### CALIFORNIA COASTAL COMMISSION

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# CDP 3-18-1081 (SANTA CRUZ WHARF REPAIR AND MAINTENANCE PROGRAM) SEPTEMBER 9, 2021 HEARING EXHIBITS

**Table of Contents** 

**Exhibit 1: Regional Vicinity Map** 

- Exhibit 2: Aerial Image of Wharf and Local Vicinity
- **Exhibit 3: Graphic Depiction and Photographs of Wharf**
- Exhibit 4: Santa Cruz Wharf Maintenance Plan
- Exhibit 5: NMFS-Approved Wildlife Training Program
- Exhibit 6: Coastal Commission Ecologist's Bird Nesting Recommendations

San Francisco

Santa Cruz

Monterey Bay National Marine Sanctuary

Monterey



Exhibit 1 3-18-1081 (Santa Cruz Wharf Repair and Maintenance Program) 1 of 1

Santa Cruz Municipal Wharf

Main Beach

cowell Beach



Exhibit 2 3-18-1081 (Santa Cruz Wharf Repair & Maintenance Program) 1 of 1





Years of Construction & Pile Core Locations (2014 Inspection)

Storm waves hitting the wharf



Foot of the Wharf

3-18-1081

1 of 1



**Bends of pier piles** 

# Santa Cruz Wharf

# **Maintenance Plan**



Prepared for:



Prepared by:



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# **Table of Contents**

1.	Exec	cutive Summary	1
2.	Sant	a Cruz Wharf Description	1
2.	1	Piles	3
2.	2	Wharf Structure	3
2.	3	Decking	5
2.	4	Fixed Landings	5
2.	5	Utilities	5
2.	6	Fire Suppression System	6
3.	Anti	cipated repairs	6
3.	1	Piles	7
3.	2	Wharf Structure	9
3.	3	Roadway1	.0
3.	4	Utilities1	0.
3.	5	Superstructure1	0
4.	Wha	arf Maintenance Areas and Procedures1	.0
4.	1	Structural Components Maintenance and Procedures1	.1
	Deck	king1	.1
	Pile	Caps1	.1
	Strin	ngers1	.1
	Coni	nection Hardware1	.1
	Raili	ng1	.1
4.	2	Wharf Wood Specifications1	.2
	Lum	ber1	.2
	Lum	ber Treatment and Storage1	.2
4.	3	Wharf Pile Driving and Repair1	.3
	Pile	Coating1	.3
	Pile	Wrapping1	.3
	Pile	Driving1	.3
	Pile	Removal1	.4
	Pile	Jacket1	.4
4.	4	Utilities Maintenance and Repair Procedures1	.5
	Fire	Suppression System1	.5
	Grav	vity Sewage System1	.5
4.	5	Construction Management	.5

# **Table of Figures**

Figure 1. Santa Cruz Municipal Wharf (Google Earth)	. 1
Figure 2. Years if Construction/Pile Core Locations (2014 Inspection)	. 2
Figure 3. Typical Wharf Framing	. 3
Figure 4. Structural Evaluation – Layout Summary Plan	.4
Figure 5. Under Deck Utilities	. 6
Figure 6. Fire Suppression Sprinklers Below Deck	. 6
Figure 7. 2014 Pile Damage Survey	. 8
Figure 8. 2014 Wharf Structure Damage Survey	. 9

Figure 9. Santa Cruz Wharf Railing	12
Figure 10. City of Santa Cruz Pile Driving Equipment	14
Figure 11. Pile Jacket Installation Methods	15

Appendix A. Avoidance and Minimization Measures and Best Management Practices

Appendix B. Seabird, Marine Mammal, and Sea Turtle Best Management Practices

Appendix C. Repair Figures

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# **1. EXECUTIVE SUMMARY**

The Santa Cruz Municipal Wharf (the Wharf) was constructed in 1914 and continuously maintained by the City of Santa Cruz (the City) in its existing configuration. The Wharf is located on the north side of Monterey Bay on the open California Coast. It is the longest timber pier on the coast of the United States and one of five of the longest timber piers in the world. Having been in continuous service for over 100 years gives it the distinction of one of the longest histories for open coast piers in continuous operation in existence. Additions have been made at various intervals and repairs have been made continuously resulting in piles aging from a few years to over one hundred years old.

Due to its age, location, and construction material the Wharf is subject to damage from waves and deterioration. To maintain safe public access to the Wharf, maintenance and repairs are required. The Wharf is presently maintained, owned, and operated by the City who have a full-time maintenance staff. Maintenance of the Wharf includes the repair and replacement of structural members (piles, pile caps, stringers, and decking), appurtenances (utilities, lighting, railing, etc.), and the building that are constructed on the Wharf deck. Maintenance and repairs will not exceed the original pier footprint and structural repairs will be made with materials similar to those used in the original construction. No alterations to the historic qualities will be made. As a historic wood pier, use of wooden piles will be prioritized for replacement.



Figure 1. Santa Cruz Municipal Wharf (Google Earth)

# 2. SANTA CRUZ WHARF DESCRIPTION

The historic Santa Cruz Wharf is approximately 2,700 feet long. The Wharf varies in width (55 feet to 250 feet) along its length as it was widened in different construction periods, see Figure 2. There are approximately 4,450 piles supporting the Wharf. There are 4 public landings. The Wharf is the longest timber pier (extending perpendicular to the shore) on the coast of the United States, and in continued use for the longest period of time.



The structural members are all timber comprised of rows of piles (bents), supporting caps, stringers, and decking. The decking is topped with a 2-inch, nominal, layer of asphalt concrete pavement. The arrangement of the structural members is regular with some variation along the joints of different

construction periods. The structure can be separated into 3 functional areas: foundation (piles and cap), deck (stringers, decking, and paving), and the superstructure (buildings on top).



Figure 3. Typical Wharf Framing

#### 2.1 Piles

The existing Wharf piles are Douglas Fir timber, 14-inch diameter (nominal), driven tip first approximately 15 feet into the sand seafloor and beach below. All existing piles are treated with preservative (mostly creosote, some ACZA, or ACZA with a polyurea compound coating). The existing piles bents are at 15 feet centers and the piles spaced along the row are at 7 feet nominal centers, with some variability.

The existing piles are in good condition. Overall, less than 5% of the existing 4,450 piles require replacement. Notable exceptions exist underneath some of the buildings. Observed damage to the piles is caused by storm waves, floating logs, and marine borers (Teredo). Repair and/or replacement of damaged piles will allow the continued function and use of the Wharf well into the future.

#### 2.2 Wharf Structure

At the south end of the Wharf, horizontal members (pile ledgers) are installed at elevation 9 feet MLLW (12 feet below top of pile). The ledgers consist of two members, one on each side of the pile that are bolted together through the pile. These members provide lateral bracing to the piles, which are longer due to the water depth at the end. The ledger members are 6x6 and 6x8 and run in the longitudinal and transverse direction of the Wharf. The ledgers start at bent 126, where they extend beneath the buildings on the west side of the Wharf, at bent 146 they span the entire width of the Wharf and continues to bent 182.

The piles support timber cap beams (12x12), stringers (4x12, with some 6x12), and decking (3x12). The arrangement of the caps, stringers, and the connections is somewhat varied, particularly along joints of different construction periods of the Wharf. Figure 4 shows the cross-sections of the Wharf at different locations. The topside of the Wharf has a nominal 3-inch-thick layer of asphalt concrete for the road and parking areas. Some of the pedestrian walkways are topped with concrete. The Wharf topside elevation is approximately 23 feet above Mean Lower Low Water (MLLW).

The caps and stringers that support the decking are in serviceable condition. Many of the fasteners used in the caps and stringers are failing leading to a reduced sheer strength of the Wharf. The structural strength varies depending on the location and service area on the Wharf - roadways have a higher strength (areas in green in Figure 4) than under the buildings and parking stalls (areas in blue in Figure 11).



Figure 4. Structural Evaluation – Layout Summary Plan

#### 2.3 Decking

The deck elevation of the main Wharf (bents 70 to 183) is 23 feet (nominal) above Mean Lower Low Water (MLLW). The northern portion of the Wharf slopes up from the shore abutment at elevation 18 feet at bent 1 to 23 feet MLLW at bent 70. The water depth ranges from 0 feet at bent 25 to around 35 feet at the end of the Wharf (bent 183), resulting in pile lengths extending above the soil (ocean floor) between 20 and 50 feet. From the abutment to bent 25 the pile lengths are 4 to 18 feet above the beach sand.

The Wharf supports multiple one- and two-story buildings, the vehicle roadway, pedestrian walkways, and parking. The topside of the Wharf has a nominal 3-inch-thick layer of asphalt concrete for the road and parking areas. Some of the pedestrian walkways are topped with concrete.

The asphalt pavement of the Wharf roads and parking areas is cracked and deteriorated over most of the traffic areas and requires repairs. There is advancing corrosion of fasteners and the fungal deterioration of the wooden substrate below the asphalt pavement.

#### 2.4 Fixed Landings

The Wharf has five locations where there is water access to small boats, provided by landings and docks. The structure at each of these locations is similar: stairway from Wharf deck to a fixed platform at elevation 8ft MLLW. The structural members are timber with bolted connections to the piles and 3x12 timber decking nailed to the stringers. The railing on the landings is timber. In addition to the five landings there is an abandoned landing at Bent 103 where Stagnaro party fishing boats have operated in the past. Maintenance includes repairing and/or replacing structural wood components on an as-needed bases due to damage or corrosion.

#### 2.5 Utilities

Sewage from the Wharf buildings is collected and transported by gravity pipes to two large pump stations on the Wharf. These stations pump sewage to the municipal collection system on shore. The existing pipes are constructed of corrosion resistant PVC and ABS material and are in good condition. Due to the proximity of the Wharf to public beaches it is paramount that there are no leaks in the sanitary piping. In a few locations there are older cast-iron pipes and utility lines (PVC and steel water lines, PVC electric conduit, etc.) that have been left in place and abandoned. Figure 5 shows utility lines located below the deck of the Wharf.



Figure 5. Under Deck Utilities

#### 2.6 Fire Suppression System

The Wharf is classified as combustible construction under the fire code because it is constructed with timber. In the past 35 years, fire warning and suppression systems have been added to the Wharf as codes and standards were developed and the use of the Wharf by the public increased. Currently the Wharf is protected by a fire suppression system along the full length of the Wharf. This system includes hydrants, sprinklers, access hatches to substructure fire truck access and a zoned fire alarm system.



Figure 6. Fire Suppression Sprinklers Below Deck

# 3. ANTICIPATED REPAIRS

The City is proposing maintenance and repairs to the Wharf for a 5-year period. Maintenance will consist of both major and minor maintenance activities. Major maintenance work is defined as any

repair or maintenance activity that involves on site pile driving, jack hammers, or removal of the Wharf's deck surface. All work not within this definition is minor maintenance work. For instance, minor work could include perimeter fence work, scaffold set up, plumbing, and electrical repairs.

Maintenance activities could include the repair and replacement of any of the Wharf structural members (piles, pile ledgers, pile cap, stringers, and decking), appurtenances (utilities, lighting, railing, etc.), and the buildings that are constructed on the Wharf deck. Large buildings will not be demolished or re-developed. Engineers prepared an Engineering Report in 2014, where they inspected the Wharf and identified locations where repairs need to take place. The figures presented in this section, displaying the damaged areas, reflect the inspection efforts performed for that report. Additionally, much of the repair is due to damage caused by winter storms, the exact member and location cannot be predicted; however, repairs to the following are likely to occur:

#### 3.1 Piles

Replace up to 40 piles per year (up to 200 piles in 5-year maintenance period). Piles to be replaced are those with greater than 40% section loss and located at all A-frame locations, see Figure 7. The existing treated (creosote, ACZA, or ACZA treated polyurea coated) timber piles (of diameters up to 16-inches) will be replaced with timber piles (of similar diameter, diameters up to 16-inches) treated with ACZA or CA-A and coated in a polyurea compound. Install or replace steel T- connections and bolts, as necessary.



Figure 7. 2014 Pile Damage Survey

#### 3.2 Wharf Structure

Repair or replace deteriorated pile ledgers, pile caps, stringers, decking, and any affiliated connections to stringers and caps. At unsupported cap splices installed side plate connections. Additional stringers may be provided beneath bearing wall loads. See Figure 8 for locations of rot and damage in decking, stringers, and pile caps as well as the location of unsupported cap splices.



Figure 8. 2014 Wharf Structure Damage Survey

#### 3.3 Roadway

Replace asphalt pavement with either a similar asphalt material, rubberized asphalt, or a system of prestressed concrete pavers throughout the road and parking areas, as needed. New asphalt should be installed at a slope to drain inlets that provide treatment for runoff water quality.

#### 3.4 Utilities

Remove abandoned piping beneath the Wharf and replace mild steel hangers with galvanized or stainless steel. Perform inspections monthly and after large wave events to check for leaks in sewage system. Conduct minor utility repairs on an as needed basis. Perform pressure tests on all new laterals installed on the Wharf.

#### 3.5 Superstructure

The Wharf maintenance crew routinely maintains various buildings and facilities (restrooms, fences, benches, and signage) on the superstructure of the Wharf. Over the course of 5 years the City is proposing several activities to the superstructure of the Wharf, these activities are listed below:

- 1. Wharf Headquarter Building Replace windows, doors, and siding on the west facing side of the Wharf Headquarter Building.
- 2. Wharf Maintenance Building Replace two roll-up doors and frames, building siding, and improve building security and storage capacity.
- 3. South Commons & Agora Seal and paint the South Commons and Agora Buildings.
- 4. North Commons & Agora Replace windows and awning of the North Commons and Agora Buildings.
- Commons Stage Repair stage substrate and pour new decorative concrete stage and entry ramps with geo-foam underlayment. Maintenance will include the installation of new aluminum handrails.
- 6. Wharf Commons Overhead Walkway Remove pavers, repair wood framing, install decorative concrete surfacing with trench drains connected to down spouts, replace all handrails with ADA compliant handrails.
- 7. Firefish Roof This effort includes the second phase or repairs to the Firefish roof. Replace mechanical equipment, plumbing, and electrical wiring as needed, and replace existing roof membrane with a welded membrane on remaining section of the roof.
- 8. Wharf Commons and Agora Commons Surface This effort includes the removal of asphalt, installation of waterproof barrier membrane, and the resurfacing with decorative concrete. The drains will be plumbed through the deck in this task.
- 9. Marcella Fishing Boat Preservation efforts for the historic fishing boat.

All the recommended repairs may not be completed and will depend on funding, time, and subsequent damage.

### 4. WHARF MAINTENANCE AREAS AND PROCEDURES

Wharf maintenance shall be performed during day-time hours primarily using land-based equipment. Repairs near the water line will be performed by a small boat. In-water work will be limited to the removal of broken piles, repair of lower ledgers, pilings, landings, floating docks, and storm damaged deck structure that requires removal by boat. Wharf maintenance activities will prevent construction debris and waste materials from entering the surface water. All work will comply with Santa Cruz County Water Quality Certification no. 34418WQ14.

#### 4.1 Structural Components Maintenance and Procedures

#### Decking

Decking shall be replaced when the surfaces become extensively worn, uneven, or hazardous. Decking shall consist of wood-alternative materials or ACZA or CA-A-preserved lumber, cuts sealed with penetrating coating, and surfaced with asphalt or concrete. Alternatives to preserved woods, such as concrete, steel, fiberglass, or naturally decay resistant wood species, shall be prioritized over the use of chemically treated wood. Decking shall be secured to stringers using steel screws or spikes. Typical decking is 3x12 at varying lengths.

#### Pile Caps

Replace pile caps when decayed or damaged. Pile cap replacements will be treated members of the same size and length as the original cap. Prior to placing the pile caps ensure that the pile tops have been properly prepared by fresh cutting the pile to ensure a true fit under the cap, apply a penetrating non-toxic preservative, and coat with a non-toxic epoxy seal. Typical pile caps are 12x12 of varying lengths.

#### **Stringers**

Replace stringers when decayed or damaged. If a stringer is only partially decayed or damaged that section may be removed and replaced. All replacement stringers shall be treated members of the same type as the original members. Connections between an existing stringer and a replacement stringer will be made directly over the pile cap. Stringers must be tightly bolted or pinned to the pile cap. Stagger adjacent splices in stringers where possible. Typical stringers are 4x12 (6x12 at roadway locations) at varying lengths. Typical spacing is 16" on center.

#### **Pile Ledgers**

Replace ledgers when decayed or damaged. Due to their location at 9 ft MLLW, they are in the middle wave zone and are subject to large waves impact during storms. Ledger replacements will be treated members of the same size and length as the original ledger. Typical pile ledgers are 6x6 and 6x8 at varying lengths.

#### **Connection Hardware**

Connection hardware with significant visible deterioration should be replaced. Bolts shall conform to ASTM A 307 and nuts shall conform to ASTM A 563. Fabricate timber connectors from ASTM-A36 and hot dip galvanize after fabrication. Replacement bolts, nuts, and miscellaneous connector shall be of the same size as original hardware. All steel hardware shall be hot dip galvanized per ASTM A 153.

#### **Railing**

This consists of railing that has rusted connection hardware, deteriorated wood, and feels loose when force is applied. Replace railing post and rails with members of the same size as original members. Set the railing post by bolting to the outside stringer. Butt splices should occur only at the railing posts. Stagger rail splices by 4 feet at a minimum. The cap rail should be laid with heart side down. Prior to the placement of the cap rail, protect the post top with several applications of the same preservative used to treat the post. The railing shall be installed to match existing, see Figure 9. This configuration has steel grating on the bottom that functions as a trash screen, cables added in between the timber members to ensure greater safety for children and is bird resistant.



Figure 9. Santa Cruz Wharf Railing

#### 4.2 Wharf Wood Specifications

#### <u>Lumber</u>

Structural lumber shall be Douglas Fir-Larch No. 1 or better as specified by the West Coast Lumber Inspection Bureau, visually graded lumber. Each piece of lumber or timber shall be identified by the grade mark of a recognized association or independent inspection agency. The association or independent inspection agency shall be certified by the Board of Review, American Lumber Standards Committee (ALSC), to grade the species used. Fabricate lumber and timbers before preservative treatment. Deck planks are required to be kiln-dried after treatment (KDAT) and marked accordingly prior to delivery.

#### Lumber Treatment and Storage

All items will be treated with ACZA with a minimum 0.6 pcf retention. All treated lumber shall have a quality mark from an ALSC accredited agency. A treatment certificate and Safety Data Sheet shall be provided with the treated material. Pressure treated wood is not typically stored on the Wharf. It is loaded onto a truck from the corporation yard, taken to the Wharf, unloaded with a fork lift and transported to jobsite. The pressure treated lumber is left on the fork lift or placed into an impervious containment device such as a portable berm system where it is cut to length and installed. Any remaining lumber is removed from jobsite and returned to the corporation yard.

Handling, storage, and treatment of lumber shall be according to American Wood Protection Association (AWPA) Standard M4 as follows. Open-stack untreated timber and lumber material on suitable skids at least 12 inches aboveground, in a manner that will prevent warping and allow shedding of water. Close stack treated timber and lumber material in a manner that will prevent long timbers from sagging or becoming crooked. Keep ground under and within 5 feet of all such piles free of weeds, rubbish, and combustible materials. Protect materials from weather using suitable coverings. Handle treated timber

with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating the surface with tools.

#### 4.3 Wharf Pile Driving and Repair

The Wharf piles are Douglas Fir timber, 14-inch diameter (nominal), driven tip first 10-15 feet into the sand seafloor and beach below. All piles are treated with a preservative, the original piles being creosote treated. The more recently installed piles are ACZA treated and the most recently installed piles are ACZA with a polyurea coating. Replacement piles shall be timber piles no greater than 16-inches in diameter.

#### **Pile Coating**

All installed piles shall be ACZA treated (minimum 2.50 pcf retention) with marine grade polyurea coating. Coating shall be resistant to saltwater, UV exposure, and marine borer infestations. Coating shall form a tough, abrasion resistant membrane that provides a continuous water-proof seal from the mudline to above high tide. Polyurea sealant shall terminate approximately thirteen feet from the tip of the pile and five feet from the butt end of the pile, so that the portion of each pile exposed above the mudline is coated to inhibit leaching of the AZCA preservative into coastal waters. Pile coating shall be applied after the pressure treatment process is complete by a facility having prior experience with coating wood with a polymer product. Pile coating system shall be able to have field cuts patched with a field applied system. Coating and patching shall be by a single manufacturer. Minimum physical properties after 48 hours shall be:

a.	Thickness	150- 250 mil	
b.	Tensile Strength	2600 psi	ASTM-D-638
c.	Tear Resistance	450 lbs/in	ASTM-D-624

Repairs to coating shall use inert wrapping such as HDPE secured by banding. No coal-tar sealants or coal tar-treated wood shall be used unless coated or wrapped with an inert material or product to isolate it from the marine environment. After installation, the polyurea sealant shall be inspected for damage annually and repaired if necessary.

#### Pile Wrapping

Pile wrapping will be allowed in lieu of pile coating. Pile wraps shall consist of a 30 mil Polyvinyl Chloride Flexible Sheet (PVC) plastic barrier wrapping over a 6-mil polyethylene liner. PVC sheets polyethylene liner shall be smooth and free from foreign matter, cracks, tears, holes, and other defects. Mechanical fasteners shall be 2-inch bronze or stainless-steel nails, helically threaded and fitted with a neoprene washer, or nylon nails with pre-drilled holes approved by the City's Representative. The bottom end of the wrap shall be provided with a 1/2-inch-wide by 0.03-inch-thick galvanized sheet band to protect wrapping during driving. Pile wrapping shall terminate approximately thirteen feet from the tip of the pile and five feet from the butt end of the pile.

#### Pile Driving

Pile installation shall occur in daylight hours during favorable tidal, ocean, and weather conditions to ensure the safety of workers and improve the visibility of marine wildlife approaching the area. All pile driving will implement a soft-start (ramp-up) method with wood cushion block to minimize noise impacts. An impact hammer shall be used to drive piles. The soft start requires an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent 3 strike sets. The first piles to be driven will be located as far as possible from any hauled out sea lions.



Figure 10. City of Santa Cruz Pile Driving Equipment

#### Pile Removal

Wharf staff regularly inspect the Wharf for newly broken piles. Piles most commonly break at the sand line or at the water line. The portion of the pile above the break can swing freely and damage the Wharf, thus, it is removed as soon as conditions allow. For piles that break at the water line the portion of the pile below the water line may be left in place until a repair to that area is made. When the repair is made the crew evaluates whether the pile needs to be removed to allow for a safe and structurally sound repair. If it does, and weather and water quality conditions allow, the pile is removed. When removing the pile is not possible, the pile is left in place and a replacement pile is driven next to the adjacent pile.

#### Pile Jacket

Where applicable, timber piles shall be repaired with a fiberglass jacket encasing a steel reinforced epoxy grout fill, Simpson FX-70 system or engineer approved equal. The Epoxy Grout Method is used for piles with less than 25% section loss and the Combination Method is used for piles with greater than 25% section loss, see Figure 10. Fiberglass jacket and grout ports shall be installed per manufacturer's recommendations. Monitor pressure-injected or gravity-feed grout application to ensure that the material does not leak into the water. The excess grout pumped out through the ports or the jacket opening shall be collected and removed from the water.

Installation and application of epoxy, resin, or cementitious grout/fill shall be conducted when predicted weather and ocean conditions allow effective control and full containment and will remain dry until cured, to prevent any leaching of uncured treatment materials into coastal waters.



Figure 11. Pile Jacket Installation Methods

### 4.4 Utilities Maintenance and Repair Procedures

#### Fire Suppression System

The fire suppression equipment (sprinklers under the Wharf) are tested regularly. Repairs or replacement are performed on the hydrants, sprinklers, and water lines if they are found to be deficient.

#### Gravity Sewage System

Inspections of the gravity sewage system shall be performed monthly and after large wave events to check for leaks of the sewage system. If any leaks are detected, repair immediately. All installed laterals shall be pressure tested. When replacing hardware that holds up the piping, use hot-dipped galvanized or stainless steel hangers.

#### 4.5 Construction Management

A Construction Coordinator shall be designated as "Point of Contact" should questions arise related to regular and emergency maintenance work. The Construction Coordinator shall provide regular and emergency contact information (i.e., email address, phone numbers, etc.) including, at a minimum, a telephone number that will be made available 24 hours a day for the duration of construction. The Construction Coordinator's contact information shall be posted at the job site where it is readily visible from public viewing areas, along with information that the Construction Coordinator should be contacted with construction questions and complaints (regular and emergency questions). The Construction Coordinator shall record the name, phone number, and nature of all complaints received

regarding the construction, and shall investigate complaints and take remedial action, if necessary, within 24 hours of receipt of the complaint.

The Construction Coordinator shall be responsible to ensure the construction site is maintained using good construction site housekeeping controls and best management practices. These tasks include but are not limited to the following:

- Clean up all leaks, drips, and other spills immediately.
- Keep materials covered and out of the rain (including covering exposed piles of soil and wastes).
- Dispose of all wastes properly, place trash receptacles on site for that purpose, and cover open trash receptacles during wet weather.
- Remove all construction debris from the tidelands.

The Construction Coordination will compile an annual Wharf Maintenance Monitoring Report by June 30<sup>th</sup>. This report shall include:

- Biological monitoring reports and maps.
- Reports of complaints and the investigation of these complaints.
- Reports of work stoppages related to work crew biological monitoring.
- A visual post-winter inspection report of any pilings installed, including damage report to piles or coating, and repairs needed or made.



#### General Avoidance and Minimization Measures and BMPs

- 1. Unless specifically authorized by Coastal Commission staff, all work shall take place during daylight hours. Unless specifically authorized, lighting of tidelands and water areas is prohibited.
- 2. All construction and/or staging areas shall be designed to minimize impacts to the marine environment and public access.
- 3. All major emergency maintenance work not deemed necessary to prevent public endangerment shall be performed during favorable tidal, ocean, wind, and weather conditions that will enhance the ability to contain and remove, to the maximum extent feasible, construction and demolition debris
- 4. Wharf maintenance equipment refueling and/or servicing will be limited, and when required will follow best management practices to eliminate the possibility that pollutants may enter coastal waters
- 5. Wharf maintenance equipment washing will be limited, and when required will take place at the designated wash rack that drains to the sanitary sewer to prevent the possibility that pollutants may enter coastal waters.
- 6. All construction materials shall be properly stored and contained so that these products will not spill or otherwise enter the coastal environment.
- 7. All materials and/or equipment storage shall be managed to have the least impact on the marine environment and public access.
- 8. All erosion control/water quality best management practices to be implemented during construction will be in place prior to the start of construction and their locations shall be noted.
- 9. Appropriate containment methods will be used to capture construction debris, sawdust, particulates, oil, grease, rust, dirt, and spills to protect coastal water quality. Containment shall be in place prior to commencement of construction and at the end of the workday as appropriate.
- 10. Appropriate disposal methods shall be used to ensure the protection of coastal waters.
- 11. All public recreational use areas, the main accessway onto the wharf, and all points of access to various areas of the wharf along its extent that are impacted by construction activities shall be restored to their preconstruction condition or better within three days of completion of that phase of construction.
- 12. Weekend work shall only occur in emergency circumstances. Any emergency weekend work will be reported within 24 hours to Coastal Commission staff.

#### Responsibilities for Use of Preservative-Treated Wood for Piles and Over-water Structures

- 1. The wood preservative selected for use shall minimize the impact on coastal water quality and the aquatic environment.
- 2. Preservative-treated Douglas fir piles shall only be used for repair and replacement, or to visibly blend, and/or structurally integrate with, existing over-water structures.
- Decking shall consist of wood-alternative materials or ACZA-preserved lumber, cuts sealed with a penetrating coating, and surfaced with asphalt or concrete. Alternatives to preserved woods, such as concrete, steel, fiberglass, or naturally decay resistant wood species, shall be prioritized over the use of chemically-treated wood.
- 4. All treated wood piles, and, where feasible, treated wood structural members, shall be wrapped in, or coated with, water-tight, UV resistant material to prevent leaching of wood-preservative chemicals into the water column, and to prolong the life of the piles and structural timbers. For piles, protection shall extend two feet below the mudline and two feet above OHW, at a minimum, and wrappings shall be secured with corrosive resistant banding or self-tapping screws. Coatings and/or sealants used shall be products that are inert after they have cured and dried. No coal-tar sealants or coal tar-treated wood shall be used unless coated or wrapped with an inert material or product to isolate it from the marine environment.
- 5. Design features, such as protective wearing surfaces or bumpers, shall be installed on fender piles and floating dock pilings, where appropriate, to resist abrasion and preserve the pile-wrap or coating.
- 6. The amount of preservative used for treating piles shall be the minimum specified by the American Wood Protection Association to effectively protect the piles. Wood treated to the standards for a higher Use Category (i.e., with a higher preservative retention level) than is necessary for that component shall not be used.

- 7. Treated piles and any treated wooden structural elements shall be transported to the project site and shall be stored on impervious pavement or an impervious tarp, and covered during rain events.
- 8. If treated wood is sanded or sawcut during demolition, installation, or maintenance, all resulting sawdust and debris shall be promptly contained and removed.

# Responsibilities for Use of Coatings, Construction and Repair of Bulkheads and Over-water Structures

- 1. Coatings and sealants shall be composed of products that are inert after they have cured and dried. Fusion Bonded Epoxy, HDPE, and polyurea products are recommended. No coal tar-based sealants shall be used unless they are themselves coated or wrapped with an inert product to isolate them from the marine environment.
- 2. Installation and application of epoxy, resin, or cementitious grout/fill shall be conducted when predicted weather and ocean conditions allow effective control and full containment and the material will remain dry until cured, in order to prevent any leaching of uncured treatment materials into coastal waters. It is preferable to perform the work in dry conditions (low tide) or off-site in a controlled-environment manufacturing facility wherever feasible.
- 3. Preparation of corroded concrete by chipping, v-notching, or demolition shall be conducted while using a wet vacuum or similar technique so that any debris, dust, and fine particles are collected and disposed of in a location where they will not enter coastal waters. Dip nets shall be on-site and used to retrieve debris if it accidentally falls into the water.
- 4. Methods to contain any leaks or spills of treatment materials during application shall be planned in advance, and any necessary equipment or supplies shall be readily accessible on-site. Any leaks or spills of anticorrosion coatings, epoxy fillers, and waterproofing sealants shall be immediately cleaned up.
- 5. All pressure-injection and gravity-feed applications of epoxy, resin, or cementitious materials shall be visually monitored closely to ensure that these materials do not leak or spill into coastal waters during application.
- 6. Coatings and waterproofing sealants used in the field shall be carefully applied by brush or roller to limit application to the immediate surfaces intended for protection, and to prevent drips or spills into coastal waters.
- 7. All anti-corrosion coatings, epoxy fillers, and waterproofing sealants shall be properly stored and contained so that these products will not leak, spill, or otherwise enter the coastal environment.
- Piles installations shall prioritize driven or hammered methods with soft-start wood cushion block, in order to minimize water quality impacts. Pile driving shall use a soft-start/ramping up BMP with hammer strikes that begin at approximately 40 to 60 percent energy levels with no less than a one-minute interval between each strike for a five-minute period.
- 9. Removal of existing piles shall observe the following conditions, where applicable:
  - a. Work shall occur during favorable tidal, ocean, and weather conditions that will enhance the ability to remove, to the maximum extent, the full length of the pile to the maximum extent feasible and any associated debris generated during demolition.
  - b. Piles and debris shall be placed directly into a vessel/container suitable for transport off-site.
  - c. Degraded pile sections that cannot be recovered from the substrate shall be cut at the deepest feasible elevation to maximize partial-retrieval.
  - d. All used piles and debris shall be removed to an offsite, authorized disposal site. Sediment adhered to the removed pile shall be removed from coastal waters.



#### Seabird Risk Mitigation

- 1. Biologist Responsibilities Before Major Maintenance Work:
  - a. Major maintenance work is defined as any repair or maintenance activity that involves on site pile driving, jack hammers, or removal of the Wharf's deck surface. All work not within this definition is minor maintenance work.
  - b. For work that would occur from February 15 through September 1, pre-construction surveys will be completed by a qualified biologist with experience in observing seabird reproductive and nesting behavior, to identify displays of nesting behavior and/or active nests (i.e., as occupied by eggs or nestlings) along the wharf including surfaces both above the deck (e.g., rooftops for gulls) and below the deck (e.g., substructures viewed from the water).
  - c. Biologist to identify active nests of protected bird species and required buffer zones on a monthly basis within no more than 7 days prior to major maintenance work.
  - d. Biologist, in consultation with Construction Coordinator, may focus surveys to identify Wharf areas where major maintenance work is most viable given biological restrictions. Surveys will include any structure within at least 150 feet of the work area.
  - e. Maps identifying the location of active nests will include the date of survey and nest stage (e.g., egg, nestling), bird type, and will clearly delineate the 100-ft Western Gull buffer zone and 150-ft Pigeon Guillemot buffer zones to inform City work plans for maintenance and repair activities.
- 2. Biologist Responsibilities Before Minor Maintenance Work:
  - a. 10-ft minor maintenance buffer zones would be delineated on maps completed for major maintenance work.
- 3. Work Crew Requirements for Major Maintenance Work:
  - a. As much as possible, major maintenance work will occur outside of bird nesting season (February 15 to September1)
  - b. Work crew may work up to 100-ft from active Western Gull nests and 150-ft from active Pigeon Guillemot nests for up to 4 hours each day for three consecutive days each week if blinds are installed or solid deck structures are between workers and occupied nests.
  - c. Major maintenance work further than 100-ft from active Western Gull nests and 150-ft from active Pigeon Guillemot nests shall have no work hours per day or days per week restrictions.
  - d. Major maintenance work within 100-ft from active Western Gull nests and 150-ft from active Pigeon Guillemot nests is prohibited unless approved by CCC staff in consultation with City biologist.
  - e. Work must cease immediately, the work area must be secured, and work crews leave the work area within 30 minutes if nesting birds show signs of distress (e.g., parents flush from the nest and do not readily return as activities continue, and/or anxious warning calls).
  - f. Work crews must report to the Construction Coordinator any disturbance that requires a work stoppage and may return the next day with biologist recommended modified work methods that reduce disturbances
  - g. Work crews are required to report any suspected new active nests to Construction Coordinator.
- 4. Work Crew Requirements for Minor Maintenance Work:
  - a. Minor maintenance work is any work not listed within the definition of major maintenance work.
  - b. Work crews may complete minor maintenance work at a distance of 25 feet or more from an active bird nest.
  - c. Work crews may complete minor maintenance work at a distance of 10 to 25 feet from active bird nests when the nesting birds cannot be seen from the vantage point of the worker (nesting below deck, on roof, or when solid wharf structures or bird blinds are between workers and occupied nests to dampen sound and minimize visual disturbance).
  - d. Work within 10 feet of an active nest is prohibited unless approved by CCC staff in consultation with City biologist.

- e. Work must cease immediately, the work area must be secured, and work crews leave the work area within 30 minutes if nesting birds show signs of distress (e.g., parents flush from the nest and do not readily return as activities continue, and/or anxious warning calls).
- f. Work crews must report to the Construction Coordinator any disturbance that requires a work stoppage and may return the next day with biologist recommended modified work methods to reduce disturbances.
- g. Work crews are required to report any suspected new active nests to Construction Coordinator.
- h. Work must cease immediately, the work area must be secured, and work crews leave the work area within 30 minutes if nesting birds show signs of distress (e.g., parents flush from the nest and do not readily return as activities continue, and/or anxious warning calls).
- i. Work crews must report to the Construction Coordinator any disturbance that requires a work stoppage and may return the next day with biologist recommended modified work methods that reduce disturbances.
- j. Work crews are required to report any suspected new active nests to Construction Coordinator.
- 5. Construction Management Reporting Activities:
  - Construction Coordinator will compile an annual Wharf Maintenance Monitoring Report by June 30th to include:
    - a. All biological monitoring reports and maps.
    - b. Any reports of complaints and the investigation of these complaints.
    - c. Any reports of work stoppages related to work crew biological monitoring.
    - d. A visual post-winter inspection report of any pilings installed, including damage report to piles or coating and repairs needed or made.

#### Marine Mammal and Sea Turtle Risk Mitigation

- 1. Pursuant of consultation with NMFS and acoustic monitoring, an in-water shutdown zone of 60 meters will be applied to all cetaceans, sea otters, and sea turtles. Pile driving activities will cease if a cetacean, sea otter, or sea turtle enters the 60-meter exclusion zone.
- 2. Consistent with consultation with NMFS, harassment of harbor seals and sea lions is not anticipated due to their tolerance of the loud ambient noise in the area, and past observations from previous repair work that showed no signs of disturbance. Additionally, pile driving will only occur sporadically throughout the year on an as needed basis with a maximum of two piles being driven in a day. The City proposes a 30-meter monitoring zone for pinnipeds.
- 3. Biologist Responsibilities:
  - a. Biologist, in cooperation with Construction Coordinator, to provide annual work crew training to coincide with annual biological survey prior to major maintenance work to address any potential issues not specifically covered in the CCC approved construction plan.
  - b. Biologist to prepare or approve work crew biological orientation training presentation and summary handout for use during tailgate meetings.
  - c. Biologist's annual on-site orientation to identify cetaceans, sea turtles, sea otters, harbor seals, and sea lions, to describe biological Best Management Practices identified in the Construction Plan, to outline required actions should ESA-listed species approach the work area, train work crews as biological monitors during maintenance work, and answer work crew questions. Orientation may be recorded for future use.
  - d. The trained biological monitor shall have the appropriate safety and monitoring equipment adequate to conduct his or her activities
  - e. During pile driving activities, the trained biological monitor will monitor a 30-meter zone for harbor seals and sea lion and the 60-meter exclusion zone for cetaceans, sea otters, and sea turtles.
  - f. If the normal commotion of preparing the work site for the day's pile driving does not cause the resident pinnipeds (i.e. seals and sea lions) to disperse away from the 30-meter monitoring zone, the trained biological monitor will record this in the required logs.
  - g. If pinnipeds remain within the vicinity of pile driving activities upon completion of soft-start pile driving activities, regular pile driving activities may proceed as long as the pinnipeds do not

exhibit any observable signs of injury or distress. If one or more pinnipeds appear injured or distressed, the trained biological monitor shall direct pile driving activities to cease and shall immediately notify the construction coordinator for further assistance and guidance.

- h. If cetaceans, sea otters, or sea turtles enter the 60-meter exclusion zone, the biological monitor will call for a work stoppage until the animal leaves the exclusion zone or is not observed within the exclusion zone for at least 30 minutes.
- 4. Work Crew Requirements for Pile Driving:
  - a. Noise associated with project activities shall be reduced or minimized to the extent feasible. In addition, all non-critical vehicle-related noise shall be avoided
  - b. A soft-start procedure will be used for impact pile driving at the beginning of each day's pile driving or any time pile driving has ceased for more than 1 hour to allow marine mammals to retreat from the work area.
  - c. The soft start requires an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent 3 strike sets.
  - d. A cushion block will be used between the pile cap and the impact hammer. Layers of heavy plywood or baywood soaked in water on top of the pile cap served to dampen the sound of the hammer striking the wood as well as to dissipate friction; plywood not soaked in water was pounded to charred splinters that became very thin and had little value in attenuating sound.
  - e. The first piles to be driven will be located as far as possible from any hauled out sea lions.
  - f. Work crews are required to report each cetacean, sea otter, or sea turtle that approaches the exclusion zone to the trained biological monitor. Information will include: date, time of day, weather, work activity, distance from work area, any other human activity taking place at the time of approach/disturbance, type and size of animal.
  - g. Work crews must cease pile driving if a cetacean, sea otter, or sea turtle enters the 60- meter shutdown zone around the work area.
  - h. Work crews may restart pile driving activities once the animal is observed to leave the 60-meter shutdown zone, or is not observed within it for at least 30 minutes using the same soft-start procedure described above.
  - i. If the shutdown zone is not entirely visible (e.g., due to darkness, fog, etc.), pile driving shall not commence or proceed (if it is underway) until visual conditions have improved.
  - j. If harbor seals or sea lions appear injured or distressed within the 30-meter monitoring zone, work crews must cease pile driving.





INDEX OF DRAWINGS						
SHEET NO.	SHEET	DRAWING TITLE				
1	C-1	PILE PLAN – BENT 1				
2	C-2	PILE PLAN – BENTS 2–19				
3	C-3	PILE PLAN – BENTS 20–40				
4	C-4	PILE PLAN – BENTS 41–60				
5	C-5	PILE PLAN – BENTS 61–80				
6	C-6	PILE PLAN – BENTS 81–100				
7	C-7	PILE PLAN – BENTS 101–110				
8	C-8	PILE PLAN – BENTS 111–120				
9	C-9	PILE PLAN – BENTS 121–130				
10	C-10	PILE PLAN – BENTS 131–140				
11	C-11	PILE PLAN – BENTS 141–151				
12	C-12	PILE PLAN – BENTS 152–168				
13	C-13	PILE PLAN – BENTS 169–182				

#### NOTES:

1. THESE DRAWINGS ARE BASED UPON UNDERWATER AND ABOVE WATER INSPECTION PERFORMED DURING SEPTEMBER-NOVEMBER 2013 AND MARCH 2014. DETAILS OF THE "SANTA CRUZ WHARF, ENGINEERING REPORT", OCTOBER 2014, MOFFATT & NICHOL.

#### LEGEND:

PILES TO BE REPLACED ARE INDICATED:

- PRIORITY 1 PILE IN ACCESSIBLE AREA, SHOULD BE REPLACED 1ST • 1 (TRIBUTARY SPAN >10')
- 2 PRIORITY 2 PILE IN ACCESSIBLE AREA, SHOULD BE REPLACED 2ND (TRIBUTARY SPAN 8'-9')
- 3 PRIORITY 3 PILE IN ACCESSIBLE AREA, DOES NOT NEED TO BE REPLACED FOR STRUCTURAL CAPACITY (TRIBUTARY SPAN 7' OR LESS)

•XI PILE IN INACCESSIBLE AREA, TO BE REPLACED WHEN POSSIBLE

PILE CAPS WITH EXCESSIVE SPAN ARE INDICATED:

4	FRAME	REPAIR	TO	MISSING	PILES	UNDER	BLDGS	ARE	INDICATED:	
	=							=		

BATTER (SLANTED PILE)

SCALE: 1"=10'

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30 of 61

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32 of 61


33 of 61



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#### NOTES:

- THESE DRAWINGS ARE BASED UPON UNDERWATER AND ABOVE WATER INSPECTION PERFORMED DURING SEPTEMBER-NOVEMBER 2013 AND MARCH 2014. FURTHER DESCRIPTION AND ANALYSIS OF THE INSPECTION RESULTS ARE PRESENTED IN THE "SANTA CRUZ WHARF, ENGINEERING REPORT", OCTOBER 2014, MOFFATT & NICHOL.
- 2. THE DRAWINGS PRIMARILY DESCRIBE AREAS OF DETERIORATION AND RECOMMENDED REPAIRS TO THE WHARF DECK STRUCTURE MADE UP OF THE HORIZONTAL MEMBERS (PILE CAP, STRINGERS AND DECKING) SUPPORTED BY THE WHARF PILES. PILES TO BE REPLACED ARE SHOWN ON DRAWINGS C-1 THROUGH C-13 (SUBMITTED SEPERATELY). DETAILS FOR REPAIRS TO PILES, WHERE REPLACEMENT IS NOT POSSIBLE OR AS AN ALTERNATIVE TO REPLACEMENT, ARE SHOWN ON DRAWING C-44.
- 3. THE INFORMATION ON THE VARIOUS GROUPS OF DRAWINGS ARE AS FOLLOWS:

C21-33 DECK PLANS (SHOWS LOCATION OF DETERIORATION DESCRIBED IN THE REPAIR NOTES)

C34-35 REPAIR NOTES (DETAIL DESCRIPTION OF DETERIORATION SHOWN ON PLANS)

C41-42 SECTIONS (REPRESENTATIVE SECTIONS OF THE MAJOR WHARF AREAS AND IDENTIFICATION OF OVERALL TREND OF DETERIORATION NOTED IN THOSE AREAS)

C43-44 TYPICAL FRAMING AND REPAIRS (DETAIL DESCRIPTION OF REPAIRS TO DETERIORATED STRUCTURAL MEMBERS IDENTIFIED ON PLANS AND NOTES.

- 4. AREAS OF DETERIORATION ARE BASED UPON VISUAL OBSERVATION AND PROBING TO IDENTIFY SOFT AREAS OF ROT AND FUNGAL DECAY. THE AREA OF EXTENT SHOWN IS APPROXIMATE AND SHOULD BE CONFIRMED UPON REMOVAL, PARTICULARLY FOR AREAS OF DECK PLANK AND TOPS OF STRINGERS AND CAPS THAT ARE COVERED.
- 5. UNDER DECK UTILITIES ARE SHOWN ON THE DRAWINGS FOR THE PURPOSE OF ORIENTATION UNDER THE WHARF TO ASSIST IN LOCATION.
- 6. PILES IN A BENT ARE COUNTED FROM THE WEST SIDE OF THE WHARF, UNLESS CALLED OUT OTHERWISE. PILE BENTS ARE THE ROWS OF PILES TRANSVERSE TO THE LONG AXIS OF THE WHARF AS COUNTED FROM THE SHORE. E.G. PILE 7 BENT 45 WOULD BE THE 7TH PILE FROM THE WEST SIDE OF THE WHARF, ON THE 45TH ROW OF PILES COUNTED FROM THE ENTRANCE TO THE WHARF AT BEACH STREET.
- 7. REPAIR PRIORITIES ARE AS FOLLOWS:

1-HIGH, REPAIR NEEDED TO A PRIMARY MEMBER WITH ADVANCED DETERIORATION AND LITTLE REDUNDANCY. SHOULD BE PERFORMED WITHIN THE NEXT 1 YEAR.

 $2-\mbox{MEDIUM},$  REPAIR TO A MEMBER WITH MODERATE DETERIORATION, ADJACENT TO OTHER LOAD BEARING MEMBERS. SHOULD BE REPAIRED IN THE NEXT 3-5 YEARS.

 $3{-}\mathsf{LOW},$  AREA SHOULD BE MONITORED AND REPAIRED WHEN THE AREA IS ACCESSIBLE AS PART OF OTHER WORK OR ROUTINE MAINTENANCE.

AREA OF DETERIORATION (SEE DWGS C-34 & C-35 FOR CORRESPONDING REPAIR NOTES

DOUBLE CAP

TRIPLE CAP

UNSUPPORTED CAP SPLICE



ANTA CRUZ WHARF ECK REPAIR PLANS DECK PLAN - BENT 1 3-18-1081 (Santá Cruz Wharf Repair and Maintenance Program)

43 of 61





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53 of 61



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				DAMAGE			
DWG	NOTE NO.	BENT	CAP	STRINGER	DECKDAWAGE	ACTION	PRORITY
26	11	95			BTWN 95-96, WESTWARD BEYOND 10 FROME SIDE IS ROTTEN AND SOFT	R	2
26	12	96	SPLIT CAP			M	3
26	13	97	WEST SIDE NR PILE 4, ROTTEN			R	2
26	14	98	SPLIT CAP AT PILE 9			M	3
<mark>26</mark>	15	<b>99</b>			ROTTING ON WEST SIDE, LEAK BTWN 99- 100	R	2
26	16	100			ROT AT DRAIN LINE WEST SIDE	R	2
27	1	101	CRACK IN UPPER CAPAT PILE 16-17			M	3
27	2	101	CAPDISCOLORATION AT PILE 8-9			M	3
27	3	102			BTWN 102-108, EAST SIDE DECKING - WHITE ROT;	R	2
27	4	102			BTWN 102-103 ROT AT DRAIN NEAR WEST SIDE PILE 3	R	2
27	5	108	SOFT CAP AROUND MID-BENT			M	3
27	6	108			EAST SIDE DECKING - WHITE ROT;	R	2
27	7	108			ROT AT DRAIN NEAR WEST SIDE PILE 3	R	2
27	8	104	CAP DAVAGED DUE TO FIRE BTWN PILE 9-13			М	2
27	9	104		EDGE STRINGER ROT ON EAST SIDE		R	2
27	10	108	ROT AT CAP TRANSITION AT PILE 8-9			R	1
27	11	108			ROT BTWN 108-109 ON WEST SIDE-LEAK	R	2
28	1	112			ROT ON WEST SIDE BTWN 112-113	R	2
28	2	114		STR ROT WHERE BUILDING STARTS	DECK ROT NEAR BUILDING/SIDEWALK INTERFACE	R	1
28	3	118		118-119, ROT AT 2ND PILE IN ON WEST	118-119, ROT AT 2ND PILE IN ON WEST	R	2
28	4	119		LOTS OF MOSS ON EAST SIDE	LOTS OF MOSS ON EAST SIDE	M	3
28	5	120		CRUSHED UNDER PARKING		R	1
28	6	120		LOTS OF MOSS ON WEST SIDE	LOTS OF MOSS ON WEST SIDE	M	3
29	1	121		SPLIT STR, 3RD ON IN FROMWEST		R	2
29	2	122			DECKING LOOKS BAD AT BUILDING INTERFACE	М	2

1. ACTION TO BE TAKEN:

M-MONITOR. NO IMMEDIATE ACTION REQUIRED. OBSERVE AREA FOR FURTHER DETERIORATION. FOR EXAMPLE: CAP SPLITS AT THE ENDS FROM BOLTS DO NOT NEED REPLACEMENT AS LONG AS THE EXPOSED INTERIOR TIMBER IS SOUND, IF SPLIT COULD EXPOSE INTERIOR TO ROT OVER TIME AND SHOULD BE MONITORED.

R-REPAIR/REPLACE AS SHOWN ON DWGS C-43/44.

2. REPAIR PRIORITIES ARE AS FOLLOWS:

1-HIGH, REPAIR NEEDED TO A PRIMARY MEMBER WITH ADVANCED DETERIORATION AND LITTLE REDUNDANCY. SHOULD BE PERFORMED WITHIN THE NEXT 1 YEAR.

2-MEDIUM, REPAIR TO A MEMBER WITH MODERATE DETERIORATION, ADJACENT TO OTHER LOAD BEARING MEMBERS. SHOULD BE REPAIRED IN THE NEXT 3-5 YEARS.

3-LOW, AREA SHOULD BE MONITORED AND REPAIRED WHEN THE AREA IS ACCESSIBLE AS PART OF OTHER WORK OR ROUTINE MAINTENANCE.

SANTA CRUZ WHARF **DECK REPAIR PLANS** REPAIR NOTES 1 OF 2 3-18-108

SANT.	CITY OF
	Santa Cruz
	PUBLIC WORKS DEPARTMENT
	809 Center Street, Room 201
C / F O R	Santa Cruz, CA 95060

SANTA CRUZ

	REVISIONS

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					DAMAGE			
DWG	NOTE NO.	BENT	2	CAP	STRINGER	DECK DAMAGE	ACTION	PRIORITY
29	3	125		CRACKINSPLICE			R	1
29	4	126			SPLITS NEAR EAST SIDE		R	2
29	5	127			CRACKED STR BTWN 127-128		R	1
	1348	4.000			EAST SIDE OF ROAD (4TH FROM		-	
29	6	128			ROAD), SPLIT		к	1
29	7	129		CAP NEAR START OF LEDGERS HAS BLACK, ROT			M	2
29	8	129			STRINGER NEAR JUNCTION BOX IS BAD		R	1
29	9	130		CAP ON 120 NEAR START OF LEDGERS IRREGULAR			М	3
30	1	138				MOSS GROWTH DETERIORATION	M	3
30	2	134			SPLIT 6X12		R	1
30	3	135		CAP SPUT AT SPLICE PILES 33-34			М	2
30	4	135			STRINGER SPLIT 4-5'IN FROM ROAD		R	1
30	5	136		CAP SPUT AT SPLICE PILE 38			M	2
30	6	136		CAP ON 136 NEAR LEDGER START LOOKS ROTTED			М	2
30	7	135			SPLITSTRINGER 4-5'EASTOF ROADWAY		R	1
30	8	138	WEST	CRACKED CAP SPLICE PILES 11- 12			М	2
30	9	138	EAST		SPLITSTRINGER 4-5'EAST OF		R	1
ব	1	140	FAST	SPUT ON FASTEND CAP			B	2
						DECKING AND FRAMING BELOW		
31	2	141	WEST			PUMP STATION ROTTEN THROUGH AND FALLING OFF	М	1
31	3	144	A		STR AND DECKING BAD BTWN 144A- 145A AT BATTER PILE		R	2
31	4	150			BROKEN ON EAST SIDE (BTWN 150- 151)		R	1
32	1	155				LEAK	R	2
32	2	157				LEAK	R	2
32	3	163		CRACK NEAR PILE 11-12			R	2
32	4	165			ROT ON ESIDE 165-166	ROTON ESIDE 165-166	R	2
32	5	166				HOLE ON E BWTN 166-167	R	2
33	1	170			ROT UNDER BUILDING BTWN 170-171	ROT UNDER BUILDING BTWN 170- 171	R	2
38	2	171		ROT AROUND PILE 5-8			R	2
33	3	171				ROT ABOUT MIDBENT UNDER DRAIN BTWN 171-172	R	2
33	4	174				TO THE WEST OF WELL THERE IS A LEAK AND SOME ROT (BTWN 174- 175)	R	2
33	5	175			ROT AROUND AND ON WOF OPEN WELLAREA BTWN 175-176	ROTAROUND AND ON W OF OPEN WELL AREA BTWN 175-176	R	2

PUBLIC WORKS DEPARTMENT 809 Center Street, Room 201 Santa Cruz, CA 95060		
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	REVISIONS

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Santa Cruz, CA 95060

18.9' PARK

≨

WATER

- 8.1' WALK

25.5' ROAD

16.6' WALK

+20-

+10-

\_10—

NO LEDGERS UNDER

STAGNAROS -

39.2' BUILDING

WALK

GRAV

PARK

25.0' BUILDING

8.8' WALK

SS

+20—

+10-

0-⊻

\_10-

LEDGERS



#### NOTES:







1. THESE DETAILS SHOW TYPICAL FRAMING MEMBER SIZES AND CONNECTIONS OF THE PRIMARY STRUCTURAL MEMBERS ON SANTA CRUZ WHARF. SPACING OF STRINGERS (DECK BEAMS) VARIES IN ROAD, PARKING, WALKWAY AND BENEATH BUILDINGS.

2. REPAIRS AND REPLACEMENTS AT SPECIFIC LOCATIONS SHOULD BE PERFORMED TO GENERAL CONFORMANCE TO THESE DETAILS

3. UNSUPPORTED CAP SPLICES (NO PILE BENEATH THE LOWER CAP) PROVIDE STRUCTURAL CAPACITY IF BOLTED AS SHOWN ON THE DETAIL. SEE ALSO SECTION 2.3 OF THE ENGINEERING REPORT.

60 of 61



#### Marine Mammal Disturbance training outline for Santa Cruz Wharf repairs.

- Project overview
  - o Source level and attenuation
  - o Level B marine mammal thresholds for sound source
  - Source level testing to ground truth
  - Potential changes to training plan if testing shows sound attenuation will exceed threshold at a certain distance.
- > Marine mammals and sea turtles you may encounter under or near the wharf
  - o Seals, sea lions, otters, and 4 sea turtle species
  - Distinguishing characteristics and behaviors of each species
  - Likelihood of each species being in the work area
- What is take and harassment under the MMPA
  - o Level A and Level B harassment
  - No take is allowed
- Sea otters are an endangered species and covered by section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C 1531 et seq.)
  - Rely on fur for warmth, must be kept clean to be waterproof
    - oil would cause fur to lose its capability to be waterproof
  - o Very intelligent and may approach just out of curiosity
  - Can remain underwater unseen for several minutes
  - Have excellent hearing and vision
  - May try to forage in area by getting barnacles and other prey items off pilings
  - o Mothers with pups are especially susceptible to being disturbed
- Other ESA- listed marine mammals and turtles that may pass offshore (exclusion zone of 60 meters during pile driving).
  - Southern Resident DPS killer whale
  - Humpback whales
  - o Gray whales
  - o Blue whale
  - Leatherback sea turtle
  - o Green sea turtle
  - o Sei whale
- Monitoring requirements
  - o Must start one half hour before construction activity begins
  - o Must continue for one half hour after construction completion for the day
  - o Exclusion zones
    - Work must stop whenever a ESA protected marine mammal or turtle is within an exclusion zone defined as follows:
      - Minimum of 49 feet at all times for otters during in-water work or work within 100 feet of tidal waters.

Fin whale

Sperm Whale

North Pacific Right whale

Guadalupe fur seal

Loggerhead sea turtle

Olive Ridley sea turtle

• 60 meters during pile driving for otters

- 60 meters for all other marine mammal and sea turtle species listed above (160db)
  - Last section of wharf is about 180 meters
- Pile driving or extraction will not commence (or re-commence following a shutdown) until marine mammals and sea turtles have not been sighted within their respective exclusion zone for a 15-minute period.
- o Monitoring zone for harbor seals and sea lions
  - During pile driving activities, the trained biological monitor will monitor a 30meter zone for harbor seals and sea lions. If the normal commotion of preparing the work site for the day's pile driving does not cause the resident pinnipeds (i.e. seals and sea lions) to disperse away from the 30-meter monitoring zone, the trained biological monitor will record this in the required logs. If harbor seals or sea lions appear injured or distressed within the 30-meter monitoring zone, work crews must cease pile driving.
- Reporting requirements:
  - If any injury or disturbance to any marine mammal appears to have occurred as a result of project activities, activities should cease and NMFS should be contacted before proceeding further. All endangered species disturbances (takes) must be recorded and reported to USFWS (otters) or NMFS (all others) as appropriate.
  - In the unlikely event of an injury or death of a marine mammal due to this project, please immediately contact our regional stranding coordinator, Justin Viezbicke, at (562) 980-3230.

### **CALIFORNIA COASTAL COMMISSION**

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# MEMORANDUM

FROM:	Lauren Garske-Garcia, PhD, Ecologist
то:	Alexandra McCoy, Central Coast District Analyst Susan Craig, Central Coast District Manager Dan Carl, Deputy Director
SUBJECT:	Santa Cruz Wharf Programmatic Maintenance and Repair Project (CDP 3-18-1081): Nesting Seabirds
DATE:	August 24, 2021

The Central Coast District has been working with the City of Santa Cruz for several years on a long-term plan to conduct maintenance and repair of the wharf's main structural components. The five-year plan would conduct much-needed repair work, including replacing approximately 200 degraded pier pilings, associated heavy structural wooden support beams, and minor structural hardware under the wharf surface as well as minor maintenance on the surface level of the century-old wharf. Two species of seabirds - western gulls (Larus occidentalis) and pigeon guillemots (Cepphus columba) - are known to regularly use the wharf for nesting, and a third, brown pelicans (Pelecanus occidentalis), may as well; most bird species, including all three of these, are considered sensitive during their reproductive life history phases. Wharf maintenance and repair activities have the potential to significantly disturb nesting seabirds and affect nestling survivorship. Since 2019, I have been advising on precautions necessary to ensure that nesting seabirds at the wharf are not significantly affected by the ongoing maintenance and repair activities. There have been discussions recognizing that the unique nature of the wharf environment itself is unlike typical seabird nesting sites and therefore warrants special consideration, and the City has continually expressed concern that protections for the nesting seabirds impose conflicts with the needed wharf maintenance and repair. This memo is intended to summarize relevant attributes of the subject species, reiterate the available mechanisms to City staff for proceeding with operations in a timely manner while still observing protections for nesting seabirds, and a series of specific avoidance and minimization measures recommended along with the technical rationale supporting these.

### **S**PECIES

Of the three nesting or potentially nesting seabird species at the Santa Cruz Wharf, pigeon guillemots raise the greatest concern because their nests have been regularly observed and documented along the length of the wharf. Pigeon guillemots nest in protected rock cavities, cliff burrows, artificial nest boxes, and within man-made structures such as the underside and inner cavities of piers, as they do at the wharf. The inconspicuous nature of their nests make detection challenging for untrained personnel and often requires careful observation for

behavioral cues that indicate nest location and status (*e.g.*, active versus fledged). At the wharf, this work would necessarily be done from the water via kayak or a small skiff. Pigeon guillemots begin to arrive at the wharf in March and peak around late May along this part of the coast; once eggs are laid, the estimated time from incubation to full-fledging is on the order of 60-70 days. The species is not particularly well understood or documented in the scientific literature but their breeding ecology at Alcatraz Island in San Francisco Bay was the subject of a 2016 graduate thesis and prompted further consultation with the author on site-specific issues (discussed below).<sup>1</sup>

Western gulls are a familiar presence throughout the California coast and are generally unphased by human activities, even at close proximity; they occur at the wharf year-round. When nesting, they become protective of their vulnerable offspring if approached. Western gulls are typically colonial nesters and make use of the ground and rocky ledges in natural settings; along the wharf, gulls reportedly nest in clusters on the rooftops of the various buildings. Nesting activity appears to be coincident with the pigeon guillemots; once eggs are laid, the estimated time from incubation to full-fledging for western gulls is on the order of 50-80 days.

Populations of brown pelicans in the western states were once listed as federally endangered although recovery efforts culminated in their official delisting in 2008. There are a few anecdotal reports of brown pelicans around the wharf seemingly showing interest and displaying potential nesting behavior; however, actual nest setup has not been directly observed and seems unlikely given that the species typically nests colonially on islands where the birds build their nests on the ground as a four to ten-inch high rim of surrounding soil and other natural materials – the physical setting of the wharf is inconsistent with being able to support such pit-like nesting. Brown pelicans have been previously observed at the wharf in June and July surveys. Generally, the estimated time from egg incubation to full-fledging is on the order of 100-120 days.

## **TYPICAL RESTRICTIONS**

Typically, the Commission either requires complete avoidance of the general bird nesting season (February 1<sup>st</sup> through August 31<sup>st</sup>) or when complete avoidance is infeasible, affords standard buffers for active nests of either 500-feet (for raptor species) or 300-feet (for other species) throughout the nesting season. These distances are based on a combination of published scientific literature and a cumulative professional experience among regulatory agencies. In some cases, they are arguably still less than ideal but they are generally consistent across Commission decisions and with the recommendations from our agency partners at the US Fish and Wildlife Service and the California Department of Fish and Wildlife. At times, we have adjusted distance requirements in either direction depending on the nature of work being done and/or the specific environment or species ecology; however, when reducing buffers, we have still required measures to dampen the effects of sound, limit visibility of human activities relative to active nests, *etc*.

# SITE-SPECIFIC CONSIDERATIONS

Provided the magnitude of maintenance and repairs that do need to occur at the wharf, and the challenges presented with conducting some of these activities during inclement weather and rough oceanographic conditions, we recognize that complete avoidance of the bird nesting season is infeasible. Therefore, I am

<sup>&</sup>lt;sup>1</sup> Seher, VL. 2016. Breeding Ecology of Pigeon Guillemots (*Cepphus columba*) on Alcatraz Island, California. Master's Thesis, San Francisco State University.

recommending pre-construction surveys to identify any active nests within or adjacent to the planned work areas and application of a standard 300-ft buffer to any such nests during maintenance and repair activities. Additionally, in recognition of the more focused nesting season for these species in this region, I am recommending an adjustment so that these surveys and buffers need only apply from March 15<sup>th</sup> through August 15<sup>th</sup>. This should alleviate some of the burden to the City by extending the unrestricted work period by two months annually while also avoiding the subject species' sensitive periods.

The City has contended that the wharf environment is already abnormally loud and particularly busy during the nesting season and that any seabirds that select nest sites there are undisturbed by, or habituated to, the normal course of business such that the recommended precautions are unwarranted. While acknowledging that the wharf is likely louder and busier than a typical nesting site<sup>2</sup>, and that a historical record of nesting activity would indicate that it has remained at least somewhat suitable for this purpose. I point out that there has not been any effort to quantify baseline conditions, consider the additional disturbances that maintenance and repair activities would layer on top of ambient conditions, or investigation of the different activities' effects on breeding and nesting success. Thus, it would be a very significant assumption, without technical basis, to deviate from our standard approach for most of the proposed activities. Were sufficient data available, the assembly, synthesis, and analysis of disturbance associated with proposed activity types (including nature, intensity, and duration), the documented presence and response of nesting seabirds, and the success of nestlings themselves could potentially be used to inform adjustments to the standard buffer recommendation; unfortunately, we have not received any indication that such data is available to work with. Similarly, I have suggested to the City and their biological consultant that should the City choose to pursue well-designed and technically rigorous studies in the future to address these concerns, compelling information yielded from such efforts would be welcomed and considered, including to potentially support development of a tiered buffering plan at this location. In addition to the suggested data types above, other considerations for such analyses might include quantification of sound dissipation through the wharf's various media (wood, asphalt, etc.) and the potential for use of sound curtains or other barriers to attenuate disturbance types at sensitive receptors (e.g., sound, visual, and vibration cues).

In response to the City's insistence that the standard buffers would essentially eliminate their ability to do any necessary maintenance and repair work, we have made a number of observations regarding the perceived constraints versus the flexibility we believe already exists. First, work can be targeted inasmuch as possible to avoid the now-narrowed nesting season and even continue strategically into the shoulder periods before seabirds begin to nest; in fact, significant maintenance and repair work may deter seabirds from even setting up near active work areas. Moreover, the City has previously communicated that they aim to avoid significant work during the tourist season, which coincides with the seabird nesting season, so arguably, major maintenance and repair work would already be limited. Second, simple deterrents could be deployed preemptively to strategically discourage nest setup in areas where work is scheduled (this may be particularly useful for gulls). Third, buffers would be applied to active nests within the work area and 300-ft perimeter, not necessarily to the full length of the approximately 2700-ft wharf; thus, maintenance activities could still proceed in unbuffered areas. In effect, surveys and work could thus be completed on a rolling basis such that some fraction of the wharf might always be available to shift focus to. Any given nest would limit a work area for 50-80 days of the year, leaving the remaining nine to ten months available. Fourth, we could consider continuous behavioral monitoring by a qualified biologist

<sup>&</sup>lt;sup>2</sup> Typically, the Commission requires that noise levels at sensitive receptor sites, such as an active bird nest, be maintained below a 60-65 decibel threshold, which is approximately equivalent to the range between noise produced by an air conditioning unit and that of a normal conversational level.

in combination with the use of reduced buffers to ensure nesting seabirds and their offspring are not being significantly disturbed as activities proceed, though this would presumably add costs for the City. And finally, should true emergency situations arise that would require intrusion on established buffers, that work would still be possible with an emergency permit. During the most recent call I participated in with the City, on December 18, 2019, all of this was discussed yet again. The City there verbally agreed to move forward with the 300-ft buffers and understood our willingness to reevaluate in the future should they be able to produce the needed studies to support further buffer reductions. Our message has been consistent both before that and since.

In January 2020, District staff approached me to inquire about the possibility of a reduced buffer that would be limited to maintenance and repair activities using only hand tools and light power tools, while the 300-ft buffer would still be applied to any major work involving heavy machinery, etc. Although there remains a lack of real data to inform such a reduction, I also recognize and appreciate that in the busy wharf environment, limited and minor work would potentially introduce only negligible to minor disturbances to nesting seabirds relative to the wharf's day-to-day ambient conditions. With this in-mind, I reached out to and consulted with five different seabird experts in the region to better understand the behaviors and sensitivities of nesting pigeon guillemots, specifically.<sup>3</sup> Important insight yielded from the collective expertise included: concurring observations that the species is particularly sensitive to visual threats when nesting, even more so than sound; sensitivity to disturbance seems to be greatest early in the day and decrease significantly by mid-day; that response to disturbance varies dramatically from one nesting pair to the next, making it important to avoid deviations from standard precautions on a widespread basis and instead, to treat individual nests by case; during the incubation stage, eggs need to be continuously tended by parents to ensure needed warmth and protection from predators; that because the birds do not forage at night and are unable to feed chicks then, early feedings each day are crucial for ensuring nestling condition and survival; and, parents tend to return to nests with food for nestlings about once per hour though this varies by individuals – rarely are successful nests left unattended for more than a few hours. When discussing appropriate buffer distances with these individuals, based upon their experience, there was general concurrence among the seabird experts that a 300-ft distance was likely adequate for most activities in the wharf environment. For work activities limited to hand tools and light power tools, there was acknowledgement that this could likely be done in closer proximity and that 50-ft might suffice. Following my consultations with the seabird experts, I proposed and discussed a strategy with the other two Commission ecologists given the precedential nature of this approach and they too have concurred with my approach.

### **RECOMMENDED AVOIDANCE AND MINIMIZATION MEASURES**

Based on the information available, understanding of the City's proposal, and consultations with seabird experts as well as the other Commission ecologists, I recommend the following be incorporated to the City's proposed best management practices/avoidance and minimization measures or our permit requirements as special conditions:

1. Maintenance and repair activities will occur outside the nesting season (March 15<sup>th</sup> through August 15<sup>th</sup>), inasmuch as possible.

<sup>&</sup>lt;sup>3</sup> Specifically, this included seabird biologists: G. McChesney at the United States Fish and Wildlife Service's Farallon Islands National Wildlife Refuge; C. Gibble and L. Henkel at the California Department of Fish and Wildlife's Office of Spill Prevention and Response in Santa Cruz; V. Seher at the National Park Service on Alcatraz Island; and, P. Warzybok at Point Blue Conservation Science.

- 2. For any work that would occur from March 15<sup>th</sup> through August 15<sup>th</sup>, pre-construction surveys will be completed by a qualified biologist with experience in observing seabird reproductive and nesting behavior, to identify displays of nesting behavior and/or active nests (*i.e.* as occupied by eggs or nestlings) along the wharf including surfaces both above the deck (*e.g.*, rooftops for gulls) and below the deck (*e.g.*, substructures viewed from the water).
  - a. Surveys will commence no more than 30 days prior to the initiation of construction and may occur weekly thereafter over the project season, with the last survey occurring no more than 72 hours prior to the start of construction.
  - b. Surveys may be focused on those areas for planned maintenance and repair activities rather than necessarily covering the entire wharf structure, and may be sequenced as needed to address specific work areas and schedules over the course of the nesting season. Surveys will include any structure within at least 300 feet of the work area.
  - c. Maps identifying the location of any active nests detected will be produced, will include the date of survey and nest stage (*e.g.*, egg, nestling), and will clearly delineate 50-ft and 300-ft buffer distances to inform City work plans for maintenance and repair activities.
- 3. Except for minor maintenance and repair efforts limited to the use of hand tools and light power tools (*e.g.*, hand drills but not jackhammers or power saws), a buffer of 300 feet will be applied to each active nest during the nesting season and until the biologist determines the nest has fully fledged.
  - a. When only minor maintenance and repair work will be conducted along the *topside* of the wharf, a buffer of no less than 50 feet will be applied to active nests. Work will not commence prior to 10:00 AM, and will not exceed four (4) hours/day or three (3) consecutive days at a time.
  - b. When only minor maintenance and repair work will be conducted along the underside or substructure of the wharf, the same restrictions as described above in (a) will apply. In addition, if minor work is expected to exceed two (2) hours in duration, blinds will be placed between the active nests and the work area to avoid visually disturbing nesting seabirds. The placement of the blinds will be overseen by the biologist and that individual will observe nest sites and parent behavior over the course of activities, or until they are satisfied that the nesting seabirds will not be significantly disturbed by the work in that area.
  - c. Should minor maintenance and repair work necessarily exceed the four (4) hours/day or three (3) consecutive days at a time threshold established above, the qualified biologist will conduct additional behavioral monitoring to assure that nesting seabirds are not being further impacted by the ongoing activities in close proximity. Once satisfied, the biologist may approve planned activities surrounding the observed nest(s). Under no circumstances will buffers be less than 50 feet or work commence prior to 10:00 AM.
- 4. If under any circumstances either wharf staff or the biologist observe signs of distress (*e.g.*, parents flush from the nest and do not readily return as activities continue, and/or anxious warning calls), work will be stopped immediately and consultation made with the biologist to determine necessary modifications to activities, and Commission staff will be informed. Activities will resume only after the biologist is satisfied that the modifications are sufficient to avoid continued disturbance to the nest(s).
5. Annual monitoring reports will be provided to Coastal Commission staff by December 1<sup>st</sup> of each year, and will include: the maps from each nest survey conducted that year; a brief narrative describing the survey methods and observations of the species' tolerances to noise, vibration, and visual disturbance cues; and, a record of maintenance and repair activities carried out during the nesting season including their location relative to active nests. If any incidents have resulted in a need for further consultation with the project biologist and/or Commission staff, these will also be discussed.