2.0 PROJECT DESCRIPTION

2.1 NEED FOR PROJECT

The Georgia Pacific (GP) Gypsum Antioch Wharf Upgrade Project (Project) is necessary due to the deteriorated condition of several facility structures. Among other benefits, after the upgrades, the wharf would provide improved berthing and mooring capacities for the larger vessels that currently deliver gypsum rock product to the GP Gypsum Antioch fiberboard manufacturing plant (Plant) under new shipping contracts. While the ships themselves are larger than ships that were commonly used for delivery in the past, the amount of gypsum rock being delivered and processed is not expected to increase after the Project. The Plant itself is not under the California State Lands Commission (CSLC)'s jurisdiction.

As described in Section 1.5, above, the wharf was built in 1955 and was last upgraded/repaired in 1984. Subsequent to a survey conducted by Sea Engineering, Inc. (SEI) in 2008, which provided a review of the condition of the existing underwater and above water structures, the CSLC, as a condition of Lease No. PRC 1589.1 approved by the CSLC on October 27, 2011, required GP Gypsum, LLC (GP Gypsum or Applicant) to submit a "wharf rehabilitation plan." The proposed Project is intended to meet this lease requirement.

2.2 PROJECT LOCATION

The Project is located on the San Joaquin River (River), approximately 2 miles west of the Senator John A. Nejedly Bridge (Antioch Bridge), in the city of Antioch, Contra Costa County. The wharf is just offshore of the Plant, which is located at 801 Minaker Drive in Antioch (see Figures 2.2-1 and 2.2.-2).

The wharf is situated approximately 90 feet north of the shore, adjacent to the Plant; two units of the Antioch Dunes National Wildlife Refuge (Refuge) are located to the east and west of the Plant near the wharf but on the shore; and West Island is across the main channel of the River, to the north of the wharf. Other industrial uses are spread along the shoreline to the north and south. The nearest residences lie about 1,800 feet to the south of the wharf and the nearest school is about 0.9 mile from the Project site.

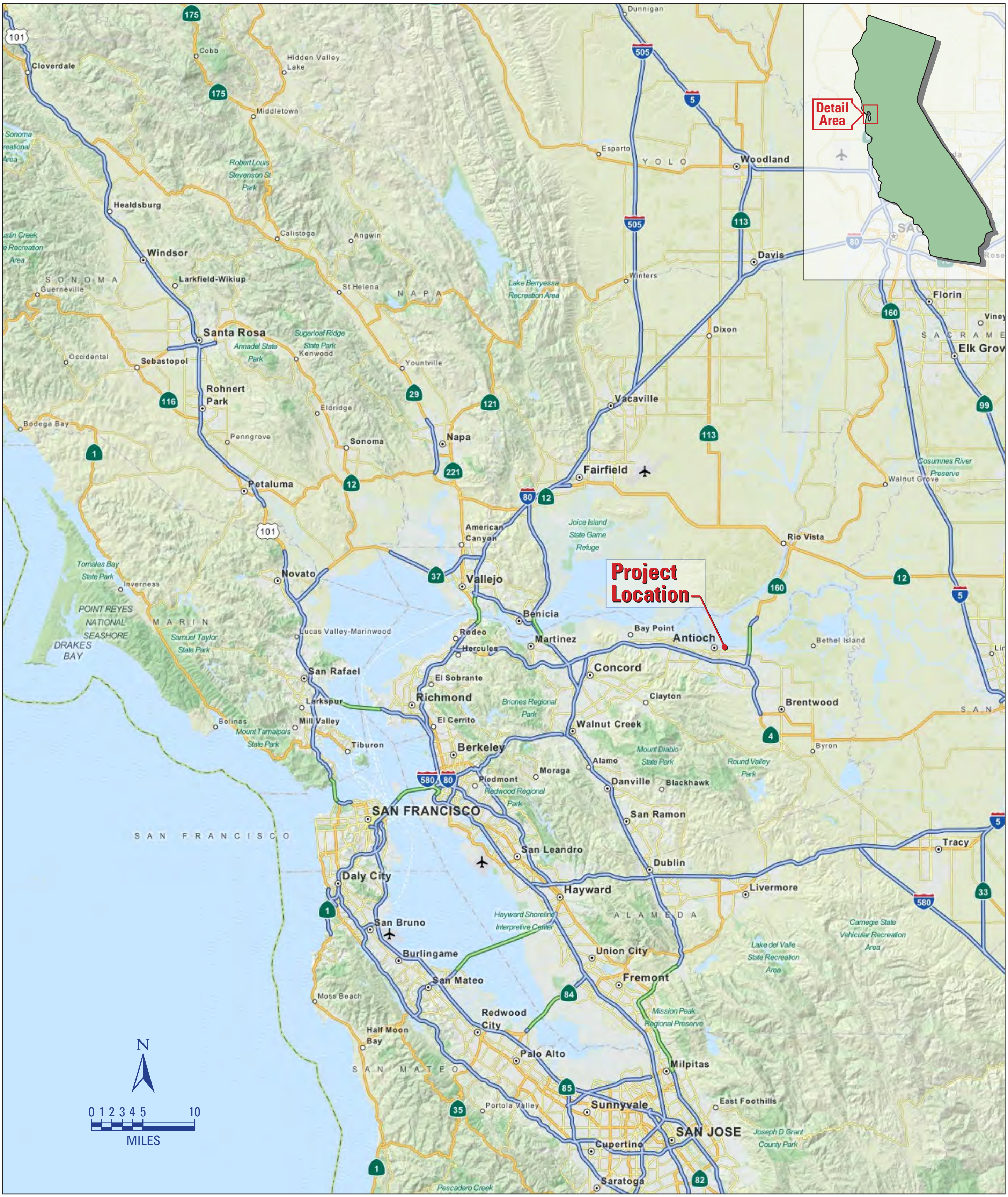


Figure 2.2-1

Project Location

Source: MapQuest/Grassetti Environmental

Figure 2.2-2

Existing Facilities and Surrounding Land Uses

Source: Grassetti Environmental

2.3 EXISTING FACILITIES

The general Project area is about 1.4 acres in size, including the wharf itself and surrounding water areas. The overall 780-foot-long wharf/ship terminal structure includes the 199-foot-long main wharf and dolphins and connecting walkways totaling 581 feet in length (see Figure 2.4-1). The wharf is constructed of a total of 303 timber piles, 1,122 linear feet of timber cap beam, 4,332 linear feet of timber stringer, and 11,631 square feet of timber decking. The main part of the wharf supports four timber breasting dolphins,[4] each consisting of twenty-two 14-inch-diameter timber piles, and a hopper/conveyor system for unloading incoming gypsum shipments from ships. Five additional timber dolphins (connected by wooden walkways) extend upstream and downstream from the main wharf platform to provide further mooring and berthing capabilities. A wooden trestle (60-feet-long x 25-feet-wide) connects the main wharf to the shore. Representative photographs of these various features are provided in Figure 2.4-2. The hopper on the wharf unloads gypsum rock, generally transported from Mexico, from the ships docking at the terminal approximately once every 4 weeks; each unloading event takes approximately 24 hours to complete.

2.4 DESCRIPTION OF THE PROPOSED PROJECT

The Project would consist of removal, installation, and repair activities at the wharf. No vessel deliveries of gypsum shipments would take place during the construction period.

The Project would be carried out entirely from the water and no equipment laydown, staging, or access would be conducted from the Plant property or other upland areas. Instead, barges would be used to carry out Project-related activities; the barges would be anchored during work activities and will be equipped with all necessary cranes and tools. In addition, the materials removed would be carried away from the site by barges. Table 2.4-1 identifies the overall number and type of Project activities. Project features and/or locations are shown on Figures 2.4-1, 2.4-2, and 2.4-3, while representative photographs of the upgraded/improved features are provided in Figure 2.4-4. Table 2.4-2 identifies the disposition of the various dolphins before and after Project implementation. As seen in Table 2.4-2, existing Dolphins A, B, G, H, and I would be demolished; existing Dolphins C, D, E and F would remain in place to structurally support the existing wharf deck.

[4] Dolphins are generally divided into two types, breasting dolphins and mooring dolphins. Breasting dolphins serve the following purposes: assist in berthing of vessels by taking up some berthing loads; keep the vessel from pressing against the pier structure; and serve as mooring points to primarily restrict the longitudinal movement of the berthing vessel. Mooring dolphins are used for mooring only and for securing the vessels by mooring lines. They also are commonly used near pier structures to primarily control the transverse movement of berthing vessels.

Table 2.4-1. Proposed Project Activities

Structures	Structural Dimensions	Pile Quantities and Sizes	Pile Length Below Mudline
Remove			
Five existing timber breasting and mooring dolphins	21 feet long x 9.5 feet wide	140 14-inch-diameter treated timber piles	About 30 to 40 feet
Two existing wooden walkways connecting dolphins to the wharf and their supporting pilings	East walkway: 280 feet long x 6.67 feet wide West walkway: 200 feet long x 6.67 feet wide	10 14-inch-diameter treated timber piles	About 30 to 40 feet
Install			
Four new breasting dolphins	20 feet long x 13.5 feet wide	Four 72-inch-diameter hollow-core steel monopiles[5]	About 65 feet
Four new cone fender systems for the four new breasting dolphins	6 feet long x 6 feet wide (center located at 7.5 feet above mean lower low water)	Fender systems would be part of breasting dolphin systems	NA
Three new mooring dolphins	15 feet long x 12 feet wide	Three 42- to 48-inch-diameter hollow-core steel monopiles	55 feet
Nine new walkway segments connecting new mooring dolphins	• Two each 66 feet long x 4 feet wide (handrail to handrail) • Two each 56 feet long x 4 feet wide • Two each 84 feet long x 4 feet wide • Two each 40 feet x 4 feet wide • One each 28 feet long x 4 feet wide	Six 24- to 30-inch-diameter steel-pipe piles	About 40 to 50 feet
Repair			
One timber piling	14 inches diameter	14-inch-diameter timber pile	About 30 to 40 feet
12 stringers (beams/lumbers) on existing wharf	• 4 inches long x 12 inches wide • 6 inches long x 12 inches wide • 10 inches long x 12 inches wide • 12 inches long x 12 inches wide	NA	NA

[5] A monopile foundation uses a single, generally large-diameter, foundation structural element to support all the loads.

Figure 2.4-1

Overview of Existing and Proposed Project Features and Work Areas

Source: Ben C. Gerwick, Inc.

Dolphin A
(to be demolished)

Dolphin C & D
(to remain)

Dolphin G & Walkway Deck
(to be demolished)

Wharf and Dolphin E
(to remain)

Dolphin G & Walkway Deck
(to be demolished)

Dolphin I Framing and Piles
(to be demolished)

Figure 2.4-2

Photos of Existing Dolphins

Source: Ben C. Gerwick, Inc.

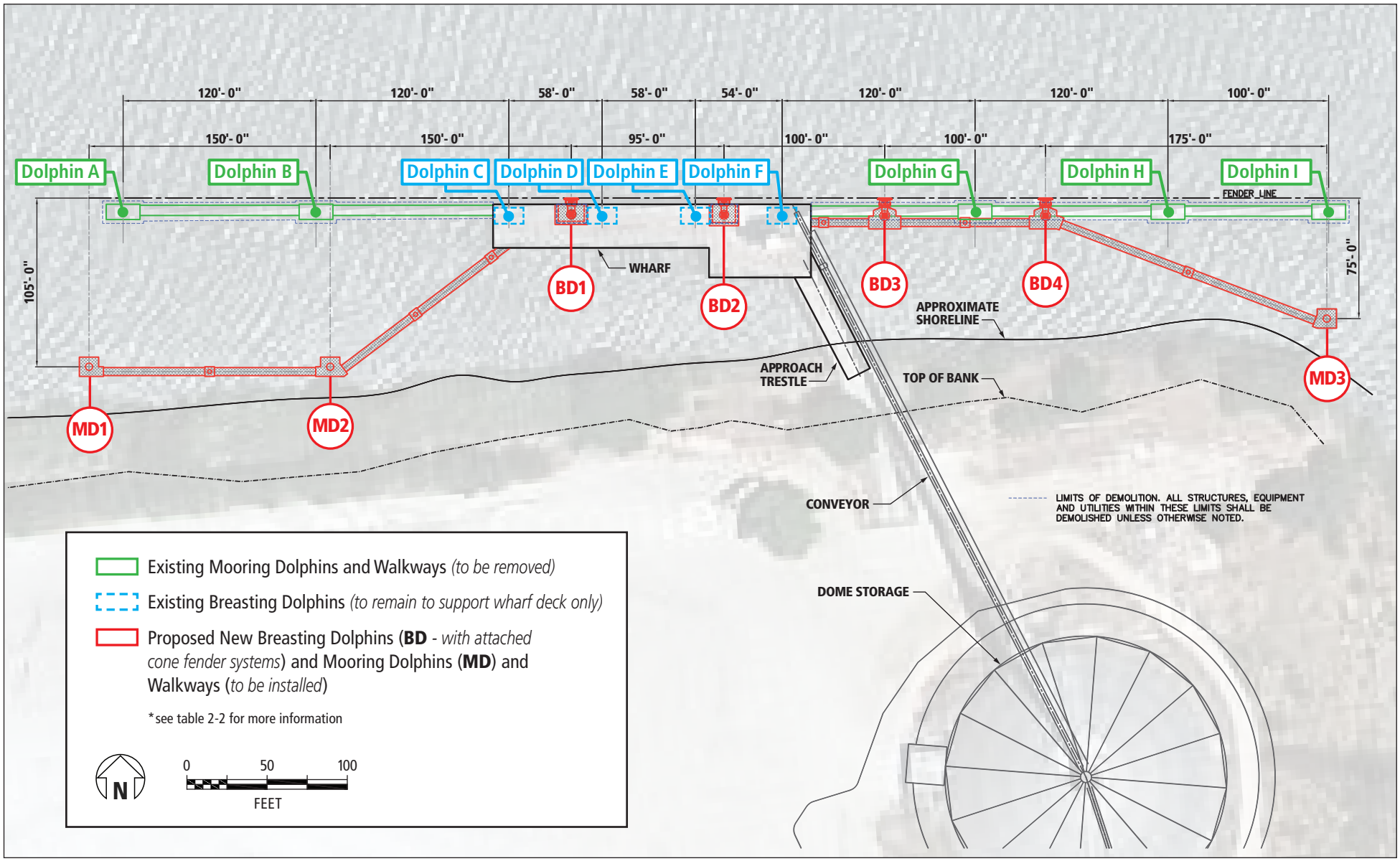


Figure 2.4-3

Proposed New Wharf Features and Dolphins

Source: Ben C. Gerwick, Inc.

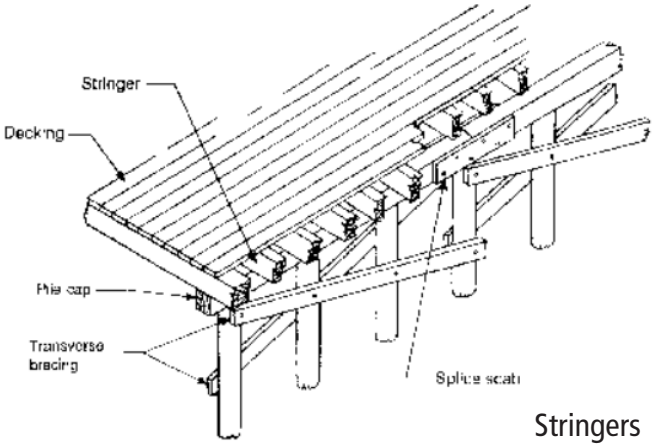
Breasting Dolphin

Dolphins with Fender Systems

Mono Pile

Mooring Dolphin attached to the walkway *(as proposed)*

Mooring Dolphin



Stringers

Figure 2.4-4

Photos of Proposed Dolphin Types

Source: Ben C. Gerwick, Inc.

Table 2.4-2. Existing and Proposed Dolphins and their Uses

Structure Designation	Current Uses	After Proposed Project Uses
EXISTING DOLPHINS		
Dolphins A, B	Berthing, mooring, and breasting	None – to be demolished
Dolphin C, D, E, F	Berthing, mooring, breasting, and supports part of wharf deck	Will only continue to be used to support part of wharf deck
Dolphin G, H, I	Berthing, mooring, and breasting	None – to be demolished
PROPOSED BREASTING DOLPHINS (BD) AND MOORING DOLPHINS (MD)		
BD 1, BD 2, BD 3, BD 4	None – not yet built	Berthing, mooring, and breasting
MD 1, MD 2, MD 3	None – not yet built	Mooring

2.4.1 Proposed Construction Area, Equipment, and Personnel

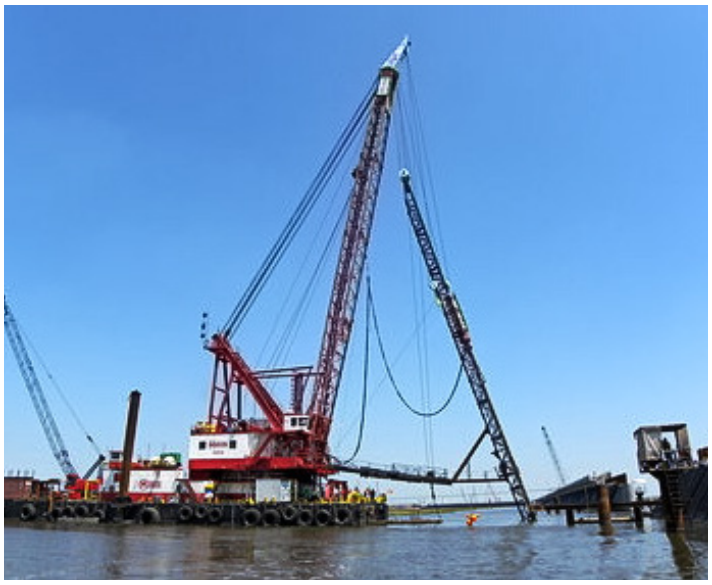
2.4.1.1 Construction Area and Access

As stated above, Project construction would be entirely conducted from barges moored in the water; there would be no land-based equipment or materials staged at the Project site. Barges are anticipated to be brought to the site from the contractor's yard located at 200 Cutting Blvd. in Richmond, CA. Tug boats are anticipated to be brought to the site from Pier 50 in the Port of San Francisco.

Warning signs readable at several hundred feet would be posted 30 days prior to the start of construction activities. Typically, fishing boats or small power boats are visible along the River 800 to 1,000 feet north of the wharf. Boats can theoretically approach the construction zone. Signage would deter entry of these boats into the Project construction area. Google Earth aerials show that the “shipping lanes” are approximately 3,325 feet north of the Project site (to the center of the Sacramento River ship channel location) on the opposite side of West Island. Recreational boating can be anywhere on the River – there are no marked travel lanes. Project construction activities are not anticipated to interfere with any other shipping or boating activities because of the Project’s distance from the shipping lanes, as discussed above.

2.4.1.2 Construction Equipment

The following construction equipment would be used to carry out the proposed Project-related activities (see photos in Figure 2.4-5).



Derrick

Diesel Hammer

Harbor Tug

Vibratory Hammer

Materials Barge

Figure 2.4-5

Photos of Marine Construction Equipment

Source: Ben C. Gerwick, Inc.

Additional detail describing the major pieces of equipment follows.

- In-water warning signs
- Material Barges
- Derrick barges
- Tugboats
- Vibratory hammer
- Impact hammer
- Chain and rigging
- Small tools
- Welding machines
- Air compressors
- Generators
- Clamshell bucket

Work and Material Barges

The barges used for the Project may vary in size. A small "work barge" is usually about 120 feet by 30 feet by 6 feet. A larger "material barge," for example one that might transport the timber piles, could be 210 feet by 60 feet by 12 feet. Material barges typically have a flat deck for optimal loading of materials. These barges would store construction materials such as timber, steel piles, precast concrete, fenders, and handrails. Work barges and material barges would be secured by tying them to the derrick barges.

Derrick Barges

Derrick barges are large barges equipped with revolving cranes on their decks. The derrick barges would be anchored in place during work. The barges hold themselves in position during operations with winch lines and anchors or with spuds. Spuds are usually steel piles that are raised and lowered by the crane or with winches. Derrick barges would be delivered and maneuvered using tugboats (see below).

During a typical work day, two to four barges would be onsite for Project construction (Gerwick, pers. comm.). The barges would be moved around the Project area with winches and cables attached to anchors or by tugboats as required to facilitate construction. For example, they would be located along the face of the wharf for the breasting dolphin construction and closer to the shoreline for the mooring dolphin construction (see Figure 2.4-1 above).

Tugboats

Harbor tugs, generally measuring 60 to 70 feet long, would be used to deliver the barges to the contractor's marine yard in Richmond for loading and configuration. The tugboats would also be used to move the barges from site to site within the Project area during demolition and construction. During any single work day one tug would likely be at the Project site (Gerwick, pers. comm.).

Vibratory Hammer

A vibratory hammer would be used for both removal and installation of the piles. For pile extraction, a vibratory hammer would be attached to the pile and then the pile would be pulled vertically with a crane or excavator. The vibratory hammer serves to break the seal or suction between the pile and the sediment holding the pile in place. For installation, the vibratory hammer would be used to sink the pile to the extent possible before installation is completed with the impact hammer.

Impact Hammer

A diesel impact hammer would be used to complete the installation of the new steel piles after the vibratory hammer has sunk the piles to the extent possible. The impact hammer would employ a hammer cushion and "soft-start" (slowly increasing the decibels (dB) from the impact strikes) techniques, and a bubble curtain system[6] would be deployed to minimize noise and underwater vibration effects.

2.4.1.3 Construction Personnel

The Project design firm (Gerwick Marine Engineers) has estimated that seven workers including supervisors would travel to the Plant site each day to work on/from the moored barges. No significant variation in staffing level is anticipated for any of the Project activities.

2.4.2 Project Components

2.4.2.1 Removal Activities

First, the walkways and wharf deck would be disassembled, placed on a barge, and removed from the Project area for disposal. After the walkways have been removed, a barge fitted with cable cranes, hydraulic cranes, or excavators would be used to remove the 150 treated timber pilings (110 pilings from dolphins and 40 pilings from walkways) using one or a combination of the following methods:

- Vertical Pulling. This method of complete pile removal involves gripping the pile with a chain, cable or collar and pulling up vertically with a cable or hydraulic crane. Vertical pulling is expected to be the preferred method of removal.
- Vibratory Extraction. Vibratory extraction involves attaching a vibratory hammer to the pile and pulling vertically with a crane or excavator, as described above.

[6] "Bubble curtains" infuse the area surrounding the pile to be driven with air bubbles, creating a bubble screen that inhibits the propagation of sound from the pile driving action. Air compressors are used to supply compressed air through air hoses to piping, typically polyvinyl chloride (PVC) or steel. The piping is supported by a frame and encircles the pile below water. Holes are predrilled in the piping, which allows the compressed air to escape thus forming the bubble curtain.

- Horizontal Snapping and Breaking. This method does not completely remove the pile, and would be employed only if complete removal was infeasible or if the piles break during the removal process due to deterioration. It typically involves pushing or pulling the pile laterally to break the pile off near the mudline. Snapping typically breaks the pile at the weakest point near the mudline which is typically 1 to 3 feet below the mudline, but this technique can leave part of the pile above mudline particularly if the pile is highly degraded, which increases the likelihood of a navigation or safety hazard. Snapping may result in more sunken or floating broken debris than pulling or cutting particularly for degraded piles. In the event a pile breaks during removal, a clamshell and/or chain would be used to grip the remaining broken piece and complete the removal process.

While complete removal is preferred, the CSLC recognizes that field conditions and the possible deteriorated state of the piles may necessitate abandonment in place of an unknown number of timber piles. Therefore, if a pile breaks or snaps 3 feet or more below the mudline during the removal attempt, the remaining pile stub would be left in place, and the location recorded. GP Gypsum would monitor the area periodically to ensure any abandoned pile stubs remain buried over time.

The pilings and/or piling remnants would be loaded onto a barge and removed from the Project area to an approved disposal facility (Potrero Hills Landfill in Suisun City, CA). As described above, equipment would include a derrick barge, a tug, a material barge to hold the removed piles and debris and one or more smaller craft to move workers, supplies, anchors and other equipment.

2.4.2.2 Installation Activities

Prior to installing the new permanent steel monopiles, pile templates would be set by stabbing temporary steel piles into the soils and constructing a framework of steel beams. This activity would use a vibratory hammer for the piles and regular rigging for the beams. The beams would be welded into place with a welding machine. After the templates have been set, the new piles would be installed using a vibratory hammer followed by an impact hammer, as described above and in more detail in Section 3.4, Biological Resources. Once the new piles have been installed, the walkways and decking would be constructed and attached, completing the new portions of the wharf.

2.4.2.3 Repair Activities

Repairs to the existing wharf would be performed concurrently with demolition and/or construction activities and within the in-water work window, and would be performed from a barge moored alongside the wharf. One damaged timber pile will be repaired in place by wrapping it in a fiberglass sleeve approximately 4 inches in diameter larger than the piling and then enclosing it within concrete. In addition, timber stringers, which

transfer vertical loads from the decking to the cap beams below, will be reinforced; 12 stringers are damaged at the face of the wharf, likely due to contact with ships. To repair these stringers, reinforcing timber 4x12s or “sisters” would be installed adjacent to the existing stringers by sliding them into the deck through the front face of the wharf. (Since they would be adjacent to and bolted to the existing stringers, they are referred to as sisters.) Drift pins would connect the new sisters to the cap beams below. The locations of these repairs are displayed in Figure 2.4-6.

2.4.3 Other Project Design Features and Considerations

2.4.3.1 Seismic Design

The wharf improvements to be constructed under the proposed Project (new dolphins and walkways) have been designed in accordance with seismic design requirements set forth in Chapters 16 and 31F of the 2013 California Building Code. The design of the new dolphins considered conservative estimates of potential corrosion loss and ensures that the structures will have functional utility for a minimum of 25 years. With maintenance, the actual life of the dolphins could extend to 50 years, contingent on it remaining in good condition and subject to periodic inspections and analyses during future lease renewal requests.

2.4.3.2 Net Displacement and Net Shadow Areas

The net water displacement (volume of the new steel monopiles and walkway supports minus the volume of timber piles being removed) would be reduced by approximately 20 cubic yards because there would be less material in the water in the Project area after the Project is completed than what is currently present. Similarly, the shadow area (shadow area before and after demolition and construction) is estimated to be reduced by 157 square feet. The total shadow area would be reduced by replacing the existing walkways with narrower walkways because it would have a 4-foot inside-to-inside handrail dimension for dolphin access. While the original structures have solid decks, the new walkway decks would be constructed using grip strut type planking (expanded metal grating) with about 50 percent open area. The reduced-shadow walkway area would extend an estimated 830 square feet (< 0.02 acre) over the River at about 9 feet depth or less. It would extend an estimated total of 1,475 square feet (about 0.03 acre) over the River at about 20 feet depth or less.

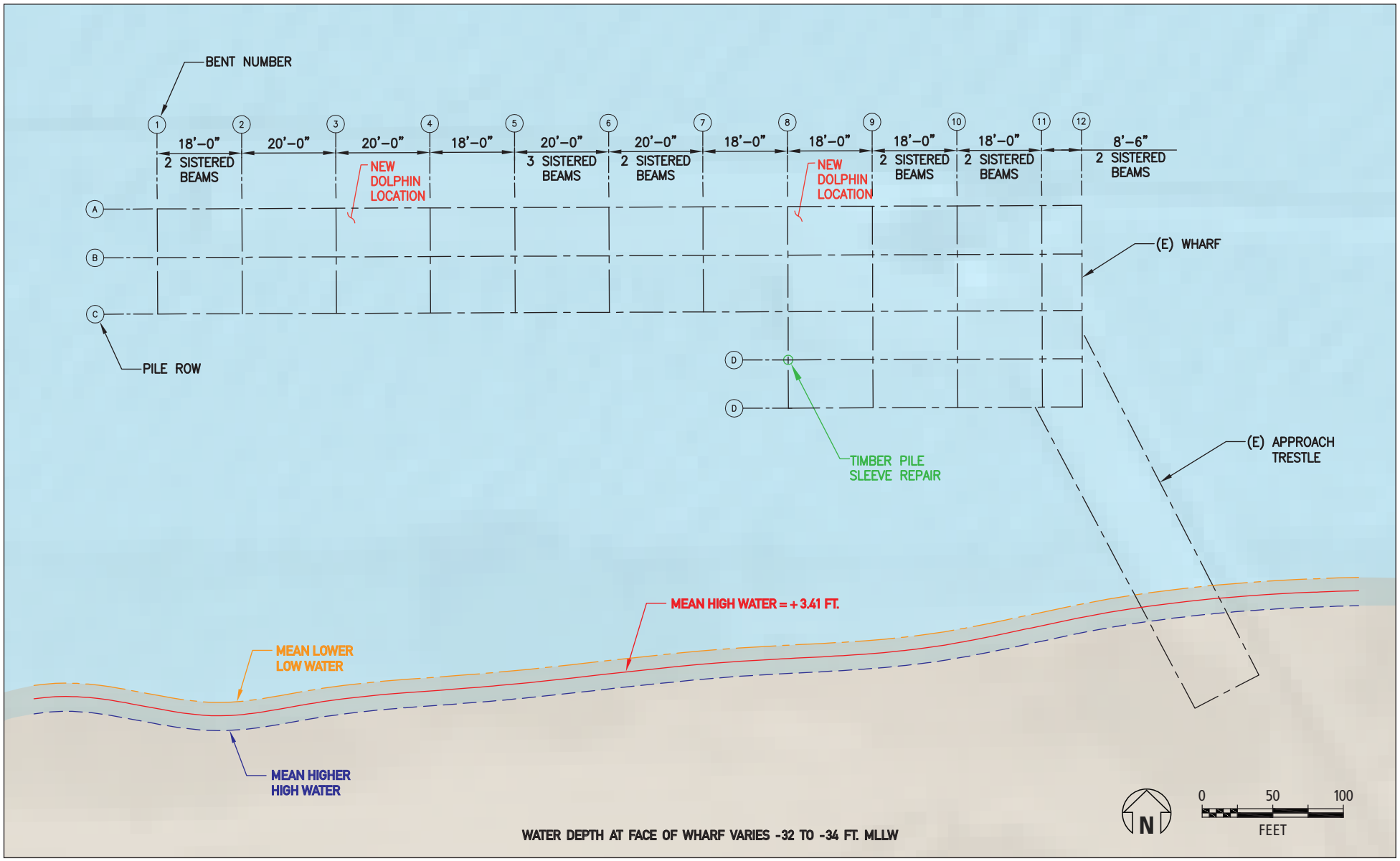


Figure 2.4-6

Proposed Wharf Repairs and Water Levels

Source: Ben C. Gerwick, Inc.

2.4.3.3 Sea-Level Rise

According to a recent study by the National Research Council (NRC 2012) tide gauge measurements show that global sea level rose by an average of about 1.7 ± 0.5 millimeters per year (mm/yr) over the last century. However, the rate of sea-level rise has increased to about 3.1 ± 0.7 mm/yr during the last two to three decades. The NRC report assesses future global sea-level rise and future sea-level rise along the coasts of California, Oregon, and Washington. In California, the presence of a major plate tectonic boundary at Cape Mendocino causes the coastline to behave in different ways on either side of the feature. The NRC report accounts for these differences and the major contributors to global sea-level rise, which are oceanic thermal expansion and melting of glaciers and ice sheets. The NRC report also accounts for the atmospheric and oceanic variables that affect rates of sea-level rise in individual coastal regions. Thus, the NRC projects different values for future sea-level rise on either side of Cape Mendocino. Relative to the year 2000, the NRC report projects the sea level to rise along the California coast south of Cape Mendocino by 5 to 24 inches by the year 2050 and 17 to 66 inches by 2100.

The wharf is at sea level. The shoreline rises sharply between 1 to 50 feet (above sea level from the water's edge) in the surrounding upland areas for approximately 0.25 mile east and west of the wharf. The wharf improvement design has taken potential sea-level rise into consideration. The CSLC used the 2050 projection of up to 24 inches (2 feet) by 2050 because of the stated design life of the structures and the expected lease term for operating the facility. Upon Project completion, the top of the wharf deck will be approximately 12.5 feet above mean lower low water (MLLW) and approximately 8.6 feet above mean higher high water (MHHW). The evaluation also incorporated a 25-year "significant wave height" estimate of 2.5 feet. Under this scenario, there would be approximately 4 feet between the MHHW + significant wave height + 2 feet sea-level rise projection and the top of the deck (see Figure 2.4-7).

2.4.4 Timing Considerations and Estimated Schedule

2.4.4.1 Work Windows

The in-water work window recommended by the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW) to minimize impacts to sensitive fish species is from August 1 through November 30. The in-water construction work is currently anticipated to require approximately 8 weeks of construction activity within a 12-week construction period.[7]

[7] This approximately 8 weeks of working days would occur within a 12-week "window" - with real-time interferences such as holidays, in-coming ship deliveries to the wharf (for which work is shut down) and normal equipment malfunctions, repairs and/or replacements.

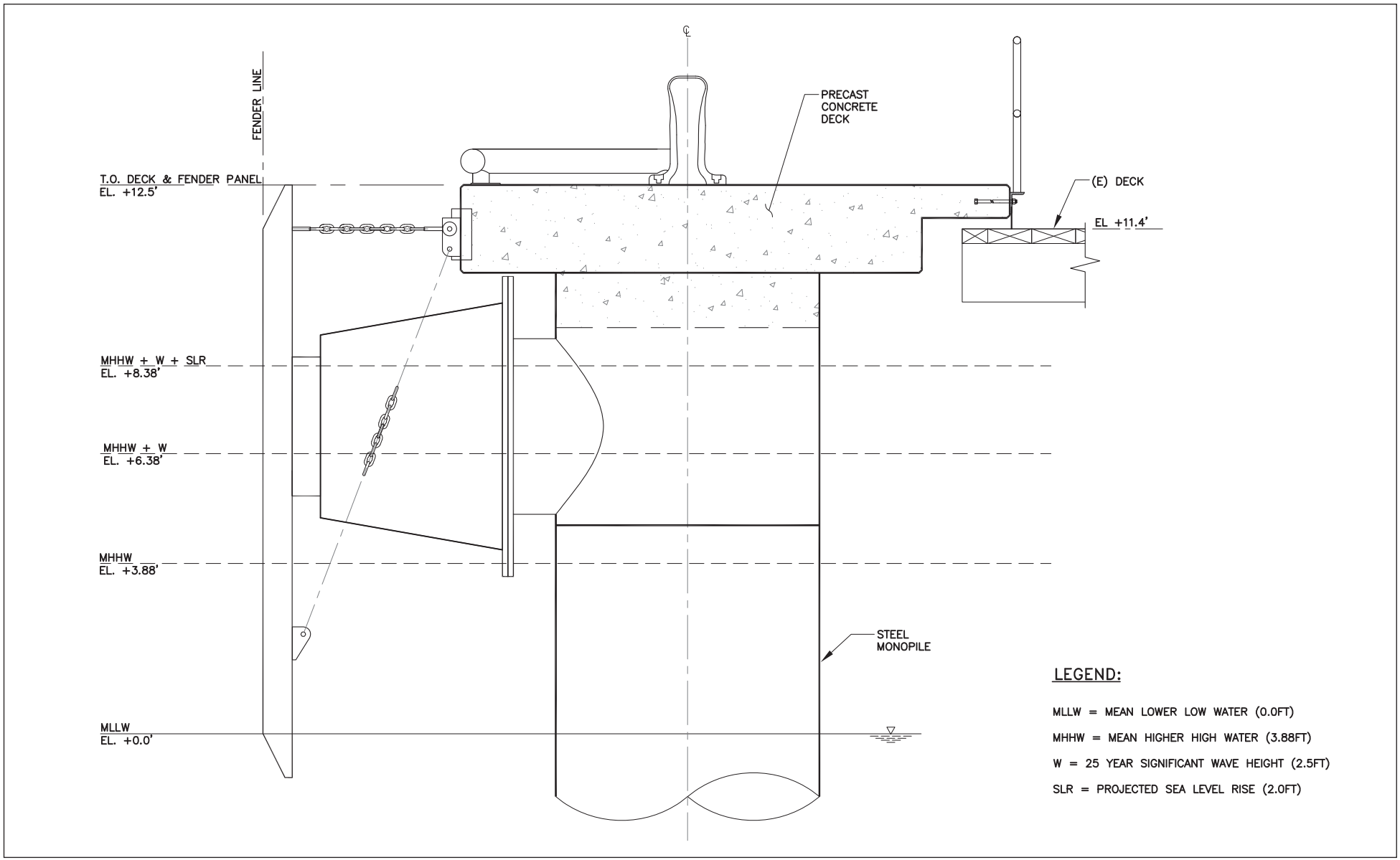


Figure 2.4-7

Dolphin and Deck Elevations Compared to Existing and Projected Tidal Heights

Source: Ben C. Gerwick, Inc.

2.4.4.2 Hours of Operation

The Project would comply with city of Antioch construction hours, which allow weekday construction hours from 7:00 AM until 6:00 PM, and weekend and holiday construction hours from 9:00 AM until 5:00 PM.[8]

2.4.4.3 Work Shifts

An 8-hour shift would typically be from 7:00 AM to 3:30 PM. Depending on the specific activities of the day, 10-hour weekday shifts may be warranted, and would usually be from 7:00 AM to 5:30 PM.

2.4.4.4 Duration of Construction Activities

As noted above, active construction is expected to take approximately 8 weeks, as estimated below (some work would occur concurrently).

- Demolition – about 5 days;
- Breasting dolphin construction – about 20 days;
- Mooring dolphin construction – about 15 days;
- Walkway construction – about 10 days; and
- Wharf repairs – about 5 days.

2.4.4.5 Specific Timing of Construction Activities

GP Gypsum anticipates initiating Project activities in August and completing the Project by the end of November. The following outlines the specific anticipated work timing:

- Install mooring dolphin and walkway piles with vibratory hammer – currently scheduled for 7 days in September.
- Install breasting dolphin piles with impact hammer – currently scheduled for 5 days in October.
- Set and weld breasting dolphin caps – currently scheduled for 8 days in October.
- Install fenders – currently scheduled for 2 days in October.
- Install mooring dolphin and walkway caps – currently scheduled for 2 days in October and 8 days in November.
- Install walkways – currently scheduled for 4 days in November.
- Demolish upstream and downstream dolphins – currently scheduled for about 10 days in November.

[8] Antioch Municipal Code Section 2, Community Noise Ordinance 5-17.060(f).

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