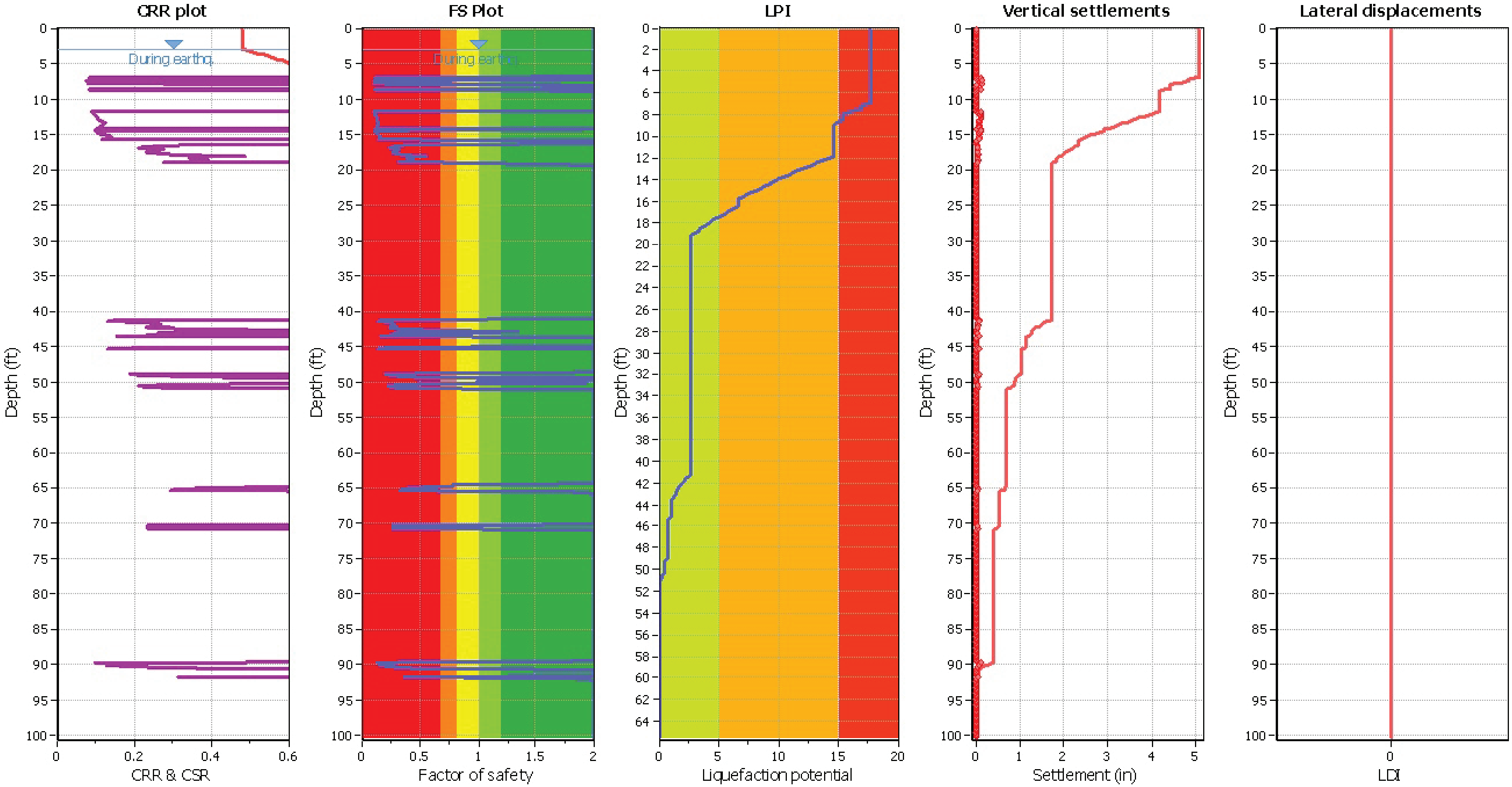
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

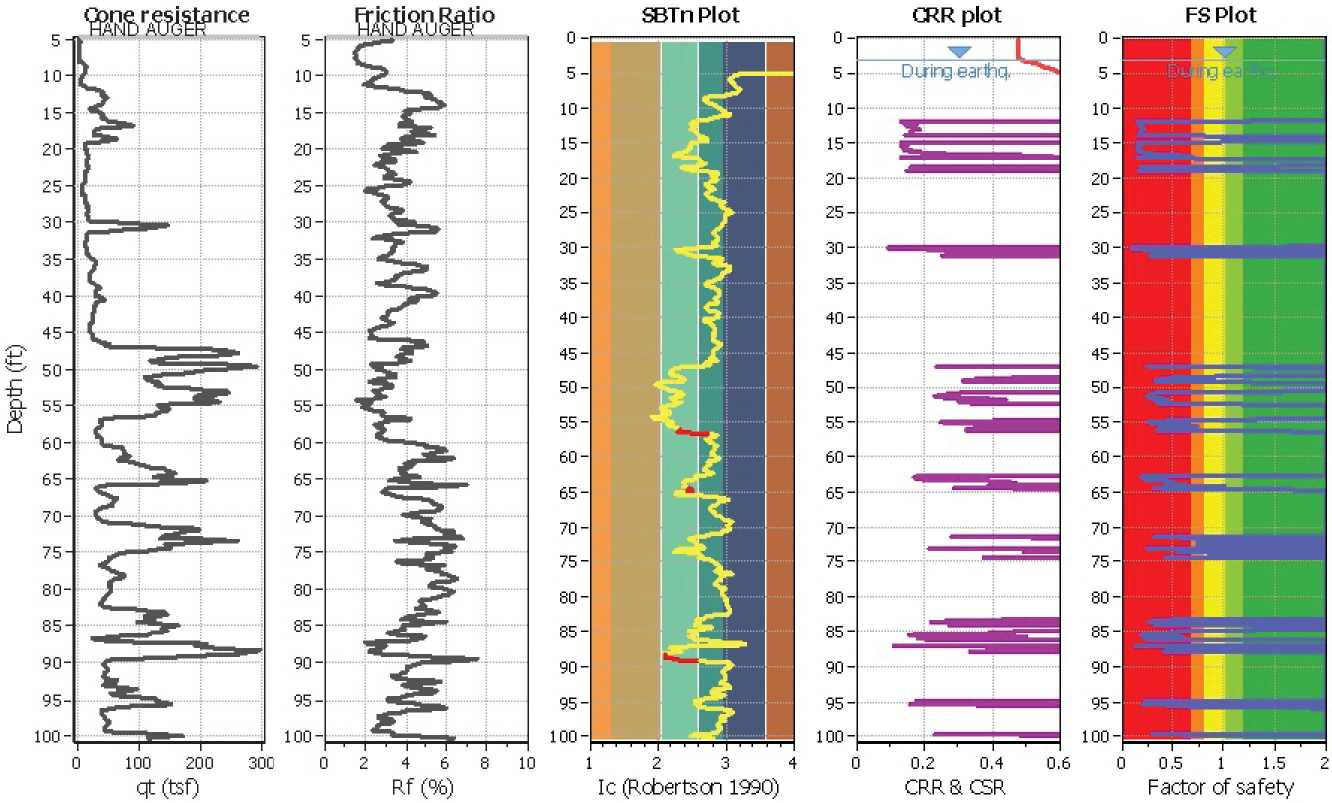
LIQUEFACTION ANALYSIS REPORT

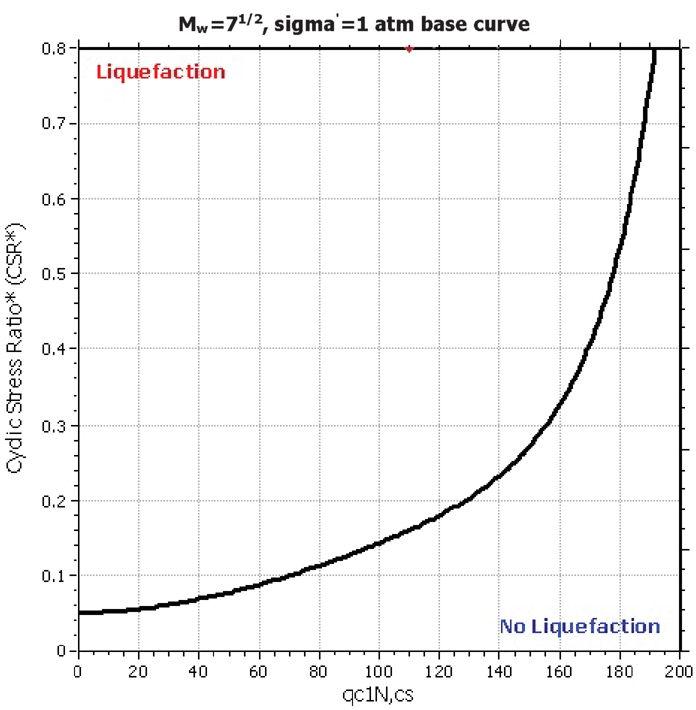
Project title : San Mateo Basin 2&3 **Location :**

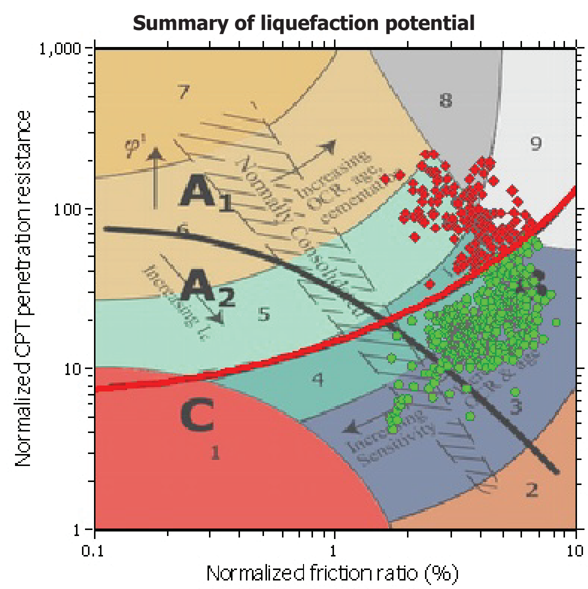
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

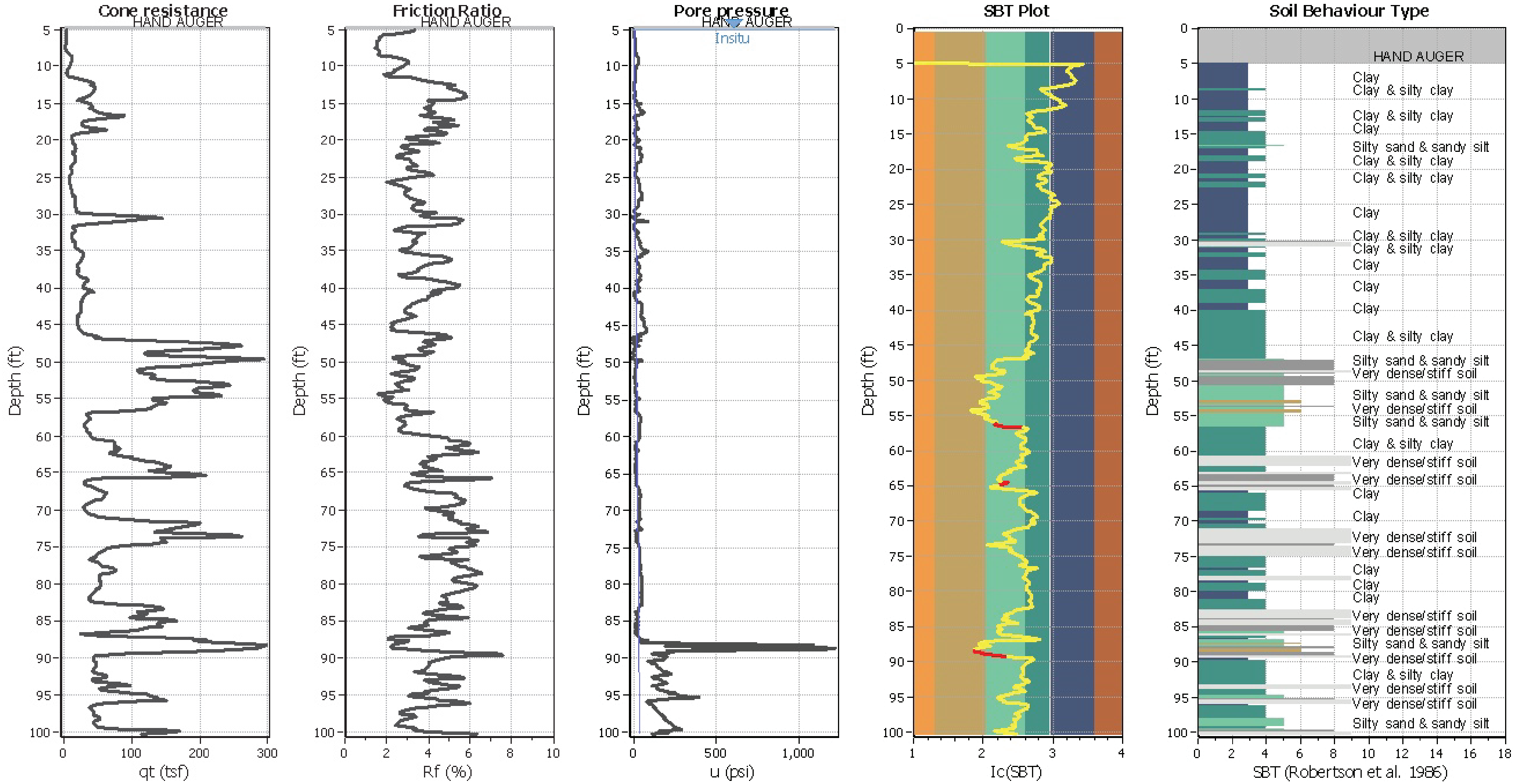






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



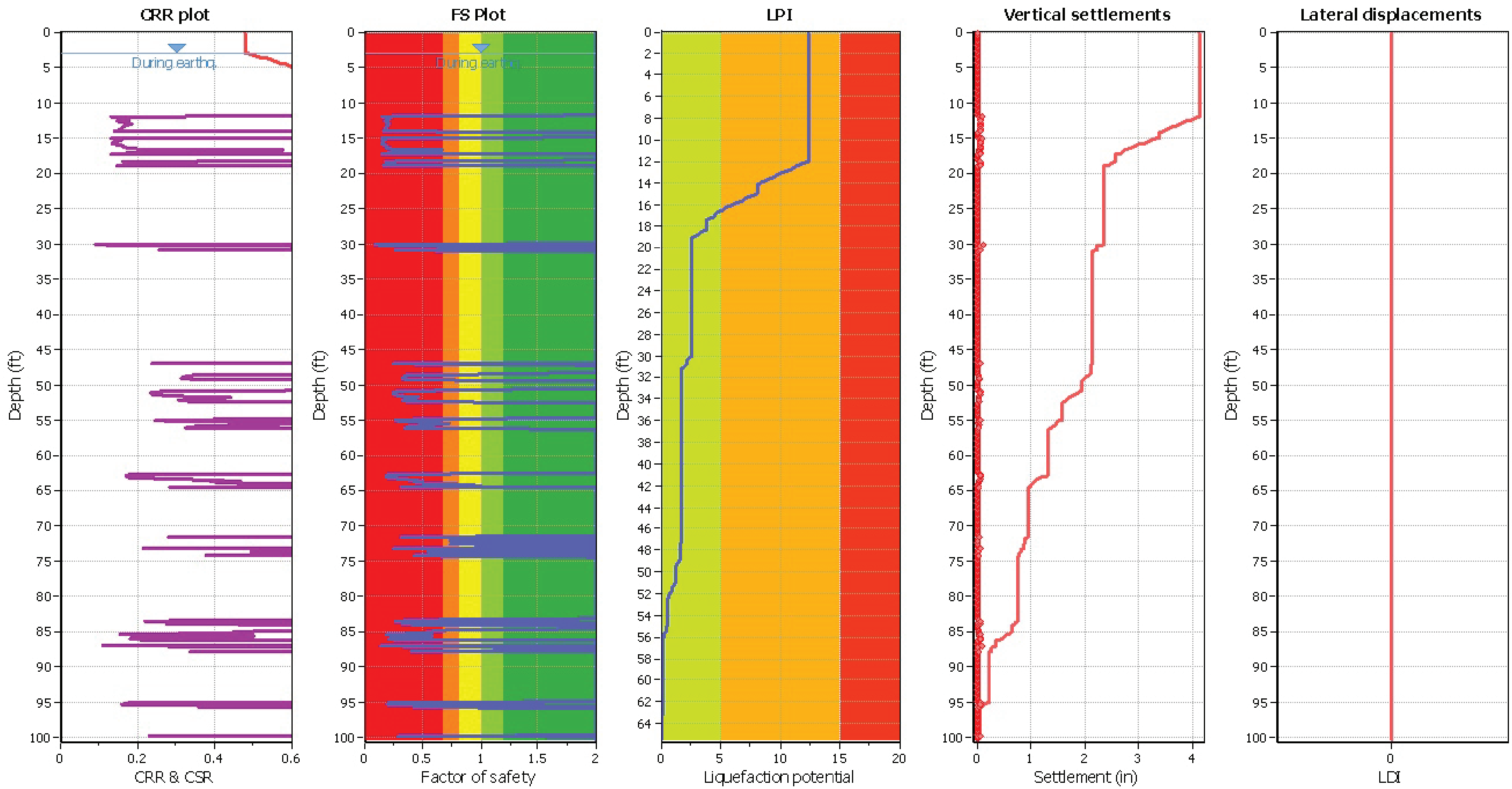
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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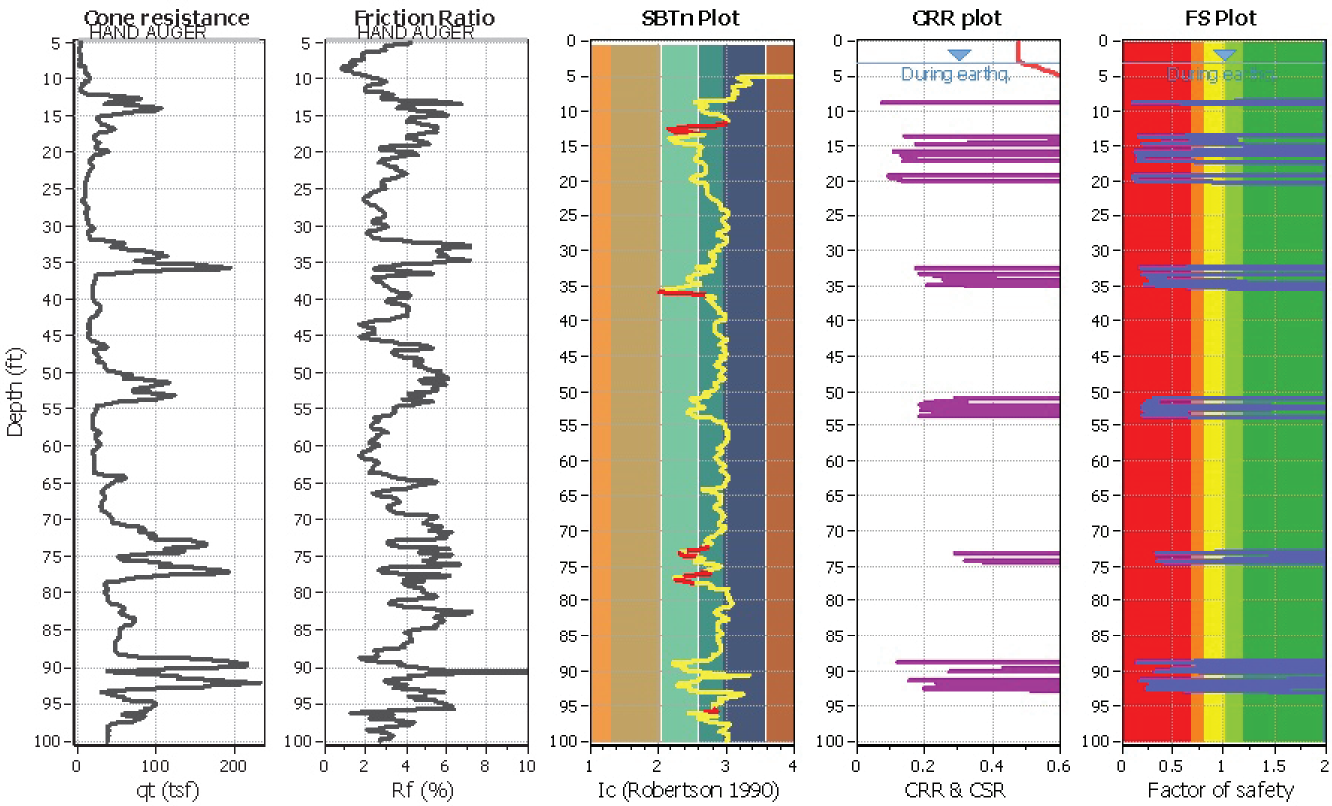
LIQUEFACTION ANALYSIS REPORT

Project title : San Mateo Basin 2&3 **Location :**

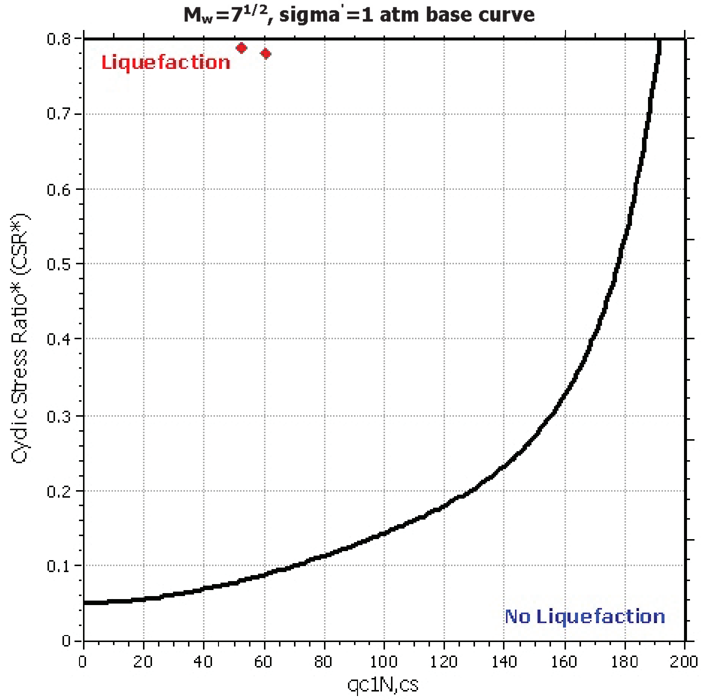
CPT file : CPT-03

Input parameters and analysis data

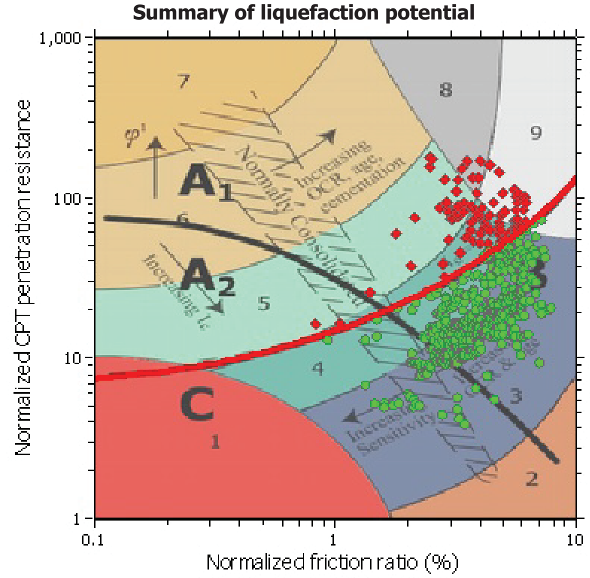
Analysis method:	I&B (2008)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		



M_w=7$^{1/2}$, sigma'=1 atm base curve

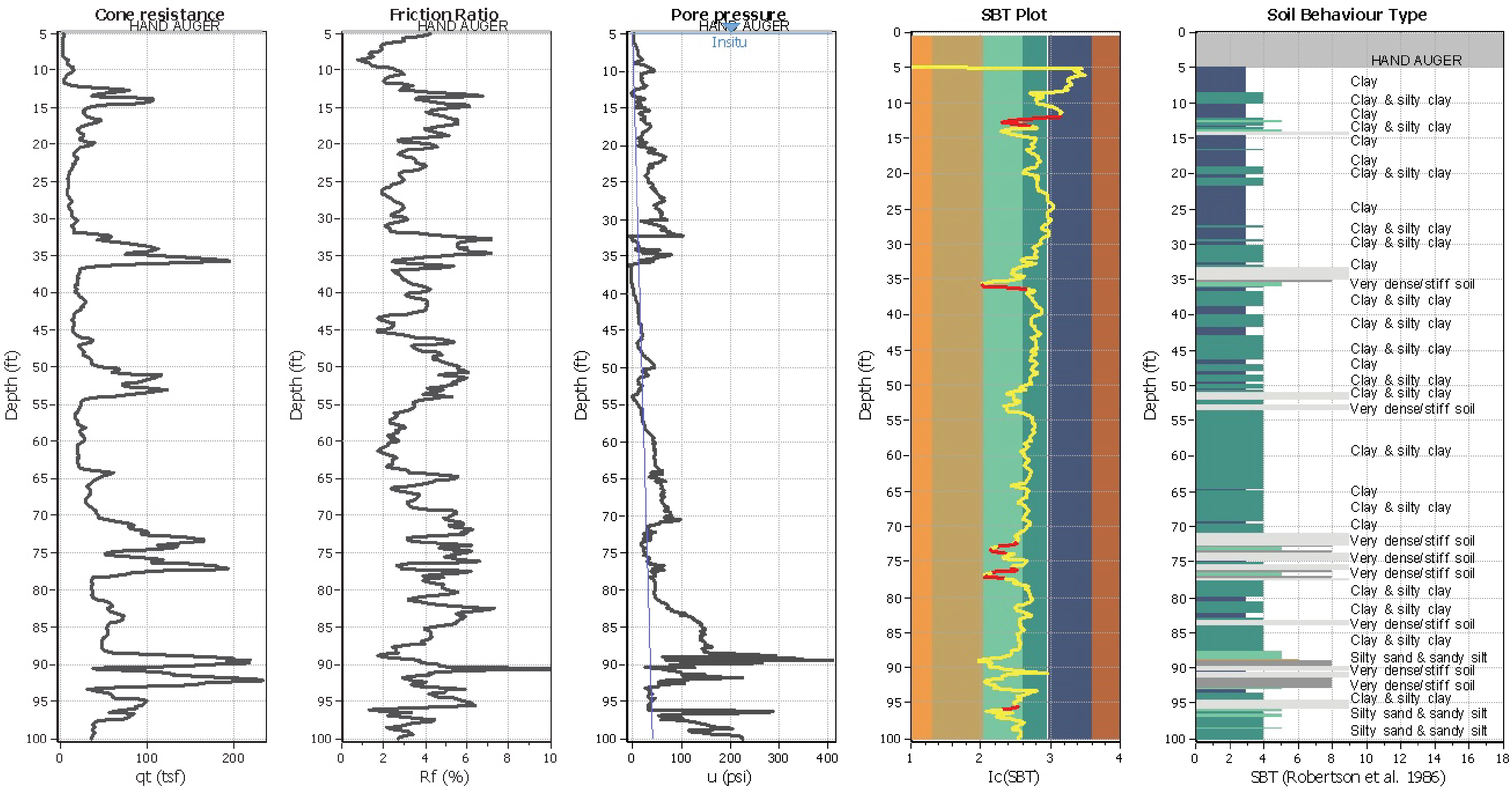


Summary of liquefaction potential



Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



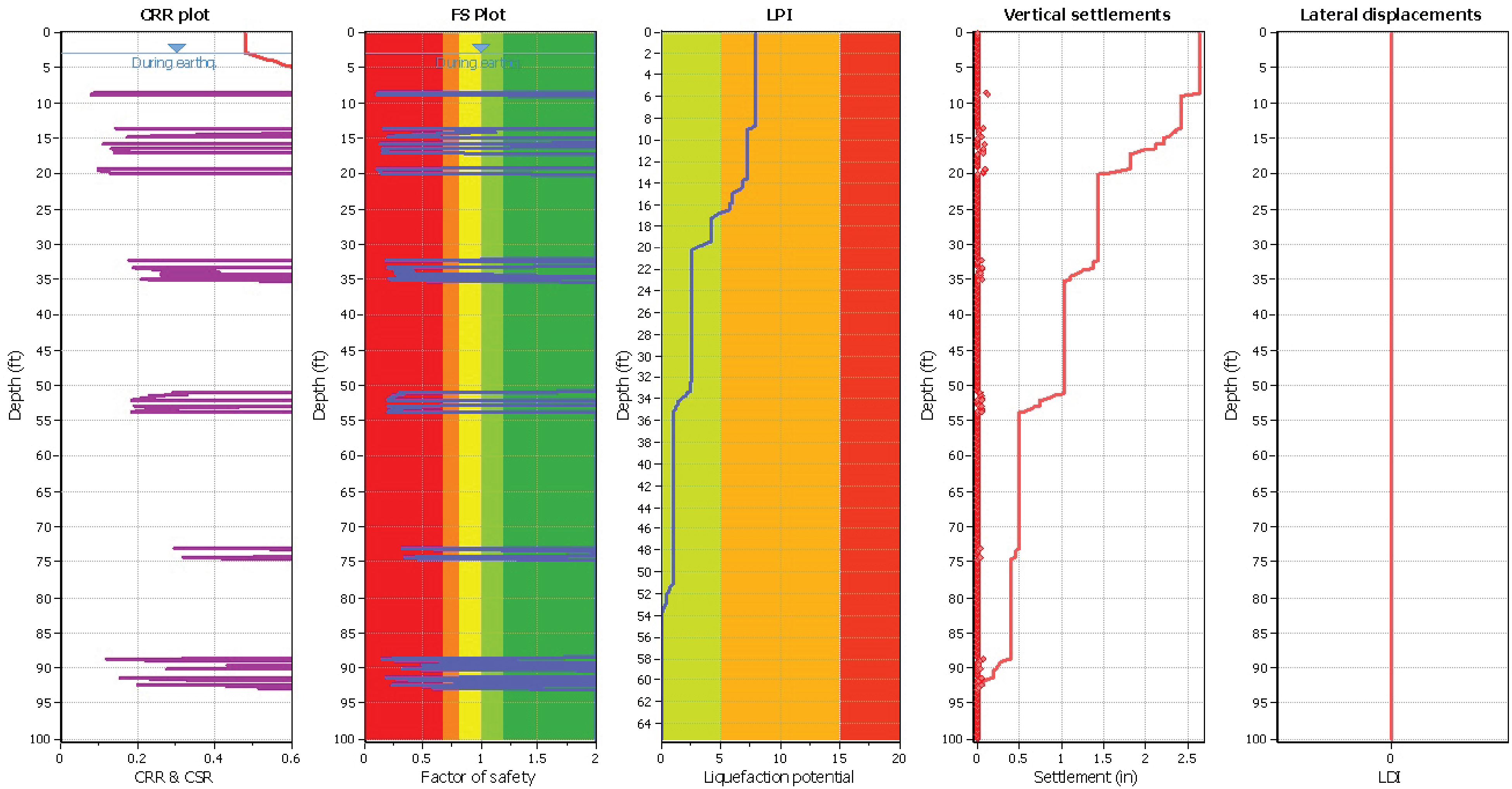
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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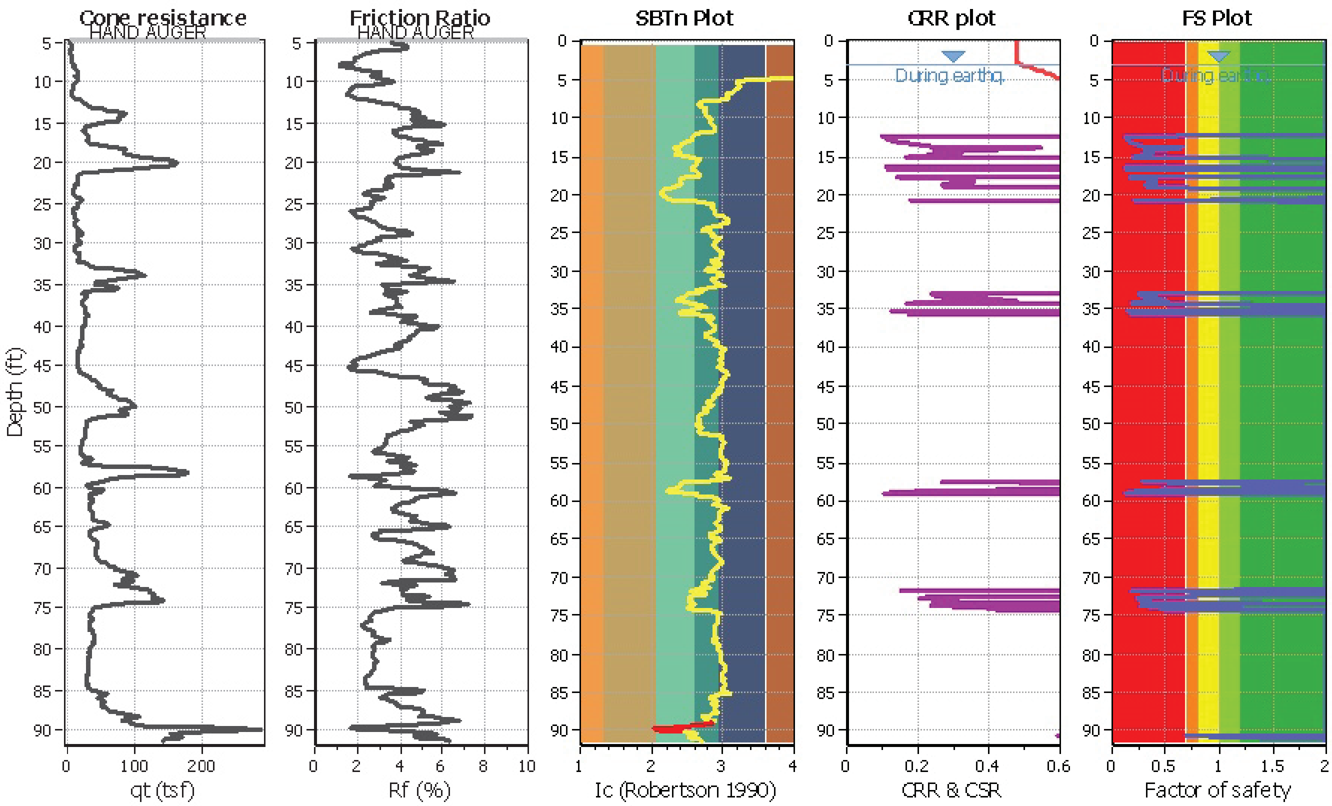
LIQUEFACTION ANALYSIS REPORT

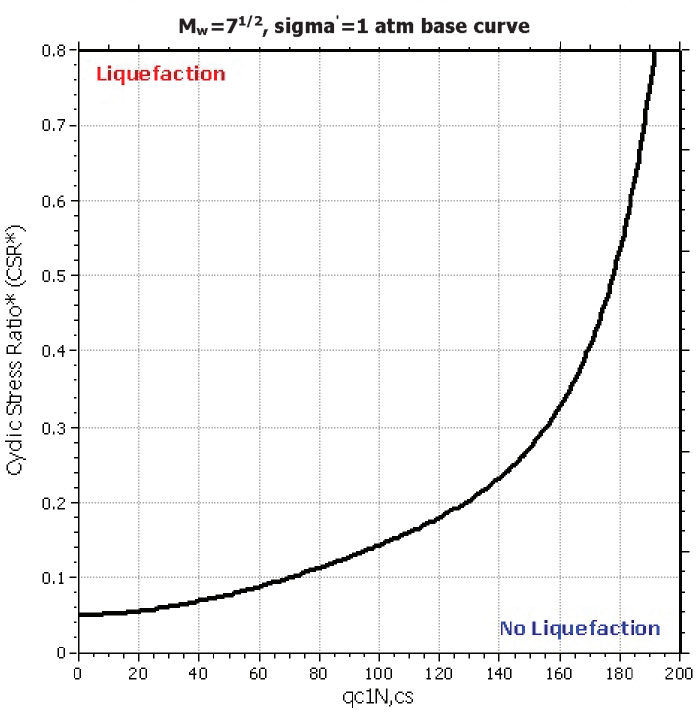
Project title : San Mateo Basin 2&3 **Location :**

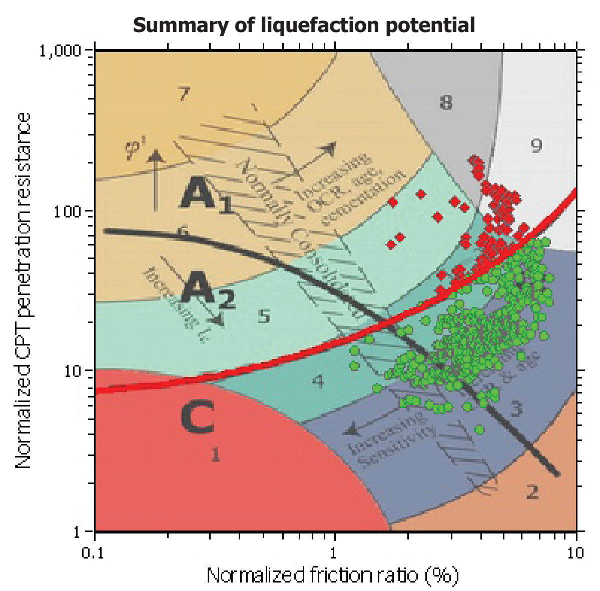
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

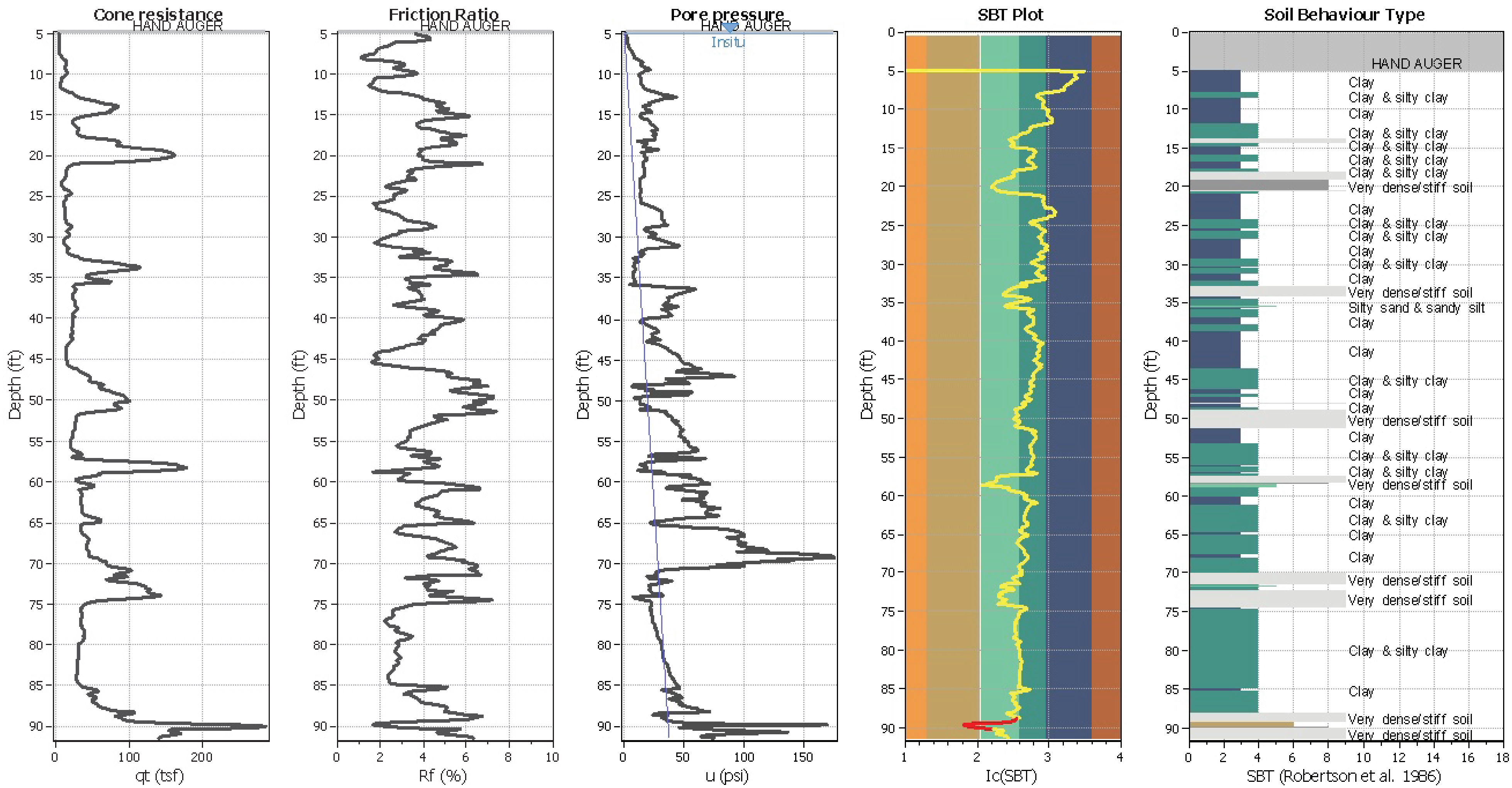






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



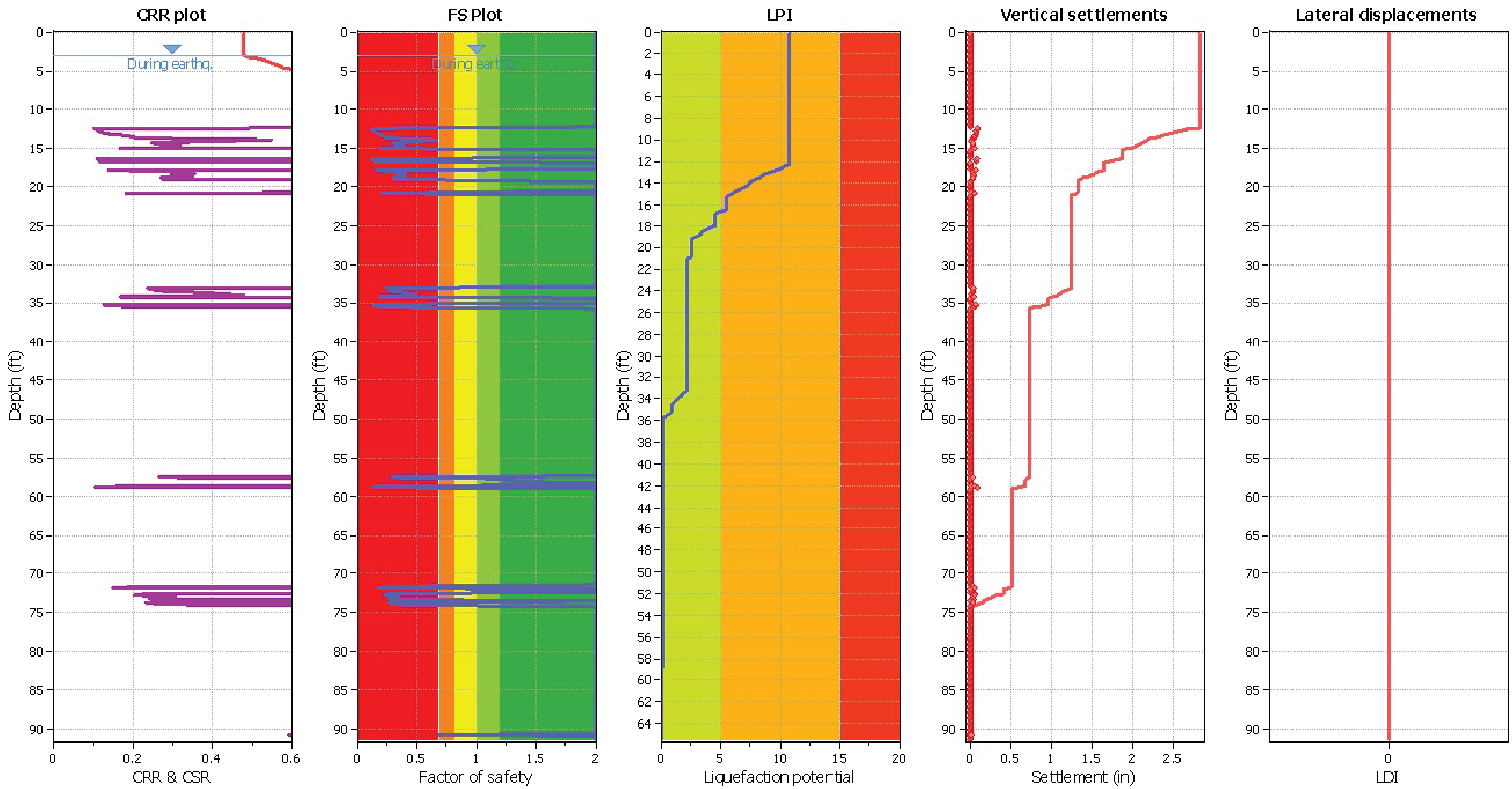
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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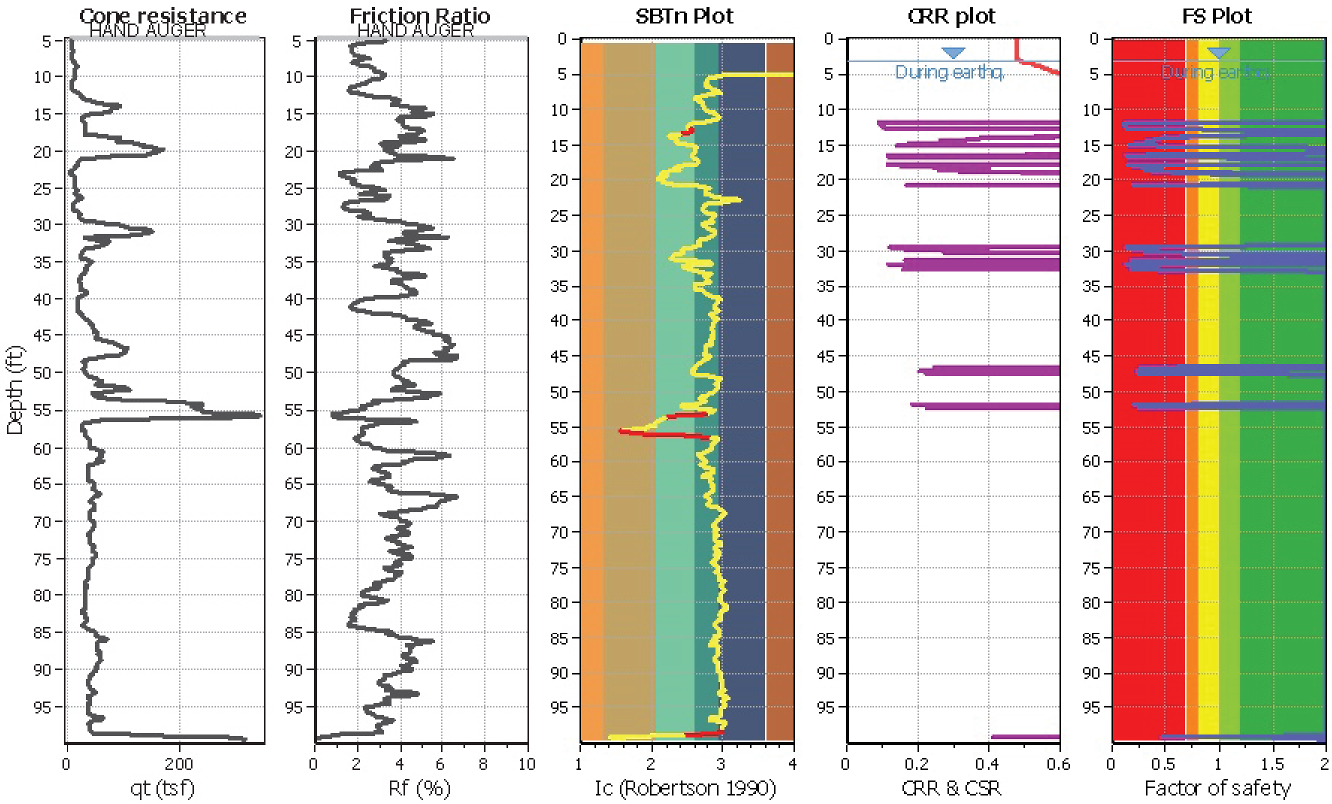
LIQUEFACTION ANALYSIS REPORT

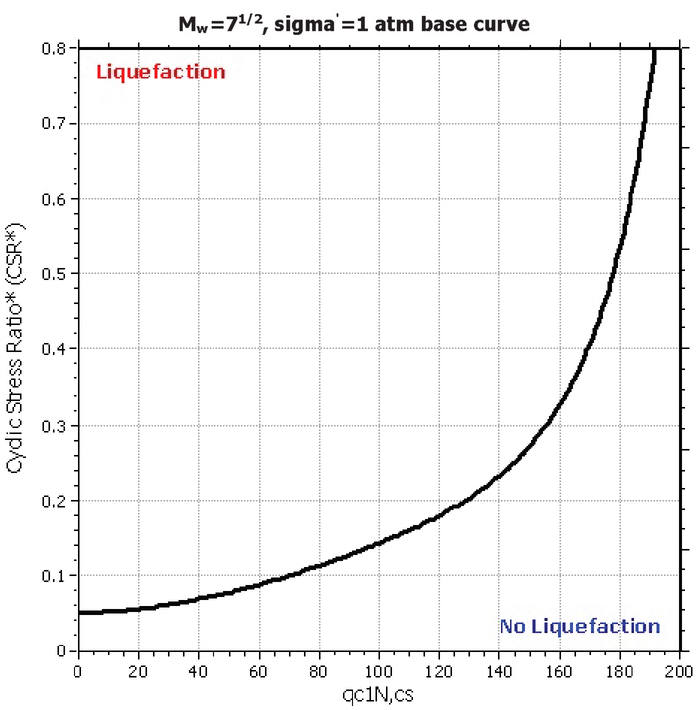
Project title : San Mateo Basin 2&3 **Location :**

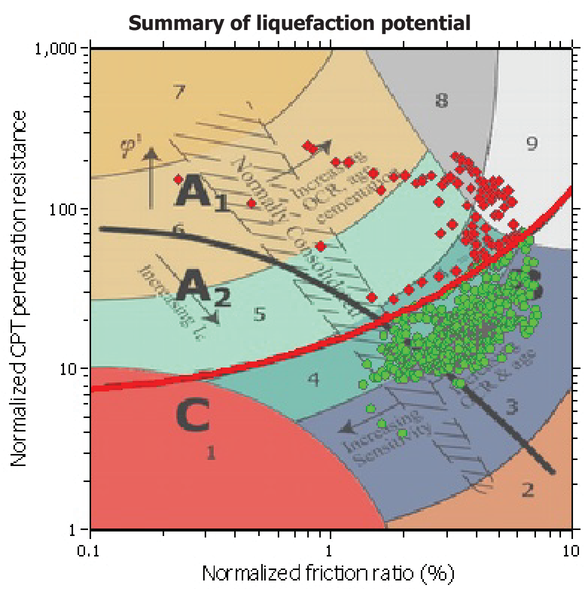
CPT file : CPT-04a

Input parameters and analysis data

Analysis method:	I&B (2008)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	I&B (2008)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

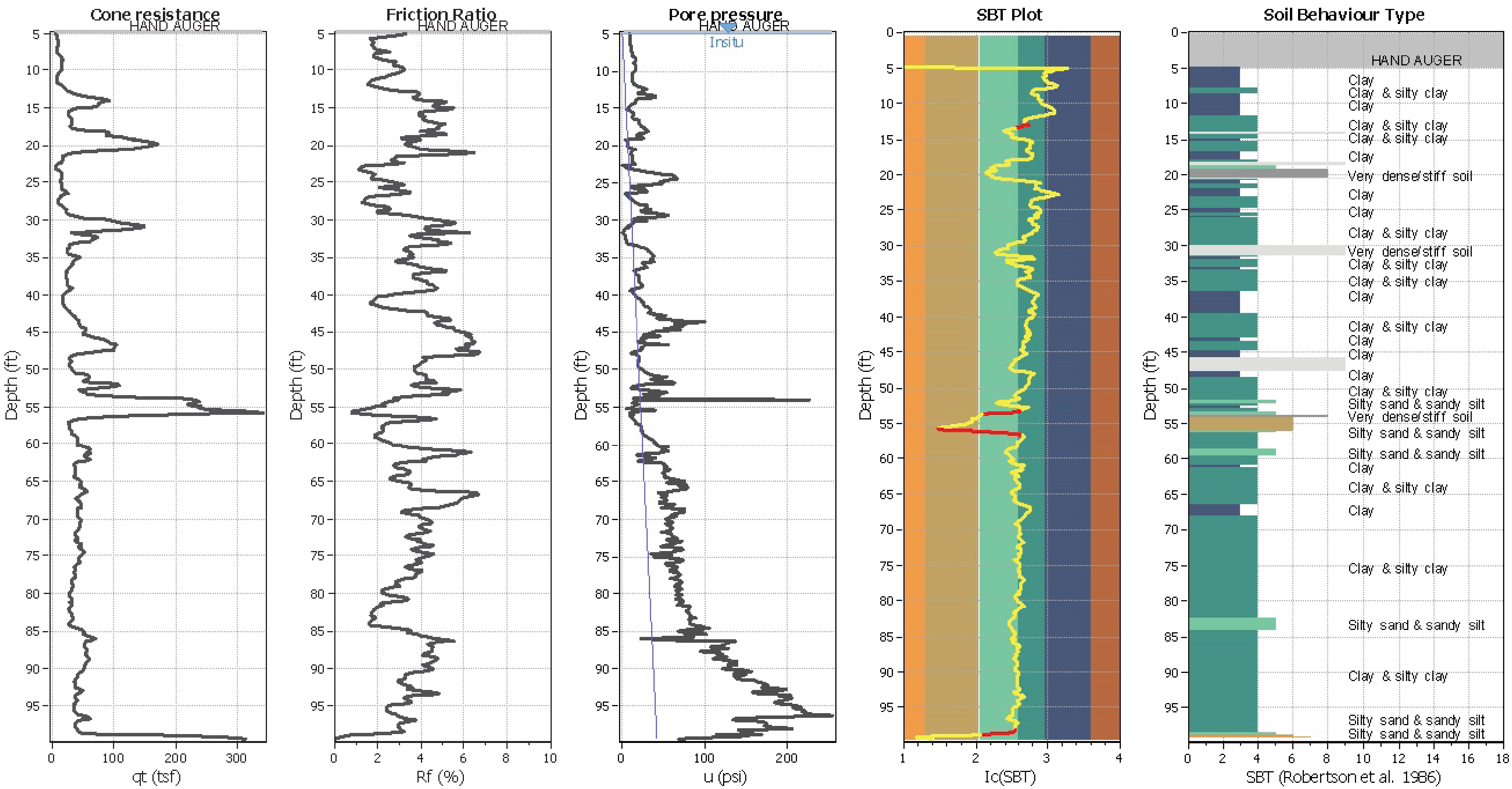






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



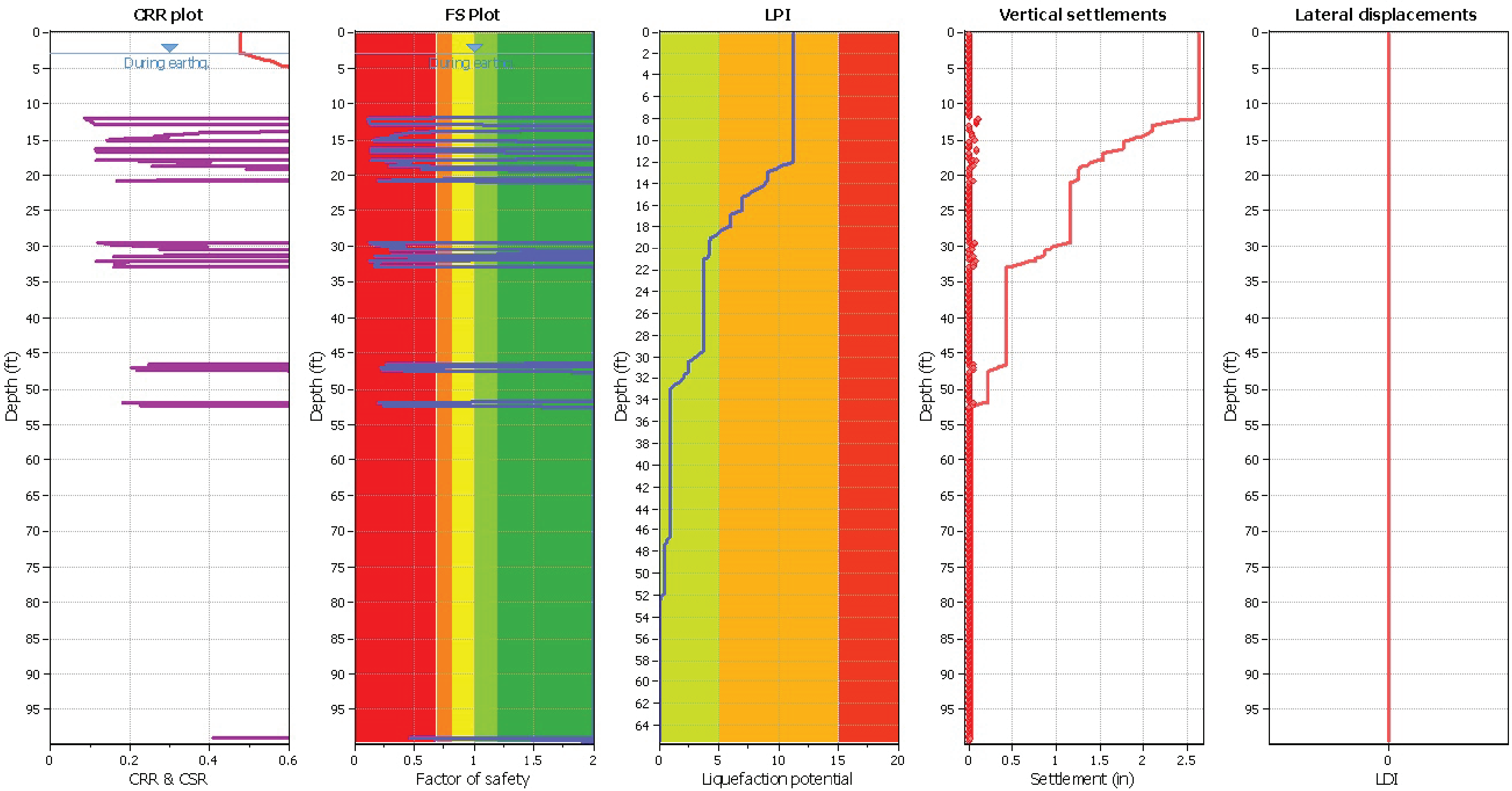
Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

- 1. Sensitive fine grained
- 2. Organic material
- 3. Clay to silty clay
- 4. Clayey silt to silty
- 5. Silty sand to sandy silt
- 6. Clean sand to silty sand
- 7. Gravely sand to sand
- 8. Very stiff sand to clayey sand
- 9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	I&B (2008)	Depth to GWT (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	I&B (2008)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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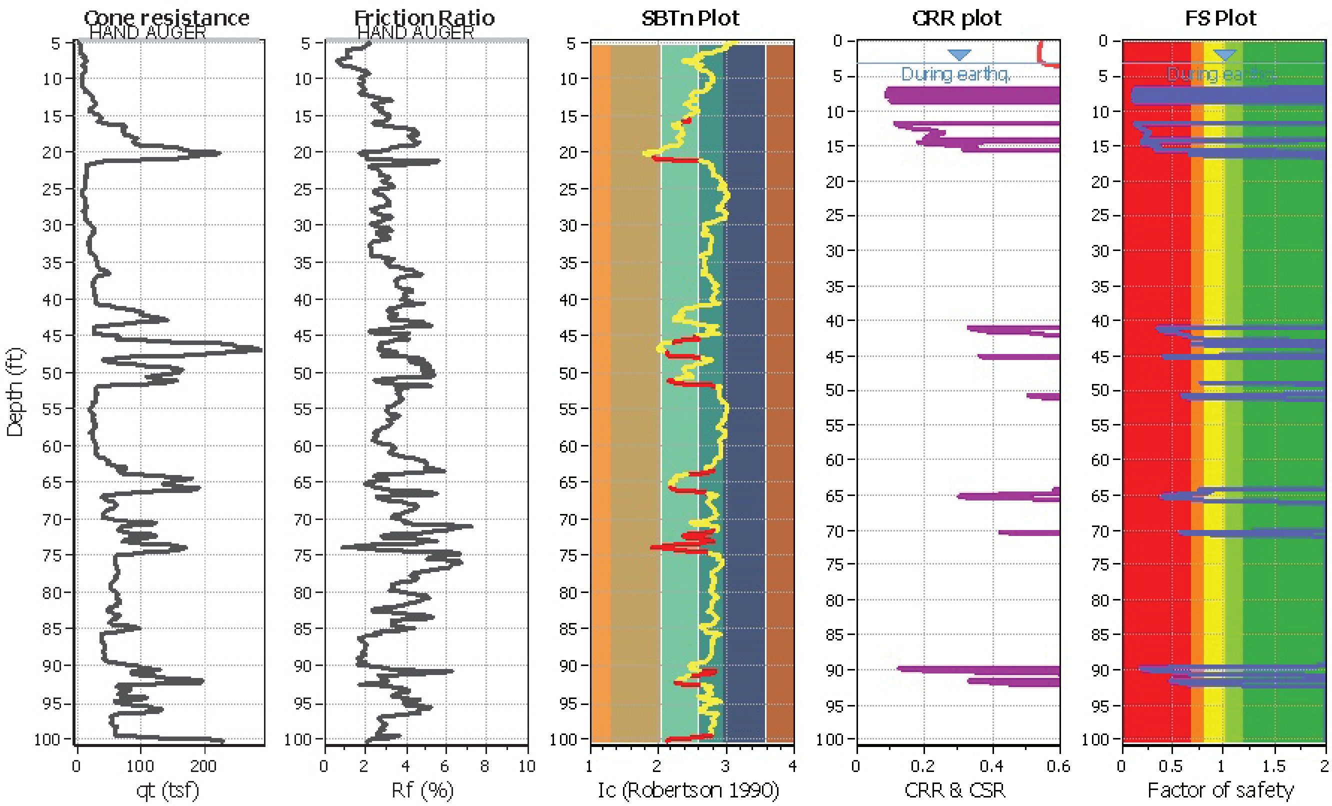
LIQUEFACTION ANALYSIS REPORT

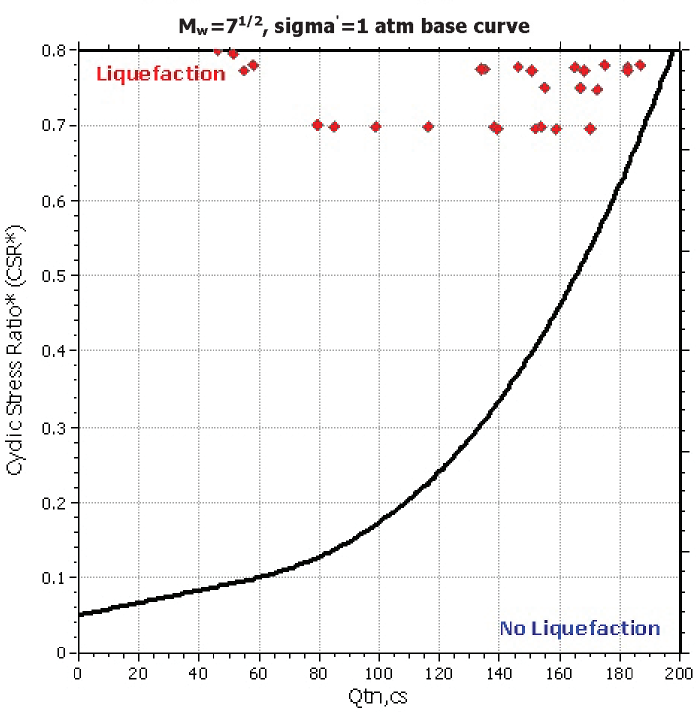
Project title : San Mateo Basin 2&3 **Location :**

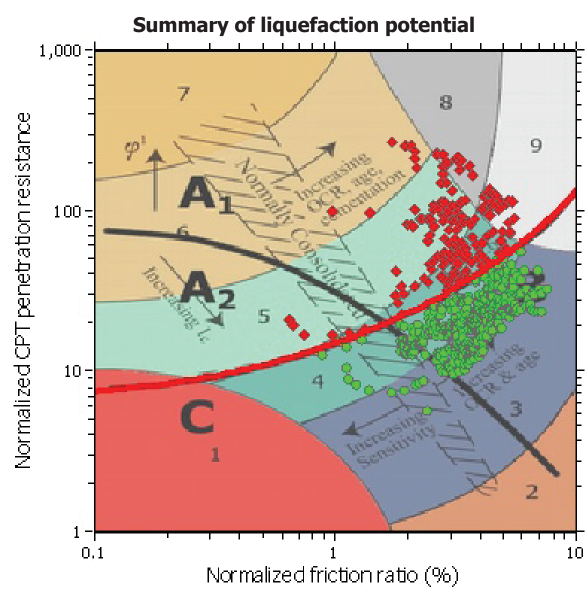
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

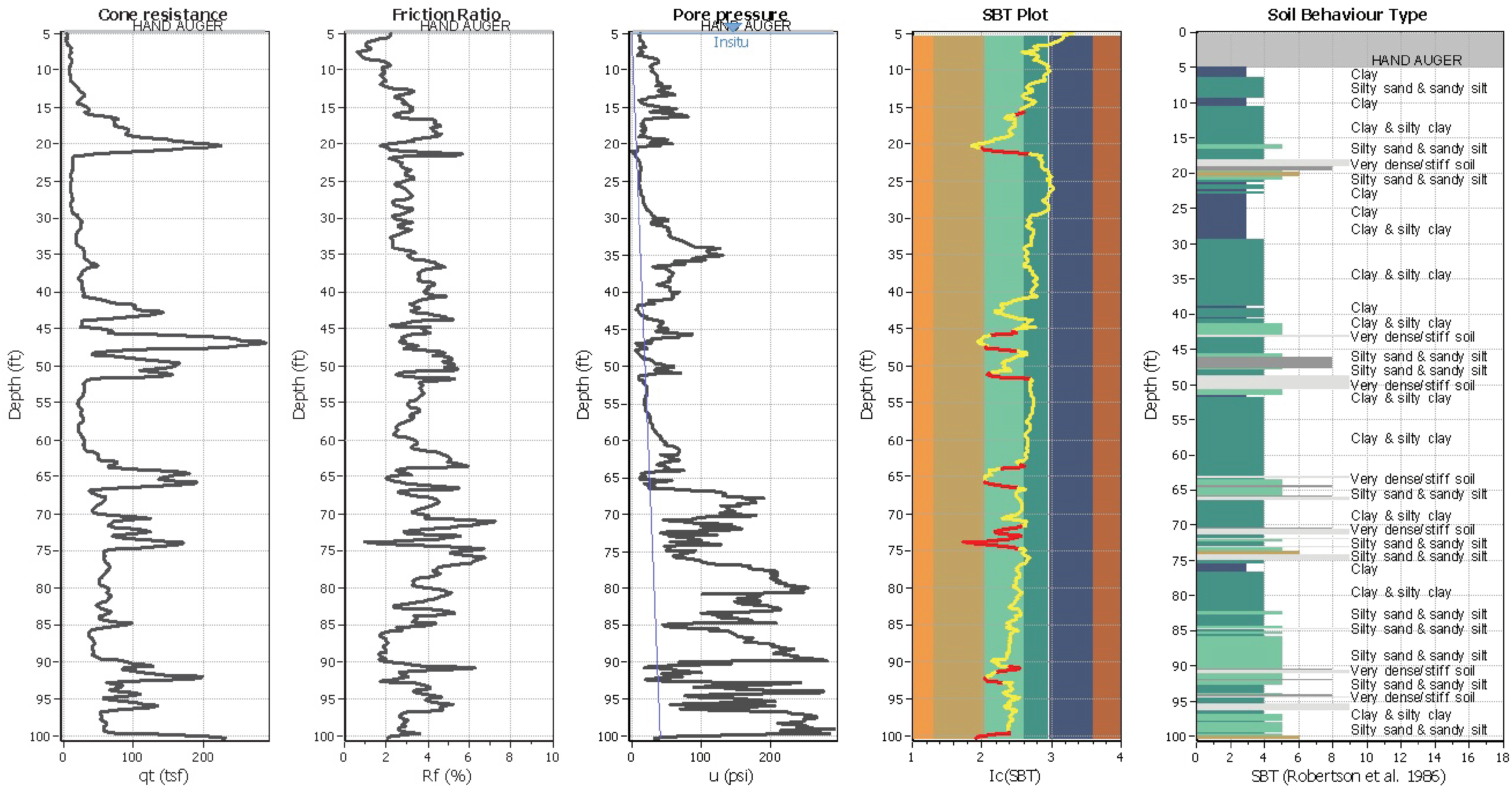






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



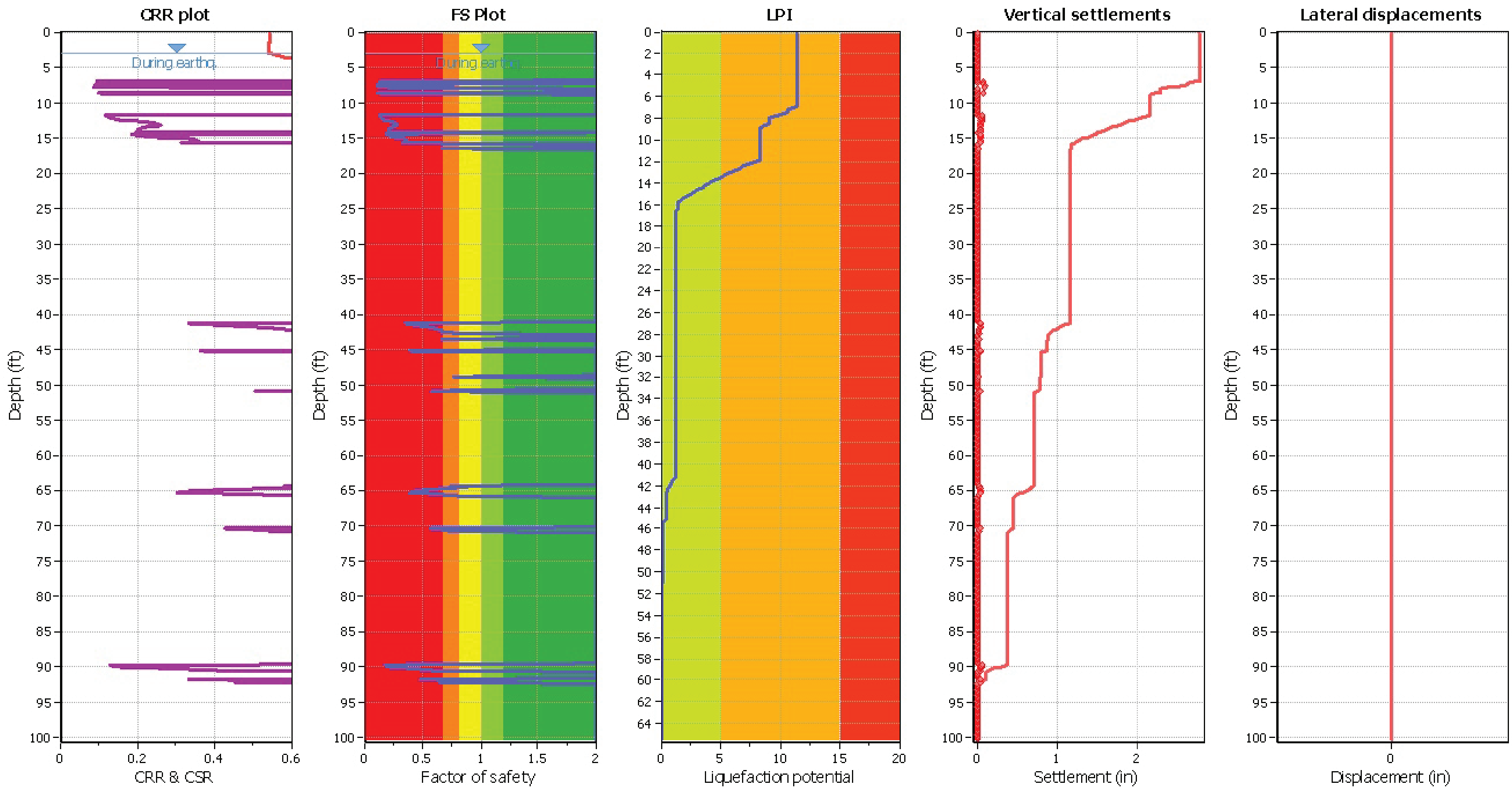
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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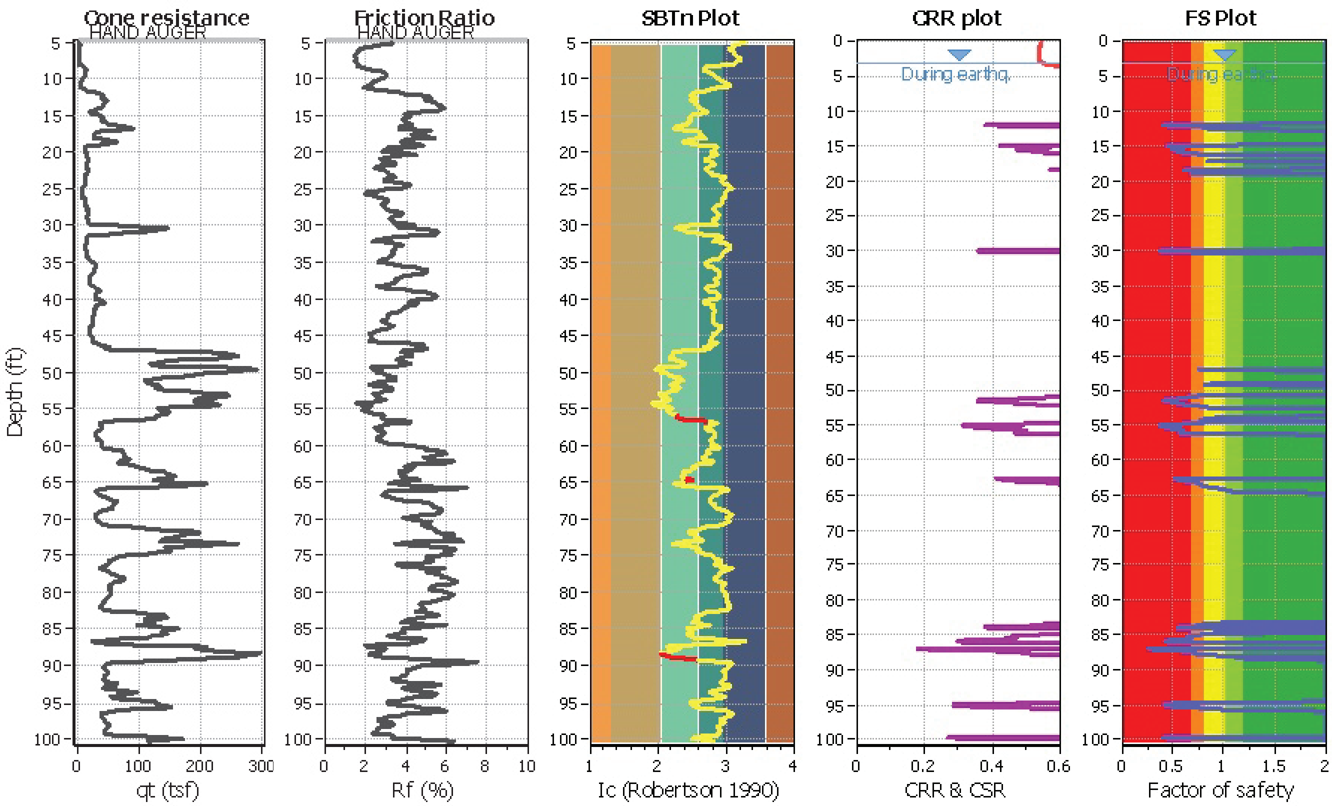
LIQUEFACTION ANALYSIS REPORT

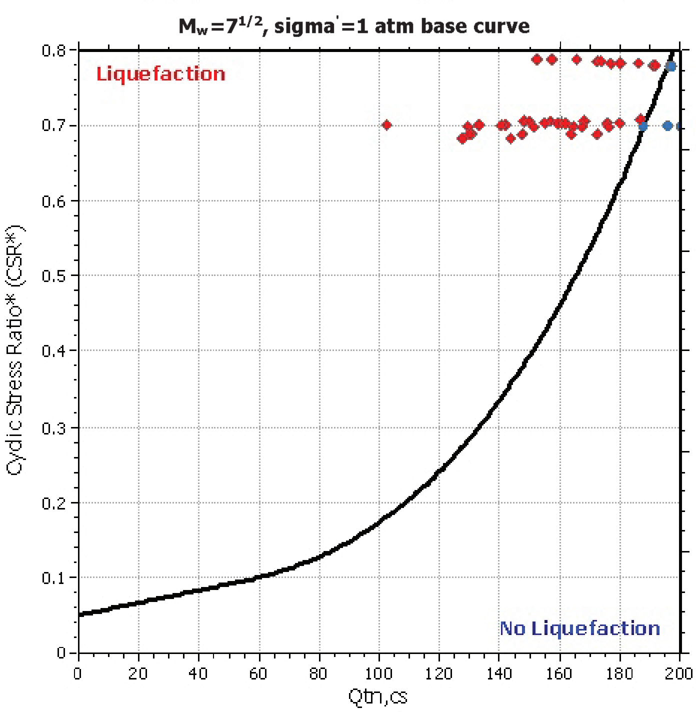
Project title : San Mateo Basin 2&3 **Location :**

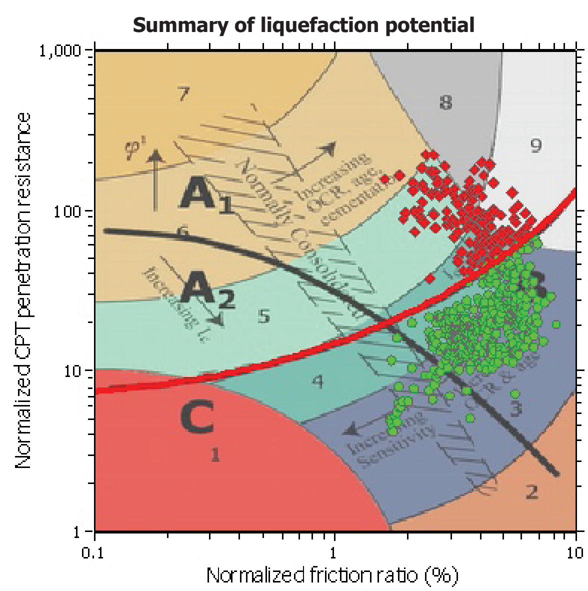
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

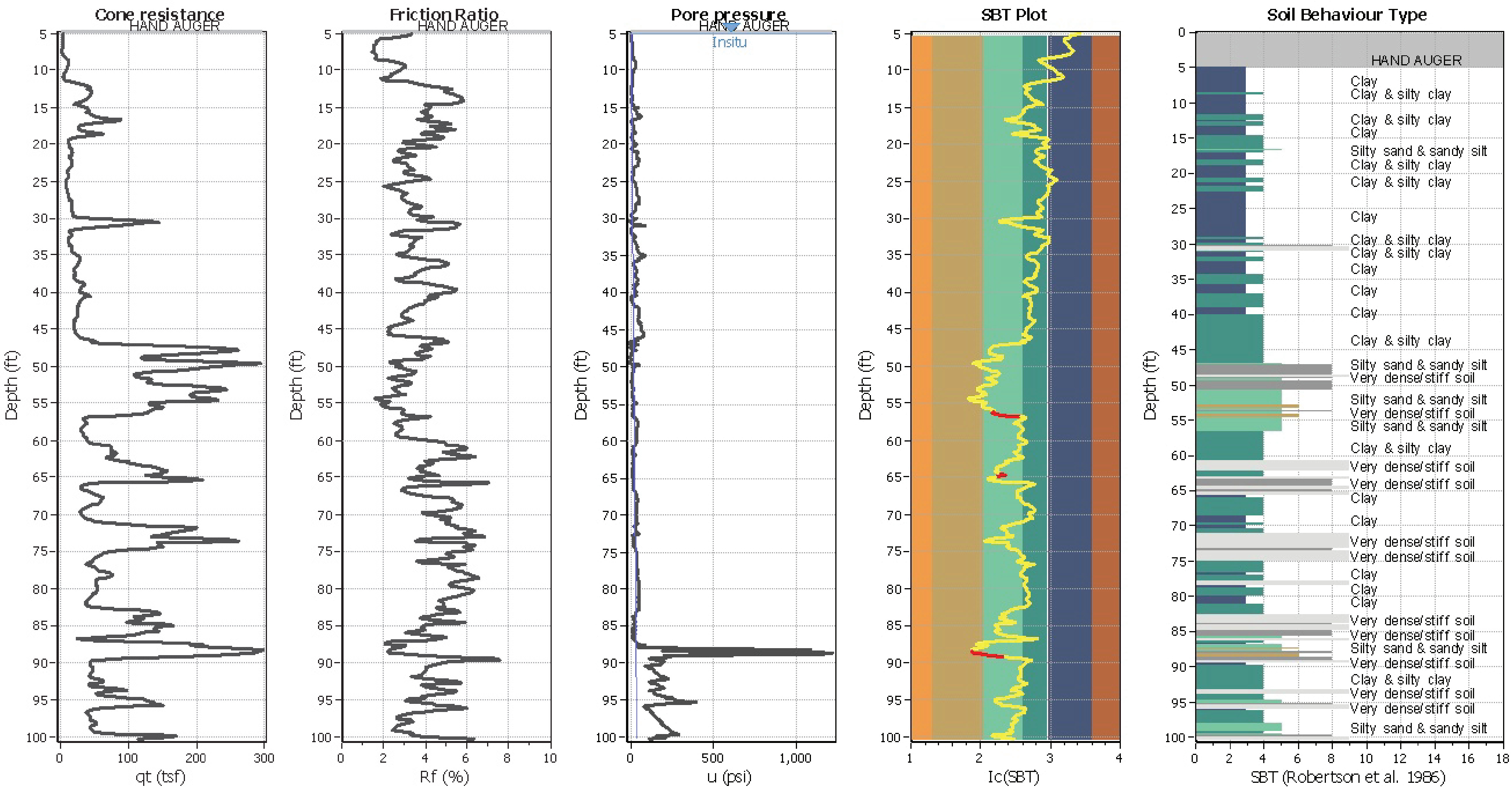






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



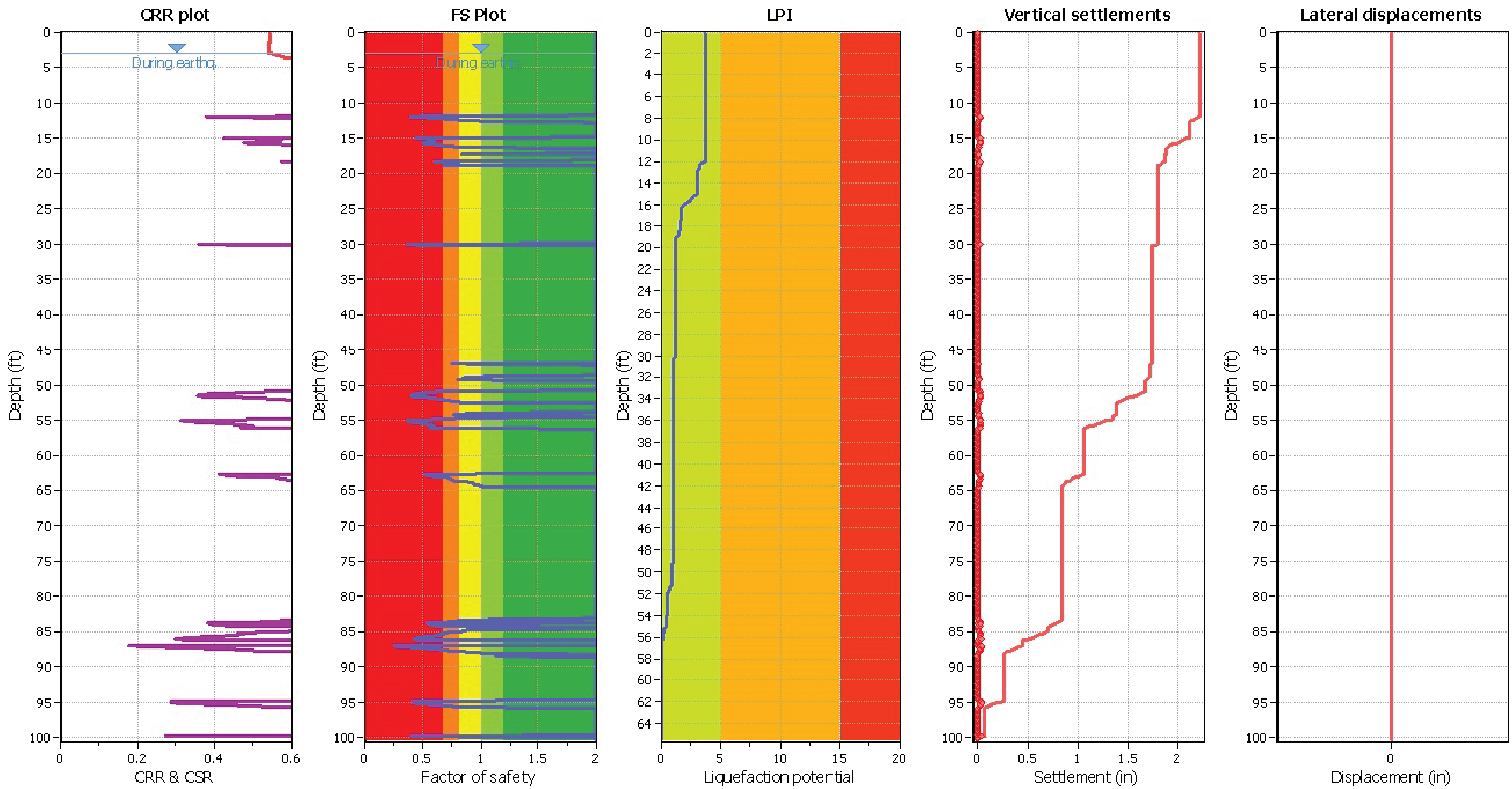
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

- 1. Sensitive fine grained
- 2. Organic material
- 3. Clay to silty clay
- 4. Clayey silt to silty
- 5. Silty sand to sandy silt
- 6. Clean sand to silty sand
- 7. Gravely sand to sand
- 8. Very stiff sand to
- 9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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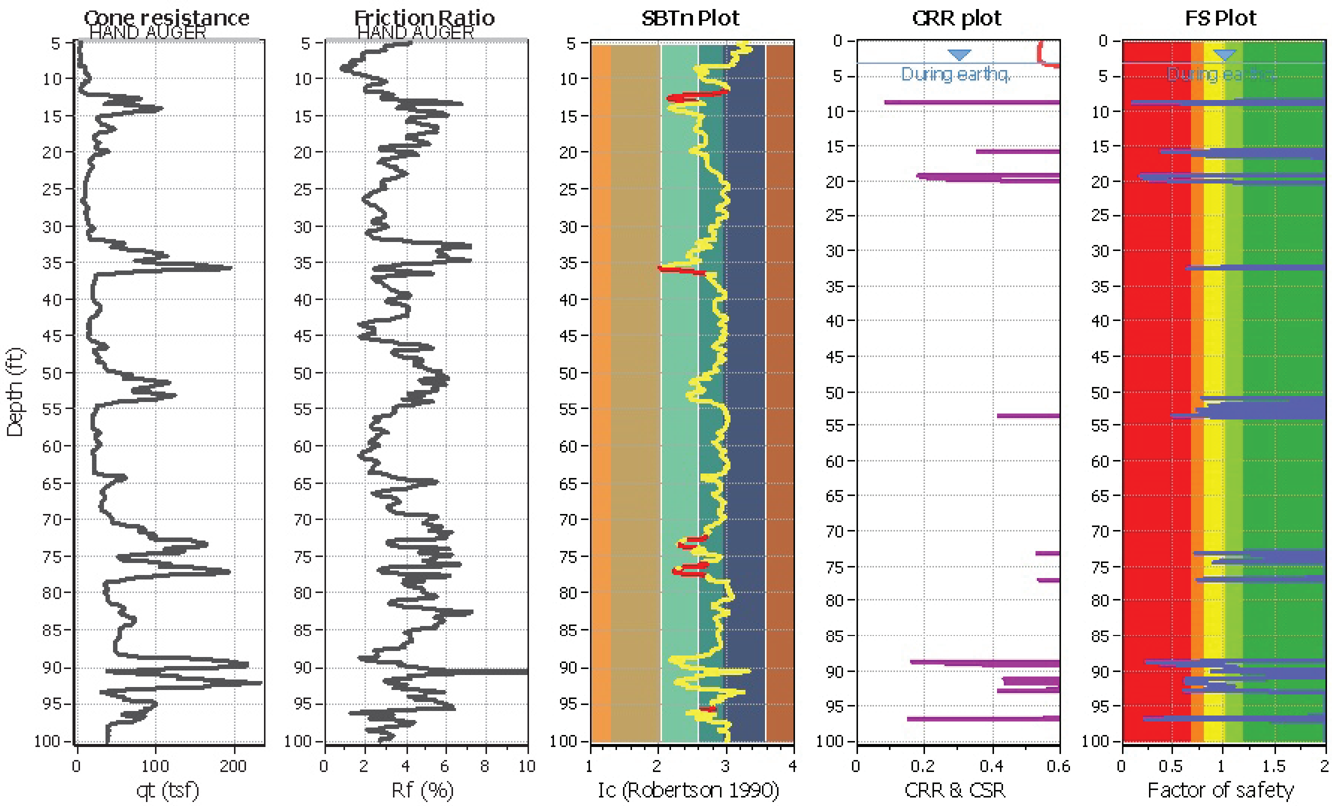
LIQUEFACTION ANALYSIS REPORT

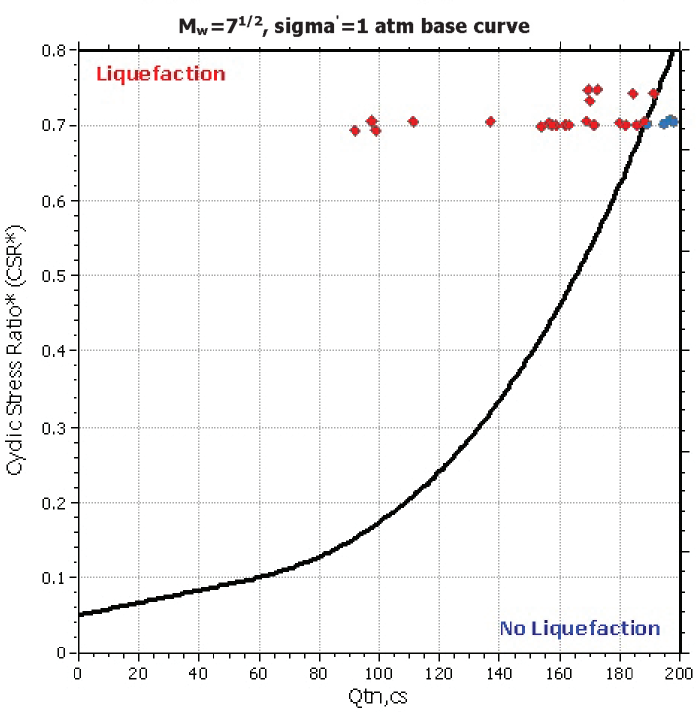
Project title : San Mateo Basin 2&3 **Location :**

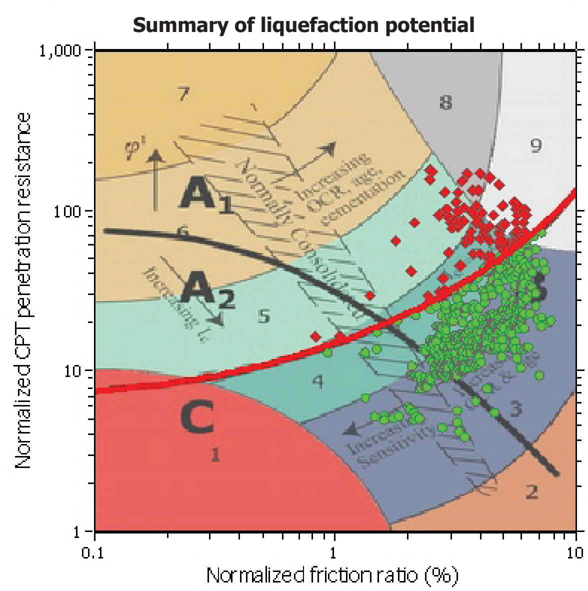
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

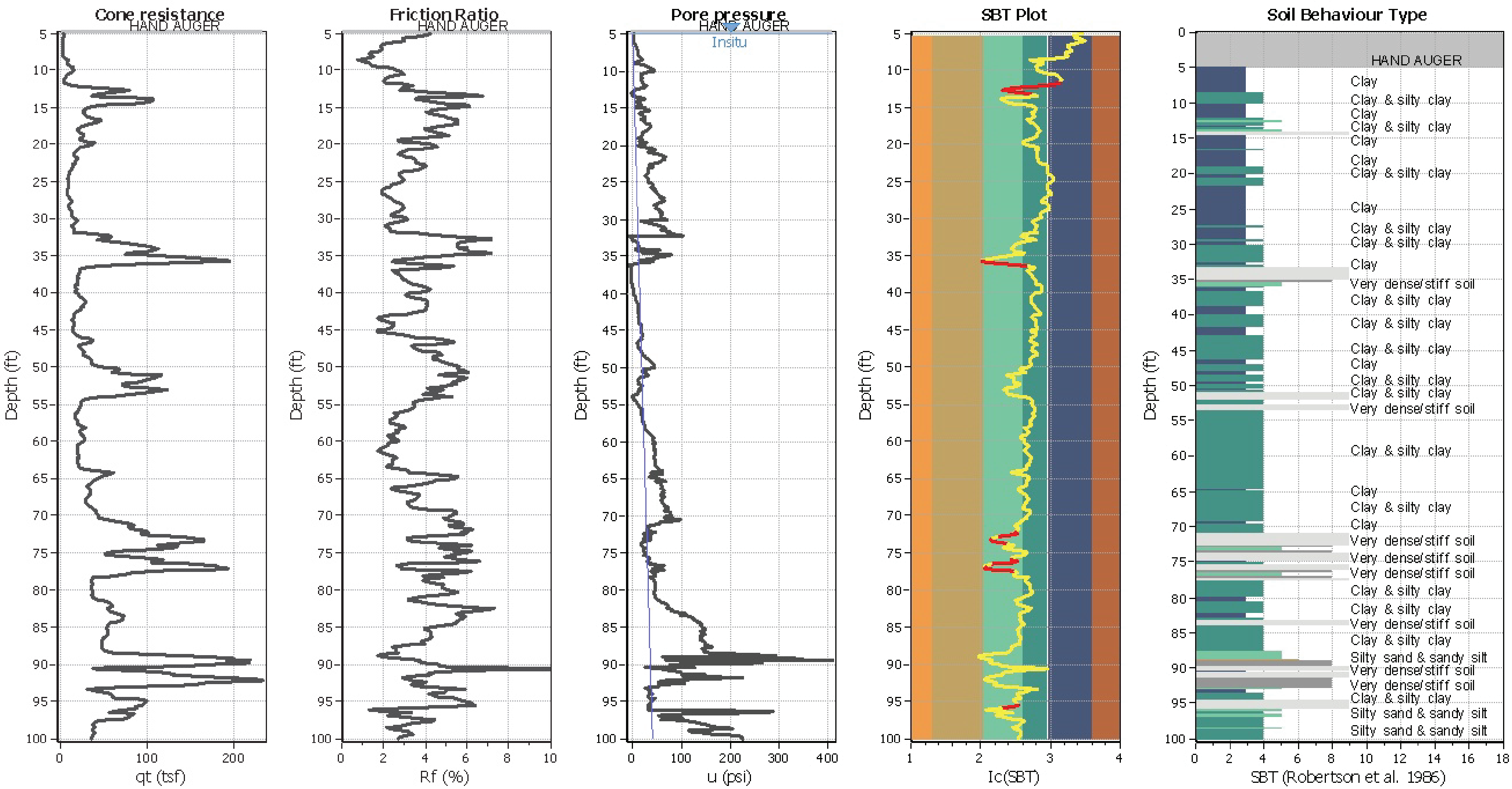






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



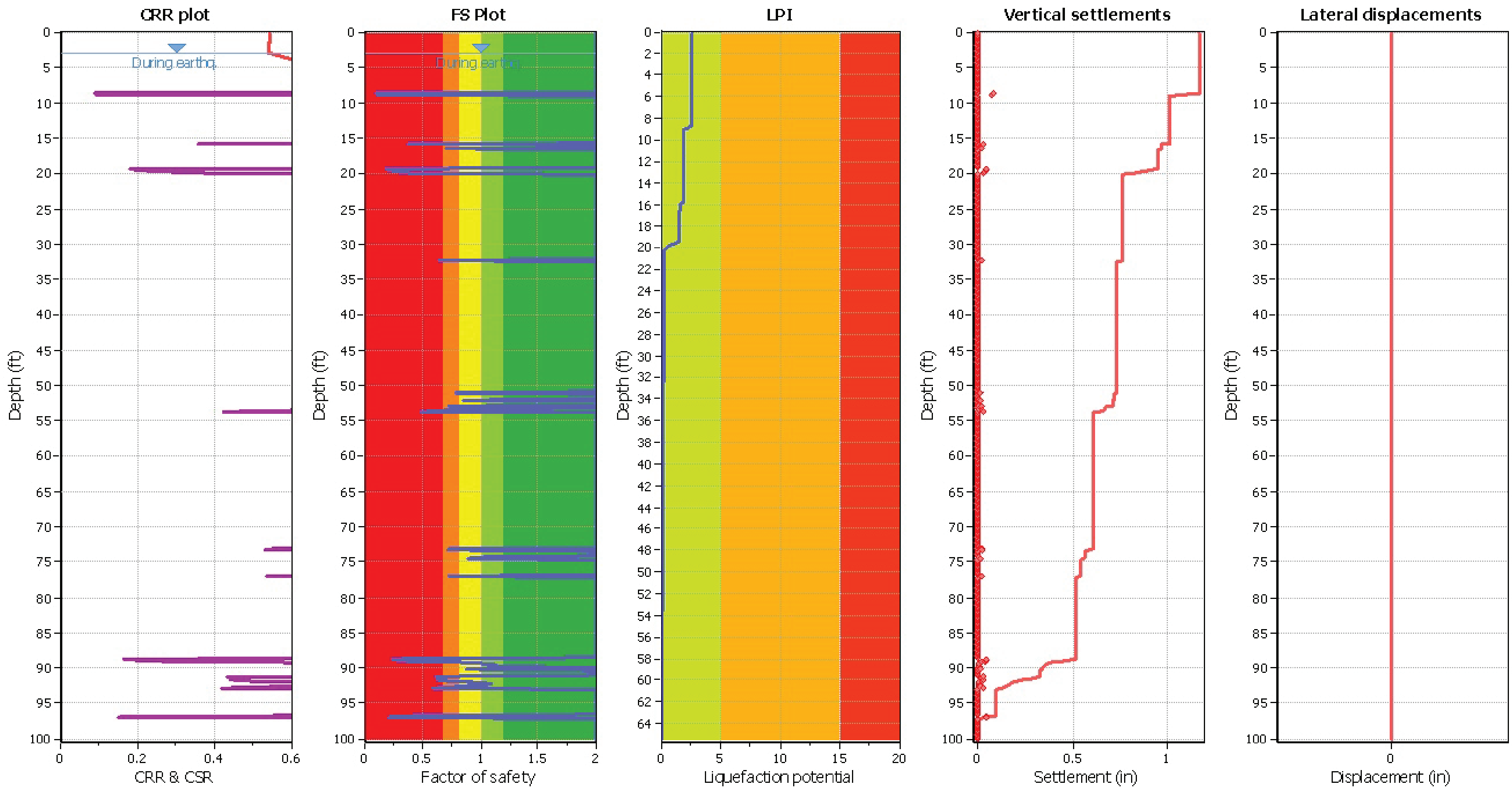
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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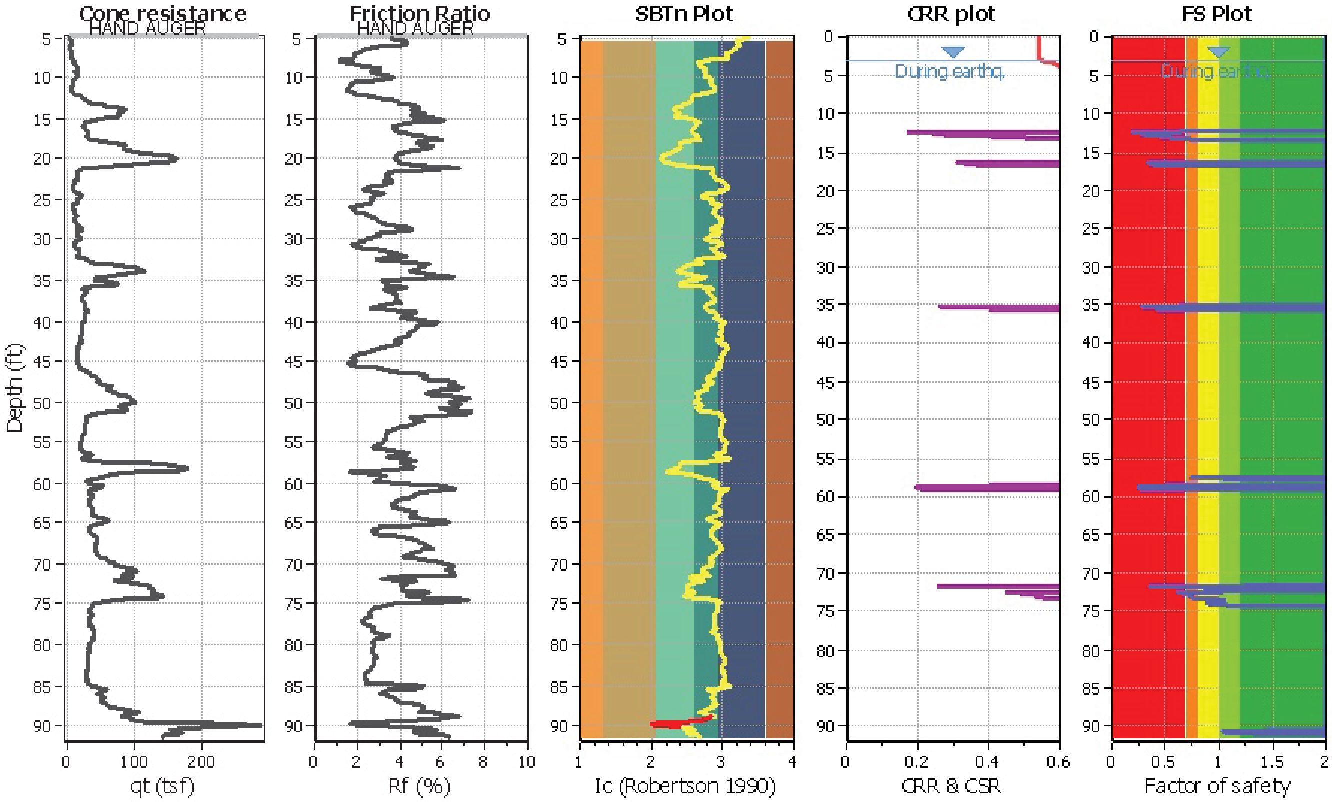
LIQUEFACTION ANALYSIS REPORT

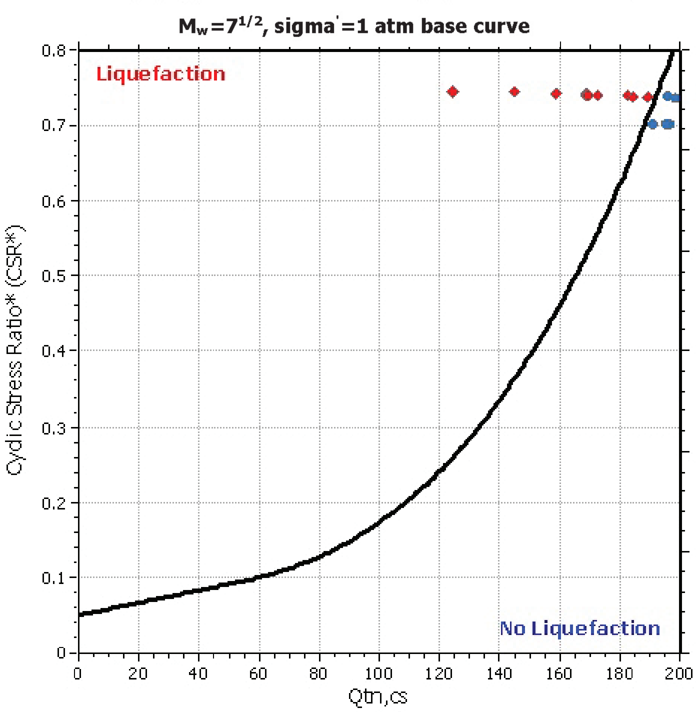
Project title : San Mateo Basin 2&3 **Location :**

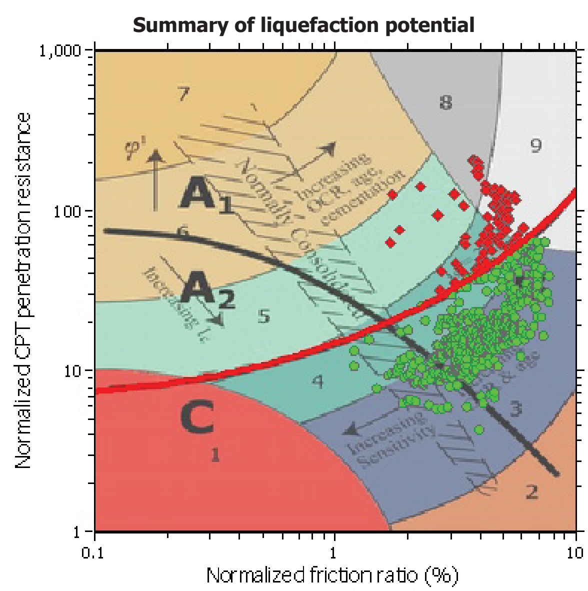
CPT file : CPT-04

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

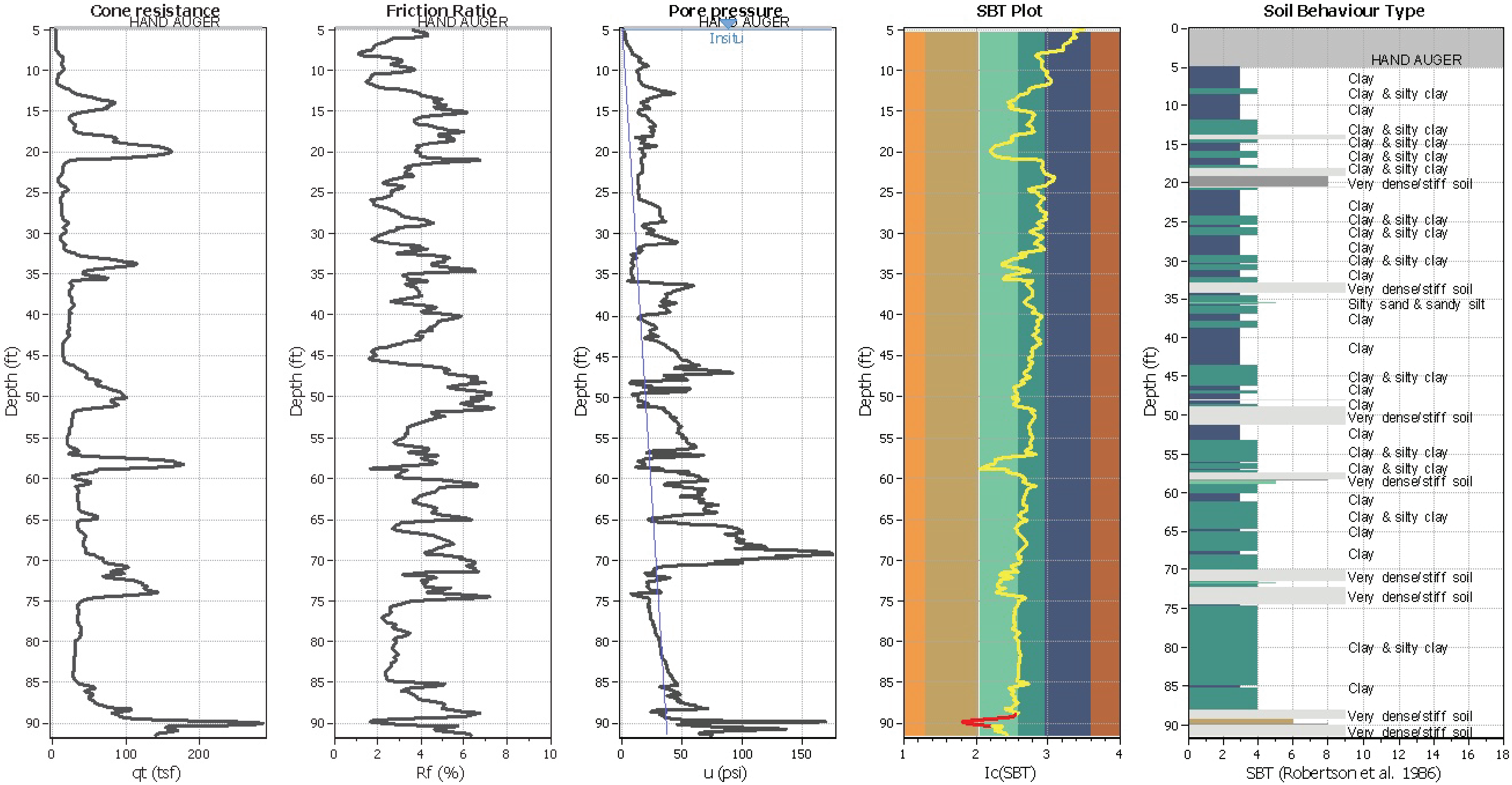






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plo



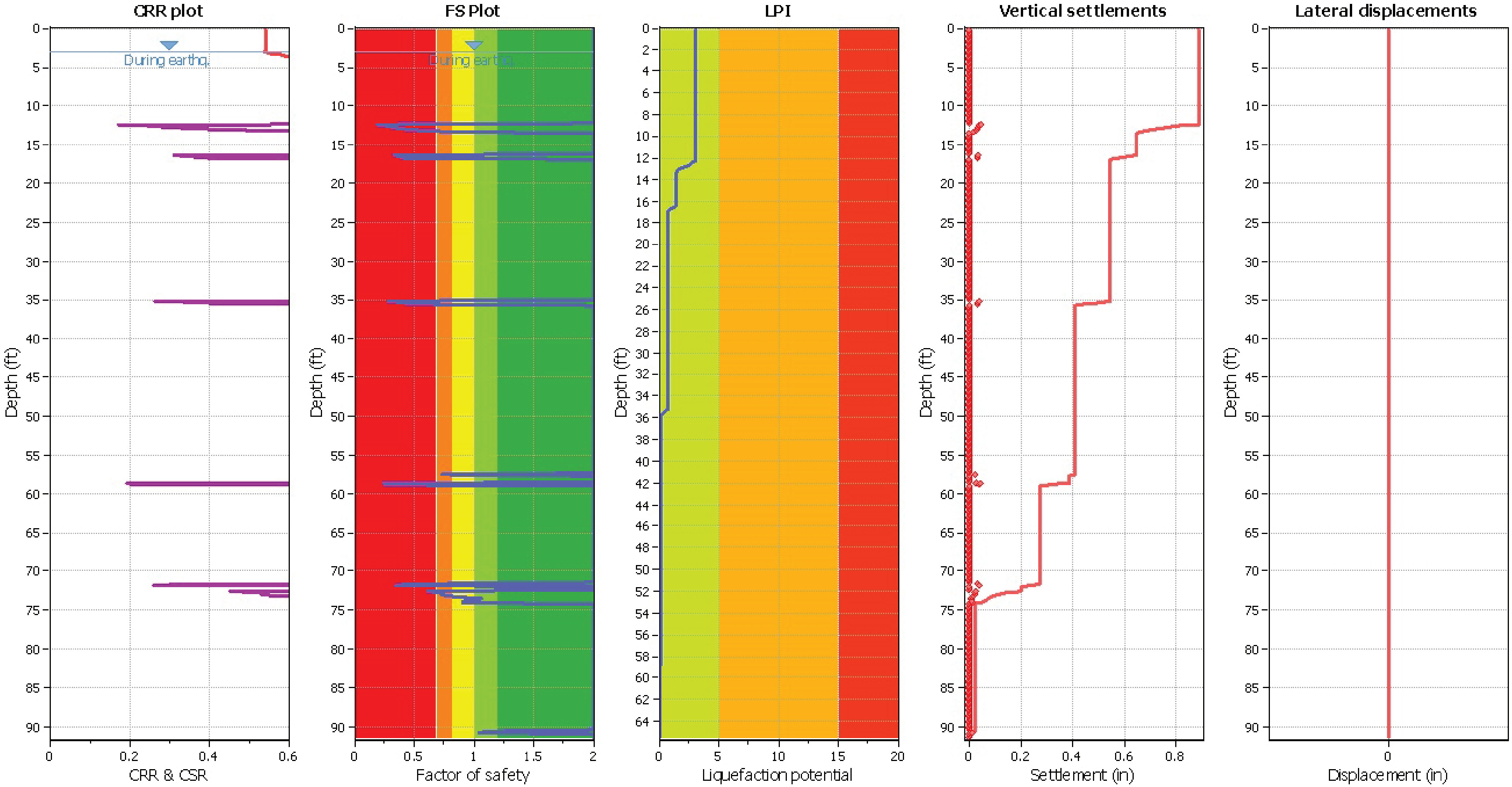
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

LPI color scheme

- Very high risk
- High risk
- Low risk

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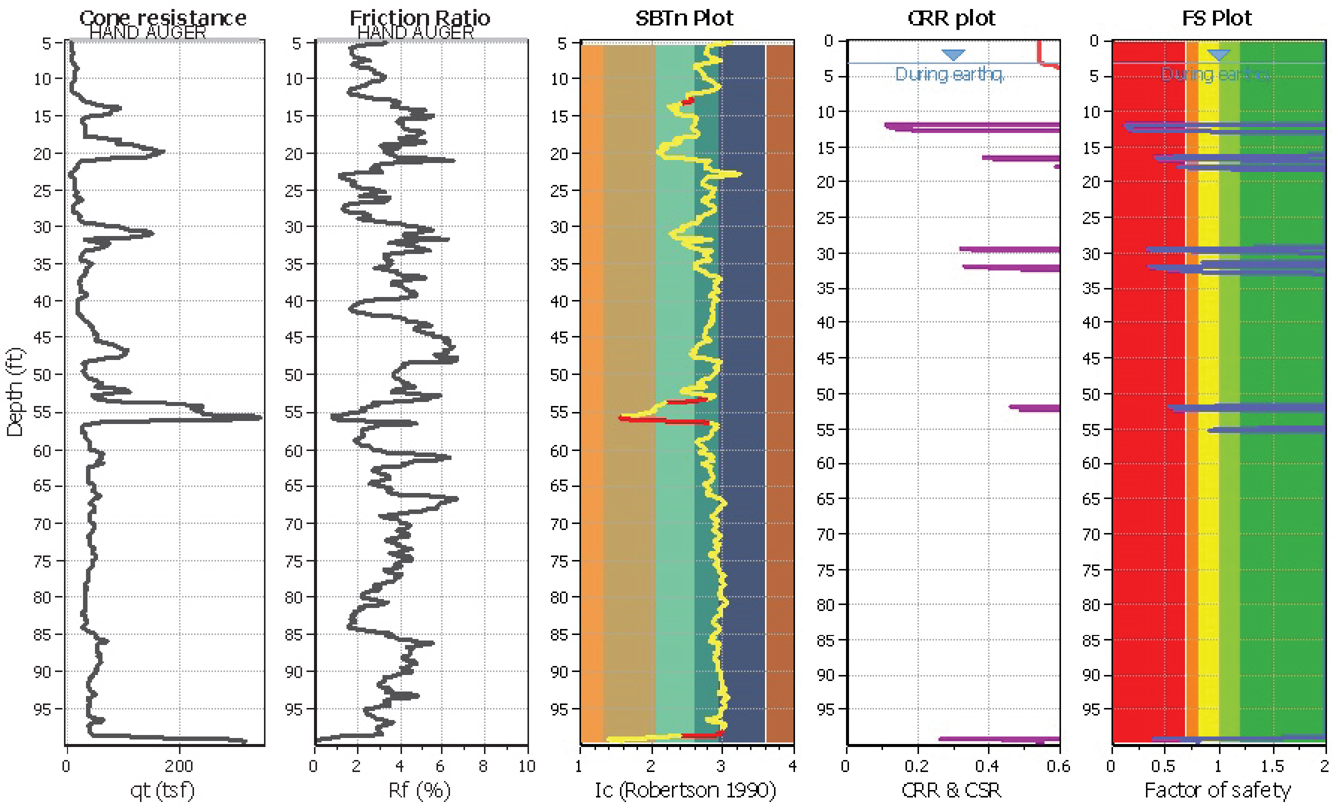
LIQUEFACTION ANALYSIS REPORT

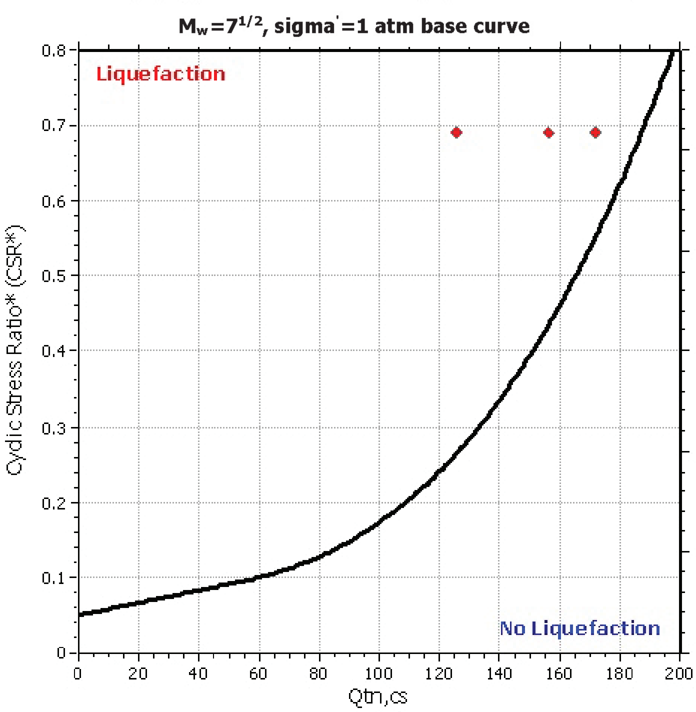
Project title : San Mateo Basin 2&3 **Location :**

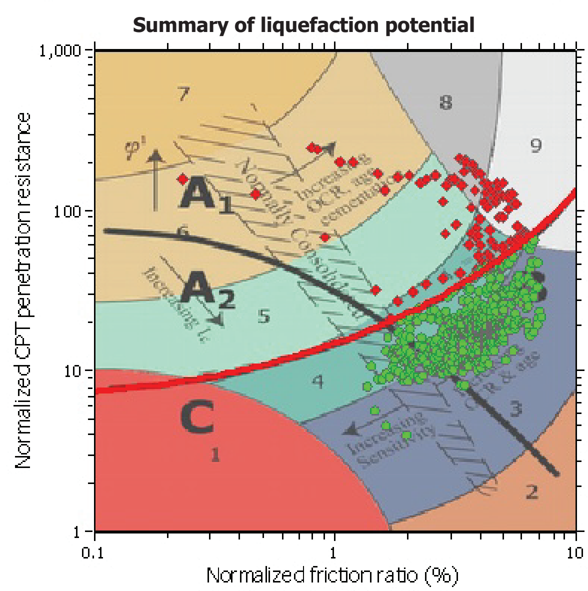
CPT file : CPT-04a

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	3.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.90	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.73	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		







Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
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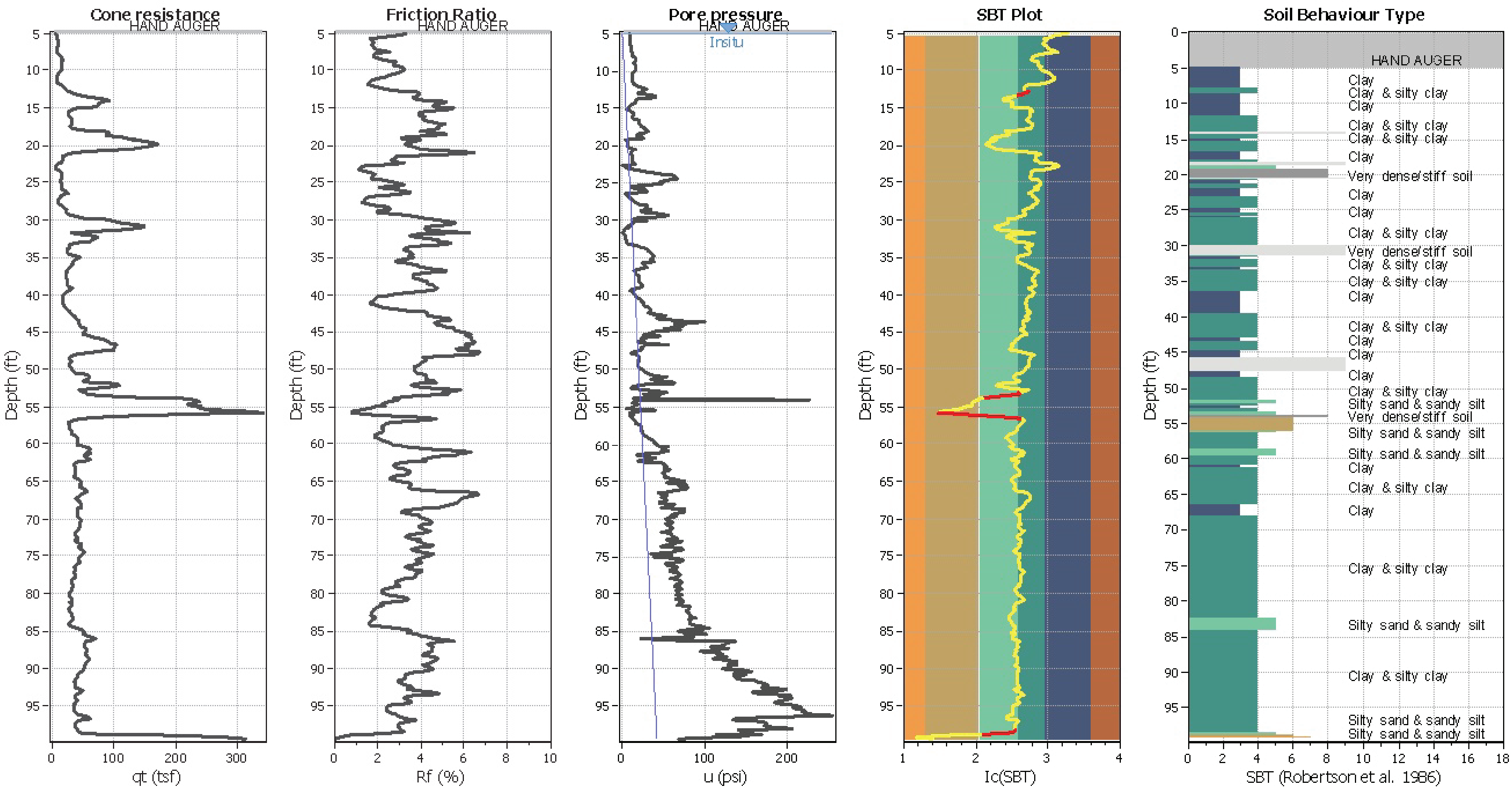
CPT basic interpretation plo



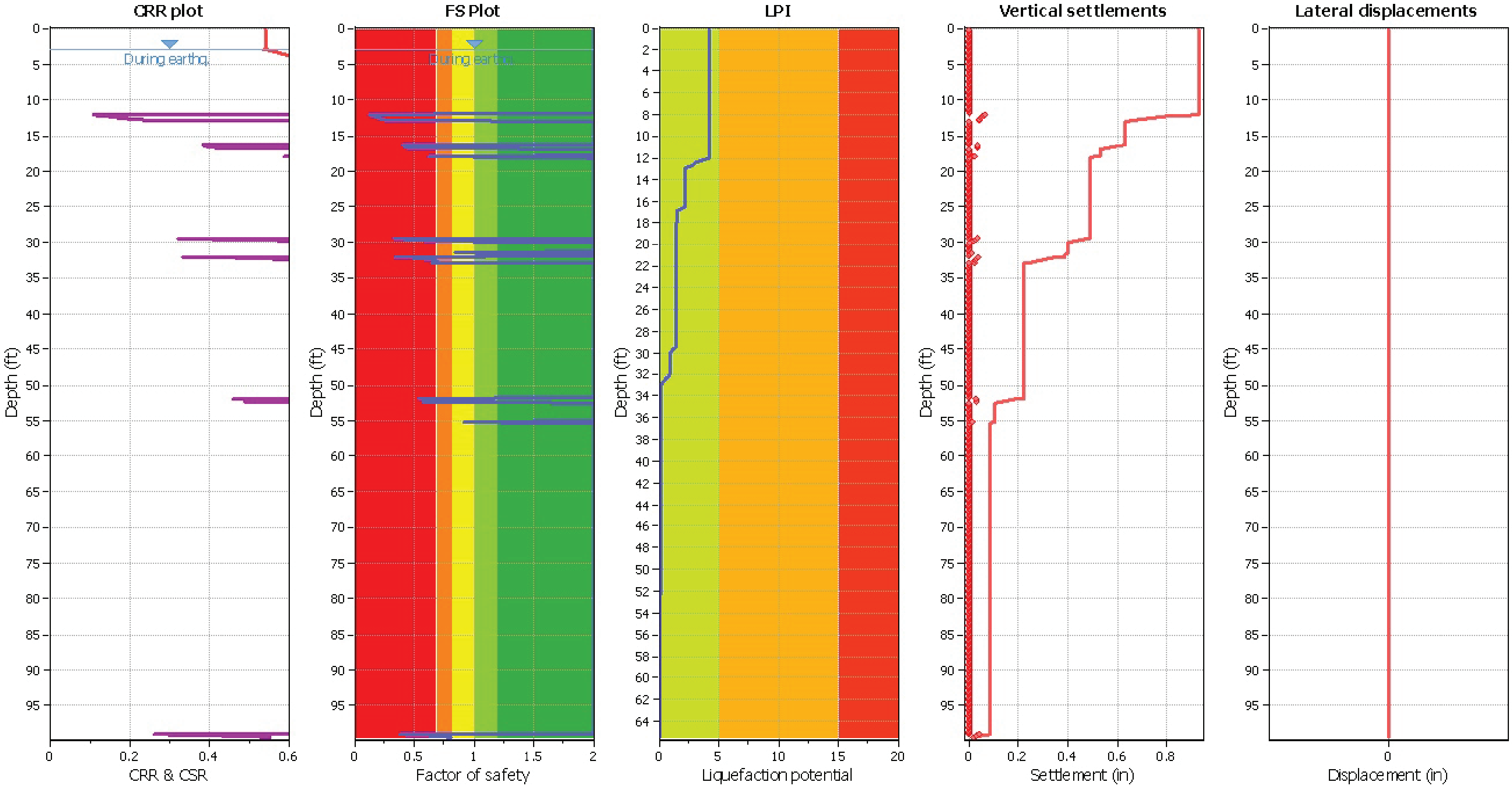
Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

Liquefaction analysis overall plot



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	3.00 ft	Fill weight:	N/A
Fines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.73	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

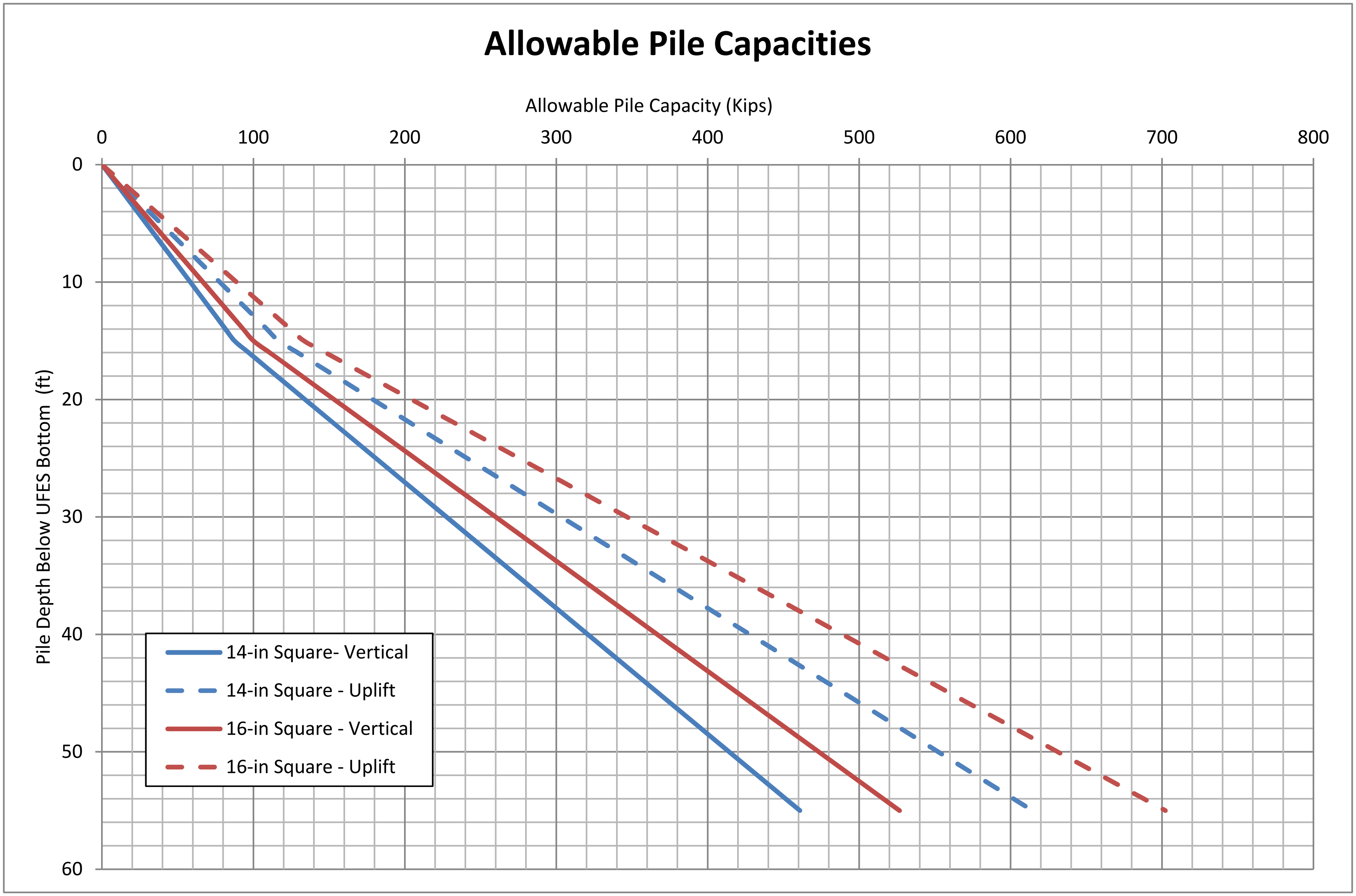
LPI color scheme

- Very high risk
- High risk
- Low risk

APPENDIX B

ALLOWABLE VERTICAL PILE CAPACITY CHART

Appendix B: Allowable Vertical Pile Capacitiy Chart



Note: Vertical pile capacities calculated using the alpha method, as recommended by the Federal Highway Administration (FHWA)

APPENDIX C

SUPPLEMENTAL RECOMMENDATIONS

TABLE OF CONTENTS

GENERAL INFORMATION

PREFACE

These supplemental recommendations are intended as a guide for earthwork and are in addition to any previous earthwork recommendations made by the Geotechnical Engineer. If there is a conflict between these supplemental recommendations and any previous recommendations, it should be immediately brought to the attention of ENGEO. Testing standards identified in this document shall be the most current revision (unless stated otherwise).

DEFINITIONS

BACKFILL	Soil, rock or soil-rock material used to fill excavations and trenches.
DRAWINGS	Documents approved for construction which describe the work.
THE GEOTECHNICAL ENGINEER	The project geotechnical engineering consulting firm, its employees, or its designated representatives.
ENGINEERED FILL	Fill upon which the Geotechnical Engineer has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with geotechnical engineering recommendations.
FILL	Soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.
IMPORTED MATERIAL	Soil and/or rock material which is brought to the site from offsite areas.
ONSITE MATERIAL	Soil and/or rock material which is obtained from the site.
OPTIMUM MOISTURE	Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.
RELATIVE COMPACTION	The ratio, expressed as a percentage, of the in-place dry density of the fill or backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557.
SELECT MATERIAL	Onsite and/or imported material which is approved by the Geotechnical Engineer as a specific-purpose fill.

PART I - EARTHWORK

1.0 GENERAL

1.1 WORK COVERED

Supplemental recommendations for performing earthwork and grading. Activities include:

- ✓ Site Preparation and Demolition
- ✓ Excavation
- ✓ Grading
- ✓ Backfill of Excavations and Trenches
- ✓ Engineered Fill Placement, Moisture Conditioning, and Compaction

1.2 CODES AND STANDARDS

The contractor should perform their work complying with applicable occupational safety and health standards, rules, regulations, and orders. The Occupational Safety and Health Standards (OSHA) Board is the only agency authorized in the State to adopt and enforce occupational safety and health standards (Labor Code § 142 et seq.). The owner, their representative and contractor are responsible for site safety; ENGEO representatives are not responsible for site safety.

Excavating, trenching, filling, backfilling, shoring and grading work should meet the minimum requirements of the applicable Building Code, and the standards and ordinances of state and local governing authorities.

1.3 TESTING AND OBSERVATION

Site preparation, cutting and shaping, excavating, filling, and backfilling should be carried out under the testing and observation of ENGEO. ENGEO shall be retained to perform appropriate field and laboratory tests to check compliance with the recommendations. Any fill or backfill that does not meet the supplemental recommendations shall be removed and/or reworked, until the supplemental recommendations are satisfied.

Tests for compaction shall be made in accordance with test procedures outlined in ASTM D-1557, as applicable, unless other testing methods are deemed appropriate by ENGEO. These and other tests shall be performed in accordance with accepted testing procedures, subject to the engineering discretion of ENGEO.

2.0 MATERIALS

2.1 STANDARD

Materials, tools, equipment, facilities, and services as required for performing the required excavating, trenching, filling and backfilling should be furnished by the Contractor.

2.2 ENGINEERED FILL AND BACKFILL

Material to be used for engineered fill and backfill should be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled.

Unless specified elsewhere by ENGEO, engineered fill and backfill shall be free of significant organics (soil which contains more than 3 percent organic content by weight), or any other unsatisfactory material. In addition, engineered fill and backfill shall comply with the grading requirements shown in the following table:

TABLE 2.2-1: Engineered Fill and Backfill Requirements

US STANDARD SIEVE	PERCENTAGE PASSING
3"	100
No. 4	35–100
No. 30	20–100

Earth materials to be used as engineered fill and backfill shall be cleared of debris, rubble and deleterious matter. Rocks and aggregate exceeding the maximum allowable size shall be removed from the site. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

ENGEO shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials. ENGEO shall be notified at least 72 hours prior to the start of filling and backfilling operations. Materials to be used for filling and backfilling shall be submitted to ENGEO no less than 10 days prior to intended delivery to the site. Unless specified elsewhere by ENGEO, where conditions require the importation of low expansive fill material, the material shall be an inert, low to non-expansive soil, or soil-rock material, free of organic matter and meeting the following requirements:

TABLE 2.2-2: Imported Fill Material Requirements

<table>
<tr><th rowspan="3">GRADATION (ASTM D-421)</th><th>SIEVE SIZE</th><th>PERCENT PASSING</th></tr>
<tr><td>2-inch</td><td>100</td></tr>
<tr><td>#200</td><td>15 - 70</td></tr>
<tr><th>PLASTICITY (ASTM D-4318)</th><td colspan="2">Plasticity Index < 12</td></tr>
<tr><th>ORGANIC CONTENT (ASTM D-2974)</th><td colspan="2">Less than 2 percent</td></tr>
</table>

A sample of the proposed import material should be submitted to ENGEO no less than 10 days prior to intended delivery to the site.

2.3 SUBDRAINS

A subdrain system is an underground network of piping used to remove water from areas that collect or retain surface water or subsurface water. Subsurface water is collected by allowing water into the pipe through perforations. Subdrain systems may drain and discharge to an appropriate outlet such as storm drain, natural swales or drainage, etc.. Details for subdrain systems may vary depending on many items, including but not limited to site conditions, soil types, subdrain spacing, depth of the pipe and pervious medium, as well as pipe diameter.

2.4 PIPE

Subdrain pipe shall conform with these supplemental recommendations unless specified elsewhere by ENGEO. Perforated pipe for various depths shall be manufactured in accordance with the following requirements:

TABLE 2.4-1: Perforated Pipe Requirements

PIPE TYPE	STANDARD	TYPICAL SIZES (INCHES)	PIPE STIFFNESS (PSI)
PIPE STIFFNESS ABOVE 200 PSI (BELOW 50 FEET OF FINISHED GRADE)			
ABS SDR 15.3		4 to 6	450
PVC Schedule 80	ASTM D1785	3 to 10	530
PIPE STIFFNESS BETWEEN 100 PSI AND 150 PSI (BETWEEN 15 AND 50 FEET OF FINISHED GRADE)			
ABS SDR 23.5	ASTM D2751	4 to 6	150
PVC SDR 23.5	ASTM D3034	4 to 6	153
PVC Schedule 40	ASTM D1785	3 to 10	135
ABS Schedule 40/DWV	ASTM D1527 & D2661	3 to 10	
PIPE STIFFNESS BETWEEN 45 PSI AND 50 PSI* (BETWEEN 0 TO 15 FEET OF FINISHED GRADE)			
PVC A-2000	ASTM F949	4 to 10	50
PVC SDR 35	ASTM D3034	4 to 8	46
ABS SDR 35	ASTM D2751	4 to 8	45
Corrugated PE	AASHTO M294 Type S	4 to 10	45

***Pipe with a stiffness less than 45 psi should not be used.**

Other pipes not listed in the table above shall be submitted for review by the Geotechnical Engineer not less 72 hours before proposed use.

2.5 OUTLETS AND RISERS

Subdrain outlets and risers must be fabricated from the same material as the subdrain pipe. Outlet and riser pipe and fittings must not be perforated. Covers must be fitted and bolted into the riser pipe or elbow. Covers must seat uniformly and not be subject to rocking.

2.6 PERMEABLE MATERIAL

Permeable material shall generally conform to Caltrans Standard Specification unless specified otherwise by ENGEO. Class 2 permeable material shall comply with the gradation requirements shown in the following table.

TABLE 2.6-1: Class 2 Permeable Material Grading Requirements

SIEVE SIZES	PERCENTAGE PASSING
1"	100
3/4"	90 to 100
3/8"	40 to 100
No. 4	25 to 40
No. 8	18 to 33
No. 30	5 to 15
No. 50	0 to 7
No. 200	0 to 3

2.7 FILTER FABRIC

Filter fabric shall meet the following Minimum Average Roll Values unless specified elsewhere by ENGEO.

Grab Strength (ASTM D-4632)..180 lbs
Mass per Unit Area (ASTM D-4751) ....6 oz/yd^2
Apparent Opening Size (ASTM D-4751)........70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491)...80 gal/min/ft^2
Puncture Strength (ASTM D-4833) ....80 lbs

Areas to receive filter fabric must comply with the compaction and elevation tolerance specified for the material involved. Handle and place filter fabric under the manufacturer's instructions. Align and place filter fabric without wrinkles.

Overlap adjacent roll ends of filter fabric in accordance with manufacturer's recommendations. The preceding roll must overlap the following roll in the direction that the permeable material is being spread. Completely replace torn or punctured sections damaged during placement or repair by placing a piece of filter fabric that is large enough to cover the damaged area and comply with the overlap specified. Cover filter fabric with the thickness of overlying material shown within 72 hours of placing the fabric.

2.8 GEOCOMPOSITE DRAINAGE

Geocomposite drainage is a prefabricated material that includes filter fabric and plastic pipe. Filter fabric must be Class A. The drain shall be of composite construction consisting of a supporting structure or drainage core material surrounded by a geotextile. The geotextile shall encapsulate the drainage core and prevent random soil intrusion into the drainage structure. The drainage core material shall consist of a three-dimensional polymeric material with a structure that permits flow along the core laterally. The core structure shall also be constructed to permit flow regardless of the water inlet surface. The drainage core shall provide support to the geotextile.

A geotextile flap shall be provided along drainage core edges. This flap shall be of sufficient width for sealing the geotextile to the adjacent drainage structure edge to prevent soil intrusion into the structure during and after installation. The geotextile shall cover the full length of the core. The geocomposite core shall be furnished with an approved method of constructing and connecting with outlet pipes. If the fabric on the geocomposite drain is torn or punctured, replace the damaged section completely. The specific drainage composite material and supplier shall be preapproved by ENGEO.

The Contractor shall submit a manufacturer's certification that the geocomposite meets the design properties and respective index criteria measured in full accordance with applicable test methods. The manufacturer's certification shall include a submittal package of documented test results that confirm the design values. In case of dispute over validity of design values, the Contractor should supply design property test data from a laboratory approved by ENGEO, to support the certified values submitted.

Geocomposite material suppliers shall provide a qualified and experienced representative onsite to assist the Contractor and ENGEO at the start of construction with directions on the use of drainage composite. If there is more than one application on a project, this criterion will apply to construction of the initial application only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining applications. The soil surface against which the geocomposite is to be placed shall be free of debris and inordinate irregularities that will prevent intimate contact between the soil surface and the drain.

Edge seams shall be formed by utilizing the flap of the geotextile extending from the geocomposite's edge and lapping over the top of the fabric of the adjacent course. The fabric flap shall be securely fastened to the adjacent fabric by means of plastic tape or non-water-soluble construction adhesive, as recommended by the supplier. To prevent soil intrusion, exposed edges of the geocomposite drainage core edge must be covered.

Approved backfill shall be placed immediately over the geocomposite drain. Backfill operations should be performed to not damage the geotextile surface of the drain. Also during operations, avoid excessive settlement of the backfill material. The geocomposite drain, once installed, shall not be exposed for more than 7 days prior to backfilling.

PART II - GEOGRID SOIL REINFORCEMENT

Geogrid soil reinforcement (geogrid) shall be submitted to ENGEO and should be approved before use. The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction to ultraviolet degradation and to chemical and biological degradation encountered in the soil being reinforced. The geogrids shall have an Allowable Tensile Strength (T_a) and Pullout Resistance, for the soil type(s) as specified on design plans.

The contractor shall submit a manufacturer's certification that the geogrids supplied meet plans and project specifications. The contractor shall check the geogrid upon delivery to ensure that the proper material has been received. During periods of shipment and storage, the geogrid shall be protected from temperatures greater than 140°F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geogrid damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

Geogrid material suppliers shall provide a qualified and experienced representative onsite at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s). Geogrid reinforcement may be joined with mechanical connections or overlaps as recommended and approved by the manufacturer. Joints shall not be placed within 6 feet of the slope face, within 4 feet below top of slope, nor horizontally or vertically adjacent to another joint.

The geogrid reinforcement shall be installed in accordance with the manufacturer's recommendations. The geogrid reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed. The geogrid reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the manufacturer's approval. Only one joint per length of geogrid shall be allowed. This joint shall be made for the full width of the strip by using a similar material with similar strength. Joints in geogrid reinforcement shall be pulled and held taut during fill placement.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacing between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings. Adjacent rolls of geogrid reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geogrid reinforcement required for immediately pending work to prevent undue damage. After a layer of geogrid reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geogrid reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geogrid reinforcement and soil. Geogrid reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geogrid reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geogrid reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geogrid reinforcement before at least 6 inches of soil have been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geogrid reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided. During construction, the surface of the fill should be kept approximately horizontal. Geogrid reinforcement shall be placed directly on the compacted horizontal fill surface. Geogrid reinforcements are to be placed as shown on plans, and oriented correctly.

PART III - GEOTEXTILE SOIL REINFORCEMENT

The specific geotextile material and supplier shall be preapproved by ENGEO. The contractor shall submit a manufacturer's certification that the geotextiles supplied meet the respective index criteria set when geotextile was approved by ENGEO, measured in full accordance with specified test methods and standards.

The contractor shall check the geotextile upon delivery to ensure that the proper material has been received. During periods of shipment and storage, the geotextile shall be protected from temperatures greater than 140°F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geotextile damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

Geotextile material suppliers shall provide a qualified and experienced representative onsite at the initiation of the project to assist the Contractor and ENGEO personnel at the start of construction. The geotextile reinforcement shall be installed in accordance with the manufacturer's recommendations. The geotextile reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed, secured with staples, pins, or small piles of backfill, placed without wrinkles, and aligned with the primary strength direction perpendicular to slope contours. Cover geotextile reinforcement with backfill within the same work shift. Place at least 6 inches of backfill on the geotextile reinforcement before operating or driving equipment or vehicles over it, except those used under the conditions specified below for spreading backfill.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacing between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings. Adjacent rolls of geotextile reinforcement shall be overlapped or mechanically connected where exposed in a wraparound face system, as applicable.

The contractor may place only that amount of geotextile reinforcement required for immediately pending work to prevent undue damage. After a layer of geotextile reinforcement has been placed, the succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geotextile reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geotextile reinforcement and soil.

Geotextile reinforcement shall be placed to lay flat and be pulled tight prior to backfilling. After a layer of geotextile reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geotextile reinforcement in position until the subsequent soil layer can be placed. Under no circumstances shall a track-type vehicle be allowed on the geotextile reinforcement before at least six inches of soil has been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geotextile reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geotextile reinforcement as slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geotextile reinforcement shall be placed directly on the compacted horizontal fill surface. Geotextile reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO.

Replace or repair any geotextile reinforcement damaged during construction. Grade and compact backfill to ensure the reinforcement remains taut. Geotextile soil reinforcement must be tested to the required design values using the following ASTM test methods.

TABLE III-1: Geotextile Soil Reinforcements

PROPERTY	TEST
Elongation at break, percent	ASTM D 4632
Grab breaking load, lb, 1-inch grip (min) in each direction	ASTM D 4632
Wide width tensile strength at 5 percent strain, lb/ft (min)	ASTM D 4595
Wide width tensile strength at ultimate strength, lb/ft (min)	ASTM D 4595
Tear strength, lb (min)	ASTM D 4533
Puncture strength, lb (min)	ASTM D 6241
Permittivity, sec^{-1} (min)	ASTM D 4491
Apparent opening size, inches (max)	ASTM D 4751
Ultraviolet resistance, percent (min) retained grab break load, 500 hours	ASTM D 4355

PART IV - EROSION CONTROL MAT

Work shall consist of furnishing and placing a synthetic erosion control mat and/or degradable erosion control blanket for slope face protection and lining of runoff channels. The specific erosion control material and supplier shall be pre-approved by ENGEO.

The Contractor shall submit a manufacturer's certification that the erosion mat/blanket supplied meets the criteria specified when the material was approved by ENGEO. The manufacturer's certification shall include a submittal package of documented test results that confirm the property values. Jute mesh shall consist of processed natural jute yarns woven into a matrix, and netting shall consist of coconut fiber woven into a matrix. Erosion control blankets shall be made of processed natural fibers that are mechanically, structurally, or chemically bound together to form a continuous matrix that is surrounded by two natural nets.

The Contractor shall check the erosion control material upon delivery to ensure that the proper material has been received. During periods of shipment and storage, the erosion mat shall be protected from temperatures greater than 140°F, mud, dirt, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the erosion mat/blanket shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed by cutting out a section of the mat. The remaining ends should be overlapped and secured with ground anchors. Any erosion mat/blanket damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

Erosion control material suppliers shall provide a qualified and experienced representative onsite, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s). The erosion control material shall be placed and anchored on a smooth graded, firm surface approved by the Engineer. Anchoring terminal ends of the erosion control material shall be accomplished through use of key trenches. The material in the trenches shall be anchored to the soil on maximum 1½-foot centers. Topsoil, if required by construction drawings, placed over final grade prior to installation of the erosion control material shall be limited to a depth not exceeding 3 inches.

Erosion control material shall be anchored, overlapped, and otherwise constructed to ensure performance until vegetation is well established. Anchors shall be as designated on the construction drawings, with a minimum of 12-inch length, and shall be spaced as designated on the construction drawings, with a maximum spacing of 4 feet.

SAN RAMON

SAN FRANCISCO

SAN JOSE

OAKLAND

LATHROP

ROCKLIN

VALENCIA

SANTA MARIA

IRVINE

CHRISTCHURCH

WELLINGTON

AUCKLAND

ENGEO
Expect Excellence

Appendix E
Phase I Environmental Site Assessment

EXPOSITION CENTER
SAN MATEO BASINS 2 AND 3
SAN MATEO, CALIFORNIA

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Submitted to
City of San Mateo
C/O Margaret M. Regan
Stantec (formerly MWH Global)
3010 W Charleston, Suite 100
Las Vegas, NV 89012

Prepared by
ENGEO Incorporated

March 28, 2017

Project No.
13231.000.000

ENGEO
Expect Excellence

Project No.
13231.000.000

March 28, 2017

City of San Mateo
C/O Ms. Margaret M. Regan
Stantec (formerly MWH Global)
3010 W Charleston, Suite 100
Las Vegas, NV 89012

Subject: Exposition Center
San Mateo Basins 2 and 3
San Mateo, California

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Dear Ms. Regan:

ENGEO is pleased to present our phase I environmental site assessment of the subject property (Study Areas 1 and 2), located in San Mateo, California. The attached report includes a description of the site assessment activities, along with ENGEO's findings, opinions, and conclusions regarding the Study Areas.

ENGEO has the specific qualifications based on education, training, and experience to assess the nature, history, and setting of the Study Areas, and has developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312. We declare that, to the best of our professional knowledge and belief, the responsible charge for this study meets the definition of Environmental Professional as defined in Section 312.10 of 40 CFR Part 312 and ASTM 1527-13.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please contact us.

Sincerely,

ENGEO Incorporated

Yanet Zepeda
yz/ja/cjn

Jeffrey A. Adams, PhD

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EXECUTIVE SUMMARY

ENGEO conducted a phase I environmental site assessment for two portions of the property located within the City of San Mateo Exposition Center, located at 2495 South Delaware Street in San Mateo, California (Study Area 1 and Study Area 2). Study Area 1 and Study Area 2, approximately 1 and 2.2 acres in area, respectively, occupy portions of the parent parcel identified by Assessor's Parcel Number (APN) 040-030-220.

Study Area 1 and Study Area 2 are situated within the City of San Mateo Exposition Center. Study Area 1 is currently occupied by an asphalt-paved parking lot. Study Area 2 is currently occupied by a gravel parking yard with stored trailers, trucks, and large metal containers. The parent parcel of Study Areas 1 and 2 is bound by Saratoga Drive to the north and east, South Delaware Street to the west and a school and park to the south.

Review of historical records indicates that Study Area 1 has been occupied by paved parking since at least 1974; prior to 1974 the Study Area was undeveloped with the exception of some land disturbance possibly associated with an adjacent airport in the 1940s. Study Area 2 remained undeveloped until at least 2005, at which time it began to be used as a parking yard.

This 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 Study Areas 1 and 2 was conducted to review site use and current conditions to check for the storage, use, production or disposal of hazardous or potentially hazardous materials.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the use or past use of Study Areas 1 and 2. A review of regulatory databases maintained by county, state, tribal, and federal agencies found no documentation of hazardous materials violations or discharge on Study Areas 1 and 2 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 Study Area.

Based on the findings of this assessment, no Recognized Environmental Conditions (RECs), controlled RECs, or Historical RECs have been identified for Study Areas 1 and/or 2.

Based on the review of regulatory databases and site reconnaissance, we present information on a feature of potential environmental concern that was contained in the databases related to the Study Areas. This feature was not considered to be an REC. We briefly discuss the feature below.

- The parent parcel (040-030-020), outside of Study Areas 1 and 2 is associated with a former leaking underground storage tank (LUST) case. The LUST case is located approximately 650 feet east of Study Area 1 and 850 feet northwest of Study Area 2. The LUST was removed in 1997 (See Figure 2). The San Mateo County Groundwater Protection Program issued a Closure Memorandum dated January 28, 2002 for the LUST case. It is our opinion that the risk of potential environmental impact to Study Areas 1 and 2 is low.

ENGEO has performed a phase I environmental site assessment in general conformance with the scope and limitations of ASTM E1527 of approximately 1 and 2.2-acre portions of the parent parcel identified by Assessor's Parcel Number (APN) 040-030-220, San Mateo, California, Study Area 1 and Study Area 2. Any exceptions to, or deletions from, this practice are described in Section(s) 1.7 and 6.2 of this report.

ENGEO recommends no further environmental studies at this time.

We understand that material offhaul may occur as part of future development. It may be prudent to perform a preliminary material offhaul screening program with laboratory analysis to evaluate potential offhaul disposal and reuse options.

1.0 INTRODUCTION

ENGEO conducted a phase I environmental site assessment for two portions of the subject property (Study Area 1 and Study Area 2) located within the City of San Mateo Exposition Center at 2495 South Delaware Street in San Mateo, California (Figure 1). Study Area 1 is currently occupied by an asphalt-paved parking lot. Study Area 2 is currently occupied by a gravel parking yard with stored trailers, trucks and large metal containers.

1.1 SITE LOCATION

The two separate study areas are located within the City of San Mateo Exposition center located at 2495 South Delaware Street in San Mateo, California (Figure 1). Study Area 1 and Study Area 2, approximately 1 and 2.2 acres in area, respectively, occupy portions of the property identified as Assessor's Parcel Number (APN) 040-030-220 (Figure 3). The parent parcel of Study Area 1 and 2 is bound by Saratoga Drive to the north and east, South Delaware Street to the west and a school and park to the south.

1.2 SITE AND VICINITY CHARACTERISTICS

According to published topographic maps, Study Areas 1 and 2 are relatively level, situated at an elevation of approximately 11 feet above mean sea level (msl) (Figure 4). Review of the regional geologic mapping by Brabb et al (1998) found that the Study Areas are underlain by historic artificial fill consisting of loose to very well consolidated gravel, sand, silt and clay in various combinations.

Geocheck – Physical Setting Source Summary of the Environmental Resources Data report (Appendix A) indicated no Federal United States Geological Survey (USGS) wells located within 1 mile of the Study Areas. The Physical Setting Source Summary also provided hydrogeologic information for use as an indicator of groundwater flow direction in the immediate area. This section indicated no wells located within 1 mile of the Study Areas.

We reviewed the Department of Water Resources On-line Water Data Library for depth to water in the vicinity of the Study Areas. The website did not identify any wells within 1 mile of the Study Areas.

We reviewed EnviroStor, a website maintained by the State of California, Department of Toxic Substances Control, and GeoTracker, a website maintained by the State of California, Water Resources Control Board, for nearby facilities with records that include depth to groundwater measurements. The following information was obtained regarding local groundwater conditions.

TABLE 1.2-1: Local Groundwater Conditions

PROXIMITY TO STUDY AREA 1	PROXIMITY TO STUDY AREA 2	REPORTED DEPTH TO GROUNDWATER	REPORTED GROUNDWATER FLOW DIRECTION
800 feet south	1,500 feet west	2½ to 4 feet	north-northeast
1,000 feet south	1,800 feet southwest	6 to 7 feet	northeast
1,200 feet north	2,350 feet northwest	5 to 6 feet	west-southwest

The site-specific depth to groundwater and direction of groundwater flow was not determined as part of this assessment. Fluctuations in groundwater levels may occur seasonally and over a period of years due to variations in precipitation, temperature, and other factors.

We reviewed the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) website and map database to determine if any historic oil and/or gas wells were located within Study Areas 1 and 2. No geothermal wells were mapped within 1 mile of Study Areas 1 and 2.

1.3 CURRENT USE OF STUDY AREAS/DESCRIPTION OF SITE IMPROVEMENTS

Study Area 1 and Study Area 2, approximately 1 and 2.2 acres in area, respectively, occupy portions of the City of San Mateo Exposition Center. Study Area 1 is currently occupied by an asphalt-paved parking lot. Study Area 2 is currently occupied by a gravel parking yard with stored trailers, trucks, and large metal containers.

1.4 CURRENT USE OF ADJOINING PROPERTIES

The parent parcel of the two Study Areas is located in a mixed-use area of San Mateo. The parent parcel is bound by Saratoga Drive to the north and east, South Delaware Street to the west and a school and park to the south.

1.5 PURPOSE OF PHASE I ENVIRONMENTAL SITE ASSESSMENT

This assessment was performed at the request of City of San Mateo and Stantec (formerly MWH Global).for the purpose of environmental due diligence during property acquisition. The objective of this phase I environmental site assessment is to identify Recognized Environmental Conditions (RECs) associated with the Study Area. As defined in the ASTM Standard Practice E 1527-13, an REC is “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

1.6 DETAILED SCOPE OF SERVICES

The scope of services performed included the following:

- A review of publicly available and practically reviewable standard local, state, tribal, and federal environmental record sources.
- A review of publicly available and practically reviewable standard historical sources, aerial photographs, fire insurance maps and physical setting sources.
- A reconnaissance of Study Areas 1 and 2 to review site use and current conditions. The reconnaissance was conducted to check for the storage, use, production or disposal of hazardous or potentially hazardous materials.
- Preparation of this report with our findings, opinions, and conclusions.

1.7 SIGNIFICANT ASSUMPTIONS OR DEVIATIONS FROM ASTM STANDARD PRACTICE

No significant assumptions or deviations were encountered during this assessment. Data gaps identified during the preparation of this report are presented in Section 6.2.

1.8 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The professional staff at ENGEO strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. The recommendations and conclusions presented in this report were based on the findings of our study, which were developed solely from the contracted services. The findings of the report are based in part on contracted database research, out-of-house reports and personal communications. The opinions formed by ENGEO are based on the assumed accuracy of the relied upon data in conjunction with our relevant professional experience related to such data interpretation. ENGEO assumes no liability for the validity of the materials relied upon in the preparation of this report.

This document must not be subject to unauthorized reuse; that is, reuse without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. The findings from a phase I environmental site assessment are valid for one year after completion of the report. Updates of portions of the assessment may be necessary after a period of 180 days after completion.

This phase I environmental site assessment is not intended to represent a complete soil or groundwater characterization, nor define the depth or extent of soil or groundwater contamination. It is intended to provide an evaluation of potential environmental concerns associated with the use of Study Areas 1 and 2. A more extensive assessment that would include a subsurface exploration with laboratory testing of soil and groundwater samples could provide more definitive information concerning site-specific conditions. If additional assessment activities are considered for Study Areas 1 and 2 and if other entities are retained to provide such services, ENGEO cannot be held responsible for any and all claims arising from or resulting from the performance of such services by other persons or entities. ENGEO can also not be held responsible from any and all claims arising or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

1.9 SPECIAL TERMS AND CONDITIONS

ENGEO has prepared this report for the exclusive use of City of San Mateo and Stantec. It is recognized and agreed that ENGEO has assumed responsibility only for undertaking the study for the client. The responsibility for disclosures or reports to a third party and for remedial or mitigative action shall be solely that of the Client.

Laboratory testing of soil or groundwater samples was not within the scope of the contracted services. The assessment did not include an asbestos survey, an evaluation of lead-based paint, an inspection of light ballasts for polychlorinated biphenyls (PCBs), a radon evaluation, or a mold survey.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's assessment. Visual observations referenced in this report are intended only to represent conditions at the time of the reconnaissance. ENGEO would not be aware of site contamination, such as dumping and/or accidental spillage, that occurred subsequent to the reconnaissance conducted by ENGEO personnel.

2.0 USER-PROVIDED INFORMATION

2.1 PROPERTY RECORDS

2.1.1 Title Report/Ownership

The Title Report lists recorded land title detail, ownership fees, leases, land contracts, easements, liens, deficiencies, and other encumbrances attached to or recorded against a subject property. Laws and regulations pertaining to land trusts vary from state to state and the detail of information presented in a Title Report can vary greatly by jurisdiction. As a result, ENGEO utilizes a Title Report, when provided to us, as a supplement to other historical record sources.

A Preliminary Title Report for the parent parcel of the Study Areas was not provided for our review prior to the publication of this document.

2.1.2 Environmental Liens and Activity Use Limitations

Environmental Data Resources, Inc. (EDR) provided an Environmental Lien Search Report for the parent parcel of Study Areas 1 and 2 prepared by NETR Real Estate Research and Information. The report, which is included in Appendix D, did not list environmental liens associated with the APN of the parent parcel of Study Areas 1 and 2.

2.2 USER KNOWLEDGE OF STUDY AREA

Ms. Dana Stoehr, Key Site Manager of the City of San Mateo Exposition Center, completed Key Site Manager and Client environmental site assessment questionnaires pertaining to user-related applicable environmental information regarding the Site. In the questionnaires, Ms. Stoehr did not identify potential environmentally related issues with the Site. However, Ms. Stoehr did acknowledge an underground storage tank had been previously present within the parent parcel of the Site. The questionnaires are presented in their entirety in Appendix G.

3.0 RECORDS REVIEW

3.1 PREVIOUS ENVIRONMENTAL REPORTS

We were not provided and did not encounter in our research previous environmental reports for Study Areas 1 and/or 2 during our records review. See section 3.4 for a summary of the files identified during our agency file review activities.

3.2 HISTORICAL RECORD SOURCES

The purpose of the historical record review is to develop a history of the previous uses or occupancies of Study Areas 1 and 2 and surrounding area in order to identify those uses or occupancies that are likely to have led to recognized environmental conditions on Study Area 1 and/or 2.

3.2.1 Historical Topographic Maps

Historical USGS topographic maps were reviewed to determine if discernible changes in topography or improvements pertaining to Study Areas 1 and 2 had been recorded. The following maps were provided to us through an EDR Historical Topographic Map Report, presented in Appendix C.

TABLE 3.2.1-1: Historical Topographic Maps

QUAD	YEAR	SERIES	SCALE
San Mateo	1896	15	1:62500
San Mateo	1899	15	1:62500
San Mateo	1915	15	1:62500
San Mateo	1939	15	1:62500
San Mateo	1947	7.5	1:24000
San Mateo	1949	7.5	1:24000
San Mateo	1956	7.5	1:24000
San Mateo	1968	7.5	1:24000
San Mateo	1973	7.5	1:24000
San Mateo	1980	7.5	1:24000
San Mateo	1993	7.5	1:24000
San Mateo	1997	7.5	1:24000
San Mateo	2012	7.5	1:24000

<u>1896, 1899, and 1915 Maps</u> – The parent parcel of Study Areas 1 and 2 is mapped within bay marshland. A railroad and sparse development with an area identified as Homestead is shown to the west of the Study Areas. No structures are depicted within Study Area 1 or 2.

<u>1939 Map</u> – The parent parcel of Study Areas 1 and 2 and surrounding area are no longer mapped as marshland. A tributary of Seal Creek is mapped traversing Study Area 1. A road is mapped immediately north of Study Area 2. Bay Meadows racetrack is mapped immediately south of Study Area 2. Two structures are mapped within the parent parcel of the two Study Areas. Development of the surrounding area has progressed north, west and south of the Study Areas. No structures are depicted within Study Area 1 or 2.

<u>1947, 1949 Maps</u> – Bay Meadows Airport is mapped immediately adjacent to Study Areas 1 and 2, occupying the parent parcel. Development of the surrounding area has progressed. No structures are depicted within Study Area 1 or 2.

<u>1956, 1968, 1973 Maps</u> – Bay Meadows Airport is no longer mapped within the parent parcel of Study Areas 1 and 2. The area occupied by the parent parcel is identified as Fiesta Grounds and County Fairgrounds. Eight structures are mapped within the parent parcel but do not occupy Study Area 1 or 2. North of Study Areas 1 and 2, Fiesta Gardens School and the County Fairground are now shown. Development of the surrounding area has progressed.

1980, 1993, 1997, 2012 Map – The mapped conditions of Study Areas 1 and 2 and the surrounding areas appear similar to the previous maps, with the exception of the 2012 map where a formerly mapped structure associated with the Bay Meadows Racetrack immediately south of Study Area 2 is no longer mapped.

3.2.2 Aerial Photographs

The following aerial photographs, provided by EDR, were reviewed for information regarding past conditions and land use at Study Areas 1 and 2 and in the immediate vicinity. These photographs are presented in Appendix E.

TABLE 3.2.2-1: Aerial Photographs

FLYER	YEAR	SCALE
USDA	1943	1”=500’
USGS	1946	1”=500’
USGS	1956	1”=500’
USGS	1963	1”=500’
USGS	1968	1”=500’
USGS	1974	1”=500’
USDA	1982	1”=500’
USGS/DOQQ	1993	1”=500’
USDA	1998	1”=500’
USDA/NAIP	2005	1”=500’
USDA/NAIP	2009	1”=500’
USDA/NAIP	2010	1”=500’
USDA/NAIP	2012	1”=500’

1943 Photograph – Study Areas 1 and 2 appear to be undeveloped. A road is visible immediately north of Study Area 2. Two or more structures and disturbed land are visible in the parent parcel of the Study Areas. North of the Study Areas, undeveloped land and Seal Creek tributaries are visible. The Bay Meadows Racetrack is visible south of the Study Areas. West of the Study Areas, residential development is visible.

1946 Photograph – Study Area 2 conditions appear similar to the 1943 photograph. Land disturbance, possibly related to Bay Meadows Airport, is visible across Study Area 1. Progress of residential development in the surrounding areas is visible.

1956 Photograph – Study Areas 1 and 2 still appear undeveloped. Several structures are now visible within the parent parcel of the study areas, including a structure immediately south of Study Area 1. Residential and likely commercial development north, south and west of the Study Areas has progressed.

1963, 1968 Photographs – Study Area 1 and 2 conditions appear similar to the 1956 photograph. The structure immediately south of Study Area 1 is no longer visible within the parent parcel.

1974, 1982 Photographs – Study Area 2 conditions appear similar to the 1963 and 1968 photographs. Study Area 1 appears to have been paved for parking use.

1993, 1998 Photographs – Study Areas 1 and 2 conditions appear similar to the 1974 and 1982 photographs. The portion of the parent parcel immediately west of Study Area 2 appears to be undergoing development into a parking area.

2005, 2009, 2010, 2012 Photographs – Re-paving activities are apparent at Study Area 1. Study Area 2 is used trailer parking with conditions generally reflecting current conditions.

3.2.3 Fire Insurance Maps

EDR prepared a Sanborn Fire insurance map search for the Study Area and surrounding properties. We reviewed maps reported for 1927, 1950, 1953, 1956, 1961 and 1969. The maps listed were blank within the bounds of Study Areas 1 and 2.

3.2.4 City Directory

City Directories, published since the 18th century for major towns and cities, lists the name of the resident or business associated with each address. A city directory search conducted by EDR is located in Appendix F. The listings found for 2495 South Delaware Street are listed in Table 3.1.4-1.

TABLE 3.2.4-1: City Directory Listings

YEAR	LISTINGS
2013	Butler Amusements Inc., Jockey Club, Ovations Fanfare, San Mateo County Event Center, Vitamix
2003	Canvas Collectibles Inc., Deejohns Christmas Trees, Ovations, San Mateo County Expo Center
1999	Deejohns Christmas Trees, San Mateo County Exposition Center, Sodexho
1995	Deejohns Christmas Trees, Fine Host Corp.
1992	Deejohns Christmas Trees, Fine Host Corp., San Mateo Exposition
1985	San Mateo County Fair Center, San Mateo County Fairgrounds, San Mateo County Fair & Exposition
1980	Araserv S Mt Fairground, San Mateo County Fair & Exposition
1977	San Mateo County Fair & Exposition
1970	Convention Assn, Peninsula Art Assn, Peninsula Model Railroad, San Mateo County Fair & Convention, San Mateo County Fairgrounds

3.3 ENVIRONMENTAL RECORD SOURCES

EDR performed a search of federal, tribal, state, and local databases regarding the parent parcel of the Study Area and nearby properties. Details regarding the databases searched by EDR are provided in Appendix A. A list of the facilities documented by EDR within the approximate minimum search distance of the parent parcel of Study Areas 1 and 2 is provided below.

3.3.1 Standard Environmental Records

3.3.1.1 Parent Parcel of Subject Study Areas

The following databases includes facilities listed on the Standard Environmental Record sources. The listed facilities are associated with the parent parcel and are located outside of Study Areas 1 and 2.

TABLE 3.3.1.1-1: Standard Environmental Records for parent parcel of Target Study Areas 1 and 2

DATABASE	NUMBER OF CASES
LUST	2
AST	1

3.3.1.2 Other Properties

The following databases includes facilities listed within the appropriate ASTM search distances of the parent parcel of Study Areas 1 and 2 on Standard Environmental Records sources.

TABLE 3.3.1.2-1: Standard Environmental Records for Surrounding Properties

DATABASE	NUMBER OF CASES
RCRA-SQG	11
ENVIROSTOR	4
LUST	86
SLIC	4
UST	3
AST	3
VCP	1

3.3.2 Additional Environmental Records

3.3.2.1 Parent Parcel of Subject Study Areas

The following databases include facilities listed on the Additional Environmental Record sources. The listed facilities are associated with the parent parcel and are located outside of Study Areas 1 and 2.

TABLE 3.3.2.1-1: Additional Environmental Records for parent parcel of Target Study Area

DATABASE	NUMBER OF CASES
HIST UST	2
San Mateo Co. BI	1
HAZNET	4
HIST CORTESE	1

3.3.2.2 Other Properties

The following databases includes facilities listed within the appropriate ASTM search distances of the parent parcel of Study Areas 1 and 2 on the Additional Environmental Record sources.

TABLE 3.3.2.2-1: Additional Environmental Records for Surrounding Properties

DATABASE	NUMBER OF CASES
WMUDS/SWAT	1
SWRCY	1
SWEEPS UST	26
HIST UST	25
CA FID UST	23
RCRA Non-Gen	1
FINDS	1
San Mateo Co. BI	57
DRY CLEANERS	1
EMI	1
HAZNET	4
HIST CORTESE	32
Notify 65	5
WDS	1

Based on the distances to the identified database sites, regional topographic gradient, and the EDR findings, it is unlikely that the above database sites pose an environmental risk to Study Areas 1 and/or 2.

Two of three unique cases listed under the "Orphan Summary" list appear to be located beyond the ASTM recommended radius search criteria. The third unique orphan summary case listed as an RGA LUST case is Honda of San Mateo with an associated address of 101 25th Avenue. The same site was listed as a LUST site under the mapped sites summary and would not be anticipated to pose an environmental risk to Study Areas 1 or 2.

3.4 REGULATORY AGENCY FILES AND RECORDS

The following agencies were contacted pertaining to possible past development and/or activity at the parent parcel of Study Areas 1 and 2.

- City of San Mateo Building Department
- City of San Mateo Fire Department
- City of San Mateo Public Works Department
- San Mateo County Department of Environmental Health
- San Mateo County Assessor's Office
- California Department of Forestry and Fire Protection

<u>City of San Mateo Building Department</u> – The City of San Mateo Building Department provided building permit records. Relevant records included permit applications for the installation and repair of underground storage tanks and above ground storage tanks located on the parent parcel, outside of Study Areas 1 and 2. Records reviewed included the following:

- Building permit application dated June 11, 1997 for the installation of an above-ground gasoline tank for motor vehicle fuel.

- Building permit application dated April 30, 1997 for the removal of an underground fuel tank.

<u>City of San Mateo Fire Department</u> – The City of San Mateo Fire Department provided permit records. A summary of the relevant records is below. The documented facilities are outside of Study Areas 1 and 2.

- Permit issued for removal of one (1) UST on April 17, 1997.

- Four (4) permit applications for one (1) 2,500-gallon propane tank truck to be stored at San Mateo County Fairgrounds dated April 11, 1986, April 24, 1987, April 27, 1988 and April 3, 1990.

- Permit application for installation of one (1) 1,000-gallon UST dated December 3, 1980.

<u>City of San Mateo Public Works Department</u> – The City of San Mateo Public Works Department provided records for our review. Relevant, documented facilities are outside of Study Area 1 and 2 and included the following:

- Drawing titled "Gasoline Storage Tank and Pump Installation" for a 1,000-gallon-capacity fiberglass tank dated December 3, 1980.

<u>San Mateo County Department of Environmental Health</u> – We reviewed documentation related to hazardous materials provided by the San Mateo County Department of Environmental Health. We reviewed records pertaining to a LUST located within the parent parcel and outside of Study Areas 1 and 2. A summary of the information contained in a San Mateo County Groundwater Protection Program Closure Memorandum dated January 28, 2002 pertaining the LUST case is provided below.

- Tank (UST) containing gasoline was removed from the parent parcel of Study Areas 1 and 2. The UST was located approximately 650 feet east of Study Area 1 and 850 feet northwest of Study Area 2. At the time of removal, soil and groundwater samples were found to contain petroleum hydrocarbons. Monitoring wells were constructed and sampled quarterly. Groundwater flow direction was determined to be directed north. Based on a review of the documents provided, the final quarterly sampling event was conducted in summer 2001 and detected 52 micrograms per liter (µg/L) TPH-g, 0.6 µg/L benzene, and 4 µg/L MTBE. Based on the results of the sampling event, the San Mateo County closure memorandum states the groundwater plume appears to be local and is stable.

San Mateo County Assessor's Office – We spoke with a representative at the San Mateo County Assessor's Office and they confirmed the APN of 040-030-220 and associated address belongs to the parent parcel of Study Areas 1 and 2.

California Department of Forestry and Fire Protection – A representative of the California Department of Forestry and Fire Protection was contacted for a file review; however, we did not receive files for review prior to publishing this report

We also reviewed GeoTracker, a website maintained by the State of California, Water Resources Control Board, and EnviroStor, a website maintained by the State of California, Department of Toxic Substances Control for information regarding Study Areas 1 and 2. The parent parcel of Study Areas 1 and 2 was listed on GeoTracker as a LUST cleanup site. The case, which is listed as closed as of September 30, 2002, is discussed above in section 3.4. The Study Areas are not listed within either database.

4.0 SITE RECONNAISSANCE

4.1 METHODOLOGY

ENGEO conducted a reconnaissance of Study Areas 1 and 2 on February 2, 2017. The reconnaissance was performed by Yanet Zepeda, a Staff Engineer of ENGEO. The Study Areas were 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 areas were also checked for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks. Study Area 2 contained one administrative office trailer for which access was not provided during our site reconnaissance. We do not consider this a significant data gap. Photographs taken during the site reconnaissance are presented in Figure 5.

4.2 GENERAL SITE SETTING

Study Area 1 and Study Area 2, respectively, occupy portions of the City of San Mateo Exposition Center. The topography of Study Areas 1 and 2 is relatively level. Study Area 1 is currently occupied by an asphalt-paved parking lot. Study Area 1 is accessible by two site entrances located on South Delaware Street and Saratoga Drive. Trees, bushes, and grasses vegetate the perimeter of Study Area 1 to the north, west, and east. Study Area 2 is currently occupied by an unpaved parking yard. Study Area 2 is accessible via the site entry on Saratoga Drive located on the northeastern portion of the parent parcel. The parking yard is populated by buses, trailers and recreational vehicles of various sizes. One administrative office trailer is situated on the southwestern corner of Study Area 2.

4.3 EXTERIOR OBSERVATIONS

Structures. One administrative office trailer structure was observed within Study Area 2.

Hazardous Substances and Petroleum Products in Connection with Identified Uses. No hazardous substances were observed within Study Areas 1 and 2 at the time of our reconnaissance.

Storage Tanks. No above-ground storage tanks or evidence of existing underground storage tanks was observed during the site reconnaissance.

Odors. No odors indicative of hazardous materials or petroleum material impacts were noted at the time of the reconnaissance.

Pools of Potentially Hazardous Liquid. No pools of potentially hazardous liquid were observed within the Study Area at the time of our reconnaissance.

Drums. No drums were observed on the Study Areas at the time of the reconnaissance.

Polychlorinated Biphenyls (PCBs). No PCB-containing materials, including transformers, were observed within the Study Areas during the reconnaissance.

Pits, Ponds and Lagoons. No pits, ponds or lagoons were observed within Study Areas 1 and 2 at the time of our reconnaissance.

Stained Soil/Pavement. No stained soil or pavement was observed within Study Areas 1 and 2 at the time of our reconnaissance.

Stressed Vegetation. No signs of stressed vegetation were observed the within Study Areas 1 and 2 at the time of our reconnaissance.

Solid Waste/Debris. One active yard waste bin was observed within Study Area 2, located adjacent the administrative office trailer. Additionally, piles of construction materials including wood, tires and steel were observed within Study Area 2.

Stockpiles/Fill Material. No stockpiles or fill material was observed during the reconnaissance.

Wastewater. No wastewater conveyance systems were observed at Study Areas 1 and/or 2 during the reconnaissance.

Wells. No wells were found within the Study Areas during our site reconnaissance.

Septic Systems. No septic systems were found within the Study Areas during our site reconnaissance.

4.4 INTERIOR OBSERVATIONS

The administrative office trailer could not be accessed during our reconnaissance.

4.5 ASBESTOS-CONTAINING MATERIALS AND LEAD-BASED PAINT

An asbestos and lead-based paint survey was not conducted as part of this assessment. The only structure is the administrative office trailer, and it is unlikely that the trailer contains asbestos-containing materials or lead-based paint.

4.6 INDOOR AIR QUALITY

An evaluation of indoor air quality, mold, or radon was not included as part of the contracted scope of services. The California Department of Health Services has conducted studies of radon risks throughout the state, sorted by zip code. Results of the studies indicate that 68 tests were conducted within the Study Area zip code, with one test exceeding the current EPA action level of 4 picocuries per liter [pCi/L][1]).

In accordance with ASTM E2600-10 (Tier 1) (*Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions*); There are no potential petroleum hydrocarbon sources for vapor intrusion within 1/10 mile of Study Areas 1 and 2 and one potential volatile organic compound (VOC) source within 1/3 mile of the Study Area. It is our opinion that the identified site does not represent a vapor intrusion concern for Study Area 1 or 2.

5.0 INTERVIEWS

Ms. Dana Stoehr, Key Site Manager of the City of San Mateo Exposition Center, completed environmental site assessment questionnaires pertaining to Key Site Manager and Client-related applicable environmental information regarding the Site. In the questionnaires, Ms. Stoehr did not identify potential environmentally related issues with the Site. However, Ms. Stoehr did acknowledge an underground storage tank had been previously present within the parent parcel of the Site. The questionnaires are presented in their entirety in Appendix G. A summary is provided below.

Ms. Stoehr is unaware of commonly known, reasonably ascertainable, or specialized knowledge indicative of releases or threatened releases that is material to the potential presence of Recognized Environmental Conditions.

6.0 EVALUATION

6.1 FINDINGS

The reconnaissance and records research did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of Study Areas 1 and 2. A review of regulatory databases maintained by county, state and federal agencies found no documentation of hazardous materials violations or discharge on Study Areas 1 and 2. No documented soil or groundwater contamination associated with abutting properties was found from the records research that would be expected to impact Study Areas 1 or 2.

[1] California Department of Health Services – Division of Drinking Water and Environmental Management – Radon (http://www.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf).

6.2 OPINIONS AND DATA GAPS

It is our opinion that the findings of this study are based on a sufficient level of information obtained during our contracted scope of services to render a conclusion as to whether additional appropriate investigation is required to identify the presence or likely presence of a REC. The following data gaps were identified:

- A Preliminary Title Report for the parent parcel of the Study Area was not provided for our review prior to the publication of this report.

- The interior of the administrative office trailer on Study Area 2 could not be accessed at the time of site reconnaissance.

- We did not receive files from the California Department of Forestry and Fire Protection prior to the publication of this report.

The data gaps identified during this process do not affect the conclusions as to the presence or lack of presence of RECs within the Study Areas.

6.3 CONCLUSIONS

The study included a review of local, state and federal environmental record sources, standard historical sources, aerial photographs, fire insurance maps and physical setting sources; a reconnaissance of Study Areas 1 and 2 to review site use and current conditions to check for the storage, use, production or disposal of hazardous or potentially hazardous materials.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the use or past use of Study Areas 1 and 2. A review of regulatory databases maintained by county, state, tribal, and federal agencies found no documentation of hazardous materials violations or discharge on Study Areas 1 and 2 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 Study Area.

Based on the findings of this assessment, no Recognized Environmental Conditions (RECs), controlled RECs, or Historical RECs are identified for Study Areas 1 and/or 2.

Based on the review of regulatory databases and site reconnaissance, we present information on a feature of potential environmental concern that was contained in the databases related to the Study Areas. This feature was not considered to be an REC. We briefly discuss the feature below.

- The parent parcel (040-030-020), outside of Study Areas 1 and 2 is associated with a former LUST case. The LUST case is located approximately 650 feet east of Study Area 1 and 850 feet northwest of Study Area 2, was removed in 1997 (Figure 2). The San Mateo County Groundwater Protection Program issued a Closure Memorandum dated January 28, 2002 for the LUST case. It is our opinion that the risk of environmental impact to Study Areas 1 and 2 is low.

ENGEO has performed a phase I environmental site assessment in general conformance with the scope and limitations of ASTM E1527 of approximately 1 and 2.2-acre portions of the parent parcel identified by Assessor's Parcel Number (APN) 040-030-220, San Mateo, California, Study Area 1 and Study Area 2. Any exceptions to, or deletions from, this practice are described in Section(s) 1.7 and 6.2 of this report.

ENGEO recommends no further environmental studies at this time.

We understand that material offhaul may occur as part of future development. It may be prudent to perform a preliminary material offhaul screening program with laboratory analysis to evaluate potential offhaul disposal and reuse options.

SELECTED REFERENCES

Brabb, E.E., Graymer, R.W., and Jones, D.L., 1998, Geology of the Onshore Part of San Mateo County, California: a digital database: U.S. Geological Survey

Google Maps (http://maps.google.com)

San Mateo County (http://www.smcgov.org/)

EnviroStor Website, Department of Toxic Substances Control, http://www.envirostor.dtsc.ca.gov/public//

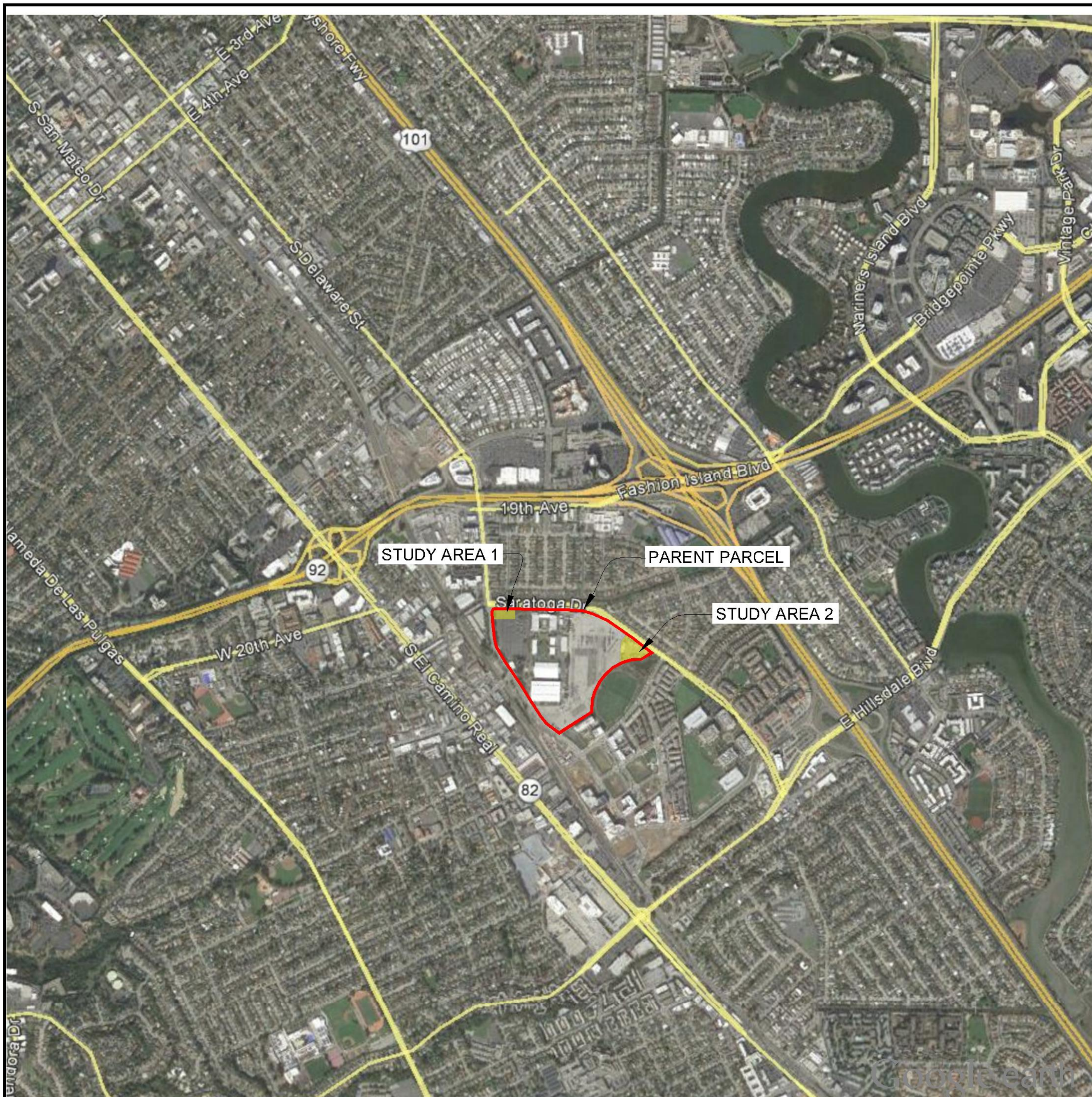
GeoTracker Website, State Water Resources Control Board, (http://geotracker.swrcb.ca.gov/)

California Department of Water Resources (http://www.water.ca.gov/waterdatalibrary/)

California Department of Conservation (DOGGR) (http://maps.conservation.ca.gov/doms/doms-app.html)

California Department of Health Services – Division of Drinking Water and Environmental Management – Radon (http://ww2.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf)

FIGURES



BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

ENGEO Expect Excellence	VICINITY MAP SAN MATEO BASINS 2 AND 3 - EXPOSITION CENTER SAN MATEO, CALIFORNIA	PROJECT NO.: 13231.000.000 SCALE: AS SHOWN DRAWN BY: SRP CHECKED BY: SB	FIGURE NO. 1

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13231\000\ESA-EXPO-SITE\13231000000-1-Vicinitymap-0217.dwg Plot Date: 2-10-17 spatters

ORIGINAL FIGURE PRINTED IN COLOR

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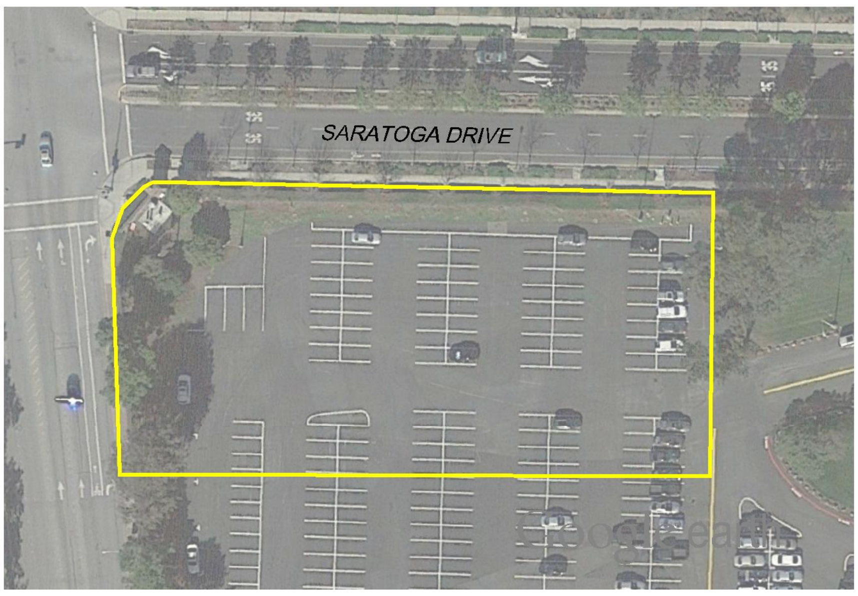

STUDY AREA 1

STUDY AREA 2

N

0 FEET 100
0 METERS 50

N

0 FEET 300
0 METERS 150

BASE MAP SOURCE: GOOGLE EARTH MAPPING SERVICE

ENGEO Expect Excellence	SITE PLAN SAN MATEO BASINS 2 AND 3 - EXPOSITION CENTER SAN MATEO, CALIFORNIA	PROJECT NO.: 13231.000.000 SCALE: AS SHOWN DRAWN BY: SRP CHECKED BY: SB	FIGURE NO. 2

ORIGINAL FIGURE PRINTED IN COLOR

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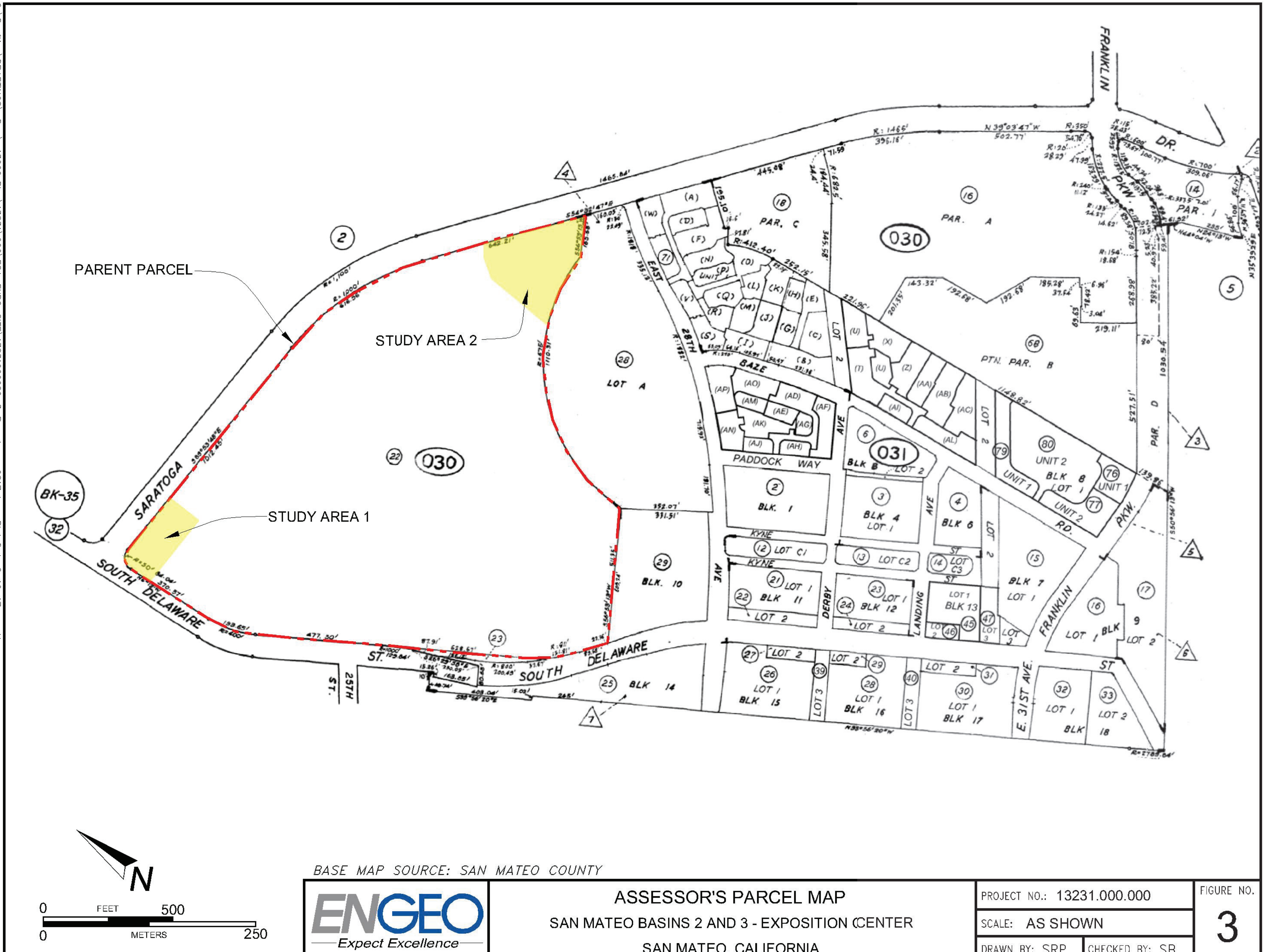


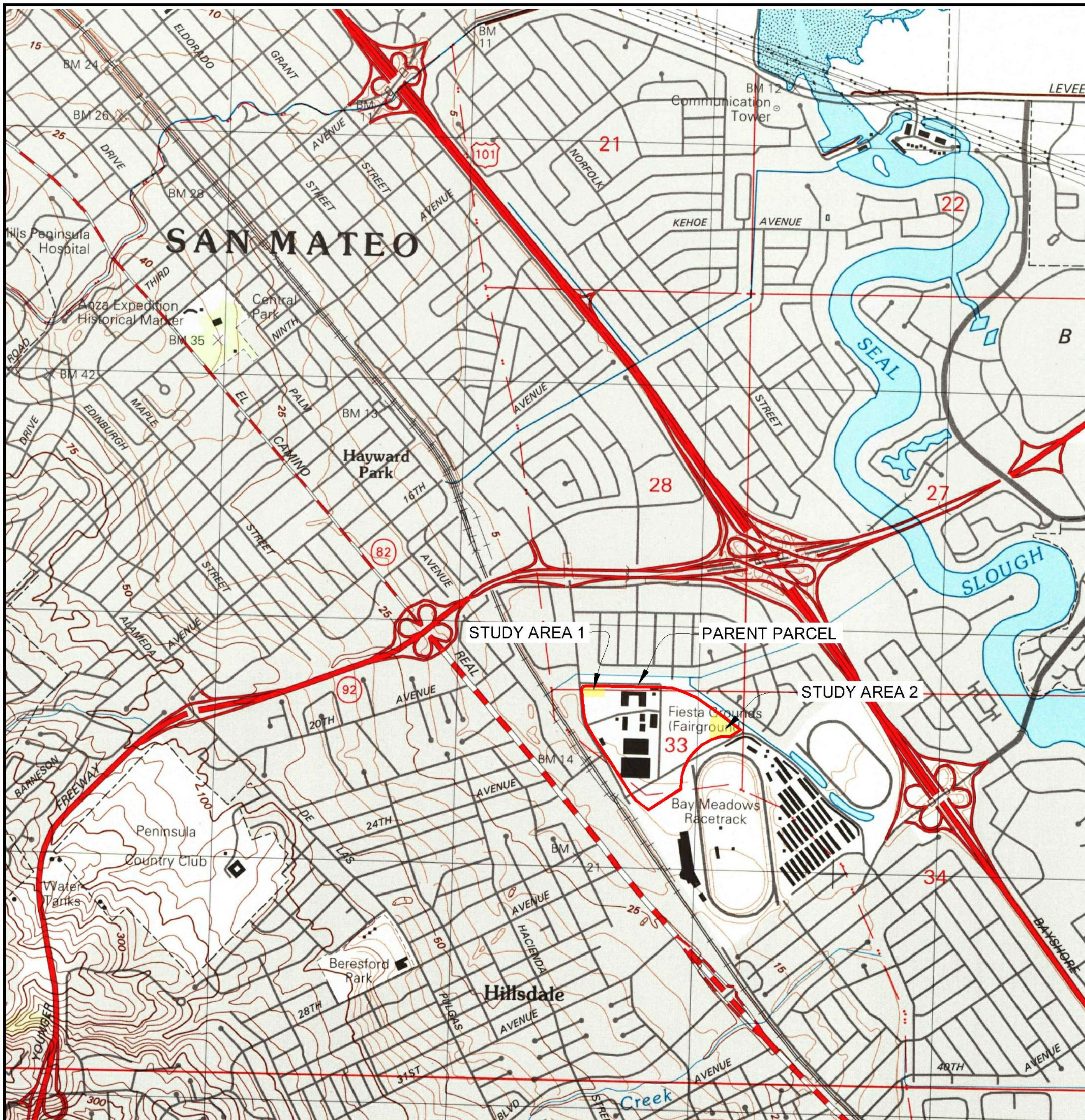
BASE MAP SOURCE: SAN MATEO COUNTY

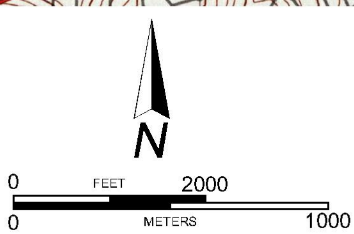
ENGEO
Expect Excellence

ASSESSOR'S PARCEL MAP
SAN MATEO BASINS 2 AND 3 - EXPOSITION CENTER
SAN MATEO, CALIFORNIA

PROJECT NO.: 13231.000.000	FIGURE NO. 3
SCALE: AS SHOWN	
DRAWN BY: SRP	CHECKED BY: SB

ORIGINAL FIGURE PRINTED IN COLOR





BASE MAP SOURCE: USGS, 1983

ENGEO Expect Excellence	TOPOGRAPHIC MAP SAN MATEO BASINS 2 AND 3 - EXPOSITION CENTER SAN MATEO, CALIFORNIA	PROJECT NO.: 13231.000.000 SCALE: AS SHOWN DRAWN BY: SRP / CHECKED BY: SB	FIGURE NO. 4

G:\Drafting\DRAFTING2_Dwg_13000 Plus\13231\000\ESA-EXPO-SITE\13231000000-4-TopographicMap-0217.dwg Plot Date: 2-10-17 spatters

ORIGINAL FIGURE PRINTED IN COLOR

LOOKING NORTHEAST
STUDY AREA 1

CONSTRUCTION DEBRIS PILE AT NORTHERN CORNER
STUDY AREA 2

LOOKING EAST
STUDY AREA 2

LOOKING WEST
STUDY AREA 2

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SITE PHOTOGRAPHS
SAN MATEO BASINS 2 AND 3 - EXPOSITION CENTER
SAN MATEO, CALIFORNIA

PROJECT NO.: 13231.000.000
SCALE: NO SCALE
DRAWN BY: SRP
CHECKED BY: SB
FIGURE NO. 5

Appendix documents available upon request