PREFACE
March 26, 2019

In response to a request under the California Public Records Act, the City of Vallejo is exercising its discretion to make public the unfinished draft Final Environmental Impact Report (FEIR) for the VMT/Orcem project. The current version of this document is not ready for certification under the purposes of California Environmental Quality Act (CEQA). As of this date, clarification is needed as to who is the responsible party for certain indemnity and mitigation measures, and who has site control and ownership of the project site. While this clarification is obtained processing of the EIR has been paused.

As of March 26, 2019, the City, as lead agency, has determined that the VMT/Orcem project is not yet ready for approval and that the environmental documents that have been prepared do not yet achieve a compliance with CEQA (Cal. Code Regs, Titl. 14 Section 15090(a)(1)) Thus, the FEIR is not ready to be presented to the City Council for certification and project approval under CEQA (Cal. Code Regs, Titl. 14 Section 15090(a)(2)).

While the processing of the application has been paused, staff will endeavor to work with applicants to obtain an updated environmental justice analysis, and data, as well as commitments from the applicants to perform certain mitigation measure in order to present them as feasible. Feasible in this context means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (Cal. Code Regs, Titl.14 Section 15364).

Recognizing that the applicants and the public have requested release of the draft FEIR for public viewing, the City is accommodating these requests by posting the documents here. A progress report on this project is expected to be presented to Council by April 23, 2019.

DRAFT FEIR

FINAL

VALLEJO MARINE TERMINAL AND ORCEM PROJECT ENVIRONMENTAL IMPACT REPORT

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
°F	degrees Fahrenheit
AB	Assembly Bill
ACM	Asbestos-containing materials
AFY	acre-feet per year
AMSL	above mean sea level
ATS	Active Treatment System
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BCDC	Bay Conservation and Development Commission
BMPs	best management practices
CAA	Clean Air Act (federal)
CAAQS	California Ambient Air Quality Standards
CalOSHA	California Occupational Safety and Health Administration
CalRecycle	California Department of Resources Recycling and Recovery
Caltrans	California Department of Transportation
CA-MUTCD	California Manual of Uniform Traffic Control Devices
CAP	Clean Air Plan
CARB	California Air Resources Board
CARE	Community Air Risk Evaluation
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
CFR	Code Federal Regulations
CGS	California Geological Survey
CH_4	methane
City	City of Vallejo
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNG	compressed natural gas
CO_2	carbon dioxide
CO_2E	carbon dioxide equivalent
CO-CAT	Coastal and Ocean Working Group of the California Climate Action Team
CPUC	California Public Utilities Commission
CREATE	Chicago Rail Efficiency and Transportation Efficiency
CRHR	California Register of Historical Resources
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
CWR	Continuous Welded Rail

Acronym/Abbreviation	Definition
cyd	cubic yards
CZMA	Coastal Zone Management Act
dB	decibel
DFEIR	Draft Final Environmental Impact Report
DHS	California Department of Health Services
DPM	diesel particulate matter
DPS	distinct population segment
dscf	dry standard cubic foot
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FMP	fishery management plan
FOS	factor of safety
FTA	Federal Transit Administration
GBFS	granulated blast furnace slag
GGBFS	ground granulated blast furnace slag
GHG	greenhouse gas
GVRD	Greater Vallejo Recreation District
GWP	global warming potential
HAG	hot air generator
HARP	Hotspots Analysis Reporting Program
HCM	Highway Capacity Manual
HFC	hydroflourocarbon
HI	Hazard Index
HMBP	Hazardous Materials Business Plan
Hz	hertz
I-780	Interstate Highway 780
I-80	Interstate Highway 80
IEP	Interagency Ecological Program
IGP	Industrial General Permit
kHz	kilohertz
LAFCO	Solano County Local Agency Formation Commission
lbs/year	pounds per year
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_{min}	minimum sound level
LID	Low Impact Development
LOS	level of service
LTMS	Long-Term Management Strategy
LUST	Leaking Underground Storage Tank

Acronym/Abbreviation	Definition
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MMT	million metric tons
mph	miles per hour
MMRP	Mitigation and Monitoring Reporting Program
MRP	Municipal Regional Permit
MMscf	million standard cubic feet
MSDS	materials safety data sheets
MT	metric tons
MTSA	Maritime Transportation Security Act
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Oceanic and Atmospheric Administration Marine Fisheries Service
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSL	noise-sensitive location
O_3	ozone
Orcem	Orcem California Inc.
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCE	passenger car equivalents
PFC	perfluorocarbon
PGA	peak ground acceleration
PG&E	Pacific Gas and Electric
ppt	parts per trillion
PPV	perturbation projection vector
PSD	Prevention of Significant Deterioration
PSHA	probabilistic seismic hazard assessment
QSD/QSP	Qualified SWPPP Developer/Qualified SWPPP Practitioner
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
REL	reference exposure level
ROA	Revised Operations Alternative
ROG	reactive organic gas
RPS	Renewable Portfolio Standard

Acronym/Abbreviation	Definition
RWQCB	Regional Water Quality Control Board
SAFE Port Act	Security and Accountability for Every Port Act
SAV	submerged aquatic vegetation
SB	Senate Bill
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Office
SLR	sea level rise
SMP	Site Management Plan
SR	State Route
SRI	solar reflectance index
SSMP	Sanitary Sewer Management Plan
STA	Solano Transportation Authority
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants
TMDLs	total maximum daily loads
TOG	total organic gas
tpy	tons per year
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
v/c	volume-to-capacity
VFD	Vallejo Fire Department
VMT	Vallejo Marine Terminal LLC
VPD	Vallejo Police Department
VRM	vertical roller mill
VCUSD	Vallejo City Unified School District
VSFCD	Vallejo Sanitation and Flood Control District
WDRs	Waste Discharge Requirements
WTP	water treatment plant
WWTP	Wastewater Treatment Plant

CHAPTER 3
ENVIRONMENTAL ANALYSIS

The following environmental analysis provides information relative to the environmental topics listed below as they pertain to the proposed project. Each section of this chapter describes existing environmental and regulatory conditions, presents the criteria used to determine whether an impact would be significant, analyzes significant impacts, identifies mitigation measures for each significant impact, and discusses the significance of impacts after mitigation has been applied.

This chapter includes a separate section for each of the following issue areas:

- Section 3.1, Aesthetics
- Section 3.2, Air Quality
- Section 3.3, Biological Resources
- Section 3.4, Cultural Resources
- Section 3.5, Geology and Soils
- Section 3.6, Greenhouse Gas Emissions
- Section 3.7, Hazards and Hazardous Materials
- Section 3.8, Hydrology and Water Quality
- Section 3.9, Land Use and Planning
- Section 3.10, Noise
- Section 3.11, Public Services and Recreation
- Section 3.12, Transportation and Traffic
- Section 3.13, Utilities and Service Systems

Preliminary analysis contained in the Initial Study (included in Appendix A) determined that development of the proposed project would result in either no impact or less-than-significant impacts to the following issue areas: agricultural and forestry resources, mineral resources, and population and housing. These environmental topics are discussed in Section 5.1, Effects Found Not to be Significant, of Chapter 5, Other CEQA Considerations, of this Environmental Impact Report (EIR), and are not discussed in further detail (in accordance with California Environmental Quality Act (CEQA) Guidelines, 14 CCR 15128).

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3.1 AESTHETICS

This section analyzes the potential impacts of the Vallejo Marine Terminal (VMT) and Orcem project (proposed project) with respect to aesthetics and recommends mitigation measures where necessary to reduce or avoid significant impacts. All figures referenced in this section are provided at the end of the section.

The methods used to analyze visual changes associated with the proposed project consisted of an aerial and photographic inventory of the project site and its surrounding land uses, along with documentation of proposed project components using existing available land use and topographic data, and conceptual plans for the proposed improvements. In addition, the following draft lighting plan was prepared for the project:

- **Appendix C:** Musco Lighting. 2014. *Draft VMT Lighting Plan.* August 29, 2014.

3.1.1 Regulatory Setting

Federal

There are no federal regulations pertaining to aesthetics applicable to the proposed project.

State

San Francisco Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) is a state agency that was created as a temporary agency by the McAteer-Petris Act in 1965. In 1969, the McAteer-Petris Act was amended to make BCDC a permanent agency. BCDC regulates filling, dredging, and changes in use in San Francisco Bay (Bay). In addition, BCDC regulates new development within 100 feet of the shoreline to ensure the provision of public access to and along the Bay. BCDC is also responsible for ensuring that shoreline property suitable for regional high-priority water-oriented uses, such as ports, water-related industry, water-oriented recreation, airports, and wildlife areas, is reserved for these purposes (BCDC 2014). BCDC planning documents applicable to the project site are described below.

<u>San Francisco Bay Plan</u>

The San Francisco Bay Plan (Bay Plan), which was prepared by BCDC between 1965 and 1969 and most recently amended in 2012, guides the protection and use of the Bay and its shoreline. BCDC has permit jurisdiction over shoreline areas subject to tidal action up to the mean high tide line and including all sloughs, tidelands, submerged lands, and marshlands lying between the mean high tide and 5 feet above mean sea level for the nine Bay Area counties with Bay frontage, and

the land lying between the Bay shoreline and a line drawn parallel to, and 100 feet from, the Bay shoreline, known as the 100-foot shoreline band. The Bay Plan provides policy direction for BCDC's permit authority regarding the placement of fill; extraction of materials; substantial changes in use of land, water, or structures within its jurisdiction; protection of the Bay habitat and shoreline; and maximizing public access to the Bay (BCDC 2012).

Shoreline Spaces: Public Access Design Guidelines for the San Francisco Bay

The BCDC Public Access Design Guidelines provide guidance for site planning and design of public access areas associated with development projects along the shoreline of the San Francisco Bay. The Public Access Design Guidelines is an advisory document based on the Bay Plan policies and is intended to facilitate the design of projects that are consistent with BCDC's policies regarding public access. The following seven public access objectives are provided to help achieve the goal of providing "maximum feasible public access, consistent with the project" (BCDC 2005):

1. Make public access PUBLIC.
2. Make public access USABLE.
3. Provide, maintain and enhance VISUAL ACCESS to the Bay and shoreline.
4. Maintain and enhance the VISUAL QUALITY of the Bay, shoreline and adjacent developments.
5. Provide CONNECTIONS to and CONTINUITY along the shoreline.
6. Take advantage of the BAY SETTING.
7. Ensure that public access is COMPATIBLE WITH WILDLIFE through siting, design and management strategies.

Local

City of Vallejo General Plan

The Vallejo General Plan 2040 was adopted in August 2017 (City of Vallejo 2017). The General Plan 2040 Land Use Map was adopted in November 2017. The previous draft of this EIR was based on the General Plan adopted in July 1999. This document, where necessary and appropriate, updates any policies pertaining to aesthetics that may have changed in the recently updated General Plan. This discussion in shown in redline and/or strikeout in this document for ease of review. The General Plan establishes the goals and policies guiding land use and development within the City's Planning Area, which includes lands within the City limits and lands outside the City limits but within the City's Sphere of Influence (SOI). The entire project site is located within the City's Planning Area and within the City limits. The project site is ~~designated~~ defined as an "Employment Center" in the City's General Plan and carries a land use designation of Industrial/Light Industrial.

The project originally included 5.25 acres that are located outside the City limits in the City's SOI and are currently designated "Open Space-Community Park" (City of Vallejo 1999). However, in the Final EIR, these additional 5.25 acres are no longer included in the proposed project.

The following goals and policies are applicable to the aesthetics and visual quality of the proposed project.

POLICY NBE-1.5 Scenic Vistas. Protect and improve scenic vistas, including views from Interstate 80 and State Route 37 in Vallejo.

- *Action NBE-1.5A Identify existing scenic vistas and update City regulations to specify requirements for protection of existing scenic vistas.*
- *Action NBE-1.5B Update City regulations for development within view of freeways in Vallejo.*
- *Action NBE-1.5C Continue to administer the residential view district regulations intended to preserve panoramic views of the surrounding natural and human-made environment from residential neighborhoods located on hills*

POLICY NBE-3.2 Downtown Identity. Ensure that buildings and public spaces contribute to the visual identity of the Downtown/Waterfront and complement the walkable character of the area.

- *Action NBE-3.2A Continue to apply the Downtown and Waterfront Design Guidelines and require compliance with the Secretary of the Interior's Standards for designated historic resources*

POLICY NBE-4.1 Waterfront Focus. Prioritize public access and recreational and water-dependent uses along the waterfront while minimizing adverse effects on the natural environment.

- *Action NBE-4.1B Investigate and provide access to places for in-water recreational activities and for commercial and recreational small crafts, such as water taxis, canoes, and kayaks.*
- *Action NBE-4.1C Collaborate with private sector partners on redevelopment of the waterfront on both sides of Mare Island Strait, consistent with existing plans and agreements.*

POLICY NBE-4.2 Waterfront Open Space. Activate waterfront open spaces adjacent to downtown Vallejo.

- *Action NBE-4.2A Work with local and regional economic agencies and groups to attract business and activities that will bring local residents, families, and visitors to the waterfront regularly.*

POLICY NBE-4.4 Visual Continuity. Foster a cohesive and distinctive visual experience along the waterfront.

- *Action NBE-4.4A Continue to use the Waterfront Design Guidelines to guide public and private investments along the waterfront between Solano Avenue and the Mare Island Causeway.*
- *Action NBE-4.4B Continue to use BCDC Public Access Design Guidelines in reviewing waterfront development proposals.*

~~*Hillside Development Goal:* To preserve the natural character of the hillsides for the enjoyment of all.~~

- ~~*Policy 1:* Development in hilly areas should be designed to capture views. The development, in turn, should be pleasing to observe from a distance. The appearance of rows along the hillside should be avoided. There should be heavy landscaping to soften manmade features.~~
- ~~*Policy 2:* Retain areas for visual amenities through development controls to protect the ridgeline and provide for site and design review of all development proposals.~~
  - ~~a. Where a designated ridgeline exists, all structures shall be located so that any roofline is a vertical distance of at least sixty (60) feet from such ridgeline, as determined by the Planning Commission.~~
- ~~*Policy 4:* Wherever possible, building heights shall be limited so as to minimize visual impact on the hillside and as well as interference with existing view corridors.~~
- ~~*Policy 12:* Structures located near ridgelines should blend into the natural topography, exhibit a low profile and roof pitches should be angled to follow the slope.~~

~~*Waterfront Development Goal:* To have a waterfront devoted exclusively to water oriented uses, including industrial, residential, commercial and open space uses, which permit public access.~~

- ~~*Policy 1:* BCDC's Public Access Design Guidelines should be used in reviewing all development proposals. In areas hazardous to public safety or incompatible with public use, in-lieu access at another nearby location may be provided.~~

City of Vallejo Zoning Code

The project site is zoned "Intensive Use." The Intensive Use zoning district is Vallejo's heaviest industrial district. The basic site development standards for the Intensive Use district include a maximum building height of 75 feet (City of Vallejo 2014).

3.1.2 Existing Conditions

The project site contains the former General Mills deep-water terminal and buildings associated with the former General Mills plant. The General Mills plant closed in 2004, and the project site has since remained vacant. The existing structures on the site vary in height from one to eight stories, and in footprint size up to 42,500 square feet, comprising a total of approximately 211,460 square feet of floor area. The location of these structures is shown on Figure 2-1 of this EIR. The southern portion of the site is currently undeveloped.

The project site is bounded by the Mare Island Strait to the west, a steep hillside to the east, rail lines and existing industrial uses to the north, and undeveloped areas to the south. Residential uses are located east and southeast from the site. Photos of the project site were taken from six surrounding locations described below and shown in Figure 3.1-1.

Photo Location 1 – Mare Island

Mare Island is located directly west of the project site across the Mare Island Strait. Mare Island was the first naval shipyard on the West Coast, established in 1854. The base closed on April 1, 1996, and has since been in the process of redevelopment in accordance with the Mare Island Final Reuse Plan and subsequent Mare Island Specific Plan.

Photo Location 1, shown in Figure 3.1-2, is located in the southeastern portion of Mare Island within the Mare Island Shoreline Heritage Preserve. The 215-acre park is currently open to the public Friday through Sunday between 10:00 a.m. and one hour after sunset. Photo Location 1 provides direct views of the project site from across Mare Island Strait and is one of the closest public view points of the project site. The current view of the project site from Photo Location 1 consists of Mare Island Strait in the foreground, the former General Mills buildings and deteriorated wharf along the shoreline, and surrounding hillsides and residential uses in the distance. The large-scale industrial buildings of the former General Mills plant are the primary focal point from Photo Location 1. The view of the northern portion of the project site is characterized by low-scale warehouse structures with undeveloped grassy hills in the background. Views of these hills are unobstructed by the existing buildings in the northern portion of the site. The central portion of the site includes larger buildings up to eight stories in height, which block views of the hillsides immediately behind them, but do not block views of the horizon or other scenic features. Views of the southern portion of the site consist of the undeveloped shoreline and steep hillside covered in trees. Existing residences are visible south and east of the project site from this location.

Photo Location 2 – Independence Park

Independence Park is a waterfront park extending south from the Vallejo Ferry Terminal along the west side of Mare Island Drive/Curtola Parkway. A wide promenade provides a public walking and viewing area along the waterfront and connects Independence Park to surrounding areas. The northern end of the park includes a parking area, open fields, and a landscaped plaza/gathering space. The southern end of the park consists of an open grassy field.

The view from Photo Location 2, shown in Figure 3.1-3, is facing south from the southern part of Independence Park towards the project site. The foreground is dominated by the grassy field, promenade, and associated lighting and fencing. Views to the south include Mare Island Strait, several pier structures, industrial uses along the waterfront, and a mix of developed and undeveloped hillsides. Further in the distance, the Carquinez Bridge, Carquinez Bay, and hills above Crockett are visible. The taller General Mills buildings are visible from this location; however, the lower buildings and waterfront are blocked by features in the foreground. From this viewing distance, the existing General Mills buildings blend into the hills surrounding them and are only visible due to the lighter building materials and large scale of the buildings.

Photo Location 3 – Sandy Beach

Sandy Beach is a small public shoreline area located at the end of Sandy Beach Road, just north of the Sandy Beach residential community and south of the project site. The narrow stretch of beach is bordered by Mare Island Strait to the west and a steep hillside to the east. The view from Photo Location 3, shown in Figure 3.1-4, is looking north toward the project site. A few of the former General Mills buildings located in the southern portion of the project site (within the Orcem Site) are visible from this location; however, these buildings are only partially visible. To the west of the existing buildings, the low-lying waterfront area and deteriorated wharf structure are visible. A small boat that has run aground is present in the foreground, while buildings on Mare Island are visible in the background.

Photo Location 4 – San Pablo Avenue Vista Point

The Vista Point on San Pablo Avenue is located west of the Carquinez Bridge and the community of Crockett. The view from Photo Location 4, shown in Figure 3.1-5, is facing north toward the project site. The foreground is dominated by trees and vegetation surrounding the vista point, as well as the Carquinez Bay. From west to east, the views in the distance include the southern tip of Mare Island, Mare Island Strait, urban development in Vallejo, the project site, steep hillsides topped with residential development, and the Sandy Beach community along the waterfront. A large wharf structure extends west into Carquinez Bay from Sandy Beach and a pier extends from Mare Island south into Carquinez Bay.

The existing buildings on the project site are visible due to their large scale and light colored building materials. From this distance, the existing buildings appear similar to the overall development pattern in the areas further north in the City of Vallejo; however, the buildings stand out given their size and proximity to the viewing location. The waterfront areas of the project site, including the deteriorated wharf structure, are visible from this location, although not easily distinguishable given the distance.

Photo Location 5 – Seawind Drive

Photo Location 5, shown in Figure 3.1-6, is on Seawind Drive in the residential neighborhood above Sandy Beach. A steep hillside separates Sandy Beach from the residential neighborhood above. This viewpoint looks north towards the project site, providing a close-up view of the site and surrounding areas. The existing buildings on the site are visible from this location, as are the wharf structures and low-lying waterfront area. The existing buildings block views of the areas immediately north of the site, including a portion of the water area; however, the buildings are similar in character to the buildings and uses located to the north of the site. Mare Island and the former shipyards and industrial buildings are visible to the north and west beyond Mare Island Strait. The hills of Napa and Sonoma are also visible in the far distance.

Photo Location 6 – Sea Crest Circle

Photo Location 6, shown in Figure 3.1-7, is on Sea Crest Circle just above Sandy Beach (and Photo Location 3). This location provides views to the north and west from a slightly higher elevation to provide a different perspective of the project site. The foreground consists of the steep hillside leading down to Sandy Beach and the southern tip of the project site. From this vantage point, the existing wharf structure and undeveloped waterfront areas of the project site are most visible. With the exception of the large Bakery Bulkhouse building, the existing buildings on the site are blocked by the hillside and vegetation and are therefore not visible from this vantage point. The Bakery Bulkhouse building is a large, white building lacking architectural details. The building blocks views of a small portion of Mare Island Strait from this location. Mare Island Strait and Mare Island are visible to the west of the project site.

3.1.3 Thresholds of Significance

The following criteria, included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), will be used to determine the significance of potential aesthetics impacts. Impacts to aesthetics would be significant if the proposed project would:

A) Have a substantial adverse effect on a scenic vista;

B) Substantially degrade the existing visual character or quality of the site and its surroundings; or

C) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

3.1.4 Impact Discussion

A) Would the project have a substantial adverse effect on a scenic vista?

VMT and Orcem Project Analysis

Construction Impacts

The project site is located along the waterfront on Mare Island Strait in an area that is visible from several public viewing points, as described in Section 3.1.2, Existing Conditions. During construction of the proposed project, a majority of the existing structures on the site would be demolished, and new structures would be erected. The VMT component of the project would involve demolition of several existing structures on the VMT Site (excluding the administrative building, the garage, the manager's house, the manager's garage, and the barn) and construction of a new wharf in the general location of the existing wharf structure, and a storage/maintenance building in the southern portion of the site. The Orcem component of the project would involve demolition of the existing structures on the Orcem Site (completed as part of the VMT component, which would utilize concrete for backfill and site grading purposes) and construction of new manufacturing facilities for the processing of green cement products.

During the construction period of the proposed project, heavy equipment would be present on the site, and marine construction barges and supply vessels would be located off the wharf structure and along the shoreline. Construction staging would occur on the project site and in the water areas adjacent to the site. Although the demolition of existing structures and presence of construction equipment would alter views of the site from nearby locations, construction activities would not block views of the bay from any public viewing points. Additionally, construction activities would be temporary and would not result in a permanent change to any scenic vistas. Therefore, impacts due to construction of the proposed project would be **less than significant**.

Operational Impacts

Once constructed, the proposed project would introduce new buildings and structures to the project site that could affect scenic vistas of the Bay and surrounding landscapes. The primary project components that would alter views of the site include the demolition of existing buildings in the northern portion of the VMT Site, replacement of the existing buildings on the Orcem Site with modern industrial structures, and the expansion and modernization of the existing wharf area. A small storage/maintenance building would also be constructed in the southern portion of the VMT Site. Figures 3.1-2 through 3.1-7 show the existing and proposed views of the project site from the

six photo locations described in Section 3.1.2, Existing Conditions. The changes in views from each location are described below.

In addition to the proposed structures that would be developed on the site, once operational, the project would result in an increase in vessels that would travel to and from the project site and would be docked at the wharf. It is estimated that up to four large deep water vessels and 3.5 smaller vessels (barges and other smaller vessels) would utilize the VMT wharf on an average monthly basis. These ships and barges would travel through Mare Island Strait to the VMT facility, where each would then dock and unload/reload materials for a period averaging up to 5 to 6 days before departing. Mare Island Strait is currently used by commercial and recreational boaters, and the presence of four large ships and 3.5 barges per month as a result of the project would not substantially alter views of the project site or the surrounding environmental setting.

Photo Location 1

As described above, the VMT component of the project would be constructed in one phase, and the Orcem component of the project would involve one primary construction phase. The visual features associated with operation of the proposed project would primarily be visible from Photo Location 1, which is directly west of the project site and provides a clear view of the waterside of the proposed location of the VMT facility. Figure 3.1-2 shows the existing view as well as views including the VMT and Orcem components of the project.

As shown in Figure 3.1-2, the removal of the existing buildings in the northern portion of the site would enhance views of the undeveloped hillside to the east, including providing views of existing trees and the historic garage and administration building that would be retained on site for future use. The proposed Orcem buildings would replace the existing industrial buildings in generally the same location. These buildings would be similar in scale and style to the existing industrial buildings and would not create any substantial changes in the view from this location. The proposed Orcem buildings would also be consistent with Hillside Development policies 4 and 12 of the City's General Plan, which call for buildings heights to be limited to minimize impacts on hillsides and existing view corridors, and for structures to blend into the natural topography. The proposed project would also follow the BCDC Public Access Design Guidelines pertaining to shoreline development by maintaining views of the Bay and the surrounding hillsides and locating shoreline buildings to allow for upland views down to the Bay.

The proposed storage/maintenance building in the southern portion of the VMT Site would primarily be visible from Photo Location 1; however, the building would blend in with the hillside to the east of it and would not block or alter any views in the area. The landside components of the

proposed project would be the same under VMT conditions; however, the waterside improvements of the wharf structure would differ.

Under the VMT component, the existing waterfront wharf area would be expanded and modernized, creating a large concrete structure on the waterfront. The proposed VMT improvements (including the Orcem component of the project) would alter views of the site from Photo Location 1 by introducing a modern concrete structure into the mid-ground. The proposed wharf would create a more unified view of the waterside of the project site and would not block any scenic vistas from this location.

Photo Location 2

As shown in Figure 3.1-3, the project site is visible in the background from Photo Location 2; however, specific project features are difficult to distinguish from existing development in the area. From this distance, the proposed structures would appear relatively similar to the existing structures on the site in terms of size and scale. No scenic vistas would be altered as a result of the landside improvements. The proposed wharf structure would create a slight change in the view of the water from this location by introducing a new solid feature along the shoreline in the background. However, since the view is currently obstructed by existing piers and other waterside improvements in the mid-ground, the introduction of a new wharf structure in the background would not substantially alter the view from this location.

Photo Location 3

As shown in Figure 3.1-4, the view of the project site from Photo Location 3 is limited to the proposed Orcem buildings and the southern end of the proposed wharf. From this vantage point, the Orcem buildings would not block any existing views besides a small amount of sky, which is not considered a scenic vista. The wharf and associated structures, including the conveyer system that would connect to the Orcem Site would partially block views of the buildings on Mare Island and would introduce a new structure extending from the horizon into the sky; however, these views are not considered scenic vistas. The view of Mare Island Strait from this location would not be altered as a result of the proposed project.

Photo Location 4

As shown in Figure 3.1-5, the project site is visible in the background from Photo Location 4; however, the specific details of the site are not clearly visible. The proposed Orcem buildings would be located in generally the same location as the existing buildings and would not block any existing views. The proposed wharf would not be clearly distinguishable from this distance and would appear similar to the existing wharf structure. The introduction of the proposed project components would therefore not alter any views from this location, and no scenic vistas would be affected.

Photo Location 5

As shown in Figure 3.1-6, the view north from Photo Location 5 would be altered as a result of the proposed project, specifically the introduction of the VMT wharf structures and the Orcem (Phase 1 and 2) buildings. The Orcem buildings would block a small portion of the water view north of the site along the waterfront. The project would also demolish several buildings that currently block views of the water in this area. Although views of a small amount of water areas would be blocked by the proposed project, the overall view of the Mare Island Strait would not be substantially impacted.

Photo Location 6

As shown in Figure 3.1-7, Photo Location 6 provides a close-up view of the southern portion of the site and the wharf area from a slightly higher elevation, including the proposed 7,200-quare-foot VMT component maintenance shed, which was originally proposed to be located in the southern portion of the project site; however, the project has been revised to relocate the proposed maintenance shed (now referred to as the "equipment storage and maintenance building") to the northwestern portion of the site and would not be visible from this location. The proposed project would result in an overall change in the view of the site by introducing more paved areas and new structures; however, from this location most of the structures would be out of view, and the structures in view would not block the existing view of the Mare Island Strait or otherwise impact the view from this location.

As described above, the proposed project would alter the existing view of the site from the six viewing locations and would result in minor view blockages of the Bay from some locations; however, the project would not result in any adverse impacts on a scenic vista. Therefore, impacts would be **less than significant**.

~~Off-Site Improvements~~

~~The proposed project includes two off-site improvements (public access improvements and removal of existing docks) that would take place within the City of Vallejo Municipal Marina located approximately 2 miles north of the project site. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the marina. The proposed launch would consist of a pre-cast articulated concrete mat, approximately 10 feet wide by 60 feet long, over a geotextile fabric. Construction of the launch ramp would require the temporary use of construction equipment in the water and on land. The introduction of this equipment would not have a substantial effect on a scenic vista and would be removed following construction. Once installed, the launch ramp would extend 60 feet from the existing sidewalk into the water area between the shoreline and the existing docks. The top of the launch ramp would be approximately 8 feet above mean lower low water~~

~~(MLLW) and the bottom of the ramp would be 2 feet below MLLW. Given the proposed elevation of the launch ramp and its location amongst existing docks and marine facilities, it would not have a substantial effect on a scenic vista.~~

~~The project would also involve the removal of existing deteriorated docks within the water area at the north end of the marina. Approximately eighty (80) 14-inch-diameter creosote timber piles and deteriorated dock facilities would be removed from this portion of the marina. Construction equipment would be temporarily located on the site during demolition activities; however, the equipment would be removed following demolition and would not have a substantial effect on a scenic vista. Although views of the north end of the marina would be altered following removal of the deteriorated docks, this change would not have a substantial effect on a scenic vista.~~

~~Since the off-site improvements would not have a substantial effect on a scenic vista, impacts would be **less than significant**.~~

B) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

VMT and Orcem Project Analysis

Construction Impacts

As described under threshold A, during construction of the proposed project, a majority of the existing structures on the site would be demolished and new structures would be erected. Heavy equipment would be present on the site and marine construction barges and supply vessels would be located off the wharf structures and along the shoreline. Although the demolition of existing structures and presence of construction equipment would alter the existing character and quality of the site, construction activities would be temporary in nature and would not result in a permanent change in the visual character or quality of the site. Therefore, impacts due to construction of the proposed project would be **less than significant**.

Operational Impacts

Once constructed, the proposed project would introduce new buildings and structures to the project site that could change the existing visual character and quality of the site. Figures 3.1-2 through 3.1-7 show the existing and proposed views of the project site from the six photo locations described in the existing conditions section. The visual character and quality of the project site are most clearly visible in Photo Locations 1 and 5 because the site is in clear view from these locations and is close enough to distinguish how the proposed changes would alter the appearance of the site. Photo Locations 2, 3, 4, and 6 either show only a portion of the project site or are too distant from the site for the details to be visible.

As shown in Figures 3.1-2 and 3.1-6, the proposed project would alter the existing visual appearance of the project site by demolishing existing buildings and constructing new buildings and structures on the site. The proposed Orcem buildings would replace the existing industrial buildings in generally the same location and would be similar in scale and style to the existing buildings that would be demolished. Under the VMT component, the existing waterfront wharf area would be expanded and modernized, creating a large concrete structure on the waterfront. These overall changes shown in Figures 3.1-2 and 3.1-6 would be consistent with the existing visual character and quality of the site, by replacing existing buildings with buildings of similar size, scale, and type. In addition, the visual character and quality of the site would be enhanced through the demolition of deteriorating buildings and wharf structures and the development of the proposed modern structures and facilities. The proposed project would also follow the BCDC Public Access Design Guidelines pertaining to shoreline development by using forms, materials, colors, and textures that are compatible with the Bay and adjacent development.

In addition to the proposed structures that would be developed on the site, once operational, the project would result in an increase in vessels that would travel to and from the project site and would be docked at the VMT wharf. It is estimated that up to four large deep water vessels and 3.5 smaller vessels (barges and other smaller vessels) would utilize the VMT wharf on an average monthly basis. These vessels would travel through Mare Island Strait to the VMT facility, where they would then dock and unload/reload materials for a period averaging up to 5 to 6 days before departing. Mare Island Strait is currently used by commercial and recreational boaters, and the presence of between four ships and 3.5 smaller vessels per month as a result of the project would be consistent with the existing visual character and quality of the area.

With implementation of the proposed project, the visual character and quality of the site and its surroundings would be similar to existing conditions and would be moderately enhanced by the project. Therefore, impacts to visual character and quality would be **less than significant**.

~~**Off-Site Improvements**~~

~~As described under Threshold A above, the proposed public access improvements and dock removal would take place at the City of Vallejo Municipal Marina. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the marina as described earlier. Construction of the launch ramp would require the temporary use of construction equipment in the water and on land. The introduction of this equipment would not substantially degrade the existing visual character or quality of the area and would be removed following construction. Once installed, the launch ramp would extend 60 feet into the water area between the shoreline and the existing docks. The launch ramp would be constructed in an area surrounded by existing docks and marine facilities and would complement the visual character and quality of the marina.~~

~~The project would also involve the removal of existing deteriorated docks within the water area at the north end of the Marina as described above. Construction equipment would be temporarily located on the site during demolition activities; however, the equipment would be removed following demolition and would not degrade the visual character or quality of the area. Removal of the docks would improve the visual character and quality of the north end of the marina by eliminating the deteriorated portions of the docks that are not in use and restoring the open water area.~~

~~Since the off-site improvements would not substantially degrade the visual character or quality of the marina and its surroundings, impacts would be **less than significant**.~~

C) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

VMT and Orcem Project Analysis

Construction Impacts

As described under threshold A, heavy construction equipment and marine construction barges would be present on the site and in the water adjacent to the site during construction of the proposed project. Use of this equipment after dark would require the use of lighting for safety and security purposes. The topography of the project site would block views of any construction lighting from locations east of the site. Construction lighting could be visible from the eastern side of Mare Island and partially visible from shoreline areas to the north and south of the site. Given the developed nature of the shoreline north and south of the site, the addition of construction lighting would not be noticeable from a distance. In addition, construction lighting would be temporary and would be removed following the construction period of the proposed project. Therefore, lighting and glare impacts during construction would be **less than significant**.

Operational Impacts

Proposed lighting on the project site would include both indoor and outdoor lighting necessary for safety and security during operation of the proposed project. Specifically, the VMT component of the project would require outdoor lighting to allow 24-hour operations for offloading and loading vessels. It is estimated that up to four large deep water vessels and 3.5 smaller vessels would utilize the VMT wharf per month. Each deep water vessel would be moored at the wharf for an average of up to 5 to 6 days. During the time that vessels are moored at the facility, 24-hour operations would be conducted for offloading or loading of cargo. Other VMT Terminal operations would be scheduled as two 10-hour shifts per day, 6 days per week. The cargo laydown areas and rail loading areas would require lighting to allow for operations after dark. The Orcem component of the project would require indoor lighting throughout their proposed facilities as well as outdoor lighting to ensure safety and security.

The preliminary VMT Lighting Plans prepared for the proposed project (see Appendix C) identify seven 70-foot lighting poles and one 80-foot lighting pole with 78 light-emitting diode (LED) lamps and shielded fixtures providing ground-level illumination levels of up to approximately 75 foot-candles. Overspill of illumination into the water or onto adjoining properties would be minimized by the shielded fixture design and placement.

Light from the project site would be visible from the eastern shore of Mare Island as well as shoreline areas just north and south of the project site. The areas east of the project site would be shielded from the new light sources by the hillside adjacent to the proposed facilities. All lighting proposed on the site would be shielded or designed to prevent off-site glare, and the placement of lighting fixtures would minimize overspill onto water or adjacent areas; however, since the proposed project would involve 24-hour operations that would require extensive lighting for safety and security, these new sources of light and glare could adversely affect views in the project area. Therefore, impacts would be **significant** (Impact 3.1-1) and mitigation is provided in Section 3.1.5 to reduce potential impacts due to lighting.

~~**Off-Site Improvements**~~

~~As described under Threshold A above, the proposed public access improvements and dock removal would take place at the City of Vallejo Municipal Marina. Construction of the launch ramp would require the temporary use of construction equipment in the water and on land. The introduction of this equipment would not substantially degrade the existing visual character or quality of the area and would be removed following construction. Once installed, the launch ramp would extend 60 feet into the water area between the shoreline and the existing docks. The top of the launch ramp would be approximately 8 feet above MLLW and the bottom of the ramp would be 2 feet below MLLW. The launch ramp would be constructed in an area surrounded by existing docks and marine facilities and would complement the visual character and quality of the Marina.~~

~~The project would also involve the removal of existing deteriorated docks within the water area at the north end of the marina as described earlier. Construction equipment would be temporarily located on the site during demolition activities; however, the equipment would be removed following demolition and would not degrade the visual character or quality of the area. Removal of the docks would improve the visual character and quality of the north end of the marina by eliminating the deteriorated portions of the docks that are not in use and restoring the open water area.~~

~~Since the off-site improvements would not substantially degrade the visual character or quality of the marina and its surroundings, impacts would be **less than significant**.~~

3.1.5 Mitigation Measures

Mitigation for Impact 3.1-1: The proposed project would involve 24-hour operations that would require extensive lighting for safety and security, which could adversely affect views in the project area.

MM-3.1-1 Final design of project lighting will be such that all permanent lighting and reflectors are not visible from public viewing areas; lighting does not cause reflected glare; and illumination of project facilities, vicinity, and nighttime sky is minimized. Final lighting plans for the VMT and Orcem projects shall be submitted to and reviewed by the City of Vallejo during the Site Development Review process and shall be approved by the City prior to issuance of a building permit. Lighting shall be designed so exterior light fixtures are warm lights (around 3000 K), hooded, with lights directed downward or toward the area to be illuminated, and so that backscatter of the nighttime sky is minimized. The design of the lighting shall be such that the luminescence or light sources are shielded to prevent light trespass outside the project boundary. All lighting shall be of minimum necessary brightness consistent with worker safety. High illumination areas not occupied on a continuous basis shall have switches or motion detectors to light the area only when occupied. The City shall verify that the final lighting plans include provisions to ensure that outdoor lighting is designed so that potential glare or light spillover to surrounding properties is minimized through appropriate site design and shielding of light standards, consistent with the preliminary plans. The plans shall also demonstrate that the use of reflective exterior materials is minimized and that proposed reflective material would not create additional daytime or nighttime glare. Measures identified in the final lighting plans shall be incorporated into construction plans and implemented by the construction contractor.

3.1.6 Level of Significance After Mitigation

Impact 3.1-1: With implementation of mitigation measure MM-3.1-1, impacts due to lighting and glare during operation of the proposed project would be reduced to a **less-than-significant** level.

DUDEK

SOURCE:

FIGURE 3.1-1

Photo Location Map

8301

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

Path: Z:\Projects\8301\MAPDOC\DOCUMENTS\EIR\Section 3\Figure3_1_1_Photo_Location_Map.mxd

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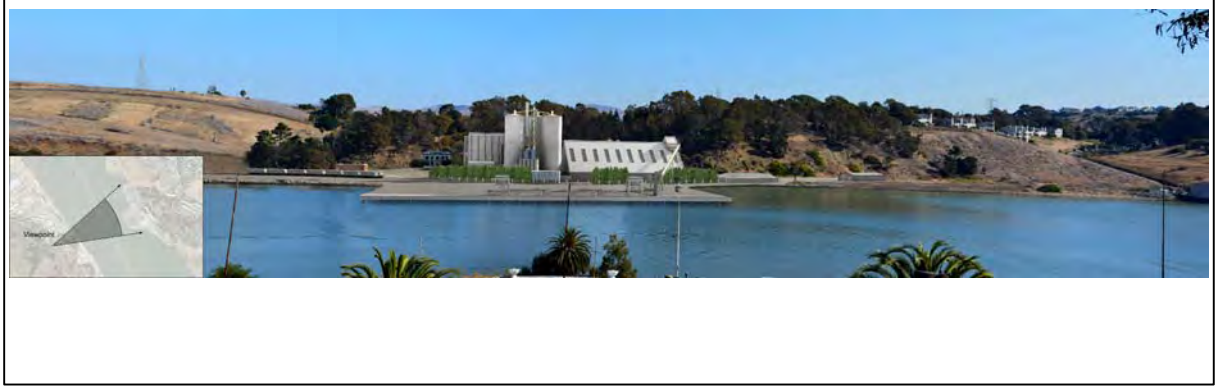
Existing View



Visual Simulation - VMT Phase 1

Visual Simulation - VMT Phase 2

DUDEK

8301

FIGURE 3.1-2

Photo Location 1 - Existing View and Visual Simulations

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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Existing View

Visual Simulation

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FIGURE 3.1-3

Photo Location 2 - Existing View and Visual Simulation

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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Existing View

Visual Simulation

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FIGURE 3.1-4

Photo Location 3 - Existing View and Visual Simulation

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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Existing View

Visual Simulation

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FIGURE 3.1-5

Photo Location 4 - Existing View and Visual Simulation

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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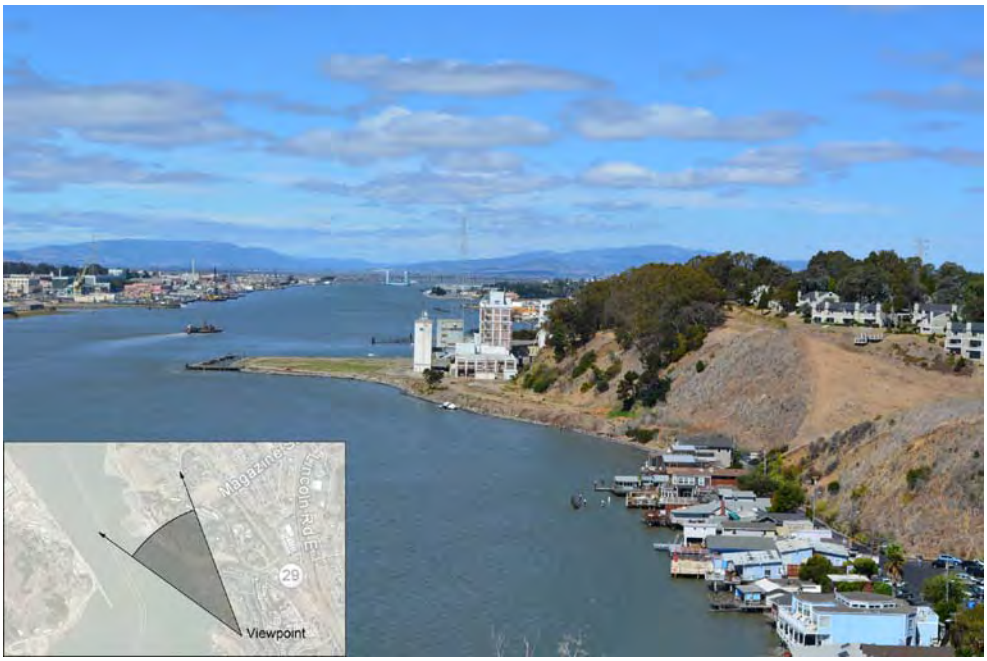
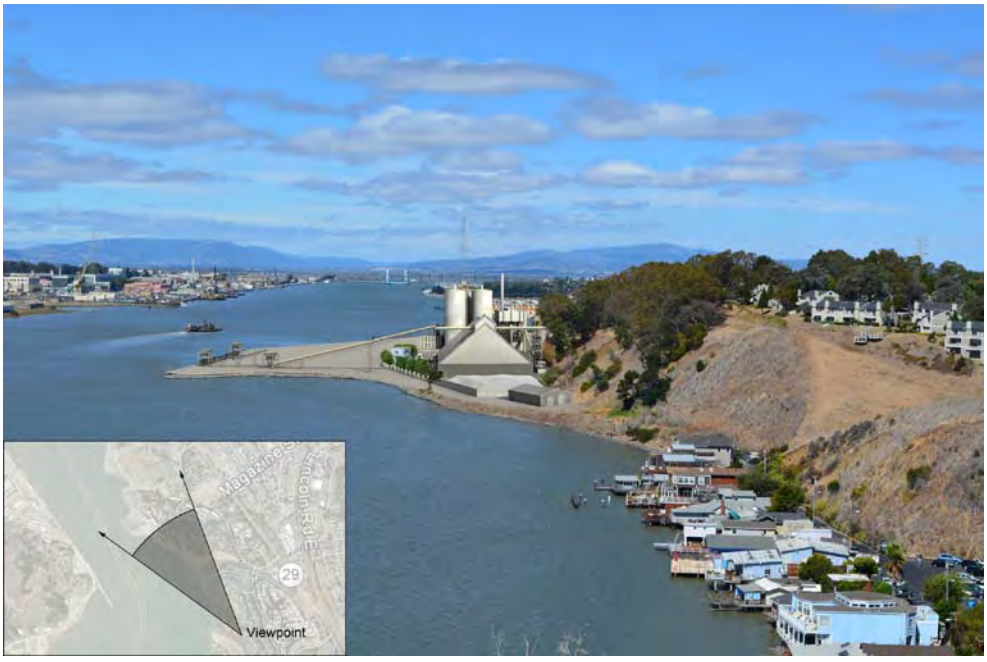


Existing View



Visual Simulation

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FIGURE 3.1-6

Photo Location 5 - Existing View and Visual Simulation

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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Existing View

Visual Simulation

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FIGURE 3.1-7

Photo Location 6 - Existing View and Visual Simulation

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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3.2 AIR QUALITY

This section evaluates the potential construction and operational impacts of the Vallejo Marine Terminal (VMT) and Orcem California Inc. (Orcem) project (proposed project), with respect to air quality impacts, and recommends mitigation measures where necessary to reduce or avoid significant impacts. Information provided in this section was prepared based on technical study prepared for the proposed project, provided as the following appendix:

Appendix D-1: Ramboll Environ. 2015. *Orcem/VMT Project – Air Quality and Greenhouse Gas Evaluation.*

Details regarding methodology, emissions calculations and model outputs can be found in Appendix D-1.

3.2.1 Regulatory Setting

Federal

The federal Clean Air Act (CAA), passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The U.S. Environmental Protection Agency (EPA) is responsible for implementing most aspects of the CAA, including the setting of National Ambient Air Quality Standards (NAAQS) for major air pollutants, hazardous air pollutant standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric ozone (O_3) protection, and enforcement provisions.

NAAQS are established by the EPA for "criteria pollutants" under the CAA, which are O_3, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead (Pb).

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The ~~Clean Air Act~~CAA requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a State Implementation Plan that demonstrates how those areas will attain the standards within mandated time frames.

State

California Clean Air Act

The California CAA was adopted in 1988 and establishes the state's air quality goals, planning mechanisms, regulatory strategies, and standards of progress.

Under the federal CAA, the task of air quality management and regulation has been legislatively granted to California Air Resources Board (CARB), with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB is responsible for ensuring implementation of the California CAA, responding to the federal CAA, and regulating emissions from motor vehicles and consumer products. Pursuant to the authority granted to it, CARB has established California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS.

The NAAQS and CAAQS are presented in Table 3.2-1, Ambient Air Quality Standards.

Table 3.2-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]
O_3	1-hour	0.09 ppm (180 μg/m^3)	—	Same as Primary Standard
	8-hour	0.070 ppm (137 μg/m^3)	0.075 ppm (147 μg/m^3)	
CO	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
	8-hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
NO_2[6]	1-hour	0.18 ppm (339 μg/m^3)	0.100 ppm (188 μg/m^3)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)	
SO_2[7]	1-hour	0.25 ppm (655 μg/m^3)	0.75 ppm (196 μg/m^3)	—
	3-hour	—	—	0.5 ppm (1300 μg/m^3)
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (for certain areas)[7]	
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)[7]	—
PM_{10}[8]	24-hour	50 μg/m^3	150 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	20 μg/m^3	—	
$PM_{2.5}$[8]	24-hour	—	35 μg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3

Table 3.2-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2]	
		Concentration[3]	*Primary*[3,4]	*Secondary*[3,5]
Lead[9,10]	30-day Average	1.5 µg/m³	—	—
	Calendar Quarter	—	1.5 µg/m³ (for certain areas)[10]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 µg/m³	
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m³)	—	—
Vinyl chloride[9]	24-hour	0.01 ppm (26 µg/m³)	—	—
Sulfates	24-hour	25 µg/m³	—	—
Visibility reducing particles[11]	8-hour (10:00 a.m. to 6:00 p.m. PST)	See footnote 11	—	—

Source: CARB 2013

Notes: ppm= parts per million by volume; µg/m³ = micrograms per cubic meter; mg/m³= milligrams per cubic meter.

1 California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, and 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. CAAQs are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 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 NO_2 and SO_2, the standard is attained when the 3-year average of the 98th and 99th percentile, respectively, of the daily maximum 1-hour average at each monitor within an area does not exceed 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/m³ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° Celsius (°C) and a reference pressure of 760 torr.
Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

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

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

6 To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

7 On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

8 On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m³ to 12 µg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

9 CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

10 The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[11] In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Truck and Bus Regulation — CARB On-Road Heavy Duty Diesel Vehicles (In-Use) Regulation

In April 2014, CARB amended the 2008 Statewide Truck and Bus Regulation to modernize in-use heavy-duty vehicles operating throughout the state. Under this regulation, existing heavy-duty trucks are required to be replaced with trucks meeting the latest NO_x and particulate matter (PM) Best Available Control Technology (BACT) or retrofitted to meet these levels.

Trucks with a gross vehicle weight rating greater than 14,000 pounds and less than 26,000 pounds are required to replace engines with 2010 or new engines, or equivalent, by January 2023. Trucks with a gross vehicle weight rating greater than 26,000 pounds must meet PM BACT and upgrade to a 2010 or new model year emissions equivalent engine pursuant to the compliance schedule set forth by the rule. By January 1, 2023, all model year 2007 class 8 drayage trucks are required to meet NO_x and PM BACT (i.e., EPA 2010 and new standards) (CARB 2014).

Drayage Truck Regulation

CARB adopted the drayage truck regulation in December 2007 to modernize the class 8 drayage truck fleet (trucks with a gross vehicle weight rating greater than 33,000 pounds) in use at California's ports. Emergency vehicles and yard trucks are exempted from this regulation. The regulatory objective is to be achieved in two phases:

1. By December 31, 2009, pre-1994 model year engines were to be retired or replaced with 1994 and newer model-year engines. In addition, all drayage trucks with 1994 to 2003 model-year engines were required to achieve an 85% PM emission reduction through the use of a CARB-approved Level 3 VDEC.
2. By December 31, 2013, all trucks operating at California ports must comply with the 2007 and newer on-road heavy-duty engine standards.

In December 2010, CARB amended the regulation to include Class 7 drayage trucks with gross a vehicle weight rating between 26,000 and 33,001 pounds. The amended regulation required the acceleration of filter replacements to January 1, 2012, for Class 7 trucks in the South Coast Air Basin and required that Class 7 trucks statewide operate with 2007 or newer emission standard engines by January 1, 2014. CARB furthermore expanded the definition of drayage trucks to include dray-offs, those noncompliant trucks that may not directly come to ports to pick up/drop off cargo but that engage in moving cargo destined to or originating from port facilities and to/from near-port facilities or rail yards.

Toxic Air Contaminants

California regulates toxic air contaminants (TACs) primarily through the Tanner Air Toxics Act (Assembly Bill (AB) 1807) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588). The Tanner Act sets forth a formal procedure for CARB to designate substances as TACs. This includes research, public participation, and scientific peer review before CARB can designate a substance as a TAC. To date, CARB has identified over 21 TACs and has adopted the EPA's list of hazardous air pollutants as TACs. Once a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate best available control technology for toxics to minimize emissions. None of the TACs identified by CARB have a safe threshold.

Under the Air Toxics "Hot Spots" Act, existing facilities that emit air pollutants above specified level were required to (1) prepare a TAC emission inventory plan and report, (2) prepare a risk assessment if TAC emissions were significant, (3) notify the public of significant risk levels, and (4) if health impacts were above specified levels, prepare and implement risk reduction measures.

Diesel Risk Reduction Plan

In August 1998, the CARB identified DPM (i.e., PM from diesel-fueled engines) as a TAC. After identifying DPM as a TAC, CARB adopted a comprehensive Risk Reduction Plan in 2000 (CARB 2000). Pursuant to this plan, CARB adopted diesel-exhaust control measures and stringent emission standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). In 2001, CARB adopted the Public Transit Bus Fleet Rule and Emissions Standards for New Urban Buses, which established emissions limits on 1985 and subsequent model year heavy-duty bus engines and vehicles for nitric oxide (NO), CO, non-methane hydrocarbons, PM, and formaldehyde. The emissions standards apply to all heavy-duty urban buses, including diesel-fueled buses. Therefore, the rule limits the emissions of two TACs identified by CARB: DPM and formaldehyde. In 2007, a low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks were put into effect, followed in 2011 by the same standards being applied to off-road diesel equipment.

Over time, the replacement of older vehicles will result in a fleet that produces substantially lower levels of TACs than the replaced vehicles. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, DPM) decreased significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., low-emission vehicle/clean fuels and Phase II reformulated gasoline regulations) and control technologies. The California Port Regulations for At-Berth Ocean-Going Vessels (approved in 2007) requires operators of vessels

meeting specified criteria to turn off auxiliary engines for most of their stay in port. The Commercial Harbor Craft Regulation adopted in November 2007 and amended in June 2011 limits DPM emissions from commercial harbor craft operating within California waters and within 24 nautical miles of the California coast. This regulation sets emission standards for new engines, as well as requirements for replacement or retrofitting of pre-Tier 1 and Tier 1 engines for in-use fleets.

With implementation of CARB's Risk Reduction Plan, DPM concentrations are expected to be reduced by 75% in 2010 and 85% in 2020 from the estimated year-2000 level. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

California Health and Safety Code Section 41700

This section of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property. This section also applies to sources of objectionable odors.

Local

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) attains and maintains air quality conditions in the San Francisco Bay Area Air Basin (SFBAAB) through a comprehensive program of planning, regulation, and enforcement. The BAAQMD strategy includes the adoption and enforcement of rules and regulations concerning sources of air pollution and the issuing of permits for stationary sources of air pollution.

The BAAQMD also inspects stationary sources of air pollution; monitors ambient air quality; and implements programs and regulations required by the federal CAA, federal CAA Amendments, and the California CAA.

The BAAQMD has prepared the 2010 Clean Air Plan to address nonattainment of the national 1-hour ozone standard in the SFBAAB. The purpose of the plan is to:

- Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
- Consider the impacts of ozone control measures on particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2009–2012 time frame.

The 2010 Clean Air Plan contains 55 control measures aimed at reducing air pollution in the San Francisco Bay Area (Bay Area) including stationary, area, mobile, and transportation control measures. CARB adopted 13 CCR 2299.2, Fuel Sulfur and Other Operational Requirements for Ocean-going Vessels within California Waters and 24 Nautical Miles of the California Baseline, in 2008. The regulation requires the use of low sulfur marine distillate fuels to reduce emissions from the use of auxiliary diesel and diesel-electric main propulsion engines and auxiliary boilers on ocean-going vessels within "Regulated California Waters."

Table 3.2-2 shows the attainment designations for the BAAQMD by pollutant.

Table 3.2-2
BAAQMD Attainment Classification

Pollutant	Federal Designation	State Designation
O_3 (1-hour)	N/A	Nonattainment
O_3 (8-hour – 2008)	Nonattainment	Nonattainment
CO	Attainment	Attainment
PM_{10}	Unclassifiable	Nonattainment
$PM_{2.5}$	Attainment	Nonattainment
NO_2	Unclassifiable/Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment

Source: Appendix D-1.
Notes: O3 = ozone; CO = carbon monoxide, PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) permitting program is a federal CAA initiative for new and modified major sources of air pollution. The definition of "major" under the federal CAA is a facility which emits or has the potential to emit 100 tons per year (tpy) or more of any criteria pollutant for the 28 specific source categories listed in the PSD regulations (including power plants, cement plants, and petroleum refineries). If a facility does not fall under one of the listed source categories, the threshold increases to 250 tpy. The concept of "significance" refers to thresholds assigned to each criteria pollutant and certain non-criteria pollutants.

The BAAQMD has addressed the PSD in their permitting regulations as follows:

1. New Major Facilities (Reg. 2-2-304.1 and 2-2-220):
    a. If the major facility is one of the 28 PSD source categories listed in Section 169 (1) of the Federal Clean Air Act, then SO_2, NO_x, PM_{10}, and CO emissions are significant if greater than or equal to 100 tons per year

b. If the major facility is not one of the 28 categories listed in Section 169 (1) of the Federal Clean Air Act, then SO_2, NO_x, PM_{10}, and CO emissions are significant if greater or equal to 250 tons per year.

2. Major Modification of a Major Facility (Reg. 2-2-304.2 and 2-2-221). Emissions are significant as defined below:

   a. For SO_2: Net emissions greater than 40 tons/year.

   b. For PM_{10}: Net emissions greater than 15 tons/year.

   c. $PM_{2.5}$: Net emissions greater than 10 tons/year.

   d. For NO_x: Emissions calculated as NO_2 greater than 40 tons/year.

   e. For CO: Emissions greater than 100 tons/year.

   f. For POC (precursor organic compounds): Net emissions greater than 40 tons/year.

3. Non-Criteria Pollutants (Reg. 2-2-306). If any criteria pollutant is greater than 100 tons/year and any non-criteria pollutant emissions increases minus reductions since December 1, 1982 are in excess of the amounts in Table 3.2-3.

Table 3.2-3
Non-criteria Pollutant Significant Emission Levels

Pollutant	Annual Average (tpy)	Daily Average (lbs/day)
Lead	0.6	3.2
Asbestos	0.007	0.04
Beryllium	0.0004	0.002
Mercury	0.1	0.5
Fluorides	3	16
Sulfuric Acid Mist	7	38
Hydrogen Sulfide	10	55
Total Reduced Sulfur	10	55
Reduced Sulfur Compounds	10	55

Source: Appendix D-1.
Notes: tpy = tons per year; lbs/day = pounds per day.

The two facilities (Orcem and VMT) entail a port operation at the VMT facility and a ground granulated blast furnace slag (GGBFS) production facility at the Orcem facility and thus would not be categorized as one of the 28 PSD major source categories (40 CFR 52.21(B)(1)(i)); therefore, the PSD threshold for this project, in cumulative, is 250 tpy for each of the PSD regulated pollutants (Appendix D-1).

Regulation 2-2-302 — BAAQMD Emission Offset Program

Offsets are a regulatory tool to manage growth while making progress toward attainment of federal and state air quality standards. Offsets are not mitigation; they are a required element in the federal New Source Review program, administered by the BAAQMD.

Offsets are triggered if a facility emits more than 10 tpy of POC or NO_x. If the facility has potential emissions above 10 but below 35 tpy of POC or NO_x, then the BAAQMD provides the offsets from the Small Facility Bank, if the facility or its parent company doesn't already own emission reduction credits (ERCs) held in a Banking Certificate. If the facility has emissions above 35 tpy, the facility must provide the offsets. A BAAQMD permit cannot be approved without the required offsets. BAAQMD Regulations 2-2 and 2-4 provide for the application, eligibility, registration, use, and transfer of ERCs.

The majority of all ERCs are generated when an industrial process is shut down. Before these ERCs can be applied to offset new source emissions, the ERCs are reduced downward by the BAAQMD by adjusting for rules, regulation, best available control technology, maximum achievable technology, and new source performance standards. In this way, progress toward attainment with federal and state standards is accomplished.

Not all proposed project emissions can be offset under the BAAQMD regulations, since New Source Review applies primarily to stationary sources. BAAQMD Rules 2-2-302 and 2-2-610 allow for the offset of stationary and cargo carrier emissions, where cargo carrier emissions include shipping and rail emissions but not truck emissions. Therefore, truck emissions and terminal equipment emissions are not subject to offsets and are addressed with mitigation measures.

BAAQMD CARE Program

Air quality and health risk data presented by CARB in the 2009 Almanac of Emissions and Air Quality for the state shows that over the period from 1990 through 2008, the average concentrations for the top 10 TACs have been substantially reduced, and the associated health risks for the state are showing a steady downward trend as well. This same trend is expected to have occurred in areas overseen by the BAAQMD. CARB-estimated emissions inventory values for the top 10 TACs for 2008 are presented in Table 3.2-4 for the Bay Area and the state.

Table 3.2-4
Top Ten Toxic Air Contaminants (TACs)

	Statewide Year 2008 Emissions (tpy)	BAAQMD Year 2008 Emissions (tpy)	BAAQMD Predicted Cancer Risk, per 106 (2007)
Acetaldehyde	9103	1350	3
Benzene	10794	1634	25

Table 3.2-4
Top Ten Toxic Air Contaminants (TACs)

	Statewide Year 2008 Emissions (tpy)	BAAQMD Year 2008 Emissions (tpy)	BAAQMD Predicted Cancer Risk, per 106 (2007)
1,3 Butadiene	3754	415	23
Carbon tetrachloride	4.04	2.13	ND
Chromium 6	0.61	0.05	8
Para-Dichlorobenzene	1508	284	ND
Formaldehyde	20951	3138	11
Methylene Chloride	6436	906	<1
Perchloroethylene	4982	788	1
Diesel Particulate Matter	35884	4151	ND

Source: Appendix D-1.
Note: ND = no data

The BAAQMD CARE program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from point sources, area sources, and on-road and off-road mobile sources co-located with sensitive populations to help focus mitigation strategies. The main objectives of the program are to:

- Characterize and evaluate potential cancer and non-cancer health risks associated with exposure to TACs from both stationary and mobile sources throughout the Bay Area.
- Assess potential exposures to sensitive receptors including children, senior citizens, and people with respiratory illnesses.
- Identify significant sources of TAC emissions and prioritize use of resources to reduce TACs in the most highly impacted areas (i.e., priority communities).
- Develop and implement mitigation measures—such as grants, guidelines, or regulations—to achieve cleaner air for the public and the environment, focusing initially on priority communities.

Starting in 2009, the CARE program began also evaluating exposures to fine particulate matter ($PM_{2.5}$) and helping to craft mitigations to reduce these exposures to address the growing evidence that exposure to fine particles has serious health effects.

The project is not located in any of the six CARE program impacted communities or regions.

City of Vallejo General Plan

The City of Vallejo adopted the General Plan 2040 in August 2017 (City of Vallejo 2017a). The General Plan 2040 Land Use Map was adopted in November 2017 (City of Vallejo 2017b). The previous draft of this EIR was based on the General Plan adopted in July 1999. This EIR, where

necessary and appropriate, incorporates these updated goals and policies from the General Plan 2040. This discussion is shown in redline and/or strikeout in this document for ease of review.

The following goals and policies are applicable to air quality as it relates to the proposed project.

POLICY CP-1.12 Clean Air. Protect the community from harmful levels of air pollution

- *Action CP-1.12B Update City regulations to set BAAQMD-recommended limits for particulate emissions from construction, demolition, debris hauling, and utility maintenance*

POLICY CP-1.14 Healthy Economic Development. Consider healthy community criteria and environmental health standards in efforts to attract new businesses to Vallejo

- *Action CP-1.14A Consider developing and adopting a "healthy development checklist" to evaluate potential new development under appropriate criteria, which might include exposure to harmful levels of air pollution, effects on the noise environment, relationship to the active transportation network and the safety of that network, and effects on social cohesion.*

3.2.2 Existing Conditions

Background Concentrations

BAAQMD operates a regional 32-station monitoring network that measures the ambient concentrations of criteria pollutants. Between 2011~~-~~5–2013~~-~~7, no exceptional event designations were requested by BAAQMD. Therefore, design values listed in Table 3.2-5 have not been adjusted for exceptional events. In the Bay Area, exceptional events would generally be restricted to wildfires or industrial accidents that contribute to exceedances of the NAAQS.

Representative background concentrations for ozone, NO_2, SO_2, CO, O_3, and $PM_{2.5}$ are based on the ambient monitoring station located on Tuolumne Street, Vallejo, California (Station No. 06-095-0004) and covers the three most recent complete years (2011~~-~~5–2013~~-~~7). The station is designated a neighborhood scale station (with a range of 500 meters – 4 kilometers) and is suitable for assigning a background concentration for determining project impacts. The monitoring station is located 2.5 kilometers northeast of the proposed facility. The monitoring station is also located approximately downwind of the facility, based on the wind data for both Vallejo and Conoco-Phillips Rodeo meteorological stations, and thus should be broadly representative of the location at which the maximum emissions from the facilities will occur. In relation to fugitive emissions from the facilities, the use of the Tuolumne Street station is likely to overestimate the background levels of $PM_{2.5}$ due to the remote nature of the project site relative to the ambient monitoring station. The background data for the relevant pollutants is outlined in Table 3.2-5 for the last 3 years for which data is available.

~~The Tuolumne Street station ceased collection of PM_{10} data in 2008. As an alternative, the PM_{10} concentrations outlined in the BAAQMD publication "2013 Air Monitoring Network Plan" (BAAQMD 2014) for Solano County, which was based on the measurements conducted at Vacaville (in Yolo-Solano Air Quality Management District) (AQS ID 060953001), have been used in the assessment. In 2013 the daily design value for Vacaville had a concentration of 36 micrograms per cubic meter ($\mu g/m^3$). The first high concentration over the period 2011–2013 was used as background for assessing the CAAQS, while the average concentration over the 3-year period was used as background for assessing against the NAAQS (Appendix D-1).~~

Table 3.2-5
Ambient Air Quality Data

Pollutant	Averaging Period	Standard	Highest Monitored Concentration [a] / Number of Days Above Standard		
			2015	*2016*	*2017*
Ozone (ppm)	1-hour State [b]	0.09	0.08 / 0	0.08 / 1	0.08 / 1
	8-hour National [c]	0.07	0.061 /0	0.063 / 1	0.061 / 2
	8-hour State [b]	0.07	0.061 /0	0.063 / 0	0.061 / 2
CO (ppm)	1-hour National	35	—	—	—
	1-hour State	20	—	—	—
	8-hour National and State	9	—	—	—
NO_2 (ppm)	1-hour National [d]	0.100	0.038 / 0	0.036 / 0	0.042 / 0
	1-hour State [d]	0.18	0.050 / 0	0.050 / 0	0.050 / 0
	Annual National	0.053	0.008	0.007	0.008
	Annual State	0.030	0.009	0.008	0.008
SO_2 (ppm)	1-hour National	0.075	—	—	—
	1-hour State	0.25	—	—	—
	24-hour State	0.04	—	—	—
PM_{10} ($\mu g/m^3$)	24-hour National	150	— / —	— / —	— / —
	24-hour State	50	— / —	— / —	— / —
	Annual State	20	—	—	—
$PM_{2.5}$ ($\mu g/m^3$)	24-hour National [e]	35	30.7 /3	19.0 / 0	41.5 / 9
	Annual National [f]	12	9.8	9.0	9.6
	Annual State [g]	12	11	10	12

Notes:
ppb = parts per billion by volume; ppm = parts per million by volume; g/m3 = micrograms per cubic meter
[a] Exceedances of the standards are shown in bold. All reported values represent the highest recorded concentration unless otherwise noted.
[b] The concentrations reported for the state 1-hour and 8-hour O3 standards represent the California designation values.
[c] The concentrations reported for the national 8-hour O3 represent the national standard design value.

[d] The concentrations reported for the national 1-hour NO2 standard represent the 98th percentile national standard design value. The concentrations reported for the national annual NO2 standard represent the annual national standard design value. The concentrations reported for the state 1-hour and annual NO2 standard represent the CA designation values.
[e] The concentrations reported for the national 24-hour PM2.5 standard represent the 98th percentile national standard.
[f] The concentrations reported for the national annual PM2.5 standard represent the annual standard design value.
[g] The concentrations reported for the state annual PM2.5 standard represent the CA annual standard designation value.
Sources: Appendix D-1; iADAM Database (CARB 2018).

~~**Table 3.2-5**~~
~~**Ambient Air Quality Data**~~

~~Pollutant~~	~~Averaging Time~~	~~2011~~	~~2012~~	~~2013~~
~~O_3~~	~~8-hour (ppb)~~	~~69~~	~~62~~	~~68~~
	~~1-hour (ppb)~~	~~90~~	~~85~~	~~82~~
	~~4th highest maximum 1-hour concentrations averaged over 3 years (ppb)~~	~~61~~	~~59~~	~~57~~
~~PM_{10}~~	~~Annual ($\mu g/m^3$)~~	~~13.76~~	~~11.30~~	~~12.85~~
	~~24-hour ($\mu g/m^3$)~~	~~35.8~~	~~26.0~~	~~35.4~~
	~~98th percentile of maximum 24-hour concentrations ($\mu g/m^3$)~~	~~N/A~~	~~N/A~~	~~N/A~~
~~$PM_{2.5}$~~	~~Annual ($\mu g/m^3$)~~	~~10.08~~	~~8.96~~	~~10.42~~
	~~24-hour ($\mu g/m^3$)~~	~~N/A~~	~~N/A~~	~~N/A~~
	~~98th percentile of maximum 24-hour concentrations ($\mu g/m^3$)~~	~~31.0~~	~~21.4~~	~~32.8~~
~~NO_2~~	~~Annual (ppb)~~	~~10.20~~	~~9.12~~	~~9.85~~
	~~1-hour (ppb)~~	~~47.4~~	~~52.4~~	~~49.4~~
	~~98th percentile of maximum 1-hour concentrations (ppb)~~	~~34.7~~	~~32.7~~	~~36.5~~
~~CO~~	~~8-hour (ppm)~~	~~2.4~~	~~2.2~~	~~2.3~~
	~~1-hour (ppm)~~	~~3.0~~	~~2.8~~	~~2.8~~
~~SO_2~~	~~1-hour (ppb)~~	~~7.4~~	~~14.2~~	~~8.1~~
	~~24-hour (ppb)~~	~~2.6~~	~~2.5~~	~~2.5~~
	~~99th percentile of maximum 24-hour concentrations (ppb)~~	~~5.1~~	~~3.9~~	~~3.3~~

~~Sources: Appendix D-1.~~
~~Notes: ppb = parts per billion by volume; ppm = parts per million by volume; $\mu g/m^3$ = micrograms per cubic meter~~

Regional Topography, Meteorology, and Climate

The SFBAAB is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The greatest distortion occurs when low-level inversions are present, and the air beneath the inversion flows independently of air above the inversion (Appendix D-1).

The climate is dominated by the strength and location of a semi-permanent, sub-tropical high-pressure cell. During the summer, the Pacific high pressure cell is centered over the northeastern Pacific Ocean resulting in stable meteorological conditions and a steady northwesterly wind flow.

The high pressure cell leads to low precipitation levels in summer months. In terms of wind patterns, during summer months, the wind flows from the northwest inland through the Golden Gate and over the lower portions of the San Francisco Peninsula (Appendix D-1).

In the winter, the Pacific high-pressure cell weakens and shifts southward resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in low air pollution potential. In relation to wind patterns, the SFBAAB frequently experiences stormy conditions with moderate to strong winds, as well as periods of stagnation with very light winds. Rainfall levels rise and account for typically 75% of the annual average (Appendix D-1).

The project site is within the Carquinez Straits subregion. In this subregion, the prevailing winds are generally from the west, with high pressure offshore during summer and fall months leading to marine air flowing eastwards through the Carquinez Strait. The wind is generally strongest in the afternoon with speeds of 15–20 miles per hour (mph) common. Summer temperatures peak at around 90° Fahrenheit (°F), with mean temperatures in winter in the high 30s°F (Appendix D-1).

3.2.3 Thresholds of Significance

This section discusses the thresholds of significance used to evaluate impacts of the proposed project construction and operational activities.

California Environmental Quality Act Guidelines Appendix G Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) recommends that air quality impacts be deemed significant if the proposed project would:

A) Conflict with or obstruct implementation of the applicable air quality plan;

B) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

C) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

D) Expose sensitive receptors to substantial pollutant concentrations; or

E) Create objectionable odors affecting a substantial number of people.

Appendix G advises lead agencies to rely on the CEQA significance criteria established by the local air pollution control agency (for the Bay Area, BAAQMD) to determine the significance of a project's air emissions under the Appendix G thresholds.

BAAQMD Thresholds

Consistent with Appendix G, this Environmental Impact Report (EIR) uses the thresholds of significance adopted in the 2010 BAAQMD CEQA Guidelines (BAAQMD 2010)[1]. The BAAQMD significance thresholds are summarized in Table 3.2-6. In general, the BAAQMD significance criteria pollutant (reactive organic gas (ROG), NO_x, PM_{10}, $PM_{2.5}$, and CO) thresholds address the first three Appendix G air quality CEQA thresholds. The BAAQMD maintains that these criteria pollutant thresholds are intended to maintain ambient air quality concentrations below state and federal standards and to prevent a cumulatively considerable contribution to regional nonattainment with ambient air quality standards. The TAC thresholds (cancer and noncancer risks) address the fourth Appendix G threshold, and the BAAQMD odors threshold addresses the fifth Appendix G threshold. For the purposes of this EIR, proposed project impacts would be considered significant and would require mitigation if they exceed the significance thresholds in Table 3.2-6.

Table 3.2-6
Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	*Average Daily Emissions (lbs/day)*	*Maximum Annual Emissions (tpy)*
ROG	54	54	10
NO_x	54	54	10
PM_{10} (exhaust)	82	82	15
$PM_{2.5}$ (exhaust)	54	54	10
$PM_{10}/PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average, 20.0 ppm (1-hour average)	
Risks and Hazards (Individual Project)	Compliance with Qualified Community Risk Reduction Plan or Increased cancer risk of > 10.0 in a million Increased noncancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase > 0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from property line of source or receptor		

[1] The BAAQMD's CEQA Guidelines and thresholds of significance, adopted in June 2010, were challenged in a lawsuit. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds. The court found that the adoption of the thresholds was a project under CEQA and ordered the BAAQMD to examine whether the thresholds would have a significant impact on the environment under CEQA before recommending their use. The court's decision did not call into question the technical merits of the thresholds. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD had complied with CEQA. In May 2012, the BAAQMD revised the 2010 CEQA Guidelines and removed reference to significance thresholds. Although the BAAQMD cannot, at this time, recommend the 2010 adopted thresholds, the adopted 2012 CEQA Guidance allows lead agencies to reference the BAAQMD's CEQA Thresholds Options and Justification Report developed by BAAQMD staff in 2009, which outlines substantial evidence supporting the thresholds of significance (BAAQMD 2017~~2~~, BAAQMD 2009).

Table 3.2-6
Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	*Average Daily Emissions (lbs/day)*	*Maximum Annual Emissions (tpy)*
Risks and Hazards (Cumulative)	Compliance with Qualified Community Risk Reduction Plan or Cancer risk of > 100 in a million (from all local sources) Noncancer risk of > 10.0 Hazard Index (chronic, from all local sources) Ambient $PM_{2.5}$ > 0.8 µg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from property line of source or receptor		
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous material located near receptors or new receptors located near stored or used acutely hazardous materials considered significant	
Odors	None	5 confirmed complaints per year averaged over three years	

Source: BAAQMD 2009; BAAQMD 2010
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; CO = carbon monoxide

3.2.4 Impact Discussion

This section presents a summary of the proposed project activities and discusses potential impacts to air quality. A detailed description of the proposed project's construction and operational activities is presented in Chapter 2.0, Project Description.

In summary, the proposed project would reestablish industrial uses on 31.4 acres of the former General Mills plant site (Figure 2-1). The VMT project component will utilize 26.52 acres of the project site. VMT construction would involve the removal and replacement of a deteriorated timber wharf with a concrete pile-supported wharf, with a structural concrete deck, associated mooring and fender systems, a laydown area, and trucking and rail connections. VMT construction would require water-based fill and dredging activities and land-based construction activities.

The proposed Orcem facility would include construction of a production plant intended for production of GGBFS, a less polluting replacement for the traditional portland cement material used in many California construction projects. The proposed Orcem project component would involve construction of approximately 73,000 square feet of buildings and equipment, and outdoor storage areas, on a 4.88-acre portion of the former General Mills plant site leased from VMT. Several of the buildings and equipment previously used by General Mills would be demolished.

In summary, VMT would operate as a modern deep-water marine terminal, providing berthing for bulk carrier and break-bulk vessels. Orcem would primarily operate as a GGBFS production facility, although the facility could also be used for production of portland cement.

Anticipated material throughput for both VMT and Orcem would ramp up over time, with the maximum monthly throughput occurring when 160,000 metric tons (MT) of raw material would be shipped in via four vessel calls per month, 91,900 MT of product would be transported via truck loads, and 68,100 MT of product would be transported via rail cars. It is projected that this maximum scenario will not occur sooner than 2020. Although some VMT cargo may be transported via barge (allowing for 3.5 additional smaller vessel calls a month), the Air Quality and Greenhouse Gas Evaluation prepared by Ramboll Environ (Ramboll Environ 2015, provided as Appendix D1) determined that maximum impacts would occur when truck and rail transport is maximized (using four larger vessels). Accordingly, the air quality impacts were quantified for the maximum potential operating scenario occurring in 2020.

The following project design features and best management practices (BMPs) would be implemented as part of the proposed project:

- BMPs recommended by BAAQMD and listed below would be required during proposed project construction activities. The contractor shall implement the following BMPs that are required of all projects:
    1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
    2. All haul trucks transporting soil, sand, or other loose material off site shall be covered.
    3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
    4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
    5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
    6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485, of the California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
    7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
    8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

The project would also implement the following project design features to reduce on-site emissions during operation:

PDF-AQ-1: Process plant and material storage buildings—All air in contact with raw material or finished product, such as air from storage buildings, silos, and elevators, is treated by bag filters or other types of filter prior to discharge to the atmosphere, with a not-to-exceed limit value of 2.5 mg/Nm3 (normal cubic meter)(0.0011 grains/dry standard cubic foot (dscf)) $PM_{2.5}$.

PDF-AQ-2: Truck filling with finished Orcem products—Filling takes place in an enclosed area, isolated from the external environment with air discharged through bag filter to atmosphere, with a not-to-exceed limit of 2.5 mg/Nm3 (0.0011 grains/dscf) $PM_{2.5}$.

PDF-AQ-3: Railcar filling—Filling of the Orcem products takes place in an enclosed area, isolated from the external environment with air discharged through bag filter to atmosphere, with a not-to-exceed limit of 2.5mg/Nm3 (0.0011 grains/dscf) $PM_{2.5}$.

PDF-AQ-4: In addition to BAAQMD best management practices related to fugitive dust control, the following measures would be implemented to further reduce potential impacts related to fugitive dust during project operations:

Potential Source of Air Emissions	PDF-AQ-4 Operational Measures to Ensure Impacts are Minimized
Grab crane on ship transfers granulated blast furnace slag (GBFS) to mobile hopper	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Hopper drop to conveyor	Watering of material transfer point to ensure adequate moisture content and aspirated hopper discharging through filter giving a control effectiveness of 95% (SCAMQD 2007).
Conveyor drop to conveyor	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Conveyor drop to mound in GBFS storage area	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Front-end loader excavation of stockpile	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Loading of hopper by front-end loader	Watering of material transfer point to ensure adequate moisture content and aspirated hopper discharging through filter giving a control effectiveness of 95% (SCAMQD 2007).
Raw material storage piles	Frequent watering of storage pile and three-sided enclosure for two of the three stockpiling areas giving a control effectiveness of 90% – 97.5% (SCAMQD 2007, EPA AP-42).
Industrial Paved Road (finished product)	Watering three times daily giving a control effectiveness of 80% (SCAMQD 2007).

Source: Appendix D-1

A) Would the project conflict with or obstruct implementation of the applicable air quality plan?

The most recent Bay Area air quality plan is the 2010 Multi-Pollutant Clean Air Plan. The Plan provides a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases. The Plan also establishes emission control measures to be adopted by the BAAQMD during 2010–2020. Projects are considered consistent with, and would not conflict with or obstruct implementation of, the local air quality management plan if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop local air quality management plans. Demographic growth forecasts for various socioeconomic categories, developed by the Metropolitan Transportation Commission, the Association of Bay Area Governments, and local and regional agencies were used to estimate future emissions in the 2010 Clean Air Plan.

The 2010 BAAQMD CEQA Guidelines recommend consideration of the following three questions to determine consistency with the relevant air quality plan:

1. Does the project support the primary goals of the air quality plan?
2. Does the project include applicable control measures from the air quality plan?
3. Does the project disrupt or hinder implementation of any Clean Air Plan control measures?

Regarding question number 1, the primary goals of the Bay Area 2010 Clean Air Plan are to attain air quality standards under the NAAQS and CAAQS, protect public health, and reduce regionally generated GHG emissions. The 2010 Clean Air Plan proposed emission reduction measures that are designed to bring the SFBAAB into attainment of the CAAQS and NAAQS. The attainment strategies in the Clean Air Plan include more stringent standards for new engines and cleanup of existing fleets, including new measures for port trucks, statewide truck fleets, ships traveling and in port, locomotives, and harbor craft that are enforced at the state and federal level on engine manufacturers and petroleum refiners and retailers; as a result, proposed project operation would comply with these control measures. The BAAQMD also adopts Clean Air Plan control measures into the BAAQMD rules and regulations, which are then used to regulate sources of air pollution in the SFBAAB. Therefore, compliance with these requirements would ensure that the proposed project would not obstruct implementation of the Clean Air Plan.

The primary purpose of the Clean Air Plan is to assist the SFBAAB to come into attainment of the NAAQS and CAAQS. As described in Threshold B below, a significant impact would occur due to NO_x emissions during project operations. Although the SFBAAB is currently in attainment for NO_x, NO_x is a precursor to the formation of ozone; therefore, an exceedance of the BAAQMD NO_x threshold would conflict with the Clean Air Plan's goal of bringing the SFBAAB into attainment for ozone. Therefore, impacts associated with the proposed project would be **significant** (**Impact 3.2-2**).

Regarding question number 2, the Clean Air Plan includes control measures related to six primary categories: Stationary Source Measures, Mobile Source Measures, Transportation Control Measures, Land Use and Local Impact Measures, Energy and Climate Measures, and Further Study Measures. Many of the control measures in the Clean Air Plan would not apply to the proposed project; however, the project would implement BAAQMD BMPs related to fugitive dust control and project design features PDF-AQ-1 through PDF-AQ-4 as described previously. In addition, with implementation of mitigation measures identified in Section 3.2.5, the project would include applicable control measures from the Clean Air Plan. MM-3.2-1 would ensure truck fleets transporting materials to the site would be model year 2010 or newer to reduce NO_x emissions, which would be consistent with the Clean Air Plan's recommended measures related to Mobile Source Measures including measure MSM B-1—HDV Fleet Modernization and B-2—Low NO_x Retrofits for In-Use Engines. MM-3.2-2 would require an increase in or replacement of diesel-powered terminal equipment with either biodiesel, natural gas, or electric-powered equipment. Project operations would also promote measure LUM 1—Goods Movement, through the use of diversified material transport and distribution through a combined use of truck, rail, and vessel transportation modes. MM-3.2-2 would also require the use of a CARB-approved capture and control system to treat emissions from auxiliary engines on ocean-going vessels, which would support the BAAQMD measure LUM 5—Reduce Risk in Impacted Communities by implementing measures to reduce health risk to nearby receptors. However, without mitigation, this impact would be **significant** (**Impact 3.2-3**).

Regarding question number 3, the proposed project would not disrupt or hinder implementation of any control measures delineated in the Clean Air Plan. The project would not hinder implementation of any Stationary Source Measures, Mobile Source Measures, Transportation Control Measures, Land Use and Local Impact Measures, Energy and Climate Measures, or Further Study Measures. Therefore, the project would not conflict with or obstruct implementation of control measures delineated in the Clean Air Plan. Impacts with regard to question number 3 would be **less than significant**.

B) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

The California Emissions Estimator Model (CalEEMod) Version 2013.2.2 was used to estimate emissions from construction and operation of the proposed project. CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state, to quantify criteria pollutant and greenhouse gas (GHG) emissions associated with the construction and operational activities from a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod input parameters, such as the proposed project land use type and size,

construction schedule, and anticipated construction equipment utilization were based on information provided by the project applicant.

CalEEMod is well suited to the assessment of typical, land-based construction activities, such as on-site construction emissions and off-site vehicle transit. Since proposed construction activities would also use marine sources, namely tugboats, emissions for marine-based activities were computed separately, outside of CalEEMod, using methodology and emission factors published by CARB (Appendix D-1). Marine source emissions were then added to CalEEMod results.

Construction Impacts

VMT Analysis

In summary, the VMT project component would replace the deteriorated timber wharf with a concrete pile supported wharf with structural concrete deck, associated mooring and fender system, and related improvements for deep-water marine transportation operations. The construction process would include the following:

- Approximately 10,300 cubic yards (cyd) of fill, the majority of which would be placed within the footprint of the existing wharf.
- Approximately 10,900 cyd of on-site recycled concrete grading material to bring the finished elevation to 11.5 feet above mean lower low water (MLLW) as needed for the proposed stormwater control plan.
- Approximately 89,800 cyd of dredging, to a design depth of -38 feet below MLLW. The dredged material may be reused on site as engineered backfill, or would be transported from the site via barges and associated tugboats and disposed of in a marine disposal site within 3 miles of the project site. Dredging activities would be subject to a permit from the U.S. Army Corps of Engineers.
- Installation of a steel maintenance shed.
- Upgrading and realignment of the existing rail service.
- Demolition of an existing warehouse building and site improvements.

VMT construction is anticipated to begin in mid-2017 and would require 4 to 6 months to complete. The VMT terminal would be constructed simultaneously with the Orcem facility.

Sources of emissions for construction would include: off-road construction equipment exhaust, on-road vehicles exhaust and entrained road dust (i.e., haul trucks, concrete trucks, worker vehicles), exhaust from tugboats used to position dredging barges, fugitive dust associated with site preparation and grading activities, and paving and architectural coating activities. Detailed equipment utilization associated with VMT construction is included in Appendix D-1.

In addition, although construction is not expected to begin until ~~2017~~2020, the construction analysis, which was completed in August 2014, assumed construction would commence in 2015 as well as the simultaneous construction of the Orcem and VMT portions of the project. Because construction equipment fleets become cleaner over time, due to regulatory requirements, the analysis of construction emissions based on a 2015 starting year conservatively overestimates ~~2017~~ 2020 construction impacts.

Average daily emissions, necessary for comparison to BAAQMD thresholds of significance, were computed by dividing the total construction emissions by the number of construction days. Table 3.2-7 shows total and average daily construction emissions of air pollutants (i.e., ROG, NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust) during VMT construction.

Table 3.2-7
VMT Construction Emissions

	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
VMT				
2017 (CalEEMod) (tons)[1]	0.08	0.85	0.04	0.04
2017 (Tug operations) (tons)[1]	0.03	0.22	0.01	0.01
Average daily emissions(pounds/day)[2]	3.5	34.5	1.6	1.6

Source: Appendix D-1
Notes: ~~:~~ ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less.
1 2017 emissions were conservatively analyzed as if construction would occur in 2015.
2 Assumes 62 work days.

A discussion of threshold exceedance is found below as construction is being evaluated for VMT and Orcem combined. In addition to criteria pollutants from equipment exhaust, PM_{10} and $PM_{2.5}$ in the form of fugitive dust would also result from construction activities. Fugitive dust is addressed under Combined VMT and Orcem Construction Impacts.

Orcem Analysis

Development of the Orcem Plant would involve construction and operation of an industrial facility for the production of a high performance, less polluting replacement for the traditional portland cement material used in most California construction projects. In particular, Orcem is proposing to construct and operate a manufacturing plant on the site which would focus primarily on production of GGBFS. However, the Orcem Plant may also produce portland cement from clinker. The Orcem Plant would involve construction of approximately 73,000 square feet of buildings and equipment, together with outdoor storage areas, on a 4.88-acre portion of the former General Mills plant site, leased from VMT. Several of the buildings and equipment previously used by General

Mills within the Orcem Site would be demolished in order to accommodate construction and operation of the proposed cement products production facility. The project would be constructed in phases to coincide with the growth in demand for Orcem's products. Orcem would import most of the raw materials used in the proposed plant via the proposed wharf on the adjoining VMT Site.

While the Orcem Plant would be constructed in phases to coincide with the growth in demand for Orcem's products, construction will take an anticipated 15 months. As described in the VMT construction discussion, although Orcem construction is not expected to begin until ~~2017~~2020, the construction analysis, which was completed in August 2014, assumed construction would commence in 2015 as well as the simultaneous construction of the VMT facility. Because construction equipment fleets become cleaner over time, due to regulatory requirements, the analysis of construction emissions based on a 2015 starting year conservatively overestimates ~~2017~~ 2020 construction impacts.

Sources of emissions would include: off-road construction equipment exhaust, on-road vehicles exhaust and entrained road dust (i.e., haul trucks, concrete trucks, worker vehicles), fugitive dust associated with site preparation and grading activities, and paving and architectural coating activities. Detailed equipment utilization associated with Orcem construction is included in Appendix D-1.

Average daily emissions, necessary for comparison to BAAQMD thresholds of significance, were computed by dividing the total construction emissions by the number of construction days. Table 3.2-8 shows average daily construction emissions of ROG, NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust during Orcem construction.

Table 3.2-8
Orcem Construction Emissions

	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
2017 (tons)[1]	0.70	3.34	0.16	0.15
2018 (tons)[1]	0.23	0.43	0.02	0.02
Average daily emissions(pounds/day)[2]	4.7	19.2	0.9	0.9

Source: Appendix D-1
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less.
1 2017 and 2018 emissions were conservatively analyzed as if construction would occur in 2015 and 2016, respectively.
2 Assumes 392 work days.

A discussion of threshold exceedance is found below as construction is being evaluated for VMT and Orcem combined. In addition to criteria pollutants from equipment exhaust, PM_{10} and $PM_{2.5}$ in the form of fugitive dust would also result from construction activities. Fugitive dust is addressed under the Combined VMT and Orcem Construction Impacts.

Combined VMT and Orcem Construction Impacts

Orcem and VMT construction are anticipated to overlap, which would result in a combined worst-case construction scenario. Table 3.2-9 shows average daily construction emissions of ROG, NO_x, PM_{10} exhaust, and $PM_{2.5}$ exhaust during the worst-case, combined construction period.

Table 3.2-9
Combined VMT and Orcem Average Daily Construction Emissions – 2017[1]

	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
VMT (pounds/day)	3.5	34.5	1.6	1.6
Orcem (pounds/day)	4.7	19.2	0.9	0.9
Combined Emissions (pounds/day)[2]	8.2	53.7	2.5	2.5
BAAQMD Thresholds (pounds/day)	*54*	*54*	*82*	*54*
Exceed Threshold?	No	No	No	No

Source: Appendix D-1
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less.
1 Emissions were conservatively analyzed as if construction would occur in 2017.
2 Assumes 392 work days.

As shown in Table 3.2-9, combined VMT and Orcem construction impacts would not exceed significance thresholds. Impacts during construction would be **less than significant**.

Fugitive Dust

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if BMPs are employed to reduce these emissions.

Implementation of the BAAQMD BMPs listed below would reduce the air quality and fugitive dust-related impacts associated with grading and new construction to less than significant. The contractor would be required to implement the following BMPs that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

Implementation of fugitive dust control measures recommended by BAAQMD would ensure air quality and fugitive dust-related impacts associated with grading and new construction would remain **less than significant**.

Operational Impacts

Orcem would import its raw materials (GBFS, Clinker, portland cement, gypsum, limestone, and pozzolan) for production via several methods of transport including ocean going vessels which will berth at the VMT wharf. The raw materials would be unloaded and transported to open or covered stockpiles on the site, as appropriate, to fully contain fugitive dust. The raw materials would then be reclaimed from these stockpiles by front end loaders to be transported by conveyors into sealed processing equipment for milling into fine powders (the finished products). The finished products would be transported in sealed convey systems into storage silos, for subsequent loading into truck or rail tankers for distribution to customers in the region. GGBFS is produced by recycling a byproduct, GBFS, from the steel industry. It is used as a partial replacement for traditional cement, also known as portland cement.

The operational phase of the development would include both Orcem and VMT operating their respective areas of the site simultaneously. This section contains a description of the emissions of criteria pollutants and TACs from combined Orcem and VMT operations.

Emissions sources during operation of the facilities would include the following:

- Transportation
  - Port activity (ship exhaust emissions, tug boats, ship loading/unloading)
  - Truck movements both on site and on the local road network
  - Rail activity
  - Barge activity
  - Off-road vehicle movements on site including operation of front end loaders and forklifts
- Material handling emissions generated from stockpiling, unloading of material, material drop points, etc.
- Fugitive dust emissions from hopper and bag filters
- Air emissions from point P-1 (main stack)

The material throughput for both the Orcem and VMT project components would increase over time, as shown in Table 3.2-10. The greatest air quality impacts would result from the activities described in scenario number 3, where the maximum material would be moved through the facilities via trucks and rail. This maximum transportation mode would not occur until at least 2020. Accordingly, the emissions are analyzed for the 2020 year for the shipping scenario where 160,000 MT of material is shipped to the VMT facility monthly via four vessels, and of that, 91,900 MT is transported out of the project site via truck, and 68,100 MT is transported out of the project site by rail. As described in Chapter 2, Project Description, the maximum train size would be 77 cars; however, this analysis evaluates the impacts of 100-car trains, which is a conservative estimate. As described in Chapter 2, the number of rail cars in any given month and week will fluctuate based on the type of product that is being transported from the project site to market, but the average number of rail cars per month is anticipated to be 800 to 1,200 per month, limited to no more than 14,400 project-related rail cars per year.

Table 3.2-10
VMT and Orcem Operational Throughput

Average Monthly Transportation Activity	Ships (#)	Barge (MT/month)	Trucks (MT/month)	Rail (MT/month)	Total (MT/month)
1) Orcem Phase 1 GBFS + VMT Truck Only	2	0	81,700	0	81,700

Table 3.2-10
VMT and Orcem Operational Throughput

Average Monthly Transportation Activity	Ships (#)	Barge (MT/month)	Trucks (MT/month)	Rail (MT/month)	Total (MT/month)
2) Orcem Phase 2 GBFS + VMT Truck and Rail	3	0	44,000	76,000	120,000
3) Orcem Phase 2 GBFS + VMT Truck and Rail	4	0	91,900	68,100	160,000
4) Orcem Phase 2 GBFS/Clinker + VMT Truck, Rail and Barge	4	48,300	81,200	30,500	160,000
5) Orcem Phase 2 GBFS/Clinker + VMT Truck, Rail and Barge	4	6,600	89,200	64,200	160,000

Source: Appendix D-1

VMT Analysis

The proposed VMT facility would include a multi-phased bulk aggregate import and distribution facility on the existing terminal footprint. The general transportation method would be to unload dry bulk cargo from vessels, temporarily store, and reclaim from storage to cargo trucks and railcars for local and regional distribution. In addition, the terminal design would allow reloading of cargo to barges enabling VMT to engage in short sea shipping initiatives with other California and West Coast ports and terminals. As an operational deep draft facility, the VMT Terminal would handle a wide range of commodities including, but not limited to, the following:

- Feed grains
- Manufactured steel
- Timber/lumber
- Rock, aggregate, ores, and related materials (including GBFS, portland cement clinker material (clinker), pozzolan, gypsum, limestone, and related materials used by Orcem)
- Project-based break-bulk items (e.g., heavy lift transport, large construction assemblies)
- Other bulk and break-bulk commodities
- Marine construction materials
- Portland cement

For the purposes of a conservative analysis, the materials with the greatest potential for fugitive dust release (sand and aggregates) were assumed to be the dominant material imported. Under these circumstances, sand and aggregates would be received from self-unloading, clam-shell

crane-equipped vessels and delivered to the storage area by covered conveyors where they would be stored in open stockpiles. The VMT Terminal would be designed to also discharge self-unloading, conveyor-equipped vessels using the same receiving hoppers and conveying equipment when throughput volumes increase.

During the initial project stages, trucks and railcars will be loaded using front-end loaders to load cargo directly into the truck trailers and railcars. When the annual throughput increases at the VMT Terminal, a railcar loading station and surge bin will be constructed on the site to improve operational efficiency and reduce the use of wheel loaders. Wheel loaders would then be used only in the stockyard to reclaim the cargo to receiving hoppers that feed conveyors leading to the rail loading stations and to maintain the stockpiles. Trucks will continue to be loaded using front-end loaders.

VMT would primarily serve as a dry bulk and break-bulk terminal. Cargoes, which are neither dry bulk nor break-bulk and which do not otherwise release fugitive dust or airborne/soluble toxic materials when handled and stored in the open, would be unloaded using portable equipment onto the paved or aggregate surfaces within the 8.05-acre VMT Terminal shipping and receiving site area. All other cargo received or shipped through the VMT Terminal would be handled through enclosed transport devices (such as the GBFS material received and transported directly to the Orcem Site). The existing surfaces at the site would be used as temporary laydown areas for the cargo being prepared for loading onto vessels or being unloaded for transfer to barge, rail, or trucks.

Annual criteria pollutant emissions from VMT operations are presented in Table 3.2-11. The VMT operational analysis reflects operation of the VMT Terminal without barge access; this scenario represents the greatest impacts because it requires the transport of all products from the facility via truck and rail, which would result in greater impacts than barge transport. The emissions analysis is based on detailed calculations, engineering data, and operation at maximum load. Emissions were calculated using industry-accepted sources including CARB's Off-Road Emission Inventory, EMFAC2014, EPA AP-42, and vendor data. Detailed calculations are presented in Appendix D-1.

VMT will be subject to the New Source Review program and BAAQMD permitting and, given that NO_x would exceed 10 tpy, emission offsets would be required for shipping and rail NO_x emissions as presented in Table 3.2-11.

Given that the estimated facility emission totals would be below the PSD threshold of 250 tpy per pollutant, the project would not be subject to PSD review (Appendix D-1).

Table 3.2-11
Maximum Annual Emissions of Criteria Pollutants – VMT

Emission Totals (tons/year)[1]								
Source	*ROG*	*CO*	*NO_x*	*SO_2*	*PM_{10} (Exhaust)*	*PM_{10} (Fugitive)*	*$PM_{2.5}$ (Exhaust)*	*$PM_{2.5}$ (Fugitive)*
Shipping[2]	0.99	2.16	18.32	1.22	0.42	—	0.40	—
Material Handling	—	—	—	—	—	0.15	—	0.02
Raw Material Storage Piles	—	—	—	—	—	0.00	—	0.00
Unpaved Road (forklift)	0.04	0.12	0.20	0.00	0.00	0.03	0.00	0.00
Unpaved Road (front loader and excavator)	0.11	1.05	0.33	0.01	0.01	0.05	0.01	0.00
Industrial Paved Road (finished product)	0.02	0.05	0.19	0.00	0.00	0.03	0.00	0.01
Public Paved Road	0.20	2.62	10.06	0.03	0.03	4.79	0.03	1.18
Rail[3]	0.02	0.81	2.24	0.00	0.02	—	0.02	—
BAAQMD Offsets	—	—	-20.56	—	—	—	—	—
Total (tpy)	1.38	6.81	10.78	1.26	0.48	5.05	0.46	1.22

Source: Appendix D-1
Notes:
1 Annual emissions and BAAQMD annual thresholds are equivalent to average daily emissions and daily thresholds, assuming 365 days/year of operation.
2 Includes transit and idling ship and tug emissions.
3 Includes engine exhaust and fugitive dust emissions. A discussion of threshold exceedance is found below as annual emissions are being evaluated for VMT and Orcem combined.

Orcem Analysis

The primary raw material utilized at the Orcem Plant would be GBFS, a recycled by-product from the first stage in the production of steel. GBFS has the appearance and handling characteristics of coarse beach sand. At the Orcem Plant, GBFS would be dried and ground to a very fine GGBFS powder (Appendix D-1).

The Orcem Plant would be constructed in phases to coincide with the growth in demand for the products in Orcem's product portfolio. The total annual throughput of raw materials of the plant at full capacity would be up to 900,000 MT per year. A maximum of 760,000 tons can be processed by the grinding mill; the remainder of raw materials would not be milled. It is not expected that the Orcem Plant would achieve full production in the first few years of operation. For this reason it is proposed that minor changes to the basic site infrastructure (but not the main processing plant) will be made in accordance with the growth pattern of production.

The trigger for the proposed infrastructure changes will be the following production phases:

- Orcem Phase 1: Up to a production of 500,000 MT per year.
- Orcem Phase 2: Above 500,000 MT per year.

While the Orcem Plant would primarily produce GGBFS, the plant would also operate in a number of finished product operational modes within any given time frame, based upon market demand for GGBFS and other cement products. These modes may include:

- Orcem Mode 1 – GGBFS production only
- Orcem Mode 2 – Cement products production only
- Orcem Mode 3 – GGBFS production and cement

Details regarding the material production associated with these modes, associated phases, and quantity of materials by phase are provided in Appendix D-1.

Estimates of the annual criteria pollutant emissions from Orcem operations are presented Table 3.2-12. The Orcem operational analysis reflects operation at a maximum production rate of up to 900,000 MT per year of which 760,000 MT per year would be milled. Emissions were calculated using industry-accepted sources including CARB's Ocean Going Vessels (OGV) Marine Emissions Model, CARB's California Harbor Craft Emissions Inventory Database, CARB's OFFROAD2011 off-road equipment inventory, CARB's EMFAC2014 on-road vehicle emissions inventory, EPA AP-42, and vendor data. Detailed calculations are presented in Appendix D-1.

In particular, emissions from the hot air generator, used in the drying process, would be released via a 50-meter stack. Emissions were calculated based on vendor data and default EPA AP-42 emission rates and additional conservative assumptions related to emission variability. In accordance with BAAQMD Regulation 2-2-301, BACT would be triggered if NO_x, SO_2, POC, or non-precursor organic compounds exceed 10 pounds per day. Estimations of emissions indicate that BACT would be required for the hot air generator as outlined in Table 3.2-12 (Appendix D-1).

Orcem will be subject to the New Source Review program and BAAQMD permitting and, given that NO_x would exceed 10 tpy, emission offsets would be required for stack, shipping, and rail NO_x emissions as presented in Table 3.2-12. Given that the estimated facility emission totals would be below the PSD threshold of 250 tons per year per pollutant, the project would not be subject to PSD review (Appendix D-1). Table 3.2-12 show that the largest source of emissions would vary by pollutant, but would generally be driven by trucks, ships, and the main stack.

A discussion of threshold exceedance is found below as annual emissions are being evaluated for VMT and Orcem combined.

Table 3.2-12
Orcem Annual Emissions of Criteria Pollutants (Phase 2)

Emission Totals (tons/year)								
Source	*ROG*	*CO*	*NO_x*	*SO_x*	*PM_{10} (Exhaust)*	*PM_{10} (Fugitive)*	*$PM_{2.5}$ (Exhaust)*	*$PM_{2.5}$ (Fugitive)*
Shipping[1]	0.63	1.41	12.00	0.80	0.28	—	0.26	—
Material Handling	—	—	—	—	—	0.09	—	0.01
Raw Material Storage	—	—	0.55	—	—	0.00	—	0.00
Unpaved Road (forklift)	0.01	0.10	0.03	0.00	0.01	—	0.01	—
Unpaved Road (front loader and excavator)[2]	0.20	1.24	0.52	0.01	0.01	0.09	0.01	0.01
Industrial Paved Road (finished product)[2]	0.06	0.07	0.26	0.00	0.00	0.03	0.00	0.01
Public Paved Road[2]	0.36	3.39	12.41	0.04	0.04	5.96	0.04	1.46
Bag Filters	—	—	—	—	—	0.18	—	—
Stack	1.53	11.30	5.59	0.18	0.25	—	0.25	—
Rail	0.01	0.25	0.70	0.00	0.00	—	0.00	—
On site	—	—	—	—	—	—	—	—
BAAQMD Offsets	—	—	-18.29	—	—	—	—	—
Total	2.80	17.76	13.77	1.03	0.59	6.35	0.57	1.50
BAAQMD Threshold	*10*	*N/A*	*10*	*N/A*	*15*	*N/A*	*10*	*N/A*
Threshold Exceeded?	*No*	*N/A*	*Yes*	*N/A*	*No*	*N/A*	*No*	*N/A*

Source: Appendix D-1
Notes:
1 Includes transit and idling ship and tug emissions.
2 Includes engine exhaust and fugitive dust emissions.

Combined VMT and Orcem Project Analysis

Table 3.2-13 shows the combined annual emissions from operation of the VMT facility and Orcem Plant. The analysis is based on operation of the VMT facility with truck and rail, but no barge transport and on operation of the Orcem Plant at a maximum throughput of 900,000 MT per year, of which 760,000 would be milled. It is anticipated that this combination of operating scenarios would result in maximum impacts (Appendix D-1).

Annual emissions are compared to BAAQMD's annual operational thresholds. BAAQMD's average day and annual thresholds are equivalent for projects operating 365 days per year. Since the project would operate 365 days per year, a separate comparison to BAAQMD's daily thresholds is not necessary.

BAAQMD offsets would be provided in compliance with New Source Review and BAAQMD requirements.

Table 3.2-13
Maximum Annual Emissions of Criteria Pollutants
from the Combined Operations of VMT and Orcem

Combined Annual Emission (tpy)								
Facility	*ROG*	*CO*	*NO_x*	*SO_x*	*PM_{10} (Exhaust)*	*PM_{10} (Fugitive)*	*$PM_{2.5}$ (Exhaust)*	*$PM_{2.5}$ (Fugitive)*
VMT	1.38	6.81	31.33	1.26	0.48	5.05	0.46	1.22
Orcem	2.80	17.76	32.06	1.03	0.59	6.35	0.57	1.50
VMT BAAQMD Offsets	—	—	-20.56	—	—	—	—	—
Orcem BAAQMD Offsets	—	—	-18.29	—	—	—	—	—
Total	4.18	24.57	24.54	2.29	1.07	11.4	1.03	2.72
BAAQMD Threshold	*10*	*N/A*	*10*	*N/A*	*15*	*N/A*	*10*	*N/A*
Threshold Exceeded?	*No*	*N/A*	*Yes*	*N/A*	*No*	*N/A*	*No*	*N/A*

Source: Appendix D-1

As shown in Table 3.2-13, combined operation of the VMT facility and Orcem Plant would exceed the BAAQMD threshold for NO_x. Combined operational emissions would remain below the threshold for all other criteria pollutants. Impacts related to NO_x during combined operations would be considered **significant (Impact 3.2-4)**.

C) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Past, present, and future development projects may contribute to the region's adverse air quality impacts on a cumulative basis. Per BAAQMD's CEQA Guidelines, by its nature air pollution is largely a cumulative impact; no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. BAAQMD holds that if a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions.

Construction Impacts

Potential projects within the proposed project vicinity would include a quick-service restaurant and gas station convenience store, a self-storage facility, and remediation of the Pacific Gas & Electric (PG&E) Southern Waterfront site (former Manufactured Gas Plant facility). Construction of these cumulative projects could potentially occur simultaneously with the proposed project. Emissions associated with construction activities would result in a temporary addition of pollutants

to the local airshed caused by soil disturbance and hauling activities, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials and worker vehicular trips. Fugitive dust (PM_{10} and $PM_{2.5}$) emissions would primarily result from site preparation activities. NO_x and CO emissions would primarily result from the use of construction equipment and motor vehicles, the latter of which would generally be dispersed over a large area where the vehicles are traveling.

Construction of cumulative projects would be short term and temporary in nature. Construction of the quick-service restaurant and gas station convenience store, and self-storage facility would contribute minimal emissions during construction~~,~~ and would not be anticipated to result in substantial emissions when considered in combination with the proposed project. Construction of the PG&E Southern Waterfront site would consist of demolition of on-site structures, site preparation, and remediation activities. Pollutants generated as a result of these activities would consist primarily of fugitive dust as a result of demolition and site preparation/remediation activities. The PG&E remediation project would include on-site fugitive dust monitoring as part of its demolition work plan and Health and Safety Plan. On-site monitoring would ensure adequate implementation of fugitive dust control measures during dust-generating activities~~,~~ and would mitigate visible dust plumes and related fugitive dust impacts to a level below significance (Melitta 2015). As fugitive dust impacts are generally localized to individual project sites, and on-site emissions would be sufficiently mitigated through demolition and dust control measures, coupled with implementation of BAAQMD BMPs as listed in Section 3.2.4 for all cumulative projects, cumulative impacts related to fugitive dust would be considered **less than significant**. Additionally, fugitive dust impacts under the proposed project would be less than significant as shown in Table 3.2-13. Moreover, once construction activities are completed, construction-related emissions would cease.

Thresholds established by the BAAQMD as shown in Table 3.2-6 are used to evaluate air quality impacts, including cumulative impacts. Thresholds established by the BAAQMD reflect the attainment status of the project area and provide for the consideration of project impacts in light of the region's nonattainment status for certain criteria pollutants. As such, these thresholds also provide a basis to evaluate the proposed project's contribution to air pollutant emissions and concentrations under the cumulative criterion.

Table 3.2-9 shows that construction of the VMT facility and Orcem Plant would not exceed BAAQMD construction thresholds for any criteria pollutants; therefore, construction activities would not result in cumulatively considerable impacts. The project's contribution to cumulative project impacts would be considered **less than significant** during the temporary construction period.

Operational Impacts

The VMT and Orcem facility and a large portion of the marine vessel and motor vehicle trips associated with the import and distribution of materials are located within the SFBAAB. Table 3.2-13 shows that the proposed project would generate operational emissions that would exceed the significance threshold for NO_x. Because the project would exceed the BAAQMD threshold for NO_x, it would, therefore, result in cumulatively considerable impacts. Cumulative project impacts would be considered **significant** during operational activities (**Impact 3.2-4**).

D) Would the project expose sensitive receptors to substantial pollutant concentrations?

The BAAQMD has adopted project and cumulative thresholds for three risk-related air quality indicators to sensitive receptors: cancer risks, noncancer health effects, and increases in ambient air concentrations of $PM_{2.5;}$ these impacts are addressed on a localized rather than regional basis, in relation to sensitive receptors identified in Table 3.2-14. Cancer risk is the probability or chance of contracting cancer over a human life span, conservatively assumed to be 70 years. Carcinogens are assumed to have no threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer. Cancer risk is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure. Non-carcinogenic substances differ in that there is assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis. Acute and chronic exposure to non-carcinogens is expressed as a hazard index (HI), which is the ratio of expected exposure levels to an acceptable reference exposure levels.

In accordance with BAAQMD guidance, the health risk assessment (HRA) provided in Appendix D-1 evaluated health impacts of project-related TAC and $PM_{2.5}$ emissions. In general, TACs and $PM_{2.5}$ can cause cancer and noncancer chronic and acute health impacts such as birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute affects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

Because many of the project-related emission sources would be diesel-powered, DPM, classified as a TAC by CARB, is a key pollutant evaluated in the HRA. $PM_{2.5}$ emissions from diesel engine combustion were used as a surrogate for DPM. Ship boiler emissions were speciated into their individual TAC components using speciation data in Appendix D-1. Fugitive TAC emissions, associated with the storage, handling, and processing of GBFS and gypsum, were also speciated into their individual TAC components using speciation data in Appendix D-1. The proposed project includes the use of 20% biodiesel blend in all on-site equipment.

Air quality modeling of annual average DPM and fugitive $PM_{2.5}$ concentrations was conducted using the EPA's atmospheric dispersion modeling system (AERMOD). The AERMOD model is

a steady-state, multiple-source, dispersion model designed to calculate pollutant concentrations from single or multiple sources. The model is recommended by BAAQMD for predicting air pollutant/contaminant concentrations associated with various emissions sources. See Appendix D-1 for details regarding model input parameters.

Construction Impacts

Construction equipment, dredging activities, and associated heavy-duty truck traffic would generate diesel exhaust, which is a known TAC. Diesel exhaust may pose a health concern to nearby sensitive receptors.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Residences, schools, day care facilities, convalescent homes, and hospitals are of particular concern. In addition to residences, there were a number of sensitive receptors identified within an approximate 2.5-mile radius of the site. These receptors are noted in Table 3.2-14.

Table 3.2-14
Sensitive Receptors Within 2.5 Miles of the Project

Receptor ID	Receptor Type	Receptor ID	UTM Coordinates (E/N)	Distance (miles)
1	School	Grace Patterson Elementary School	566878, 4214937	0.36
2	School	Touro University	564493, 4215574	1.10
3	School	Glen Cove Elementary School	569365, 4214485	2.0
4	School	Beverly Hills Elementary School	568008, 4215793	1.24
5	School	St. Patrick High School	569974, 4215797	2.3
6	School	Annie Pennycook Elementary School	569251, 4216011	1.4
7	Daycare facility	Village Childcare	569207, 4216011	2.3
8	School	Mare Island Academy	563474, 4215422	1.8
9	School	John Swett High School	568280, 4211942	2.3
10	School	Cal Maritime Academy	567463, 4213715	1.3
11	School	Reignierd School	566142, 4218726	2.3
12	School	Cave Elementary School	567736, 4218848	2.5
13	School	St. Basils School	566881, 4218709	2.3
14	Convalescent home	Genesis Home Care	568897, 4215861	1.59
15	Medical facility	Mare Island VA Hospital	562359, 4217056	2.78
16	Daycare facility	Benecia Kinder Care	570897, 4215220	2.8

Source: Appendix D-1
Notes:
All coordinates from Google Earth (approximate center point of each receptor location), image date 2014.
Based on a 2.5-mile-radius area search. The nearest school is located approximately 0.36 mile east of the site. All other schools are located in excess of 1 mile from the site.
See Appendix D-1 for location of sensitive receptors.

An HRA of the project construction activities evaluated the potential health effects on sensitive receptors from construction emissions of diesel particulate matter (DPM). A dispersion model was used to predict the off-site DPM and $PM_{2.5}$ concentrations resulting from project construction. Resulting concentrations were used to evaluate cancer risks and noncancer impacts (Appendix D-1).

The HRA focused on modeling on-site construction activity using construction fleet information included in the project design features. As described previously, construction period emissions were modeled using CalEEMod based on projected construction activity. The number and types of construction equipment and diesel vehicles, along with the anticipated equipment utilization were based on site-specific construction activity schedules provided by the project proponent.

The CalEEMod model provided total annual $PM_{2.5}$ exhaust emissions (assumed to be DPM) for the off-road construction equipment and for exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles). The on-road emissions are a result of haul truck travel, worker travel, and vendor deliveries during building demolition, grading, and construction activities. A trip length of 0.65 mile was used to represent vehicle travel while at or near the construction site. Fugitive $PM_{2.5}$ dust emissions were also calculated by CalEEMod (Appendix D-1). Table 3.2-15 provides the emissions of exhaust and fugitive $PM_{2.5}$. Tugboat emissions were calculated outside of CalEEMod, using CARB emissions factors and methodology, and added to the CalEEMod calculations.

Table 3.2-15
On-Site and Near-Site Construction DPM and $PM_{2.5}$ Emissions

Year	$PM_{2.5}$ Exhaust (DPM) (tons)	$PM_{2.5}$ Fugitive (tons)
Orcem		
2015*	0.1431	0.0800
2016*	0.0209	0.0004
VMT		
2015*	0.0403	0.0024
2015 (Tug operations)	0.01	0.00

Source: Construction Air Quality Analysis prepared by AWN Consulting (2014) provided in Appendix D-1.
Note:
* Emissions estimated using CalEEMod.

Construction activity is anticipated to involve demolition of the existing on-site buildings and building construction. As discussed earlier, both the Orcem and VMT facility would have less-than-significant construction-related emissions. While those thresholds primarily address the potential for emissions to adversely affect regional air quality, localized emissions of dust or equipment exhaust could affect nearby sensitive land uses.

Predicted Cancer Risk and Hazards

The maximally exposed residential receptor is shown on Figures 3.2-1 and 3.2-2. Increased cancer risks were calculated using the modeled concentrations and BAAQMD recommended risk assessment methods for both a child exposure (third trimester through 2 years of age) and adult exposure. Since the modeling was conducted under the conservative assumption that emissions occurred daily for a full year during each construction year, the default BAAQMD exposure period of 350 days per year was used.

Results of this assessment indicate that for project construction, the incremental child cancer risk at the maximally exposed individual receptor would be 5.7 in one million, and the adult incremental cancer risk would be 0.3 in one million.

The maximum annual $PM_{2.5}$ concentration was 0.08 microgram per cubic meter ($\mu g/m^3$) occurring at the same location as the predicted maximum cancer risk. This $PM_{2.5}$ concentration is below the BAAQMD threshold of 0.3 $\mu g/m^3$ used to indicate the significance of health impacts from $PM_{2.5}$.

Potential noncancer health effects due to chronic exposure to DPM were also evaluated. The chronic inhalation reference exposure level (REL) for DPM is 5 $\mu g/m^3$. The maximum predicted annual DPM concentration was 0.043 $\mu g/m^3$, which is much lower than the REL. The HI, which is the ratio of the annual DPM concentration to the REL, is 0.009. This HI is much lower than the BAAQMD significance criterion of a HI greater than 1.0 (Appendix D-1). Therefore, construction impacts would be **less than significant**.

Operational Impacts

Local Carbon Monoxide Concentrations

The BAAQMD Thresholds of Significance for local CO emissions is the 1-hour and 8-hour CAAQS of 20.0 parts per million (ppm) and 9.0 ppm, respectively. By definition, these represent levels that are protective of public health. If a project would cause local emissions of CO to exceed any of the thresholds listed below, the proposed project would result in a significant impact to air quality.

Because CO impacts have been historically related to automobile idling at intersections, the BAAQMD CEQA Guidelines contain a preliminary screening methodology that provides a conservative indication of whether the implementation of the proposed project would result in CO emissions that exceed the Thresholds of Significance based on automobile traffic at intersections.

According to the BAAQMD CEQA Guidelines (May 2011), a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria is met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The project is consistent with the local congestion management program. In addition, as is seen in Section 3.12, Transportation and Traffic, there are no intersections or grade crossings affected by the project with a maximum hourly traffic volume of 24,000 vehicles per hour. Therefore, the CO impacts from project traffic would be less than significant.

For this project, CO emissions would result from the project's stationary source, rail traffic, truck traffic, on-site mobile equipment, and ship traffic. The CO impacts from truck and rail traffic are expected to be low because both truck and rail traffic emissions are stringently controlled. BAAQMD screening thresholds for on-road CO concentrations are based on traffic volume at intersections; no intersections near the project exceed the threshold as a result of the project. The impact from vessels hoteling at the VMT terminal, and the stationary source equipment have the greatest potential to result in off-site impacts of CO (Appendix D-1).

Accordingly, the CO impact evaluation was conducted assuming that a single ocean-going vessel is docked, and, for the 1-hour standard, the main and auxiliary engine are operating. For the 8-hour standard, it is assumed that the auxiliary engine is operating for the entire 8-hour period. Otherwise, long-term emissions estimates are used to estimate the potential for short-term CO exceedances. The results of that evaluation are shown in Table 3.2-16.

Table 3.2-16
Local Carbon Monoxide Emissions

CAAQS Averaging Time	Threshold Concentration (ppm)	Estimated Concentration (ppm)
1-hour	20	7
8-hour	9.0	4

Source: Appendix D-1

As shown in Table 3.2-16, maximum off-site concentration of CO is below the BAAQMD significance thresholds, and impacts would be less than significant. Details regarding the evaluation conducted to estimate the maximum CO concentrations are provided in Appendix D-1.

Cancer Risks and Hazards

The operational HRA was conducted incorporating dispersion modeling consistent with BAAQMD Guidelines and HRA methods consistent with Office of Environmental Health Hazard Assessment methods as adopted by the BAAQMD.[2] The results of that HRA are presented in Table 3.2-17. The largest contributing sources to health risks include ship auxiliary engines, on-site equipment such as front-end loaders, and trucks (Appendix D-1).

Table 3.2-17
Project Health Risks Impacts

BAAQMD Threshold	Threshold	Units	Estimated Value (unmitigated)	Threshold Exceeded?
Project Cancer Risk	10.0	In one million	18.33~~13.3cum~~	Yes (unmitigated)
Project Noncancer Risk	1.0	Unitless	0.01	No
Project Noncancer Risk Chronic Hazard Index	1.0	Unitless	0.1	No
Project $PM_{2.5}$ Concentrations	0.3	$\mu g/m^3$	0.13	No

Source: Appendix D-1, VMC/Orcem Health Risk Assessment 2015 OEHHA Guidance Update, February 22, 2016.~~Ramboll 2016 study~~

As shown in Table 3.2-17, proposed project operations would exceed the threshold for cancer risk. Impacts would therefore be **significant (Impact 3.2-6)**. The risks were calculated at maximum operation (as determined by the number of vessel calls) with no additional mitigation beyond the use of a 20% biodiesel blend for all diesel operated equipment. It should be noted that the proposed project cancer risk would not reach the level of significance of 10.0 in one million until the average number of ship calls exceeds 28 ships per year (assuming 19 Orcem vessel calls and the remainder VMT ship calls).

Cumulative Risks and Hazards

The BAAQMD considers a project to have a cumulatively considerable impact if the aggregate total of past, present and foreseeable future sources within a 1,000-foot radius from the fence line plus the contribution from the project exceeds the significance thresholds.

[2] In March 2015, the Office of Environmental Health Hazard Assessment promulgated new guidance for Health Risk Assessments. The BAAQMD has not yet fully adopted the new guidance. This analysis was conducted in accordance with the current BAAQMD recommendations.

The maximum mitigated excess cancer risk from the Project (Orcem and VMT operation) was calculated to be less than 10.0 in a million, which is below the BAAQMD significance threshold for an individual project. Acute and chronic noncancer health effects would also be below the BAAQMD significance threshold of a hazard index greater than 1.0.

In addition, a~~A~~ccording to the BAAQMD's adopted Guidelines (BAAQMD 2017~~2~~), for evaluating cumulative risks, permitted stationary sources of TACs near the project site were identified using BAAQMD's *Stationary Source Risk and Hazard Analysis Tool* for sources in Napa and Solano Counties. This mapping tool uses Google Earth to identify the location of stationary sources and their estimated screening level cancer risk and hazard impacts. Three stationary sources within a 0.5-mile radius of the project site were identified:

Plant G10729 is the Discount Gas Grocery and Liquor located at 605 Magazine Street, approximately 1,300 feet northeast of the project boundary. This gas station has a cancer risk value of 4.02, a hazard value of 0.004, and no $PM_{2.5}$ value associated with it.

Plant 16677 is Original Display Fixtures located at 206 Lemon Street, about 600 feet northwest of the Project boundary. There are no cancer risk, hazard, or $PM_{2.5}$ values associated with this source.

Plant 17907 is the Sousa Solano Auto Body and Paint shop located at 407 Lemon Street, about 970 feet north of the project boundary. There are no cancer risk, hazard, or $PM_{2.5}$ values associated with this source.

It is assumed that both Plants 16677 and 17907 would not contribute to cumulative risks or hazards. For Plant G10729, it is unlikely that the gas station would significantly contribute to a~~ny~~ significant cumulative cancer risk or hazard when combined with the proposed project's cancer risks and hazards since the BAAQMD Thresholds for significant cumulative risk, shown in Table 3.2-18, are a cancer risk of greater than 100 in one million and a hazard index of greater than 10.0 for all local sources combined.

Although there are other industrial sources in the area, such as refineries, freeways, and other marine traffic, they were deemed to be either too far from the project site to be considered relevant for the purposes of a cumulative risk assessment or not relevant. For example, the closest refinery, in Rodeo, California, is located approximately 2 miles away. The I-80 freeway is approximately 3,000 feet away. The I-780 is approximately 1 mile away. Since the CARB Land Use Handbook considers 1,000 feet to an adequate separation distance between freeways and sensitive receptors (CARB 2005), it was determined that freeways located further than this distance would not contribute significantly to a cumulative impact in the vicinity of the project. Impacts from non-project marine traffic in the project vicinity are not possible to quantify without knowledge of specific shipping activities. However, CalEnviroScreen, OEHHA's mapping, which identifies California communities affected by pollution, ranks the area in the project vicinity as being in the

best 20% of California for $PM_{2.5}$ air quality and 25% of California for DPM (OEHHA 2018). These indicators represent how much $PM_{2.5}$ and DPM are emitted into the air within and nearby the populated parts of the project vicinity.

Table 3.2-18
Cumulative Health Risks

BAAQMD Threshold	Threshold	Units	Estimated Value (unmitigated)	Threshold Exceeded?
Cumulative Cancer Risk	100	In one million	17	No
Cumulative Noncancer Risk Chronic Hazard Index	10.0	Unitless	0.1	No
Cumulative $PM_{2.5}$ Concentrations	0.8	$\mu g/m^3$	0.13	No

Source: Appendix D-1

As shown in Table 3.2-18, the proposed project would both be in compliance with the BAAQMD's adopted Thresholds for Single Source and Cumulative community risks, as well as hazard index risks. The proposed project would have a **less-than-significant** cumulative health risk impact.

E) Would the project create objectionable odors affecting a substantial number of people?

Construction Impacts

Construction of the proposed project would increase air pollutants due to the combustion of diesel fuel. Some individuals may sense that emissions from the combustion of diesel fuel have an objectionable odor, although it is difficult to quantify the odorous impacts of these temporary and intermittent emissions to the public. The application of architectural coatings and the paving of parts of the site with asphalt also would have the potential to cause odors; however, these odors would be temporary and not likely to be noticeable for extended periods of time much beyond the project's site boundaries.

Therefore, impacts associated with odors during construction would be considered **less than significant**.

Operational Impacts

Operation of the proposed project would increase air pollutants due to the combustion of diesel fuel and processing of GBFS. Some individuals may sense that emissions from the combustion of diesel fuel have an objectionable odor, although it is difficult to quantify the odorous impacts of these emissions to the public. The mobile and intermittent nature of the project emission sources (i.e., ships, trucks, rail) would help to disperse the emissions. The processing of GBFS would be contained within the mill and filter buildings and would not involve the use of heavily odorous

materials. Emissions from offloading and storage activities would be minimal due to the installation of BACT on these sources.

Additionally, the distance between project emission sources and the nearest receptor, Grace Patterson Elementary School approximately 0.36 mile away, should be far enough to allow for adequate dispersion of these emissions to less-than-significant odor levels.

The BAAQMD does not have an adopted odor threshold for operational activities, but does recommend screening criteria based on distance between types of sources known to generate odor and the receptor. For projects outside the screening distance, and with no known potential odor sources, no additional analysis is required. For projects within the screening distances, the BAAQMD uses the following threshold for project operations:

> An odor source with five (5) or more confirmed complaints per year averaged over three years is considered to have a significant impact on receptors within the screening distance shown in the Bay Area Air Quality Management District's guidance, Table 3.3.

The BAAQMD 2010 Guidelines identify wastewater treatment plants, oil refineries, or other types of asphalt plants, chemical manufacturing, painting/coating operations, coffee roasters, food processing facilities, recycling operations, and metal smelters as odor sources that could potentially be located in heavy industrial land uses. The proposed project would not include any of these operations. Impacts associated with odors during operation would be **less than significant**.

3.2.5 Mitigation Measures

Mitigation for Impacts 3.2-2 and 3.2-4: The combined impact of the VMT and Orcem facilities would exceed the BAAQMD CEQA levels of significance for NO_x during operations as shown in Table 3.2-13. Mitigation Measure MM-3.2-1 would reduce impacts as described below. The following text was included in the DEIR in the discussion of mitigation; however, in this FEIR this text has been moved to the discussion of regulatory requirements as BAAQMD offsets are not mitigation, but a permit requirement.

MM-3.2-1 The proposed project will use 100% 2010 or newer model year heavy duty diesel trucks at the start of facility operations.

Mitigation for Impact 3.2-3: The proposed project would not include the applicable control measures from the Clean Air Plan. Refer to **MM-3.2-1** and **MM-3.2-2.**

Mitigation for Impact 3.2-6: The combined project operations would exceed the BAAQMD threshold for cancer risk. Mitigation Measures MM-3.2-2 and MM-3.2-3 would be implemented to reduce cancer risk.

MM-3.2-2 The following shall be implemented as part of MM-3.2-2:

1. Once vessel calls reach 16 per year, compressed natural gas (CNG) fuel shall be used in the following: Orcem and VMT front-end loaders and Orcem excavator. All other equipment (i.e., Orcem conveyors and hoppers, VMT forklifts) shall use B20 fuel.
2. Once vessel calls reach 30 per year, the following equipment shall be electrified: Orcem conveyors and hoppers and VMT forklifts. Orcem and VMT front-end loaders and Orcem excavator shall continue to use CNG per MM-ROA-2a.
3. Once vessel calls reach 34 per year, all requirements of MM-ROA-2b shall apply plus 80% of all ship calls shall use shore-side power for auxiliary engines while at berth or use an alternative, CARB-certified capture and control emission technology. At the time of this evaluation, two such systems had been approved by CARB: Advanced Cleanup Technologies' Advanced Marine Emissions Control System (AMECS) and Clean Air Engineering's Marine Exhaust Treatment System (CAEM).

Vessel calls per year shall mean the total number of vessel calls in a calendar year, not the average number of annual vessel calls from the start of the project.

~~**Table 3.2-19**~~
~~**Cancer Risk Following Mitigation**~~

~~Annual Number of Vessel Calls[1]~~	~~Mitigation Measure~~	~~Maximum Mitigated Residential Cancer Risk (in a million)[2]~~
~~0–16~~	~~20% biodiesel in all/remaining equipment[3]~~	~~9.94~~
~~17–20~~	~~20% biodiesel in all/remaining equipment[3]; and 100% biodiesel in conveyors and hoppers.~~	~~9.86~~
~~21–31~~	~~20% biodiesel in all/remaining equipment[3]; and Orcem natural gas-fueled front-end loaders.~~	~~9.98~~
~~32–35~~	~~20% Biodiesel in all/remaining equipment[3]; and 100% biodiesel in conveyors and hoppers; and Orcem natural gas-fueled front-end loaders.~~ ~~OR~~ ~~20% Biodiesel in all/remaining equipment[3]; VMT natural gas-fueled front-end loaders; and Orcem natural gas-fueled front-end loaders.~~	~~9.79~~ ~~9.82~~

~~Table 3.2-19~~
~~Cancer Risk Following Mitigation~~

~~Annual Number of Vessel Calls[1]~~	~~Mitigation Measure~~	~~Maximum Mitigated Residential Cancer Risk (in a million)[2]~~
~~36–40~~	~~VMT natural gas-fueled front-end loaders; Orcem natural gas-fueled front-end loaders; and Electrified conveyors and forklifts.~~	~~9.92~~
~~41–48~~	~~VMT natural gas-fueled front-end loaders; Orcem natural gas-fueled front-end loaders; Electrified conveyors and forklifts; and CARB-approved capture and control system to treat emissions from auxiliary engines on ocean-going vessels.~~	~~6.58–6.54[4]~~

~~Source: Appendix D-1~~
~~Notes:~~
~~[1] Annual number of vessel calls is the maximum number of vessel calls per year.~~
~~[2] Due to the relative contributions from different sources (on-site equipment, ship hoteling, trucks, etc.), the location of the maximally exposed individual may vary with the number of ship calls and mitigation measures. The values presented here represent the maximum residential risk for each scenario.~~
~~[3] If other mitigation measures indicating a higher percentage of biodiesel or use of CNG or electrification are selected, use of 20% biodiesel is assumed for remaining equipment.~~
~~[4] Mitigated cancer risk may vary slightly depending on the CARB-approved capture and control system selected. At the time of this response two such systems were approved by CARB: Advanced Cleanup Technologies' Advanced Marine Emissions Control System (AMECS) and Clean Air Engineering's Marine Exhaust Treatment System-1 (CAEM).~~Mitigation for Impact 3.2-4: Cumulative project impacts would be considered significant during operational activities. Refer to MM-3.2-1, MM-3.2-2, and MM-3.2-3.

MM-3.2-3 The highest available U.S. Environmental Protection Agency (EPA) tier off-road equipment engines shall be purchased or leased at the time of equipment acquisition. The potential for purchase of electric off-road equipment shall be evaluated at the time of purchase or lease and provided to the lead agency under the Mitigation Monitoring and Reporting Program (MMRP).

It is not anticipated that portable diesel generators will be used during routine activities. Portable diesel generators may be used during the initial phase of construction until Pacific Gas & Electric (PG&E) completes new electric service installation. Portable diesel generators may be used during unanticipated events or repairs. If such events arise, diesel generators shall be registered under the California Air Resources Board's (CARB's) Portable Equipment Registration Program (PERP).

In addition to MM-3.2-1, MM-3.2-2, and MM-3.2-3, the following project design features that were previously outlined in this section would be implemented to ensure fugitive dust measures are implemented during project operation:

PDF-AQ-1: Process plant and material storage buildings—All air in contact with raw material or finished product, such as air from storage buildings, silos, and elevators, is treated by bag filters

or other types of filter prior to discharge to the atmosphere, with a not to exceed limit value of 2.5 mg/Nm3 (0.0011 grains/dry standard cubic foot (dscf)) $PM_{2.5}$.

PDF-AQ-2: Truck filling with finished product—Filling of the Orcem component finished products takes place in an enclosed area using tanker trucks, isolated from the external environment with air discharged through bag filter to atmosphere, with a not to exceed limit of 2.5 mg/Nm3 (0.0011 grains/dscf) $PM_{2.5}$.

PDF-AQ-3: Railcar filling—Filling of the Orcem component finished products takes place using rail tanker cars in an enclosed area, isolated from the external environment with air discharged through bag filter to atmosphere, with a not to exceed limit of 2.5mg/Nm3 (0.0011 grains/dscf) $PM_{2.5}$.

PDF-AQ-4: In addition to BAAQMD best management practices related to fugitive dust control, the following measures are required to be implemented to further reduce potential impacts related to fugitive dust during project operations:

Potential Source of Air Emissions	PDF-AQ-4: Operational Measures to Ensure Impacts are Minimized
Grab crane on ship transfers GBFS to mobile hopper	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Hopper drop to conveyor	Watering of material transfer point to ensure adequate moisture content and aspirated hopper discharging through filter giving a control effectiveness of 95% (SCAMQD 2007).
Conveyor drop to conveyor	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Conveyor drop to mound in GBFS storage area	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Front loader excavation of stockpile	Watering of material transfer point to ensure adequate moisture content giving a control effectiveness of 95% (SCAMQD 2007).
Loading of hopper by front loader	Watering of material transfer point to ensure adequate moisture content and aspirated hopper discharging through filter giving a control effectiveness of 95% (SCAMQD 2007).
Raw material storage piles	Frequent watering of storage pile and three-sided enclosure for two of the three stockpiling areas giving a control effectiveness of 90% – 97.5% (SCAMQD 2007, EPA AP-42).
Industrial Paved Road (finished product)	Watering three times daily giving a control effectiveness of 80% (SCAMQD 2007).

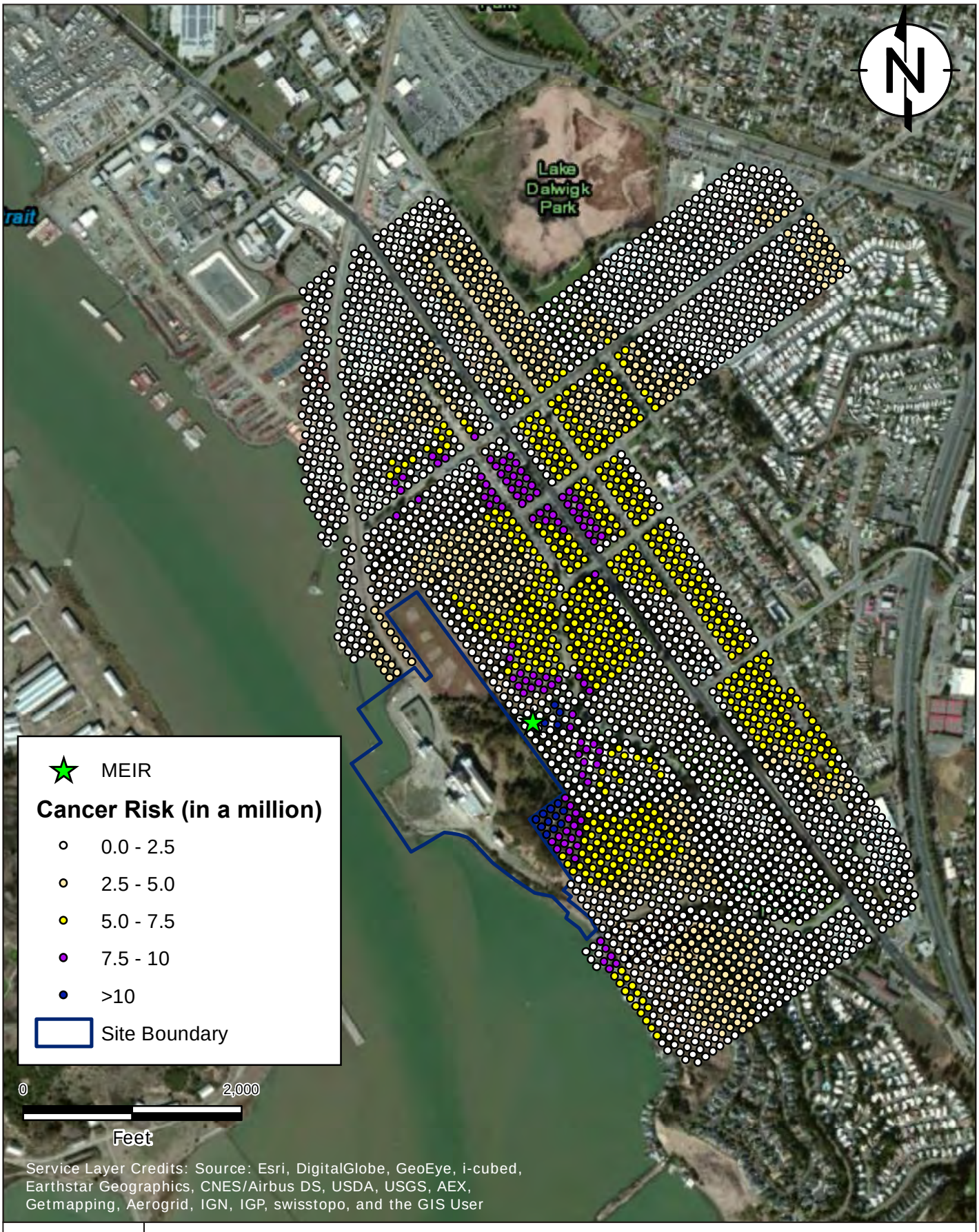
Source: Appendix D-1

3.2.6 Level of Significance After Mitigation

Impacts 3.2-2 and 3.2-4: Mitigation Measures MM-3.2-1, MM-3.2-2, and MM-3.2-3 would be implemented to reduce Impacts 3.2-2 and 3.2-4; however, these measures would not reduce impacts to a level that is less than significant. As such, Impacts 3.2-2 and 3.2-4 would remain **significant and unavoidable** with mitigation.

Impact 3.2-3: Implementation of MM 3.2-1 and MM 3.2-2 would reduce Impact 3.2-3 to **less than significant**.

Impact 3.2-6: Mitigation Measures MM-3.2-2 and MM-3.2-2 would be implemented to reduce Impact and 3.2-5. Impacts related to cancer risk would be reduced to **less than significant**.



DUDEK

8301

SOURCE: RAMBOLL ENVIRON 2015

FIGURE 3.2-1

Cancer Risk: Unmitigated Full Operations (48 Ships)

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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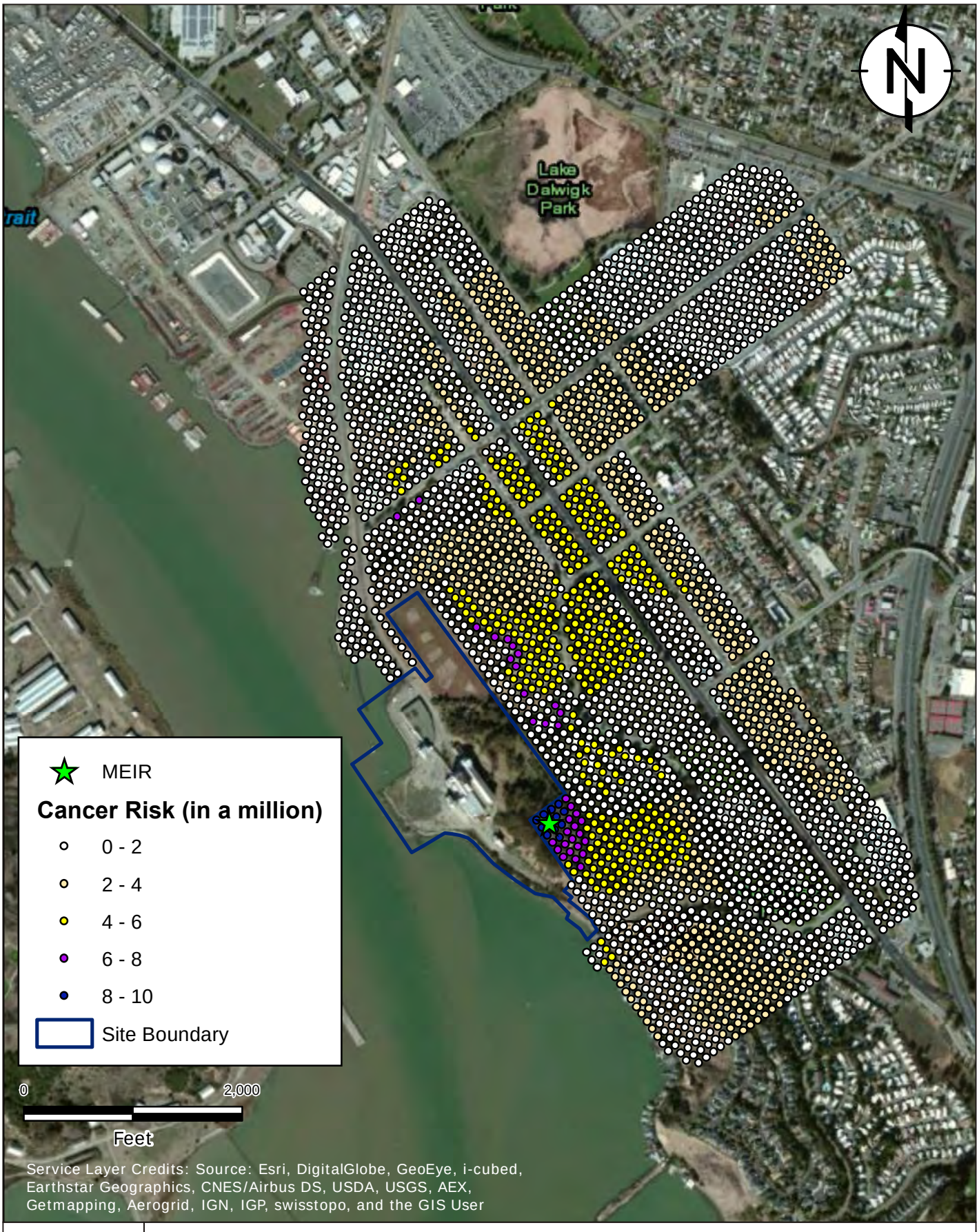

DUDEK

8301

SOURCE: RAMBOLL ENVIRON 2015

FIGURE 3.2-2

Cancer Risk: Mitigated Full Operations (48 Ships)

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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3.3 BIOLOGICAL RESOURCES

This section analyzes the potential impacts of the Vallejo Marine Terminal (VMT) and Orcem project (proposed project) with respect to terrestrial and marine/aquatic biological resources and recommends mitigation measures where necessary to reduce or avoid significant impacts. For the purposes of this California Environmental Quality Act (CEQA) assessment, the study area for the marine/aquatic resources includes the lower Napa River adjacent to Mare Island, the western portion of Carquinez Strait, and the eastern region of San Pablo Bay as it abuts the Carquinez Strait.

The onshore and offshore information used in the preparation of this section was obtained from regional biological and ecological habitat reports (NOAA Fisheries 2007, USFWS 1989), long-term regional studies such as the Regional Monitoring Program for Water Quality in San Francisco Bay–Delta, California Department of Fish and Wildlife (CDFW), the Interagency Ecological Program (IEP) for the San Francisco Bay–Delta, and other standard biological literature. In addition, the following information sources support the analysis presented in this section:

- **Appendix E-1:** WRA Environmental Consultants. 2008. *Biological Resources Assessment, General Mills Project, Vallejo, Solano County, California*. February 2008.
- **Appendix E-2**: WRA Environmental Consultants. 2008. *Tree Survey, General Mills Project, Vallejo, Solano County, California*. April 2008.
- **Appendix E-3:** Dudek. 2014. *Review of Biological Resources Assessment and Biological Resources Survey for the Vallejo Marine Terminal Project in the City of Vallejo, Solano County, California*. November 3, 2014.
- **Appendix E-4:** Applied Marine Sciences Inc. (AMS). 2014. *Field Report: Intertidal Habitat and Marine Biota Survey of the Vallejo Marine Terminal Site, Vallejo, California*. April 18, 2014.
- **Appendix E-5:** Applied Marine Sciences Inc. (AMS). 2014. *Technical Memorandum: Fish Species Inhabiting the Lower Napa River and San Pablo Bay*. June 25, 2014.
- **Appendix E-6:** Applied Marine Sciences Inc. (AMS). 2014. *Benthic Survey of Vallejo Marine Terminal LLC Site Vallejo, California*. August 2014.

~~**Appendix E-7:** Applied Marine Sciences Inc. (AMS). 2015. Technical Memorandum: Intertidal Habitat and Biological Community Survey at the Proposed Kayak Launch Site Located at the Vallejo Municipal Marina; Vallejo Marine Terminal CEQA Project. July 1, 2015.~~

All figures referenced in this section are provided at the end of the section.

3.3.1 Regulatory Setting

Federal

Endangered Species Act

Section 9 of the Endangered Species Act (ESA) prohibits any "take" of a species that has been federally listed as threatened or endangered, except as permitted under the act. The definition of take is "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct," and has been interpreted to include habitat modification that interferes with a species' foraging, breeding, or shelter. For example, changes in land use (e.g., conversion of vernal pool wetlands to urban development) that could result in the loss of vernal pools occupied by fairy shrimp would be prohibited under the ESA unless a take permit was obtained.

Biological assessments of the VMT component's effects pertaining to listed aquatic species, based on the information presented in this EIR, will be prepared for consultation submittal to National Oceanic and Atmospheric Administration Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), and CDFW. The biological assessments are expected to result in the issuance of Biological Opinions with final conditions of approval from NOAA Fisheries and USFWS, and an Incidental Take Permit issued by CDFW. Consistent with CEQA Guidelines Section 15162, the final conditions of approval from NOAA Fisheries, USFWS, and CDFW shall supersede the corresponding mitigation measures presented in this EIR, provided that the required condition is not substantially different from the mitigation listed in this EIR, and would not change the finding that, with mitigation, the impact in question is reduced to a less-than-significant level.

Migratory Bird Treaty Act

Migratory birds are protected by the USFWS under the provisions of the Migratory Bird Treaty Act (MBTA) of 1916 as amended (16 U.S.C. Chapter 7, 703-712) which governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. The take of all migratory birds is governed by the MBTA's regulation of taking migratory birds for educational, scientific, and recreational purposes and requiring harvest to be limited to levels that prevent over utilization. Executive Order 13186 (signed January 10, 2001) directs each federal agency taking actions that would have or would likely have a negative impact on migratory bird populations to work with USFWS to develop a Memorandum of Understanding to promote the conservation of migratory bird populations. Protocols developed under the Memorandum of Understanding must include the following agency responsibilities:

- Avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

- Restore and enhance habitat of migratory birds, as practicable.
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

The Executive Order is designed to assist federal agencies in their efforts to comply with the MBTA; it does not constitute any legal authorization to take migratory birds. Take, under the MBTA, is defined as the action of, or an attempt to, pursue, hunt, shoot, capture, collect, or kill (66 FR 3853–3856). The definition includes "intentional" take (take that is the purpose of the activity in question) and "unintentional" take (take that results from, but is not the purpose of, the activity in question).

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits the taking or possession of and commerce in bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*), with limited exceptions. Under the act, it is a violation to "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time or in any manner, any bald eagle commonly known as the American eagle, or golden eagle, alive or dead, or any part, nest, or egg, thereof." Take is defined to include pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, and disturb. Disturb is further defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Recent revisions to the Bald and Golden Eagle Protection Act authorizes take of bald eagles and golden eagles under the following conditions: (1) where the take is compatible with the preservation of the bald eagle and golden eagle, (2) is necessary to protect an interest in a particular locality, (3) is associated with but not the purpose of an otherwise lawful activity, and (4) for individual instances of take the take cannot be avoided, or (5) for programmatic take the take is unavoidable even though advanced conservation practices are being implemented (16 U.S.C. 668 et seq.).

Federal Regulation of Wetlands and Other Waters

The U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredged or fill material into waters of the United States, including wetlands, under Sections 404 and 401 of the Clean Water Act.

The Clean Water Act defines "wetland" as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal

circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(b); 40 CFR 230.3(t)).

Projects that would result in the placement of dredged or fill material into waters of the United States (including vernal pools) may require a Section 404 permit from the USACE. The presence of federally listed species in vernal pools/wetlands requires the USACE to initiate consultation with the USFWS through Section 7 of the ESA and obtain a Biological Opinion prior to issuing any Section 404 permit. Some classes of fill activities may be authorized under general or nationwide permits if specific conditions are met. Nationwide permits do not authorize activities that are likely to jeopardize the existence of a threatened or endangered species listed or proposed for listing under the ESA. In addition to conditions outlined under each nationwide permit, the USACE, as part of the Section 404 permitting process, can require project-specific conditions. When a project's activities do not meet the conditions for a nationwide permit, an individual permit may be issued.

Finally, the federal government also supports a policy of minimizing "the destruction, loss, or degradation of wetlands." Executive Order 11990 (May 24, 1977) requires that each federal agency take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Section 401 of the Clean Water Act requires that applicants obtain a USACE permit to obtain state certification that the activity associated with the permit will comply with applicable state effluent limitations and water quality standards. In California, water quality certification, or a waiver, must be obtained from the Regional Water Quality Control Board (RWQCB), for both individual and nationwide permits.

The USACE also regulates activities in navigable waters under Section 10 of the Rivers and Harbors Act. The construction of structures, such as tide gates, bridges, or piers, or work that could interfere with navigation, including dredging or stream channelization, may require a Section 10 permit, in addition to a Section 404 permit if the activity involves the discharge of fill.

Magnuson–Stevens Fishery Conservation and Management Act

The Magnuson–Stevens Fishery Conservation and Management Act (Magnuson–Stevens Act) (16 U.S.C. 1801–1884) of 1976, as amended in 1996 and reauthorized in 2007, applies to fisheries resources and fishing activities in federal waters that extend to 200 miles offshore. Conservation and management of U.S. fisheries, development of domestic fisheries, and phasing out of foreign fishing activities are the main objectives of the legislation.

The Magnuson–Stevens Act defines "essential fish habitat" as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The act, as amended through 2007, sets forth a number of new mandates for ~~National Oceanic and Atmospheric Administration~~

(NOAA) Fisheries, regional fishery management councils, and federal action agencies to identify essential fish habitat and to protect important marine and anadromous fish habitat. The Magnuson–Stevens Act provided NOAA Fisheries with legislative authority to regulate fisheries in the United States in the area between 3 miles and 200 miles offshore and established eight regional fishery management councils that manage the harvest of the fish and shellfish resources in these waters. The councils, with assistance from NOAA Fisheries, are required to develop and implement fishery management plans (FMPs), which include the delineation of essential fish habitat for all managed species. An FMP is a plan to achieve specified management goals for a fishery and is composed of data, analyses, and management measures. Essential fish habitat that is identified in an FMP applies to all fish species managed by that FMP, regardless of whether the species is a protected species or not. Federal agency actions that fund, permit, or carry out activities that may adversely affect essential fish habitat are required under Section 305(b), in conjunction with required Section 7 consultation under the ESA, to consult with NOAA Fisheries regarding potential adverse effects of their actions on essential fish habitat and to respond in writing to NOAA Fisheries' recommendations. An Essential Fish Habitat Assessment of the effects of the VMT component of the project on species covered under the Magnuson–Stevens Act is being prepared for submittal to the National Marine Fisheries Service.

The lower Napa River, Carquinez Strait, and San Pablo Bay areas of the San Francisco Bay–Delta, are designated as essential fish habitat for fish managed under three FMPs and as a Habitat Area of Particular Concern under two FMPs. A total of 20 species of commercially important fish and sharks managed in the Pacific groundfish and coastal pelagics FMPs use this region of the Bay–Delta as either essential fish habitat or habitat area of particular concern. In addition, the Pacific coast salmon FMP, which includes Chinook salmon (*Oncorhynchus tshawytscha*) and coho salmon (*Oncorhynchus kisutch*), identifies all of the San Francisco Bay–Delta as essential fish habitat (USACE and EPA 2009).

Rivers and Harbors Appropriations Act of 1899

Section 10 of the Federal Rivers and Harbors Appropriations Act of 1899 (30 Stat. 1151, codified at 33 U.S.C. 401, 403) prohibits the unauthorized obstruction or alteration of any navigable water. Navigable waters under the act are those "subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 CFR 3294). Typical activities requiring Section 10 permits are construction of piers, wharves, bulkheads, marinas, ramps, floats, intake structures, cable or pipeline crossings, and dredging and excavation.

Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972 (MMPA), as amended in 1981, 1982, 1984, and 1995, establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting the "take" of any marine mammal (16 U.S.C. Ch. 31). The MMPA defines "take" as the act of hunting, killing, capture, and/or harassment of any marine mammal, or the attempt at such. The act also imposes a moratorium on the import, export, or sale of any marine mammals, parts, or products within the United States. These prohibitions apply to any person performing an activity in U.S. waters and to any U.S. citizen in international waters.

The primary authority for implementing the MMPA belongs to the USFWS and NOAA Fisheries. The USFWS is responsible for ensuring the protection of sea otters (*Enhydra lutris*) and marine otters (*Lontra felina*), walruses (*Odobenus rosmarus*), polar bears (*Ursus maritimus*), three species of manatees (Trichechidae), and dugongs (Dugonginae). NOAA is responsible for protecting pinnipeds (seals and sea lions) and cetaceans (whales and dolphins).

The MMPA, as amended, provides for the "incidental take" of marine mammals during marine activities, as long as NOAA Fisheries finds the "take" would be of small numbers of individuals and have no more than a negligible impact on those marine mammal species not listed (i.e., listed under the ESA, as depleted under the MMPA, and not having an immitigable adverse impact on subsistence harvests of these species.

National Invasive Species Act

Under the National Invasive Species Act of 1996 (16 U.S.C. 4701), the U.S. Coast Guard established national voluntary ballast water[1] guidelines. The Coast Guard published regulations on June 14, 2004, establishing a national ballast water management program with mandatory requirements for all vessels equipped with ballast water tanks that enter or operate in U.S. waters. The regulations carry mandatory reporting requirements to aid in the Coast Guard's responsibility, under the National Invasive Species Act, to determine patterns of ballast water movement. The regulations also require ships to maintain and implement vessel-specific ballast water management plans.

Estuary Protection Act

The Estuary Protection Act (16 U.S.C. 1221 et seq.) highlights the value of estuaries and the need for conservation of their valuable natural resources. It authorizes the Secretary of the Interior, in cooperation with other federal agencies and the states, to study and inventory estuaries of the

[1] Fresh or salt water, sometimes containing sediments, held in tanks and cargo holds of ships to increase stability and maneuverability during transit.

United States and to determine whether any areas should be acquired by the federal government for future protection.

Under this act, the Secretary of the Interior is required to review all project plans and reports for land and water resource development affecting estuaries and make an assessment of likely impacts and related recommendations for conservation, protection, and enhancement of estuaries.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) enacted by Congress in 1972 (16 U.S.C. 1451 et seq.) is administered by the NOAA's Office of Ocean and Coastal Resource Management. The CZMA provides for management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. The CZMA outlines two national programs: the National Coastal Zone Management Program and the National Estuarine Research Reserve System. The 34 coastal programs aim to balance competing land and water issues in the coastal zone, while estuarine reserves serve as field laboratories to provide a greater understanding of estuaries and how humans impact them. The overall program objectives of CZMA remain balanced to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone."

Under Section 307 of the CZMA (16 U.S.C. 1456), activities that may affect coastal uses or resources that are undertaken by federal agencies, require a federal license or permit, or receive federal funding must be consistent with a state's federally approved coastal management program. California's federally approved coastal management program consists of the California Coastal Act, the McAteer–Petris Act, and the Suisun Marsh Protection Act. The California Coastal Commission implements the California Coastal Act and the federal consistency provisions of the CZMA for activities affecting coastal resources outside of San Francisco Bay. The Bay Conservation and Development Commission (BCDC) implements the McAteer–Petris Act and the Suisun Marsh Preservation Act, and performs federal consistency reviews for activities affecting the San Francisco Bay–Delta and the Bay shoreline.

State

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code, Section 2050 et seq.) prohibits the taking of species listed as threatened or endangered under the act, or candidates for listing, except as authorized by state law. CESA defines take as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Section 2081 of the CESA states that take of an endangered, threatened, or candidate species may be authorized by CDFW if the impacts of the take are incidental to an otherwise lawful activity, are "minimized and fully

mitigated," and do not "jeopardize the continued existence of [the] species." Any mitigation measures imposed under CESA must be measures "roughly proportional in extent to the impact of the authorized taking on the species."

Porter–Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act (California Water Code, Section 13000 et seq.) directs the State Water Resources Control Board (SWRCB) to formulate and adopt state policies for controlling water quality and designates the SWRCB as the state water pollution control agency for all purposes stated in the Clean Water Act. This means that the SWRCB and its designee, the Regional Water Quality Control Board, fulfill the role contemplated by Section 401 of the Clean Water Act, which provides for the state water pollution control agency to certify that a permit being issued under Section 404 complies with state water quality laws.

California Fish and Game Code

The California Fish and Game Code governs state-designated wetlands, including riparian and stream habitat, and mandates that mitigation be implemented to replace wetland extent and value lost to development. Sections 1600–1607 of the Fish and Game Code regulate activities that would affect rivers, streams, or lakes by altering the flow; substantially changing or using any materials from the bed, channel, or bank of any river, stream, or lake; or disposing of debris. Activities that affect these areas, as well as associated riparian habitats, would require a Streambed Alteration Permit from CDFW. Section 3503 of the Fish and Game Code prohibits impacts to actively nesting birds, their nests, or their eggs. Section 3503.5 prohibits killing of raptor species and destruction of raptor nests.

The Fish and Game Code provides protection from take for a variety of species, referred to as *fully protected species*. Fish and Game Code Section 3511 lists fully protected birds and prohibits take of these species. The code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected species is prohibited.

Prior to creation of CESA and the federal ESA, the State of California first began to designate species as "fully protected" and typically applied this designation to those animals that were rare or faced possible extinction. Fish and Game Code Section 4700 (a)(1) affirms the state's protection of fully protected species by regulating that such species "may not be taken or possessed at any time."

Marine Life Management Act

Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act (California Fish and Game Code, Sections 90–99.5, 105, 7050–

7090, 8585–8589.7, 8842, and 9001.7). This law directs CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well license aquaculture operations. CDFW, through the commission, is the state's lead biological resource agency and is responsible for enforcement of the state endangered species regulations and the protection and management of all state biological resources.

Marine Invasive Species Act

All shipping operations that involve major marine vessels are subject to the Marine Invasive Species Act of 2003 (California Public Resources Code, Section 71200 et seq.), which revised and expanded the California Ballast Water Management for Control of Non-indigenous Species Act of 1999 (Assembly Bill 703). The State Lands Commission administers this act that regulates the handling of ballast water from marine vessels arriving at California ports in order to prevent or minimize the introduction of invasive species from other regions.

San Francisco Bay Plan and San Francisco Waterfront Special Area Plan

In 1968, the San Francisco BCDC adopted the San Francisco Bay Plan (Bay Plan), which has been periodically amended over the past 45 years. Of importance to this project, the Bay Plan specifies goals, objectives, and policies for existing and proposed waterfront land use and other areas under the jurisdiction of the BCDC (BCDC 2012).

Of particular importance to aquatic biological resources, the Bay Plan identifies that fill should be limited to providing substantial public benefits provided that these same benefits could not be achieved equally well without filling. Developing adequate port terminals, on a regional basis, to keep San Francisco Bay in the forefront of the world's great harbors, is an identified acceptable benefit for filling in areas of the Bay under the Bay Plan (BCDC 1968).

However, the Bay Plan also establishes that Bay filling "destroys the habitat of fish and wildlife, future filling can disrupt the ecological balance in the Bay, which has already been damaged by past fills, and can endanger the very existence of some species of birds and fish. The Bay, including open water, mudflats, and marshlands, is a complex biological system, in which microorganisms, plants, fish, waterfowl, and shorebirds live in a delicate balance created by nature, and in which seemingly minor changes, such as a new fill or dredging project, may have far-reaching and sometimes highly destructive effects" (BCDC 1968).

The Bay Plan also emphasizes the importance of designing projects to avoid adverse environmental impacts to Bay natural resources such as to water surface area, volume, or circulation and to plants, fish, other aquatic organisms and wildlife habitat, subtidal areas, or tidal marshes or tidal flats. Whenever adverse impacts cannot be avoided, they should be minimized to the greatest extent. The Bay Plan notes that measures to compensate for unavoidable adverse

impacts to the Bay's natural resources should be required; however, mitigation is not a substitute for meeting the other requirements of the McAteer–Petris Act (BCDC 2008).

The Bay Plan states that "individual compensatory mitigation measures should be sited and designed within a Baywide ecological context, as close to the impact site as practicable, to: (1) compensate for the adverse impacts; (2) ensure a high likelihood of long-term ecological success; and (3) support the improved health of the Bay ecological system." The information provided in the Baylands Ecosystem Habitat Goals report can help determine the suitability of proposed mitigation locations.

Local and Inter-Agency

San Francisco Bay Subtidal Habitat Goals Project

In 2010, BCDC, the California Ocean Protection Council/California State Coastal Conservancy, NOAA, and the San Francisco Estuary Partnership, in collaboration with each other and the broader scientific community, managers, restoration practitioners, and stakeholders, published a set of restoration planning goals and guidelines for the subtidal areas and habitats of the San Francisco Bay–Delta (SFBSHGP 2010). Though currently neither a policy nor regulatory document, this report offers guidance on opportunities for subtidal restoration and protection. Implementation will occur through a number of avenues. Local governments may incorporate these recommendations into their planning processes and documents and regulatory agencies may use this report to evaluate, revise, or implement their policies. Subtidal habitat consists of all the submerged area beneath the Bay water's surface, including mud, shell, sand, rocks, artificial structures, shellfish beds, submerged aquatic vegetation, macroalgal beds, and the water column above the bay bottom. Submerged habitats are important for threatened species such as green sturgeon (*Acipenser medirostris*), steelhead (*Oncorhynchus mykiss irideus*), and Chinook salmon, commercial species such as Dungeness crab (*Cancer magister*) and Pacific herring (*Clupea pallasi*), species of special concern such as eelgrass and the native Olympia oyster, and a host of other fish, shrimp, crabs, migratory waterfowl, and marine mammals.

The San Francisco Bay Subtidal Habitat Goals Project takes a Baywide approach in setting science-based goals for maintaining a healthy, productive, and resilient ecosystem. Where possible, these subtidal goals are designed to connect with intertidal habitats and with goals developed by other projects, including goals for Baylands and uplands habitats. The goals and recommendations contained within the Subtidal Habitat Goals Project are not binding by regulation but rather are intended to serve as guidance to local, state, and federal agencies when evaluating projects and their potential ecological effects, and when issuing permits.

The principal habitat conservation goals included in the Subtidal Habitat Goals Report that apply to the VMT component of the project include:

- Soft Substrate
  - Promote no net increase to disturbance to San Francisco Bay soft bottom habitat
  - Promote no net loss to San Francisco Bay subtidal and intertidal sand habitats
- Rock Habitats
  - Promote no net loss of natural intertidal and subtidal rock habitats in San Francisco Bay
- Artificial Structures
  - Enhance and protect habitat function and the historical value of artificial structures in San Francisco Bay
  - Improve San Francisco Bay subtidal habitats by minimizing placement of artificial structures that are detrimental to subtidal habitat function
- Shellfish Beds
  - Protect San Francisco Bay native shellfish habitats (particularly native oyster *Ostrea lurida*) through no net loss to existing habitats
- Submerged Aquatic Vegetation
  - Protect existing eelgrass habitat in San Francisco Bay through no net loss to existing beds
  - Protect Macroalgal Beds
  - Protect San Francisco Bay Fucus beds through no net loss to existing beds
  - Protect San Francisco Bay Gracilaria beds through no net loss to existing beds

City of Vallejo General Plan

The Vallejo General Plan 2040 was adopted in August 2017 (City of Vallejo 2017a). The General Plan 2040 Land Use Map was adopted in November 2017 (City of Vallejo 2017b). The previous draft of this EIR was based on the General Plan adopted in July 1999. This document, where necessary and appropriate, updates any policies pertaining to biological resources that may have changed in the recently updated General Plan. This discussion in shown in redline and/or strikeout in this document for ease of review.

The following General Plan 2040 goals and policies are applicable to biological resources of the proposed project:

POLICY NBE-1.1 Natural Resources. Protect and enhance hillsides, waterways, wetlands, and aquatic wildlife habitat through land use decisions that avoid and mitigate potential environmental impacts on these resources to the extent feasible.

- *Action NBE-1.1A Cooperate with federal, State, and local regulatory and stewardship agencies to promote the restoration and long-term sustainability of local natural resources.*
- *Action NBE-1.1B Continue to participate in the implementation of regional habitat conservation and restoration programs.*
- *Action NBE-1.1F Require a biological assessment for new development proposed on sites that are determined to have some potential to contain sensitive biological and wetland resources. The assessment should be conducted by a qualified professional to determine the presence or absence of any sensitive resources, should evaluate potential adverse effects, and should define measures for protecting the resources in compliance with State and federal laws. Detailed surveys are not necessary in locations where past and existing development have eliminated natural habitat and the potential for presence of sensitive biological resources.*
- *Action NBE-1.1G Avoid potential impacts on jurisdictional wetlands and other waters as part of new development to the maximum extent feasible. This should include streams and associated riparian habitat and coastal salt marsh habitat along the Vallejo shoreline. Where complete avoidance is not possible, require that appropriate authorizations be secured from State and federal jurisdictional agencies and that adequate replacement mitigation be provided to ensure there is no net loss in habitat acreage or values*

POLICY NBE-1.2 Sensitive Resources. Ensure that adverse impacts on sensitive biological resources, including special-status species, and sensitive natural communities are avoided and mitigated to the greatest extent feasible as development takes place.

- *Action NBE-1.2C Protect the nests of raptors and other birds when in active use, as required by State and federal regulations. As part of new development, avoid disturbance to and loss of bird nests in active use by scheduling vegetation removal and new construction during the non-nesting season (September through February) or by conducting a preconstruction survey by a qualified biologist to confirm nests are absent or to define appropriate buffers until any young have successfully fledged the nest.*

- *Action NBE-1.2E Collaborate with public agencies responsible for managing open space in and around Vallejo to control and reduce the spread of non-native, invasive plant and animal species on public open space lands.*

POLICY NBE-1.3 Interpretive Facilities. Encourage the development of facilities that provide education about local environmental resources and ecosystems.

- *Action NBE-1.3B Work with landowners to facilitate assembly and retention of parcels of sufficient size to preserve valuable tidal marshes, seasonal marshes, managed wetlands and contiguous grassland areas for the protection of aquatic and wildlife habitat.*
- *Action NBE-1.3C Provide or encourage public access to natural resource areas where appropriate, to enhance environmental awareness as well as passive recreational opportunities.*

POLICY NBE-1.4 Waterway Restoration. Restore riparian corridors and waterways throughout the city.

- *Action NBE-1.4B Work with the U.S. Environmental Protection Agency (USEPA), Regional Water Quality Control Board (RWQCB), Solano County, and neighboring jurisdictions in efforts to reduce pollution in local waterbodies.*

POLICY NBE-1.6 Open Space. Conserve and enhance natural open space areas in and adjacent to Vallejo and its waterfront.

- *Action NBE-1.6C In coastal wetland and marsh areas and along creeks, allow and provide amenities to support public recreational activities compatible with conservation of the natural environment, such as picnicking, hiking, and nature and wildlife educational opportunities.*

POLICY NBE-1.7 Green Infrastructure. Encourage the installation of green infrastructure, including tools such as permeable pavement, rain gardens, constructed wetlands, grassy swales, rain barrels and cisterns, and green roofs, to treat stormwater, attenuate floods, increase groundwater recharge, and reduce urban heat islands.

- *Action NBE-1.7A Continue to administer urban greening requirements to help extend the life of public improvements such as curbs, gutters, and sidewalks, and to help ensure that trees removed due to age, health, or potential to damage property are replaced in kind with new trees that are appropriate for their locations.*

~~The Vallejo General Plan, adopted in July 1999, establishes goals and policies that guide land use and development within the City's Planning Area, which includes lands within the City limits and lands outside the City limits, but within the City's Sphere of Influence.~~

~~The following goals and policies from the 1999 General Plan (City of Vallejo 1999) are applicable to the proposed project. The City's Open Space and Resource Conservation Element (1976) does not contain any goals or policies applicable to the project.~~

~~*Waterfront Development Goal:* To have a waterfront devoted exclusively to water oriented uses, including industrial, residential, commercial and open space uses, which permit public access.~~

- ~~Policy 3: The following public access to and along public waterways, streams and rivers is required where feasible:~~

  ~~a. Access to the water every 1,500 feet;~~

  ~~b. Access way to be a minimum of 50 feet wide;~~

  ~~c. Access along the: water to be a minimum of 200 feet in width;~~

  ~~d. Planned Developments and commercial and industrial areas may vary provided they are within the intent and purpose of this provision.~~

~~*Fish and Wildlife Resources Goal*: To protect valuable fish and wildlife habitats.~~

- ~~*Policy 5:* Recognize areas valuable for marine life production, particularly the Napa Marshes and Carquinez Strait, and work with the California Department of Fish and Game and Bay Conservation and Development Commission in insuring the protection of these areas from incompatible uses.~~

City of Vallejo Municipal Code

Chapter 10.12, Trees, of the City's Municipal Code includes requirements for tree removal and pruning. A permit is required to remove trees, and tree replacement is required for any street trees removed (City of Vallejo 1988).

3.3.2 Existing Conditions

The San Francisco Bay–Delta is the second largest estuary in the United States (NOAA Fisheries 2007) and is composed of multiple aquatic/marine habitats and biological communities. It encompasses approximately 479 square miles (1,241 square kilometers), including shallow mudflats (NOAA Fisheries 2007). Typically, San Francisco Bay (the Bay) is divided into four main basins: South Bay, Central Bay, San Pablo or North Bay, and Suisun Bay. The most northern and upstream region is Suisun Bay, which transforms quickly into the diked wetlands of Suisun

Marsh and the west Delta. Suisun Bay lies east of the Carquinez Strait to the westerly point where the Sacramento and San Joaquin Rivers combine at the Sacramento Delta, providing the main source of freshwater into San Francisco Bay. San Pablo Bay is immediately east of the Carquinez Strait and Suisun Bay and connects to the Central Bay at the Richmond–San Rafael Bridge. Along with being the major source of freshwater input, sediments are also transported into the Bay primarily by the Sacramento and San Joaquin Rivers, but also by the Yolo Bypass, Mokelumne River, Calaveras River, Cosumnes River, and several other smaller tributaries (NOAA Fisheries 2007). Both the Napa and Petaluma Rivers flow into San Pablo Bay.

The project site is located at the southern end of the Napa River just prior to flowing into the Carquinez Strait and San Pablo Bay (see Figure 1-2 in Chapter 1, Introduction).

Terrestrial Biology

A biological resources assessment was conducted in 2008 by WRA (Appendix E-1). It evaluated the 38 acres that comprise the former General Mills plant site. An updated biological survey and site visit was subsequently performed by a Dudek biologist in April 2014 (Appendix E-3). The project site was traversed on foot to determine if any sensitive plant communities were present within the area, if existing conditions provide suitable habitat for any special-status plant or wildlife species, and if any sensitive habitats were present.

The western portion of the project site is generally flat, and a hillside is adjacent to the eastern side of the existing industrial buildings. The slope has a southwestern aspect and is undeveloped with the exception of an abandoned residence and associated storage-type buildings. On the southern portion of the slope a eucalyptus grove is present.

The project site is bordered to the east and north by residential and commercial development. To the south, there is a small area of open space, predominately non-native grassland and on the west the site is bordered by the Mare Island Strait. Elevations in the area range from 0 to 140 feet.

Non-sensitive Biological Communities

The project site is primarily composed of non-sensitive biological communities: non-native grassland, non-native trees and shrubs, and developed industrial areas (Figure 3.3-1, Vegetative Communities).

Non-native Grassland

The non-native annual grassland present on portions of the hillside tended to be weedy and disturbed. Disking occurs regularly in this portion of the site. Dominant species appeared to be Johnsongrass (*Sorghum halepense*), wild oats (*Avena* sp.), fennel (*Foeniculum vulgare*), and

mustard (*Brassica nigra*). Regular disking reduces the suitability of the grassland habitat for special-status wildlife species.

Non-native Trees and Shrubs

Stands of non-native trees are present in the southern portion of the hillside, and a row of exotic shrubs appears to have been planted along the southern shoreline. Dominant species in the grove of trees are non-native species including acacia (*Acacia* spp.), eucalyptus (*Eucalyptus* spp.), and pines (*Pinus* spp.). Exotic shrubs including Spanish broom (*Spartium junceum*) are also present among the trees. Much of the understory of these groves is disked and/or consists of leaf litter from the trees; therefore, suitable habitat for native plants is limited.

A tree survey prepared for the project by WRA in 2007 identified 523 trees 6 inches or larger diameter at breast height ~~(dbh)~~ (see Appendix E-2). The majority of the trees on the site are blue gum (*Eucalyptus globulus*) and white ironbark eucalyptus (*Eucalyptus leucoxylon*) (265 trees), followed by blackwood acacia (*Acacia melanoxylon*; 61 trees) and Monterey pine (*Pinus radiata*; 55 trees). These tree species make up 73% of trees on the site. The full list of trees is provided in Appendix E-2. No trees surveyed on the site are native to this region of California with the exception of seven coast live oaks (*Quercus agrifolia*) and one toyon (*Heteromeles arbutifolia*).

Developed Industrial Areas

Developed areas within the project site consist of paved areas and roads (some gravel) containing only sparse vegetation. These areas provide little to no value as habitat for plant and wildlife species due to the high level of disturbance and human activity. Plant species present in these areas include chicory (*Cichorium intybus*) and bristly ox-tongue (*Picris echioides*). Buildings in this portion of the project site have the potential to provide suitable nesting or roosting habitat for native wildlife species such as bats and birds. No wildlife species were observed utilizing the developed portion of the site during the 2007 field visit. However, an active osprey (*Pandion haliaetus*) nest was identified on top of the flour mill building on the site during the 2014 field visit.

Sensitive Biological Communities

Northern Coastal Salt Marsh

Northern Coastal Salt Marsh consists of salt-tolerant hydrophytes forming moderate to dense cover and is usually found along sheltered inland margins of bays, lagoons, and estuaries (Holland 1986). This plant community occurs in the project site on a small portion (0.01 acre) of the southern shoreline along Mare Island Strait. The dominant species in this community are salt grass (*Distichlis spicata*) and jaumea (*Jaumea carnosa*). No wildlife species were observed in this

community, and due to its small size and lack of extensive pickleweed, is unlikely to support any special-status species.

Seasonal Wetland

A small (0.02 acre) seasonal wetland plant community is present in the southern portion of the project site at the base of the steep hillside. It is located in a slight depression approximately 50 feet from Mare Island Strait. In between the wetland and Mare Island Strait are ruderal grassland, a flat, dirt lot, and a border of upland shrubs. Portions of this wetland were ponded during the late June field visit and may have perennial hydrology. The plant species were a mix of cattail (*Typha angustifolia*) in the wetter portions and species including Bermuda grass (*Cynodon dactylon*), bristly ox-tongue, and willowherb (*Epilobium ciliatum*) in the drier portions. No wildlife species were observed in this community. Due to its small size, this wetland is unlikely to support any special-status species.

A wetland delineation performed by WRA in 2007 (see Appendix E-1) determined that a small seasonal wetland is potentially under the jurisdiction of the USACE. The seasonal wetland does not appear to connect to any other wetlands or waters of the United States. The wetland is dominated by wetland species including cattail, Bermuda grass, willowherb, and bristly ox-tongue. The wettest area of the wetland, which may be better described as emergent marsh, has hydric soils characterized by histosols and was inundated or saturated at the time of the field visit. The drier areas of the wetland had moist soils exhibiting redoximorphic features. The source of wetland hydrology for this feature was presumed to be hillside runoff or a hillside seep. The wetland was dry at the time of the 2014 field visit.

Common Wildlife Species

The wildlife species likely to occur on the project site are common species that are adapted to life in proximity to human activity, such as raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), and small mammal and reptile species like mice (*Microtus* sp.) and western fence lizard (*Sceloporus occidentalis*).

Wildlife species observed during the April 2014 field visit included osprey, great egret (*Ardea alba*), black phoebe (*Sayornis nigricans*), and turkey vulture (*Cathartes aura*). As previously noted, an active osprey nest was observed on top of the flour mill building during the 2014 visit.

Special-Status Species

Special-Status Plants

The results of the nine-quad database searches for special-status plant species identified 11 special-status plant species that have been documented in the vicinity of the project site. No special-status plant species were observed in the project site during the field visit in June 2007, during the March 2007 reconnaissance rare plant survey, or the April 2014 field visit by Dudek (see Appendix E-3). The purpose of the 2007 reconnaissance rare plant survey was to search for Johnny-jump-up (*Viola pedunculata*) and potential special-status plant species. No Johnny-jump-up or special-status plant species were found during the survey. All 11 species documented to occur in the vicinity of the project site are unlikely or have no potential to occur because the site lacks suitable habitat and/or because the species were not observed during the various site visits.

Special-Status Wildlife

The results of the nine-quad California Natural Diversity Database (CNDDB) search, USFWS threatened and endangered species list, and other literature review conducted for the site identified a total of 32 special-status wildlife species recorded in the vicinity of the project site. Out of these 32 species, 7 have some potential to occur on the project site or have been documented in the area (CDFW 2014a). These are listed in Table 3.3-1 and depicted on Figure 3.3-2, CNDDB Special-Status Species Occurrences.

Table 3.3-1
Special-Status Wildlife Species with Potential to Occur On or Near the Project Site

Scientific Name	Common Name	Status (Federal /State)	Primary Habitat Associations	Potential to Occur On or Near the Project Site
Sterna caspia	Caspian tern	USFWS Bird of Conservation Concern	Nests in dense colonies on undisturbed islands, levees, or shores. Nests are scraped, unlined depressions in soil near water. Barren, or nearly barren, sites are preferred.	This species was observed flying over the project site in 2007. Low potential to breed on the site.
Ardea herodias	Great blue heron	CDFW Protected Rookery Sites	This species feeds mostly in slow moving or calm freshwater, also along seacoasts. Occasionally in surf and fields. Nests in trees, bushes, on ground, and artificial structures, usually near water.	High potential to occur. The shoreline and thicket may provide suitable foraging and nesting for this species.

Table 3.3-1
Special-Status Wildlife Species with Potential to Occur On or Near the Project Site

Scientific Name	Common Name	Status (Federal /State)	Primary Habitat Associations	Potential to Occur On or Near the Project Site
Corynorhinus townsendii	Townsend's big-eared bat	CDFW, Western Bat Working Group Candidate Threatened	Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night, day, hibernation, or maternity roosts.	Moderate potential to occur. The unoccupied buildings may provide suitable roosting habitat for this species.
Ardea alba	Great egret	CDFW Protected Rookery Sites	Rookery sites are located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes. Nests in large trees and roosts in trees.	Moderate potential to occur. Dense vegetation along the shoreline may provide roosting habitat for this species. Eucalyptus trees may provide suitable nesting habitat for this species.
Reithrodontomys raviventris	Salt-marsh harvest mouse	USFWS/ CDFW Endangered	Primary habitat in pickleweed dominated saline emergent marshes of San Francisco Bay. Require adjacent upland areas for escape from high tides.	Low potential to occur. A small salt marsh exists on site, but provides little quality habitat for this species.
Rallus longirostris obsoletus	California clapper rail	USFWS/ CDFW Endangered	Locally common yearlong in coastal wetlands and brackish areas around San Francisco. Forages in higher marsh vegetation, along vegetation and mudflat interface, and along tidal creeks. Requires shallow water and mudflats for foraging, with adjacent higher vegetation for cover during high water.	Low potential to occur. A small salt marsh and wetland exists on site, but provides little quality habitat for this species.
Riparia riparia	Bank swallow	CDFW Threatened	Restricted to riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils, into which it digs nesting holes. Feeds predominantly over open riparian areas, but also over brushland, grassland, wetlands, water, and cropland.	Low potential to occur. The cliff below the grove of eucalyptus trees provides minimal suitable habitat for a colony.

Marine Biology

The predominant marine/aquatic habitat types in San Francisco Bay–Delta include open water (pelagic), soft sediment subtidal and intertidal, and hard bottom subtidal and intertidal environments (NOAA Fisheries 2007). The open water (pelagic) environment is the predominant habitat of San Pablo Bay, the Carquinez Strait, and lower Napa River, and includes the area between the water surface and the seafloor. The physical conditions of the open water environment are constantly changing with tidal flow and season. Each of the Bay basins and rivers flowing into the Bay–Delta are heavily influenced by ocean water brought into the Bay by the daily tidal cycle and by freshwater flow from the many rivers and tributaries that flow to the Pacific Ocean through the Bay–Delta. The water column provides habitat for plants (phytoplankton), invertebrates (zooplankton), fishes, birds, and marine mammals, which make up the pelagic communities. The Napa River is tidally influenced as far upriver as the city of Napa, with two high and low tides per 24-hour period. As a result of the daily tidal flow of the Napa River past the VMT Site, the area can result in significant currents.

Soft bottom (benthic) habitats of the San Francisco Bay–Delta seafloor include mud/silt/clay, sand, pebble/cobble, and shell mix. Exposure to wave and current action, temperature, salinity, and light penetration determines the composition and distribution of organisms within the sediments. Most surveys and other information sources indicate unconsolidated sediments are present throughout the Bay–Delta and are the most common substrate type in San Francisco Bay (NOAA Fisheries 2007).

Hard bottom (benthic) habitat in the study area consists of natural and artificial surfaces. Natural substrates include boulders, rock face outcrops, and low relief rock. Artificial hard substrate includes vessel structures, pilings, riprap, and pipelines. Pilings, riprap, and pipelines can be found in every region of the San Francisco Bay–Delta. Hard substrate provides habitat for an assemblage of marine algae, invertebrates, and fishes. Natural substrates provide surface area for algae and diatoms and foraging areas for birds and marine mammals. Boulders and rock face outcrops provide substrate for fish rearing, spawning, and growth.

Open Water (Pelagic) Habitat

Plants and Phytoplankton

Diatoms followed by dinoflagellates and cryptophores dominate the phytoplankton community in San Pablo Bay, Carquinez Strait, and the project area (NOAA Fisheries 2007). Most of the phytoplankton species in San Francisco Bay can tolerate broad ranges of salinity and temperature (NOAA Fisheries 2007), and as a result can be found in the North, South, and Central Bays. Similarly, the freshwater species, *Skeletonema potamos* is carried into the Bay with the freshwater flows from the Delta and are regularly found in San Pablo Bay and the project area (NOAA

Fisheries 2007). Because of the flow of ocean water from Central Bay into San Pablo Bay, red algae (*Polysiphonia denudata*) can occasionally be observed floating in the water (NOAA Fisheries 2007). The kelps, *Laminaria* spp. and *Egregia* spp., are found in addition to other species such as *Ahnfeltiopsis* ssp. (formerly *Gymnogongrus*) and *Halymenia* spp. that are common on the outer exposed rocky coast.

Zooplankton

The zooplankton community in the study area consists of small invertebrate organisms that spend all or a portion of their life cycle in the water column. These include microzooplankton (tintinnids, rotifers, and copepod nauplii), larger copepods (small crustaceans), cladocerans (small crustaceans or water fleas), and the larvae of benthic and pelagic invertebrate animals and fish (meroplankton). Zooplankton species typically change seasonally with a few species being present throughout the year. Several introduced species in the 1980s have changed the zooplankton community's dominant taxa. Bay meroplankton is dominated by northern anchovy (*Engraulis mordax*); longfin smelt (*Spirinchus thaleichthys*); Pacific herring; plainfin midshipman (*Porichthys notatus*); sea gooseberry (*Pleurobrachia bachei*)*;* isopod (*Synidotea laticauda*); the shrimps *Palaemon macrodactylus*, *Crangon franciscorum,* and *C. nigricauda*; the mysid *Neomysis kadiakensis;* and the medusa *Polyorchis* spp. (NOAA Fisheries 2007).

Fish

Seventeen (17) species of pelagic fish have been documented inhabiting the deep and shallow water areas of San Pablo Bay and the Carquinez Strait adjacent to the Napa River mouth into San Pablo Bay (Appendix E-4). Six of these species account for over 96% of the total abundance, with the dominant species, northern anchovy and Pacific herring (*Clupea pallasii*) comprising 76.5 % and 14.4 %, respectively, of the fish inhabiting the pelagic zone. Other dominant fish species include American shad (*Alosa sapidissima*), longfin smelt, striped bass (*Morone saxatilis*), and Bay goby (*Lepidogobius lepidus*), which collectively account for 5.3% of the total abundance inhabiting the water column. Additional pelagic species that are present in low abundance include Chinook salmon, plainfin midshipman, jacksmelt (*Atherinopsis californiensis*), splittail (*Pogonichthys macrolepidotus*), threadfin shad (*Dorosoma petenense*), delta smelt (*Hypomesus transpacificus*), threespine stickleback (*Gasterosteus aculeatus*), Pacific staghorn sculpin (*Leptocottus armatus*), English sole (*Parophrys vetulus*), and starry flounder (*Platichthys stellatus*).

Important managed, protected, or special-status pelagic zone species that are found in the Study Area, either seasonally or year-round, include northern anchovy, Pacific herring, longfin smelt, delta smelt, steelhead, and Chinook salmon (Appendix E-5; IEP 2010–2012, USFWS 2013a; CDFW 2014b). Delta smelt and winter-run Chinook salmon are listed as endangered and currently protected under both the ESA and CESA. Central California Coast distinct population segment

(DPS) steelhead trout are listed under the ESA as threatened and are a species of special concern under CESA. Longfin smelt are listed under CESA as threatened and under the ESA as a species worthy of protection, but which cannot be formally listed at this time (USFWS 2013b).

Northern anchovy is the only managed species under the Magnuson–Stevens Act (Coastal Pelagic FMP) observed to be present in the study area (IEP 2010–2012), and Pacific herring is considered a species of special concern in the San Francisco Bay–Delta by NOAA Fisheries (NOAA Fisheries 2007).

Finally, the project area is located along an established migration corridor for adult steelhead and smolts as well as fall-run Central Valley ESU Chinook salmon and smolts. Both the main shipping channel and adjacent shallows are used by steelhead and salmon for migration and foraging (NCRCD 2012). Although CDFW data (IEP 2010–2012) do not indicate that steelhead or Chinook salmon are present in the project area in any significant numbers, individuals can be expected to be present during migration times. The lower Napa River is considered foraging habitat for both longfin and delta smelt.

Marine Mammals

Seven species of marine mammals use the pelagic water column habitat in San Francisco Bay for migrating and foraging (NOAA Fisheries 2007). Marine mammals frequently observed in San Pablo Bay and the lower reaches of the Napa River include harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), and the harbor porpoise (*Phocoena phocoena*). California gray whales (*Eschrichtius robustus*) occasionally swim into San Francisco and San Pablo Bays on their annual migrations between Mexico and Alaska (NOAA Fisheries 2007). Harbor seals and California sea lions forage for fish throughout the San Francisco Bay–Delta, including schooling northern anchovy and Pacific herring, but also feed on migratory Pacific lamprey, salmonids, and mysid shrimp and other invertebrates within the water column (NOAA Fisheries 2007). Harbor porpoises predominantly occur in central San Francisco Bay, but individuals have been observed in San Pablo Bay and the lower reaches of the Napa River (NOAA Fisheries 2009a; Todorov 2007). All of these species are protected under the federal MMPA. There are no major haul-outs or rookeries in San Pablo Bay, Carquinez Strait, or the lower Napa River for any marine mammals, but individuals may still use various structures to haul out and rest.

Birds

Dominant marine birds inhabiting or utilizing San Pablo Bay and the project area include cormorants (*Phalacrocorax* spp.), the pigeon guillemot (*Cepphus columba*), the herring gull (*Larus argentatus*), and the mew gull (*L. canus*) (NOAA Fisheries 2007). The California brown pelican (*Pelecanus occidentalis californicus*) can also frequent the study area, and osprey (*Pandion haliaetus*) is known to be present in the project area (NOAA Fisheries 2007). In 2014, an osprey nest was observed on top

of the flour mill. More information on birds inhabiting the project area and potential project effects to birds is found above in Section 3.3.2, under the heading Terrestrial Biology.

Soft Sediment (Benthic) Habitat

Submerged Aquatic Plants

Several types of aquatic vegetation can also be found in or near the study area, including *Ulva/Enteromorpha* spp. on shallow mud flats and eelgrass (*Zostera marina*) (Merkel & Associates 2005). The largest eelgrass bed in San Francisco Bay is located between Point San Pablo and Point Pinole and covers more than 1,500 acres (Merkel & Associates 2010). Smaller beds are located at Point San Quentin and Point San Pedro (Merkel & Associates 2010). Submerged aquatic vegetation (SAV) and eelgrass beds in particular are important habitats within San Francisco Bay because they stabilize sediments, help clarify water through sediment trapping, cycle nutrients, and oxygenate water (Merkel & Associates 2005). SAV in San Francisco Bay has been poorly studied, and very little is known about its distribution and abundance. However, there are four main types of SAV communities known to inhabit the Bay: surfgrasses (*Phyllospadix torreyi* and *P. scouleri),* eelgrass (*Zostera marina*), widgeon grass (*Ruppia maritime)*, and sago pondweed (*Stuckenia pectinata*) (NOAA Fisheries 2007). Each species of SAV has varying physical requirements and is found in distinct parts of the Bay. All four SAV species provide primary productivity and decrease erosion by dampening wave action, preventing sediment resuspension, increasing sedimentation, providing attachment for sessile organisms, and providing a resource area for invertebrates, fishes, birds, and marine mammals. Most species of plants and algae need coarse particles such as pebbles or shells to become established in soft bottom habitats, otherwise they are removed by water motion such as tidal and wind currents as well as storm action. Eelgrass beds also provide habitat to an abundant array of invertebrates, fish, and birds. Eelgrass is a nursery habitat for most of the anadromous fish found in San Francisco Bay, including Chinook salmon, as well as sturgeon, striped bass, and smelt. Pacific herring use eelgrass beds to deposit their eggs during spawning (Merkel & Associates 2005). Likewise, many of the waterfowl present in the Bay use eelgrass beds for foraging such as black brant (*Branta bernicla nigricans*) (Merkel & Associates 2005). No submerged vegetation beds were observed in the subtidal or intertidal areas of the VMT Site (Appendix E-4, Appendix E-5).

Invertebrates

The nearshore subtidal region at the VMT Site is composed of soft mud, sand, and gravel (Appendix E-6). Based upon typical salinity concentrations at the VMT location, the marine environment can be characterized as either mesohaline (salinity concentrations between 5.0 to 18.0 parts per trillion (ppt) or polyhaline (salinity concentrations between 18.0 to 30.0 ppt) (NOAA Fisheries 2007, Appendix E-6). NOAA (2007) classifies the soft substrate benthic habitats present in the Bay–Delta in mesohaline and polyhaline environments as consisting of deep channels,

channel edge, slough channels, and shallow subtidal. Only the deep channel, channel edge, and shallow subtidal habitats are present at the VMT Site (Appendix E-6).

In assessing the benthic habitat and associated invertebrate community at the VMT Site (Appendix E-6), Applied Marine Sciences (AMS) reported observing three benthic infaunal communities occupying the area. The first and shallowest infaunal community predominantly occupied the tidal mudflat located in the northeast corner of the offshore portion of the VMT Site and was observed in water depths ranging from 2.0 to 2.5 meters (6.7 to 8.2 feet). This infaunal community was comprised of 15 to 16 taxa with a total mean density of 5,530 individuals per square meter. The amphipods *Ampelisca abdita* and *Grandidierella japonica*, the cumacean *Nippoleucon hinumensis*, the polychaete *Streblospio benedicti*, tubificidae oligochaetes, and the bivalve clam *Potamocorbula amurensis* dominated this community. *A. abdita* and *N. hinumensis* numerically dominated the community making up more than 67% to 82% of the total abundance observed at the two sampled sites. The dominant taxa observed in this community were fairly evenly distributed between suspension feeders and surface deposit feeders.

The second benthic infaunal community occupied the region immediately adjacent to and north of the existing wharf in water depths ranging from 3.8 to 12.4 meters (12.5 to 40.7 feet) was comprised by 24 to 34 taxa with a total mean density of 4,289 individuals per square meter. This community was the most diverse infaunal community observed at the VMT Site. It was numerically dominated by the polychaetes *Polydora cornuta, Capitella capitata* (complex), and *Streblospio benedicti;* the nudibranch *Okenia plana;* the amphipods *Incisocalliope derzhavini*, *Monocorophium acherusicum*, *Corophium heteroceratum*, *C. alienense*, *C. unidentified*, *Ampelisca abdita*, and *Grandidierella japonica;* the horseshoe worm *Phoronopsis harmeri;* annelid tubificidae worms; the Asian clam *Potamocorbula amurensis;* and the barnacles *Amphibalanus improvisus*, *Balanus crenatus,* and *Balanomorpha unidentified*. The barnacles were observed attached to large gravel and pebbles located on the surface of most of the sample sites. The dominant taxa consisted of eight filter feeders, eight filter and deposit feeders, and one carnivore. The total abundance per meter square of seafloor for the second benthic infaunal community was slightly lower than observed at the first more shallow community described above, and was divided between more species.

The third benthic infaunal community was located in the natural river channel adjacent to the VMT Site in approximately 14 meters (42.7 feet) of water and was overwhelmingly dominated by the bivalve clam *Potamocorbula amurensis. Potamocorbula* accounted for 83% of the total individual abundance at this site. The third infaunal community consisted of 14 taxa with a total mean density of 4,413 individuals per square meter.

As observed at the VMT Site, the benthic infaunal community of North Bay and the Delta has been significantly affected by the introduction of exotic species. Most importantly, the establishment of two

invasive clams, *Potamocorbula amurensis* and *Corbicula fluminea,* has drastically changed the benthic communities in San Pablo Bay, Suisun Bay, and the Delta (NOAA Fisheries 2007). In addition, the high water filtering rate of *P. amurensis* has been identified as one possible factor responsible for decreased plankton biomass in the Delta and North Bay (Thompson et al. 2008; Kimmerer 2006). Of the 54 taxa observed at the VMT Site, 16 are identified as non-native, and 7 of the 16 most numerically dominant taxa observed at the VMT Site, which accounted for 90.5% if the total number of individuals observed, are non-native species (Appendix E-6).

Large motile invertebrates common in the study area include Dungeness crab, blackspotted shrimp (*Crangon nigromaculata*), a gastropod snail (*Ilyanassa obsoleta*), the American spider crab (*Pyromaia tuberculata*) and the nudibranch (*Sakuraeolis enosimensis*) (NOAA Fisheries 2014). The non-native nudibranch, *Okenia plana*, was also observed as one of the most common and numerically dominant taxa by AMS during their assessment of the VMT Site (Appendix E-6). Dungeness crab use San Francisco Bay, as they do all estuaries along the north Pacific coast, as an area for juvenile growth and development prior to returning to the ocean as sexually mature adults (Tasto 1979; Pauley et al. 1989).

Fish

Many different fish species spend all or part of their life cycle in association with the demersal (seafloor) zone. The demersal (seafloor) region of the Napa River mouth is composed of 25 species of fish living in close association with the benthos during their sub-adult and adult life (Appendix E-4; IEP 2010–2012; AECOM 2013). Of these demersal species, Bay goby (*Lepidogobius lepidus*) is the dominant species comprising 29.9% of the total fish abundance, and English sole is the second most common species accounting for 22.5%. The following nine species collectively account for 43.5% of the species commonly inhabiting the seafloor and immediately adjacent waters in both the deep and shallow water regions of the Napa River mouth: Pacific staghorn sculpin, striped bass, yellowfin goby (*Acanthogobius flavimanus*), starry flounder, plainfin midshipman, speckled sanddab (*Citharichthys stigmaeus*), longfin smelt, Shokihaze goby (*Tridentiger barbatus*), and American shad (*Alosa sapidissima*). Additional demersal species that are present in low abundance include sand sole (*Psettichthys melanostictus*), cheekspot goby (*Ilypnus gilberti*), Shimofuri goby (*Tridentiger bifasciatus*), brown smoothhound (*Mustelus henlei*), California halibut (*Paralichthys californicus*), diamond turbot (*Hypsopsetta guttulata*), white croaker (*Genyonemus lineatus*), Pacific herring, shiner perch (*Cymatogaster aggregata*), Bay pipefish (*Syngnathus leptorhynchus*), river lamprey (*Lampetra ayresii*), white sturgeon (*Acipenser transmontanus*), green sturgeon and threespine stickleback.

Managed, protected, or other special-status fish species observed inhabiting the demersal zone near the project area include English sole, starry flounder, and sand sole. These three species are managed under the Pacific Groundfish FMP. The green sturgeon is an ESA threatened species and

CESA species of special concern, and the river lamprey is a CESA species of special concern (IEP 2010–2012; AECOM 2013; CDFW 2014b).

San Pablo Bay – Hard Bottom (Benthic) Habitat

Algae and Invertebrates

Some near-shore hard bottom substrate can be found in the subtidal and intertidal area of the region and the project site. The intertidal hard bottom consists mostly of man-made hard bottom, which may extend into the subtidal area. Relatively little hard substrate occurs naturally in the estuary and around the project area (Goals Project 2000).

The shoreline habitat at the VMT Site consists primarily of cobble-sand-silt beaches with assorted quarry rock and concrete debris of assorted sizes armoring the shoreline bluff, with isolated rocks or concrete debris found lower in the intertidal area. Depending on the location of the hard substrate and its proximity to freshwater flow, San Pablo Bay can support several different communities of sessile invertebrates. In areas with lower salinity, the mussel *Mytilus trossulus/galloprovincialis* and the barnacle *Amphibalanus improvisus* are frequently observed organisms (NOAA Fisheries 2007). In the higher salinity regions of San Pablo Bay and the Carquinez Strait, the sessile invertebrate taxa are typically more diverse than what is observed in the lower salinity regions. This is the result of the more favorable salinity conditions enabling more marine species to establish and thrive (NOAA Fisheries 2007). This is what was observed during a survey of the intertidal habitat at the VMT Site (Appendix E-4). This site visit revealed that overall, there appears to be a single intertidal community inhabiting the upper and mid intertidal zones of the project site. This community is dominated by the algae *Ulva* spp. with colonial diatoms frequently occurring on the surface of rocks that are present in the mid intertidal zone. The invertebrate community in the mid intertidal zone was similar to the high zone with colonial diatoms and balanoid barnacles present throughout. Depending on the available bare rock space and the amount of crevices, the California mussel (*Mytilus californianus)* was also observed occurring occasionally in the riprap areas of survey segments. Both live and dead carapaces of the shore crab (*Hemigrapsus sanguineus*) were also observed. The low intertidal zone appeared to contain a similar diversity of species as the middle intertidal zone, including colonial diatoms and barnacles, depending on substrate type. In the lower intertidal zone, a few additional algae species were observed including under the pier, where predation and desiccation appears to be minimized during low tide cycles, the greatest diversity of taxa was observed. This area is the only location where evidence of the Olympia oyster (*Ostrea lurida (conchaphila)*) was observed, with both live individuals and scars. The lower intertidal also contained *Fucus distichus*, which was the only abundant algae species documented in the lower intertidal. Encrusting turf, typically composed of tunicates, hydroids, bryozoans, and other encrusting species, was also observed in the low intertidal area under the pier. No eelgrass or other listed protected or special-status species were

found anywhere along the shoreline of the VMT Site that was surveyed. The only invasive species observed were the hybrid Mytilus mussel (*Mytilus trossulus/galloprovincialis*) and the Asian crab (*Hemigrapsus sanguineus*) that have become endemic to the entire San Francisco Bay–Delta.

~~The shoreline habitat at the proposed kayak launch site located at the City of Vallejo Municipal Marina consists primarily of small, quarried rock, ranging in size from 4 to 12 inches. The intertidal zone is divided up into three zones: high, mid, and low. The algae *Ulva* spp. was present throughout the high and mid intertidal zones with the mid zone containing moderate siltation on all the rocks (Appendix E-7). In additional to the dominant algae *Ulva* spp. in the mid intertidal zone, encrusting diatoms were also present. The low intertidal zone showed evidence of heavy siltation with encrusting diatoms being the dominant taxa, with the algae *Ulva* spp., an unidentified Serpulid worm (tube worm), and barnacles also being commonly observed (Appendix E-7). No special-status or sensitive species were observed in the survey area.~~

Sensitive Natural Communities

Sensitive communities in the project area include those that are especially diverse, regionally uncommon, designated by CDFW, or are otherwise covered by state, federal, or local regulations. CNDDB tracks the status of sensitive natural communities throughout California.

Designated Critical Habitat

The USFWS and NOAA Fisheries designate critical habitat with the purpose of contributing to the conservation of threatened and endangered species and the ecosystems upon which they depend. The designation of an area as critical habitat provides additional protection to habitat only when there is a federal nexus with regard to some aspect of a project, for example, when a federal agency is implementing or issuing a permit for a project. Critical habitat protection is only relevant when other statutory or regulatory protections, policies, or other factors relevant to agency decision-making would not prevent the destruction or adverse modification of habitat. Designation of critical habitat triggers the prohibition of destruction or adverse modification of that habitat, but it does not require specific actions to restore or improve habitat. The aquatic habitat adjacent to the VMT Site is within designated critical habitat for Central California Coast steelhead that includes, among other areas, the Napa River, Carquinez Strait, and San Pablo Bay. The VMT Site is adjacent to winter-run and spring-run Chinook salmon and green sturgeon designated critical habitat that includes, among other areas, Carquinez Strait and all waters of San Pablo Bay.

Designated Essential Fish Habitat

Designated essential fish habitat is defined as all habitat types that contain the waters and substrates necessary for fish spawning, breeding, or growth, as defined in the Magnuson–Stevens Fishery

Conservation and Management Act. San Pablo Bay is designated as essential fish habitat for both Chinook and Coho Salmon (Stadler et al. 2011).

Special-Status Species

A number of species known to occur in the project vicinity are protected pursuant to federal and/or State of California endangered species laws, or have been designated as Species of Special Concern by CDFW. In addition, section 15380(b) of CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing. Species recognized under these terms are collectively referred to as "special-status species." For the purposes of this Environmental Impact Report (EIR), special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under the federal or state endangered species acts;
- Species that are candidates for listing under either federal or state law;
- Species formerly designated by the USFWS as Species of Concern or designated by CDFW as Species of Special Concern;
- Species protected by the federal Migratory Bird Treaty Act (16 U.S.C. 703 et seq.); and/or
- Species such as candidate species that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines.

Table 3.3-2 provides a comprehensive list of the fish and marine mammal special-status species that have been documented in, or have potential to occur in suitable habitat within the general project area. Other databases and informational tools used to determine whether special-status species have the potential to occur in the vicinity of the project include:

- The USFWS Official List of Federal Endangered and Threatened Species (USFWS 2015)
- The CDFW Wildlife Habitat Relationships database search
- The USFWS websites for special-status species

Based on review of the biological literature of the region, previous EIRs, surveys in the project vicinity, and an evaluation of the habitat conditions of the proposed project site, many of these species were eliminated from further evaluation because (1) the project site or the immediate area does not provide suitable habitat, or (2) the known range for a particular species is outside of the project site and/or the immediate area.

The special-status species list presented in Table 3.3-2 includes fish and marine mammal species for which potential habitat (i.e., general habitat types) occurs on or in the vicinity of the project site. Species for which generally suitable habitat occurs but that were nonetheless determined to

have low potential to occur in the study area are also listed in Table 3.3-2. This table also provides the rationale for each potential-to-occur determination. Species observed or with a moderate to high potential-to-occur in the project area are discussed in further detail below.

Table 3.3-2
Special-Status Fish and Marine Mammal Species That May Occur Within the Waters of the Study Area

Common Name Scientific Name	Listing Status		General Habitat	Potential for Species Occurrence Within Project Site	Time Period Present in Project Site Waters
	Federal– ESA/ MMPA	*State– CESA*			
Sacramento River winter-run ESU Chinook salmon (*Oncorhynchus tshawytscha*)	FE/–	CE	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through San Francisco Bay–Delta to freshwater spawning grounds	Low potential to occur. This species could potentially be present and foraging in the Carquinez Strait near the project area during migration periods, but there is no evidence of their presence.	Adults – November and December Juveniles – fall and winter
Central Valley spring-run ESU Chinook salmon (*O. tshawytscha*)	FT/–	CT	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through San Francisco Bay–Delta to freshwater spawning grounds	Low potential to occur. This species could potentially be present and foraging in the Carquinez Strait near the project area during migration periods, but there is no evidence of their presence.	Adults – late winter to spring Juveniles – fall though spring
Central Valley fall-run/late fall-run Chinook salmon *(O. tshawytscha*).	FSC/–	–	Ocean waters, Sacramento and San Joaquin Rivers; migrates from Ocean through San Francisco Bay–Delta to freshwater spawning grounds, including the Napa River	High potential to occur. Given the project area's location along the main channel of the Napa River, both adults and juveniles of this species could be present in the project area during migration periods.	Adults – June through September Juveniles –- winter through summer
Central California Coast ESU Coho salmon (*Oncorhynchus kisutch*)	FE/–	CE	Ocean waters, Sacramento and San Joaquin Rivers; migrates from ocean through San Francisco Bay–Delta to freshwater spawning grounds	Unlikely to occur. This species may only be present in the project area if it were determined that they migrate higher up into the watershed.	Previously assumed to be extirpated from the Napa River but recent data suggests that Coho salmon might be present in the Napa River watershed.
Central Valley DPS steelhead trout *(O. ~~M~~mykiss)*	*FT/–*	–	Ocean waters, Sacramento, San Joaquin, and Napa Rivers; migrates from ocean through San Francisco Bay–Delta to freshwater spawning grounds upriver	Low potential to occur. This species could potentially be present and foraging in the Carquinez Strait near the project area during migration periods, but there is no evidence of their presence.	Adults – winter and spring Juveniles – year-round

Table 3.3-2
Special-Status Fish and Marine Mammal Species That May Occur Within the Waters of the Study Area

Common Name Scientific Name	Listing Status		General Habitat	Potential for Species Occurrence Within Project Site	Time Period Present in Project Site Waters
	Federal– ESA/ MMPA	*State– CESA*			
Central California Coast DPS steelhead trout *(O. mykiss)*	FT/–	CSC	Ocean waters, Sacramento and San Joaquin Rivers; migrates from Ocean through San Francisco Bay–Delta to freshwater spawning grounds	High potential to occur. Given the project area's location along the main channel of the Napa River, both adults and juveniles of this species could be present in the project area during migration periods.	Adults – winter Juveniles – year-round
Green sturgeon (Southern DPS) *(Acipenser medirostris)*	FT/–	CSC	Marine and estuarine environments and the Sacramento and Napa Rivers; all of San Francisco Bay–Delta	Moderate-high potential to occur. Critical habitat for the green sturgeon includes San Pablo and San Francisco Bays and they have been found in the stretch of the Napa river near the project area.	Year-round
Tidewater goby *(Eucyclogobius newberryi)*	FE/–	CSC	Coastal lagoons, estuaries, and marshes in coastal California from the Smith River (Del Norte County) to Aqua Hedionda Lagoon (San Diego County)	Unlikely to occur. This species is presumed to be extirpated from San Francisco Bay–Delta.	NA
Delta smelt *(Hypomesus transpacificus)*	FT/–	CE	Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, river channels and sloughs in Delta	Low-high potential to occur. This species is present in the project area in wet high-flow years and may not be present in low-flow years.	Delta smelt have been observed inhabiting the lower reaches of the Napa River, although their presence can be sporadic from year to year depending on how wet the rainy season is and the amount of flow in the river.
Longfin smelt *(Spirinchus thaleichthys)*	FC/–	CT	Throughout the nearshore coastal waters and open waters of San Francisco Bay–Delta including the river channels and sloughs of the Delta	Moderate-high potential to occur. The bulk of the San Francisco Bay population occupies the region between the Carquinez Strait and the Delta. Adults migrate from San Francisco and San Pablo Bays to the Delta to spawn.	Year-round

Table 3.3-2
Special-Status Fish and Marine Mammal Species That May Occur Within the Waters of the Study Area

Common Name Scientific Name	Listing Status		General Habitat	Potential for Species Occurrence Within Project Site	Time Period Present in Project Site Waters
	Federal– ESA/ MMPA	*State– CESA*			
River lamprey *(Lampetra ayresii)*	–/–	CSC	River lampreys are found in coastal streams in San Francisco Bay, San Pablo Bay and the Carquinez Strait.	Low-moderate potential to occur. During this species' spawning, adults have been observed in the Sonoma and Napa rivers. Individuals have also been caught in San Pablo Bay and the Carquinez Strait.	Year-round River lamprey spawn in small streams in April and May. During spawning run, adults are observed in the Sonoma and Napa rivers (UCSD 2014).
Sacramento splittail (*Pogonichthys macrolepidotus*)	–/–	CSC	Upper San Francisco Estuary, including the Sacramento-San Joaquin River Delta, and the Central Valley	Low to moderate potential to occur. This species has been observed in low numbers in San Pablo Bay and the Carquinez Strait and are reported to be present in both the Napa and Petaluma Rivers.	Splittail migrate upstream to freshwater rivers and floodplains for spawning in the winter and return to the more brackish water of the Delta and San Francisco Estuary in the spring and summer.
Harbor porpoise *(Phocoena phocoena)*	–/FP	–	An inshore species inhabiting shallow, coastal waters and occasional large rivers, including San Francisco Bay–Delta	Unlikely low potential to occur. This species has been observed irregularly in the Bay over recent years.	Year-round; although predominantly observed in Central San Francisco Bay, individuals have been observed in eastern San Pablo Bay and the lower reaches and mouth of the Napa River.
Pacific harbor seal (*Phoca vitulina*)	–/FP	–	Coastal waters, and throughout Bay–Delta	Moderate potential to occur. This species may forage in the vicinity of the project area, especially during steelhead and salmon migration periods.	Year-round; harbor seals forage throughout SF Bay–Delta and can be observed in San Pablo Bay and westward into the Delta, especially when salmon and steelhead are migrating through the area.
California sea lion (*Zalophus californianus*)	–/FP	–	Coastal waters, and throughout Bay–Delta	Moderate potential to occur. This species may forage in the waters of and adjacent to the project area.	Year-round; California sea lions forage throughout SF Bay–Delta and can be observed in San Pablo Bay and westward into the Delta, especially when salmon and steelhead are migrating through the area.

Table 3.3-2
Special-Status Fish and Marine Mammal Species That May Occur Within the Waters of the Study Area

Common Name Scientific Name	Listing Status		General Habitat	Potential for Species Occurrence Within Project Site	Time Period Present in Project Site Waters
	Federal– ESA/ MMPA	*State– CESA*			
Gray whale (*Eschrichtius robustus*)	FDL/FP	–	Predominantly coastal waters, although occasional individuals enter the Bay–Delta and have been observed swimming up the Sacramento River and into the South Bay	Unlikely low potential to occur. This species has been observed irregularly in the Bay over recent years.	December to April, during migration from Alaska to Baja California, occasionally enter Bay–Delta, transient
Humpback whale (*Megaptera novaeangliae*)	FE/FD	–	Predominantly coastal waters, although occasional individuals enter the Bay–Delta	Unlikely low potential to occur. This species has been observed irregularly in the Bay over recent years.	April to December, during migration, occasionally enter the Bay–Delta, transient

ESA = Federal Endangered Species Act
MMPA = Marine Mammal Protection Act
CESA = California Endangered Species Act

Federal (USFWS):
FDL = Delisted
FE = Listed as Endangered (in danger of extinction) by the federal government
FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by the federal government
FP = Proposed for Listing as Endangered or Threatened
FC = Candidate to become a proposed species
FSC = Former Federal Species of Concern. The USFWS no longer lists Species of Concern but recommends that species considered to be at potential risk by a number of organizations and agencies be addressed during project environmental review. *NOAA Fisheries still lists Species of Concern.

State (CDFW):
CE = Listed as Endangered by the State of California
CT = Listed as Threatened by the State of California
CR = Listed as Rare by the State of California (plants only)
CSC = California Species of Special Concern

Federal (NOAA MMPA):
FD = Depleted Population
FP = Federally Protected

Sources: Bartling 2006; Bay Institute 2007; McGowan and Josselyn 2008; NCRCD 2012; Garza and Crandall 2013; 70 FR 52488 et seq.; NOAA Fisheries 2015; NOAA Fisheries 2009b; Sommer and Mejia 2013; USFWS 1989; 65 FR 7764–7787, USFWS 2015; USFWS 2013a; LSA 2009.

Of the special-status marine taxa presented in Table 3.3-2, only the marine species discussed in the following section were determined to have a moderate to high occurrence within the vicinity of project site, were fully considered in the impact analysis.

Central Valley Fall/Late Fall-Run Chinook Salmon

The population of Chinook salmon, also known as king salmon, in San Francisco Bay–Delta comprises three distinct runs: winter-run, spring-run, and fall/late fall-run (*Oncorhynchus tshawytscha*). These runs are distinguished by the seasonal differences in adult upstream migration, spawning, and juvenile downstream migration. Chinook salmon are anadromous fish, spending 3 to 5 years at sea before returning to freshwater to spawn. These fish pass through San Pablo Bay waters to reach their upstream spawning grounds. In addition, juvenile salmon migrate through the Bay to the Pacific Ocean.

The Central Valley fall/late fall-run Chinook salmon is a Species of Concern (NOAA Fisheries), and a California Species of Special Concern. These salmon enter the Sacramento and San Joaquin Rivers from June through December, spawning from October through December, with a peak in November.

Adult and juvenile (smolts) winter-run, spring-run, and fall/late-fall-run Chinook salmon are known to occur in San Pablo Bay and transit through the Carquinez Strait during migrations to and from upstream spawning habitat. Although principally found in the main channels, they can use adjacent shallows for foraging. Fish survey efforts in the Napa River have determined that fall-run Chinook salmon is the run found in the Napa River (NCRCD 2012). Given the project site location along the main channel of the Napa River at its mouth, fall-run adult and juvenile Chinook salmon must migrate past the project site.

Central California Coast Steelhead Trout

The Central California Coast steelhead trout (*O. mykiss*) is federally listed as threatened. Steelhead are rare in most streams that are tributary to San Francisco Bay and previously assumed to be extirpated from the Napa River. However, recent data documents the presence of Central California Coast Steelhead trout in the Napa River watershed (NCRDC 2012).

Central California Coast steelhead migrate from the Pacific coast through San Francisco Bay in the winter to spawn in freshwater in the upper Sacramento River (McEwan and Jackson 1996) and Napa River. Upstream migration occurs from December through May, and peak spawning occurs in April. Juveniles may spend a year or more in San Francisco Bay before moving on to the ocean.

Critical habitat includes all river reaches and estuarine areas accessible to listed steelhead in coastal river basins, from the Russian River to Aptos Creek (inclusive), and the drainages of

San Francisco and San Pablo Bays. Also included are adjacent riparian zones, all waters of San Pablo Bay west of the Carquinez Bridge, and all waters of San Francisco Bay to the Golden Gate (65 FR 7764–7787).

Green Sturgeon

The green sturgeon (*Acipenser medirostris*), an anadromous fish, is the most widely distributed member of the sturgeon family and the most marine-oriented. It is a federally listed threatened species and a California Species of Special Concern. Green sturgeon is found in nearshore waters, ranging from Mexico to the Bering Sea and are common occupants of bays and estuaries along the western coast of the United States (Moyle et al. 1995). Adults in the San Joaquin Delta are reported to feed on benthic invertebrates including shrimp, amphipods, and occasionally small fish (Moyle et al. 1995), while juveniles have been reported to feed on opossum shrimp and amphipods. Adult green sturgeons migrate into freshwater beginning in late February, with spawning occurring in March through July and peak activity in April and June. After spawning, juveniles remain in fresh and estuarine waters for 1 to 4 years and then begin to migrate out to sea (Moyle et al. 1995). Critical habitat for the green sturgeon includes the Sacramento River; the Sacramento-San Joaquin Delta; and Suisun, San Pablo, and San Francisco Bays (74 FR 52300–52351). The upper Sacramento River has been identified as the only known spawning habitat for green sturgeon in the southern DPS. Although green sturgeon is caught and observed in the lower San Joaquin River, no spawning is known to occur within the river. The California Department of Fish and Game (now CDFW) CDFG Interagency Ecological Program (2000–2007) data indicate that green sturgeon are not frequent or significant inhabitants of the area of San Pablo Bay where the project is located; however, they do occur within the shallows and use the navigation channel to migrate between the ocean and the Sacramento River. It was previously assumed that green sturgeon were no longer present in the Napa River watershed, but recent evidence has established that they are present in both the upper reaches and the lower mouth of the Napa River (AECOM 2013; Ducks Unlimited 2014).

Delta Smelt

The delta smelt (*Hypomesus transpacificus*), a federally threatened (recently nominated as endangered) and a state endangered species, is a small slender-bodied fish native to the Sacramento-San Joaquin estuary. This species is able to tolerate a wide salinity range. The fish live in schools and primarily feed on planktonic crustaceans, small insect larvae, and mysid shrimp (Moyle 2002). This species, which typically has a 1-year life span, lives primarily along the freshwater edge of the saltwater-freshwater interface of the Sacramento-San Joaquin Delta. Prior to spawning, delta smelt migrate upstream from the brackish-water habitat to river channels and tidally influenced backwater sloughs to spawn. Migration and spawning occur between December and June (Moyle 2002). The species has been collected in large quantities in Suisun and San Pablo Bays, although their presence west of the Carquinez Strait is directly related to increased

freshwater flow through the delta and reduced salinity concentrations. The delta smelt has no commercial or recreational value, but is considered a key indicator species of the environmental health of the Delta. Delta smelt have been reported to occur in both the upper and lower segments of the Napa River, although their numbers and presence are a function of freshwater flow and seasonal rainfall (Bay Institute 2007; Sommer and Mejia 2013).

Longfin Smelt

The longfin smelt (*Spirinchus thaleichthys*), a California threatened species (and proposed for listing by ESA), is a small schooling fish that inhabits the freshwater section of the lower Delta. It has been observed from south San Francisco Bay to the Delta, with the bulk of the San Francisco Bay population occupying the region between the Carquinez Strait and the Delta (McAllister 1963; Miller and Lea 1972). They have been collected in large numbers in Montezuma slough, Suisun Bay, and near the Pittsburg and Contra Costa power plants. In the fall, adults from San Francisco and San Pablo Bays migrate to fresher water in the Delta to spawn. The spawning habits of longfin smelt are similar to the delta smelt, and the species are known to school together. Larval stages are known to inhabit Suisun Bay and move south within the Bay–Delta as they grow larger in April and May (Ganssle 1966). The larvae are pelagic and found in the upper layers of the water column. CDFG Interagency Ecological Program Data (2010-2012) indicate that longfin smelt is one of the more common species comprising the pelagic and demersal fish populations in the region of San Pablo Bay adjacent to the project area. High larval densities of longfin smelt have also been observed in the Napa River and are likely a result of both local spawning in wet years and tidal effects pushing larvae that hatched in the Delta or Suisun Bay into the lower Napa River system, including the project site (Robinson and Greenfield 2011).

Pacific Harbor Seal

The Pacific harbor seal (*Phoca vitulina*) is protected by the MMPA. It is a common resident marine mammal along the west coast. They prefer to stay close to shore in sub- and inter-tidal habitats such as bays and estuaries, but occasionally venture into rivers. Groupings of various sizes can haul out on rocks, mudflats, and sandy/cobble coves (Zeiner et al. 1990). In general, the same sites are used over many years (Kopec and Harvey 1995). They have been observed as far upstream in the Delta and Sacramento River as the City of Sacramento, though their use of the habitat north of Suisun Bay is irregular (Goals Project 2000). Pacific harbor seals in the Bay feed on yellowfin goby, northern anchovy, Pacific herring, staghorn sculpin, plainfin midshipman, and white croaker (Torok 1994). They may forage in the vicinity of the VMT Site, especially during steelhead and salmon migration time.

California Sea Lion

Like the harbor seal, the California sea lion (*Zalophus californianus*) is a permanent resident in the San Francisco Bay–Delta and protected by the MMPA. A common, abundant marine mammal, they are found throughout the West Coast, generally within 10 miles of shore. They breed in Southern California and the Channel Islands, after which they migrate up the Pacific coast to the Bay. They haul out on offshore rocks, sandy beaches, and floating docks, wharfs, vessels, and other man-made structures in the Bay and coastal waters of the state. California sea lions feed on a wide variety of seafood, mainly squid and fish and sometimes even clams. Commonly eaten fish and squid species include salmon and hake (*Merluccius productus*) (NOAA Fisheries 2014; Weise and Harvey 1999). Sea lions may forage in the waters of and adjacent to the project area.

Pacific Herring

Pacific herring (*Clupea pallasi*) is neither a protected species under the ESA or CESA, nor a managed fish species under the Magnuson–Stevens Act. Pacific herring does, however, represent a species of special concern for San Francisco Bay since it is an important member of the San Francisco Bay marine ecosystem; provides an important food source for marine mammals, sea birds, and fish; and constitutes a state fishery that is entirely conducted within an urban estuary, making it particularly susceptible to anthropogenic impacts. As a state fishery, it is regulated under Sections 8550–8559 of the California Fish and Game Code.

Pacific herring are found throughout the coastal zone from northern Baja California northward around the rim of the North Pacific Basin to Korea. In California, herring forage offshore during spring and summer and then migrate inshore to bays and estuaries to spawn from October through April. Known spawning areas in California include San Diego Bay, the San Luis River, Morro Bay, Elkhorn Slough, San Francisco Bay, Tomales Bay, Bodega Bay, the Russian River, the Noyo River, Shelter Cove, Humboldt Bay, and Crescent City Harbor (Bartling 2006). The largest spawning aggregations in California occur in the San Francisco Bay–Delta and Tomales Bay. Most spawning areas are characterized as having reduced salinity with calm and protected waters. Spawning-substrate such as submerged aquatic vegetation beds, especially eelgrass beds, or rocky intertidal areas are preferred, but man-made structures such as pier pilings and riprap are also frequently used spawning substrates in San Francisco Bay (Bartling 2006). After hatching, herring fry and juveniles use nearby protected inshore waters for rearing habitat (Lassuy 1989).

Managed U.S. Fisheries Species

Under the Magnuson–Stevens Act (see Section 3.3.1 for description), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104–297), the NOAA Fisheries, Fishery Management Councils, and federal agencies are required to cooperatively protect essential fish habitat for commercially important fish species such as Pacific coast groundfish, three species of

salmon, and five species of coastal pelagic fish and squid. As defined by the Act, essential fish habitat includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

Northern anchovy is the only Magnuson–Stevens Act species present in the project area that is managed under the Coastal Pelagic Fish Management Plan ((IEP 2010-2012; USACE and EPA 2009) and English sole, starry flounder, and sand sole are the only demersal fish species managed under the Pacific Groundfish FMP (USACE and EPA 2009). Both Chinook and Coho salmon species are managed under the Pacific Coast Salmon Fishery Management Plan.

Non-native and Non-indigenous Species

New species of estuarine and marine animals are inadvertently or intentionally introduced into California waters regularly. Often referred to as introduced, non-indigenous, alien, non-native, or exotic species, most pose little or no threat to native ecosystems or biological communities. However, a few have the potential to severely disrupt local ecosystems, fisheries, and human infrastructure (Ray 2005).

The San Francisco Bay–Delta has more than 230 identified non-native taxa inhabiting its estuarine and marine waters and has been described as the most invaded estuary in North America (Ray 2005). It is currently estimated that a new aquatic species is introduced into the San Francisco Bay–Delta every 14 weeks, whereas prior to 1960 the rate was once every 55 weeks (Roman 2010). Introduced species now dominate all benthic communities within the Bay–Delta and make up more than 95% of the biomass and total abundance of organisms (Roman 2010). Estuaries and sheltered coastal areas appear to be among the most invaded habitats as a result of being naturally disturbed, low-diversity systems with historic centers of anthropogenic disturbance from shipping, industrial development, and urbanization (Ray 2005).

Non-native organisms are introduced by a variety of methods, the most prevalent being shipping. Primary methods of introduction have included ballast water and fouling organisms that have attached themselves to ship hulls, anchors, and anchor chains (Hewitt and Campbell 2010), such as Asian kelp (*Undaria pinnatifidum*). In recent years, the introduction of non-native species into Bay waters from ballast water has been substantially reduced as a result of increased regulations and monitoring to prevent ballast water exchanges in state waters and harbors. Additional sources of introduction include recovered flotsam, "live" rock and plants from the aquarium trade, the accidental release of animals from packing materials by restaurants serving live seafood, and the live bait industry (Ray 2005). In addition, many invasive species, such as striped bass, channel and white catfish (*Ictalurus punctatus* and *Ameiurus catus*), and giant pacific oysters (*Crassostrea gigas*), have been deliberately introduced into California waters. A few of the most damaging in the San Francisco Bay–Delta include the Chinese mitten crab (*Eriocheir sinensis*), the European

green crab (*Carcinus maenas*), the Asian shore crab (*Hemigrapsus sanguineus*), the Asian clam (*Potamocorbula amurensis*), and an isopod (*Sphaeroma quoyanun*). The Chinese mitten crab is found throughout the Bay–Delta and is displacing native intertidal crabs. The Asian clam has completely changed the subtidal benthic infaunal community in the western Delta, and because of its voracious feeding on bacterioplankton, phytoplankton, and copepod larvae, it has been identified as one of the potential causes of reduced zooplankton and fish abundances and distributions in the Delta (Ray 2005; Kimmerer 2006; Thompson and Parchaso 2003), especially delta and longfin smelt populations in the Bay–Delta (AFS 2007).

Analysis of the dominant marine species observed inhabiting the subtidal and intertidal habitats of the VMT Site reveals that 44% of the species observed inhabiting the subtidal sediments and 18% of the species observed inhabiting the intertidal habitat were non-native species (Appendix E-6~~, Appendix E-7~~).

3.3.3 Thresholds of Significance

The following criteria, included in Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.), will be used to determine the significance of potential terrestrial and marine biological resources impacts. Impacts to biological resources would be significant if the proposed project would:

A) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;

B) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;

C) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

D) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; or

E) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

The impact analysis addresses construction and operation of the VMT project component and the Orem project component separately, if required. Otherwise footprint-related effects of project construction are not unique to one project component versus another.

3.3.4 Impact Discussion

A) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Terrestrial Biological Resources

VMT and Orcem Project Analysis

Construction Impacts

While the biological assessment prepared for the project site determined that there is low potential for special-status species of birds to nest within the project site, project construction of both the VMT and Orcem project components could disturb breeding and nesting behaviors of special-status species of birds, as well as common raptor and passerine species protected by the MBTA if these species are present and if construction occurs during the typical breeding season (February 15 through August 31). Additionally, an active osprey nest was identified on top of the flour mill building in April 2014. The abandoned osprey nest will be removed during the non-nesting season after consultation with CDFW. Since this species typically returns to a nest site for several years, there is the possibility that the osprey would return to the site. Take of any active raptor nest is prohibited under Fish and Game Code Section 3503.5 and would be a **significant impact** (**Impact 3.3-1**) if project implementation disturbs an active nest. Mitigation measures to avoid a take of active nests are identified in Section 3.3.5.

Townsend's big-eared bat (*Corynorhinus townsendii*) has been proposed as a candidate for state listing as a threatened species. Townsend's big-eared bat is very sensitive to human disturbance and is not known to occur on the project site; the project site is regularly disturbed by human activity, and suitable day roosts are not available in the project area (see Appendix E-1). While the site may not offer optimal roost sites for this species, Townsend's big-eared bat commonly roosts in abandoned buildings; therefore use of the buildings on the project site cannot be entirely discounted. The project site has been vacant for approximately 10 years and has been subject to minimal disturbance, human or otherwise, over that time. While it is unlikely that this species or roost sites would be found on the project site, disturbance of roost sites would be a **significant impact** (**Impact 3.3-2**). Mitigation measures to avoid disturbance to this species are identified in Section 3.3-5.

Operational Impacts

Operation of the proposed project would require ship, rail car, truck, and heavy equipment operations within the area of the existing developed site and developed off-site areas. It is

anticipated that disturbance associated with project operation would deter special-status species from using the project site and that any use of the site by special-status species would be by species adapted to human presence and disturbance or within portions of the project site farther from project activities, such as the bluffs or shoreline areas unaffected by the proposed project. It is anticipated that impacts to special-status species associated with operation of the project would be **less than significant**.

Impacts to Marine/Aquatic Biological Resources

VMT Analysis

Construction Impacts

The VMT project component would involve multiple in-water construction activities that have the potential to directly and indirectly affect protected and special-status marine species listed above. Proposed redevelopment of the decaying wharf and waterfront area of the VMT Site would include the following.

Wharf Redevelopment

- Dredging approximately 89,800 cubic yards of sediment between the reconstructed wharf and the existing deep-water channel
- Approximately 10,300 cubic yards (cyd) of fill, the majority of which would be placed within the footprint of the existing wharf
- Approximately 10,900 cyd of grading fill to bring the finished elevation to +11.5 feet mean lower low water as needed for the proposed stormwater control plan.
- Removal of approximately 444 decaying creosote and concrete-jacketed creosote wood pilings
- Installation of eighty-one (81) 24-inch concrete pilings for the new wharf
- Installation of eight 30-inch steel pilings to support mooring equipment installation
- Installation of approximately 600 feet of steel sheet pile
- Construction of a 29-foot-wide, 500-foot-long concrete wharf
- Reconstruction of approximately 50,453 square feet of existing shoreline fronting the ~~Phase 1~~ wharf with the addition of engineered fill and rocky riprap armoring
- Use of reclaimed concrete from on-site demolition for use as engineered fill

~~*Off-Site Public Launch Ramp – Vallejo Municipal Marina*~~

- ~~Construction of a 10-foot-wide by 60-foot-long articulated concrete mat boat ramp with riprap reinforcement at the City of Vallejo Municipal Marina for self-propelled boats~~
- ~~Removal of 1,080 square feet (0.025 acre) of existing artificial rocky intertidal habitat~~

In addition to the in-water construction activities, onshore construction, equipment and material staging, and on-site demolition activities also have the potential to result in short-term impacts to marine habitats and associated biota, including special-status species through the accidental release of hydrocarbons (fuel, lubricating oils, hydraulic fluids), site trash and packing materials, and uncontrolled stormwater and on-site dust control water finding its way into the water.

The open water (pelagic) and soft subsurface sediment (demersal) areas of the Napa River adjacent to and part of the VMT Site are utilized by Chinook salmon (Central Valley fall-run and late fall-run), steelhead trout (Central California Coast), longfin smelt, delta smelt, and Sacramento splittail for foraging and access to spawning grounds upstream. Longfin smelt and green sturgeon utilize the area for foraging. As such, the presence of most of these species is limited to seasonal migration periods, and in the case of delta smelt and Sacramento splittail, to wet winters when salinity concentrations in the lower Napa River decrease (Bay Institute 2007; LSA 2009; Merz et al. 2011; Sommer and Mejia 2013).

The lower Napa River and San Pablo Bay are also listed as essential fish habitat for the five identified FMP-managed fish taxa. Pacific harbor seals and California sea lions can be observed in the lower Napa River year-round for short periods of time, but are most prevalent in the area during salmon and steelhead migration periods.

The proposed VMT in-water project activities would result in the following ecological effects:

- Proposed dredging would result in the temporary loss of foraging habitat for some fish and marine mammal species, cause short-term and localized increased water turbidity and exposure to sediment-affiliated organic and inorganic contaminants from resuspended sediments, and could entrain[2] fish.
- Modifications to the existing shoreline by renovating the rock dike/shoreline armoring as part of the wharf reconstruction~~, and the removal of 0.25 acre of shoreline armoring and soft-bottom sediment for the construction of a self-propelled boat ramp at the City of Vallejo Municipal Marina~~ would result in the temporary loss of existing intertidal hard

[2] Entrainment is defined as the direct uptake or capture of aquatic organisms by the dredge clamshell or suction head.

substrate habitat and the permanent loss of subtidal soft substrate habitat and their associated marine communities which are used as fish forage.

- Removal of 444 decaying creosote pilings would result in the temporary loss of 832 square feet (0.011 acre) of intertidal and subtidal artificial hard substrate habitat and attached invertebrate communities that serve as fish forage habitat.
- Removal of decaying creosote pilings would result in resuspended contaminated sediment and release of toxic piling fragments into the water column and exposing fish and invertebrate taxa ~~which~~that can be fatal and/or harmful to marine invertebrates, fish, and marine mammals.
- Installation of 24-inch concrete and 30-inch piles would result in the permanent loss of approximately 0.009 acre of subtidal habitat and associated marine community that is used for fish forage.
- Resuspension of sediment from dredging and the construction of an overwater wharf would result in both temporary and permanent shading, respectively of Bay–Delta waters and possibly reduced plankton productivity and effects on planktivorous fish such as longfin and delta smelt and Sacramento splittail.
- Installation of 24-inch concrete pilings, 30-inch steel pilings, and steel sheet piling for wharf construction could result in increased noise levels that can be fatal and/or harmful to fish and marine mammals.

The following discussions address the potential effect of these project-related ecological changes on project area marine habitats and their potential impact on identified sensitive species.

Disturbed and Lost Habitat

Table 3.3-3 summarizes the estimated Napa River acreage that would be affected by VMT in-water construction. Dredging for the wharf construction would result in the short-term loss of an estimated 1.03 acres (Appendix E-6) of unconsolidated sand-silt-clay substrate essential fish habitat/critical habitat and associated benthic infaunal community. The placement of concrete and steel pilings would result in the loss of approximately 0.007 acre of essential fish habitat/critical habitat. Removal of the existing 444 on-site wood creosote pilings would result in the return of approximately 0.011 acre of Bay–Delta subtidal habitat or a net gain of 0.004 acre from pilings. Alterations to the existing shoreline would result in the loss of approximately 600 linear feet of existing artificial rocky intertidal habitat. The lost rocky intertidal habitat would be replaced with approximately the same length of artificial rocky intertidal (680 feet). Additionally, construction of the wharf would result in the loss of approximately 1.07 acres of nearshore intertidal and soft substrate subtidal habitat under new fill within the project site. ~~This loss of Bay–Delta tidelands will be partially offset by the installation of the 10-foot by 60-foot self-propelled boat launch at the City of Vallejo Municipal Marina, existing artificial rock~~

~~armoring would be removed along an 18-foot-wide path through the existing shoreline rock armoring at the Marina. The rock armoring would be replaced within the 18-foot-wide path and along both sides of the concrete boat launch once the articulated concrete pad is installed. Portions of the articulated concrete launch ramp would be placed above and below the existing rock armoring. Approximately 5 to 10 feet of existing soft substrate harbor bottom will be covered with the concrete mat.~~

Total short and long-term habitat loss from VMT wharf construction (including dredging, pilings, shoreline modification, in-Bay fill) is estimated at 10.54 acres, with 1.04 acres being permanent from Bay infill and 9.5 acres being temporary from dredging. ~~Total short- and long-term habitat loss from the construction of the proposed public launch ramp at the City of Vallejo Municipal Marina would be < 0.25 acre.~~

Altering benthic habitat and associated infaunal and epifaunal communities can result in the loss or reduction of habitat suitable for fish foraging, especially for sensitive species including salmon, steelhead, green sturgeon, and groundfish. The current benthic community inhabiting the project site includes assorted amphipods, polychaetes, mollusks, and gastropods that are common fish forage, especially the mollusks by green sturgeon (74 FR 52300–52351). Green sturgeon is known to feed upon opossum shrimps (*Neomysis mercedis* and *N. awatschensis*), the amphipod *Corophium*, the annelid worms, California bay shrimp (*Crangon franciscorum*), the isopod *Synidotea laticauda*, the Asian clam (*Corbicula fluminea*), and the gastropod *Olivella baetica* (EPIC 2001). Only the amphipod *Corophium* was reported to be part of the benthic infaunal community at the VMT Site (Appendix E-6).

The benthic infaunal community inhabiting the VMT Site is also consistent in composition with those reported by NOAA (NOAA Fisheries 2007) as inhabiting polyhaline (salinities in the 18.0–30.0 ppt range) and mesohaline (salinities in the 5.0–18.0 ppt range) environments (Appendix E-6). AMS (Appendix E-6) reported that of the 16 most abundant taxa observed at the VMT Site, NOAA listed 14 as key taxa that characterized channel, channel edge, and shallow subtidal habitats in polyhaline and mesohaline environments.

~~The rocky intertidal armoring at the City of Vallejo Municipal Marina location for the proposed public launch facility supports a much more limited intertidal community than present at the VMT Site. Heavy siltation on the rocks has severely limited the attachment and growth of a robust intertidal invertebrate and algal community (Appendix E-7).~~

The proposed project~~, including its off-site improvements at the Marina,~~ would result in permanent loss of approximately 1.0~~4~~5 acres of subtidal soft substrate habitat to Bay infill to build the VMT facility, and the temporary loss of 9.5 acres to periodic dredging~~, and the loss of <0.005 acre of rocky intertidal habitat at the City of Vallejo Municipal Marina~~. Despite the occurrence of several factors that

would be considered potentially offsetting factors in assessing the overall impact of this action, i.e., the low suitability of the substrate to provide fish forage for protected and special-status fish species, the absence of any submerged aquatic vegetation (e.g., eelgrass or widgeon grass), the positive effects of the removal of toxic creosote pilings, and the creation of an additional 800 feet of subtidal and intertidal rocky habitat (approximately 0.92 acre of new subtidal hard substrate habitat), ~~and the replacement of rocky intertidal habitat at the City of Vallejo Municipal~~ the infill of Bay Delta subtidal and intertidal habitat still results in a determination that VMT construction activities and dredging would result in **significant** impacts (**Impact 3.3-12**), and mitigation is provided in Section 3.3.5.

Table 3.3-3
In-Water Acreage of the Napa River Affected by the VMT Project Component

In-Water Construction Location	Activity	Acreage			Feet	Cubic Yards
		Fill (Above and Below Mean High Water Mark)	*Lost Marine Habitat (To Bay Fill or Dredging)*	*Shading*	*Shoreline Change*	*Dredged Sediments*
VMT Phase 1 Wharf	Redeveloped shoreline	3.51	1.03	—	600	27,600
	Wharf decking	—		0.33	—	—
	Pilings	0.007	0.007	—	—	—
	Dredged Channel	—	9.5	—	—	62,200

Source: Appendix E-6
Note: All quantities are estimated maximums.

The loss of approximately 600 linear feet of artificial hard substrate in the high to low intertidal zone combined with the loss of intertidal and subtidal artificial hard substrate from the removal of approximately 444 creosote pilings, would result in the temporary loss of limited hard substrate habitat which supports a unique and vital community in the San Francisco Bay–Delta (SFBSHGP 2010). Hard substrate habitat supports a community of sessile organisms, including the native Olympia oyster, which provides important forage for many species of fish, birds, and megabenthic invertebrates. The intertidal community observed inhabiting the VMT Site predominantly consists of colonial diatoms, the algae *Ulva* spp. and *Fucus distichus*, barnacles, mussels, the Asian shore crab (*Hemigrapsus sanguineus)*, and the native Olympia oyster (Appendix E-4).

Removal or burial of the intertidal hard substrate and the existing wood pilings would result in the complete loss of any associated flora or fauna. Although this loss would be temporary in nature until the new rock armoring/riprap and wharf pilings are installed, it would require some time, possibly a year or more to recover to pre-disturbance conditions. Choice of material for use in armoring the shoreline is also important and can have an effect on the speed of recovery, the taxa colonizing the hard substrate, and the long-term stability of the structure and the type of habitat it provides (Figley 2003; Anderson et al. 2009). The placement of overlapping armoring along

sloping shorelines provides increased colonizing surface area and protected habitat not provided by flat hard substrate surfaces that results in increased taxonomic diversity, abundances, and taxonomic presence than typically provided by flat hard substrate surfaces such as steel sheet piling, concrete break walls, and rock cliffs (AMS 2009).

It can be anticipated that the marine biota expected to inhabit the new artificial hard substrate habitats at the VMT Site would consist, at a minimum, of the same species inhabiting the existing middle and lower rocky intertidal and near subtidal habitats. It can also be anticipated that the increased intertidal and shallow subtidal hard substrate habitat provided by the new VMT wharf and shoreline modifications would have the potential to increase the diversity and abundance of the sessile community inhabiting it compared to the existing community present. Additionally, the shaded intertidal area, estimated at approximately 0.33 acre, provided by the new wharf, compared to the existing estimated 0.09 acre of the remaining deteriorated wharf, can be expected to provide additional protected habitat for native Olympia oysters, since the only location AMS observed Olympia oysters at the VMT Site was underneath the existing pier/wharf (Appendix E-4).

The temporary loss of 600 linear feet of lower and middle intertidal and subtidal artificial hard substrate and associated biota as a result of the deconstruction of the existing wharf and construction of the new wharf at the VMT Site, when combined with the addition of approximately 680 linear feet (0.78 acre) of middle and lower intertidal and subtidal artificial hard substrate and the creation of additional intertidal and subtidal hard substrate habitat, would potentially support a more diverse and abundant biological community, including providing more habitat for native Olympia oysters and other species, which could be expected to provide improved fish foraging. The impact would be **less than significant after implementation of MM-3.3-10**. These elements of the project may be subject to additional mitigation measures as part of the BCDC, RWQCB and CDFW permitting process and included in mitigation required by MM-3.3-10.

Additionally, the permanent loss of the artificial hard substrate caused by removing the existing 444 creosote wood pilings (0.019 acre) would be **less than significant** since they would be replaced with 101 concrete and steel pilings, which will be less toxic to marine life, longer lasting, subject to less physical disturbance and damage, and will provide an estimated 0.24 acre (a slight increase in surface area) of similar artificial hard substrate habitat for colonizing as the current pilings.

Exposure to Contaminants from Bay Sediments, Recycled Concrete, Creosote Pilings, and Construction Debris

The presence of organic or inorganic contaminants in Bay–Delta sediments at concentrations high enough to result in detectable increased loading of contaminants to Bay–Delta waters and therefore pose a threat to marine biota inhabiting the project site is not expected, either from dredging activities or placement/removal of pilings. Additionally, any reused concrete for engineered fill is

expected to be contaminant free and therein pose little to no threat of contaminant exposure to marine resources, as discussed in Section 3.7, Hazards and Hazardous Materials.

As discussed in Section 3.8, Hydrology and Water Quality, only surface sediments have been tested for organic and inorganic contaminants, but no sediment cores or analysis of potential dredged sediment has occurred. As part of the permitting process for dredging these sediments, representative samples would be collected for physical, chemical, toxicity, and bioaccumulation to assess the quality of sediment and determine the suitability for each disposal option permitted. Under the proposed project, dredged sediments may be disposed in the Bay, but if they meet state and federal criteria for beneficial reuse would be dried and mixed with reclaimed and properly sized concrete to produce engineered fill which would be used to construct the new wharf. If analytical analysis shows that either organic or inorganic contaminants are present in sediments at unacceptable concentrations for any aquatic or beneficial reuse site, adherence to the Long-Term Management Strategy (LTMS)-required best management practices (BMPs) for dredging and disposal procedures (e.g., use of silt curtains, upland disposal) would ensure that any potential impact from the resuspension or leaching of organic or inorganic contaminants from dredging or dredging materials would result in **less-than-significant** impacts. Additionally, implementation of mitigation measures MM-3.8-1 and MM-3.8-2, described in Section 3.8, Hydrology and Water Quality, would ensure that both dredged sediments and any reclaimed and reused concrete would be adequately tested and certified to be free of potentially harmful contaminants before being reused in construction of the new wharf.

The removal of derelict creosote pilings in the Bay–Delta results in the loss of low quality and continually degrading artificial subtidal and intertidal hard substrate habitat that poses potential toxicity issues to marine invertebrates and fish, especially Pacific herring, a species of special concern, as well as to the survivability of their eggs (Vines et al. 2009). The potential impact to the marine benthic community inhabiting the sediments in close proximity to these creosote pilings from polyaromatic compounds poses potentially greater risk to the quality of the fish foraging habitat for protected and MSA-listed fish (Stratus Consulting 2006; EPA 2008). The potential impact to subtidal habitats and special-status taxa from their presence is reduced with the removal of these structures. The San Francisco Bay Subtidal Habitat Goals Project (SFBSHGP 2011) identified critical advantages in the removal of derelict creosote pilings in the Bay–Delta to include:

- Reduced substrate for introduced species
- Reduced shading of the bottom and water column
- Reduced toxic effects of creosote and other contaminants
- Reduced restrictions to flow and sediment movement
- Restoration, re-creation, or realignment of intertidal mudflats, sand flats, rock, and shellfish, eelgrass, and SAV beds

They further identified potential disadvantages to be:

- Disruption during removal (physical damage, turbidity, and release of toxic compounds)
- Reduced habitat for fish and invertebrates including native oysters
- Reduced resting or nesting sites for birds

Critical to the prevention of increased contaminant exposure to marine taxa by removing creosote pilings, is the operational approach employed in their removal. Use of excavators, backhoes, and other mechanical means to physically grab onto and attempt to free the piling from the seafloor generally results in the piling disintegrating into wood fragments, exposing previously unweathered polycyclic aromatic hydrocarbons (PAH)-laden creosote to the marine environment. Generally, the piling is broken off at or slightly above the sediment mud line. Deployment of an oil recovery boom can assist in the corralling of floating pieces, but in locations where high wind and tidal current occur, the effectiveness of the boom is severely restricted. The most effective BMP for removal of creosote pilings is the use of a vibratory hammer to vibrate structurally sound pilings from the seafloor (EPA 2007). This operational method results in minimal, if any, creosote wood piling fragments discharged to Bay–Delta waters and largely eliminates the threat to special-status species and Bay–Delta marine resources. However, for those pilings that are not structurally sound enough to be removed by the vibratory hammer, other methods (as described above) would be employed. Because a significant percentage of the estimated 444 creosote pilings at the VMT Site are not structurally sound enough to be removed using a vibratory hammer, removal would result in a **significant impact (Impact 3.3-3)** from the release of toxic PAHs from creosote piling fragments of pilings removed with methods other than a vibratory hammer. Mitigation measures, designed to bring the impact of removing the creosote pilings to a level of less than significant, are provided in Section 3.3.5.

During proposed deconstruction and construction activities at the VMT Site, construction debris could be introduced, including contaminant containing concrete, brick and asphalt materials, creosote wood, hydrocarbons, building materials and wrapping, and sediment runoff into the Napa River and the greater Bay–Delta ecosystem. This could have detrimental effects on fish, birds, and marine mammals, as well as pose impairments to foraging habitat used by special-status species. Many of these materials (e.g., creosote coated wood, asphalt, asbestos materials, plastic) contain potentially hazardous contaminants that could pose a threat to special-status marine species and to marine biota in general. Gasoline and diesel-powered construction and deconstruction equipment also possess the potential for the accidental release of toxic hydrocarbons to the Napa River and to Bay–Delta waters. The deliberate or accidental discharge of construction and deconstruction materials into project site waters could result in a **significant impact (Impact 3.3-4),** and

mitigation measures designed to bring the impact of deconstruction and construction activities to a level of less than significant, are provided in Section 3.3.5.

Resuspension of Sediments from Dredging and Piling Removal

Resuspended sediments from dredging approximately 89,800 cubic yards of material would be expected to be short-term, occurring only while dredging is conducted. Duration for dredging based on a 7,000-cubic-yards-per-day production rate is estimated at approximately 12–14 days. All in-water construction activities would be required to comply with USACE, EPA, RWQCB, and BCDC regulations and provisions in issued permits including ~~best management practice~~BMPs for avoiding or reducing potential impacts related to resuspended sediments. In addition, wind waves and high tidal currents present at the VMT Site may quickly dissipate any turbidity plumes generated from dredging operations and thus minimize any effect on marine habitats and biota. Potentially increased turbidity from VMT construction activities is not expected to have a substantial effect on plankton productivity, since the shallow waters adjacent to the waterfront are naturally turbid with light penetrating less than a few feet from the surface. The use of clamshell dredging, with a clamshell bucket ≤ 10 cubic yards, for port slips and open water areas is consistent with routine maintenance and new channel/harbor dredging methodologies currently employed throughout the Bay annually and evaluated in the development of the LTMS for dredging in San Francisco Bay (LTMS 1998). Compliance with existing regulations and permit requirements would require strict adherence to BMPs for avoiding or reducing suspended sediments would ensure that the impact from contaminant exposure from resuspension of sediments would be **less than significant**.

Entrainment of Marine Taxa

Dredging of Bay–Delta sediments by either hydraulic suction or clamshell dredging equipment has the potential to entrain (directly remove) fish, benthic infauna, and mobile epibenthic (on the sediment surface) invertebrates, such as shrimp and crabs (Reine and Clarke 1998). Of these two dredging technologies, clamshell dredging, especially with a clamshell bucket ≤ 10 cubic yards capacity, has the lowest occurrence of fish and mobile invertebrate entrainment, since these animals are generally capable of sensing the pressure wave that precedes the clamshell bucket traveling through the water column, are expected to actively avoid the bucket, and generally avoid the active dredging site because of increased seafloor turbidity and noise (Reine and Clark 1998). A derrick barge with a clamshell bucket ≤ 10 cubic yards capacity would be used to dredge the approximate 136,300 cubic yards of material at the VMT Site. If contaminated sediments are found during the dredging process, the estimated 12–14 days needed to dredge this volume of material could be slightly extended, depending on the type and size of the dredge.

The LTMS for the Placement of Dredged Materials in San Francisco Bay Region (LTMS 1998) evaluated the potential entrainment of special-status and sensitive fish and invertebrate species by in-Bay dredging activities. To prevent and minimize entrainment of fish and invertebrates, the

LTMS BMPs for Bay–Delta dredging include environmental work windows, restricted in-Bay disposal, limits on overflow dredging, and lowering hydraulic suction dredge heads when priming (LTMS 2013). VMT proposed dredging would be conducted with a clamshell dredge of ≤ 10 cubic yards capacity, and would employ either upland disposal or if acceptable would be used for beneficial reuse such as engineered fill on site. In addition, overflow dredging would be restricted and this work would be conducted within the environmental work windows shown in Table 3.3-4 in accordance with the LTMS. By adhering to the LTMS work windows and the employment of LTMS-established BMPs, salmon, steelhead, delta smelt, longfin smelt, and Sacramento splittail would not be present in the VMT Site during dredging, and the risk to these special-status species would be **less than significant**.

Table 3.3-4
Environmental Work Windows for Maintenance Dredging Activities
Established in the Long-Term Management Strategy for San Francisco Bay

Species	Applicable Bay Region/Location	Authorized Work Windows
Steelhead Trout	Napa and Petaluma Rivers, Sonoma Creek	August 1 to October 15
Chinook Salmon, juveniles	San Francisco Bay Bridge to Sherman Island	June 1 to November 30
Chinook Salmon, adults	Pinole Shoal Suisun Bay Channel	June 1 to November 30
Chinook Salmon (Proposed 2014 Modification)	Napa River Channel/Mare Island Strait, Including Vallejo	No dredging December 1 to May 31
Sacramento Splittail	Carquinez Bridge to Collinsville	Consultation Required
Sacramento Splittail, juveniles	North San Pablo Bay, Napa and Petaluma Rivers	August 1 to January 31
Delta Smelt (water > 10 feet)	Carquinez Bridge to Collinsville	September 1 to November 30
Delta Smelt	Napa River	August 1 to January 31
Longfin Smelt	Carquinez Bridge to Collinsville	September 1 to November 30
Dungeness Crab	North Bay, San Pablo Bay, and shallow berthing areas	July 1 to April 30

Sources: LTMS 2004, 2014.

It should be noted that the LTMS environmental assessment and guidelines were initially established prior to green sturgeon being listed as an ESA-protected species on April 7, 2006, longfin smelt as a CESA-protected species on June 25, 2009, and the determination by the USFWS that longfin warrant listing, but that USFWS is precluded at this time from proposing to list the species because of the need to address other higher priority listing actions. Since these listings and determination, the LTMS has undergone a 12-year review and updated the environmental work windows and guidance to dredgers conducting maintenance dredging. Table 3.3-4 reflects these updates.

Although all of San Francisco Bay–Delta is listed as critical habitat for green sturgeon, their actual distribution and use of habitats throughout the Bay–Delta are relatively unknown. Green sturgeon is known to be present in the mouth of the Napa River (AECOM 2013; Ducks Unlimited 2014).

There is limited evidence of sturgeon entrainment during dredging (Hoover et al. 2005) and no known sturgeon entrainment incidents within San Francisco Bay–Delta by clamshell dredge. Since mechanical clamshell dredging equipment, which has been reported to be less a threat to fish entrainment than hydraulic dredging (Reine and Clark 1998), would be used for proposed VMT dredging activities, the potential risk to green sturgeon entrainment would be **less than significant.**

Construction Noise Impacts on Fish and Marine Mammals

As part of the wharf reconstruction, the VMT project component would include installation of eighty-one (81) precast 24-inch concrete pilings and approximately 600 feet of steel sheet piling for construction of a reinforced concrete wharf and 8 additional 30-inch steel pipe-pilings to support mooring points on the wharf. Concrete piles would be driven with an impact hammer using cushion blocks. Steel pipe piles would be driven to the maximum extent possible with a vibratory hammer. Concrete and steel piles that are driven within the water column can produce high-intensity noise and result in damage to soft tissues, such as gas bladders or eyes (barotraumas), and/or harassment of fish and marine mammals such that they alter swimming, sleeping, or foraging behavior or abandon temporarily forage habitat. Protected and managed fish species, including salmon, steelhead, Sacramento splittail, delta and longfin smelts, Pacific herring, green sturgeon, and other bottom fish, as well as Pacific harbor seals and California sea lions, use the waters adjacent to the VMT for foraging and as a transit corridor between the open ocean (via the Golden Gate) and the Napa River, and would be potentially affected by the noise from pile driving.

The striking of a pile by a pile-driving hammer creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses, as a function of time are referred to as a waveform. Peak waveform pressure underwater is typically expressed in decibels (dB) referenced to 1 microPascal (µPa). Sound levels are generally reported as peak levels (peak) and sound exposure levels (SEL). In addition to the pressure pulse of the waveform, the frequency of the sound, expressed in hertz (Hz) is also important to evaluating the potential for sound impacts. Low frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high frequency sounds. Pile driving hammers driving concrete and steel piles in water typically generate sound waves ranging between 185–220 dB_{peak} and 160–195 dB (SEL) (Caltrans 2009).

Table 3.3-6 provides a summary of estimated underwater noise levels from pile driving for wharf construction using both vibratory and impact hammers. For purposes of this assessment, it is assumed that the underwater sound levels generated by pile driving at the VMT Site would be similar to those reported by Caltrans (2009) for 24-inch octagonal concrete piles and both 30-inch steel pipe and steel sheet piles. Additionally, ambient underwater noise for a major harbor like San Francisco is estimated at approximately 150 dB (peak) (Caltrans 2009),

although the ambient noise at the VMT Site can be assumed to be slightly lower, since little large vessel traffic occurs at that location, the Vallejo Ferry being the most frequent.

Caltrans (2009) reported sound levels of 175–192 dB at distances of approximately 10 and 30 feet (3 to 10 meters), respectively being generated (depending on water depth) when using an impact hammer to drive 24-inch octagonal concrete pilings. Caltrans further reported underwater sound levels of 205 dB at a distance of 30 feet (10 meters) being generated when using an impact hammer to drive 30-inch steel pilings. These sound levels can be reduced using attenuation devices such as bubble curtains and cushion blocks, as shown in Table 3.3-5. As an example, underwater sounds levels can be reduced for 24-inch octagonal concrete piles from 192 dB to 188 dB using cushion blocks and are shown to further lower them down to 175 dB when utilizing bubble curtains (Caltrans 2009). Pile driving for the VMT project component would use wood cushion blocks.

Using in-water noise level data for impact hammer driven 24-inch concrete and 30-inch steel piles and applying estimated installation requirements for the VMT wharf (approximately 580 hammer strikes as estimated in Caltrans for 24-inch concrete piles), the distances required to reach established regulatory thresholds of 187 and 183 dB, discussed above, can be estimated (Caltrans 2009). Results for these estimates are shown in Table 3.3-6. The results indicate that using an impact hammer to drive a 24-inch concrete piling would be expected to generate a peak sound level of 175-192 dB and 166 SEL, at a distance of 30 feet (10 meters). Using an impact hammer to drive a 30-inch steel piling would be expected to generate a peak sound level of 205 dB and 180 SEL, at a distance of 30 feet (10 meters).

Furthermore, the sounds generated from driving 24-inch concrete pilings would be expected to attenuate to 187 dB at distances of 0-28 meters (0 to 0.02 mile) and to 183 dB at distances of 0–51 meters (0 to 0.03 mile). The distance of the channel directly adjacent to the VMT Site is approximately 335 meters, so it can be assumed that any sound produced from pile driving of 24-inch concrete pilings using an impact hammer would reach approximately one-sixth of the way across the channel. Sound produced from use of an impact hammer to drive 30-inch steel pilings is estimated to reach across the channel and presumably bounce back across the channel at sound levels of 150 dB, resulting in potential behavioral effects on fish and marine mammals transiting the Napa River adjacent to the project site.

In addition, installation of 24-inch steel sheet piles is proposed during wharf construction. VMT would employ a vibratory hammer to install these estimated steel sheet piles generating underwater noise levels of 177 dB at 30 feet and attenuating to 183 dB at a distance of approximately 30 feet.

This would indicate that all special-status fish species, especially smelt and Sacramento splittail, and any mammals that happen to be present in the channel would be affected by noise produced by all pile driving requiring the use of both impact and vibratory hammers.

Noise Impacts to Fish

Scientific investigations on the potential effect of noise on fish indicate that sound levels below 183–187 dB do not appear to result in any acute physical damage or mortality to fish a (barotraumas) depending on their size (Dalen and Knutsen 1986; Caltrans 2009). Table 3.3-7 provides a summary of some known acute and sub-lethal effects of noise on fish and marine mammals. Table 3.3-8 additionally provides NOAA acute and sub-lethal effects of underwater noise levels for different groupings of marine mammals. Noise levels that result in startle responses in steelhead trout and salmon have been documented to occur at sound levels as low as 140 dB at a frequency of 100 Hz and between 180 and 186 dB in Pacific herring (San Luis and Delta Mendota Water Authority and Hanson 1996). Any disturbance to ESA-listed fish species that results in altered swimming, foraging, movement along a migration corridor, or any other altered normal behavior is considered harassment.

Table 3.3-5
Estimated Near-Source Underwater Noise Levels From Pile Driving

Pile Size/Type	Relative Water Depth	Distance from Piling Measurement Taken	Average Sound Pressure			Attenuation Device
			Peak (dB)	*Route Mean Square (RMS)*	*SEL (dB)*	
Vibratory Driver						
24-inch AZ steel sheet	~50 feet (15 meters)	~30 feet (10 meters)	177	163	162	None
*Impact**						
24-inch AZ steel sheet	~50 feet (15 meters)	~30 feet (10 meters)	205	189	179	None
24-inch octagonal concrete	~10 feet (3 meters)	~30 feet (10 meters)	192	172	—	None
24-inch octagonal concrete	~30–50 feet (10-15 meters)	~30 feet (10 meters)	188	176	166	Cushion block
24-inch octagonal concrete	~10 feet (3 meters)	~30 feet (10 meters)	175	162	—	Short confined bubble curtain
30-inch steel pipe pile	<15 feet (<5 meters)	~30 feet (10 meters)	205	190	—	None
30-inch steel pipe pile	<15 feet (<5 meters)	~30 feet (10 meters)	196	180	—	Bubble Curtain

Source: Caltrans 2009
Notes:
* Note that use of an impact hammer is conservatively used in this analysis for driving the 30 steel piles listed in this table; as noted above, the applicant's preferred method of installation for these larger piles is use of a vibratory hammer, which would have reduced average sound pressure results.
1 Signal analyses of pile installation sounds were not performed; therefore, corresponding SEL data are not available.
2 The sound from pile driving was only partially attenuated due to problems setting the isolation casing/air bubble curtain.

Based on estimated underwater noise attenuation values (see Table 3.3-6), the use of impact hammers with a cushion block to install the 36-inch steel piles is expected to generate 187 dB or lower sound levels for a short period of time within a zone extending out approximately 4 to 44 meters (0 to 0.03 mile) from the VMT Site (Caltrans 2009), or approximately one-tenth the width of the Napa River at the VMT Site. As noted above, the applicant's preferred method for use of a vibratory hammer to drive the 30-inch steel piles would produce lower sound level impacts. Pile driving of 24-inch concrete piles using an impact hammer is estimated to attenuate to 187 dB at distances of 0 to 28 meters (0 to 0.02 mile) and to 183 dB at distances of 0 to 51 meters (0 to 0.03 mile), respectively, or approximately one-tenth of the distance across the Napa River at the VMT Site.[3]

During pile driving activities, fish are not expected to be present within a zone of several meters (6 to 8 feet), since the movement of the piling through the shallow water and initial contact with the Bay–Delta seafloor would result in any fish that are present quickly leaving the immediate area. Any salmon, steelhead, green sturgeon, Pacific herring, or MSA-managed fish species swimming near pile driving activities are therefore not expected to experience any acute effects or barotraumas from vibratory pile driving. However, longfin smelt, delta smelt and Sacramento splittail frequent shallow water, so there is a greater probability that they would be present in the project area during pile driving. Although the potential for acute barotrauma to occur is limited, behavioral changes in fish movement or activity can be expected to occur. Due to this potential impact from pile driving noise, the use of vibratory pile drivers and other BMPs can be expected to reduce underwater pile driving noise to substantially reduced noise levels.

[3] The width of the Napa River at the VMT Site is estimated at 335 meters (1,099 feet or 0.21 mile).

Table 3.3-6
Estimated Vibratory and Impact Hammer Pile Driving Sound Levels and Disturbance to Criteria Levels

Pile Type	Estimated Number of Strikes	Equipment Type	Distance to Sound Level Threshold* (meters)				Attenuation Equipment
			206 dB	*187 dB (Fish ≥ 2g)*	*183 dB (Fish < 2g)*	*150 dB (Behavioral)*	
24-inch AZ Steel Sheet	100-200	Vibratory	0	5-7	9-14	74	None
24-inch AZ Steel Sheet	100-200	Impact	9	63-100	117-185	3981	None
24-inch Octagonal Concrete	580	Impact	1	0	0	293	None
24-inch Octagonal Concrete	580	Impact	1	28	51	541	Cushion block
24-inch Octagonal Concrete	580	Impact	0	0	0	63	Short confined bubble curtain
30-inch steel pipe pile	580	Impact	9	0	0	63	None
30-inch steel pipe pile	580	Impact	2	0	0	1000	Bubble Curtain

Notes:

* Calculated according to protocols outlined in Caltrans 2009. Number of strikes also taken from Caltrans 2009.

1* Estimated range based on subtracting 11 and 26 dB, documented reductions in sound pressure levels with wood cushion block (Caltrans 2009).

2 Signal analyses of pile installation sounds were not performed; therefore, corresponding SEL data are not available.

3 Estimated number of strikes based on minimum number of strikes to drive 24-inch concrete piling (Caltrans 2009). Driving of 30-inch steel piles with a vibratory hammer as preferred by the applicant would produce lower sound impacts without emissions associated with "strikes."

Table 3.3-7
Potential Effects of Varying Noise Levels to Fish and Marine Mammals

Taxa	Sound Level (dB)	Effect	Reference
Fish			
All fish >2 grams in size	206 (peak) 187 (SEL)	Acute Barotraumas	Fisheries Hydroacoustic Working Group 2008
All fish <2 grams	186 (SEL)	Acute Barotraumas	Fisheries Hydroacoustic Working Group 2008
Pacific Herring	180–186	Avoidance behavior	Dales and Knudsen 1986
Salmon, Steelhead	166	Avoidance behavior	Loeffelman et al. 1991
Salmon, Steelhead	140–160	Startle response	San Luis and Delta Mendota Water Authority and C.H. Hanson. 1996
Marine Mammals			
Marine Mammals	180–190	Level A[1] harassment out to 65 feet from sound source	NOAA Fisheries 2011
Harbor seals	180 at 12 kHz	Discomfort zone out to 4 miles	Kastelein et al. 2006
Harbor seals	166–195	Can be detected at distances up to 2.9 miles	Terhung et al. 2002
Marine Mammals	160 from impact hammer	Level B[2] harassment out 328 feet from sound source	NOAA Fisheries 2011
Marine Mammals	120 from vibratory hammer	Level B[2] harassment out to 1.2 miles	NOAA Fisheries 2011
Harbor seals	>155	Avoidance behavior	Terhung et al. 2002
Harbor seals	107 at 12 kHz	Discomfort zone out 20-meters from the sound source	Kastelein et al. 2006
Harbor seals	>75	Threshold level of detection	Kastak and Schusterman 1998

Notes: kHz = kilohertz

1 Level A harassment is defined as any act of pursuit, torment, or annoyance with has the potential to injure a marine mammal or marine mammal stock in the wild.

2 Level B harassment is defined as any act of pursuit, torment, or annoyance with has the potential to disturb a marine mammals or marine mammal stock in the wild.

Table 3.3-8
Summary of NOAA Established Permanent Threshold Shift[1] and Temporary Threshold Shift[2] Sound Levels[3] from Underwater Noise Levels for Marine Mammals

Hearing Group	Impulsive[4]	Non-impulsive[5]
Low-Frequency (LF) Cetaceans (Baleen whales)	$L_{pk,flat}$: 219 dB $L_{E,LF,24H}$: 183 dB	$L_{E,LF,24H}$: 199 dB
Mid-Frequency (MF) Cetaceans (Dolphins, toothed whales, beaked whales, bottlenose dolphins)	$L_{pk,flat}$: 230 dB $L_{E,LF,24H}$: 185 dB	$L_{E,LF,24H}$: 198 dB
High-Frequency (HF) Cetaceans (True porpoises, Kogia, river dolphins, cephalohynchid, *Lagenorhynchus cruciger*, and *L. australis*)	$L_{pk,flat}$: 202 dB $L_{E,LF,24H}$: 155 dB	$L_{E,LF,24H}$: 173 dB

Table 3.3-8
Summary of NOAA Established Permanent Threshold Shift[1] and Temporary Threshold Shift[2] Sound Levels[3] from Underwater Noise Levels for Marine Mammals

Hearing Group	Impulsive[4]	Non-impulsive[5]
Phocid Pinnipeds (True Seals) (Underwater)	$L_{pk, flat}$: 218 dB L_E,$L_{F,24H}$: 185 dB	L_E,$L_{F,24H}$: 201dB
Otariid Pinnipeds (Sea lions and fur seals) (Underwater)	$L_{pk, flat}$: 232 dB L_E,$L_{F,24H}$: 203 dB	L_E,$L_{F,24H}$: 219 dB

Notes:
1 Permanent Threshold Shift is when a permanent reduction in hearing occurs or the frequencies at which sound can be detected are permanently reduced.
2 Temporary Threshold Shift is when a short-term (temporary) reduction in hearing or the frequency at which sound can be detected occurs.
3 Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa²s. In this table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2014). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.
4 Impulsive noise is a category of noise which includes unwanted, almost instantaneous sharp sounds.
5 All noise not included in the definition of impulsive noise.
Source: NOAA Fisheries 2016.

As indicated above, use of an impact hammer to drive 24-inch concrete and 30-inch steel pilings can be expected to reach sound levels that exceed 187 dB distances equal to or slightly greater than one-tenth the width of the Napa River at the project site. These sound levels pose potential significant risk to small fish such as longfin and delta smelts and Sacramento splittail, as well as cause salmon, steelhead, and green sturgeon and could modify their foraging and/or normal swimming behaviors (Table 3.3-5). Although the LTMS windows (Table 3.3-4) were designed for dredging, they are also applicable for pile driving. Restricting the installation of all pile driving to the LTMS work windows, when potentially threatened special-status fish species are not expected to be present in the project area, would minimize if not eliminate the potential impact to these species. If the work is unable to adhere to the designated LTMS work windows, the project must develop and follow a noise management plan acceptable to USFWS, CDFW, and other state and federal agencies with regulatory jurisdiction to prevent noise impacts on special-status fish species. As proposed by the applicant, vibratory hammers should be implemented on all installations whenever and wherever possible, as a BMP. The use of other BMPs such as bubble curtains and cushion blocks can be expected to reduce transmitted sounds levels and the distance over which potentially deleterious sounds levels would travel during pile drive installations. Effective application of these BMPs (potentially as permit conditions) is also critical to reducing pile driving noise generation.

Corroborating this determination, the NOAA Fisheries 2007 programmatic consultation for essential fish habitat pursuant to the MSA-listed (NOAA Fisheries 2007) and ESA-listed (74 FR 52300–52351) species, and marine mammals covered by the MMPA, established activity-specific criteria to avoid or minimize adverse effects to individuals and cumulative instances of specific routine permitted activities. These activities include bridge repair, bank stabilization, culvert replacement, navigational dredging, boat dock construction and maintenance, piling installation, pipeline repairs, and levee maintenance. As part of a project's consultation with NOAA Fisheries, pursuant to the ESA, MMPA, and MSA, if the proposed activity included one of the above routine permitted activities and conformed to normal and routine type operations, the activity would be allowed pursuant to specific requirements. Specific to piling installation, this programmatic consultation established that for any size of steel, wood, or concrete piling installation employing a vibratory hammer, that installation could occur year-round with no meaningful impact to fish.

Based on the potential for underwater noise generated from impact hammer pile driving of 24-inch concrete, 30-inch steel pipe, and steel sheet pilings for the construction of the wharf, the potential impact to special-status fish species, including salmon, steelhead, sturgeon, and especially longfin and delta smelt and Sacramento splittail, would be **significant (Impact 3.3-5)**, and mitigation is provided in Section 3.3.5.

Noise Impacts to Marine Mammals

Noise studies on pinnipeds (seals and sea lions) indicate that harbor seals can detect sounds in water as low as 65 dB at frequencies of 75 Hz and higher, and that avoidance behaviors are regularly exhibited at sound levels of 80 dB above hearing thresholds, or approximately 160 to 165 dB (Kastak and Schusterman 1998) (see Table 3.3-7 and Table 3.3-8). Of particular significance are the investigations of Kastelein (Kastelein et al. 2006), which found that 12-kilohertz (kHz) sounds produced a discomfort threshold for harbor seals at 107 dB and that 180 dB sounds at the same frequency maintained a discomfort zone extending out 4 miles. Sounds at 12 kHz are extremely low frequency sounds and as such can travel long distances with little decrease in sound intensity. Programmatic consultation (NOAA Fisheries 2007) between USACE and NOAA Fisheries for routine harbor and port maintenance activities established that when marine mammals are potentially present, a species-specific work window would apply to the project; the project may be required to have on-site monitors; and incidental harassment permits might be needed. The consultation further stated that the project would be required to:

- Maintain route mean square (RMS) underwater sound pressures below levels that can injure (180 dB re 1 micropascal) or affect the behavior (160 dB re 1 micropascal) of marine mammals.
- Maintain a 1,600-foot (500-meter) safety zone around sound sources in the event the sound level is unknown or cannot be adequately predicted through modeling or calculations.

- Maintain sound levels below 90 dBA (A-weighted decibels) in air when pinnipeds (seals and sea lions) are present, by real-time noise monitoring.
- Halt work activities when a marine mammal enters the 1,600-foot (500-meter) safety zone.
- Bring loud mechanical equipment on-line slowly.
- Reduce vessel operations speed when marine mammals are in the project area.

Bay–Delta waters adjacent to the proposed pile driving activities at the VMT Site are infrequently used by harbor seals and California sea lions. They are mostly present during salmon and steelhead migration periods. Thus, there would be a potential for noise disturbance from proposed pile driving activities to affect these marine mammals if conducted when the probability of sea lions and harbor seals being present is highest. It can be assumed that if pile driving occurs during the LTMS work windows for salmon and steelhead, that the likelihood of causing impact to marine mammals would be minimal. Depending on when pile driving activities would be conducted for the VMT project component, the potential effects of underwater noise from pile driving on marine mammals could be **significant** (**Impact 3.3-6**), and mitigation is provided in Section 3.3.5.

Operational Impacts

Ongoing routine operation of the VMT project component would include activities that have the potential to directly and indirectly affect protected and special-status marine species listed earlier. These include the following.

- Installed wharf lighting can cause temporary increased nighttime illumination of Bay–Delta waters, which may alter normal fish behavior and increase bird, fish, and marine mammal predation on some fish species, including longfin and delta smelts and Sacramento splittail. Artificial lighting can attract marine mammals, including California sea lions and harbor seals, and some special-status marine birds, as discussed in Section 3.3.2, under the heading Terrestrial Biology.
- Stormwater runoff from the wharf can potentially introduce increased nutrients, sediments, and organic and inorganic contaminants to Bay–Delta waters.
- The placement of a large wharf over Bay–Delta waters would result in the shading of Bay–Delta waters, potentially resulting in the reduction of plankton productivity which support special-status species such as delta and longfin smelts and Sacramento splittail, as well as inhibit or prevent the establishment or growth of submerged aquatic vegetation beds such as eelgrass or widgeon grass.
- Ongoing maintenance dredging can be expected to result in the temporary loss of foraging habitat for some fish and marine mammal species, cause short-term and localized increased

water turbidity and exposure to sediment-affiliated organic and inorganic contaminants from resuspended sediments, and fish entrainment

- Wharf maintenance can be expected to result in the periodic removal and installation of 24-inch concrete piles that can result in the temporary loss of subtidal hard substrate habitat and associated marine community that is used for fish forage.
- Wharf piling installation and maintenance dredging can be expected to result in the temporary resuspension of potentially contaminated sediments during dredging, as well as in temporary shading from dredge overflow plumes, which could directly and indirectly affect special-status fish species.
- Replacement of 24-inch concrete pilings during wharf maintenance can result in increased noise levels that can be fatal and/or harmful to special-status fish and marine mammals.

VMT anticipates receiving approximately up to four vessels a month to load and offload bulk and break-bulk cargo from the wharf. The additional vessel traffic through the San Francisco Bay–Delta and the Napa River is not expected to result in any substantive increase in vessel traffic through San Francisco Bay as discussed in Section 3.12, Transportation and Traffic. As such, no potential threat to special-status species is expected from vessels using the VMT facilities.

The following discussions address the potential effect of the previously listed project-related ecological changes on project area marine habitats and their potential impact on identified sensitive species.

Increased Nighttime Artificial Illumination of Water

Increased artificial illumination of Bay–Delta waters at night can alter normal swimming and foraging behavior of fish, marine mammals, and seabirds. Many pelagic schooling fish, such as sardines and herring, as well as delta smelt and longfin smelt, are attracted to illumination cast by boats and offshore structures and are therein subject to increased predation from other fish species, marine birds, and marine mammals (TRAC 2001). Measures that are often used to minimize the effects of artificial night lighting on marine biota include installation of wharf, pier, and dock lighting that is low to the dock or pier surface; use of low-voltage, sodium, LED, or non-yellow-red spectrum lights; and use of shielding to restrict the transmittance of artificial light over the water. Critical to reducing artificial lighting impacts to aquatic species is to restrict artificial lighting to the areas of the wharf that require artificial illumination and to limit overwater lighting. The potential for impacts on sensitive species from artificial night lighting on the new wharf as well as from improved shoreside facilities and buildings would result in a **significant impact** (**Impact 3.3-7**), and mitigation is provided in Section 3.3.5.

Stormwater Runoff to Bay–Delta Waters

Stormwater runoff from the VMT wharf has the potential to result in the introduction of increased nutrients, sediments, and organic and inorganic contaminants to the Napa River and Bay–Delta ecosystems. As discussed in Section 3.8, Hydrology and Water Quality, the planned stormwater control plans for both the VMT and Orcem Sites have all stormwater directed away from the Napa River and contained in a retention pond. As a result, no potential threat to special-status species is anticipated from stormwater runoff from the collective projects and is determined to be **less than significant**.

Shading of Bay–Delta Waters

The installation of the wharf would result in overwater shading of approximately 14,500 square feet (0.33 acre) of subtidal and intertidal habitat. This is in comparison to the remnants of the deteriorated wharf, which currently provides approximately 0.17 acre of shading.

Overwater structures can alter the physical ecological conditions present under them, including increasing the deposition of sediments and thereby reducing water depth and the grain size composition of seafloor sediments and therein the composition of benthic infaunal communities, and reducing the penetration of ambient light into Bay waters (TRAC 2001). Decreased light penetration into Bay waters can have an effect on phytoplankton production and the presence and growth of marine algae, including eelgrass. Shade cast from docks, piers, and pilings has been shown to reduce the amount of ambient light within the marine environment, affect invertebrate and vertebrate community composition, and create behavioral barriers that can deflect or delay fish migration, reduce fish prey forage, and alter predator-prey relationships over normal open-water conditions (TRAC 2001).

During intertidal and benthic surveys of the VMT Site (Appendix E-4 and Appendix E-6), very little subtidal marine algae was observed, and no eelgrass or other submerged aquatic vegetation was present. The Napa River flows past the VMT Site and because of its location at the mouth of the river as it flows into San Pablo Bay, the site experiences twice daily high wave and tidal currents that maintain seafloor sediments and sediments in suspension. This results in naturally turbid water that limits ambient light penetration and phytoplankton production. Based on existing conditions at the proposed VMT Site, the potential effect of shading on sensitive species is expected to be **less than significant**. Additionally, the increased shading of the lower intertidal hard substrate habitat adjacent to the wharf is expected to result in increased native Olympia oyster habitat.

Wharf Maintenance Activities Including Maintenance Dredging and Wharf Piling Maintenance

As discussed earlier under VMT Construction Impacts, channel dredging and piling installation would result in the temporary loss of both soft and hard substrate habitat used to support marine taxa used as

fish forage for some special-status fish species and MSA-managed fish species. Additionally, these routine maintenance activities can result in the temporary resuspension of contaminated sediments, cause temporary shading from sediment plumes, and produce underwater noise that can be directly or indirectly harmful to special-status fish species and MSA-managed fish species.

Although the frequency of needed wharf maintenance or pile replacement is unknown, for the purposes of this assessment it is assumed that they would occur periodically throughout the life of the facilities and would be of short duration when they do occur. Maintenance dredging, which would be authorized through permits issued by state and federal regulatory agencies, may be required, on average, for a period of 5 days every 4 years. As discussed earlier under VMT Construction Impacts, the potential effects and affected special-status species would be similar in nature to those discussed for initial site dredging, piling removal, and replacement, as well as expected recovery of marine biota following the activity. As with the initial dredging and piling replacement, the application of BMPs, including adherence to LTMS acceptable work windows, would reduce the potential impact to special-status species; however, the impact would be **significant** without mitigation (**Impact 3.3-8)**. Mitigation is provided in Section 3.3.5.

Orcem Analysis

Construction Impacts

As discussed earlier, deconstruction/demolition of existing buildings and infrastructure at the Orcem Site and construction of new buildings and infrastructure has the potential to introduce demolition and construction debris, trash, and waste materials, as well as sediment and stormwater bearing hydrocarbons and other contaminants into the Napa River. These actions would pose a threat to special-status marine species and to marine biota in general. Additionally, the staging or stockpiling of potentially toxic deconstruction debris and materials such as concrete, asphalt, contaminated sediments or other contaminant-containing materials, such as asbestos, that are awaiting disposal or reuse, as well as stockpiling new construction materials and equipment near or adjacent to the waterfront could result in the accidental release of these materials into the Napa River and the Bay–Delta ecosystem, therein posing a significant threat and a **significant impact** to special-status species and the Bay–Delta ecosystem in general (**Impact 3.3-9**. Mitigation is provided in Section 3.3.5.

Operational Impacts

Stormwater runoff from the Orcem operations and onshore facilities has the potential to result in the introduction of organic and inorganic contaminants to the Napa River and to Bay–Delta ecosystems. As discussed in Section 3.8, Hydrology and Water Quality, the planned stormwater control plans for both the VMT and Orcem Sites have all stormwater directed away from the Napa River and contained

in a retention pond. As a result, no potential threat to special-status species is anticipated from stormwater runoff from the collective projects, and impacts would be **less than significant**.

B) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Terrestrial Biological Resources

VMT and Orcem Project Analysis

Approximately 0.01 acre of Northern Coastal Salt Marsh and 0.02 acre of Seasonal Wetland occur on the project site; however, these areas would not be impacted by the proposed project. Therefore, **no impact** to terrestrial riparian habitat or other sensitive natural community would occur as a result of the proposed project.

Marine Biological Resources

VMT and Orcem Project Analysis

No known eelgrass or extensive submerged aquatic vegetation beds occur at the VMT or Orcem Sites (Appendix E-4). Potential removal of some existing subtidal rock shoreline armoring/riprap and pier pilings may remove some artificial habitat used to support submerged aquatic vegetation, but their replacement by new pilings and hard substrate subtidal armoring/riprap, which would be recolonized, would result in a **less than significant** impact.

Although some native Olympia oysters were observed by AMS (Appendix E-4) inhabiting the lower intertidal area under the existing VMT wharf, it is assumed that they are also present in the shallow subtidal region of the VMT Site attached to existing rock armoring/riprap and wood pilings. Removal and replacement of both the rock armoring/riprap and pilings as part of the wharf construction, as discussed earlier under VMT Construction Impacts, would result in the temporary loss of both the existing artificial hard substrate habitat and any attached native Olympia oysters. This loss of artificial hard substrate habitat inhabited by native Olympia oysters would be temporary once the construction of the wharf is completed. As further discussed under VMT Construction Impacts, the substantial increase in linear footage of low intertidal and shallow subtidal artificial hard substrate habitat, as well as the 91% increase in low intertidal acreage covered by wharf decking, is expected to also increase the amount of suitable habitat for native Olympia oysters and therefore result in a **less than significant** impact.

C) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

VMT and Orcem Project Analysis

A wetland delineation was conducted by WRA in 2007 (Appendix E-1). The project site contains approximately 0.01 acre of Northern Coastal Salt Marsh and 0.02 acre of Seasonal Wetland, as well as tidal waters and a shoreline band. Northern Coastal Salt Marsh is considered a sensitive plant community by CDFW. Neither the Northern Coastal Salt Marsh nor the Seasonal Wetland would be impacted by the proposed development on the site. As discussed earlier under Impact B, there are no known eelgrass or extensive submerged aquatic vegetation beds at the VMT or Orcem Sites (Appendix E-4). For these reasons, **no impact** to federally protected wetlands would occur as a result of the proposed project.

D) Would the project 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?

Terrestrial Biological Resources

VMT and Orcem Project Analysis

The project site is not part of a regional wildlife corridor and is not directly connected to any larger area of contiguous habitat, as the site is surrounded by urban development.

The project site does not function as part of a terrestrial wildlife corridor that links large open space areas. Impacts to wildlife movement corridors would be **less than significant.**

Marine Biological Resources

VMT and Orcem Project Analysis

As discussed earlier (under VMT Construction Impacts) for criteria A, the waters of the Napa River adjacent to the project site are used as a migratory corridor by Chinook salmon (Central Valley fall and late fall-run), steelhead trout (Central California Coast), longfin smelt, delta smelt, and Sacramento splittail, as they swim to locations farther upriver to spawn. Depending on the species, the LTMS work windows identify acceptable periods of time when the special-status species are not expected to be present in the area. Additionally, delta smelt and Sacramento splittail are only known to be present in the lower Napa River during periods of high freshwater flow during wetter winters (LSA 2009).

Although dredging poses some risk to salmon, steelhead, longfin and delta smelts, and Sacramento splittail from entrainment, exposure to resuspended sediments and potential contaminants, the use of a bucket dredge (≤ 10 cubic yards capacity), adherence to the LTMS work windows, and the application to established BMPs required by the USACE, RWQCB, and BCDC when issuing permits for dredging, the potential effect of dredging on migratory fish species as they transit past the project site is expected to be **less than significant**.

Similarly, use of an impact hammer for pile driving of new 24-inch concrete and 30-inch steel piles can be expected to result in underwater noise levels that can result in permanent auditory damage to migrating fish, especially delta and longfin smelts, Sacramento splittail, and juvenile steelhead and salmon, as discussed earlier (under VMT Construction Impacts) for criteria A. This impact would be **significant** (**Impact 3.3-10**), and mitigation is provided in Section 3.3.5.

E) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Terrestrial Biological Resources

VMT and Orcem Project Analysis

A tree survey prepared for the project by WRA in 2007 identified 523 trees 6 inches or larger diameter at breast height~~dbh~~ (see Appendix E-2). The majority of trees species on the site are blue gum and white ironbark eucalyptus (265 trees), followed by blackwood acacia (61 trees) and Monterey pine (55 trees). These tree species make up 73% of trees on the site. The proposed project has been designed to avoid impacts to treed areas on site and would impact two southern magnolia (*Magnolia grandiflora*) trees. These trees are not regulated by the City's tree ordinance, and removing these trees would result in **no impact** related to conflicts with the City's tree ordinance.

Marine Biological Resources

VMT and Orcem Project Analysis

The San Francisco Bay Subtidal Habitat Goals Report, as discussed in Section 3.3.1 (Local Regulations), provides a scientific foundation and approach for the conservation and enhancement of submerged areas of San Francisco Bay and was prepared in collaboration with BCDC, California Ocean Protection Council/California State Coastal Conservancy, NOAA, and the San Francisco Estuary Partnership (SFBSHGP 2010). As such, it contains many recommended conservation goals for Bay subtidal habitats potentially affected by VMT activities, most notably the reconstruction/construction and maintenance of the wharf. These goals can be used by these agencies when evaluating proposed projects within their jurisdiction. The Subtidal Habitat Goals Report includes habitat conservation goals that promote no net loss

or disturbance to soft bottom and rock habitats (subtidal and intertidal zones), enhancing habitat function of artificial structures, minimizing placement of artificial structures detrimental to subtidal habitat function, protecting native shellfish habitat and existing eelgrass habitat, and protecting macroalgal bed (*Fucus* and *Gracilaria* spp.). Although the San Francisco Bay Subtidal Habitat Goals Project has no regulatory authority, any detrimental changes to Bay–Delta subtidal habitats would also have potential negative effects to special-status species, critical habitat, managed fish species EFH, or important forage for marine mammals.

As discussed in the impact assessments (under VMT Construction Impacts) for criteria A, some disturbance and both temporary or permanent loss of Bay–Delta intertidal and subtidal soft substrate habitat is expected to occur during dredging (temporary), wharf construction (permanent), and piling removal and installation (temporary and permanent). Additionally, as part of the wharf construction, a small area of sandy beach intertidal would be permanently lost, and intertidal and shallow subtidal artificial hard substrate habitat would be temporarily lost. At the completion of the wharf, an additional 800 linear feet of lower intertidal and shallow subtidal artificial hard substrate habitat would be created, and an estimated additional 1,200 linear feet of lower intertidal and 800 feet of shallow subtidal habitat, suitable for native Olympia oyster habitat, would be established.

As noted in Section 3.3.2 under Marine Biology, *Fucus distichus* was observed inhabiting the lower intertidal area of the approximately 2,000 linear feet of sandy beach intertidal habitat at the VMT Site (Appendix E-4). AMS observed only individual plants in low numbers and predominantly along the southern stretch of beach closer to San Pablo Bay and more saline water, which would be left undisturbed.

None of the proposed VMT wharf improvements would result in the removal or loss of any habitat function or historical value of artificial structures, or result in the net loss of any eelgrass or macroalgal beds, or result in a net loss of oyster beds or habitat. The removal of the approximate 444 creosote wood pilings, although currently providing limited intertidal and subtidal hard substrate habitat, do not appear to support a very rich or abundant marine community (Appendix E-4) and pose a greater toxic risk to the marine environment because of the creosote coating the pilings. Additionally, these pilings would be replaced by eighty-one (81) 24-inch concrete, eight (8) 30-inch steel, and 600 feet of steel sheet piling, resulting in an increase in artificial hard substrate in the intertidal and subtidal zones, than currently present. Finally, as mentioned earlier, the establishment of the new wharf at the VMT Site is expected to increase available native Olympia oyster habitat. Consequently, potential effects of the VMT project component on marine biota considered in local policies or ordinances intended to protect biological resources is determined to be **less than significant.**

Non-native Species

One of the greatest threats to San Francisco Bay–Delta marine subtidal and intertidal habitats is from the introduction of non-native species. The introduction of non-native species into the Bay–Delta ecosystems can result in large-scale changes to the aquatic communities. It is estimated that a new species is introduced into San Francisco Bay every 14 weeks based on the number of known introduced species into the Bay since tracking began (Roman 2011). Many fail to survive their introduction or do not spread. Some do survive, however, and produce major ecological changes in resident biological communities, such as has occurred with the introduction of the Asian clams, *Potamocorbula amurensis* and *Corbicula fluminea*, which has resulted in significant changes in native benthic infaunal communities in the western Delta and Sacramento and San Joaquin Rivers. Historically, the principal mechanism of introduction into the Bay has been fouling, boring, and release of ballast dwelling organisms. Introduced species include snails, shrimp, plankton, and crabs. As mentioned in Section 3.3.2 (Marine Biology), many of the taxa observed inhabiting both the intertidal and soft substrate subtidal habitats at the VMT Site are introduced species.

The Marine Invasive Species Act (formerly the California Ballast Water Management for Control of Non-Indigenous Species Act of 1999) and California Public Resources Code Sections 71203 to 71207 specify required ballast water management practices and the control of ship fouling. Large ships entering state waters are required to comply with state and federal regulations concerning ballast water. Assuming compliance with these regulations, ballast from visiting boats and ships coming to San Francisco to use the VMT facilities would not be expected to pose a high risk of introducing non-native species.

The final concern with invasive marine organisms is the potential spread or the potential for accelerating the spreading of already introduced invasive species such as *Undaria* and *Sargossum*, which have established themselves in other regions of San Francisco Bay but have not been observed at the VMT Site (Appendix E-4). The proposed project could increase the risk of spreading non-native marine species attached to wood pilings or rock armoring/riprap being removed as part of the VMT wharf construction activities. Spread of non-native species would be a **significant impact** (**Impact 3.3-11**) to Bay–Delta marine habitats and ecosystems. Mitigation measures to reduce the potential for spread of non-native species are identified in Section 3.3.5.

3.3.5 Mitigation Measures

Mitigation for Impact 3.3-1: Take of any active raptor nest is prohibited under Fish and Game Code Section 3503.5, and a significant impact would occur if project implementation disturbs an active nest.

MM-3.3-1 Should construction activities begin during the nesting season (February 15 through August 31), a qualified biologist shall conduct appropriate pre-construction surveys for any raptor or other nesting migratory bird nests within or immediately adjacent

to the project site no more than 30 days before any construction activity commences. The pre-construction surveys shall follow accepted survey protocols for nesting birds. The purpose of the surveys shall be to determine if active nests of special-status birds or migratory birds are present in the disturbance zone or within 500 feet of the disturbance zone boundary. If active nests are found, the biologist shall consult with the California Department of Fish and Wildlife (CDFW) to determine the appropriate buffer depending upon the species. Limits of construction to avoid impacts to an active nest during construction activities shall be established in the field with flagging, fencing, or other appropriate barriers and construction personnel shall be instructed on the sensitivity of nest areas. The qualified biologist shall serve as a construction monitor during those periods when construction activities are to occur near active nest areas to avoid inadvertent impacts to these nests. If construction activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 7 days elapse between the survey and ground-disturbing activities.

If an osprey nest within the project footprint requires removal, it shall be removed outside of the nesting season (September 1 through February 14) or when all young of the year have fledged, as determined by the qualified biologist in consultation with CDFW. If alternative nesting sites are not available within 500 feet of a removed raptor nest, the applicant shall determine, with input from CDFW, location and feasibility of constructing of an artificial nesting platform in the vicinity.

Mitigation for Impact 3.3-2: While it is unlikely that the Townsend's big-eared bat or roost sites would be found on the project site, disturbance of roost sites would be a significant impact.

MM-3.3-2 Within 6 months and no earlier than 30 days prior to initiation of construction activities, or such other period as may be approved in writing by CDFW, a habitat assessment shall be conducted by a qualified biologist, approved by the CDFW, to determine if suitable bat habitat or active roosts of Townsend's big-eared bat are present on or within 300 feet of the construction area. Surveys shall include the structure(s) planned for removal. If Townsend's big-eared bat habitat is present or it is detected roosting in any of the sites planned for removal, the project applicant shall consult with the CDFW to develop a bat avoidance and protection plan. The avoidance and protection plan will identify specific work windows and humane eviction methods that may avoid sensitive life stages including hibernation and active maternity colonies, appropriate disturbance buffers, and identify appropriate additional avoidance and minimization measures, if applicable. Under no circumstance shall an active roost be directly disturbed, and construction within 300 feet shall be postponed or halted, until the roost is

naturally vacated, as determined by a qualified biologist. If bats do not vacate the roost voluntarily, and the roost site must be removed, the project applicant shall implement humane eviction methods in accordance with the avoidance and protection plan developed in consultation with CDFW and secure any necessary permit for incidental take of the bat.

Mitigation for Impact 3.3-3: Removal of the estimated 444 creosote pilings at the VMT Site would result in a significant impact from the release of toxic PAHs from creosote piling fragments if the pilings are not removed properly.

MM-3.3-3 **Creosote Piling Removal Plan:** Prior to removal of any pilings from the VMT Site ~~or the City of Vallejo Municipal Marina~~, VMT shall develop a Piling Removal Plan that begins with an inventory of all existing pilings at the wharf, documents their individual condition, and suitability for removal using Best Management Practices (BMPs). The Plan shall address, but not be limited to the following:

- Use of vibratory hammers (timbers jaws) as the primary method of removal for all wood pilings whose wood cores have not rotted away, making use of a vibratory hammer impracticable. If use of a vibratory hammer is not practicable for more than 20% of the pilings, the applicant shall provide verifiable documentation for which piles cannot be removed using a vibratory hammer. A demonstration effort may be required to validate the applicant's justification for not being able to use vibratory removal equipment.
- Use of direct pull with a cable or chain and crane to remove pilings.
- Other feasible methods that remove the pilings in their entirety or with as little shredding of the pilings as possible.
- Use of excavators to remove deteriorated creosote wood pilings shall only be used where it would be ineffective to use vibratory hammers or other cited methods.
- Use of a floating boom, designed for deployment in high energy environments. The floating boom shall be used during all piling removal as well as dredging activities if excavators are needed to remove the wood pilings, leaving sections of the pilings in the Bay sediments which would be removed during dredging.
- Proper use and deployment of boom anchors to ensure that the boom remains open and recovers all floating debris, especially during removal of the outer rows of pilings.
- Regular removal of all collected debris within the boom on a regular schedule (minimum hourly). The boom shall be cleaned of all debris at the end of the day prior to shut down.

- Use of a skiff or chase boat to recover any floating debris that falls outside or escapes the containment boom.
- Proper onshore retention and disposal of creosote wood pilings and debris and the proper disposal of all pilings and debris.

This plan shall conform to all U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), Bay Conservation and Development Commission (BCDC), and City of Vallejo permit conditions and be reviewed and approved by the City of Vallejo and a third-party independent environmental mitigation monitor.

Mitigation for Impacts 3.3-4 and 3.3-9: The deliberate or accidental release of construction and deconstruction materials into the Napa River and the Bay–Delta ecosystem could result in a significant impact to special-status species and the Bay–Delta ecosystem in general.

MM-3.3-4 **Construction/Deconstruction Pollution Prevention Plan:** Prior to any deconstruction of the existing wharf, removal of any pilings, removal or burial of existing shoreline armoring/riprap, and construction of the new wharf, VMT shall prepare and implement a Construction/Deconstruction Pollution Prevention Plan. This plan shall detail all steps to be taken, including selection of equipment, operational procedures, on-site monitors, etc. that will be employed to ensure that no construction or deconstruction debris is accidentally deposited or remains in Napa River or Bay–Delta waters and therein pose a threat to special-status fish species, marine mammals, and any Bay–Delta ecosystems. This plan shall conform to all USACE, RWQCB, BCDC, and City of Vallejo permit conditions and be reviewed and approved by the City of Vallejo and a third-party independent environmental mitigation monitor. The plan shall include but not be limited to:

- Training of all personnel engaged in construction/deconstruction activities as to the importance of preventing any materials, especially hydrocarbon containing materials from entering the water.
- Measures to be implemented to prevent foreign materials (e.g., wood scraps, wood preservatives, fuels, lubricating oils, hydraulic fluids, other chemicals, etc.) from entering the Napa River or other Bay–Delta waters. This requirement shall include, but not be limited to:
    - Installation of secondary containment around all vehicle fueling and servicing locations on site.

  - Abundant on-site closable trash containers in which all packaging materials and trash can be placed. Frequent removal and replacement of all trash containers shall occur to ensure that adequate empty containers are on site at all times.
  - Provision of labeled and separate containers for different types of recyclable materials (metals, plastic, other) and trash (hazardous and non-hazardous).
  - Effective on-site stormwater containment during all construction and deconstruction activities that prevents any on-site water from reaching Bay and River waters.
  - All equipment and materials shall be temporarily or permanently stored or placed a sufficient distance away from the waterfront to prevent accidental releases of fuels, lubricants, fluids, packaging, etc. from quickly reaching the Napa River before corrective actions can be implemented.

- For any work on or beneath fixed decking, heavy-duty mesh containment netting or other engineering approach shall be maintained below all work areas where construction discards or other debris could enter the water.
- A floating containment boom, netting, or functional equivalent shall be placed around all active portions of a construction/deconstruction site where any floating debris could enter the water. Similar containment shall be placed around any locations where creosote wood pilings are being removed. Deployment anchors shall be used with all booms to ensure that the boom remains open and capable of collecting any floating debris.
- All floating booms or similar containment devices used to collect floating debris as well as any temporary decking or netting placed under overwater structures shall be cleaned daily or more frequently if significant debris is being collected. During active creosote piling removal, the boom shall be cleaned hourly of any collected debris.
- In addition to providing booming, a small, motored skiff/chase boat shall be on site to chase and recover any floating debris that escapes the containment booming.
- Use of a grizzly screen on the dredge spoil barges during all dredging activity to separate any pieces of creosote pilings removed from the Bay floor that were broken off below the seafloor during removal.
- Adequate spill prevention measures shall be in place to prevent the transfer of any hydrocarbon materials from entering the water while equipment is being used during construction and deconstruction, as well as when being serviced and/or parked.

- Provisions shall be made to ensure that no external wrapping, internal packing materials, strapping, pallets, boxes, crates, drums, or other associated waste material from staged on-site construction materials can enter the Napa River or Bay–Delta waters.

Mitigation for Impact 3.3-5: Based on the potential for underwater noise generated from impact hammer pile driving of 24-inch concrete, 30-inch steel pipe, and steel sheet pilings for the construction of the wharf, the potential impact to special-status fish species, including salmon, steelhead, sturgeon, and especially longfin and delta smelt and Sacramento splittail, would be significant.

Mitigation for Impact 3.3-10: Use of an impact hammer for pile driving of new 24-inch concrete and 30-inch steel piles can be expected to result in underwater noise levels that can result in permanent auditory damage to migrating fish, especially delta and longfin smelts, Sacramento splittail, and juvenile steelhead and salmon. This impact would be significant.

MM-3.3-5 **Impact Hammer Pile Driving Noise Reduction for Protection of Fish:** Prior to the start of construction, VMT shall develop a National Oceanic and Atmospheric Administration Marine Fisheries Service (NOAA Fisheries)-approved sound attenuation reduction and monitoring plan. This plan shall provide information on the final design of the new wharf; the effects on dolphins; and piling installations, detailing that the minimum number, size, and material for all pilings is being used to meet project engineering requirements as well as generate the lowest levels of underwater noise possible. The plan shall also detail the sound attenuation system, detail methods used to monitor and verify sound levels during pile driving activities, and all BMPs to be taken to reduce impact hammer pile-driving sound in the marine environment to an intensity level of less than 183 decibels (dB). The sound monitoring results shall be made available to the NOAA Fisheries and the CDFW. The plan shall incorporate but not be limited to the following BMPs:

- All impact pile driving for 24-inch concrete and 30-inch steel pilings, shall be conducted in strict accordance with the Long-Term Management Strategy (LTMS) work windows, during which periods the presence of special-status species in the project site is expected to be minimal.
- VMT shall make every effort possible to restrict pile driving activities during approved LTMS work windows.
- VMT shall consult with both NOAA Fisheries and CDFW concerning the potential for take of special status species as a result of pile driving activities and obtain incidental take authorization from NOAA Fisheries~~,~~ and/or CDFW, as necessary and/or required based on agency consultations, to address potential impacts on delta and longfin smelt, Sacramento splittail, Chinook salmon, steelhead trout, and

green sturgeon, and to implement all requested actions included in the incidental take permits to avoid impacts.

- Steel sheet pile will be installed using vibratory hammers and the use of impact hammers kept to the bare minimum.
- If exceedance of noise thresholds established and approved by NOAA Fisheries occur, a contingency plan using bubble curtains or an air barrier will be implemented to attenuate sound levels to below thresholds.
- The hammer will be cushioned using a minimum 12-inch-thick wood cushion block during all impact hammer pile driving operations. Cushion blocks will be replaced frequently to maintain maximum sound reduction.
- Other BMPs will be implemented as appropriate to reduce underwater noise levels to acceptable levels.

Mitigation for Impact 3.3-6: There would be a potential for noise disturbance from proposed pile driving activities to affect marine mammals if conducted when the probability of sea lions and harbor seals being present is highest. Depending on when pile driving activities would be conducted for the VMT project component, the potential effects of underwater noise from pile driving on marine mammals could be significant.

MM-3.3-6 **Pile Driving Noise Reduction for Protection of Marine Mammals:** As part of the NOAA Fisheries-approved sound attenuation-monitoring plan required in MM-3.3-5, VMT shall take actions in addition to those listed in MM-3.3-5 to reduce the effect of underwater noise transmission on marine mammals. These actions shall include at a minimum:

- A 1,600-foot (500-meter) safety zone shall be established and maintained around the sound source, for the protection of marine mammals in the event that sound levels are unknown or cannot be adequately predicted.
- Work activities shall be halted when a marine mammal enters the 1,600-foot (500-meter) safety zone and shall cease until the mammal has been gone from the area for a minimum of 15 minutes.
- A "soft start" technique shall be employed in all pile driving, giving marine mammals an opportunity to vacate the area.
- Sound levels below 90 A-weighted decibels (dBA) shall be maintained in air when pinnipeds (seals and sea lions) are present.
- An NOAA Fisheries-approved biological monitor will conduct daily surveys before and during impact hammer pile driving to inspect the work zone and

adjacent Bay waters for marine mammals. The monitor will be present as specified by NOAA Fisheries during the impact pile-driving phases of construction.

Mitigation for Impact 3.3-7: The potential for impacts on sensitive species from artificial night lighting on the new wharf, as well as from improved shoreside facilities and buildings, would result in a significant impact.

MM-3.3-7 **Wharf Lighting:** VMT shall update the preliminary lighting plan to specifically include a wharf lighting plan that minimizes to the maximum extent practicable and with regard to operational and personnel safety, artificial lighting installed on and adjacent to the VMT wharf. This plan shall include but not be limited to:

- Use of fully shielded, downward casing, low-voltage, sodium, LED, or non-yellow-red spectrum lights that are well shielded to restrict the transmittance of artificial light over the water.
- Restriction of artificial lighting to those areas of the wharf and adjacent staging areas that require lighting.
- Directing all wharf and near wharf lighting to illuminate only the wharf and ground and not adjacent Napa River waters or the sky.

Mitigation for Impact 3.3-8: Wharf maintenance or pile replacement would have similar potential effects and affected special-status species as initial site dredging, piling removal, and replacement, as well as expected recovery of marine biota following the activity. Although the application of BMPs, including adherence to LTMS acceptable work windows, would reduce the potential impact to special-status species, the impact would be significant without mitigation.

Refer to **MM-3.8-1** in Section 3.8, Hydrology and Water Quality.

Mitigation for Impact 3.3-11: The proposed project could increase the risk of spreading non-native marine species attached to wood pilings or rock armoring/riprap being removed as part of the VMT wharf construction activities. Spread of non-native species would be a significant impact to Bay–Delta marine habitats and ecosystems.

MM-3.3-9 **Invasive Marine Species Control:** Prior to any in-water deconstruction activities at the VMT Site, VMT shall develop and implement an Invasive Species Control Plan. The plan shall be prepared in consultation with the RWQCB, the U.S. Coast Guard, and California State Lands Commission Marine Invasive Species Program personnel. Provisions of the plan shall include but not be limited to the following:

- Environmental training of construction personnel involved in the removal of pier pilings or intertidal or subtidal shoreline armoring/riprap to inform them about invasive marine species in San Francisco Bay that might be attached to removed structures.
- Actions to be taken to prevent the release and spread of marine invasive species, especially algal species.
- Procedures for the safe removal and disposal of any invasive taxa observed on the removed structures prior to disposal.
- A post-construction report identifying what, if any, invasive species were found attached to removed equipment and materials and the treatment/ handling of identified invasive species.

Mitigation for Impact 3.3-12: The proposed project would result in the loss of Bay–Delta subtidal and intertidal habitat from infill of the Napa River for the wharf construction. The placement of fill within the Bay–Delta will result in potential lost foraging habitat and reduced migration corridors for special status fish species.

MM-3.3-10 **Mitigation for Bay–Delta Fill:** As part of the project permitting efforts with BCDC, the RWQCB, and CDFW, VMT will identify, execute, and/or fund sufficient mitigation activities that will adequately compensate for the placement of new Bay–Delta fill on subtidal and intertidal areas of the Napa River Project site. All mitigation proposed as compensatory mitigation would be subject to specific success criteria, success monitoring, long-term preservation, and long-term maintenance and monitoring pursuant to the requirements of the Mitigation Rule. All compensatory mitigation will fully replace lost function through the mechanisms discussed below, which will result in restoration and/or creation of habitat with at least as much function and value as those of the impacted habitat. In some cases, the mitigation habitat will afford significantly higher function and value than that of impacted habitat. Compensation ratios are driven by type, condition, and location of replacement habitat as compared to type, condition, and location of impacted habitat. Compensatory mitigation usually includes restoration, creation, or rehabilitation of aquatic habitat. Typically, impacted habitat will be replaced in-kind, although impacts on some habitat types will be mitigated out-of-kind with higher functioning habitat types such as riparian wetland, marsh, and/or seasonal wetland. Compensatory mitigation will be accomplished by one, or a combination of, the following methods:

- Purchase credits for restored/created/rehabilitated habitat;

- On-site (adjacent to the project footprint) restoration or rehabilitation;
- On-site (adjacent to the project footprint) creation of aquatic habitat;
- Off-site restoration or rehabilitation of similar habitat;
- Off-site creation of aquatic habitat; and/or
- Payment into a Fee-in-Lieu program.

The amount and level of mitigation will be in accordance with mitigation efforts as outlined in the Bay Plan, CDFW regulations for impingement of onshore operations on migration corridors, and the Porter–Cologne Act.

3.3.6 Level of Significance after Mitigation

Impact 3.3-1: Implementation of MM-3.3-1 would reduce the potential impact to nesting birds during construction of the proposed project to a **less-than-significant** level.

Impact 3.3-2: Implementation of MM-3.3-2 would reduce the potential impact to Townsend's big-eared bat during construction of the proposed project to a **less-than-significant** level.

Impact 3.3-3: Implementation of MM-3.3-3 would reduce the potential impact due to the removal of creosote pilings to a **less-than-significant** level.

Impacts 3.3-4 and 3.3-9: Implementation of MM-3.3-4 would reduce the potential impacts related to deliberate or accidental discharge of construction and deconstruction materials into project site waters to a **less-than-significant** level.

Impacts 3.3-5 and 3.3-10: Implementation of MM-3.3-5 would reduce the potential impacts to special-status fish species from pile driving to a **less-than-significant** level.

Impact 3.3-6: Implementation of MM-3.3-6 would reduce the potential impact to marine mammals from pile driving to a **less-than-significant** level.

Impact 3.3-7: Implementation of MM-3.3-7 would reduce the potential impacts on sensitive species from artificial night lighting to a **less-than-significant** level.

Impact 3.3-8: Implementation of MM-3.8-1 (Section 3.8, Hydrology and Water Quality) would reduce the potential impacts to special-status species due to wharf maintenance and pile replacement to a **less-than-significant** level.

Impact 3.3-11: Implementation of MM-3.3-8 would reduce the potential impact due to the increased risk of spreading non-native marine species to a **less-than-significant** level.

Impact 3.3-12: Implementation of MM-3.3-10 would reduce the potential impact due to the increased risk of spreading non-native marine species to a **less-than-significant** level.

DUDEK

SOURCE: WRA Environmental Consultants 2007

FIGURE 3.3-1
Vegetative Communities

8301

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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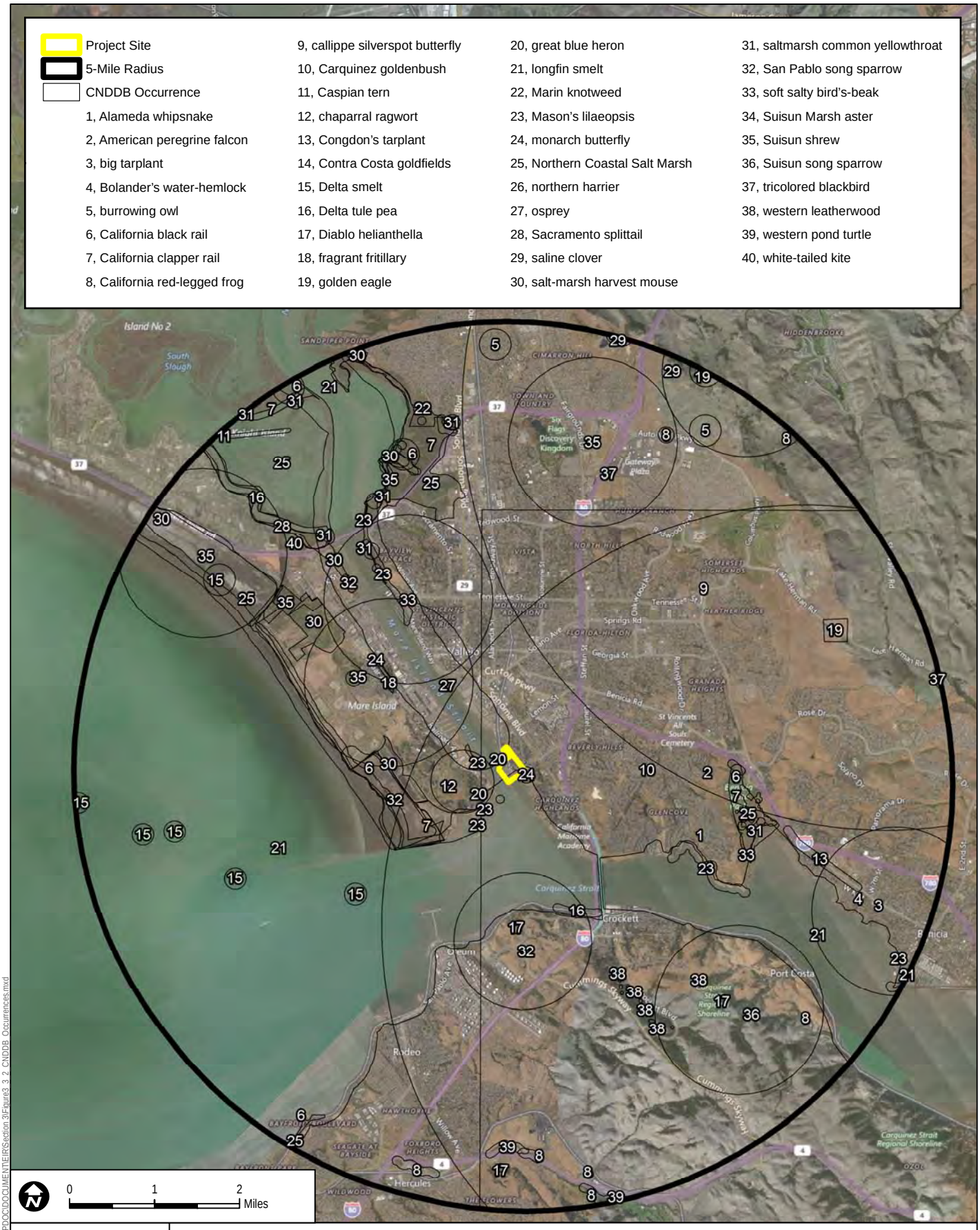

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SOURCE: Bing 2014, CDFW

FIGURE 3.3-2

CNDDB Special-Status Species Occurrences

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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3.4 CULTURAL RESOURCES

This section analyzes the potential impacts of the Vallejo Marine Terminal (VMT) and Orcem projects (proposed project) with respect to cultural resources and recommends mitigation measures where necessary to reduce or avoid significant impacts. The information provided in this section is based on the following:

- **Appendix F:** Carey and Co. Inc. 2014. *Historic Resources Evaluation Report for the Sperry Flour Company Site*.
- **Appendix G:** Dudek. 2014. *NAHC Records Search and Confidential* Archaeological Resources Records Search.

All figures referenced in this section are provided at the end of the section.

3.4.1 Regulatory Setting

Federal

National Historic Preservation Act

The National Historic Preservation Act (16 U.S.C. 470 et seq.) establishes the nation's policy for historical preservation and sets in place a program for the preservation of historical properties by requiring federal agencies to consider effects to significant cultural resources (e.g., historical properties) prior to undertakings.

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of projects on historical properties (resources included in or eligible for the National Register of Historic Places (NRHP). It also gives the Advisory Council on Historic Preservation and the State Historic Preservation Office an opportunity to consult. Federal agencies issuing permits for the proposed project will be required to comply with National Historic Preservation Act requirements.

Executive Order 11593, Protection and Enhancement of the Cultural Environment

Executive Order 11593 (36 FR 8921) (1) orders the protection and enhancement of the cultural environment through requiring federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations; (2) initiates measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people; and (3) in consultation with the Advisory Council on Historic Preservation, institutes procedures to assure that federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

State

California Public Resources Code

California Public Resources Code Sections 5097–5097.6 stipulate that the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands is a misdemeanor. It prohibits the knowing destruction of objects of antiquity without a permit (expressed permission) on public lands and provides for criminal sanctions. This section was amended in 1987 to require consultation with the Native American Heritage Commission (NAHC) whenever Native American graves are found. Violations for taking or possessing remains or artifacts are felonies.

California Public Resources Code Section 5097.5 states that "no person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historic feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands."

California Register of Historical Resources

The California Register of Historical Resources (CRHR) is used in the consideration of historical resources relative to significance for purposes of the California Environmental Quality Act (CEQA). The CRHR includes California State Historical Landmarks, eligible Points of Historical Interest, and resources listed, or formally determined eligible for listing, in the NRHP. Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts), or that have been identified in a local historical resources inventory, may be eligible for listing in the CRHR and are presumed to be significant resources for purposes of CEQA unless a preponderance of evidence indicates otherwise.

Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing in the CRHR (California Public Resources Code Section 5024.1; 14 CCR 4852), consisting of the following:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. It is associated with the lives of persons important to local, California, or national history; or
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values; or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Evaluation for eligibility to the CRHR requires an establishment of historic significance before integrity is considered. There are seven aspects of integrity including the following: location, design, setting, materials, workmanship, feeling, and association. Definitions of these seven aspects are provided below.

Integrity is the authenticity of a historical resource's physical identity as evidenced by the survival of characteristics or historic fabric 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. The question of integrity is answered by whether or not the property retains the identity for which it is significant.

Location is the place where the historic property was constructed or the place where the historic event occurred. The relationship between a property and its historic associations will be destroyed if the physical characteristics of the historic property no longer exist.

Design is the combination of elements that create the form, plan, space, structure, and style of a property.

Setting is the physical environment of a historic property. Setting refers to the character of the place in which the property played its historical role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space. Setting often reflects the basic physical conditions under which a property was built and the functions it was intended to serve.

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property.

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Workmanship is generally not used as a measure of integrity when looking at areas, sites, and districts. It is not evaluated here as the historic resources on site do not present physical evidence of a craft, artisan's labor or skill, or innovative period techniques.

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. Feeling results from the presence of physical features that, taken together, convey the property's historic character.

Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer.

California's list of special considerations includes some allowances for moved buildings, structures, or objects, as well as lower requirements for proving the significance of resources that are less than 50 years old and a more elaborate discussion of the eligibility of reconstructed buildings.

In addition to separate evaluations for eligibility to the CRHR, the state will automatically list resources if they are listed or determined eligible for the NRHP through a complete evaluation process.

The California Historic Resource Status Codes (status codes) are a series of ratings created by the State Historic Preservation Office to quickly and easily identify the historic status of resources listed in the state's historic properties database. These codes were revised in August 2003 to better reflect the many historic status options available to evaluators. The following are the seven major status code headings:

- Properties listed in the National Register or the California Register.
- Properties determined eligible for listing in the National Register or the California Register.
- Appears eligible for National Register or California Register through Survey Evaluation.
- Appears eligible for National Register or California Register through other evaluation.
- Properties recognized as historically significant by local government.
- Not eligible for listing or designation.
- Not evaluated for National Register or California Register or needs revaluation.

California Environmental Quality Act

CEQA requires lead agencies to determine if a proposed project would have a significant effect on archaeological resources (California Public Resources Code, Sections 21000 et seq.). As defined in Section 21083.2 of the California Public Resources Code, a "unique" archaeological resource is 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 any of the following criteria:

- It contains information needed to answer important scientific research questions, and there is a demonstrable public interest in that information.
- It has a special and particular quality, such as being the oldest of its type or the best available example of its type.
- It is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition, CEQA Section 15064.5 broadens the approach to CEQA by using the term "historical resource" instead of "unique archaeological resource." The CEQA Guidelines recognize that certain historical resources may also have significance. Further, the CEQA Guidelines recognize that a historical resource includes: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in Public Resources Code Section 5020.1(k), or identified as significant in a historical resource survey meeting the requirements of Public Resources Code Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of the California Public Resources Code and Section 15064.5 of the CEQA Guidelines apply. If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site is to be treated in accordance with the provisions of California Public Resources Code Section 21083.2, and is considered a unique archaeological resource. The CEQA Guidelines note that if an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (CEQA Guidelines, Section 15064.5(c)(4)).

California Health and Safety Code

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. The California Health and Safety Code, Section 7050.5, requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the county coroner has examined the remains (Section 7050.5b). If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the NAHC within 24 hours (Section 7050.5c). The NAHC will notify the Most Likely Descendant. With the permission of the landowner, the Most Likely Descendant may inspect the site of discovery. The inspection must be completed within 24 hours of notification of the Most Likely Descendant by the NAHC. The Most Likely Descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

Local

City of Vallejo General Plan

The City of Vallejo adopted the General Plan 2040 in August 2017. The General Plan 2040 replaced the previous General Plan, most recently amended in 1999. The General Plan 1999 was the basis of earlier drafts of this EIR. This document, where necessary and appropriate, updates any policies pertaining to cultural resources that may have changed in the General Plan 2040. This discussion is shown in redline and/or strikeout in this document for ease of review.

The following goals and policies in the General Plan 2040 are applicable to cultural resources.

POLICY NBE-1.9 Cultural Resources. Protect and preserve archaeological, historic, and other cultural resources.

- *Action NBE-1.9A Continue to require that land use activities comply with State requirements and follow best practices to ensure that cultural resources are not impacted and that appropriate agencies and technical experts are involved in the evaluation and protection of resources and sites.*

POLICY NBE-1.10 Historic Resources. Encourage the protection, rehabilitation, and reuse of historic buildings and structures.

- *Action NBE-1.10B Require the identification and protection of all on-site historic resources in conjunction with any proposed development, in compliance with all applicable City provisions (including the Downtown Specific Plan Historical Resource Assessment) and State and federal guidelines for the treatment of historic properties.*
- *Action NBE-1.10C Participate in federal and State programs that offer funding and economic incentives for the restoration and preservation of qualified historic buildings, including:*
  - *The federal historic preservation tax credit for qualified rehabilitation projects;*
  - *Reduced development fees for projects that comply with the State Historical Building Code (SHBC) and the Secretary of the Interior's Standards;*
  - *The Mills Act Property Tax Abatement Program;*
  - *Income tax deductions for qualified donations of historic preservation easements; and*
  - *Transfer of Development Rights*

POLICY NBE-1.11 Historic Districts. Preserve the integrity of the City's historic districts, including downtown, as physical changes occur within them.

- *Action NBE-1.11A Update design guidelines to require development in historic districts to complement historic resources, including through appropriate mass, scale, and exterior features.*
- *Action NBE-1.11B Support preservation, rehabilitation, and reuse of known and potentially historic buildings in Downtown~~,~~ and consider periodic detailed assessments to update the list of existing historic resources.*

POLICY NBE-1.12 Historic Preservation. Promote community awareness of the benefits of historic preservation.

- *Action NBE-1.12A Work with community, real estate, and commerce organizations to promote the connection between historic resources and the economic and cultural well-being of the community.*

POLICY NBE-1.13 Community Preservation. Encourage high standards of property maintenance and rapid abatement of conditions contributing to blight.

- *Action NBE-1.13A Update City regulations, adequately staff and fund, and increase enforcement as needed to require adequate structure and yard upkeep, increase penalties for illegal dumping and graffiti, and prohibit inappropriate outdoor storage (including non-operating vehicles).*

~~The following goals, objectives, and policies in the City's General Plan (City of Vallejo 1999), are applicable to cultural resources.~~

~~*Historic Preservation Goal:* Preserve and improve historically and architecturally significant structures and neighborhoods.~~

~~Objectives:~~

1. ~~Develop pride and awareness of Vallejo's heritage, both locally and elsewhere.~~
2. ~~Assist property owners in the restoration of significant buildings.~~
3. ~~Protect significant buildings from exterior alterations that would diminish their historic or architectural significance.~~
4. ~~Prevent the demolition of significant buildings when it is economically feasible to restore them.~~

~~Policies:~~

1. ~~Promote Vallejo's heritage.~~
2. ~~Assist property owners in their restoration efforts. This includes providing information on preservation resources and assisting in the placement of structures on the National Register of Historic Places.~~
3. ~~The City will regulate changes in the exteriors of structures in the Heritage District, Historic District, and designated City landmarks to enhance the value of Vallejo's heritage.~~

~~The State Historic Building Code will be used as permitted by state law and the State's Architect's Office on any structure on the Historic Resources Inventory or in the Architectural Heritage and the St. Vincent's Historic Districts.~~

3.4.2 Existing Conditions

Historical Setting

Site History

In 1869, Abraham Dubois Starr convinced the Southern Pacific Railroad to extend tracks to the current project area in Vallejo, on which Starr subsequently constructed a flour mill, dock, and warehouse. Starr deemed the site ideal for a flour mill because of its proximity to Mare Island and Mare Island Strait, which created easy access to both the San Francisco Bay and, hence, the Pacific Ocean, as well as to the San Joaquin Delta, which provided water access to inland California. The railroad extension connected the site to the newly completed transcontinental railroad, which, in turn, connected the mill to all points along that route, from the Pacific to the Atlantic. Only portions of the Starr Mill and dock remain, but the site served continuously from 1869 to 2004 as one of the most important flour mills in California. Port Costa Flour Company bought the property in 1895, followed by Sperry Flour Company in 1910. At the time, Sperry Flour Company was the largest grain products and flour milling corporation on the Pacific Coast, and eventually the third largest flour company in the nation. Four of the historically significant buildings at the site – the mill, silos, administrative building, and garage – were built during World War I in response to the Allies' significantly increased demand for American-made flour. Because it had the most modern facilities and participated in the wartime effort to supply flour to soldiers and civilians in the United States and abroad, the Vallejo plant was the most significant in the Sperry empire. The manager's house, a model of the First Bay Area Tradition, predated these buildings, but achieved its current form during this same period of wartime expansion. General Mills Corporation acquired Sperry Company and the Vallejo site in 1929 and made relatively minor changes. Apart from a few very brief stoppages, mills at the site continuously produced flour and feed for 135 years.

While the history of this site in the flour milling industry dates back to 1869, its period of significance extends from 1917 to 1920, the period when the flour milling facility was greatly expanded in response to the increased demand for American flour spurred by World War I. The United States government strictly curtailed construction activities during World War I to projects that directly benefited the war effort, and increased national and international demand for flour during the war prompted the construction of the mill, silos, administrative building, and garage at Sperry's Vallejo site. In keeping with its newly achieved status as the mill of greatest importance within the Sperry Flour Company empire, the company also remodeled the manager's house, enlarging it to conform with the then popular Bay Tradition style of domestic architecture. Increased production capacity at the mill rendered the original Starr Mill and warehouse inadequate, so the company also added on to the warehouse and wharf. Although that building and warehouse disappeared long ago, the extant pilings and dock date at the latest to this period of significance. Some of the pilings may date to as early as 1869. The Vallejo site's importance within the Sperry Flour Company had waned by the mid-1920s.

Few changes occurred to the Sperry Flour Company site before World War II, with the exception of a fire on August 30, 1934, that destroyed the bulkhouse that dated to between 1910 and 1916.

The site's architecture, along with its nearly 150-year association with flour milling for the most powerful flour companies in California and the nation, and its intimate associations with World War I render the Sperry Flour Company a valuable historic resource.

Existing Structures

The 2008 Historic Resources Evaluation Report for the Sperry Flour Company Site identified six structures (flour mill, grain silos, administrative building, garage, manager's house, and dock) that were potential historic resources with a California Historic Resource Status Code of 3S, Appears Eligible for National Register or California Register through Survey Evaluation. In October 2014, Carey and Company verified and reevaluated the historical status of these same structures. The reevaluation resulted in a modification to the status of the historic resources, and changes the historical status of the structures from structures individually eligible for listing in the NRHP to contributing resources to the potential ~~a potential~~ Sperry Flour Mill Historic District. In addition, Carey and Company added one other structure, the barn, to the list of contributing resources (see Figure 3.4-1, Historical Resources Survey Map).

In 2014, t~~T~~he Sperry Flour Mill ~~is~~ was considered a *potential* historic resource because the buildings ~~have~~ had not gone through a formal designation process and ~~are~~ were not listed on any local, state, or federal register of historic resources. However, as described in Section 3.4.1, the CEQA Guidelines recognize that a historical resource includes resources identified as significant in a historical resource survey that meets~~ing~~ the requirements of California Public Resources Code Section 5024.1(g).

Contributing resources include buildings, structures, and objects that define the historic integrity and physical character that make a potential historic district eligible for listing in the CRHR. Contributing properties are considered integral parts of the historic context of multiple resource properties and key to historic associations, feeling, setting, and its historic architectural qualities. The complex of seven former Sperry Flour Company buildings creates an industrial site dating to World War I during which time the site experienced expansion.

The project area includes 16 structures, each of which is described below, in order of (sometimes estimated) date of construction. The location of these structures is shown on Figure 3.4-1, Historical Resources Survey Map.

It is important to note that in March of 2016, the City of Vallejo Architectural Heritage and Landmarks Commission approved the nomination by the Vallejo Architectural Heritage Foundation to designate the six historic structures as City Landmarks, following recommendation of city staff. Two weeks later, VMT filed an appeal on this decision to City Council but as of this date, no appeal has been heard. In June of 2016, the Vallejo Architectural Heritage Foundation initiated an application to nominate the site as an historic district with the National Register of Historic Places. In July 2017, the California State Historical Resources Commission approved the nomination of the Sperry Four Company Vallejo Mills Historic District to the National Register of Historic Places as Vallejo's fourth Historic District. As a result of this designation by the state, all references to a "potential" district have been removed from the discussion below.

Wood Dock and Wood Pilings – c. 1869–1919

Pilings associated with the dock upon which the original Starr Mill warehouse stood run along the central western portion of the site. Horizontal planks cover the pilings at the most southwesterly corner and feature markings where railroad tracks once ended.

The dock retains integrity of location, setting, and association, having never been moved and still adjacent to an industrial site. While the dock's integrity of design, materials, workmanship, and feeling have been compromised by the loss of considerable material, this loss does not prevent this simple dock structure from conveying its historic significance. This dock conceivably tells a story of the mill site from its earliest days in 1869 and appears to be eligible for the California Register under criterion 1 as a contributing structure to a ~~potential~~ historic district.

Manager's House – c. 1901, altered c. 1917 and after 1919

The manager's house dates to the early 1900s. The current look and plan of the building date to around 1917, during the period of significance for the site. Sperry Flour Company enlarged the house to accommodate a manager of the then most important facility within the company's flour empire. The house also embodies defining characteristics of the First Bay Area Tradition, a

regional style that influenced domestic architecture for nearly a century and which contributed to the emergence of a regional identity. Set apart from the industrial buildings, the house creates a sylvan contrast to the modern industrial landscape. Clad with unpainted brown shingles and adorned with no exterior decoration, the house blends into the landscape and allows the natural setting to provide ornamentation.

The manager's house has undergone numerous alterations over the years. Despite these changes, Carey and Company has determined that this structure retains sufficient integrity to convey its historic significance. Alterations to the structure are not obvious upon viewing it; Carey and Company had to compare Sanborn maps to periodize them and determine how exactly the building changed over time. The earliest images of this building indicate that it has always been clad with unpainted wood shingles, making it an early example of the First Bay Area Tradition. Subsequent alterations have always respected this historical precedent, allowing the building to continue to express historical character. Moreover, the most significant alterations were made 90 years ago, and although the house has deteriorated, the structure as it appeared then remains largely uncompromised. This house, therefore, exudes an overall historical character that dates to World War I, the period of significance to which the other historical buildings at the plant belong. The manager's house appears to be eligible for the CRHR under criteria 1 and 3 as a contributing structure to a ~~potential~~ historic district. It should be noted that the house is in a state of substantial disrepair.

The driveway leading up to the manager's residential complex is lined with rock walls on the north side. The construction date of the rock walls has not been determined. Thus, the rock walls may or may not have been constructed within the period of significance. Since no definitive construction date of the walls was found, they are not a contributing resource to a ~~potential~~ historic district.

Barn – c. 1901–1919

Sanborn maps indicate that the barn was constructed between 1901 and 1919. The barn was part of the manager's residential complex on the site. The corrugated metal cladding may not be original to the structure, but the building retains sufficient integrity with its wood sash windows and overall form. Since the barn is directly linked to the residential complex of the site manager and was used by the site manager during the heyday of the plant's operation, the building may be eligible for the CRHR under criterion 1 as a contributing structure to a ~~potential~~ historic district. This structure is also in a state of severe disrepair.

Grain Silos and Elevator – 1917

Like the mill, the silos derive historical significance from their association with World War I and the emergence of the Vallejo plant as the most important facility in the most important grain milling corporation of the Pacific Coast. These silos, built in the most modern methods, allowed the mill to store the grain necessary to produce flour for American and European soldiers and

civilians, and their monumental scale speaks to massive quantity of flour that the mill was expected to produce. The location of the silos, directly behind the mill, further underscores the intimate relationship between the two buildings and their common function to produce flour on an unprecedented scale for both the Vallejo mill and the Sperry Flour Company.

Also like the mill, the silos retain a high level of integrity. With the exception of metal slider windows replacing some multi-lite awning windows within the large, multi-lite fixed metal windows of the top stories of the building, the silo remains virtually unchanged since its construction in 1917–1918. This lends the silos integrity of design, materials, and workmanship. The scale and location of the silos directly behind the mill remains intact as well, fostering integrity of setting, association, and feeling. This high level of integrity enables the silo to convey its historic relationship to the mill, their collective contribution to World War I, and the significance of the Sperry Flour Company in California and the grain industry. The grain silos appear to be eligible for the CRHR under criterion 1 as a contributing structure to a ~~potential~~ historic district.

Administrative Building – 1917

Built in 1917, the administrative building belongs to the site's period of significance (1917–1920) and reflects the significant growth of the plant both in size and prestige within the Sperry Flour Company and milling industry. Like the mill and silos, the administrative building reflects a relatively early example of reinforced concrete construction. Even more than the mill and silos, this building demonstrates early efforts to use concrete for aesthetic purposes rather than just functional ones. Particularly notable elements include the raised relief on the cornice, the inset panels on the window surrounds, molded detailing at the base of the building, and the pilasters, pediment, and entablature of the entry surround. These classical features also contribute to the historic feeling of the building.

The building retains a high level of integrity. It has not been moved, and its surroundings have changed little since it was constructed, lending the building integrity of location, setting, and association. The building has undergone some alterations, including the addition of metal awnings, filling in of some rear windows, and replacement of the front door and windows. While these alterations affect integrity of materials and workmanship, they are easily reversible and do not affect integrity of design, scale, plan, or overall expression of the aesthetic and historic feeling of the building. The building retains sufficient integrity to convey its historic significance. The administrative building appears eligible for the CRHR under criteria 1 and 3 as a contributing building to a ~~potential~~ historic district.

Flour Mill – 1917

Architecturally, the Flour Mill building is a relatively early example of reinforced concrete skeletal frame construction, which allowed for more windows and, therefore, natural light and ventilation

in a factory environment. The brick cladding, entablature, and parapet also reflect an effort to combine aesthetics with function in industrial design, as well as experimentation with the aesthetic potential of concrete itself. The building's relationship to the mill further enhanced the architectural composition of the mill. Located directly in front of the silos and with a hillside serving as a backdrop, the mill not only produced flour, but created an unusually picturesque statement for industrial architecture. The mill is also significant for its association with World War I, a defining event of the twentieth century and an event of international importance. Since the federal government curtailed most construction not related to the war effort, it is entirely likely that the mill would not have been built if it had not been for the importance of and need for American grain milling capacity during that period. Whereas the Sperry Company initially intended to build a simple warehouse for its old mill, demand for flour during wartime prompted the company to build the most modern facility possible, which allowed it to mill grain at a rate necessary to feed American and European soldiers and civilians alike. Subsequent to the war, the new mill also catapulted the Vallejo plant to the most important position in the pantheon of the most powerful Pacific Coast milling company's numerous facilities.

The building has undergone some alteration. Almost all of the windows are non-original, as are the metal awnings, rooftop mechanical units, a conveyor shed from the mill to the bakery warehouse, and a partially enclosed passageway supported by metal posts and clad with corrugated fiberglass sheets that is located at the northwest end of the building. The conveyor shed at the northwest end of the building dates to the construction of the mill, but does not retain a high level of integrity; it has been truncated and reclad.

While these alterations affect the mill's integrity of materials, design, and workmanship, the mill retains sufficient integrity to convey its architectural and historic significance. Alterations have occurred mostly to secondary features, and nearly all are reversible. Moreover, the building retains its original scale, plan, and overall design. In addition, the building has not been moved, and its setting, on the narrow strip of bedrock next to the Mare Island Strait with the silos and hillside serving as backdrop, has changed little, leaving the building with integrity of location, setting, feeling, and association. These factors enable the mill's ability to express its aesthetic intent, its function as a mill, and its historic role as the most important mill in the Sperry Flour Company during World War I and its immediate aftermath. The flour mill appears to be eligible for the CRHR under criteria 1 and 3 as a contributing building to a ~~potential~~ historic district.

Garage – 1918

The garage is the fourth and last structure on site to be built specifically in response to wartime demand for flour in the United States and Europe. Like the mill and administrative building, it is a reinforced concrete structure that combines aesthetic and functional considerations. The building retains a high level of integrity. Alterations include non-original roll-up doors and bricking in of one bay. Otherwise,

the structure retains integrity of location, design, setting, materials, and workmanship, which contributes to its ability to express the aesthetics of the period in which it was built and its association with Sperry Flour Company's expansion at the Vallejo plant in the wake of increased demand for flour during World War I. The garage appears eligible for the CRHR under criteria 1 and 3 as a contributing building to a ~~potential~~ historic district.

Warehouse – 1947

Although this building was completed in 1947 and therefore falls within the 50-year threshold for consideration for the CRHR, it falls well outside the period of historical significance of the mill site. Its style reflects post-World War II industrial architecture, but is not the work of a master or a rare and/or exceptional example of such postwar architecture that conveys a significant level of historical feeling in and of itself. As the architectural style does not conform to that of the property's period of historical significance, it does not contribute to the historical feeling of the site. The building retains a high level of integrity, having undergone few significant alterations. The conveyor shed and bulkhouse adjacent to the building detract, however, from its historical integrity, as the former originally connected the building to the old Starr Mill and warehouse, while the latter did not exist until 1992. Because it is not associated with the site's period of historic significance, this building does not appear to be eligible for the CRHR.

Manager's Garage – c. 1950s

Sanborn maps indicate that a structure was built at this location between 1901 and 1919 and that this structure had an L-shaped plan. Its date of origin may therefore fall within the period of significance for the site of the former Sperry Flour Company mill. The current structure has a rectangular plan, suggesting that it has been altered significantly or is non-original and dates to some point after 1950. These factors alone highly compromise the historic integrity of the building. It does not retain sufficient integrity to convey its historical significance, and Carey and Company has determined that it is ineligible for the CRHR.

Old Bulkhouse – c. 1957

The old bulkhouse is 50 years old, just meeting the age requirement for the CRHR and NRHP. It has one notable feature: corrugated asbestos cladding. However, this material was not new to industrial design, and otherwise the building does not exhibit architectural distinction, is not associated with the life of an important person, will not yield information important to prehistory or history, and is not associated with significant events in the life of the property, city, state, or country. Therefore, Carey and Company has determined that the structure is not eligible for the CRHR.

New Bulkhouse – c. 1965, Forklift Repair – c. 1985, Welding Shop – c. 1985, Pipe Storage – c. 1985, Mill Run Canopy – 1986, Bakery Bulkhouse – 1992

These six additional structures do not meet the 50-year threshold and do not bear any characteristics that would warrant their listing on the CRHR. These structures do not exhibit exceptional architectural merit, any intimate association with a major historical event or pattern, or any association with a historical person. They are also unlikely to yield information that is important to history or prehistory.

Archaeological Setting

Dudek conducted a records search for the proposed project at the Northwest Information Center on October 15, 2014. Based on a review of the records, no archaeological resources have been previously recorded within the project site. The nearest previously recorded site is located approximately 0.5 mile from the site. Two previous cultural resources technical surveys have directly included the project site (see Appendix G). Dudek conducted an archaeological survey of the project site in May 2014. The Dudek archaeologist did not identify any archaeological sites or features within the project site.

A letter was sent to the NAHC on October 8, 2014, requesting a records search for identified Native American cultural resources in the project vicinity. The response received on October 24, 2014 stated, "A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area" (see Appendix G).

A review of the California State Lands Commission Shipwreck Database indicates that there is no record of marine archaeological resources in the vicinity in the project site (CSLC 2014).

3.4.3 Thresholds of Significance

The following criteria, included in Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.), will be used to determine the significance of potential cultural resources impacts. Impacts to cultural resources would be significant if the proposed project would:

A) Cause a substantial adverse change in the significance of a historical resource as defined in Section15064.5;

B) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section15064.5;

C) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or

D) Disturb any human remains, including those interred outside of formal cemeteries.

3.4.4 Impact Discussion

A) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

VMT and Orcem Project Analysis

A "substantial adverse change" is defined in the CEQA Guidelines as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." Further, that the "significance of an historical resource is materially impaired when a project "demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in the California Register of Historical Resources;" or "demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources..." or demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA."

The proposed project involves demolition of existing buildings as well as an extensive amount of new construction and site work (grading, new asphalt or concrete driveways, new site features) that could impact the historical significance of buildings on the site. The Orcem project component would require demolition of the following buildings: grain silos and elevator, flour mill, old bulkhouse, new bulkhouse, welding shop, pipe storage, and forklift repair. The VMT project component would require demolition of the warehouse, bakery bulkhouse, and dock. The administrative building and garage would remain in their current location and would be reused by VMT for administrative and office uses. The manager's house, manager's garage, and barn would not be impacted by the project.

As described in existing conditions, the flour mill, grain silos, administrative building, garage, manager's house, barn, and dock are all contributing buildings to ~~a potential~~ the Sperry Flour Mill Historic District. The remaining structures on the site were either not built during the period of significance and are therefore not contributing structures to the cultural and/or historic importance of the Sperry Mill, or do not meet the 50-year threshold for listing on the CRHR.

Although the administrative building and garage would not be demolished as a result of the proposed project, construction activities could cause both direct and indirect impacts to the administrative building and garage, which are contributors to ~~a potential~~ the Sperry Flour Mill Historic District. The manager's house and barn are also contributing historic resources to the ~~a potential~~ Sperry Flour Mill Historic District. However, they are located far enough away, about 185 feet, from construction activities that the potential for direct or indirect impacts is limited and would not rise to the level of

a significant adverse impact. Such activities could include the operation of heavy machinery and drilling equipment, staging, storage of materials and dump trucks directly passing by the contributing resources. Construction activities could damage these historic architectural resources through destabilization, or physical contact. Also, depending on the nature and type of demolition and new construction on the project site, vibration-related impacts could have an effect on these historic resources. Trucks hauling materials associated with demolition and new construction to and from the project site could also potentially impact these resources. The proposed project would therefore result in a **significant impact** due to the potential for damage to the administrative building and garage during construction (**Impact 3.4-1**).

As described above, the proposed project would result in demolition of the flour mill, grain silos, and dock, which are all important components of the original Sperry Mill. Once demolished, the buildings would no longer retain historic integrity and would no longer be contributors to ~~a potential~~ the historic district. The proposed demolition of the flour mill, grain silos, and dock, and extensive new construction and site work (grading, new asphalt or concrete driveways, new landscaping) would have a significant adverse effect on the integrity of ~~a potential~~ the Sperry Flour Mill Historic District. The flour mill and grain silos are the most important structures that define a potential historic district and convey the historic significance of a potential historic district that justifies its eligibility for inclusion in the CRHR. Combined with the loss of the dock, the proposed project would result in the loss of such a ~~potential~~ historic district's integrity. As mentioned previously, integrity is defined as the authenticity of a historical resource's physical identity as evidenced by the survival of characteristics or historic fabric 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, as discussed in detail below.

Location. In this case the flour mill and grain silos represent the most important physical characteristics that justify ~~a potential~~ the historic district's eligibility for inclusion in the CRHR. Although relatively more minor, the dock is also one of the ~~potential~~ historic district's physical characteristics. These physical characteristics will be gone once the structures are demolished.

Design. With demolition of the three contributing resources and the construction of the proposed project, the design aspects of the ~~potential~~ historic district—its most important structures, the spatial relationships between all the contributing resources, and the layout and relationship of other existing, but not necessarily historic features—will be lost.

Setting. As a result of the demolition of two of the key contributing resources to ~~a potential~~ the Sperry Flour Mill Historic District and one other lesser resource, the result will be the loss of the physical environment which will no longer reflect the basic physical conditions under which the property was first developed and the functions the Sperry Flour Mill was intended to serve.

Materials. With demolition of the three contributing resources, the physical elements that comprise ~~a potential~~ the historic district and justify its eligibility for inclusion in the CRHR will be lost.

Workmanship. Workmanship is generally not used as a measure of integrity when looking at areas, sites, and districts. It is not evaluated here as the ~~potential~~ historic district does not present physical evidence of a craft, artisan's labor or skill, or innovative period techniques. Although workmanship can take into account vernacular methods of construction, the structures contributing to the significance of the ~~a potential~~ historic district do not provide evidence of innovative technological practices or aesthetic principles.

Feeling. With demolition of two of the key contributing resources to the ~~a potential~~ Sperry Flour Mill Historic District and one other lessor resource, the physical features that convey the character of the ~~potential~~ historic district will be lost.

Association. With demolition of two of the most important contributing resources to ~~a potential~~the historic district and one other lesser resource, the direct link to the Sperry Flour Mill will be severed, and the place will not be sufficiently intact to convey that relationship.

The administrative building and the garage would be retained and rehabilitated. Therefore, they would contribute to retaining the integrity of ~~a potential~~the historic district. However, they are relatively less important in defining the significance of ~~a potential~~the historic district than the flour mill and grain silos, and their retention would not be sufficient for ~~a potential~~the historic district to maintain its integrity.

Implementation of the proposed project would result in a **significant impact** on historic architectural resources due to the loss of integrity of ~~a potential~~the Sperry Flour Mill Historic District associated with demolition of the flour mill, grain silos, and dock (**Impact 3.4-2**).

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site: public access improvements and removal of existing deteriorated docks. These improvements do not involve alteration of any historic resources, and no historic resources would be affected by the improvements. Therefore, **no impact** would occur as a result of the off-site improvements.~~

B) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

VMT and Orcem Project Analysis

As described in existing conditions, no archaeological resources have been previously recorded within the project site. Further, based on inspection of subsurface exposures, the topography, and highly

developed nature of the planned area of direct impact, there appears to be little potential for the unanticipated discovery of archaeological resources during project implementation. Nevertheless, there is potential for the inadvertent discovery of unknown archaeological resources during ground-disturbing activities associated with project construction, which could lead to an impact to archaeological resources. Therefore, impacts would be **potentially significant (Impact 3.4-3)**.

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site: public access improvements and removal of existing deteriorated docks. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the marina. The proposed launch would consist of a pre-cast articulated concrete mat, approximately 10 feet wide by 60 feet long over a geotextile fabric. Installation of the launch ramp would occur within the existing Municipal Marina, which has been disturbed by dredging and development. The project would also involve the removal of existing deteriorated dock improvements within the water area at the north end of the marina. Approximately 80 14-inch-diameter creosote timber piles and deteriorated dock facilities would be removed from this portion of the marina. A review of the California State Lands Commission Shipwreck Database indicates that there is no record of marine archaeological resources in the vicinity in the Marina (CSLC 2014). Although there is little potential for unanticipated discovery of marine archaeological resources as a result of the off-site improvements, in the event an unanticipated discovery is made during implementation of the off-site improvements, impacts would be **potentially significant (Impact 3.4-4)**.~~

C) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

VMT and Orcem Project Analysis

As described in Section 3.5, Geology and Soils, and shown in Figure 3.5-1, the area of the site to be developed is underlain by a mantle of artificial fills approximately 3 feet to 19 feet thick (increasing in thickness towards the San Francisco Bay). In the areas of the site to be developed, the existing fills are underlain by bay mud deposits. Based on the historical disturbances to the project site, the geologically young and unconsolidated nature of the affected sediments, the potential for significant paleontological resources to be present on the site is very low. However, construction of the retaining walls on the northeastern border of the site and excavations for structures that must be founded on bedrock could result in incidental disturbance to older, native sedimentary rock that shallowly underlies the hillside to the west, and that deeply underlies the proposed project's development footprint. Due to the age and sedimentary marine origin of the

bedrock underlying the site, it could contain fossils, but they would be more likely to consist of abundant marine invertebrates (e.g., foraminifera) than unique or significant vertebrate fossils.

Although the paleontological potential of rocks and sediment within the project's disturbance footprint is very low, the potential remains for deep excavations to uncover potentially significant fossils within the bedrock underlying the site. For this reason, impacts would be **potentially significant** (**Impact 3.4-4~~5~~**).

~~Off-Site Improvements~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site: public access improvements and removal of existing deteriorated docks, as described previously. The areas to be disturbed by the off-site improvements are underlain by bay mud deposits. Based on the historical disturbances to the Marina, the geologically young and unconsolidated nature of the affected sediments, the potential for significant paleontological resources to be present on the site is very low. Therefore, impacts would be **less than significant**.~~

D) Would the project disturb any human remains, including those interred outside of formal cemeteries?

VMT and Orcem Project Analysis

There is no evidence of human remains on the project site, and the potential for the inadvertent discovery of human remains on the project site is very low because there is no evidence of any historical camps or human settlement on the site. Additionally, existing regulations through California Health and Safety Code Section 7050.5 state that if human remains are discovered during project construction, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin. Further, pursuant to California Public Resources Code Section 5097.98(b), remains shall be left in place and free from disturbance until a final decision as to the treatment and disposition has been made. If the County Coroner determines the remains are Native American, the NAHC shall be contacted within a reasonable time. Subsequently, the NAHC shall identify the Most Likely Descendant. The Most Likely Descendant shall then make recommendations and engage in consultations concerning the treatment of the remains as provided in California Public Resources Code Section 5097.98. Although the potential for human remains on the project site is very low, in the event that human remains are found on the site during project construction, impacts would be **potentially significant** (**Impact 3.4-5~~6~~**).

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site: Public access improvements and removal of existing deteriorated docks. There is no evidence of human remains within the areas to be disturbed by the off-site improvements, and the potential for the inadvertent discovery of human remains is very low because there is no evidence of any historical camps or human settlement in this area. Additionally, existing regulations through California Health and Safety Code Section 7050.5 state that if human remains are discovered during project construction, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin. Further, pursuant to California Public Resources Code Section 5097.98(b), remains shall be left in place and free from disturbance until a final decision as to the treatment and disposition has been made. If the County Coroner determines the remains are Native American, the NAHC shall be contacted within a reasonable time. Subsequently, the NAHC shall identify the Most Likely Descendant. The Most Likely Descendant shall then make recommendations and engage in consultations concerning the treatment of the remains as provided in California Public Resources Code Section 5097.98. Although the potential for human remains within the off-site improvement areas is very low, in the event that human remains are found during construction of the off-site improvements, impacts would be **potentially significant** (**Impact 3.4-7**).~~

3.4.5 Mitigation Measures

Mitigation for Impact 3.4-1: The proposed project would result in a significant impact to historic architectural resources due to the potential for damage to the administrative building and garage during construction.

MM-3.4-1a A historic preservation plan shall be prepared and implemented to aid in preserving those historic resources proposed to be retained within the original Sperry Mill site. These include the administrative building, garage, manager's house, and the barn, all of which shall be protected from direct or indirect impacts during construction activities (i.e., due to damage from operation of construction equipment, staging, material storage, and vibrations).

If deemed necessary upon further condition assessment of the buildings, the plan shall include the preliminary stabilization, prior to construction, of deteriorated or damaged materials or systems that may be hazardous.

At a minimum, the plan shall include:

- A requirement for the placement of perimeter fencing and/or signs around the historical resources to identify them as sensitive resources to be avoided;

- Guidelines for operation of construction equipment adjacent to historical resources;
- Guidelines for storage of construction materials away from the resources;
- Requirements for monitoring and documenting compliance with the plan; and
- Education/training of construction workers about the significance of the historical resources around which they would be working. The training program shall be prepared by a historical architect and approved by Planning Division staff.

The plan shall be prepared by a qualified architectural historian or historical architect who meets the Secretary of Interior's Professional Qualification Standards (36 CFR, Part 61). The plan shall be reviewed and approved by Planning Division staff. The project sponsor shall ensure that the contractor follows these plans. The protection plan, specifications, monitoring schedule, and other supporting documents shall be incorporated into the building permit application plan sets.

MM-3.4-1b Prior to construction, a historical architect and a structural engineer shall undertake an existing condition study of the administrative building and garage. The purpose of the study would be to establish the baseline condition of the structures prior to construction. The documentation shall take the form of written descriptions and visual illustrations, including those physical characteristics of the resource that convey its historical significance and that justify its inclusion on, or eligibility for inclusion on, the California Register of Historical Resources. The documentation shall be reviewed and approved by Planning Division staff.

The historical architect shall make periodic site visits to monitor the condition of the resource, including monitoring of any instruments such as crack gauges. The historical architect shall consult with the structural engineer to ensure that character-defining features are protected, especially if any problems with character-defining features of the historic resource are discovered. If in the opinion of the monitoring team, substantial adverse impacts to the historic resource related to construction activities are found during construction, the monitoring team shall so inform the project sponsor or designated representative responsible for construction activities. The project sponsor shall adhere to the monitoring team's recommendations for corrective measures, including halting construction in situations where construction activities would imminently endanger the historic resource. The monitoring team shall prepare site visit reports and submit them for review and approval by Planning Division staff.

MM-3.4-1c Upon completion of construction activities at the proposed project site, the qualified architectural historian or historical architect shall document (e.g., with photographs and

other appropriate means) the level of success in meeting the Secretary of the Interior's Standards for the Treatment of Historic Properties and in preserving the character-defining features of the identified historic resources. The documentation shall be submitted to Planning Division staff for review and approval.

The project sponsor shall ensure that repairs occur in the event of damage to the historic resources during construction. Repair work shall comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties and shall restore the character-defining features in a manner that does not affect the eligibility of the historic property for the California Register of Historical Resources. All repairs shall be reviewed by Planning Division staff in consultation with the architectural historian or historical architect.

Mitigation for Impact 3.4-2: Implementation of the proposed project would result in a significant impact on historic architectural resources due to the loss of integrity of ~~a potential~~the Sperry Flour Mill Historic District associated with demolition of the flour mill, grain silos, and dock.

MM-3.4-2a Prior to the issuance of demolition or site permits, the project sponsor shall undertake Historic American Building Survey (HABS) documentation of the subject property, structures, objects, materials, and site features. The documentation shall be undertaken by a qualified professional who meets the standards for history, architectural history, or historic architecture (as appropriate), as set forth by the Secretary of the Interior's Professional Qualification Standards (36 CFR, Part 61). The documentation shall consist of the following:

Measured Drawings

The project sponsor shall engage the services of an architectural historian to conduct research to find plans and drawings of the structures on the project site that comprise the historic resources, most importantly those of the flour mill and grain silos. If plans are found and can be made available for reproduction, they shall be reproduced on archival materials, either archival bond paper or mylar.

If suitable plans are not available, an architectural historian or historical architect shall prepare sketch plans for the flour mill building. One sketch plan shall be made of the ground floor (including the warehouse). Another plan shall be made of one floor of the tower portion of the flour mill. In addition, sketch floor plans shall be made of the administrative building and garage.

An architectural historian or historical architect shall prepare a site plan, including the manager's house and grounds. Site plans prepared by the project sponsor can be used as a base.

Photography

Large format negatives shall be required. Photography shall be undertaken by a qualified professional with demonstrated experience in Historic American Buildings Survey photography and shall follow the HABS/HAER/HALS Photography Guidelines (National Park Service, Heritage Documentation Programs, 2011). Digital prints shall be acceptable.

Photography shall include context photographs, site features, and all structures on the project site that comprise the historic resources. The photographer shall consult with the architectural historian engaged in the measured drawings and historical report about the type and number of views required for the documentation of the ~~potential~~ historic district.

Historical Report

An architectural historian shall prepare a written Narrative Report based on HABS Guidelines for Preparing Written Historical and Descriptive Data. Carey and Company's previous report (2008) and the revised evaluation for this historic resources evaluation can be used in the preparation of the Narrative Report. The architectural historian shall make an effort to locate and conduct an oral history interview with Floyd Miller, who provided assistance with the 2008 report.

All documentation shall be submitted for review and approval by Planning Division staff prior to the issuance of final building occupancy permits. The final documentation shall be disseminated to the John F. Kennedy Library, Northwest Information Center, Sonoma State University (California Historical Resource Information System), and Vallejo Naval and Historical Museum.

MM-3.4-2b The project sponsor shall install permanent interpretive exhibits at the Vallejo Naval and Historical Museum that provide information to visitors and occupants regarding the history of the Sperry Flour Mill. The interpretive exhibit shall utilize images, narrative history, drawings, or other archival resources. The interpretive exhibits may be in the form of, but are not necessarily limited to plaques or markers, interpretive display panels. The interpretive exhibits shall be installed at a pedestrian friendly location, and be of adequate size to attract the interested public. The project sponsor's consultant shall submit conceptual and final designs to Planning Division staff for

review and approval. Mitigation for Impact 3.4-3: Construction and excavations for structures on the site could result in incidental disturbance to native sedimentary rock and, although low, potential remains for deep excavations to uncover significant fossils, which would result in a significant impact.

Mitigation for Impacts 3.4-3 and 3.4-4: There is potential for the inadvertent discovery of unknown archaeological resources during ground-disturbing activities associated with project construction and the off-site improvements, which could lead to a significant impact to archaeological resources.

MM-3.4-3 In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project or the off-site improvements, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can be retained to evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA) (14 CCR 15064.5(f); California Public Resources Code, Section 21082), the archaeologist may record the find and allow work to continue. If the discovery proves significant under CEQA, additional work such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted.

Mitigation for Impact 3.4-5: Although the paleontological potential of rocks and sediment within the project's disturbance footprint is very low, the potential remains for deep excavations to uncover potentially significant fossils within the bedrock underlying the site.

MM-3.4-4 If potential fossils are discovered by construction crews, all earthwork or other types of ground disturbance within 50 feet of the find shall stop immediately until a qualified professional paleontologist can assess the nature and importance of the find. Based on the scientific value or uniqueness of the find, the paleontologist may record the find and allow work to continue or recommend salvage and recovery of the fossil. If treatment and salvage is required, recommendations shall be consistent with Society of Vertebrate Paleontology 1995 guidelines and currently accepted scientific practice and shall be subject to review and approval by the City. Work in the affected area may resume once the fossil has been assessed and/or salvaged and the City, in consultation with the professional paleontologist, has provided written approval to resume work.

Mitigation for Impacts 3.4-6 ~~and 3.4-7~~: Although the potential for human remains on the project site and within the off-site improvement areas is very low, in the event that human remains are

found during project construction or implementation of the off-site improvements, impacts would be potentially significant.

MM-3.4-5 In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are encountered by project personnel, the County Coroner shall be notified within 24 hours of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within 2 working days of notification of the discovery, the appropriate treatment and disposition of the human remains. If the County Coroner determines that the remains are, or are believed to be, Native American, he or she shall notify the Native American Heritage Commission (NAHC) in Sacramento within 48 hours. In accordance with California Public Resources Code Section 5097.98, the NAHC must immediately notify those persons it believes to be the most likely descendent (MLD) of the deceased Native American. The MLD shall complete their inspection within 48 hours of being granted access to the site. The designated Native American representative shall then determine, in consultation with the property owner, disposition for the human remains.

3.4.6 Level of Significance After Mitigation

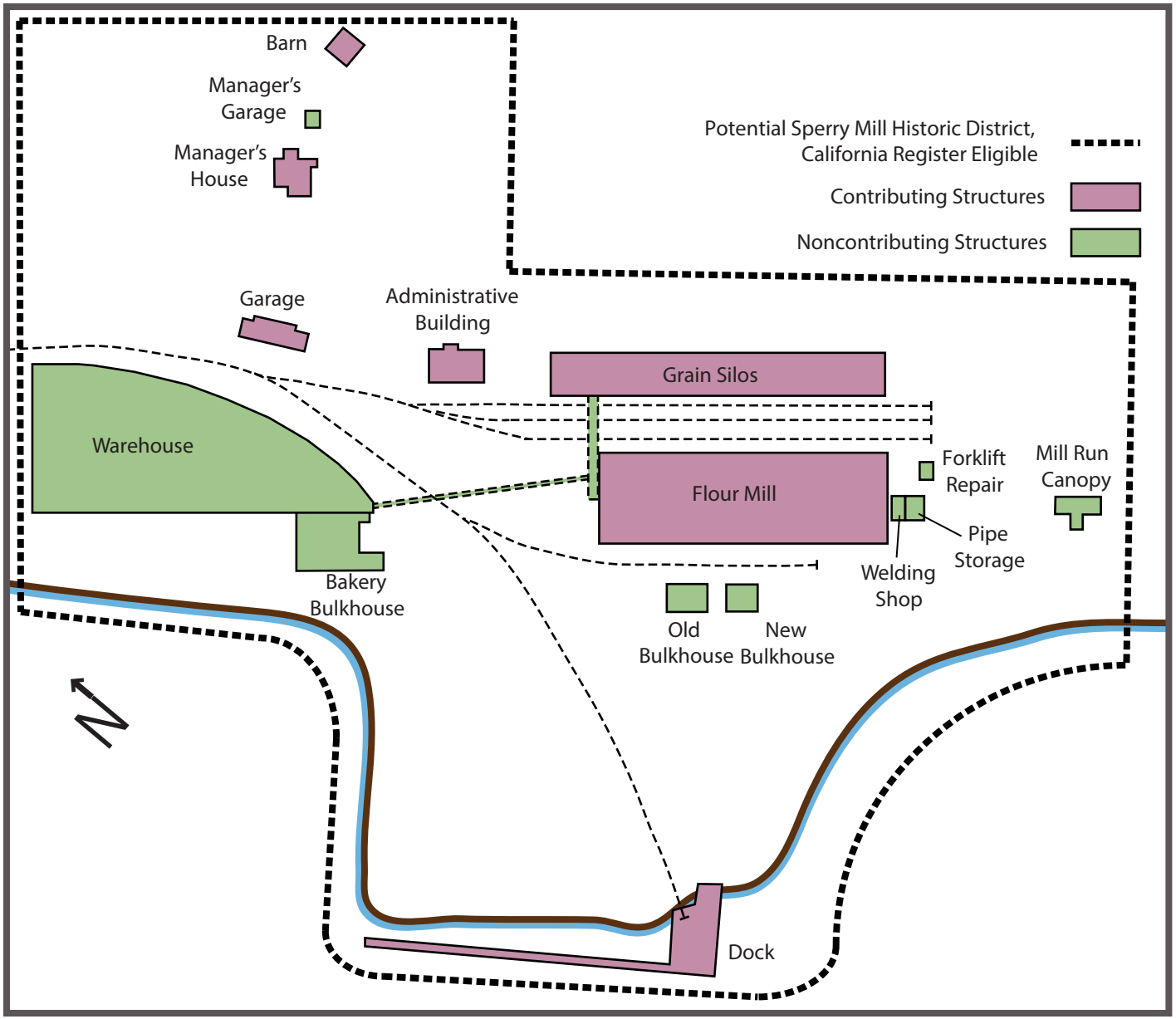
Impact 3.4-1: Implementation of mitigation measures MM-3.4-1a: Historic Preservation Plan and Protective Measures; MM-3.4-1b: Historic Resource Baseline Condition Study; and MM-3.4-1c: Compliance with the Secretary of the Interior's Standards for the Treatment of Historic Properties and Preserve the Character-Defining Features of Historic Resources would reduce Impact 3.4-1 to a **less-than-significant** level.

Impact 3.4-2: Implementation of MM-3.4-2a: Historic American Buildings Survey Documentation and MM-3.4-2b: Permanent Interpretive Exhibits would reduce Impact 3.4-2, but not to a less-than-significant level. Thus, the impacts would remain **significant and unavoidable**.

Impacts 3.4-3 and 3.4-4: Implementation of MM-3.4-3 would reduce Impacts 3.4-3 and 3.4-4 to **less-than-significant** levels.

Impact 3.4-5: Implementation of MM-3.4-4 would reduce Impact 3.4-5 to a **less-than-significant** level.

Impacts 3.4-6 and 3.4-7: Implementation of MM-3.4-5 would reduce Impacts 3.4-6 and 3.4-7 to **less-than-significant** levels.



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SOURCE: Carey & Co Inc. Architecture

FIGURE 3.4-1
Historical Resources Survey Map

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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3.5 GEOLOGY AND SOILS

This section analyzes the potential impacts of the Vallejo Marine Terminal (VMT) and Orcem project (proposed project) with respect to geology and soils and recommends mitigation measures where necessary to reduce or avoid significant impacts. The primary information sources used to support this analysis include geologic and soils data and geotechnical analyses in association with past remediation activities and former project proposals. These include:

- **Appendix H-1**: Treadwell and Rollo. 2013. *Geotechnical and Environmental Consultation, GGBS Manufacturing Facility, Vallejo, California*. Prepared for Eocem Materials. Prepared by Treadwell and Rollo. February 20, 2013.
- **Appendix H-2**: ENGEO Inc. 2008. Preliminary Geotechnical Exploration, Proposed Residential Development, General Mills Property, 790 Derr Street, Vallejo, California. Submitted to Cherokee Brooks Street LLC. Prepared by ENGEO Inc. Project No. 7599.200.201. June 2008.

Treadwell and Rollo performed a review of past geologic and remedial action reports, evaluated their adequacy, and provided additional assessment of the Orcem Site's seismic hazards and slope stability. ENGEO Inc. performed a preliminary geotechnical evaluation of a former project proposed on the site, which is relied upon in this section as a source of baseline geologic information. Additional information sources used in this section include publicly available geologic maps, soil surveys, and fault information provided by the U.S. Department of Agriculture (USDA), the United States Geological Survey (USGS), and the California Department of Conservation (CDC). All figures referenced in this section are provided at the end of the section.

3.5.1 Regulatory Setting

Federal

Occupational Safety and Health Administration Regulations

Excavation and trenching are among the most hazardous construction operations. The Occupational Safety and Health Administration's (OSHA) Excavation and Trenching standard, Title 29 of the Code of Federal Regulations (CFR), Part 1926.650, covers requirements for excavation and trenching operations. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area.

State

The statewide minimum public safety standard for mitigation of earthquake hazards (as established through the California Building Code (CBC), Alquist–Priolo Earthquake Fault Zoning Act, and the Seismic Hazards Mapping Act) is that the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, is not required to prevent or avoid the ground failure itself. It is not feasible to design all structures to completely avoid damage in worst-case earthquake scenarios. Accordingly, regulatory agencies have generally defined an "acceptable level" of risk as that which provides reasonable protection of the public safety, although it does not necessarily ensure continued structural integrity and functionality of a project (California Code of Regulations (CCR) Title 14, Section 3721(a)). Nothing in these acts, however, precludes lead agencies from enacting more stringent requirements, requiring a higher level of performance, or applying these requirements to developments other than those that meet the acts' definitions of "project."

Alquist–Priolo Earthquake Fault Zoning Act

The Alquist–Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and has published maps showing these zones. Earthquake fault zones are designated by the California Geological Survey (CGS) and are delineated along traces of faults where mapping demonstrates surface fault rupture has occurred within the past 11,000 years. Construction within these zones cannot be permitted until a geologic investigation has been conducted to prove that a building planned for human occupancy will not be constructed across an active fault (CGS 2002). These types of site evaluations address the precise location and recency of rupture along traces of the faults and are typically based on observations made in trenches excavated across fault traces.

The proposed project is not within an Alquist-Priolo Earthquake Fault Zone and therefore is not subject to the requirements of this act.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Section 2690–2699.6) directs the California Department of Conservation to protect the public from earthquake-induced liquefaction and landslide hazards (note that these hazards are distinct from fault surface rupture hazard regulated by the Alquist–Priolo Special Studies Zone Act of 1972). This act requires the State Geologist to delineate various seismic hazard zones, and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones (i.e., zones of required investigation). Before a development permit may be granted 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. Evaluation and mitigation of potential risks from seismic hazards within zones of required investigation must be conducted in accordance with the CGS, Special Publication 117A, adopted March 13, 1997 by the State Mining and Geology Board as updated in 2008.

To date, Seismic Hazard Zone Maps have been prepared for portions of Southern California and the San Francisco Bay Area; however, no seismic hazard zones have yet been delineated for the project area (i.e., the Benicia USGS 7.5-minute Quadrangle). As a result, the provisions of the Seismic Hazards Mapping Act would not apply to the project.

California Building Code

The CBC has been codified in the CCR as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The 2010 edition of the CBC is based on the 2009 International Building Code published by the International Code Conference. The 2010 CBC contains California amendments based on the American Society of Civil Engineers Minimum Design Standards 7-05, which provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (such as wind loads) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. The proposed project would involve the demolition, removal and/or off-site transport of existing structures, including an equipment maintenance facility, office spaces, conveyors, crushers, screens, wash plants, scales, and other miscellaneous structures.

Local

Vallejo Municipal Code – Building Code

Chapter 12.04 of the Vallejo Municipal Code (Ordinance No. 1689 N.C.(2d), section 2(12.04.040), 11-12-2013) fully adopts the CBC by reference, with local amendments.

Vallejo Municipal Code – Excavation, Grading, and Filling

Chapter 12.40 of the Vallejo Municipal Code (Ordinance 400 N.C.(2d) section 1 (part), 1977) establishes rules and regulations for excavation, grading, and filling activities intended to preserve and enhance the natural beauty of the land, streams, and shorelines, and to reduce or eliminate the hazards of earthslides, mud flows, rock falls, undue settlement, erosion, siltation, and flooding. To obtain a grading permit, plans and specifications prepared by a licensed engineer must be submitted to the city engineer/director of public works for review and approval. Plans and specifications, among many things, must show:

- A vicinity sketch or other data adequately indicating the site location;
- Property lines of the property on which the work is to be performed;
- Location of any buildings or structures within 50 feet of the proposed work;
- Accurate contours showing the topography of the existing ground;
- Elevations, dimensions, location, extent, and the slopes of all proposed grading, working slopes; and
- Details of all drainage devices, walls, or other protective devices to be constructed in connection with, or as a part of, the proposed work.

In addition, the application must also contain the following:

- Erosion control methods and details, including schedule for installation. Erosion control plans for large-scale projects (50 acres or 200 lots, whichever is less) shall be prepared by a hydrologist specializing in erosion control.
- A map showing the drainage area and estimated runoff of the work and adjacent areas.
- A soils investigation report, including data regarding the nature, distribution and strength of existing soils, conclusions, and recommendations for grading procedures and design criteria.
- A geological report, including an adequate description of the geology of the site and conclusions and recommendations regarding the effect of geologic conditions on the proposed work.

No permit shall be granted until all of the required data has been submitted for the application, the city engineer/director of public works has approved the plans, and all required fees have been paid.

Vallejo Municipal Code – Seismic Hazard Identification and Mitigation Program for Unreinforced Masonry Buildings

Chapter 12.07 of the Vallejo Municipal Code (Ord. 1601 N.C.(2d) Section 5.01, 2007: Ord. 1075 N.C.(2d) Section 1 (part), 1990) requires owners of unreinforced masonry buildings to investigate

and correct the potential seismic hazards of their buildings. The URM program requires owners of URM buildings to have an engineering report submitted to the city's building division, to determine the existence, nature, extent and severity of structural deficiencies in their buildings' capacities for earthquake resistance which could result in damage or collapse with possible injury or loss of life. The engineering report must describe areas found by analysis to be deficient in their ability to withstand prescribed seismic forces, discuss in general terms the alternatives available for mitigation of these inadequacies, and the engineer's recommendations for most suitable solutions.

The ordinance includes options for hazard mitigation such as abandoning the building, retrofitting the building, changing the use of the building to an exempted building class, among others. The ordinance also specifies timeframes that hazard reduction actions must be accomplished following the issuance of the engineering report. The City's Building official must review and approve engineering reports and proposed hazard reduction strategy.

Due to the age and nature of certain buildings on the project site, including qualifying historic buildings 9 (Administrative Building) and 10 (Garage), the URM building program may apply, depending on future occupancy. These buildings were previously renovated by the former owner, Cherokee Brooks, and used as administrative offices.

City of Vallejo General Plan

The Vallejo General Plan 2040 was adopted in August 2017 (City of Vallejo 2017a). The General Plan 2040 Land Use Map was adopted in November 2017 (City of Vallejo 2017b). The previous draft of this EIR was based on the General Plan adopted in July 1999. This document, where necessary and appropriate, updates any policies pertaining to geology and soils that may have changed in the recently updated General Plan. This discussion is shown in underline and/or strikeout in this document for ease of review.

The following goals and policies aim to protect life, property, and public well-being from seismic, floodplain, and other environmental hazards, and to reduce or avoid adverse economic, social, and physical impacts caused by environmental conditions.

> POLICY NBE-5.3 Health and Safety Codes. Enforce development regulations and building code requirements to protect residents, businesses, and employees from flooding, liquefaction, earthquakes, fires, and other hazards.
>
> - *Action NBE-5.3B Continue to require development to comply with building and safety codes and continue to route plans and drawings to all relevant City departments for review.*
>
> POLICY NBE-5.4 Project Location and Design. Prohibit development in any area where it is determined that the potential risk from natural hazards cannot be mitigated to acceptable levels.

- *Action NBE-5.4A Continue to require geotechnical studies for land use proposals to determine engineering measures that may be necessary to adequately mitigate any seismic, flooding, sea level rise, landslide, erosion, or related risk.*

- *Action NBE-5.4B Continue to require drainage and erosion control measures for landslide-prone or geologically hazardous hillside areas to minimize risks to downhill areas.*

POLICY NBE-5.6 Flood Control Planning. Protect the community from potential flood events.

- *Action NBE-5.6D Continue to enforce City regulations that prohibit development, grading, and land modification activities that would adversely affect the local drainage system or create unacceptable erosion impacts.*

POLICY NBE-5.7 Design for Stormwater Control. Encourage new development and redevelopment to minimize the area of new roofs and paving.

- *Action NBE-5.7A Provide informational materials that promote the use of permeable materials for driveways, streets, parking lots, sidewalks, and plazas.*

POLICY NBE-5.10 Site Safety. Ensure that affected soil, groundwater, or buildings will not have the potential to adversely affect the environment or the health and safety of site occupants.

- *Action NBE-5.10A Continue to require remediation of hazardous material releases from previous land uses as part of any redevelopment activities.*

~~The City of Vallejo has three overarching goals related to geology, soils, and seismicity, as detailed in the Vallejo General Plan (City of Vallejo 1999).~~

~~The seismic hazards goal is to protect life, property, and public well-being from seismic, floodplain, and other environmental hazards, and to reduce or avoid adverse economic, social, and physical impacts caused by existing environmental conditions (City of Vallejo 1999). Policies developed to achieve this goal that are or may be relevant to the proposed project are:~~

- ~~Adopt, maintain, review (wherever necessary), and enforce adequate standards and criteria to reduce or avoid all levels of seismic or other geologic risk, whether it be unacceptable, tolerated or avoidable risk.~~
- ~~Existing and prospective property owners should be made aware of the potential hazards and their implications.~~

- ~~Seismic Shaking:~~
  - ~~A systematic survey should be conducted to identify those older structures most vulnerable to earthquake damage.~~
  - ~~There should be continued compliance with Chapter 1207, Seismic Hazard Identification and Mitigation Program for Unreinforced Masonry Buildings, of the Vallejo Municipal Code.~~
  - ~~At the discretion of the Building Official, certain of the more important or critical use structures in Groups I, II, and III (such as hospitals, schools, high rise buildings and fire stations, etc.) should be specified as requiring more conservative seismic design parameters utilizing the maximum credible earthquake). Other less important uses in Groups I, II and III (such as certain utilities, roads, and small isolated dams) could be designed utilizing the maximum probable earthquake, as are the ordinary types of construction in Groups IV and V.~~

~~The slope instability goal is to protect life, property, and public well-being from seismic, floodplain, and other environmental hazards, and to reduce or avoid adverse economic, social, and physical impacts caused by environmental conditions (City of Vallejo 1999). Policies developed to achieve this goal that are or may be relevant to the proposed project are:~~

- ~~Require special engineering studies in areas of known slope instability.~~
- ~~Avoid development on known unstable slopes where engineering design cannot ensure safe living conditions.~~
- ~~Identify and appropriately zone areas of unstable soils and/or geologic formations in areas identified as having slopes of over 20%, and regulate density and siting in accordance with the natural carrying capacity of the land.~~

~~The soil-related problems goal is to protect life, property, and public well-being from seismic, floodplain, and other environmental hazards, and to reduce or avoid adverse economic, social, and physical impacts caused by environmental conditions. Policies developed to achieve this goal that are or may be relevant to the proposed project are:~~

- ~~Special engineering studies should be required for areas underlain by un-engineered fill.~~
- ~~Special foundation design, including pile foundations, may be required in the area underlain by bay mud.~~

3.5.2 Existing Conditions

Physiography and Topography

The proposed project is located in the northern portion of the East Bay Hills, east of San Pablo Bay and the Mare Island Strait. The East Bay Hills lie within the region of coastal California referred to by geologists as the Coast Ranges geomorphic province. The Coast Ranges have experienced a complex geological history characterized by Late Tertiary folding and faulting that has resulted in a series of northwest-trending mountain ranges and intervening valleys (CGS 2002). The San Francisco Bay Valley and enclosing peripheral hills, in association with the two main fault structures (the San Andreas and Hayward–Rodgers Creek faults), comprise the main geological features of the local Bay Area. Diverse crustal movements within this tectonic framework are responsible for the morphology and seismicity of the area.

The project site is located on the shore of the Mare Island Strait, with the bulk of the developed areas located on flat land slightly above the high tide line that is mostly comprised of artificial fills. On the landward edge of the site to the northeast, a steep slope trends from northwest to southeast. Slopes along the hillside locally exceed 50%, with elevations on site varying from sea level to about 140 feet above mean sea level. Figure 3.5-1 includes topographic contours and two elevation profiles that were analyzed for slope stability (discussed below). Areas of steep slopes occur adjacent to the eastern side of the Orcem Site and on the eastern sides of the northern and southern ends of the VMT Site boundary.

Geology and Soils

The available data indicates the eastern portion of the site is blanketed by a few feet of soil, which is underlain by Cretaceous Great Valley Sequence bedrock consisting of moderately to well-cemented, strong to friable, thinly bedded sandstone, with friable, thinly bedded siltstone and claystone interbeds (Appendix H-1). The western portion of the site appears to be blanketed by clayey fill. The fill is either underlain directly by bedrock or soft clay locally referred to as Bay Mud, which overlies bedrock. The project area has been mapped by various authors as underlain by Holocene artificial fill in the west and Late Cretaceous undivided sandstone, siltstone, and shale of the Great Valley Complex in the east (Appendices H-2 and H-3). Dibblee (2005) maps the eastern upland portion of the site as Panoche formation consisting of micaceous shale with minor thin sandstone beds (Kp) and arkosic sandstone (Kps).

Each of the geologic units present on site are further described below and shown in Figure 3.5-1:

- ***Artificial fills:*** These deposits typically consist of undocumented "man-made" fills that may have been derived from material generated from cutting of the adjacent rock slope placed in connection with existing site improvements, and possibly from off-site sources.

These existing fills generally consist of intermixed loose to dense silty and gravelly sands, silty clays, and rock fragments with occasional intermixed construction rubble and debris (i.e., brick, wood, metal, and concrete fragments, etc.). The rock fragments vary in size from cobbles to boulders, likely derived from excavations generated in the surrounding slopes to the east. According to the ERRG (2007) reports, some debris and rubble was encountered during their excavation work at the site in connection with environmental remediation work. Existing fills range from about 3 to 19 feet thick, thickening towards the western portion of the site (i.e., the Mare Island Strait).

- ***Alluvial Soils and Bay Mud Deposits:*** The western lower-lying areas of the site appear to be underlain by natural soft, highly compressible alluvial soils and "bay mud" deposits, presumed to be beneath the layer of artificial fill that make up the flat-lying portions of the site. Bay Mud deposits are highly compressible and may be susceptible to significant settlement when subjected to additional loading, either through the placement of additional fill and/or additional structural loads. In addition, these deposits have low strength characteristics and may be problematic when excavated due to their instability in temporary cuts and slopes. As shown in Figure 3.5-1, these deposits are thought to be about 10 feet thick, pinching out to zero down the center of the site. Underlying or interfingered with the Bay Mud deposits are medium stiff to stiff alluvial deposits of silts and clays.
- ***Colluvial Deposits***: Colluvium is an accumulation of soil that has been deposited primarily by erosion and slope wash. Areas of thicker soil cover in swales on the eastern portion of the site are interpreted to be colluvium, and have been found to be up to 12 feet thick. Colluvium consists of dark brown or dark gray, soft to stiff, silty clay and sandy clay with varying moisture content. Samples of the colluvium have been tested as having a plastic index of 37, which indicates the material is highly expansive (Appendix H-2).
- ***Bedrock:*** Bedrock encountered at the site mainly consists of interbedded sandstone, siltstone, and claystone of the Cretaceous Great Valley Sequence. In general, the sandstone is moderately to well cemented, moderately strong to friable, thinly bedded, light yellowish brown where weathered, and gray to dark gray where fresh. Siltstone is generally light gray to dark gray, friable, and thin bedded to laminate. Claystone is generally dark gray to yellowish brown, friable, preferentially sheared and thinly bedded. The sedimentary layers are oriented in a manner that is favorable from a slope-stability perspective (i.e., the rock layers are inclined into the slope rather than along it) (Appendix H-1).

Overlying the geologic units described above is a mantle of soil that varies in thickness and character. In general, soil characteristics are strongly governed by slope, relief, climate, vegetation, and the geologic unit upon which they form. Soil types are important in describing engineering constraints such as susceptibility to soil erosion (from both water and wind), corrosion risks, and various behaviors that affect structures, such as expansion and settlement. The type, aerial extent, and some key physical

and hydrological characteristics of soils within project area were identified based on a review of a soil survey of Solano County completed by the USDA Natural Resources Conservation Service (USDA 2014). Soil units are described in Table 3.5-1. The Dibble–Los Osos clay loam is generally coincident with the area of the project underlain by bedrock, whereas the "made land" corresponds to the area of the site underlain by artificial fills. Physical characteristics of "made land" are not included because it can vary substantially based on their origin and manner of placement.

Table 3.5-1
Soil Types in the Proposed Project Area

Soil Unit	Acres / Percent of Project Area	Shrink/Swell Potential	Corrosion Risk[1]		Erosion and Runoff	
			Uncoated Steel	*Concrete*	*Hydrologic Soil Group*[2]	*Erosion Factor (Kf)*[3]
Dibble–Los Osos clay loam, 9% to 30% slopes	5.8 (13%)	Moderate - High	Moderate-High	Low	D	0.28-0.37
Dibble–Los Osos clay loam, 30% to 50% slopes	21.2 (47%)	Moderate - High	High	Low	D	0.28-0.37
Made Land	9.2 (21%)	—	—	—	—	—
Water	8.7 (19%)	—	—	—	—	—

Source: USDA 2014.
Notes:
1 "Risk of corrosion" pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete.
2 Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups (A through D) according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. Soils in Group B have a moderate infiltration rate and a moderate rate of water transmission. Soils in Group C have a slow infiltration and transmission rates and consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. Soils in Group D have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.
3 Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Regional Faulting and Seismic Hazards

Fault Rupture: The proposed project is not located in a State of California Earthquake Hazard Fault Zone (California Department of Conservation 2014a). Furthermore, according to review of other faults not mapped under the Alquist–Priolo Earthquake Fault Zoning Act and a field reconnaissance in 2008 did not observe geology or geomorphic features indicative of faulting at the site. Based on these findings, the potential for ground rupture at the site is low.

Ground Shaking: The major active faults in the area are the Hayward, Calaveras, San Andreas, Concord–Green Valley, and San Gregorio Faults. The project site could be subject to significant ground shaking from a major earthquake along any of these faults or along many other active and potentially active faults in the region. A magnitude 6.0 earthquake along the West Napa Fault on August 24, 2014, caused strong to very strong ground shaking in the Napa region with significant

damage, though it is estimated to have caused moderate ground shaking at the project site, with little to no observable damage (USGS 2014). The portion of the fault that ruptured in that quake was not previously known to be Holocene-active, nor was it zoned under the Alquist–Priolo Earthquake Fault Zoning Act.

The primary tool that seismologists use to describe future ground-shaking hazards is a probabilistic seismic hazard assessment (PSHA). The PSHA for the State of California takes into consideration the range of possible earthquake sources and estimates their characteristic magnitudes to generate a probability map for ground shaking. The PSHA maps depict values of peak ground acceleration (PGA)[1] based on various return periods and are useful because they incorporate all known sources of seismicity. For example, based on the PSHA, the project site is expected to have a 10% probability of exceeding a PGA of 0.48g and a 2% probability of exceeding a PGA of 0.72g in the next 50 years (California Department of Conservation 2014b). A 2% probability of exceedance in 50 years is about the same as a 2,500-year average repeat time. In past earthquakes, average peak accelerations in between 0.44g and 0.83g have been correlative to severe to violent perceived ground-shaking intensities and moderate to heavy structural damage (USGS 2014).

Liquefaction: Even though the project site is located close to the bay and likely has a shallow groundwater table, the potential for liquefaction is expected to be low based on site-specific boring and test log data (Appendix H-1).

Lateral Spreading: The proposed development is along the Mare Island Strait, and the ground slopes down towards the center of the channel. However, because there does not appear to be a continuous layer of potentially liquefiable soil, the potential for lateral spreading is expected to be low (Appendix H-1).

Slope Stability

A slope failure is a mass of rock, soil, and debris displaced down a slope under the influence of gravity by sliding, flowing, or falling. Several factors can affect the susceptibility of a slope to failure, including (1) steepness of the slope; (2) strength and bulk density of the soil or bedrock; (3) width, orientation, and pervasiveness of bedrock fractures, faults, or bedding planes; (4) prevailing groundwater conditions; and (5) type and distribution of vegetation. Those features, among others, are important factors that determine the predisposition of a sloped surface to fail, while external processes such as exceptionally heavy rainfall, earthquakes, or human disturbances (e.g., quarrying, road cuts, and large-scale vegetation removal) may trigger a new or reactivate an existing slope failure. Review of publicly available landslide maps do not reveal any known landslides in or adjacent to the project site, but that

[1] The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as a percentage of the constant value of acceleration due to gravity (g) (approximately 980 centimeters per second squared).

the slopes above the Orcem Site are "generally susceptible" to landslides and "marginally susceptible" to earth flows (USGS 1974, Bortugno 1986).

The degree to which a slope will remain stable is expressed by the "factor of safety" (FOS), which is calculated by dividing the forces that resist movement (the shearing strength available along a potential slide surface) by the shearing stresses that tend to produce failure along a surface. When a calculated FOS value is less than 1, conditions that make a slope susceptible to failure have exceeded those that tend to hold it in place. Treadwell and Rollo (2013) used the engineering properties of fill, colluvium, and bedrock collected from past investigations of the site to analyze the failure potential along two cross sections (shown in Figure 3.5-1). The location and length of the cross sections were selected based on a determination of the "critical" failure surface, which is determined by using a computer program to model hundreds of iterations to search for the terrain surface in the study area that results in the lowest FOS. Calculations of the FOS based on the critical failure surface ensure that the analysis results are representative of the worst-case scenario.

The results of the slope stability analysis conducted by Treadwell and Rollo (2013) are presented in Table 3.5-2. The static factors of safety for the existing slopes vary from about 1.2 to 2.1. Under a design earthquake scenario (referred to as pseudo-static), the pseudo-static factor of safety for the existing slope decreases to values ranging from 0.8 to 1.2. Typically, a slope with a static factor of safety of at least 1.5, and a pseudo-static factor of safety of at least 1.15 is considered stable (Seed 1979, as cited in Appendix H-1). Thus, the critical failure surface along cross section A-A' would be considered generally stable under normal conditions (i.e., the value exceeds 1, but is below 1.5), but susceptible to failure in a large earthquake. However, the magnitude of anticipated slope movement was estimated to be small, about 4 to 5 inches. Cross section B-B' was found to be stable under both normal and seismic conditions.

Table 3.5-2
Slope Stability and Seismic Slope Displacements

Profile	Static Factor of Safety	Pseudo-Static Factor of Safety	Yield Acceleration (g)	Seismic Slope Displacement during Design Earthquake
A-A'	1.194	0.813	0.118	About 4 to 5 inches
B-B'	2.055	1.227	—	Negligible

Source: Appendix H-1, Appendix H-2.

The analysis of slope failure above is specific to large-scale, deep-seated failures of large portions of the hillside. However, rockfalls, whereby individual rocks or boulders fall, tumble, or roll down the slope, represent another kind of slope failure mechanisms that could occur on the slope. Treadwell and Rollo (2013; see Appendix H-1) used a different methodology—which takes into consideration slope angles, slope lengths, and surface roughness, as well as the size and shape of rocks that could be dislodged—to model how fast, how far, and with how much bounce blocks

and boulders could travel down-slope. The model found that as many as 94% of the rockfalls (should any occur) would resume rolling past the base of the slope and calculated that the kinetic energy for a 1 cubic foot rock could be about 4,950 foot-pounds by the time it reached the base of the slope (Appendix H-1).

3.5.3 Thresholds of Significance

The following criteria, included in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), will be used to determine the significance of potential geology and soils impacts. Impacts to geology and soils would be significant if the proposed project would:

A) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

   i) Rupture of a known earthquake fault, as delineated on the most recent Alquist–Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. Refer to Division of Mines and Geology Special Publication 42;

   ii) Strong seismic ground shaking;

   iii) Seismic-related ground failure, including liquefaction; or

   iv) Landslides.

B) Result in substantial soil erosion or the loss of topsoil;

C) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; or

D) Be located on expansive soil, as defined in Table18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

This analysis assumes that construction and design of proposed facilities would utilize standard site-preparation practices, engineering designs, and seismic safety techniques that are required under the CBC and local amendments (see Section 3.5.1). This analysis also assumes that the preliminary geotechnical design recommendations developed by Treadwell and Rollo (2013), refined as necessary according to final designs, would be implemented as part of the proposed project and incorporated into final project designs.

The following CEQA criteria topics are not discussed further in this EIR section, either because the issue is not applicable to the project, because there would be no impact, or because the issue is addressed in another section of the EIR.

Would the project expose people or structures to potential substantial adverse effects, including 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?

No faults zoned under the Alquist–Priolo Earthquake Fault Zoning Act, or any other Holocene-active faults pass through the project site (Appendix H-1). Thus, there would be no impact with respect to fault rupture on the site.

Would the project result in substantial soil erosion or the loss of topsoil?

The potential for soil erosion and loss of topsoil is comprehensively addressed in Section 3.8, Hydrology and Water Quality, which analyzes and mitigates for the adverse effects runoff and/or facility discharges with respect to erosion and sedimentation. This CEQA criterion is therefore not further discussed in this section.

3.5.4 Impact Discussion

A) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- ***i. Strong seismic ground shaking?***
- ***ii. Seismic-related ground failure, including liquefaction?***
- ***iii. Landslides?***

VMT and Orcem Project Analysis

Ground shaking is an unavoidable hazard for nearly all man-made facilities in the Bay Area. The general setting means proposed facilities are likely to experience ground shaking from at least one major earthquake (e.g., greater than moment magnitude 6.7) sometime during the operational life of the project. Based on the most recent PSHA for the State of California, the project site would have an approximately 10% chance of exceeding a PGA of 0.48g and a 2% chance of exceeding a PGA of 0.72g in the next 50 years. The project site is also underlain by soils that if not properly engineered during construction site preparation, could be subject to secondary effects such as seismically induced settlement. As discussed in the setting, soils underlying the project site are not anticipated to be subject to liquefaction or lateral spreading due to the soil characteristics that were observed in borings. Proposed structures, including berths, conveyors, administrative office buildings, guardhouse, out load silos and weighbridges, mill and filter buildings, accessory structures, as well as surface and buried infrastructure, could be subject to damage from earthquakes and earthquake-induced ground failures.

The proposed project does not involve any activities that would expose the general public or off-site properties to greater level of risk from geologic and/or seismic hazards compared to existing conditions. A security fence and entrance kiosk would limit public access to the facility, and ample buffer space exists between proposed facilities and the nearest properties such that residential areas or public spaces would be unaffected by toppling equipment or falling debris (however unlikely on a properly designed site). The project would not make any destabilizing excavations into the hillsides to the east—on the contrary, the project would carry out slope repairs as necessary and install a retaining wall along the base of the hillside such that soils would be buttressed and seismically induced slope movements minimized or avoided. Note that potential effects of the project on slope stability are addressed in the following criterion.

For the aforementioned reasons, the consequences of earthquake-related damage the facility might incur would be limited to the facility itself and its on-site workers. Based on the definitions in Section 12.07.030 of the City's municipal code, none of the existing or proposed buildings on site would be categorized as an "essential building" (i.e., a hospital or medical building, fire or police station, or municipal government disaster operation and communication center), or a high-risk building (i.e., any building with an occupant load of 100 persons or more). There are several buildings on site that—based on the definition in Section 12.07.030D of the City's municipal code—may be classified as an unreinforced masonry building (URM), if they contain "walls and/or columns constructed wholly or partially of masonry without at least fifty percent of the reinforcement required by the most current edition of the California Existing Building Code adopted by the city." Buildings 9 and 10 were occupied with offices used by the previous owner and would again initially be occupied during VMT construction for the purpose of administrative and operational support, and possibly leased thereafter for a variety of complementary terminal operations, warehousing, office, and general manufacturing uses. These buildings are described as reinforced concrete structures, but may have unreinforced brick infill "spandrel panel" that are not part of the structural system. The City's URM ordinance would require an engineering report prior to occupancy to evaluate the structural integrity and recommend options to reduce the hazard of failure during an earthquake. If necessary, the applicant would undertake repairs and reinforcements necessary to allow the occupancy of the buildings, per Section 12.07 of the City's municipal code.

The Orcem project component is expected to provide for up to 40 full-time jobs, and the VMT project component is expected to have a maximum of 40 workers on site at any one time (though the permanent workforce is expected to consist of about 25 employees). This means there would normally be about 65 employees on site during working hours, with up to 85 employees during busy shipping and freight operations. The workforce would have various functions (cargo loading, maintenance responsibilities, plant operations, administrative and sales functions, etc.), and would be in scattered locations in various buildings and loading areas across the site. Based on this information, most if not all (with the possible exception of administrative offices) of the buildings

on site, due to required compliance with modern building codes, would be classified as low risk buildings per Section 12.07.030 of the City's municipal code.

The project would minimize exposure of on-site workers and proposed facilities to earthquake-related damage through proper design and construction in accordance with the provisions of the 2010 CBC, and sections of the Vallejo Municipal Code dealing with construction, grading, and excavation (see Section 3.5.1). According to the geotechnical review completed by Treadwell and Rollo (Appendix H-1), it is expected that most buildings on the eastern side of the site (where bedrock is shallower than 5 feet below grade) can be adequately supported with spread-foot or mat foundations, whereas structures on the western portion of the site (where bedrock is deeper than 5 feet below grade) will require drilled piers or auger-cast piles driven deeply enough to provide the necessary bearing capacity. The mill will require a massive concrete foundation to dampen vibrations and support anticipated loads, and preliminary information suggests the foundation will be able to reach bedrock (Appendix H-1). Specific parameters for seismic design, based on anticipated ground motions are also provided in Appendix H-2.

Geologic studies, evaluations, and/or geotechnical reports necessary to demonstrate the proposed project has properly assessed and mitigated for seismic hazards are mandated as a condition of grading and/or building permits, which the applicants and/or their contractors would need to obtain from Vallejo Building Division prior to start of construction. The purpose of these local permits is to ensure the proposed development complies with all relevant building codes (i.e., CBC and local amendments), local ordinance codes, and local and state geologic hazard regulations. As indicated in Section 3.5.1, Chapter 12.40 of the Vallejo Municipal Code, applicants must prepare and submit to the city engineer/director of public works final grading plans, including geotechnical and soils reports prepared by appropriately licensed individuals (Professional Geologist (PG), Certified Engineering Geologist (CEG), or Professional Engineer (PE)), for review and approval prior to project approval.

Given the proposed facilities would be closed to the general public and would not affect off-site properties, and given the facilities would be constructed in accordance with the CBC and geotechnical design recommendations, the impact of the project with respect to earthquakes would be **less than significant**.

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements (public access improvements and removal of existing deteriorated docks) that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the marina. The proposed launch would consist of~~

~~a pre-cast articulated concrete mat, approximately 10 feet wide by 60 feet long over a geotextile fabric. As described previously, seismic ground shaking is an unavoidable hazard for nearly all man-made facilities in the Bay Area, and seismic-related ground failure and landslides are also a possibility in areas with susceptibility to these hazards. Although the launch ramp would provide a public facility that could be susceptible to seismic-related hazards, this pre-cast articulated concrete mat would be designed to withstand seismic shaking and would not include any features that would pose potential hazards to the public in the event of a seismic event. The project would also involve the removal of existing deteriorated dock improvements within the water area at the north end of the marina. Removal of the deteriorated docks would eliminate the potential for exposure of people and structures to seismic hazards since the docks would no longer be in the water. Since the off-site improvements would not expose people or structures to substantial adverse effects due to seismic hazards, impacts would be **less than significant**.~~

B) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

VMT and Orcem Project Analysis

As discussed in the setting, there are steep slopes along the northeast side of the Orcem Site as well as the northern and southern ends of the VMT Site. According to the geotechnical review of the project site, these slopes are stable under normal conditions, and generally stable in a design earthquake, with movements of 4 to 5 inches expected along the most critical slope profile (i.e., assuming no retaining wall is present) (Appendix H-1). The proposed project does not involve cuts into the hillside that could remove buttressing soils or otherwise destabilize the slope. Therefore, the project does not make slope failures more likely or affect landslide hazards for off-site properties. However, planned facilities and use of the site for active industrial operations may put site workers and facilities at risk slope failure or rockfall if improperly designed.

The Orcem component of the project would place a 3-meter-high retaining wall along the base of the slope, generally along the northern and eastern sides of the planned material storage areas. Should a slope failure or rockfall occur, the retaining wall would serve to protect the facility, and the location of the raw material storage lots on the other side of the retaining walls essentially provides ample buffer space which reduces the chances of occupied buildings being affected by slope movements. Proposed facilities on the VMT Site would generally be sufficiently distant from the base of the steep slopes to be affected by potential slope instabilities.

Construction Impacts

Deep excavations for the mill foundation and other buildings founded on bedrock could encounter weak or saturated soils, or bay mud deposits that would be subject to sloughing or slumping such

that either sloped excavations or retaining walls would be required to protect worker safety (Appendix H-1). The exact location and methods for construction-related slope protection, whether it be installing temporary retaining walls or sloping excavations to maintain adequate stability, would be specified in final construction plans in accordance with the required geotechnical investigations of the site. As discussed above under Criterion A), such plans would be prepared by appropriately licensed individuals and submitted to the City for review and approval prior to the start of construction.

Furthermore, California Occupational Safety and Health Administration (CalOSHA) requirements for excavation safety require that trenches and excavations that pose a risk to site workers be sloped or shored, and be approved and monitored by a CalOSHA approved "competent person." The CalOSHA competent person would make changes and modifications to sloping and shoring requirements as soil and/or groundwater conditions change across the site. OSHA requirements are discussed in Section 3.5.1. Following construction, open trenches and excavated pits would be backfilled with engineered fill or replaced by properly designed foundations, minimizing the potential for future slope instabilities. Because construction-related excavations would be temporary in nature, and would be governed by CalOSHA-related safety requirements, construction-dike impacts of the project on slope stability would be **less than significant**.

Operational Impacts

Installation of the retaining wall, if properly designed, would protect site workers and operations from the potential effects of a slope failure and/or rockfalls. As discussed in the setting, slope failure is only expected in the event of a large earthquake, and even then, slope movements were estimated to be on the order of 4 or 5 inches. However, rockfalls may occur anytime due to occasional downslope tumbling of blocks or boulders that become dislodged in the process of weathering (e.g., root action, freeze/thaw, rainfall, etc.). Given the proposed project is industrial in nature, and that the site would include diesel storage tanks, refueling areas, and storage of other hazardous materials, the consequences to the site and surrounding environment of a landslide would be high.

Although project plans include provisions of retaining walls to protect the site, it is important that these be designed to be high enough and strong enough to buttress the hillside and to resist damage from rockfall impacts. For example, analysis by Treadwell and Rollo (2013) estimates falling rocks could have a maximum kinetic energy of 4,950 foot-pounds and a maximum bounce height of 8.5 feet by the time they reach the base of the slope. The retaining walls should include provisions for adequate drainage and should be founded below any potential failure planes. Although slope stability evaluations have already been prepared for the project and have concluded the risk of landslides is low, these conclusions are preliminary in nature. Proper design of remedial systems will require

more detailed study as design of the project proceeds to final stages. Therefore, prior to mitigation, operational impacts would be **significant** (Impact 3.5-1).

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site as described earlier. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the Marina. The proposed launch would consist of a pre-cast articulated concrete mat, approximately 10 feet wide by 60 feet long over a geotextile fabric. The project would also involve the removal of existing deteriorated dock improvements within the water area at the north end of the marina. The proposed off-site improvements would be located in the water area and would not increase the risk of landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts would be **less than significant**.~~

C) Would the project be located on expansive soil, as defined in Table18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

VMT and Orcem Project Analysis

Table 18-1-B of the Uniform Building Code defines the expansive potential of a soil by its "expansion index," which if greater than 20, typically requires special foundation design consideration under the Uniform Building Code (ICBO 1994). The expansive potential of soils is typically related to the type and amount of clay minerals in a soil, along with the moisture content of the soil and how often it changes (i.e., wet/dry cycles). Calculations of the expansion index require site-specific testing of soils. The USDA (2014), based on regional studies of representative soils, estimates the expansive potential of the Dibble–Los Osos clay loam (within upland portions of the site) to be moderate to high (see Table 3.5-1). This is consistent with site-specific testing completed by ENGEO (2008), which found the expansive potential of soils to be moderate to high (with expansion indices ranging from 17–37). The most expansive soils were found within colluvium, which does not underlie the footprint of the proposed facilities (see Figure 3.5-1). Bay mud deposits, which are presumed to underlie the artificial fills on site, may also be expansive and would not be suitable for use as engineered fill.

The presence of expansive soils, however, would not generally represent a significant hazard to life or safety, and would be addressed through application of modern building codes and generally accepted professional engineering geologic principles and practice. ENGEO (2008) recommends typical measures to reduce the potential for expansive soils to have adverse effects on building foundations and utilities. This includes a combination of special rigid mats such as post-tensioned slabs or conventional reinforced mats, and special grading requirements such as overexcavation, moisture conditioning, and compaction within specified ranges.

As discussed under Criterion A), prior to the issuance of any grading or building permits, a design-level geotechnical study would be prepared by a registered civil or geotechnical engineer, and submitted for review and approval to the City of Vallejo. The design-level geotechnical study would include more detailed information based on final designs that identify soil conditions, recommend foundation designs, and provide recommendation to mitigate for expansive soils. The geotechnical study would be required to comply with applicable building codes and engineering standards, including any applicable amendments to the CBC contained in the City's municipal code. The project structures would be designed to either avoid or accommodate without issues small-scale instabilities such as shrink/swell behavior, load-induced and long-term soil settlement, among other issues. For these reasons, the project impacts with respect to expansive soils would be **less than significant**.

~~**Off-Site Improvements**~~

~~The proposed project includes two off-site improvements that would take place at the City of Vallejo Municipal Marina located approximately 2 miles north of the project site as described earlier. The public access improvements would involve installation of a new self-propelled personal watercraft launch ramp just north of the access ramp to K Dock at the south end of the marina. The proposed launch would consist of a pre-cast articulated concrete mat, approximately 10 feet wide by 60 feet long over a geotextile fabric. The project would also involve the removal of existing deteriorated dock improvements within the water area at the north end of the marina. Although the off-site improvements could be located on expansive soils, the presence of expansive soils would not represent a significant hazard to life or safety in the context of the improvements, and would be addressed through application of generally accepted professional engineering geologic principles and practice. Therefore, impacts would be **less than significant**.~~

3.5.5 Mitigation Measures

Mitigation for Impact 3.5-1: Although project plans include provisions of retaining walls to protect the site, proper design of remedial systems would require more detailed study as design of the project proceeds to final stages. Therefore, impacts would be significant prior to mitigation.

MM-3.5-1 **Maintenance of Adequate Slope Stability**. Prior to approval of final project designs, the applicants shall: (a) Prepare and submit for review construction-level plans for the catchment and retaining wall to be placed at the toe of the slope on the Orcem Site; and (b) Prepare and submit for review construction-level plans and a supplemental soil engineering review to demonstrate that proposed final design slopes on the VMT Site would maintain adequate factors of safety under both static and pseudo-static conditions. The supplemental investigation shall include additional exploratory borings, trenching, laboratory testing, and geologic

analyses, as necessary, to ensure the analysis is based on the proper distribution and characteristics of earth materials, and adequately informs the final designs of proposed retaining walls. The acceptable level of stability (i.e., seismic and static factor of safety (FOS) values) shall be determined by the geotechnical consultant in consultation with the City of Vallejo Building Division; but in no case shall be below a static FOS of 1.5 or a pseudo static FOS of 1.15. All slope stability evaluations shall be prepared and stamped by a registered geotechnical engineer or engineering geologist, and reviewed and approved by the City of Vallejo Building Division prior to approval of final building plans.

3.5.6 Level of Significance After Mitigation

Implementation of mitigation measure MM-3.5-1 (Maintenance of Adequate Slope Stability) would ensure that the retaining wall is properly engineered to protect the site from slope movements. With implementation of MM-3.5-1, exposure of proposed facilities and site workers to slope instabilities (include rockfall and landslide) would be eliminated or minimized to an acceptable level. Impact 3.5-1 would be reduced to **less than significant** with mitigation.

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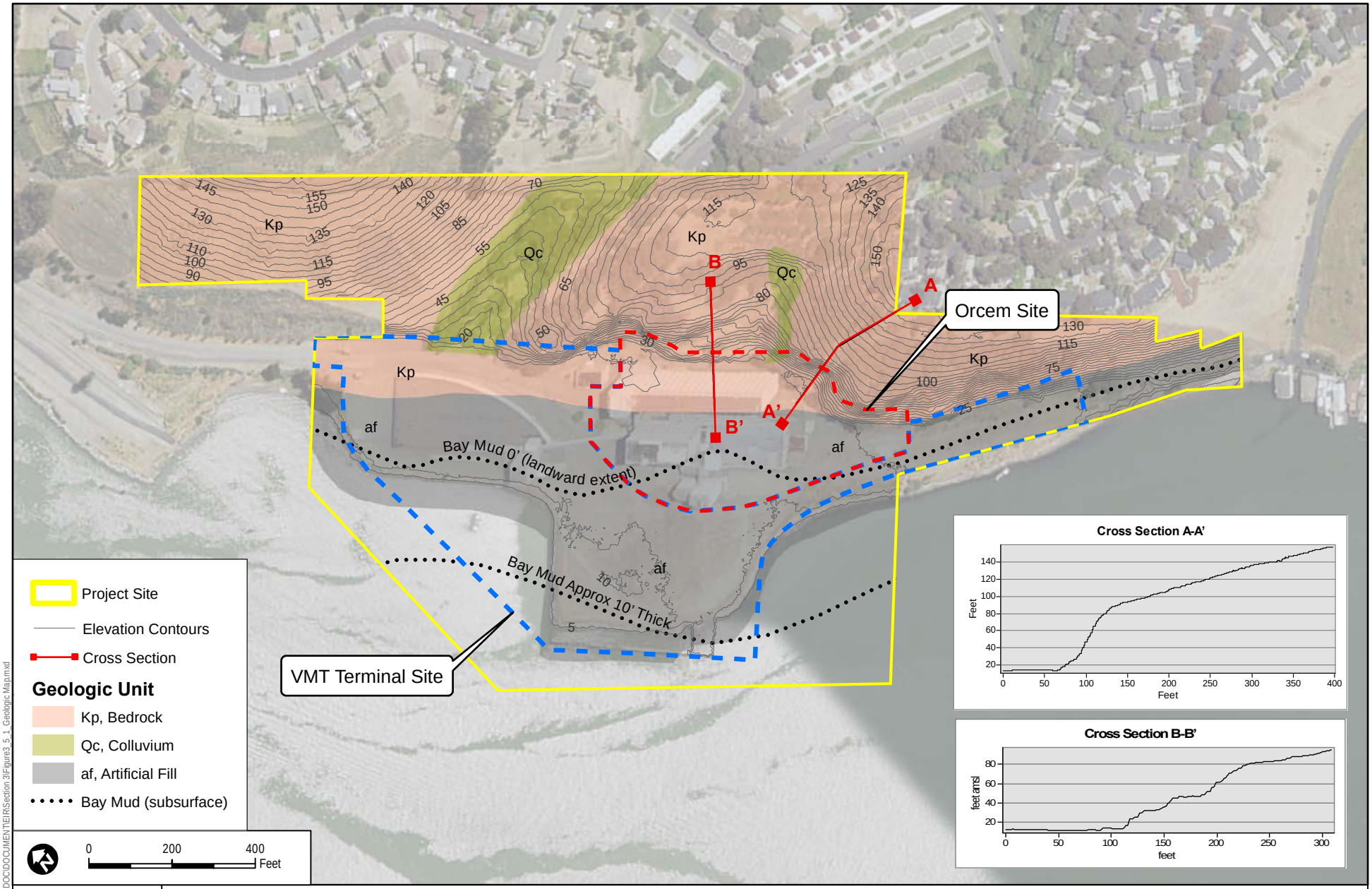

SOURCE: Engeo 2013, NCALM 2003

FIGURE 3.5-1

Site Geology and Topography

DUDEK

8301

VALLEJO MARINE TERMINAL AND ORCEM PROJECT

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