San Mateo County Harbor District
Pillar Point Harbor Johnson Pier Expansion and Dock Replacement Project

Marine Mammal Monitoring Plan

December 6, 2022

San Mateo County Harbor District (SMCHD) is proposing the Pillar Point Harbor (PPH) Johnson Pier Expansion and Dock Replacement Project (the Project). The Project involves replacing existing deteriorated commercial floating docks (Dock D, E, F, G, H, and fuel dock), expanding Johnson Pier to improve the safety of commercial fish handling operations, and completing minor concrete and utility repairs. The Project is located at Pillar Point Harbor in the Community of Princeton, north of Half Moon Bay, San Mateo County, California. The Project occurs within the Pillar Point inner harbor (Action Area) protected by three solid rubble-mound breakwaters. The Pillar Point outer harbor is protected by two additional solid rubble-mound breakwaters.

1. Species of Marina Mammals

Marine mammals with the potential to occur in the Project vicinity are briefly discussed below. For additional species information see the Pillar Point Harbor Johnson Pier Expansion and Dock Replacement Project Incidental Harassment Authorization (IHA) request (M&N 2022).

1.1. Gray Whale

The western North Pacific distinct population segment (DPS) gray whale (*Eschrichtius robustus*) is listed as federally endangered under the Endangered Species Act (ESA). As the Project is within the Pillar Point inner harbor which is contained by three solid rubble-mound breakwaters and positioned within the outer harbor which is contained by two additional solid rubble-mound breakwaters, it is not anticipated that this species will occur in the Project area.

2. Non-ESA-Listed Marine Mammals

2.1. Northern Elephant Seal

The northern elephant seal (*Mirounga angustirostris*) is protected by the Marine Mammal Protection Act (MMPA). Suitable beach habitat for breeding is not present within the Project area, and the species has a low potential to transit and/or forage within Pillar Point Harbor.

2.2. Harbor Porpoise and Common Bottlenose Dolphin

The harbor porpoise (*Phocoena phocoena)* is protected by the MMPA and occurs globally in temperate, subarctic, and arctic coastal and offshore waters. The common bottlenose dolphin (*Tursipos truncates)* is protected by the MMPA and occurs in temperate and tropical waters.

The harbor porpoise and common bottlenose dolphin are unlikely to occur within the Project area due to the breakwaters which separate the harbor from the ocean. Both of these species have a low likelihood to transit or forage within the Project area.

2.3. Harbor Seal

The harbor seal (*Phoca vitulina)* is protected by the MMPA and inhabits temperate coastal habitats along the entire coast of California. Harbor seals were observed within the Project area during the field survey completed for the Project (Rincon 2022) and have been frequently documented within Pillar Point Harbor.

2.4. California Sea Lion

The California sea lion (*Zalophus californianus)* is protected by the MMPA and occurs in the shallow waters of the eastern North Pacific Ocean. California sea lions were observed within the Project area during the field survey (Rincon 2022) and have been frequently documented within Pillar Point Harbor by Pillar Point Operations staff.

3. Estimated Sound Production

Up to 145, 24-inch diameter concrete piles and up to 215, 16-inch diameter concrete or fiberglass piles are proposed to be installed as part of the Project. Piles could be installed with an impact hammer, vibratory hammer, or hydraulic jet. The Project IHA request (M&N 2022) can be referenced for detailed construction methods. Anticipated noise levels for the proposed pile installation methods are summarized in Tables 1 and 2.

Table 1 - Anticipated In-water Equipment Noise (Unattenuated)

Equipment	Noise Level			Measurement Distance
	dB Peak	dBrms	dB SEL	
Impact pile driver (unattenuated, 16-inch concrete or fiberglass pile)[1]	193	168	160	10 meters
Impact pile driver (unattenuated, 24-inch concrete pile)[1]	188	176	166	10 meters
Vibratory driving (unattenuated, 16-inch fiberglass)[2]	N/A	151.6	N/A	49 meters
Vibratory removal (unattenuated, 14-inch concrete or timber pile)[2]	N/A	151.6	N/A	49 meters

[1] Caltrans 2020
[2] Naval Facilities Engineering Systems Command Southwest 2022, based on unattenuated noise levels for vibratory removal of 20-inch concrete piles

Table 2 - Anticipated In-air Equipment Noise (Unattenuated)

Equipment	Noise Level		Measurement Distance
	Lmax	Unweighted dBrms	
Impact pile driver (unattenuated, 16-inch concrete pile or fiberglass)[1]	108	94	15.25 meters
Impact pile driver (unattenuated, 24-inch concrete pile)[2]	115	98	15.25 meters
Vibratory pile driver/extractor (16-inch fiberglass, 14-inch concrete and timber)	94	88	15.25 meters

[1]WSDOT 2020, based on impact installation of 20-inch diameter concrete pile 16-inch diameter not available, fiberglass not available

[2] WSDOT 2020, based on impact installation of 36-inch diameter concrete pile, 24-inch diameter not available, fiberglass not available

[2] WSDOT 2020, based on vibratory installation of 18-inch diameter steel pile, data not available for concrete, fiberglass, or timber

4. Proposed Monitoring and Exclusion Zones

Project related noise would be confined to the inner harbor marina. The proposed monitoring and exclusion zones for marine mammals are based on the calculated zones of influence as defined in the Project IHA request (M&N 2022).

4.1. Grey Whales, Harbor Porpoises, Common Bottlenose Dolphins and Northern Elephant Seals

An exclusion zone for grey whales, harbor porpoises, common bottlenose dolphins, and northern elephant seals would be established to avoid potential noise impacts to these species. This exclusion zone would include the entire inner harbor area during pile driving and removal activities (Figure 1). Take of grey whales, harbor porpoises, common bottlenose dolphins, and northern elephant seals is not proposed.

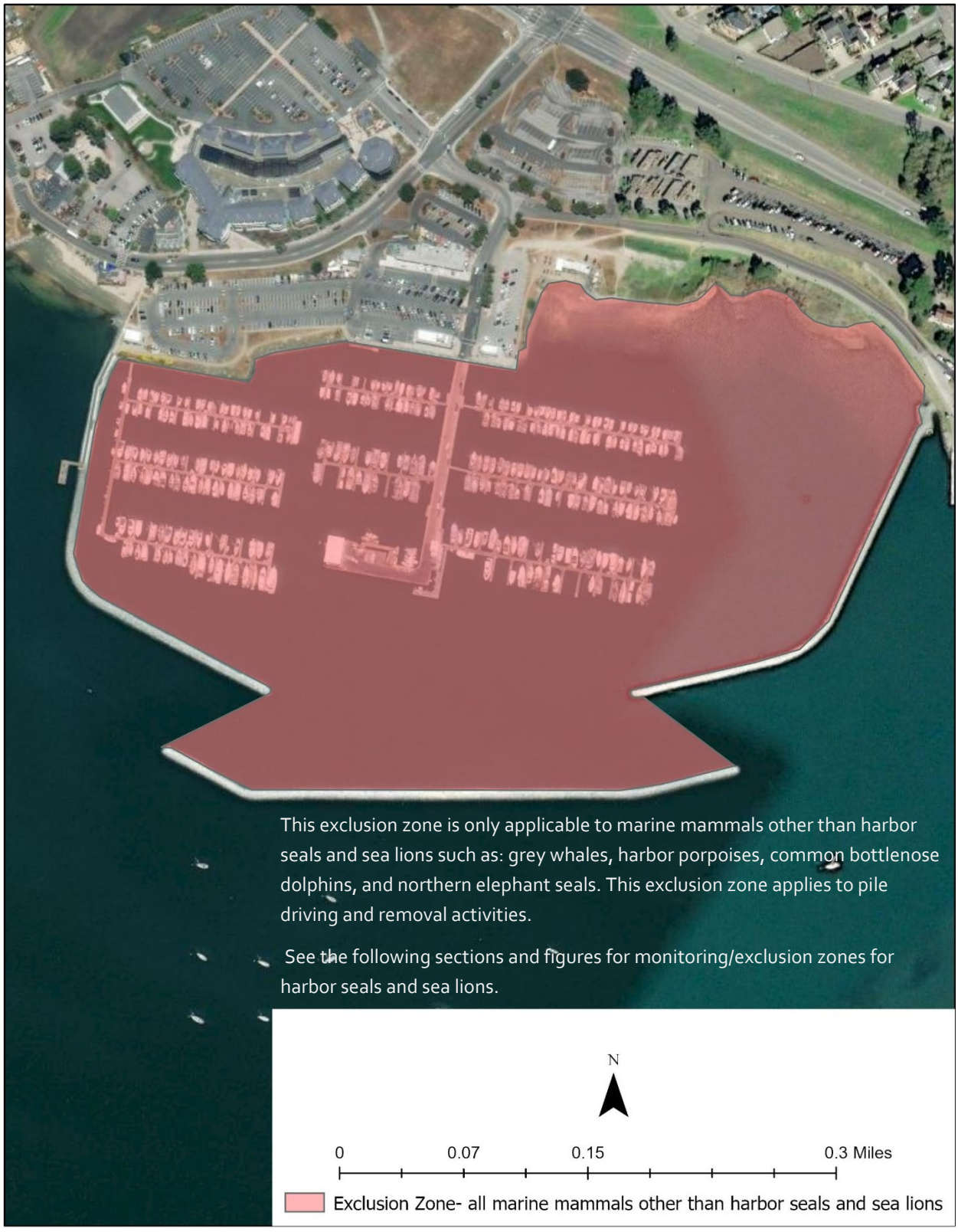

Figure 1 - Proposed Exclusion Zone for Grey Whales, Harbor Porpoises, Common Bottlenose Dolphins, and Northern Elephant Seals

4.2. Harbor Seals and Sea Lions

A combination of exclusion zones and monitoring zones are proposed to minimize potential noise impacts to harbor seals and sea lions. These are summarized below and discussed in additional detail in the Project IHA request (M&N 2022).

The proposed monitoring zones for harbor seals and sea lions are based on the calculated zones of influence summarized in Tables 3 and 4 below. For harbor seals, the Level A take area supersedes the Level B threshold area during installation activities. Therefore, all take of harbor seals will be Level A take during installation. For the purpose of this IHA it has been conservatively assumed that harbor seal Level A take will occur anytime a harbor seal enters the inner harbor area during pile installation (Figure 2). Harbor seal Level A take during removal activities has been conservatively assumed to occur when a harbor seal is identified within 25 meters of the proposed pile removal activities (Figure 3). Harbor seal Level B take during removal activities has been conservatively assumed to occur when a harbor seal enters the inner harbor area during pile removal activities (Figure 3).

Sea lion Level A take during installation activities has been conservatively assumed to occur when a sea lion is identified within 25 meters of the proposed pile driving activities (Figure 2). Sea lion Level B take has been conservatively assumed to occur when a sea lion enters the inner harbor area during pile installation or extraction activities (Figure 2 and Figure 3). The proposed monitoring zones are shown on Figure 2 and 3. Given past observations, the proposed duration of pile driving and removal activities, and the calculated zones of influence, estimated Level A and Level B Take are summarized in Table 5.

In addition to the proposed monitoring zones, a 15.25 meter (50 foot) exclusion zone will be implemented for harbor seals and California sea lions to avoid potential interaction with pile driving equipment (Figures 4 and 5).

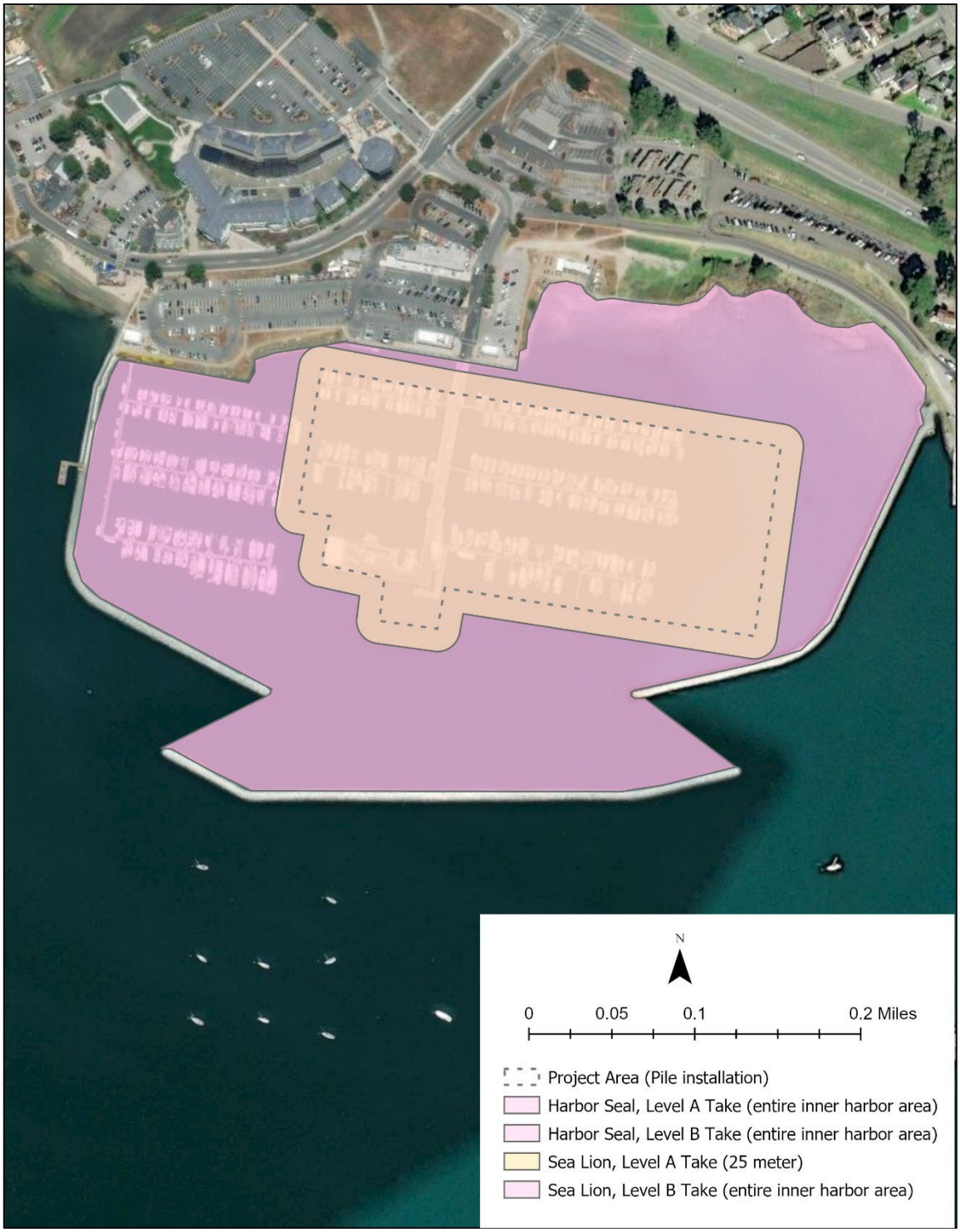

Figure 2 - Proposed Monitoring Zones for Harbor Seals and Sea Lions During Pile Installation

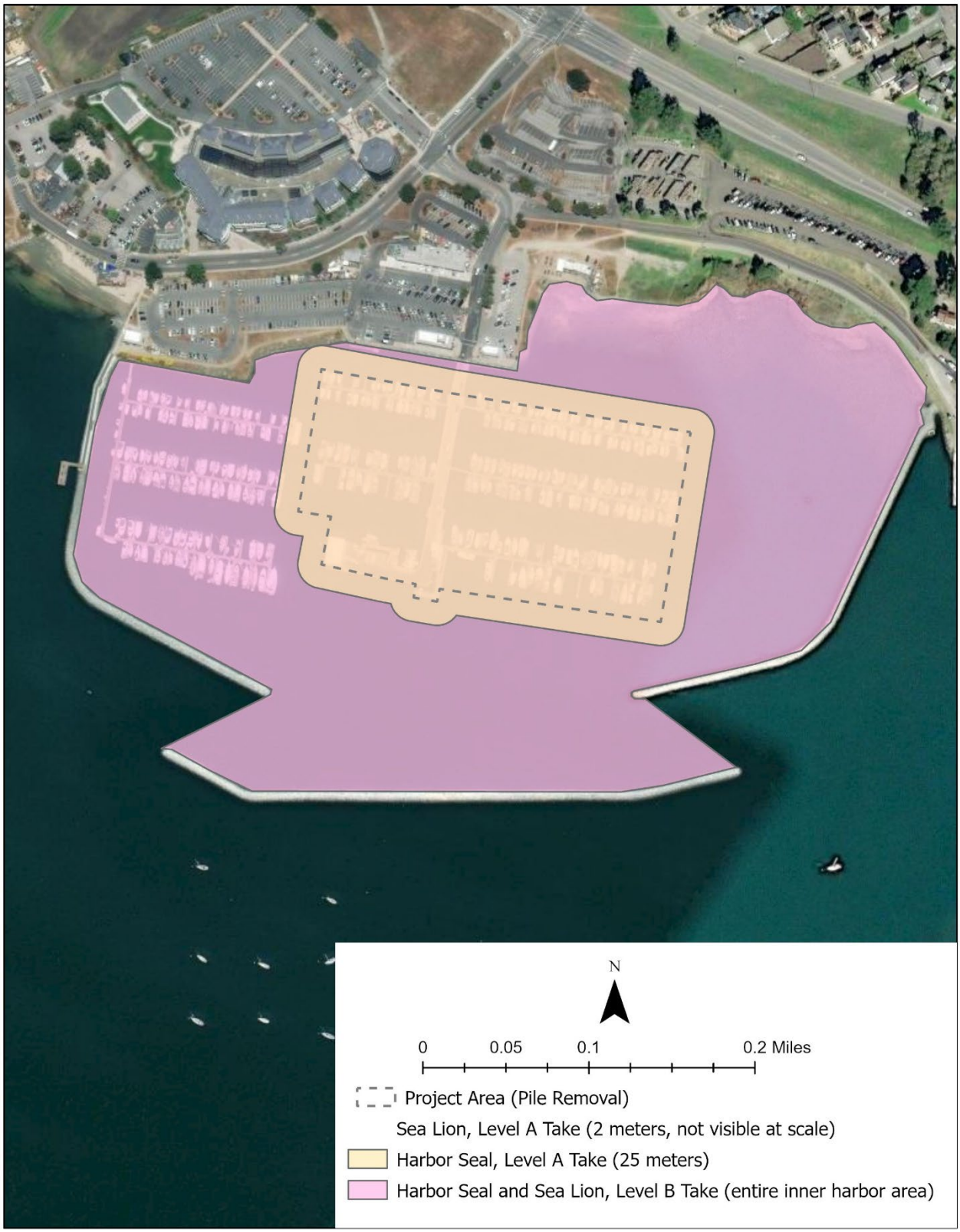

Figure 3 - Proposed Monitoring Zones for Harbor Seals and Sea Lions During Pile Removal

Figure 4 - Proposed Exclusion Zone (15.25 meters [50-foot]) for Harbor Seals and Sea Lions Based on Pile Installation Project Area

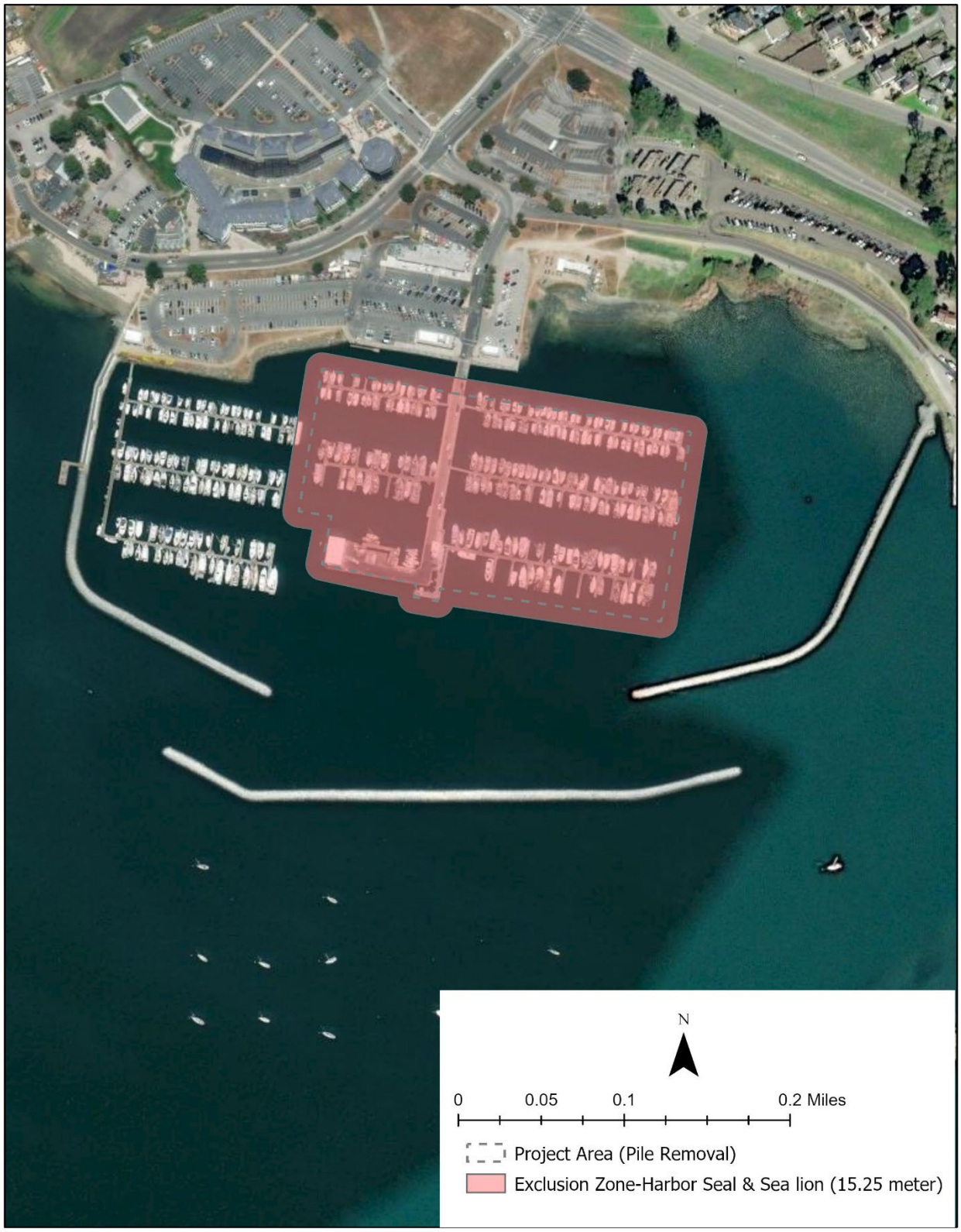

Figure 5 - Proposed Exclusion Zone (15.25 meters [50-foot]) for Harbor Seals and Sea Lions Based on Pile Removal Project Area

Table 3 - Potential Exposure of Harbor Seals and Sea Lions During Impact Pile Driving Activities

	Injury (PTS)		In-water Behavioral	In-air Behavioral
Phocid Pinniped Threshold	**185 dB SELcum**	**218 dB Peak**	**160 dBrms**	**90 dBrms**
Distance to threshold, 16-inch diameter concrete or fiberglass- impact installation	96 meters	Does not exceed	35 meters	25 meters
Distance to threshold, 24-inch diameter concrete- impact installation	290 meters	Does not exceed	117 meters	39 meters
Otariid Pinniped Threshold	**203 dB SELcum**	**232 dB Peak**	**160 dBrms**	**100 dBrms**
Distance to threshold, 16-inch diameter concrete or fiberglass- impact installation	7 meters	Does not exceed	35 meters	8 meters
Distance to threshold, 24-inch diameter-concrete- impact installation	22 meters	Does not exceed	117 meters	13 meters

Table 4 - Potential Exposure of Harbor Seals and Sea Lions During Vibratory Pile Driving Activities

	Injury (PTS)	In-water Behavioral	In-air Behavioral
Phocid Pinniped Threshold	**201 dB SELcum**	**120 dBrms**	**90 dBrms**
Distance to threshold, 16-inch diameter fiberglass-vibratory installation	23 meters	6,265 meters	Does not exceed
Distance to threshold, 14-inch concrete or timber piles-vibratory removal[1]	23 meters	6,265 meters	Does not exceed
Otariid Pinniped Threshold	**219 dB SELcum**	**120 dBrms**	**100 dBrms**
Distance to threshold, 16-inch diameter fiberglass-vibratory installation	2 meters	6,265 meters	Does not exceed
Distance to threshold, 14-inch concrete or timber piles-vibratory removal[1]	2 meters	6,265 meters	Does not exceed

[1] Distance to threshold was calculated using the 49-meter measurement distance (Table 3)

Table 5 - Estimated Take for 80 Days of Pile Driving and 50 Days of Removal Activities

Species	Level A Take	Level B Take
Harbor Seal	200	100
Sea Lion	40	260

5. Construction Monitoring

One or more protected species observers (PSOs), able to accurately identify and distinguish species of marine mammals, will be present before and during all in-water pile driving and removal activities. Prior to in-water pile driving and removal activities, the proposed exclusion zones (i.e., shut-down) zones and monitoring zones will be established (Figure 1-5). These exclusion and monitoring zones include the entire inner harbor area. A "soft-start" technique will be used to allow marine mammals to vacate the area before the pile driver reaches full power. For vibratory hammers, the contractor will initiate the driving for 15 seconds at reduced energy, followed by a 1-minute waiting period when there has been downtime of 30 minutes or more. This procedure shall be repeated two additional times before continuous driving is started. This procedure will also apply to vibratory pile removal. For impact driving, an initial set of three strikes will be made by the hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three-strike sets before initiating continuous driving.

5.1. Exclusion Zones

Visual monitoring of the exclusion zones (Figures 1, 4, and 5) shall commence at least 30 minutes prior to the beginning of pile driving and removal activities each day and after each break of more than 30 minutes. If marine mammals are observed within the proposed exclusion zones, all pile driving and pile removal activities shall cease. Project activities shall not commence or continue until the marine mammal has either been observed having left the exclusion zone, or at least 15 minutes have passed since the last sighting whereby it is assumed the marine mammal has voluntarily left the exclusion zone. Pile installation activities shall not occur if any part of the exclusion zones are obscured by weather or sea conditions.

5.2. Monitoring Zones

Visual monitoring of the monitoring zones (Figures 2 and 3) shall commence at least 30 minutes prior to the beginning of pile driving and removal activities each day and after each break of more than 30 minutes. Level A take will tallied anytime a harbor seal enters the inner harbor area. Sea lion Level A take will be tallied anytime the sea lion is within 25 meters of the proposed pile installation or removal activities. Sea lion Level B take will be tallied any time the sea lion enters the inner harbor area. A qualified observer will monitor the zone of influence (Figures 2 and 3), and document all harbor seals and sea lions that enter the monitoring zone. Take will be tallied against allowed take authorized by the Project IHA request (Table 5). Pile installation activities shall not occur if any part of the monitoring zones is obscured by weather or sea conditions.

5.3. PSO Requirements

Prior to project commencement, SMCHD, or a contractor on behalf of SMCHD, will hire one to two qualified PSO(s) to complete monitoring during construction. The employed PSO(s) will determine the most appropriate observation location(s) for monitoring during pile installation. Locations could include Johnson Pier, adjacent floating docks, and/or the shoreline area. If necessary, observations may occur from two locations simultaneously.

The minimum qualifications for PSOs will include:

1. Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars or spotting scope may be necessary to correctly identify the target.
2. Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred), or equivalent Alaska Native traditional knowledge.
3. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
4. Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
5. Sufficient training, orientation or experience with vessel operation and pile driving operations to provide for personal safety during observations
6. Writing skills sufficient to prepare a report of observations. Reports should include such information as the number, type, and location of marine mammals observed; the behavior of marine mammals in the area of potential sound effects during construction; dates and times when observations and in-water construction activities were conducted; dates and times when in-water construction activities were suspended because of marine mammals, etc.
7. Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area, as needed.

In addition, the following conditions will be met:

1. The PSO(s) will be positioned such that the entire exclusion zone is visible to them If weather or sea conditions restrict the observer's ability to observe for species, or become unsafe for the monitoring vessel(s) to operate, cease pile installation until conditions allow for monitoring to resume.
2. The PSO(s) will have the following to aid in determining the location of observed listed species, to take action if listed species enter the exclusion zone, and to record these events:
    a. Binoculars
    b. Range finder

c. GPS
d. Compass
e. Two-way radio communication with construction foreman/superintendent
f. A log book of all activities which will be made available to the USACE and NMFS upon request

3. The PSO(s) will have no other primary duty than to watch for and report on events related to marine mammals.
4. The PSO(s) will be in direct communication with on-site project lead and will have shutdown authority.
5. The PSO(s) will scan the exclusion zone the waters for 30 minutes before and continuously during all pile driving. If marine mammals enter or are observed near the identified exclusion zones during or 20 minutes before pile driving, the observer(s) will immediately notify the on-site supervisor or inspector, and require that pile driving either not be initiated or temporarily cease until the animals have moved outside of the area of potential sound effects on its own.
6. A final technical report will be submitted to NMFS within 90 days after the final pile has been driven for the project. The report will summarize findings, and results of marine mammal monitoring conducted during pile driving activities.
7. If a listed marine mammal is taken (i.e., a listed marine mammal(s) is observed entering the exclusion zone before pile-driving operations can be shut down), re-initiation of consultation is required, and the take must be reported to NMFS within one business day.

6. References

California Department of Transportation (Caltrans). 2020. Technical Noise Supplement. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/hydroacoustic-manual.pdf Caltrans.

Moffatt & Nichol 2022. Incidental Harassment Authorization Pillar Point Harbor Johnson Pier Expansion and Dock Replacement Project. Prepared for San Mateo County Harbor District. November 4.

Rincon. 2022. Johnson Pier Expansion and Dock Replacement Project Biological Resources Assessment. January.

Washington State Department of Transportation (WSDOT). 2020. Construction Noise Impact Assessment. Accessed April 8, 2021. https://wsdot.wa.gov/sites/default/files/2018/01/18/Env-FW-BA_ManualCH07.pdf