

## 3.12 Noise

This section of the Environmental Impact Report (EIR) characterizes the existing noise resources within the Eden Landing Phase 2 project area and analyzes whether implementation of the project would cause a substantial adverse effect on noise quality. The information presented is based on a review of the existing noise resources within the area and pertinent federal, state and local regulations. Using this information as context, an analysis of the noise-quality-related environmental impacts of the project is presented for each alternative. The program-level mitigation measures described in Chapter 2, Alternatives, would be implemented with the project. Therefore, this section only includes additional, project-level mitigation measures as needed.

### 3.12.1 Physical Setting

#### Introduction and Methodology

Development of the baseline conditions, significance criteria, and impact analysis in this section is commensurate to and reliant upon the analysis conducted in the 2007 South Bay Salt Pond (SBSP) Restoration Project Final Environmental Impact Statement/Report (2007 Final EIS/R). It includes a summary of the physical setting, existing noise levels, and the regulatory setting. Applicable regional, state, and local plans and policies concerning noise and vibration were reviewed during preparation of this EIR.

#### *Acoustic Fundamentals*

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave because of a disturbance or vibration, and as any pressure variation in air that the human ear can detect. Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss may both result in permanent hearing damage. Also, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 1998).

**Noise Descriptors.** Selection of a proper noise descriptor for a specific source is dependent on the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined below (Caltrans 1998; Lipscomb and Taylor 1978).

- $L_{\max}$  (Maximum Noise Level): The maximum instantaneous noise level during a specific period of time. The  $L_{\max}$  may also be referred to as the peak (noise) level.
- $L_{\min}$  (Minimum Noise Level): The minimum instantaneous noise level during a specific period of time.

- $L_x$  (Statistical Descriptor): The noise level exceeded X percent of a specific period of time.
- $L_{eq}$  (Equivalent Noise Level): The energy of the mean (average) noise level. The instantaneous noise levels during a specific period of time in A-weighted decibels (dBA) are converted to relative energy values. From the sum of the relative energy values, an average energy value is calculated, which is then converted back to dBA to determine the  $L_{eq}$ . In noise environments determined by major noise events, such as aircraft overflights, the  $L_{eq}$  value is heavily influenced by the magnitude and number of single events that produce the high noise levels.
- $L_{dn}$  (Day-Night Noise Level): The 24-hour  $L_{eq}$  with a 10 dBA “penalty” for noise events that occur during the noise-sensitive hours between 10 p.m. and 7 a.m. In other words, 10 dBA is “added” to noise events that occur in the nighttime hours, and this generates a higher reported noise level when determining compliance with noise standards. The  $L_{dn}$  attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- CNEL (Community Noise Equivalent Level): The CNEL is similar to the  $L_{dn}$  described above, but with an additional 5 dBA “penalty” added to noise events that occur during the noise sensitive hours between 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and television. If using the same 24-hour noise data, the reported CNEL is typically approximately 0.5 dBA higher than the  $L_{dn}$ .
- SENL (Single Event [Impulsive] Noise Level): The SENL describes a receiver’s cumulative noise exposure from a single impulsive noise event, which is defined as an acoustical event of short duration that involves a change in sound pressure above some reference value. SENLs typically represent the noise events used to calculate the  $L_{eq}$ ,  $L_{dn}$ , and CNEL.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, noise level  $L_{eq}$ , which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given period (usually 1 hour). The  $L_{eq}$  is the foundation of the composite noise descriptors such as  $L_{dn}$  and CNEL, as defined above, and shows good correlation with community response to noise.

### **Vibration**

Vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of groundborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, groundborne vibrations may be described by amplitude and frequency. Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, horizontal directional drilling, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

## Regional Setting

The communities along San Francisco Bay (or Bay) are primarily urban in character; however, open space and other undeveloped areas (including ecological reserves, wildlife refuges, and parks) fringe the southern portion of the Bay and are scattered in and around the communities.

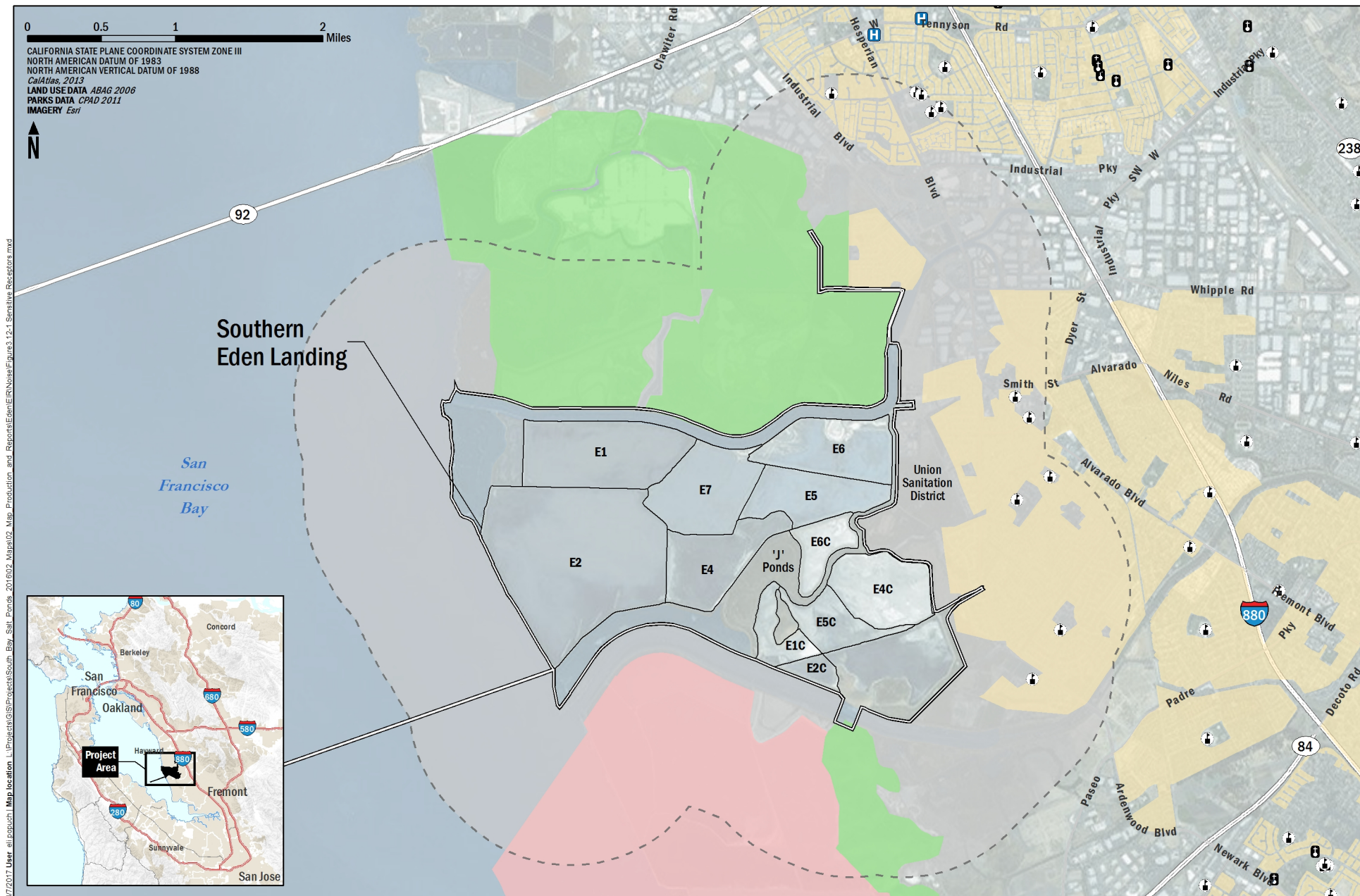
### ***Noise-Sensitive Uses***

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects and uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other noise-sensitive land uses include schools, hospitals and health-care facilities, parks, places of worship, and other uses where low interior noise levels are essential. Figure 3.12-1 shows the locations of nearby noise-sensitive receptors, including residential areas. The locations of these receptors in relation to the Eden Landing Phase 2 project area pond clusters are discussed below.

## Project Setting

As discussed in Section 3.8, Land Use, land uses surrounding the Eden Landing Phase 2 project area consist of urban development (single and multifamily residential, commercial, and industrial uses), open space and recreation areas, tidal mudflats, salt flats, salt marsh, creeks, flood control levees, rural land, and wildlife interpretative areas. The existing noise environment of the Eden Landing pond complex and the locations of sensitive receptors are discussed below. No noise monitoring was conducted within the pond complex to define the actual noise levels from inside the pond complex.

The Eden Landing pond complex is within Hayward, in Alameda County. Union City is to the east and Fremont neighbors Eden Landing across the Alameda Creek Flood Control Channel (ACFCC) to the south. Noise levels in the pond complex area are low and may be somewhat influenced by vehicular traffic on Interstate 800 (I-880), approximately 1.75 miles to the east and State Route (SR) 92, approximately 2 miles to the north. The Hayward General Plan identifies noise contours for major roadways within its jurisdiction. Noise levels within 50 feet of SR 92 range from 75 to 79  $L_{dn}$  (City of Hayward 2011). Other local noise sources are associated with passing trains and airplanes flying overhead. The Union Pacific Railroad line is located approximately 3 miles east of the pond complex. The Hayward Executive Airport is located approximately 5 miles to the north. Currently, no major noise sources occur within the Eden Landing pond complex because salt production operations ceased when the California Department of Fish and Wildlife (CDFW) acquired the property. With the exception of the trails along the ACFCC, the entire southern half of the Eden Landing pond complex is closed to the public. Wildlife-compatible recreational uses (e.g., hiking, kayaking) occur in the northern half of Eden Landing. During duck hunting season, some of the pond areas in Eden Landing are open to permitted hunters. Intermittent noises associated with these activities can be heard in the vicinity of these recreational areas.



#### LEGEND

- Church
- Park
- School
- Refuge
- Hospital
- Residential
- Eden Landing Phase 2 Project Area
- Southern Eden Landing Ponds
- Project Area 1 Mile Buffer

**AECOM**

South Bay Salt Pond Restoration Project

**Figure 3.12-1**  
Sensitive Receptors



No sensitive receptors exist within the Eden Landing pond complex itself, as it is all part of the Eden Landing Ecological Reserve (ELER, or Reserve), which is owned and managed by CDFW. Open space and commercial and industrial uses surround the Reserve to the north, east and south; the San Francisco Bay shoreline is to the west. The nearest sensitive receptors to the major construction activity are residences located approximately 900 feet east of Pond E4C (off Carmel Way in Union City). Also, as part of this project, some trail improvements will occur on top of existing levees north of the Eden Landing Phase 2 project area. One of these levees, along Pond E6A, is approximately 100 feet south of residences along Marshbrook Drive and Baker Circle in Hayward and in the southern part of the pond complex adjacent to Monterey Drive in Union City. Finally, there are several East Bay Regional Park District (EBRPD) facilities nearby. The Alameda Creek Regional Trail is on both sides of the ACFCC, and the Coyote Hills Regional Park is immediately across the ACFCC, just south of Cal Hill.

### 3.12.2 Regulatory Setting

Noise is regulated in the Eden Landing Phase 2 project area and the regional area through implementation of local general plan policies and noise regulations. Local general plans identify general principles intended to guide and influence development plans, and noise regulations set forth specific standards and procedures for addressing particular noise sources and activities. Generally, the goal of noise regulations is to protect the health and welfare of the public by minimizing excessive, unreasonable, and unnecessary noise. Each jurisdiction defines unacceptable noise levels and, in most cases, noise level standards and work hour limitations, to achieve this goal.

## Laws and Regulations

### *Alameda County*

The Alameda General Plan Countywide Noise Element provides background information about evaluating the effects of noise on communities and the current regulatory framework. It also presents baseline information for the existing noise environment in Alameda County, along with goals, policies, and actions for controlling noise in existing and future development (Alameda County 1994). Acceptable noise levels range from 55 to 65  $L_{dn}$  for residential and educational uses to 70  $L_{dn}$  for commercial and to 75  $L_{dn}$  for industrial and open-space recreation and parks uses.

Relevant countywide noise policies include the following goals.

- **Goal #1:** The peace, health, safety, and welfare of the residents of Alameda County require protection from excessive, unnecessary, and unreasonable noises from any and all sources in the cities and unincorporated territory.
- **Goal #2:** Promote the compatibility of land uses with respect to noise generation by legislatively protecting sensitive land uses from noise sources.

Chapter 6.60, Noise, of the Alameda County Code of Ordinances prohibits unnecessary, excessive, and annoying noise to ensure public health, welfare, and safety (Alameda County 1966). This chapter provides maximum exterior noise limits for specific land uses during specified time periods. Permissible noise levels range from 45 to 65 dBA for residential and public area uses and from 60 to 80 dBA for commercial properties during the night (10 p.m. to 7 a.m.). Permissible noise levels range from 50 to 70 dBA for residential and public area uses and from 65 to 85 dBA for commercial properties anytime during the day (7 a.m. to 10 p.m.).

### ***City of Hayward***

The Hayward General Plan 2040 identifies and describes the existing noise sources in the City, projects noise levels in the future, and provides policies and strategies to protect the public health, safety and welfare against the adverse effects of excessive noise (City of Hayward 2014).

Goal 8 of the General Plan's Hazards Element specifies noise guidelines for new development (City of Hayward 2014). New development projects must meet acceptable noise level standards established in Goal 8 within the Hazards Element. The *highest* levels of exterior noise exposure that are regarded as "Normally Acceptable" based on land use type are as follows:

- Residential uses (low-density single family, duplex, mobile homes): 60 dBA ( $L_{dn}$  or CNEL);
- Residential uses (townhomes and multi-family apartments and condominiums), Lodging (Motels and Hotels): 65 dBA ( $L_{dn}$  or CNEL);
- Urban Residential Infill and Mixed-Use Projects: 70 dBA ( $L_{dn}$  or CNEL);
- Schools, Libraries, Churches, Hospitals, Nursing Homes: 70 dBA ( $L_{dn}$  or CNEL);
- Playgrounds, Neighborhood Parks, Office Buildings (Business, Commercial, and Professional): 70 dBA ( $L_{dn}$  or CNEL);
- Golf Courses, Riding Stables, Water Recreation, Cemeteries: 75 dBA ( $L_{dn}$  or CNEL);
- Industrial Manufacturing, Utilities, Agriculture: 75 dBA ( $L_{dn}$  or CNEL); and

Auditoriums, Concert Hall, Amphitheaters, Sports Arena, Outdoor Spectator Sports: *Mitigation based on site-specific study* Additional considerations are provided below for residential uses:

1. The maximum acceptable exterior noise level in residential areas is an  $L_{dn}$  of 60 dB for single-family development and an  $L_{dn}$  of 65 dB for multi-family development.

Along with this list of standards, the Hayward General Plan 2040 Hazards Element has the following policies that are relevant to the SBSP Restoration Project, Eden Landing Phase 2 (City of Hayward 2014):

**Haz 8.2 -** The City shall require development projects in areas where they may be exposed to major noise sources (e.g. roadways, rail lines, and aircraft or other non-transportation noise sources) to conduct a project level environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table HAZ-1 and shall incorporate noise mitigation when located in noise environments that are not compatible with the proposed uses of the project.

**Haz 8.17 -** The City shall maintain, implement, and enforce a community noise control ordinance to regulate noise levels from public and private properties, vehicles, construction sites, and landscaping activities.

**Haz 8.20 -** The City may require development projects subject to discretionary approval to assess potential construction noise impacts on nearby sensitive uses and to minimize impacts on those uses, to the extent feasible.

**Haz 8.21 -** The City shall limit the hours of construction and maintenance activities to the less sensitive hours of the day (7:00am to 7:00pm Monday through Saturday and 10:00am to 6:00 pm on Sundays and holidays).

**Haz 8.22 -** The City shall require a vibration impact assessment for proposed projects in which heavy-duty construction equipment would be used (e.g. pile driving, bulldozing) within 200 feet of an existing structure or sensitive receptor. If applicable, the City shall require all feasible mitigation measures to be implemented to ensure that no damage or disturbance to structures or sensitive receptors would occur.

The City of Hayward Section 4.1.03 of the Municipal Code Noise states that “it shall be unlawful for any person in the City of Hayward to cause, suffer, permit or allow the repeated or persistent emission of any noise or sound produced by any such person, or by any animal or fowl, or any mechanical means, within his possession, ownership or control, which by reason of its raucous nature shall disturb the peace and quiet of any person or persons in the City of Hayward.” Although the Code does not specify noise limitations for stationary sources, Section 4.1.03 of the Municipal Code prohibits construction noise<sup>1</sup> level more than six dB above the local ambient level at any point outside the property plane before 7 am and after 7 pm daily except on Sundays and holidays. On Sundays and holidays the restrictions apply to before 10 am and after 6 pm. (City of Hayward 2011).

In addition, the Code states that “no person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of same, on or abutting areas zoned or used for residential purposes, a construction noise level more than 6 dBA above the local ambient level at any point outside the property plane before the hour of 7 am and after the hour of 7 pm daily except on Sundays and holidays. On Sundays and holidays the restrictions of this subsection shall apply before 10 am and after 6 pm.”

The City Manager or its designee may provide exception permits in cases where the applicants can show that a diligent investigation of available noise abatement techniques indicates that immediate compliance with the requirements would be impractical or unreasonable. However, appropriate conditions to minimize public detriment caused by such exceptions would be required (City of Hayward 2011).

### ***Other Relevant Plans in the Region***

#### ***City of Union City***

The Health and Safety Element of Union City’s 2002 General Plan Policy Document discusses the noise environment in the City, provides maximum allowable noise levels based on land uses, and identifies policies and implementation programs to achieve the goal of protecting public health and welfare (City of Union City 2002).

Union City provides the maximum allowable noise exposure by land use. Normally acceptable noise levels for residential uses, including schools, are as follows:

- Residential Uses (low-density single family, duplex, mobile homes): 45 to 60 dBA (Ldn or CNEL); and
- Multi-family residential, group homes, motels/hotels, schools, libraries, churches, hospitals, extended care: 45 to 60 dBA (Ldn or CNEL).

Section 9.40 of the Union City Municipal Code identifies noise limits for various land uses. For residential property, the Code prohibits noise levels more than 10 dBA above the local ambient noise at any point outside of the property plane. The noise limitation is less stringent for commercial and industrial property; the Code permits up to 12 dBA above the local ambient noise level at any point outside of the property line (City of Union City 2002).

Section 9.40.053 identifies noise restrictions associated with construction activities. Construction, alteration, or repair activities are authorized by valid City permit between the hours of 8 am and 8 pm. Monday through Friday, 9 am to 8 pm on Saturday, and 10 am to 6 pm on Sunday and holidays if at least one of the following noise limitations are met: 1) no individual piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 ft (8 m), or 2) the noise level at any point outside the property plane of the project shall not exceed 86 dBA. Exception permits are permitted in accordance with Section 9.40.060 as long as appropriate conditions to minimize the public detriment caused by such exceptions are implemented (City of Union City 2002).

### ***City of Fremont***

Noise is regulated in Fremont through enforcement of Municipal Code performance standards and implementation of General Plan policies.

Article 19, Section 8-21904 of the Fremont Municipal Code contains noise performance standards for the land uses within the City, at the property line nearest the source of a suspected violation. The maximum noise generated by such use cannot exceed 60 dBA when adjacent uses are residential, park or institutional uses. Less stringent standards apply to adjacent commercial or industrial uses (65 to 70 dBA, respectively). Excluded from these standards are occasional sounds generated by the movement of railroad equipment, temporary construction activities, or warning devices (City of Fremont 2016b).

## **3.12.3 Environmental Impacts and Mitigation Measures**

### **Approach to Analysis - Construction**

The following sections provide an overview of how construction activities may generally influence existing noise conditions in relation to the Eden Landing Phase 2 project area. It describes predicted noise and vibration levels created by certain construction equipment that are used later to prepare the impact assessment according to the stated thresholds of significance. This overview is intended to inform the impact assessment by presenting the key concepts associated with the noise and vibration impact assessments.

Construction activities would occur under the Eden Landing Phase 2 Restoration Project Action Alternatives (Alternatives Eden B, Eden C, and Eden D). They do not apply to the No Action Alternative (Alternative Eden A).

### ***Construction Noise***

Noise impacts from construction equipment depend on the type of activity, the equipment used, and the distance from sensitive receptors. A discussion of the typical construction equipment that would be used and their associated noise levels, the distances of the Eden Landing Phase 2 project area from sensitive receptors, and projected noise levels at the sensitive receptors from construction and operation of the project are presented below.



In general, construction activities would include excavation, backfilling, bulldozing and other earthmoving, material transport, and other miscellaneous activities (using both land-based and amphibious equipment). On-site construction equipment may include (but is not limited to) long-reach excavators, amphibious excavators, bulldozers, dump trucks, a compaction roller, a water tanker, refueling tanks, cranes, pile drivers, and pickup vehicles for transportation in and out of a project site. Water-based equipment may include floating barges with pile drivers and cranes, equipment barges, work tugs, pumps, generators, crew/survey boats, and the hydraulic offloader.

According to the Federal Transit Administration's (FTA's) Transit Noise and Vibration Assessment (FTA 2006), noise levels for typical construction equipment (including those listed below) range from 74 to 101 dBA at 50 feet without feasible control measures. Table 3.12-1 provides a summary of typical noise levels generated by construction equipment at a distance of 50 feet with and without feasible noise controls installed. Noise levels could decrease by 1 dBA to as much as 16 dBA with feasible noise-control measures such as intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturers' specifications.

**Table 3.12-1 Typical Construction-Equipment Noise Levels for Various Types of Equipment**

Equipment Type	Noise Level (in dBA) at 50 feet without Feasible Noise Control <sup>1</sup>
Dozer or tractor	85
Excavator	88
Front-end loader	85
Backhoe	80
Vibratory roller	74
Crane	83
Truck	88
Pile driver (impact)	101
Pile driver (sonic)	96
Water pump	76
Dump truck	88
Compaction roller	74
Diesel generator	81

Source: FTA 2006.

<sup>1</sup> Feasible noise controls include the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturers' specifications.

Tables 3.12-2 shows the distances of the nearest sensitive receptors from construction activities at the Eden Landing Phase 2 project area and the predicted noise levels at various distances, respectively. Short-term construction activities would include general earthmoving activities using the equipment identified in Table 3.12-1. Table 3.12-2 distinguishes between general construction activities and pile driving activities. General construction activities can occur anywhere within the southern Eden Landing ponds, so the edges of the ponds closest to sensitive receptors were used to determine the approximate distance to the nearest sensitive receptors. Pile driving activities may be required to install bridges, water control structures, or the offloading facility, and the project would likely use the sonic pile driving (vibration) method, where possible. However, for purposes of this analysis and to be conservative, impact pile driving was assumed. These are short-term construction actions that would not be an ongoing part of the construction work and would occur in only a handful of places at southern Eden Landing. During pile driving activities, the project would create a 400-foot exclusion zone surrounding that activity for safety

purposes. This would require the temporary closure (during the pile-driving work hours only) of some trails as well as installing temporary fencing in some areas (e.g., Coyote Hills Regional Park).

The existing and proposed water control structures and the locations of the proposed bridges are shown in the Eden Landing Phase 2 Action Alternatives (Figures 2-4 through 2-6) in Chapter 2, Alternatives. As such, the distance from pile driving activities to the nearest sensitive receptors can be better approximated than other general construction activities. The estimates of the distances from work sites form the basis of the analyses presented later in this section.

**Table 3.12-2 Predicted Construction Noise Levels at Various Distances**

Eden Landing Phase 2 Action Alternatives/ Construction Component <sup>1</sup>	Equipment Used	Closest Distance Between Construction Site and Sensitive Receptors (feet)	Predicted Peak Construction Noise Levels (dBA)
Alternative Eden B			
Trail Construction	Bulldozer	100	79
Levee Improvements/Habitat Transition Zones	Various	900	77
Bridge Construction/Pile Driving	Pile Driver	3,000	66
Alternative Eden C			
Trail Construction	Bulldozer	100	79
Levee Improvements/Habitat Transition Zones	Various	6,000	61
Bridge Construction/Pile Driving	Pile Driver	400	83
Alternative Eden D			
Trail Construction	Bulldozer	100	79
Levee Improvements/Habitat Transition Zones	Various	900	77
Bridge Construction/Pile Driving	Pile Driver	3,000	66

Note: Noise levels are based on attenuation at 6 dBA for doubling of distance.

<sup>1</sup> The nearest sensitive receptors are based on the measurement from the edge of the pond closest to the sensitive receptors to the sensitive receptors.

Table 3.12-2 shows the calculated predicted noise levels at various distances associated with construction activities. It also shows the expected noise levels at sensitive receptors for the Action Alternatives. The noise levels were calculated based on one or both of the following two assumptions (used in the 2007 Final EIS/R and the 2016 Final EIS/R for Phase 2 actions at the Don Edwards San Francisco Bay National Wildlife Refuge [Refuge] and thus reapplied here):

- Combined intermittent noise levels of 102 dBA at 50 feet without feasible noise control, based on the simultaneous use of the three noisiest types of construction equipment shown in Table 3.12-1; and
- A typical noise-attenuation rate of 6 dBA per doubling of distance.

The assumption associated with the simultaneous use of the three noisiest types of construction equipment provides for the most conservative analysis of potential noise levels associated with construction activities at the Eden Landing Phase 2 project area for each Action Alternative. It should be noted that in some cases, pile driving may not be necessary, and the use of a sonic/vibratory driver would further reduce peak noise levels. Also, each pile driving activity would be done in a few hours or a day at most, reducing the duration of that noise. In other cases, construction activities would not occur at the edge of the pond nearest to the sensitive receptors, so noise levels would likely be lower than those reported below. Finally, many construction activities would not only occur at the edge of the pond, but

would be distributed throughout all of southern Eden Landing. In those cases, the longer distance between sensitive receptors and the construction work area would further decrease noise levels through distance attenuation.

### ***Construction Traffic-Related Noise***

Construction traffic-related noise would be associated with the transport of equipment, material, and workers to and from the Eden Landing Phase 2 project area. The number of vehicle trips needed for construction of restoration, flood risk management, and recreational features would be greater than the number of vehicle trips needed for construction (or decommissioning/destruction) of dredge material infrastructure. Because these phases of the construction would not be concurrent, the analysis of construction traffic-related noise was based on the number of vehicle trips needed during the restoration component of the construction period, to provide estimates commiserate with the highest use during construction.

Upland fill material would be brought to the Eden Landing Phase 2 project area by trucks. Assuming transportation of fill occurs using trucks with a storage capacity of 11 cubic yards per truck, in the Action Alternative requiring the most material import (154,000 cubic yards), there would be 14,000 one-way truck trips to deliver the high-end estimate of total fill required. These truck trips are not actually generated by the Eden Landing Phase 2 project. The material would come from other, unrelated construction projects in nearby communities. So, in the absence of the Eden Landing Phase 2 project, the material would be generated and transported to a landfill or other disposal site. Thus, this analysis only addresses the transportation of the material from the nearest highway or major arterial to the ponds where it would be used. Details of this routing and its related effects on traffic are discussed in Section 3.11 of this EIR.

The truck trips to import this material would likely occur over several construction seasons. But as a conservative estimate, the analysis in Section 3.11 – Traffic assumed that all of the material would be imported in the shortest possible time. The analysis thus assumed 200 haul truck trips would be generated to deliver the required fill material to southern Eden Landing. These trips are calculated by alternative in Table 3.12-3.

**Table 3.12-3 Construction Fill (CY) and Truck Trips**

Alternative	Volume of Fill Imported by Truck (CY)	Truck Trips	Construction Period Involving Hauling Fill (days)	One-Way Max Daily Truck Trips
Eden B	92,000	8,364	42	200
Eden C	59,000	5,362	27	200
Eden D	154,000	14,000	70	200

### ***Construction-Related Vibration***

Construction activities would generate vibration. Vibration levels depend on the specific construction equipment used and the operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increased distance. Table 3.12-4 shows the vibration levels generated by typical construction equipment. The California Department of Transportation's (Caltrans) recommended standard with respect to the prevention of structural building damage is 0.2 inch/second peak particle velocity (PPV) for normal structures, and the FTA's maximum-

acceptable vibration standard is 80 vibration decibels (VdB) (FTA 2006) with respect to human annoyance for residential uses. As shown in Table 3.12-5, the highest vibration associated with construction equipment for all Eden Landing Phase 2 Action Alternatives would be generated from impact pile drivers. Vibration created by pile drivers would exceed both the Caltrans and the FTA standards at a distance of 25 feet. The use of trucks, drilling, and bulldozers would also exceed FTA standards at 25 feet with respect to human annoyance for residential uses. In general, pile driving would be used wherever cofferdams and dewatering would be needed (the sheet piles to form the cofferdams would need to be driven). The two places where this need exists are where the bridges and the water control structures are to be located. Predicted vibration levels at nearby sensitive receptors from construction activities are shown in Table 3.12-5.

**Table 3.12-4 Typical Construction Equipment Vibration Levels**

Equipment		PPV at 25 feet (inch/second) <sup>1</sup>	Approximate Lv at 25 feet <sup>2</sup>
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large bulldozer		0.089	87
Trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: FTA 2006.

<sup>1</sup> PPV is the peak particle velocity

<sup>2</sup> Lv is the velocity level in decibels (VdB) referenced to 1 inch/second and based on the root mean square (RMS) velocity amplitude.

**Table 3.12-5 Predicted Vibration Levels at Nearby Sensitive Receptors from Construction Activities**

Eden Landing Phase 2 Action Alternatives/ Construction Component	Equipment Used	Closest Distance to Structures (feet)	PPV (inches/second)	Approximate Lv (VdB)
Alternative Eden B				
Trail Construction	Bulldozer	100	0.0111	68.9
Levee Improvements/Habitat Transition Zones	Bulldozer	900	0.0004	40.3
Bridge Construction/Pile Driving	Pile Driver	3,000	0.0012	49.6
Alternative Eden C				
Trail Construction	Bulldozer	100	0.0111	68.9
Levee Improvements/Habitat Transition Zones	Bulldozer	6,000	0.000024	15.6
Bridge Construction/Pile Driving	Pile Driver	3,000	0.0012	49.6
Alternative Eden D				
Trail Construction	Bulldozer	100	0.0111	68.9
Levee Improvements/Habitat Transition Zones	Bulldozer	900	0.0004	40.3
Bridge Construction/Pile Driving	Pile Driver	3,000	0.0012	49.6

Note: Vibration levels generated by pile driving and/or other construction equipment as designated in the fourth column.

PPV at 25 feet is based on FTA 2006. To calculate PPV at other distances, the following equation (FTA 2006) was used:  $PPV \text{ at distance } D = PPV \text{ (at 25 ft)} * [(25/D)^{1.5}]$ .

Lv at 25 feet is based on FTA 2006. To calculate Lv at other distances, the following equation (FTA 2006) was used:  $Lv \text{ at distance } D = Lv \text{ (at 25 ft)} - 30\log(D/25)$ .

## Approach to Analysis – Operations and Maintenance

Under the No Action Alternative (Alternative Eden A), no new activities would occur under Eden Landing Phase 2 and the pond complex would continue to be monitored and managed through the activities described in the Adaptive Management Plan (AMP) and in accordance with CDFW's current practices for management of the Reserve. The existing levees would continue to be maintained and repaired as needed to prevent unplanned breaches and maintain de facto flood protection. Water control structures would be manually opened and closed as needed to manage water levels in the ponds. The currently permitted seasonal hunting would continue unchanged. Ongoing monitoring and studies to track the status of wildlife and vegetation in and around these ponds would be the principal component of the continued operations, as well as implementation of the AMP. Mosquito abatement and control of invasive vegetation species are also possible on an as-needed basis. All of these activities would be reached by pickup trucks and other passenger vehicles driving on levees. Additional details regarding the implementation of the AMP are described in the 2007 Final EIS/R.

Under the Action Alternatives, most operations and maintenance activities would not be substantially different from those performed under the No Action Alternative. There would still be biological monitoring, water control structure operations, seasonal hunting, levee maintenance, mosquito abatement, invasive vegetation control, and so on. The project area would remain open space, consisting of tidal habitat/managed ponds and some recreational facilities. New recreational facilities would be constructed for all Action Alternatives. Under the Action Alternatives, southern Eden Landing would include recreational facilities that permit walking/hiking/biking, birdwatching, kayaking, viewing wildlife and wetlands, seasonal hunting, and learning about the history and uses of the area. No active recreational uses (e.g., ball fields) would be constructed.

Other new activities would include bridge maintenance and additional use of recreational trails. The locations of those activities would differ by alternative, but since none of them would be new or increased noise-generating actions, there would be little meaningful difference in noise in the areas around southern Eden Landing. The anticipated noise levels generated by the passive recreational uses would not substantially alter the ambient noise environment. The low and occasional noise levels generated by recreational users would not be noticeable from off-site locations. Noise generated by area roadways and highways, railroads, and overflights, the dominant noise sources in the area, would in some cases be much higher than any noise generated from passive recreational users.

## Significance Criteria

For the purposes of this EIR, a significant noise impact would occur if the project resulted in the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plans or noise ordinances or the applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;



- A substantial temporary or periodic increase in ambient noise levels in the project vicinity due to construction activities; or
- Exposure of people residing or working in the project area to excessive aircraft-generated noise levels.

The quantitative noise standards depend on the jurisdictions where activities would occur (see Section 3.12.2, Regulatory Setting), and are discussed below in relation to the SBSP Restoration Project.

The SBSP Restoration Project would not expose people residing in (no habitable structures exist within the project area) or working in the Eden Landing Phase 2 project area to excessive aircraft-generated noise levels, because no habitable structures would be located within the pond complex, and the Eden Landing Phase 2 project area is not in an area with excessive aircraft-generated noise levels. Therefore, this significance criterion is not assessed in the project-level evaluation below.

As adopted in the 2007 Final EIS/R, the project is committed to implementing SBSP Mitigation Measure 3.13-2, which ensures that contractors use routes that require trucks to avoid residential areas for haul routes.

As explained in Section 3.1.2, Environmental Setting and Impact Analysis, even though both the Council on Environmental Quality Regulations for Implementing National Environmental Policy Act and the California Environmental Quality Act (CEQA) Guidelines were considered during the impact analysis, impacts identified in this EIR are characterized using CEQA terminology. Section 3.1.2 describes the terminology used to explain the severity of the impacts.

### **Program-Level Evaluation**

The 2007 Final EIS/R conducted broad, regional analyses of program-level noise impacts from the types of activities that would be necessary to implement Programmatic Alternative A (the No Action Alternative) and Programmatic Alternatives B and C (the two program-level Action Alternatives). The 2007 Final EIS/R evaluated the potential noise and vibration impacts of three long-term alternatives, which were each determined to have less than significant impacts to persons, ambient noise levels, and the established standards of local plans. The 2007 Final EIS/R found that under each programmatic alternative, noise impacts from construction activities, traffic, water pumping, and Operations and Management (O&M) activities would be less than significant with mitigation incorporated. Furthermore, the 2007 Final EIS/R found that none of the long-term alternatives would result in vibration levels in excess of the Caltrans or FTA standards.

### **Project-Level Evaluation**

#### ***Eden Landing Phase 2 Impact 3.12-1: Short-term construction noise effects.***

***Alternative Eden A (No Action).*** Under Alternative Eden A, the No Action Alternative, no new activities would be implemented as part of the Phase 2 project. The CDFW would continue maintaining and operating the Eden Landing pond complex in accordance with the *Eden Landing Ecological Reserve System E2 and E2C Operation Plan*, the AMP, and current CDFW practices.

No new recreation or public access features would be added in Alternative Eden A. Under Alternative Eden A, no construction activities would occur within the Eden Landing pond cluster. As such, no short-term construction noise impacts would occur.

**Alternative Eden A Level of Significance: No Impact**

**Alternative Eden B.** Alternative Eden B would restore the entirety of southern Eden Landing to tidal marsh in a single project implementation stage by providing sufficient improvements to the eastern, backside levees to provide the necessary degree of flood risk management. Construction activities include: levee breaches, levee lowering, installation of water control structures, excavation of pilot channels, installation of fish habitat channels, construction of habitat islands and habitat transition zones, the construction and decommissioning of dredge material placement infrastructure (including an offloading facility), beneficial reuse of dredged material and/or import of upland fill material, bridges and trail construction, and recreation components such as extension of the Bay Trail and maintenance/improvement of existing trails surrounding the Eden Landing Phase 2 project area.

Construction would be accomplished using equipment barges, work tugs, generators, crew/survey boats, excavators, bulldozers, dump trucks, a compaction roller, a water tanker, refueling tanks, pile driving equipment, pumps, cranes, paving equipment, and pickup vehicles for transportation in and out of the project site. Trail construction on top of existing levees would primarily be done by bulldozers. As shown in Table 3.12-2, the nearest sensitive receptors (residences) are approximately 100 feet away from some of the trail construction activity and a bulldozer at that distance would generate a noise level of 79 dBA. Constructing levee improvements, breaching levees, lowering levees and creating habitat transition zones would involve several different pieces of equipment operating simultaneously and generate a noise level of 77 dBA at the nearest sensitive receptors, approximately 900 feet away. Bridge construction is likely to involve pile driving, and if an impact pile driver is used it would generate a noise level of 66 dBA at the nearest sensitive receptors, approximately 3,000 feet away. (Mooring the offloading facility would also require pile driving, but the offloader would be much further away from residences.)

As adopted in the 2007 Final EIS/R, the project is committed to implementing SBSP Mitigation Measure 3.13-1, which requires that construction activities be limited to the days and hours or noise levels designated for the Hayward, where the work activities would occur, and those designated for the adjacent Union City and Fremont, where the closest sensitive receptors are located. Therefore, construction activities will not occur during noise-sensitive hours. The haul routes used for import of fill material would be almost entirely on designated truck routes in Union City. The exception is the last few blocks leading to the gated entrance into southern Eden Landing, which are not so designated. The project is also committed to implementation of SBSP Mitigation Measure 3.13-2, which limits the hours trucks may deliver fill and requires trucks to minimize residential areas for haul routes. Therefore, noise impacts from short-term construction activities would be less than significant.

**Alternative Eden B Level of Significance: Less than Significant**

**Alternative Eden C.** Alternative Eden C would retain the Inland Ponds and the Southern Ponds as managed ponds and add a number of water control structures to allow the depth and salinity of these ponds to be actively managed for a range of different pond-dependent wildlife. The Bay Ponds would be restored to tidal marsh as in Alternative Eden B through the use of a mid-complex levee that would largely be built on top of the existing internal levees.

Construction would be accomplished using equipment barges, work tugs, generators, crew/survey boats, excavators, bulldozers, dump trucks, a compaction roller, a water tanker, refueling tanks, pile driving equipment, pumps, cranes, paving equipment, and pickup vehicles for transportation in and out of the project site. Trail construction on top of existing levees would primarily be done by dozers. As shown in

Table 3.12-2, the nearest sensitive receptors (residences) are approximately 100 feet away from some of the trail construction activity and a bulldozer at that distance would generate a noise level of 79 dBA. Constructing levee improvements, breaching levees, lowering levees and creating habitat transition zones would involve several different pieces of equipment operating simultaneously and generate a noise level of 61 dBA at the nearest sensitive receptors, approximately 6,000 feet away. Bridge and water control structure construction may involve pile driving and if an impact pile drive is used it would generate a noise level of 83 dBA at the nearest sensitive receptor, approximately 400 feet away. Although Coyote Hills Regional Park is less than 400 feet from one of the proposed bridge locations trails temporary fencing would be installed to keep people at least 400 feet away from any pile driving activity for safety purposes. Once construction is completed the fencing would be removed.

As adopted in the 2007 Final EIS/R, the project is committed to implementing SBSP Mitigation Measure 3.13-1, which requires that construction activities be limited to the days and hours designated for the City of Hayward, where the work activities would occur. Therefore, construction activities will not occur during noise-sensitive hours. The project is also committed to implementation of SBSP Mitigation Measure 3.13-2, which requires trucks to minimize residential areas for haul routes. Therefore, noise impacts from short-term construction activities would be less than significant.

#### **Alternative Eden C Level of Significance: Less than Significant**

**Alternative Eden D.** Alternative Eden D is a staged implementation of the tidal marsh restoration outlined in Alternative Eden B. It would make use of a mid-complex levee, as in Alternative Eden C, but that levee would be temporary. This separation of the Bay Ponds from the others would allow those large outer ponds to first be restored to tidal marsh, after which, the mid-complex levee would be removed, and the Inland and Southern Ponds then restored to tidal marsh. Water control structures would be added to the Inland and Southern Ponds for use during the years in which they would be operated as managed ponds and then removed to allow tidal flows. The trail and associated viewing platform would be similar to those in Alternative Eden B.

Construction would be accomplished using equipment barges, work tugs, generators, crew/survey boats, excavators, bulldozers, dump trucks, a compaction roller, a water tanker, refueling tanks, pile driving equipment, pumps, cranes, paving equipment, and pickup vehicles for transportation in and out of the project site. Trail construction on top of existing levees would primarily be done by dozers. As shown in Table 3.12-2, the nearest sensitive receptors (residences) are approximately 100 feet away from some of the trail construction activity and a bulldozer at that distance would generate a noise level of 79 dBA. Constructing levee improvements, breaching levees, lowering levees and creating habitat transition zones would involve several different pieces of equipment operating simultaneously and generate a noise level of 77 dBA at the nearest sensitive receptors, approximately 900 feet away. Bridge and water control structure construction may involve pile driving and if an impact pile drive is used it would generate a noise level of 66 dBA at the nearest sensitive receptors, approximately 3,000 feet away.

As adopted in the 2007 Final EIS/R, the project is committed to implementing SBSP Mitigation Measure 3.13-1, which requires that construction activities be limited to the days and hours designated for the City of Hayward, where the work activities would occur. Therefore, construction activities will not occur during noise-sensitive hours. The project is also committed to implementation of SBSP Mitigation Measure 3.13-2, which limits the hours trucks may deliver fill and requires trucks to minimize residential areas for haul routes. Therefore, noise impacts from short-term construction activities would be less than significant.

### Alternative Eden D Level of Significance: Less than Significant

#### ***Eden Landing Phase 2 Impact 3.12-2: Traffic-related noise impacts during construction.***

***Alternative Eden A (No Action).*** Under Alternative Eden A, the No Action Alternative, no new activities would be implemented as part of the Phase 2 project. The CDFW would continue maintaining and operating the Eden Landing pond complex in accordance with the Eden Landing Ecological Reserve System “E2 and E2C Operation Plan”, the AMP, and current CDFW practices.

No new recreation or public access features would be added in Alternative Eden A. Under Alternative Eden A, no construction activities would occur within the Eden Landing pond cluster. As such, no construction traffic noise impacts would occur.

### Alternative Eden A Level of Significance: No Impact

***Alternatives Eden B, Eden C, and Eden D.*** Construction of Alternatives Eden B, Eden C, and Eden D would require the transport of equipment and the generation of truck trips associated with the delivery of equipment at the beginning and end of the construction period, daily worker vehicles, and from the long-term delivery of upland fill (92,000 cubic yards [cy] for Alternative Eden B, 59,000 cy for Alternative Eden C, and 154,000 cy for Alternative Eden D), requiring 200 daily trips by trucks carrying 11 cy each. Truck trips for the delivery of fill would be concentrated in the shortest duration possible (42 days for Alternative Eden B, 27 days for Alternative Eden C, and 70 days for Alternative Eden D) over portions of three construction seasons.

Typically, an increase in noise levels is perceptible (3 dBA [CNEL/  $L_{dn}$ ]) when traffic volumes double along an affected roadway segment. Access to southern Eden Landing will be provided via designated haul routes, as described in Section 3.11, Traffic. Per SBSP Mitigation Measure 3.13-2, trucks would be required to minimize travel through residential areas and, as such, impacts would be less than significant.

Short-term construction traffic would consist of the transportation of the worker crew, which would consist of five to 10 people per day, and other construction truck trips delivering equipment and materials.

A large volume of traffic travels on I-880. According to the Caltrans Traffic and Vehicle Data Systems Unit, traffic volumes in 2014 for I-880 at Whipple Road (which leads to Union City Blvd.) were 14,000 vehicles during the peak hour<sup>1</sup> and 209,000 average daily traffic (ADT) during the peak month (Caltrans 2014).

Per SBSP Mitigation Measure 3.13-2, trucks would be required to minimize travel through residential areas and, as such, impacts would be less than significant.

### Alternatives Eden B, Eden C, and Eden D Level of Significance: Less than Significant

<sup>1</sup> Peak hour values indicate the volume in both directions; in urban and suburban areas, the peak hour normally occurs every weekday.

### ***Eden Landing Phase 2 Impact 3.12-3: Traffic-related noise effects during operation.***

**Alternative Eden A (No Action).** Under this alternative, operational activities would not change from existing conditions. There is very little recreational use of the Phase 2 Eden Landing project area which is limited to trail use along the Alameda Creek Regional Trail (the EBRPD trail along both sides of the ACFCC) and limited waterfowl hunting inside the Reserve between November and January. This activity would continue with Alternative Eden A but would not increase from existing conditions. As such, there would be no impact associated with traffic-related noise during operation from this alternative. Noise impacts associated with traffic associated with operation and maintenance activities are discussed below under Impact 3.12-4.

#### **Alternative Eden A Level of Significance: No Impact**

**Alternatives Eden B, Eden C, and Eden D.** Operational traffic from the build alternatives is associated with recreational activity at southern Eden Landing. Under these Action Alternatives, recreational activity at the Phase 2 Eden Landing project area is expected to increase with the addition of new recreational facilities. Under Alternatives Eden B, Eden C, and Eden D, a new section of the Bay Trail spine and a viewing platform would be installed to improve recreation and public access to these ponds. Under Alternative Eden C, there would also be a new pedestrian/bicycle bridge over the ACFCC and another spur trail (as a loop with a bridge or an out and back) along Old Alameda Creek to the site of the Alvarado Salt Works. Operation of these new recreational facilities is anticipated to result in some increases in visitors to the Phase 2 Eden Landing Ponds. These are detailed in Section 3.6 – Recreation of this EIR. However, the increased number of visitors is anticipated to result in a minor increase of approximately 56 additional vehicles a day to the local network (see Section 3.11 – Traffic). Further, these vehicles would be almost entirely passenger vehicles, which generate less noise than commercial trucks or construction vehicles.

Due to the minimal increase in recreation visitors, the implementation of any of these alternatives would not result in a substantial increase in traffic volumes compared to the current traffic levels in the area. Therefore, impacts would be less than significant.

#### **Alternatives Eden B, Eden C, and Eden D Level of Significance: Less than Significant**

### ***Eden Landing Phase 2 Impact 3.12-4: Potential operational noise effects from O&M activities.***

**Alternative Eden A (No Action).** Under this alternative, Eden Landing would continue to be maintained and operated according to CDFW's O&M plan, applicable Alameda County operations, and the AMP. Most of these activities are limited to small crews of workers (up to half a dozen people) doing invasive vegetation control, monitoring wildlife, or operating water control structures. On rare occasions, larger crews and construction vehicles may be needed for levee repair.

In sum, Alternative Eden A activities would require limited O&M activities that would generate noise. However, because O&M activities would occur during daytime, non-noise-sensitive hours only, and because such activities would occur intermittently within the 50-year planning period and at large distances from sensitive receptors, noise effects would be less than significant.

#### **Alternative Eden A Level of Significance: Less than Significant**



**Alternatives Eden B, Eden C, and Eden D.** Under Alternatives Eden B, Eden C, and Eden D, the O&M activities at southern Eden Landing would continue to follow and be dictated CDFW's O&M plan, applicable Alameda County operations, and the AMP.

Regular operations and maintenance of the pond infrastructure (primarily the water control structures) would be required following construction, as would the ongoing wildlife monitoring, invasive vegetation control, and so on. This maintenance would require a staff person to travel to the ponds one or two times a week to perform activities such as water structure control operation or vandalism repairs. More periodic O&M activities might include invasive vegetation removal or levee repair. On these rare occasions, larger crews and construction vehicles may be needed. In addition, AMP monitoring activities would occur, which would require additional workers (e.g., staff, consultants) to access the pond clusters. The frequency of visits to southern Eden Landing to conduct AMP monitoring activities would depend on the actual activities and would vary by season (e.g., during the bird-breeding season, there would be more trips to the site than during the non-breeding season).

The O&M activities associated with Alternatives Eden B, Eden C, and Eden D would not significantly increase noise levels to levels greater than those that currently occur under existing conditions or what would occur over time under Alternative Eden A. Noise effects from operation of recreational facilities would be less than significant, as the low and occasional noise levels generated by recreational users would not be noticeable from off-site locations and such noises would be limited to the daytime hours when recreational facilities are open to the public. As such, operation noise impacts would be less than significant.

**Alternatives Eden B, Eden C, and Eden D Level of Significance: Less than Significant**

### ***Eden Landing Phase 2 Impact 3.12-5: Potential vibration effects during construction and/or operation.***

**Alternative Eden A (No Action).** Under this alternative, no new construction would occur and limited O&M activities would occur. Small crews of workers may be on-site during O&M activities; fewer workers would likely be on-site for O&M activities than for a typical construction worker crew, which would likely be five to 10 people. Alternative Eden A activities would require limited O&M activities that would generate vibration. However, because O&M activities would occur during daytime, non-vibration-sensitive hours only, and because such activities would occur intermittently within the 50-year planning period, vibration effects during construction and/or operation would be less than significant.

**Alternative Eden A Level of Significance: Less than Significant**

**Alternatives Eden B, Eden C, and Eden D.** Construction activities under these alternatives have the potential to result in varying degrees of temporary groundborne vibration. Construction of Alternatives Eden B, Eden C, and Eden D may require the use of pile drivers for the construction of bridges and repair or install water control structures. Table 3.12-5 shows the distance between these construction activities and sensitive receptors as well as predicted vibration levels at the sensitive receptors. From the calculated values, operation of construction of Alternatives Eden B, Eden C, or Eden D would not exceed the Caltrans recommended standard of 0.2 in/sec PPV and would not exceed FTA's maximum-acceptable vibration standard of 80 VdB. As such, potential impacts from construction would be less than significant.

As with Alternative Eden A, limited O&M activities that would generate vibration would occur under the build alternatives. Also, because O&M activities would occur during daytime, non-vibration-sensitive hours only, and because such activities would occur intermittently within the 50-year planning period, vibration effects during construction and/or operation would be less than significant.

As adopted in the 2007 Final EIS/R, the project is committed to implementing SBSP Mitigation Measure 3.13-1, which requires that construction activities be limited to the days and hours or vibration levels designated for the City of Hayward where the work activities would occur. Therefore, construction activities would not occur during vibration-sensitive hours. The project is also committed to implementation of SBSP Mitigation Measure 3.13-2, which requires trucks to avoid residential areas for haul routes. Therefore, vibration impacts from short-term construction activities would be less than significant.

#### **Alternatives Eden B, Eden C, and Eden D Level of Significance: Less than Significant**

### **Impact Summary**

Eden Landing Phase 2 noise impacts and levels of significance are summarized in Table 3.12-6. The levels of significance are those remaining after implementation of program-level mitigation measures, project-level design features, and the AMP and other Reserve management practices and documents. The noise analysis required no project-level mitigation measures to reduce the impacts to a level that was less than significant.

**Table 3.12-6 Eden Landing Phase 2 Summary of Impacts – Noise**

IMPACT	ALTERNATIVE EDEN A	ALTERNATIVE EDEN B	ALTERNATIVE EDEN C	ALTERNATIVE EDEN D
<b>Eden Landing Phase 2 Impact 3.12-1:</b> Short-term construction noise effects.	NI	LTS	LTS	LTS
<b>Eden Landing Phase 2 Impact 3.12-2:</b> Traffic-related noise impacts during construction.	NI	LTS	LTS	LTS
<b>Eden Landing Phase 2 Impact 3.12-3:</b> Traffic-related noise effects during operation.	NI	LTS	LTS	LTS
<b>Eden Landing Phase 2 Impact 3.12-4:</b> Potential operational noise effects from O&M activities.	LTS	LTS	LTS	LTS
<b>Eden Landing Phase 2 Impact 3.12-5:</b> Potential vibration effects during construction and/or operation.	LTS	LTS	LTS	LTS

Note: Alternative Eden A is the No Action Alternative (No Project Alternative under CEQA).

LTS = Less than Significant

NI = No Impact