



**PETROGAS FERNDAL PIER  
MAINTENANCE ACTIVITIES 2023-2028  
INCIDENTAL HARASSMENT  
AUTHORIZATION APPLICATION**

**Project Engineer:**

Travis Linds

[Travis.Linds@Altagas.ca](mailto:Travis.Linds@Altagas.ca)

360-398-3165

**Project Permitting Lead:**

Chase Carter

[Chase@EnvoyEC.com](mailto:Chase@EnvoyEC.com)

360-303-3601

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<b>TABLE OF CONTENTS</b> .....	Page
1. Description of Specified Activity.....	6
2. Dates, Duration, and Specified Geographic Region.....	13
3. Species and Numbers of Marine Mammals.....	16
4. Affected Species Status and Distribution.....	24
5. Types of Incidental Taking Authorization Requested.....	32
6. Take Estimates for Marine Mammals.....	34
7. Anticipated Impact of the Activity.....	54
8. Anticipated Impacts on Subsistence Uses.....	56
9. Anticipated Impacts on Habitat.....	57
10. Anticipated Effects of Habitat Impacts on Marine Mammals.....	58
11. Mitigation Measures to Protect Marine Mammals and Their Habitat.....	60
12. Mitigation Measures to Protect Subsistence Uses.....	63
13. Monitoring and Reporting.....	64
14. Suggested Means of Coordination.....	77
15. References.....	78

**LIST OF FIGURES.....Page**

**Figure 1.** Site Plan and Vicinity Map.....15

**Figure 2.** Vibratory pile driving thresholds for removal of 16-inch piles.....37

**Figure 3.** Vibratory pile driving thresholds for installation of 30-inch piles.....38

**Figure 4.** Impact pile driving thresholds for installation of 30-inch piles.....40

**Figure 5.** Underwater chainsaw noise threshold exceedance zone.....42

**Figure 6.** SRKW density based on effort-corrected data in the Salish Sea.....51

**Figure 7.** Shutdown zone for ESA MM and WCTKW when impact driving.....65

**Figure 8.** Shutdown zone for ESA MM and WCTKW when vibratory driving 30-inch piles.....66

**Figure 9.** Shutdown zone for ESA MM and WCTKW when vibratory pulling 16-inch piles.....67

**Figure 10.** Monitoring and exclusion zones for non-ESA listed marine mammals during impact pile driving 30-inch piles.....69

**Figure 11.** Monitoring and exclusion zones for non-ESA listed marine mammals during vibratory pile driving 30-inch piles.....70

**Figure 12.** Monitoring and exclusion zones for non-ESA listed marine mammals during impact pile driving 16-inch piles.....71

**Figure 13.** Proposed PSO monitoring locations.....75

**LIST OF TABLES.....Page**

**Table 1.** Planned in-water pile removal and installation for pier maintenance....11

**Table 2.** Estimated in-water noise for pile driving and pile cutting.....12

**Table 3.** Marine mammals that have the potential to be in the project area.....17, 18, 19

**Table 4.** Marine mammal noise thresholds.....33

**Table 5.** Calculated vibratory pile driving disturbance distances to attenuation for marine mammals.....35

**Table 6.** Total ensonified area per pile removal and installation method.....36

**Table 7.** Calculated impact pile driving disturbance distances to attenuation for marine mammals, Level A and B thresholds.....39

List of Tables continued on next page:

<b>LIST OF TABLES Continued</b> .....	Page
<b>Table 8.</b> Calculated disturbance zone for underwater pile cutting.....	41
<b>Table 9.</b> Airborne sound levels and distances to attenuation from vibratory and impact pile driving (dB).....	43
<b>Table 10.</b> Marine mammal species densities used for exposure calculations.....	44
<b>Table 11.</b> Total level A exposure estimates and estimated take by species for pile driving activities at the Petrogas Pier.....	47
<b>Table 12.</b> Total level B exposure estimates and estimated take by species for pile driving activities at the Petrogas Pier.....	49
<b>Table 13.</b> Exclusion zones for ESA listed marine mammals and WCTKW.....	64
<b>Table 14.</b> Monitoring and exclusion zones for non-ESA listed marine mammals.....	68

## **GLOSSARY**

<u>BE</u>	<u>Biological Evaluation</u>
<u>BMP</u>	<u>Best Management Practices</u>
<u>CV</u>	<u>Coefficient of Variation</u>
<u>dB</u>	<u>Decibels</u>
<u>dBA</u>	<u>A-weighted Decibels</u>
<u>DPS</u>	<u>Distinct Population Segments</u>
<u>EPA</u>	<u>Environmental Protection Agency</u>
<u>ESA</u>	<u>Endangered Species Act</u>
<u>Ft.</u>	<u>Feet</u>
<u>Hz</u>	<u>Hertz</u>
<u>IHA</u>	<u>Incidental Harassment Authorization</u>
<u>kHz</u>	<u>Kilohertz</u>
<u>km</u>	<u>Kilometers</u>
<u>LF</u>	<u>Linear Feet</u>
<u>MHW</u>	<u>Mean High Water</u>
<u>MLLW</u>	<u>Mean Lower Low Water</u>
<u>MMPA</u>	<u>Marine Mammal Protection Act</u>
<u>MMM</u>	<u>Marine Mammal Monitor</u>
<u>M/SI</u>	<u>Mortality and Serious Injury</u>
<u>NMFS</u>	<u>National Marine Fisheries Service</u>
<u>NMD</u>	<u>North Mooring Dolphin</u>
<u>OHWM</u>	<u>Ordinary High-Water Mark</u>
<u>PBR</u>	<u>Potential Biological Removal</u>
<u>PSO</u>	<u>Protected Species Observers</u>
<u>PTS</u>	<u>Permanent Threshold Shift</u>
<u>RMS</u>	<u>Root Mean Square</u>
<u>SEL</u>	<u>Sound Exposure Level</u>
<u>SPL</u>	<u>Sound Pressure Level</u>
<u>SELCum</u>	<u>Cumulative Sound Exposure Level</u>
<u>SPPC</u>	<u>Spill Prevention and Control Countermeasures</u>
<u>TTS</u>	<u>Temporary Threshold Shift</u>
<u>UMEs</u>	<u>Unusual Mortality Events</u>
<u>USACE</u>	<u>U.S. Army Corps of Engineers</u>
<u>WAC</u>	<u>Washington Administrative Code</u>
<u>WDFW</u>	<u>Washington Department of Fish &amp; Wildlife</u>

## **SECTION 1 - DESCRIPTION OF SPECIFIED ACTIVITY**

### **FACILITY DESCRIPTION**

The Petrogas Pier is a timber pier structure that has served as a loading facility for LPG products. The Pier, which was originally constructed in 1965, has undergone frequent routine repairs to maintain it in a fully serviceable condition. The conveyance pipe for Intalco Aluminum Corporation's main wastewater and stormwater outfall also runs along the Pier to a diffuser below the surface of the water. This structure is located on the southeastern shore of the Strait of Georgia in the northern Puget Sound area.

### **WORK DESCRIPTION**

Petrogas has an ongoing program of periodic inspection, maintenance, repair, and replacement activities required to ensure safe and reliable operations at the Pier. This project continues these essential maintenance activities. The Pier work includes both in-water and above-water maintenance. Inspections of the Pier infrastructure have indicated that the North Mooring Dolphin's (NMD) mooring capacity does not meet industry best practice. Petrogas plans to replace the structure during this 5-year maintenance period. The replacement structure will be comparable to the original structure and the replacement will reduce the long term effects to the shoreline resources and the environment through removal of creosote treated wood and a reduced structural footprint. This project will generate environmental impacts primarily through noise from vibratory and impact pile driving to remove the old piles and set new dolphin and catwalk piles. Using an underwater chainsaw may also generate disturbance level noise if it is necessary to cut piles that cannot be removed via vibratory pile driver or direct pull methods.

This document characterizes the potential impacts along with the best management practices and mitigation measures that will be implemented to minimize potential effects on the environment as this work is conducted. As this project is located in marine waters, protection of marine mammals is critical to conform with the Marine Mammal Protection Act. As pile driving has a significant disturbance radius, and healthy populations of marine mammals may live and forage in the nearby waters, level A and level B take are requested through an Incidental Harassment Authorization (IHA) to complete work while minimizing impacts.

**WORK APPLICABLE TO MARINE MAMMAL PROTECTION TAKE REQUEST:**

**Replacement of North Mooring Dolphin deck and catwalk:** Replacement of the NMD will involve removal of 47 creosote treated timber piles and replacement of them with 9, 30-inch steel piles. Vibratory pile removal will be the first method of removal for the timber piles. Due to a known hard layer in the substratum, pile driving for the new piles will start with vibratory pile driving but may need to be continued with impact pile driving to reach stable embedment.

**Removal of Equipment:** Petrogas may begin removal of obsolete conveyor equipment that is supported by pile dolphins. This process would remove 22 creosote treated timber piles via vibratory extraction. If this and other preferred full extraction pile removal methods are not feasible, an underwater chainsaw will be used to complete pile removal.

**CONSTRUCTION METHODS**

**CONSTRUCTION SEQUENCING AND TIMING:**

In-water work will begin only during the approved in-water work windows. Pile driving and pile removal activities are anticipated to take approximately 17 days. These will not be consecutive work days. Timing will be a function of the permit approval timeline, safe work weather and how long disassembly of the original structure takes.

**SITE PREPARATION:**

The working barge will be moored to the pier or spudded into the seafloor to stabilize the barge. Tools will be placed on lanyards to prevent them from falling into the water. The equipment will be inspected and if necessary cleaned to prevent discharge to the waters during work.

**EQUIPMENT TO BE USED:**

Barge(s), crane, work skiff, vibratory pile driver, impact pile driver, tender boat, tug boat(s), welder, cutting torch, hand tools, lumber, tarps and tool lanyards. Scroll / band saw system,

dust control equipment including tarps, containment basins, water recirculation pumps, barrels for captured debris and cutting water / sediments.

**CONSTRUCTION MATERIALS TO BE USED:**

30-inch diameter steel piles, dolphin platform, mooring system, prefabricated catwalk, replacement bracing and fasteners.

**CONSTRUCTION METHODS AND NOISE GENERATION:**

**Installation of Piles, Dolphin Platform and Mooring System:**

NMD installation involves driving 7, 30-inch, 150 foot steel piles via vibratory and impact driving, centered 25 ft to 50 ft to the north of the old North Mooring Dolphin. Piles will be driven to approximately 100' of penetration into the sea floor. Pile driving time is estimated to take 65 minutes per pile. The pile will be driven via vibratory driver for the majority of the distance (approximately 25 minutes), then will be driven and proofed via impact driver (approximately 40 minutes) to ensure the pile meets the structural load design criteria. See attached design drawings. Two more 30-inch steel piles will be driven with the same methods for the catwalk supports but to approximately 80' of penetration into the sea floor. Pile driving will take 5-7 days and pile driving time will not exceed 3 hours in any 24 hour period. Marine mammal monitoring will be conducted for both vibratory driving and impact driving. Marbled murrelet monitoring will also be conducted during impact driving. Once the replacement mooring dolphin is structurally sound and tested, the old mooring dolphin will be decommissioned.

Estimated construction time 4-5 weeks.

**Removal of the old mooring dolphin:**

A crane and barge will be used to stabilize and support each section of the old mooring dolphin cap as it is cut into manageable pieces with a bandsaw system (or similar method). Dust and debris will be controlled through use of a tarping system. The piles below the cap will then be cut by chainsaw to free the section of concrete pile cap. Tarps will be used to capture all debris from the pile cutting. Each dolphin cap section will be lifted and placed upon the barge for disposal. Alternatively, if a large enough crane and barge are available, the cap may be cut free and lifted in one piece to the barge for disposal. Once the dolphin cap is completely removed, each creosote treated timber pile will be removed using a vibratory driver, taking roughly 2 minutes. If vibratory removal is not feasible, a different removal method will be used per the DNR guidance manual: Washington Department of Natural Resources Derelict



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Creosote Piling Removal Best Management Practices for Pile Removal & Disposal (Updated 1/25/2017) and placed on the barge for disposal. A total of 47 creosote piles will be disposed of at an approved upland landfill site.

Estimated demolition time: 1-2 weeks.

#### **Removal of Alumina Unloading Conveyor:**

Above water removal of the alumina unloading equipment will include removal of the conveyor system to the alumina silos. Once the conveyor system is dismantled via crane and barge, when the in-water work window allows, the conveyor system dolphins will be disassembled. These are dolphins #7, #11 and #15. Dolphin #7 is composed of 8 treated timber piles, while dolphins #11 and #15 are composed of 7 treated timber piles each. The piles will be separated by cutting the existing connecting bolts and disassembling associated hardware.

Each pile will be removed using a vibratory driver, taking roughly 2 minutes. If vibratory removal is not feasible, a different removal method will be used per the DNR guidance manual: Washington Department of Natural Resources Derelict Creosote Piling Removal Best Management Practices for Pile Removal & Disposal (Updated 1/25/2017) and placed on the barge for disposal. A total of 22 creosote piles will be disposed of at an approved upland landfill site.

Estimated demolition time: 4 weeks.

## **NOISE GENERATION**

### **Vibratory Driving for 30-inch Steel Piles**

Hydroacoustic analysis was conducted using the NMFS Multi-Species Pile Driving Calculator (Version: May 2022). The vibratory driver driving a 30-inch steel pile in 10 meters of water yields a sound pressure of 159 dB RMS per the vibratory proxy sound level reference tab in the pile driving calculator (row 28). This value was used to calculate the isopleths for each species and the resulting action area. Calculations assumed 30 minutes of vibratory driving time per day (20 minutes per pile). The noise from vibratory driving 30-inch steel piles will attenuate below the 120 dB behavioral disruption threshold for the most sensitive marine group characterized (marine mammals) at 3,981 meters from the project. The resulting action area is a 3,981 meter radius around the project during this activity. The Permanent Threshold Shift (PTS) SEL<sub>cum</sub> maximum isopleths to attenuation below the injury threshold for vibratory driving based upon 30 minutes of daily pile driving is 4.7 meters from the project for high frequency cetaceans. A marine mammal monitoring program will be implemented to protect marine

mammals in the action area by stopping work before they enter the injury threshold boundaries.

### **Impact Driving for 30-inch Steel Piles**

The hydroacoustic analysis was conducted using the NMFS Multi-Species Pile Driving Calculator (Version: May 2022). The impact driver driving a 30-inch steel pile in 3 meters of water yields a sound pressure of 210 dB Peak / 177 dB SEL / 190 dB RMS per the impact proxy sound level reference tab in the pile driving calculator (row 19). These values were selected to calculate the isopleths for each species and the resulting action area based upon the guidance of NOAA specialists and NMFS analysis of similar projects. Calculations assumed 67.5 minutes of impact driving time per day for 1.5 piles (45 minutes per pile). The contractor will use a full depth bubble curtain during impact driving of the 30-inch piles. A 5 dB attenuation factor was added to account for the bubble curtain's noise reduction effects.

The noise from impact driving 30-inch steel piles will attenuate below the 160 dB behavioral disruption threshold for marine mammals 465 meters from the project. The Permanent Threshold Shift (PTS) SEL<sub>cum</sub> maximum isopleths to attenuation below the injury threshold for impact driving based upon 67.5 minutes of daily pile driving is 457 meters from the project for high frequency cetaceans.

For both the vibratory and impact pile driving of the 30-inch steel piles a marine mammal monitoring program will be implemented to protect all marine mammals in the action area by stopping work before they enter the injury threshold boundaries. Please refer to the marine mammal monitoring protocols in Section 13, and the list of mitigation measures and best management practices to minimize project hydroacoustic impacts during pile driving in Section 11 for additional details.

### **Vibratory Pile Removal**

Replacement of the NMD will require removal of up to 47 creosote treated timber piles. Up to 20 piles will be removed per day using a vibratory driver. Vibratory removal is estimated to average 2 minutes per pile in the soft, sandy substrate. The hydroacoustic analysis was conducted using the NMFS Multi-Species Pile Driving Calculator (Version: May 2022). The vibratory hammer pulling out a timber pile in 10 meters of water yields a sound pressure of 162 dB RMS per the vibratory proxy sound level reference tab in the pile driving calculator (row 42). This value was used to calculate the isopleths for each species and the resulting action area. Calculations assumed 40 minutes of vibratory pulling time per day. The noise from vibratory pulling timber piles will attenuate below the 120 dB behavioral disruption threshold

for the most sensitive marine group characterized (marine mammals) at 6,310 meters from the project. The resulting action area is a 6,310 meter radius around the project during this activity. The permanent threshold shift (PTS) SEL<sub>cum</sub> maximum isopleths to attenuation below the injury threshold for vibratory driving based upon 40 minutes of daily pile pulling is 9 meters from the project for high frequency cetaceans. A marine mammal monitoring program will be implemented to protect marine mammals in the action area by stopping work before they enter the injury threshold boundaries. Timber pile removal will follow applicable practices per the Department of Natural Resources guidance manual: Washington Department of Natural Resources Derelict Creosote Piling Removal Best Management Practices for Pile Removal & Disposal(DNR BMPs) (Updated 1/25/2017).

**Table 1.** Planned in-water pile removal and installation for pier maintenance.

Location	Pile Type and Size	Activity	Removal / Install Method	# of Piles	Total Days of Install	Piles Per day	Hours Pile Driver in Use	Impact Strikes per Pile
North Mooring Dolphin	16-inch timber piles	Removal	Vibratory hammer, direct pull	47	Up to 5	Up to 10	1	None
North Mooring Dolphin	30-inch steel pipe pile	Install	Vibratory hammer	9	Up to 7	1.5	0.5	None
North Mooring Dolphin	30-inch steel pipe pile	Install	Impact Pile Driver	9	Up to 7	1.5	1.1	Up to 2000
Conveyor System Dolphin Removal	16-inch timber piles	Removal	Vibratory hammer, direct pull	22	Up to 5	Up to 10	1	None

### Cutting Piles with an Underwater Chainsaw

It may be necessary to utilize a variety of pile removal methods as listed in the DNR BMPs to safely complete this work. A reasonable attempt will be made to use the preferred removal methods per the guidance manual. If piles must be cut, they will be cut below the mudline to the guidance manual specifications, with an underwater chainsaw or cutting torch. Cutting a pile with an underwater chainsaw generates underwater SPL (Sound Pressure Level) of 140 dB RMS (159 dB peak). This activity will generate temporary disturbance level sound in a radius of 215 meters from the location of the activity. A cutting torch is not anticipated to generate significant noise. The removed piles will be lifted to a barge for proper disposal.

**Table 2.** Estimated in-water noise for pile driving and pile cutting.

Equipment Used	Noise Level			Distance from Measurement
	dB Peak	dB rms	dB SEL	
Impact pile driving 30-inch steel piles	210	190	177	10 m
Vibratory pile driving 30-inch steel piles*	196	159	-	10 m
Vibratory pile driver pulling 16-inch timber piles*	172	162	-	10 m
Underwater chainsaw**	159	140	-	10 m

Noise Level Sources: \*Caltrans 2020, \*\*WSDOT 2020.

### AIRBORNE NOISE

Pile driving will also generate disturbance level airborne noise. This noise will attenuate near the pile driving activities. These impacts are evaluated further in Section 6.

## **SECTION 2 - DATES, DURATION, AND SPECIFIC GEOGRAPHIC REGION**

### **PROJECT DATES AND DURATION OF ACTIVITIES:**

Pile driving work will be planned to start on August 1, 2024, when the Washington Department of Fish and Wildlife in-water work window opens, assuming weather conditions are favorable. Pile driving is anticipated to take up to 17 days to complete. Pile driving for replacement of the North Mooring Dolphin will take up to 7 days. Once the installation work has been completed, the old mooring dolphin will be disassembled and vibratory removal will be used to pull the old piles. It is expected that there will be 2-4 weeks between pile installation and pile removal. Pile removal for the NMD and the conveyor system removal using a vibratory driver may take up to 10 days. Work may also not occur on consecutive days due to weather and other project needs. Pile removal for the conveyor system may also be done the next in-water work season if necessary. If work is not ready to begin immediately, the most likely work window would be between August 1 and October 31, 2024. As the Strait of Georgia is a very large water body with a long fetch, calm in-water work conditions are typically only available from August to the end of October. This is planned to be a 1 year project but if pile removal is not complete, an extension to a second year will be requested with the exact same scope described here, as required.

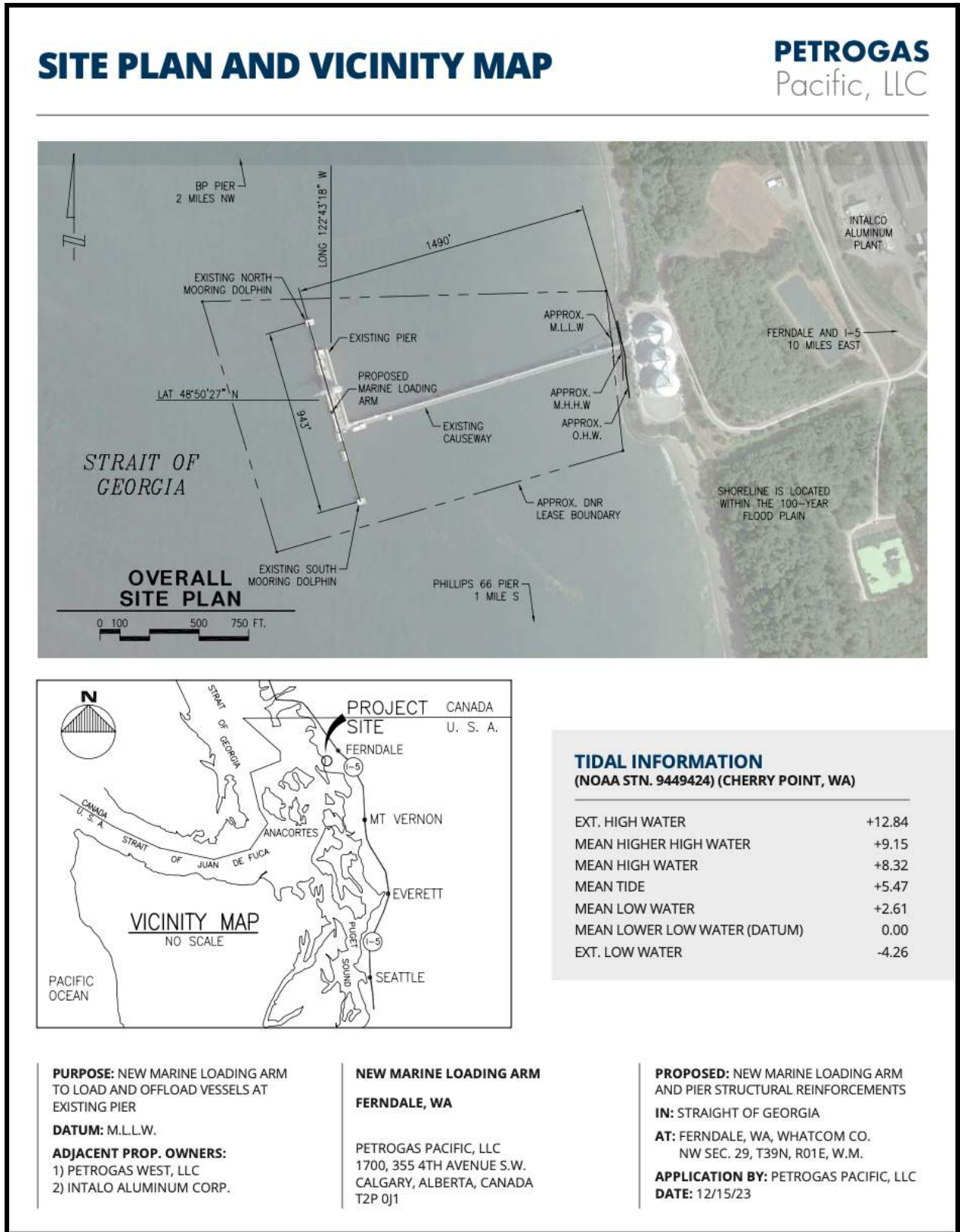
### **GEOGRAPHIC REGION DESCRIPTION:**

Petrogas maintains and operates a marine Pier on the southeastern shoreline of the Strait of Georgia. The Strait of Georgia is the northern marine waters of the Salish Sea, with a long fetch that extends to the northwest between the Canadian mainland and Vancouver Island. The Pier is located west of the Intalco Aluminum Corporation, located at 4050 Mountain View Rd, Ferndale, WA 98248. The Pier is built on aquatic lands leased from the Washington Department of Natural Resources. The shore area is characterized by wave washed feeder bluffs where sediment transport creates both sandy and cobbled beaches and intertidal zones. The shoreline and aquatic area surrounding the Pier is part of the Cherry Point Aquatic Reserve, a DNR protected marine environment with extraordinary water quality.

**CRITICAL HABITAT IMMEDIATELY ADJACENT TO THE PROJECT:**

The waters of the Strait of Georgia are designated critical habitat under the ESA for the Southern Resident Killer whale for the "Summer Core" area. The Washington State Water Quality Assessment System lists the Strait of Georgia as a waterbody with areas of water quality categories 1-5. The area immediately adjacent to the Pier is category 1 and 2. Outside of the DNR aquatic lands lease boundaries, the marine habitat is protected as part of the Cherry Point Aquatic Reserve, an area of exceptional water quality and significant biodiversity. There are no known pinniped haulouts immediately adjacent to the project.

**Figure 1. Site Plan and Vicinity Map**



### **SECTION 3 - SPECIES AND NUMBER OF MARINE MAMMALS**

Per the US Pacific marine Mammal Stock Assessments, there are thirteen marine mammal species that have a potential to be found in the project action area. The project action area is defined based on the extent of the hydroacoustic impacts from the project as this parameter is the farthest extending impact from project activities. The thirteen species are identified in Table 3 along with their likelihood of presence. Some of these species have very limited sightings and are a rarity in the Puget Sound. Density estimates are provided but these calculations must be qualified as they are based upon uniform distribution over time and space which does not represent each species characteristic behaviors including seasonal movements throughout the Puget Sound and beyond.



**Table 3.** Marine mammals that have the potential to be in the project area.

Common Name	Stock	ESA / MMPA Status	Known Spatially / Temporally Important Areas	Stock Abundance	PBR	Annual M / SI	Stock Status Factors (UMEs, spills, etc.)
Humpback Whale ( <i>Megaptera novaeangliae</i> )	California / Oregon / Washington (Mexico DPS & Central American DPS)	California/Oregon/Washington Stock: Depleted and Strategic Central America DPS: Endangered Mexico DPS: Threatened	Rare	4,973(CV = 0.048)	46.5	25	Strategic
Killer whale (Orcinus orca)	Eastern North Pacific Southern Resident	Endangered 70 FR 699903 Depleted and Strategic	Rare Seasonal: Spring to winter	73 (No CV)	0.13	0	Strategic
Gray Whale (Eschrichtius robustus)	Eastern North Pacific	Normal	Rare	26,960 (CV = 0.05)	801	139	None
Humpback Whale (Megaptera novaeangliae)	Central North Pacific (Hawaii DPS)	Normal	Rare (only a small percentage would be from the Hawaii DPS)	10,103 (CV = 0.30)	83	9.5	Strategic (stock)

**Table 3 Continued.** Marine mammals that have the potential to be in the project area.

Common Name	Stock	ESA / MMPA Status	Known Spatially / Temporally Important Areas	Stock Abundance	PBR	Annual M / SI	Stock Status Factors (UMEs, spills, etc.)
Minke Whale (Balaenoptera acutorostrata)	California / Oregon / Washington	Normal	Rare	915 (CV = 0.792)	4.1	0.59	None
Dall's porpoise (Phocoenoides dalli)	California / Oregon / Washington	Normal	Rare	16,498 (CV = 0.608)	99	0.66	None
Harbor porpoise (Phocoena phocoena)	Washington Inland Waters	Normal	Likely	11,233 (CV = 0.37)	66	≥ 7.2	None
Killer whale (Orcinus orca)	West Coast Transient	Normal	Possible (Seasonal Sightings)	243 (No CV)	2.4	0	None
California sea lion (Zalophus californianus)	United States	Normal	Possible (August - early June)	257,606 (No CV)	14,011	≥ 321	None

**Table 3 Continued.** Marine mammals that have the potential to be in the project area.

Common Name	Stock	ESA / MMPA Status	Known Spatially / Temporally Important Areas	Stock Abundance	PBR	Annual M / SI	Stock Status Factors (UMEs, spills, etc.)
Steller sea lion ( <i>Eumetopias jubatus</i> )	Eastern United States	Normal	Rare	43,201 (*MPE, No CV)	2,592	112	None
Northern elephant seal ( <i>Mirounga angustirostris</i> )	California Breeding	Normal	Rare	187,386 (No CV)	5,122	≥ 5.3	None
Harbor seal ( <i>Phoca vitulina richardii</i> )	Washington Northern Inland Waters Stock	Normal	Possible	11,036* (CV = 0.15)	Unknown	9.8	None

Stock delineations and abundance are from NOAA Stock Assessment Reports by Carretta et al., 2015, 2020, 2021 and Muto et al., 2020. Rare = The distribution of the species is near enough to the area that the species could occur there, or there are a few confirmed sightings. Likely = Confirmed and regular sightings of the species in the area year-round, Seasonal = Confirmed and regular sightings of the species in the area on a seasonal basis. \*This estimate is older than eight years (Jeffries et al., 2003); therefore, NMFS does not consider this a current estimate for the stock. \*MPE = Minimum Population Estimate, not equivalent to standard stock abundance estimate (NAVFAC 2022).

### 3.1 HUMPBACK WHALE

There are two stocks of humpback whales on the West Coast of the contiguous United States, separated into two feeding groups, called distinct population segments (DPS). These groups are the Central American DPS (endangered) and the Mexico DPS (threatened). Per the US Pacific Marine mammal Stock Assessment, 2022, there are an estimated 5,000 individuals. There is a seasonality to this stock's presence, with feeding occurring in the summers and typically leaving to feed in southern regions thousands of miles away. Humpback whales, while relatively few in number, are regularly seen in the Puget Sound. They are most frequently found in the South Puget Sound, the Strait of Juan De Fuca, the Haro Strait and among the Canadian Gulf Islands, which are all nearby regions of the Strait of Georgia, the location of this project. They are found in transit in the southern parts of the Strait of Georgia on occasion, but are not a common occurrence per the sightings archive of the Orca Network. Humpback whales could potentially occur within the project area but are unlikely to be present. This population will be discussed further in section 4. Exclusion zones will be implemented to avoid potential Level A and Level B take.

### 3.2 KILLER WHALE (ORCINUS ORCA), EASTERN NORTH PACIFIC SOUTHERN RESIDENT

There are two genetically distinct populations of killer whales that frequent the Puget Sound. The Southern Resident killer whale (SRKW) population is comprised of three pods (J, K and L pods) with a total population of 75 individuals as of the 2023 census (Lynne Barre, 2023). SRKW are typically found in the Salish Sea spring, summer and fall, and are found along the west coast of the United States and British Columbia in the winter (NOAA, 2022). The J pod tends to stay closer to the Puget Sound even during winter. The orca pods travel about the Puget Sound swiftly and though a rare occurrence, the pods may pass through in the project area. The project does not have any key habitat characteristics that make it a primary feeding area but it is located in the summer core zone, where they may be traveling to other parts of the Puget Sound or feeding areas in Canada. Monitoring zones will be implemented to avoid potential Level A and Level B take.

### 3.3 GRAY WHALE, (ESCHRICHTIUS ROBUSTUS) EASTERN NORTH PACIFIC STOCK:

Gray whales travel between feeding in Alaska in the summer and wintering in the waters on the west coast of Mexico. They pass through the Puget Sound on the travels but are not

frequently observed. Per the population analysis on gray whales from 1996-2015, from June 1 to November 30, only days of 6 total sightings were recorded in the Northern Puget Sound. The Northern Puget Sound refers to a study range of the Puget Sound marine waters from Edmonds, WA to the Canadian border (Calambokidis, 2017). As gray whales migrate south from November to mid-February and north from mid-February to May, they will not be migrating when in-water work is most likely occurring for this project August - October (NOAA Web 1, 2023). Gray whales are not anticipated to be in the area of the project based upon migratory timing and infrequency of presence in the area. Take is not proposed. This species will not be discussed further.

### **3.4 MINKE WHALE, (BALAENOPTERA ACUTOROSTRATA), CALIFORNIA / OREGON / WASHINGTON**

Abundance estimates for the California / Oregon / Washington stock is 912 (CV = 0.792) based upon a 2018 study (Becker et al. 2020). Some minke whales in the Puget Sound have been identified as having home ranges in the Puget Sound, classifying them as “resident”. The San Juan Islands and southern Puget Sound are known to have some sightings of minke whales as found in reports from the Orca Network, though reports of minke whales in the Southeastern Strait of Georgia are rare. Exclusion zones will be implemented to avoid potential Level A and Level B take. Take is not proposed, and this species will not be discussed further.

### **3.5 DALL’S PORPOISE (PHOCOENOIDES DALLI), CALIFORNIA / OREGON / WASHINGTON**

The Dall’s porpoise stock is at 16,498 (CV = 0.608) and primarily resides on the West Coast of the United States and Canada (Becker et al. 2020). The latest estimate of inland Dall’s porpoise was 900, counted in 1996 Calambokidis et al., 1997. This is quite an old estimate and more recent aerial surveys (Evenson 2016) indicate far fewer Dall’s porpoises remain in the inland waters of the Puget Sound. Due to the low likelihood of presence, take is not proposed, and this species will not be discussed further. Exclusion zones will be implemented to avoid potential Level A and Level B take.

### **3.6 HARBOR PORPOISE (PHOCOENA PHOCOENA), WASHINGTON INLAND WATERS STOCK**

Harbor porpoises of the Washington Inland Waters Stock are estimated at 11,233 individuals (Smultea et al. 2015a). Aerial surveys have identified harbor porpoises throughout the Puget

Sound, including the Strait of Georgia. They reside in the Puget Sound year-round. With a diet consisting of mostly schooling fish like herring and mackerel, this marine mammal may be found near the project area. This population will be discussed further in Section 4.

### **3.7 KILLER WHALE (ORCINUS ORCA) WEST COAST TRANSIENT**

West Coast Transient killer whales are an ecotype of orca distinct from offshore and resident orcas. They move in and out of the Puget Sound as they hunt. Minimum stock abundance is estimated at 243 (Fisheries and Oceans Canada, 2009; Allen & Angliss, 2013, Muto et al., 2020). There is a low likelihood of presence, but as these killer whales move swiftly and may be difficult to distinguish from the SRKW this population will be discussed further in section 4. Exclusion zones will be implemented to avoid potential Level A and Level B take.

### **3.8 CALIFORNIA SEA LION (ZALOPHUS CALIFORNIANUS)**

The California sea lion population is estimated at 257,606 individuals on the West Coast of the United States and the Puget Sound. They are found throughout the Puget Sound with haulouts on various terrain like reefs, ledges and beaches. There are no known haulouts near the project but due to their presence throughout the Puget Sound, this population will be discussed further in Section 4.

### **3.9 STELLER SEA LION (EUMETOPIAS JUBATUS), EASTERN UNITED STATES**

The Steller sea lion minimum estimated population is approximately 43,000 individuals (Muto et al., 2020). The Eastern U.S. Stock ranges from southeast Alaska to California, including the inland waters of the Puget Sound. Steller sea lions eat many different species of fish and cephalopods and demonstrate a variety of foraging strategies. There are no known haulouts near the project but due to their presence throughout the Puget Sound, this population will be discussed further in Section 4.

### **3.10 NORTHERN ELEPHANT SEAL (MIROUNGA ANGUSTIROSTRIS), CALIFORNIA BREEDING STOCK**

The California Breeding Stock of Northern elephant seals has an estimated population of 187,386 individuals. These seals breed and give birth in the Channel Islands off California or

Baja California, Mexico. The other 9 months of the year they migrate to waters near Alaska to feed. Northern elephant seals are not common in the Puget Sound. Due to the low likelihood of presence, take is not proposed, and this species will not be discussed further. Exclusion zones will be implemented to avoid potential Level A and Level B take.

### **3.11 HARBOR SEAL (PHOCA VITULINA RICHARDII), WASHINGTON NORTHERN INLAND WATERS STOCK**

The stock estimate for the Washington Northern Inland Water Stock of Harbor seals was 11,000 individuals in 2003. Harbor seals are typically considered resident but may migrate for seasonal prey. There are two known low population haulouts within 5 miles of the project area as documented in the Washington Department of Fish and Wildlife Atlas of Seal and Sea Lion Haulout sites in Washington (Jeffries et al., 2000). This population will be discussed further in Section 4.

## **SECTION 4 - AFFECTED SPECIES STATUS AND DISTRIBUTION:**

### **4.1 HUMPBACK WHALES, CALIFORNIA / OREGON / WASHINGTON**

#### **A. Status and Management**

Humpback whales are listed as depleted under the MMPA and have been listed as endangered under the Endangered Species Act since 1973. In 2021, NOAA designated 48,521 square nautical miles of critical habitat for the Central America DPS of humpback whales off the coasts of Washington, Oregon, and California, and 116,098 square nautical miles of critical habitat for Mexico DPS of humpback whales in the North Pacific Ocean (86 FR 21082, 2021). There is a total estimated population of 5,000 individual humpback whales from these two stocks.

#### **B. Distribution**

Central America and Mexico stocks of humpback whales mate in these southern regions and proceed to migrate north to California, Oregon and Washington in the summer and fall to feed. Studies indicate that a small sub-population of whales consistently return seasonally to feed from central Washington to Southern Vancouver Island (Calambokidis et al., 2004, 2008). Per data from the Orca Network, sightings have increased over the past 20 years, peaking between April and July, though they have been seen all months of the year.

#### **C. Density and Site**

There is a seasonality to this stock's presence, with feeding occurring in the summers and typically leaving to feed in southern regions thousands of miles away. Humpback whales, while relatively few in number, are regularly seen in the Puget Sound. They are most frequently found in the South Puget Sound, the Strait of Juan De Fuca, the Haro Strait and among the Canadian Gulf Islands, which are all nearby regions of the Strait of Georgia, the location of this project. They are found in transit in the southern parts of the Strait of Georgia on occasion, but are not a common occurrence per the sightings archive of the Orca Network. Humpback whales could potentially occur within the project area but are unlikely to be present. Of 42 reports on the Orca Network from November 2021 to October 2023, 13 sightings were in the Strait of Georgia. Of these, 10 were in the waters of British Columbia, Canada, at least 18 miles away. Of the remaining 3 sightings, 2 lacked detailed location data. The closest observation was over 7 miles away between Lummi and Matia Islands. There are no sightings of humpback whales documented by the Orca Network along the southeastern edge of the Strait of Georgia



from January 2020 to October of 2023. The lack of sightings may indicate the project area may not be part of their migration path or feeding grounds. As these are ESA listed species, exclusion zones will be implemented to avoid potential Level A and Level B take.

#### **D. Hearing Sensitivity**

Humpback whales are classified as low-frequency cetaceans which have an approximate in-water hearing range of 7 Hz to 35 kHz (NMFS 2018).

### **4.2 KILLER WHALE (ORCINUS ORCA), EASTERN NORTH PACIFIC SOUTHERN RESIDENT**

#### **A. Status and Management**

The Eastern North Pacific Southern Resident Killer Whale (SRKW) are protected under the MMPA and have been listed as endangered under the Endangered Species Act since 1995. In 1996, the National Oceanic and Atmospheric Administration designated 2,560 square miles of critical habitat for the SRKW which includes the Summer Core Area in the Haro Strait, the waters around the San Juan Islands, the northern Puget Sound into the Strait of Georgia, and the Strait of Juan de Fuca per 71 FR 69054. In 2021, an additional 15,910 square miles along the US West Coast, from the southern border of Canada to Point Sur, California were added to the critical habitat of SRKW (86 FR 41668, 2021). There are a total of 75 SRKW composed of 3 pods, J, K and L.

#### **B. Distribution**

The three pods of SRKW spend late spring, summer and fall in the Salish Sea but they may also travel as far north as Alaska and as far south as Monterey Bay, California, typically within roughly 20 miles of the coastline. The J pod is commonly in the inland waters during winter and uses the entire Salish Sea, while K and L pods spend much more of the winter hunting up and down the coastline. The Summer Core area is where the pods are most often found during the summer (NOAA, 2022).

#### **C. Density and Site**

As mentioned, there are only 75 SRKW in total and they tend to travel in pods that are typically 20 (J pod) to 35 (L pod) (Houghton et al., 2015), or smaller when the groups separate. The project site is in the Summer Core Area of their critical habitat. The orcas are not frequently reported in the southeastern corner of the Strait of Georgia but they may be in the vicinity of

the project. Pile driving activities will occur during the in-water work window, during favorable weather conditions, starting August 1st and working into the fall. Pods could possibly be in the area during the in-water pile driving work. As these are ESA listed species, exclusion zones will be implemented to avoid potential Level A and Level B take. Marine mammal monitoring will be conducted to prevent and minimize project impacts on these marine mammals to the greatest extent practicable.

#### **D. Hearing Sensitivity**

Killer whales are classified as mid-frequency cetaceans which have an approximate in-water hearing range of 150 Hz to 160 kHz (NMFS 2018).

### **4.3 KILLER WHALE (ORCINUS ORCA), WEST COAST TRANSIENT STOCK**

#### **A. Status and Management**

Transient killer whales are protected under the MMPA but are not listed under the ESA like the SRKW. They are one of two stocks of orca that visit the inland waters of Washington. The estimated population, which has a very large distribution range is 243.

#### **B. Distribution**

The West Coast Transient Stock of killer whales (WCTKW) can be found from southeast Alaska down to the southern coast of California (M.M. Muto et al. 2021). Their preferred territory, where they spend the majority of the year, is north of Washington, near British Columbia and southeastern Alaska (Krahn et al. 2002). Some groups enter the Salish Sea, in search of prey along the Southeastern end of Vancouver Island. This is most often during August and September, peak season for harbor seal pupping (Baird et al. 1995). April and May have also been identified as having an increased regular frequency in WCTKW. Other pods of transient orca are less predictable and may be found in the Puget Sound any time of year.

#### **C. Density and Site**

There are only 243 SRKW in total and they tend to travel in smaller pods of up to 4-6 individuals (Baird et al. 1995). Because their pods are smaller, they are more evenly and randomly distributed than the SRKW. Pile driving activities will occur during the in-water work window, during favorable weather conditions, starting August 1st and working into the fall. This is their peak Salish Sea visitation period. Pods could possibly be in the area during the in-water

pile driving work. Marine mammal monitoring will be conducted to prevent and minimize project impacts on these marine mammals to the greatest extent practicable.

#### **D. Hearing Sensitivity**

Killer whales are classified as mid-frequency cetaceans which have an approximate in-water hearing range of 150 Hz to 160 kHz (NMFS 2018).

### **4.4 HARBOR PORPOISE (PHOCOENA PHOCOENA VOMERINA), WASHINGTON INLAND WATERS STOCK**

#### **A. Status and Management**

Harbor porpoises are protected under the MMPA but have no current special designations per the ESA or MMPA. Washington State has no designated critical habitat for harbor porpoise. There are 6 stocks identified by the NMFS. The Washington Inland Water Stock is the only stock found in the Puget Sound. The 2015 population estimate is 11,233 individuals (Laake et al., 1997). The population has more than tripled between the 1990 / 1991 and 2013 / 2015 surveys (NOAA, 2022).

#### **B. Distribution**

Harbor porpoise reside in the Puget Sound year-round. Data from harbor porpoise sightings indicate that distribution is heterogeneous with some areas consistently suggesting higher densities of harbor porpoise. The British Columbia Cetacean Sightings Network (BCCSN) reports summer concentrations in areas that include the South-Central Strait of Georgia (Canadian side), Haro Strait, Boundary Pass and sites further north in British Columbia (Zier, 2015). Winter concentrations include the Port of San Juan, Haro Strait, Swanson Channel, and the central Strait of Georgia (in British Columbia) (Zier, 2015). Harbor porpoises are a common sighting in the San Juan islands and the Strait of Juan de Fuca (Zier, 2015).

#### **C. Density and Site**

Harbor porpoises are commonly found in the Strait of Georgia as indicated by regular sightings from the BCCSN and the Orca Network (Zier, 2015). The Strait of Georgia is an extremely large body of water and the project will affect only a small area for short durations of time. Marine

mammal monitoring will be conducted to prevent and minimize project impacts on these marine mammals.

#### **D. Hearing Sensitivity**

Harbor porpoises are classified as high-frequency cetaceans which have an approximate in-water hearing range of 160 Hz to 275 kHz (NMFS 2018).

### **4.5 CALIFORNIA SEA LION (ZALOPHUS CALIFORNIANUS), UNITED STATES STOCK**

#### **A. Status and Management**

California sea lions (CSL) are protected under the MMPA but have no current special designations per the ESA or MMPA. Washington State has no designated critical habitat for the CSL. There are 5 CSL stocks but the U.S. is the only stock found in the Puget Sound. The 2014 estimated population size is 257,606 individuals spread from Southeast Alaska to California (Lowry, 2017). The population has more than tripled since 1975 and is considered within the range of its optimum sustainable population (OSP) size (Laake et al., 2018).

#### **B. Distribution**

California sea lions are native to the west coast of North America. Their primary rookeries are on the Channel Islands off the coast of California. They visit these islands and breed during the summer. Females fish locally around the islands and feed the pups while males migrate to the north to feed for the rest of the year. They migrate to northern California, Oregon, Washington and British Columbia, Canada to find abundant food sources. California sea lions will explore harbors, river mouths and bay in search for food. They will haul out on natural formations and man-made structures, including jetties, docks, and buoys (NOAA, 2022).

#### **C. Density and Site**

There are no known haulouts near the project but California sea lions may be in the vicinity of the project foraging as they move through the wider area. While California sea lions can be found throughout the Puget Sound, estimates place the number of CSLs in the springtime at an average of 450 in the Puget Sound proper (Jefferson, et al., 2023). There are two documented haulouts in the southern Strait of Georgia, both along the western coast of the

Strait of Georgia in British Columbia, Canada. The closest haulout is near Tumbo Island on the eastern edge of the Gulf Islands, over 15 miles from the project site (LeValley, E., 2021).

#### **D. Hearing Sensitivity**

California sea lions are classified as otariid pinnipeds which have an approximate in-water hearing range of 60 Hz to 39 kHz (NMFS 2018).

### **4.6 STELLER SEA LION (EUMETOPIAS JUBATUS), EASTERN UNITED STATES**

#### **A. Status and Management**

Eastern US Steller sea lions (EUSSSL) are protected under the MMPA but have no current special designations per the ESA or MMPA. Washington State has no designated critical habitat for the EUSSSL. The EUSSSL is the only stock found in the Puget Sound. The minimum estimated population is 43,000 individuals for all EUSSSL from Southeast Alaska to California. Population models with data from 1987 to 2017 indicate the Eastern Stock is growing in all regions (Muto, 2020).

#### **B. Distribution**

Eastern United States Steller sea lions are distributed along the west coast of the United States and Canada. (NMFS 2023c). The majority of Steller sea lion population in Washington is found on the west coast but there are consistently used haulouts and breeding sites throughout the Puget Sound. These sites are typically rocky, gravel or sand beaches, ledges and reefs. There are two documented haulouts in the southern Strait of Georgia. The first is near Tumbo Island on the eastern edge of the Gulf Islands in British Columbia, Canada, (west coast of the Strait of Georgia). The second is on Sucia Island (LeValley, E. 2021), at the southern end of the Strait of Georgia.

#### **C. Density and Site**

EUSSSL may be in the vicinity of the project. The Strait of Georgia is a very large body of water with no haulouts in the immediate vicinity of the project. The closest documented haulout location is over 10 miles from the project site, on Sucia Island (Jeffries et al., 2000). On the west

side of the Strait of Georgia, over 15 miles from the project site, survey data provided an estimated population of EUSSSL for the Tumbo Island haulout, between 100 and 500 sea lions.

#### D. Hearing Sensitivity

Steller sea lions are classified as otariid pinnipeds which have an approximate in-water hearing range of 60 Hz to 39 kHz (NMFS 2018).

### 4.7 HARBOR SEAL (PHOCA VITULINA RICHARDII), WASHINGTON NORTHERN INLAND WATERS STOCK

#### A. Status and Management

Harbor seals are protected under the MMPA but have no current special designations per the ESA or MMPA. There are 3 delineated stocks in the Puget Sound. These stocks include the Hood Canal stock, the Northern Inland Waters stock and the Southern Puget Sound stock. This project is only likely to affect the Northern Inland Waters Stock. This stock has an estimated population of 11,000 individuals (NOAA, 2022) and has been characterized as stable.

#### B. Distribution

Harbor seals are distributed throughout the Oregon and Washington outer and inner coastlines. They are the most common and most widely distributed marine mammal in the Puget Sound. They are frequently found in saltwater bays, estuaries and inlets. Their preferred haulouts include intertidal and subtidal rocks, beaches, sandbars, rocky reefs, log booms and floats. Haulouts may be just a few individuals but may range beyond 500 individuals. Harbor seals generally live and feed in a limited range but may travel up to 400 miles for seasonal prey. The Northern Inland Waters stock is the most wide-spread stock throughout the Puget Sound, from Cape Flattery, to the Strait of Georgia, to the Tacoma Narrows Bridge (NOAA, 2022).

#### C. Density and Presence in Project Area

Harbor seals may be in the vicinity of the project. The Strait of Georgia is a very large body of water with no haulouts in the immediate vicinity of the project. The closest documented

haulouts are two different low population (>100 individuals) locations approximately 5 miles from the project site, one to the north and one to the south (Jeffries et al., 2000). To the southwest and west of the project location are 14 other haulouts dotted throughout a few of the small northern San Juan Islands (North of Orcas Island) within 10 miles of the project (Jeffries et al., 2000).

#### **D. Hearing Sensitivity**

Harbor seals are classified as phocid pinnipeds which have an approximate in-water hearing range of 50 Hz to 86 kHz (NMFS 2018).

## **5 - TYPE OF INCIDENTAL TAKING AUTHORIZATION REQUESTED:**

The MMPA defines “harassment” as: any act of pursuit, torment or annoyance which (Level A) has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment has the potential to disturb a marine mammal or a marine mammal stock in the wild by causing disruption to behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (50 CFR, Part 216, Subpart A, Section 216.3, Definitions).

Per section 101(a)(5)(D) of the Marine Mammal Protection Act, Petrogas requests an Incidental Harassment Authorization (IHA) for in-water pile driving and removal activities that may result in in-water noise levels above the protective noise thresholds established by the Office of Protected Resources, National Marine Fisheries Service. Level A harassment is being requested for the harbor porpoise, and the harbor seal. Level B harassment is being requested for the West Coast transient killer whale, the harbor porpoise, the California sea lion, and the Eastern DPS Steller sea lion, and the harbor seal. These requests are based upon calculated in-water noise impacts derived from the NMFS Multi-Species Pile Driving Calculator Tool and animal densities from area marine mammal surveys.

The primary source of take will be pile driving activities related to maintenance replacement work. Level A Harassment will be managed through a robust marine mammal monitoring program. Steel piles will be driven using both vibratory and impact pile driving. Vibratory pile and impact pile driving attenuate below the Level A harassment level for all marine mammals within 458 meters or less from the location of pile driving, allowing monitoring to be an effective protective measure. Level B harassment noise generated from the vibratory driving does not attenuate below 120 dB until over 3,000 meters for vibratory pile driving and pile removal. Level B Harassment level noise will require monitoring specific to each species’ regulatory status and relative abundance.



**Table 4.** Marine Mammal Noise Thresholds

Hearing Group	Noise Type	Level A Harassment		Level B Harassment
		dB SELcum	dB Peak	dBrms
Low-frequency Cetaceans: Humpback whale	Inwater, Impulsive	183	219	160
	In-water, Continuous	199	-	120
Mid-frequency Cetaceans: Killer Whale	Inwater, Impulsive	185	230	160
	In-water, Continuous	198	-	120
High-frequency Cetaceans: Harbor porpoise	Inwater, Impulsive	155	202	160
	In-water, Continuous	173	-	120
Phocid pinnipeds: Harbor seal	Inwater, Impulsive	185	218	160
	In-water, Continuous	201	-	120
	In-air	-	-	90
Otariid Pinnipeds: California and Steller sea lions	Inwater, Impulsive	203	232	160
	In-water, Continuous	219	-	120
	In-air	-	-	100

## **SECTION 6 - TAKE ESTIMATES FOR MARINE MAMMALS**

Take estimates for individual species are calculated by determining the estimated zone of influence from a noise generating activity and then multiplying that value by published marine mammal population densities and the number of expected noise generating work days. There are two zones of influence that are calculated which correspond with the two levels of take, Level A take which results in a PTS and Level B take which results in TTS or behavioral disturbance.

### **ESTIMATED ZONES OF INFLUENCE:**

There are three different types of pile driving activities that may occur on site that result in harassment level in-water noise generation. These activities include vibratory pile installation, vibratory pile removal and impact pile installation. Hydroacoustic analysis of each pile driving activity has been conducted to identify the zones which may result in Level A and Level B harassment. Vibratory pile driving impacts were evaluated for removal of 16-inch timber piles and for installation of 30-inch steel piles. As a vibratory driver will be used for timber pile removal, the same protective procedures will be implemented during removal activities as will be implemented for pile installation activities. Impact pile driving noise generation was also evaluated for the 30-inch piles as there is a known benthic substrate that may require impact driving to reach proper embedment.

To calculate the distances to noise attenuation for each of these project elements, the NMFS Multi-species Pile Driving Calculator was used. This calculator uses the practical spreading loss model, which assumes an attenuation rate of 4.5 dB for each doubling of distance. In-air noise attenuation used a spherical spreading loss model assuming a 6 dB attenuation rate for each doubling of distance.

**Table 5.** Calculated vibratory pile driving disturbance distances to attenuation for marine mammals.

Pile Size and Type	Harassment Level A for Pinnipeds		Harassment Level A for Cetaceans			Behavioral Disturbance Level B
	Harbor Seal	Sea Lions	Low Freq	Mid Freq	High Freq	All Marine Mammals
*Timber piles	3.7 m	<1 m	6.1 m	<1 m	9.0 m	6,310 m
30-inch steel pile	1.9 m	<1 m	3.2 m	<1 m	4.7 m	3,981 m

\*The representative reference sound levels for timber piles did not have a specific pile diameter (Caltrans 2020).

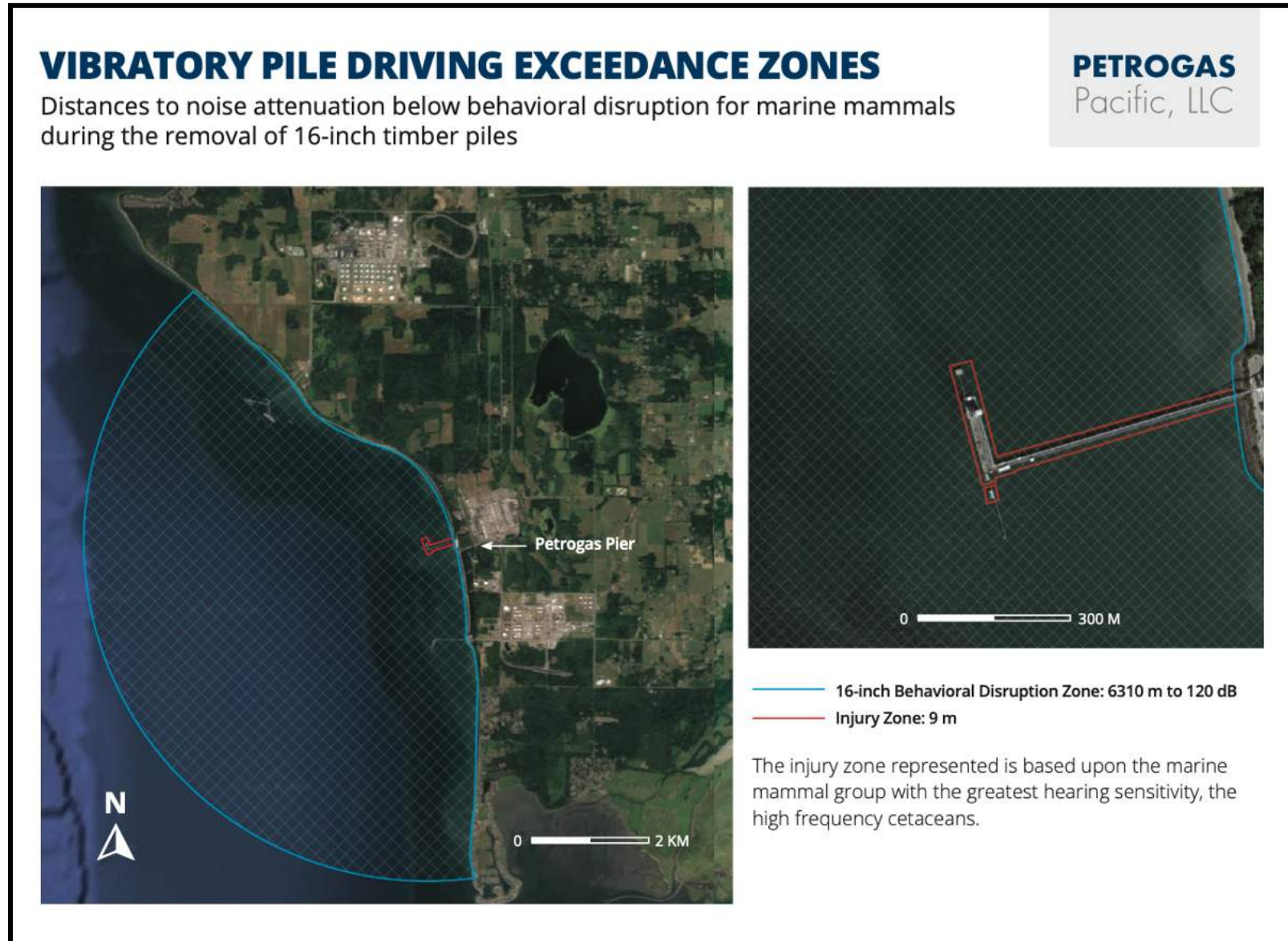
As seen from Table 5, marine mammals will have to be very close to the vibratory driving activity to be within the zone of level A harassment. Marine mammal monitors will be in place, closely monitoring this zone and work will stop before any marine mammal gets near even the largest level A harassment radius of 9 m from the noise source. Level B, behavioral disturbance for all marine mammals will extend from the project source to 6,310 meters for 16-inch piles and 3,981 m for 30-inch piles. Figures 2 and 3 show the extent of the behavioral disturbance and injury zones.

**Table 6.** Total ensonified area per pile removal and installation method.

Species	30" Impact Pile Driving Ensonified Area (km <sup>2</sup> ) for <b>Level A Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )	30" Impact Pile Driving Ensonified Area (km <sup>2</sup> ) for <b>Level B Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )	30" Vibratory Pile Driving Ensonified Area (km <sup>2</sup> ) for <b>Level A Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )	30" Vibratory Pile Driving Ensonified Area (km <sup>2</sup> ) for <b>Level B Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )	16" Vibratory Pile Removal Ensonified Area (km <sup>2</sup> ) for <b>Level A Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )	16" Vibratory Pile Removal Ensonified Area (km <sup>2</sup> ) for <b>Level B Disturbance</b> using PTS ONSET (SEL <sub>cum</sub> )
Humpback Whale	0.463	0.679	0.000	24.895	0.000	62.543
SRKW	0.001	0.679	0.000	24.895	0.000	62.543
KW Transient	0.001	0.679	0.000	24.895	0.000	62.543
Harbor Porpoise	0.656	0.679	0.000	24.895	0.000	62.543
Steller Sea Lion	0.001	0.679	0.000	24.895	0.000	62.543
Cali Sea Lion	0.001	0.679	0.000	24.895	0.000	62.543
harbor Seal	0.132	0.679	0.000	24.895	0.000	62.543

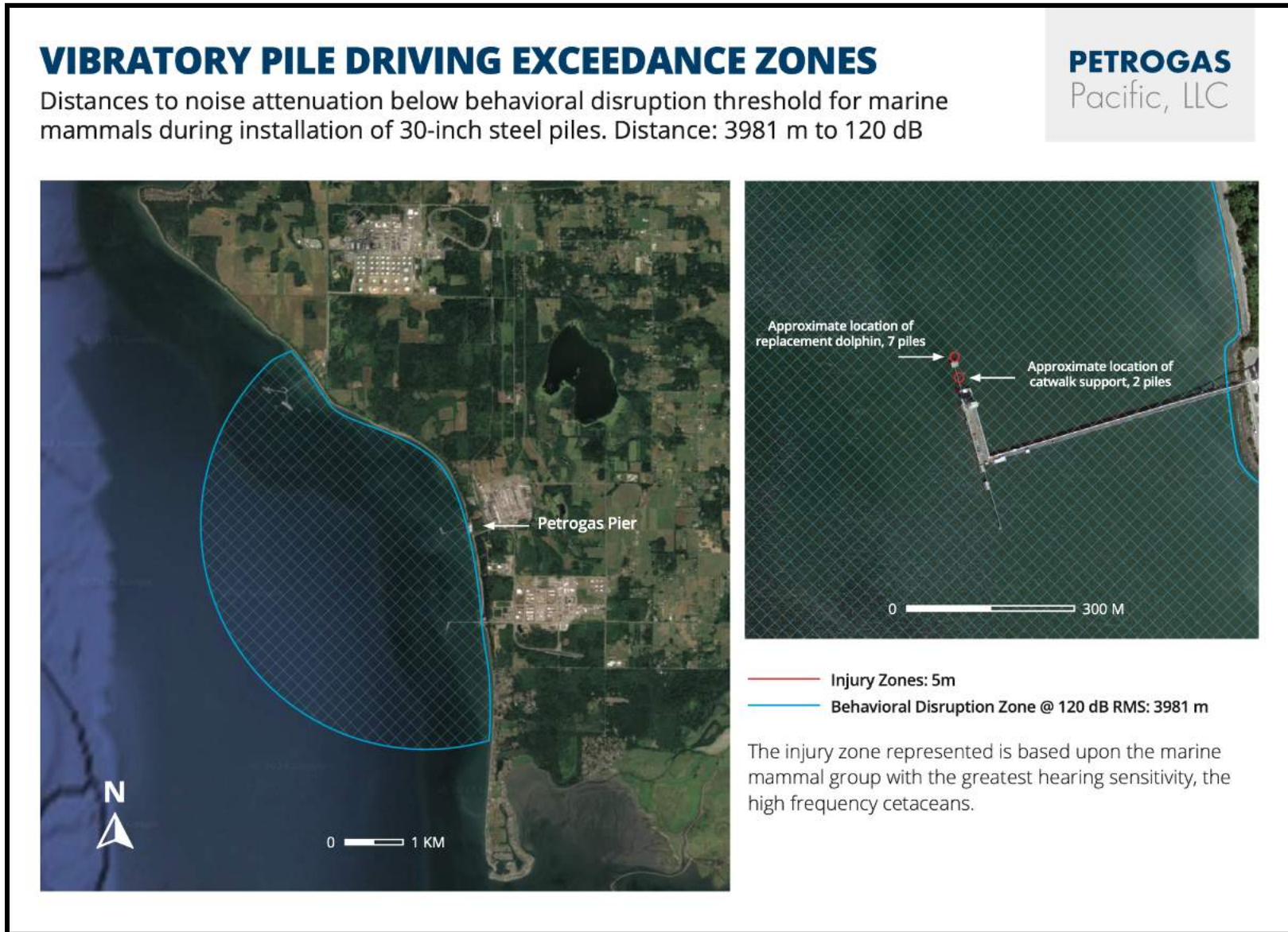
Table 6 shows the total ensonified area for each pile driving activity in square kilometers. Land mass was subtracted from the radius for the final ensonified marine water surface area.

**Figure 2.** Vibratory pile driving behavioral and injury thresholds for removal of 16-inch piles.





**Figure 3.** Vibratory pile driving behavioral and injury thresholds for installation of 30-inch piles.

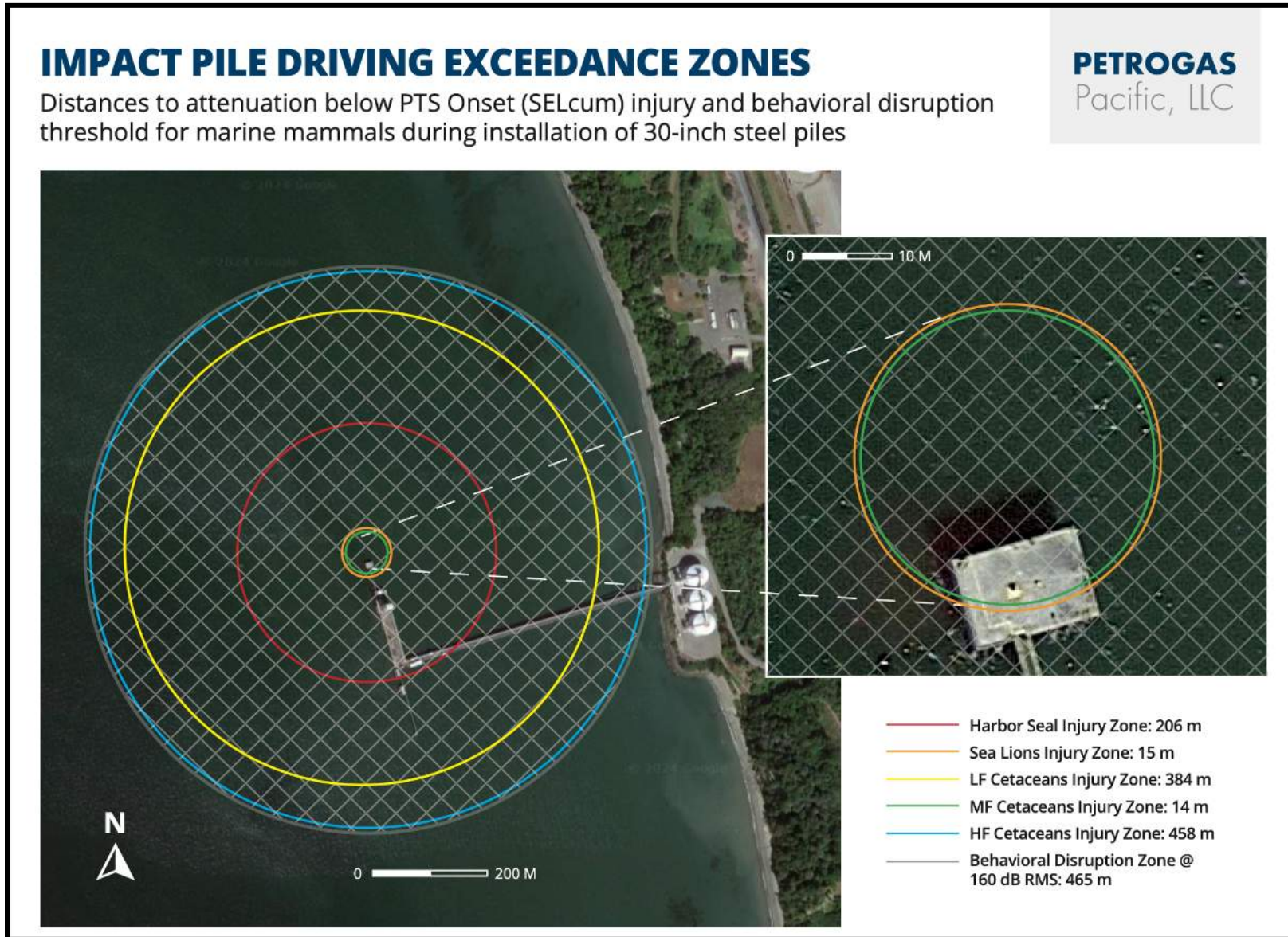


**Table 7.** Calculated impact pile driving disturbance distances to attenuation below PTS (SELcum) and disturbance thresholds for marine mammals, for PTS onset threshold.

Pile Size and Type	Harassment Level A for Pinnipeds (SELcum)		Harassment Level A for Cetaceans (SELcum)			Behavioral Disturbance Level B (160 dB <sub>RMS</sub> )
	Harbor Seal	Sea Lions	Low Freq	Mid Freq	High Freq	All Marine Mammals
30-inch pile	206 m	15 m	384 m	14 m	458 m	465 m

The Level A harassment zones for marine mammals during impact pile driving are larger than vibratory pile driving activities. Marine mammal monitors will be in place, closely monitoring this zone and work will stop before any marine mammal gets near the largest level A harassment radius of 458 m from the noise source. Level B, behavioral disturbance for all marine mammals will extend from the project source to 465 m for impact installation of 30-inch piles. Figure 4 provides a visual representation of the injury and behavioral disturbance zones calculated for impact pile driving during this project.

**Figure 4.** Impact pile driving behavioral and injury thresholds for installation of 30-inch piles



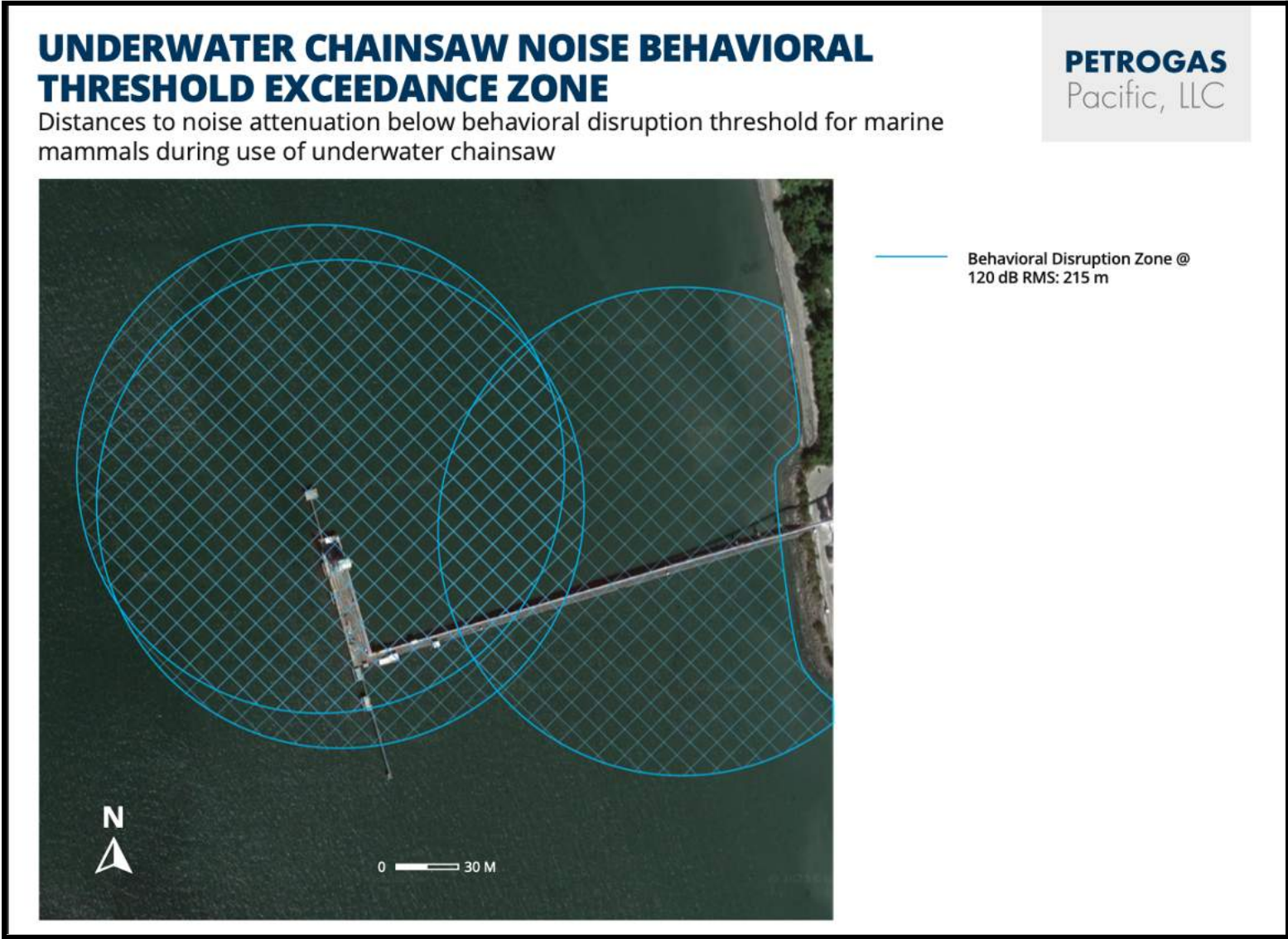


**Table 8.** Calculated disturbance zone for underwater pile cutting.

Method	Behavioral Disturbance level for Marine Mammals	Noise Level Generated	Distance to Attenuation
Underwater Chainsaw	120 dB	140 dB <sub>RMS</sub>	215 m

Underwater pile cutting may be necessary to remove old timber piles if other extraction methods are not successful. This activity is not anticipated to be a significant source of take as it is not expected to be used extensively. As planned, underwater pile cutting did not contribute to the take calculations. Marine mammal monitoring will be initiated if this removal method is used to protect marine mammals in the area. As this activity is low noise impact, and a small disturbance radius, disturbance does not have a significant impact on harassment calculations. Underwater pile cutting is not included as a factor for requested take in this application.

**Figure 5.** Underwater Chainsaw Noise Behavioral Threshold Exceedance Zone.



**Table 9.** Airborne sound levels and distances to attenuation from vibratory and impact pile driving (dB).

Pile Size and Installation Method	Sound Levels (L <sub>max</sub> @ 50 ft)	Phocid (harbor seals) Disturbance level: 90 dB <sub>RMS</sub>	Otariid (sea lions) Disturbance level: 100 dB <sub>RMS</sub>
		Distances to attenuation for airborne disturbance	
30-inch Steel, Impact	110 dB	150 m	47 m
30-inch Steel, Vibratory	105 dB	84 m	27 m
16-inch Steel, Vibratory	94 dB*	24 m	0 m

\*The closest representative pile size for reference sound levels was 18-inch piles (Caltrans 2020).

As pinnipeds may be found on the shorelines and often surveying their surroundings with their heads above water, airborne sounds levels were also considered when assessing the behavioral impacts on marine mammals. As all of the pile installation activities and most of the pile removal activities will be done roughly 450 m out from the shoreline, the sound will attenuate below the disturbance threshold for any pinnipeds on the shore. For the near shore pile removal activities, shorelines will be inspected to determine if any pinnipeds are in the area and at risk of disturbance per the marine mammal monitoring protocol before pile driving activities start. Airborne noise is not anticipated to generate a risk of take.

**ESTIMATED DENSITIES:**

Marine mammal densities found in published surveys varied significantly based upon methodologies, geographic partitioning, time of year, etc. There was no data that clearly identified the southern Strait of Georgia from other geographically distinct areas. The data selected typically integrated the southern Strait of Georgia into the same data as the San Juan Islands. While geographic neighbors, a review of whale sighting sources like the Orca Network, or references like the WDFW seal and sea lion haulouts, one finds clear density and migratory pattern differences between, for example, the Haro Strait and the southeastern Strait of Georgia, both often clumped into the same region. There were a few Strait of Georgia surveys

published, though they also included the vast Canadian waters which may also be characterized as distinct from the southern region. These Canadian studies were also too old to provide representative data per NOAA's 8 year standard. With this acknowledgement, all density estimates are considered highly conservative as they assume uniform distribution of mammals throughout the region which is not representative of their natural behavior or preferred geographic locations.

**Table 10.** Marine mammal species densities used for exposure calculations.

Species	Region Characterized	Density (Animals / km <sup>2</sup> )
Humpback Whale	North Puget Sound / San Juan Islands (Fall and Winter)	0.0027
SRKW	North Puget Sound / San Juan Islands (Fall and Winter)	0.0078
KW Transient	North Puget Sound / San Juan Islands (Fall and Winter)	0.00306
Harbor Porpoise	North Puget Sound	2.16
Steller Sea Lion	North Puget Sound / San Juan Islands (Fall)	0.0027
California Sea Lion	North Puget Sound / San Juan Islands (Fall)	0.0179
Harbor Seal	North Puget Sound / San Juan Islands (Fall)	0.76

Source for all density values: Navy. (2019). U.S. Navy Marine Species Density Database Phase III for the Northwest Training and 27 Testing Study Area. NAVFAC Pacific Technical Report. Naval Facilities Engineering Command 28 Pacific, Pearl Harbor, HI. Amended August 12, 2020. 262 pp.

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**Estimated Take:**

Estimated take was calculated based on the two determined zones of influence for each pile driving activity. The first is Level A noise, an auditory permanent threshold shift, which may result in injury or death. This threshold has been evaluated and determined based on individual species sensitivity. The second zone of influence is disturbance level noise, Level B, which is any noise that may disrupt normal behavior. For marine mammals this threshold is 120 dB for vibratory pile driving and 160 dB for impact pile driving. The total area of each zone of influence was determined, this area is then multiplied by the estimated densities to identify the number of exposures per species. Finally, the number of exposures is multiplied by the number of anticipated work days to totalize the estimated exposures per species for the whole project. Tables 11 and 12, provide the calculated estimates for each species. Impact pile driving for the project is expected to have 4 Level A exposures. Calculated Level A take resulted in potential take of 10 harbor porpoises and 1 harbor seal. The project plans to minimize level A harassment through a robust marine mammal monitoring program to stop work before any marine mammals come near the Level A exposure area. Potential Level A and Level B exposures will be discussed in detail for each species below.

**POTENTIAL LEVEL A THRESHOLD EXPOSURES:**

Impact pile driving generates significant hydroacoustic noise and does not dissipate below the PTS threshold for marine mammals until 458 meters from the project for the most sensitive marine mammals (high frequency cetaceans). This large area in combination with the abundance of harbor porpoises and harbor seals in the Strait of Georgia results in potential Level A harassment for both of these species.

**Harbor Porpoise**

Harbor porpoises are commonly found in the Strait of Georgia as indicated by regular sightings from the BCCSN and the Orca Network (Zier, 2015). Calculated take based upon the species density in the Strait of Georgia yielded 10 potential Level A exposures from the 7 days of impact pile driving work. Vibratory pile driving did not yield any meaningful calculated level A exposure.

## Harbor Seal

Harbor seals are commonly found in the Strait of Georgia. Calculated take based upon species the species density in the Strait of Georgia yielded 1 potential Level A exposure from the 7 days of impact pile driving work. Vibratory pile driving did not yield any meaningful calculated level A exposure.

**Table 11.** Total calculated level A exposure estimates and requested take by species for pile driving activities at the Petrogas Pier.

Calculated Exposure Estimates for Level A, PTS Level Noise (120 dB)**					
Species	Impact driving 30-inch pile (7 days)	Vibratory driving 30-inch piles (7 days)	Vibratory driving 16-inch piles (10 days)	Total Calculated Level A Take*	Total Request Level A Take
Humpback Whale	0	0	0	0	0
SRKW	0	0	0	0	0
KW Transient	0	0	0	0	0
Harbor Porpoise	10.1	0	0	10	10
Steller Sea Lion	0	0	0	0	0
California Sea Lion	0	0	0	0	0
Harbor Seal	0.7	0	0	1	1

\*Total calculated take is the sum of each individual project aspect, which with fractions taken into account, are rounded to the nearest whole number.

\*\*Level A exposure estimates are a theoretical calculation based upon 24 hour continuous hours of exposure at the predicted noise level. This condition will never be generated at this site as the planned work anticipates only slightly over 1 hour of active impact pile driving time per day, not 24 hours of impact pile driving.

**POTENTIAL LEVEL B THRESHOLD EXPOSURES:**

The number of potential Level B threshold exposures are much higher than Level A exposures. This is because the total area at the disturbance level is much larger than the injury level area. Vibratory and impact pile driving generate significant hydroacoustic noise and does not dissipate below the 120 dB disturbance threshold for marine mammals for hundreds or thousands of meters from the project. This large area along with the multiple weeks needed to complete installation and removal of piles, results in potential exposure for humpback whale, southern resident killer whales, transient killer whales, harbor porpoise, steller sea lions, california sea lions, and harbor seals.



**Table 12.** Total level B exposure estimates and requested take by species for pile driving activities at the Petrogas Pier.

Calculated and Requested Take for Level B, Disturbance Level Noise (120 dB)					
Species	Impact driving 30-inch pile (7 days)	Vibratory driving 30-inch piles (7 days)	Vibratory driving 16-inch piles (10 days)	Total Calculated Level B Take*	Requested Level B Take
Humpback Whale	0	0.5	1.7	2	0
SRKW	0	1.4	4.9	6	0
KW Transient	0	0.5	1.9	2	0
Harbor Porpoise	10.3	376.4	1,351	1,738	1,738
Steller Sea Lion	0	0.5	1.7	2	17*
California Sea Lion	0.1	3.1	11.2	14	51*
Harbor Seal	3.6	132	475	611	611

\*At Seattle’s Pier 63 there were a maximum of 3 CSLs and 1 SSL taken per day over 17 in-water work days between Oct 12 and Nov 30, 2022. Assuming the same maximum takes for these species over the proposed 17 days of in-water work would result in 51 proposed takes of CSLs and 17 proposed takes of SSL by Level B harassment. Calculated takes were 14 CSLs and 2 SSLs but Petrogas felt like these numbers were too low given the close proximity of the Cherry Point Aquatic Reserve and the likelihood that large numbers of prey species can be found there.

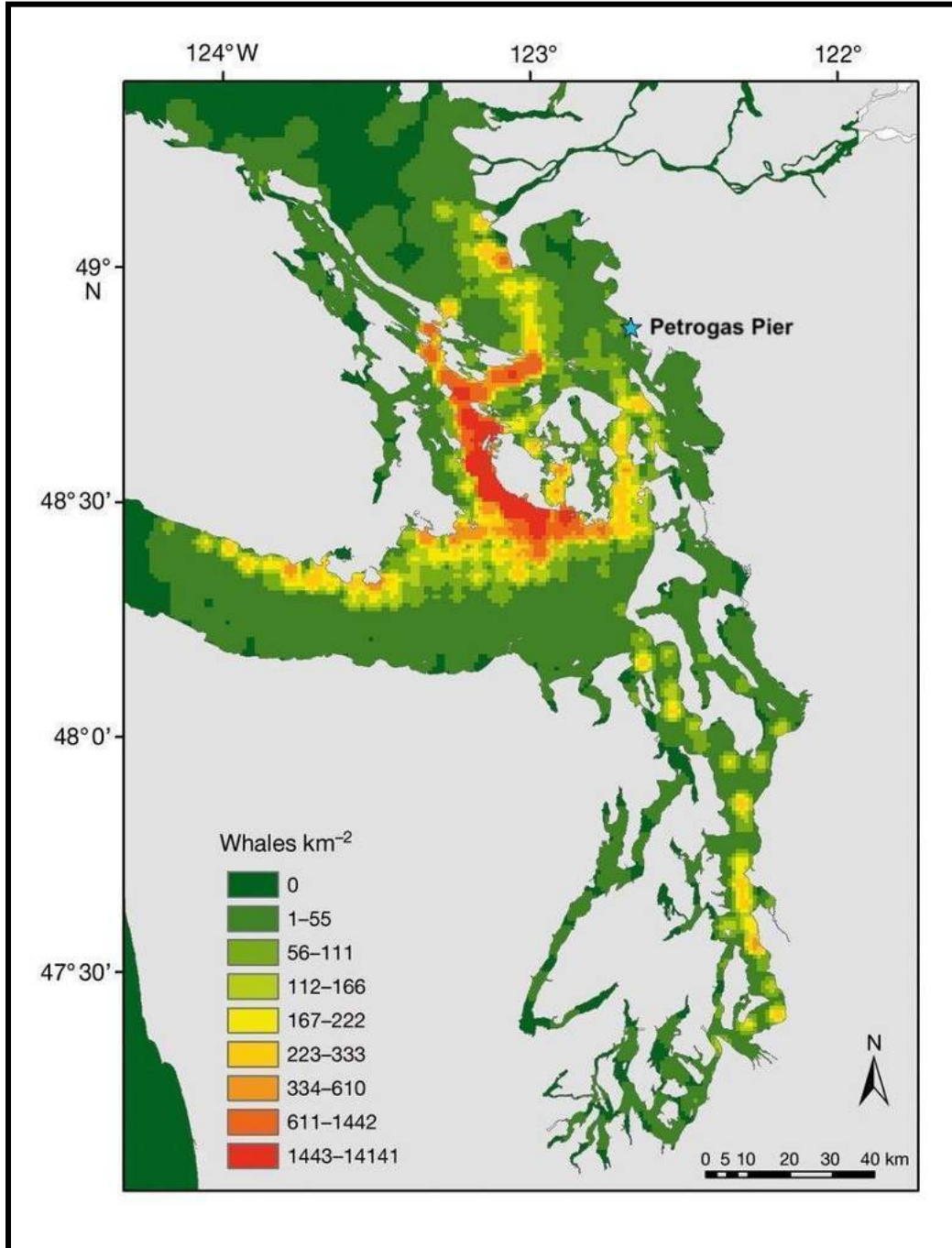
### **Humpback Whale (Central North Pacific and California / Oregon / Washington Stocks)**

Humpback whales are a rare occurrence near the project area but have the potential to be in the area as they migrate to feeding grounds to the north and mating grounds far south. Based upon the sighting data from the Orca Network, the closest they are regularly seen is in the Haro Strait and up through the Gulf Islands of British Columbia. Estimated Level B take was 2 exposures for humpback whales. As these are ESA listed species, level B take will not be requested. A robust marine mammal monitoring plan will be developed and implemented to prevent level B take.

### **Killer Whale (Eastern North Pacific Southern Resident Stock)**

SRKW are commonly seen in the Puget Sound, along the Haro Strait, among the San Juan Island, north into the Strait of Georgia via Boundary Pass and the Gulf Islands. This area constitutes their summer core area. This is best seen in Figure 6, showing the SRKW density from 38 years of data. The southeastern corner of the Strait of Georgia, the location of this project, is not a common location they are found. Seasonally, in-water work is anticipated to start August 1st and the SRKW will still be in the Puget Sound and the project adjacent, Summer Core area. Calculated take based upon species density yielded 6 Level B exposures but as these are ESA listed species, level B take will not be requested. A robust marine mammal monitoring plan will be developed and implemented to prevent level B take.

**Figure 6.** Southern Resident Killer Whale density based on effort-corrected data in the Salish Sea. Figure from Olsen et al 2018. Plotted sightings data from 1976 - 2014 with site location added for reference.



### **Killer Whale (West Coast Transient Stock)**

Transient killer whales have seasonal presence in Puget Sound. Some groups enter the Salish Sea, in search of prey along the Southeastern end of Vancouver Island during August and September, peak season for harbor seal pupping (Baird et al. 1995). Seasonally, in-water work is anticipated to start August 1st and the WCTKW may be in the area.

WCTKW within the disturbance zone of the project may experience a Level B exposure. Calculated take based upon species density yielded 2 Level B exposures. As these marine mammals are not easily discernible from their endangered cousins, the SRKW, no take is requested. A robust marine mammal monitoring plan will be developed and implemented to prevent level B take.

### **Harbor Porpoise**

Harbor porpoises are commonly found in the Strait of Georgia as indicated by regular sightings from the BCCSN and the Orca Network (Zier, 2015). Calculated take based upon species the species density in the Strait of Georgia yielded 1,738 potential Level B exposures during the 17 days of pile driving work.

### **Steller Sea Lion**

Calculated level B disturbance was 2 Steller sea lions within 1585 m from the project. The facility felt like this number was too low given the close proximity of the Cherry Point Aquatic Reserve and the likelihood that large numbers of prey species can be found there. At Seattle's Pier 63 there were a maximum 1 Steller sea lion taken per day over 17 in-water work days between Oct 12 and Nov 30, 2022. Assuming the same maximum take for this species over the proposed 17 days of in-water work would result in 17 proposed takes of Steller sea lions by Level B harassment. While there are no known immediate nearby haulouts, there are haulouts in the greater Strait of Georgia and because this species may travel significantly in search for prey, possibly into the marine waters of the Cherry Point Aquatic Reserve, the facility is requesting 17 total level B harassment for Steller sea lions.

### California Sea Lion

Calculated level B disturbance was 14 California sea lions within 1585 m from the project. The facility felt like this number was too low given the close proximity of the Cherry Point Aquatic Reserve and the likelihood that large numbers of prey species can be found there. At Seattle's Pier 63 there were a maximum 3 California sea lions taken per day over 17 in-water work days between Oct 12 and Nov 30, 2022. Assuming the same maximum take for this species over the proposed 17 days of in-water work would result in 51 proposed takes of California sea lions by Level B harassment. While there are no known immediate nearby haulouts, there are haulouts in the greater Strait of Georgia and because this species may travel significantly in search for prey, possibly into the marine waters of the Cherry Point Aquatic Reserve, the facility is requesting 51 total level B harassment for California sea lions.

### Harbor Seal

Harbor seals are commonly found in the Strait of Georgia. Calculated take based upon species the species density in the Strait of Georgia yielded 611 potential Level B exposures during the 17 days of pile driving work.

### TAKE FOR AIRBORNE DISTURBANCE

Airborne Level B threshold disturbances are not anticipated to occur during pile driving activities. These disturbance zones are small and the in-water pile driving exclusion zones and marine mammal inspections of the shorelines will effectively prevent airborne take.

## **SECTION 7 - ANTICIPATED IMPACTS OF ACTIVITY**

### **NOISE: IN-WATER NOISE**

Per NMFS studies, sufficient noise may produce both short and long term effects on marine mammals, via temporary hearing threshold shifts and long term permanent damage to their auditory senses. A temporary threshold shift (TTS) results when noise disrupts their hearing but their senses return to baseline. This may occur in the zone of Level B disturbance noise. A permanent threshold shift (PTS) occurs when the noise results in permanent hearing damage. This can occur when noise is above the Level A threshold (NMFS 2022). The proposed project will produce noise that has the potential to result in Level A or Level B threshold exceedances if marine mammals come within these characterized zones. Calculation of these zones of influence, evaluation and selection of most representative available marine mammal density data and careful evaluation of the possible uses of the area by marine mammals indicate that there is potential for Level A take for the most common species, harbor porpoises and harbor seals though this will be for a small count (11 total). It is not anticipated that any marine mammals will be permanently injured by this work as work will be stopped before marine mammals enter the Level A injury zone. Daily pile driving will also not occur long enough to accumulate the impacts generated from the calculated injury values. This is a protective aspect of using the isopleth values from the cumulative sound exposure levels rather than peak noise isopleths. Level B take, as a function of the larger behavioral disturbance zone and species specific population densities, is expected to occur during this project.

Due to the noise generated from pile driving, and the large resultant radius of disturbance, this project is anticipated to temporarily disturb marine mammals, particularly the higher population density marine mammals; sea lions, harbor porpoise and harbor seals in the area. These stocks are at healthy population levels and do not put the overall stocks at any risk. Short term impacts may include temporary threshold shifts in hearing, temporary displacement from the waters near the project due to aversion to the noise generated and lack of prey availability during work as they may also be temporarily displaced by noise.

Humpback, SRKW and WCTKW are not anticipated to be impacted as monitoring will attempt to identify these species and stop work before they enter the disturbance zones. Pile driving activities will only last a few weeks and a marine mammal monitoring plan will be used to carefully monitor the injury and disturbance zones to minimize impacts to marine mammals.

With this protective plan in place this project is not anticipated to result in any long term impacts.

#### **NOISE: AIRBORNE NOISE**

The Level B Airborne noise threshold disturbance area for pinnipeds is small and will not reach the beach for the vast majority of the project work and will not overlap with haulouts. Given that the in-water monitoring and exclusion zones will be in place during the airborne noise, it is unlikely that this aspect will have any impact on pinnipeds.

## **SECTION 8 - ANTICIPATED IMPACTS ON SUBSISTENCE USES**

Marine mammals in the project area are not harvested for subsistence use. Therefore, no impact will occur to subsistence uses.



## **SECTION 9 - ANTICIPATED IMPACTS ON HABITAT**

There are no anticipated permanent negative impacts to habitat for any of the seven marine mammal species evaluated for take. Marine mammal prey species may temporarily be displaced by noise generated during pile driving. The pile driving activities are temporary and will result in removal of 47 creosote treated timbers, and a smaller replacement dolphin footprint for the north mooring dolphin replacement. The conveyor system removal will eliminate 13,400 sq. ft. of surface area over water and remove 22 creosote treated timber piles from marine waters. Pile driving may temporarily increase turbidity but this will be localized and not expected to exceed the Washington State water quality standards. Water quality will be monitored and managed per the approved Water Quality Monitoring and Protection Plan. The pile removal activities listed above will result in an estimated 87 tons of creosote treated timber piles removed from the marine environment. This project is anticipated to yield a net environmental benefit per the NMFS Puget Sound Nearshore Conservation Calculator.

## **SECTION 10 - ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS**

Impacts to harbor seals, harbor porpoises, sea lions, orca, humpback whales may include temporary loss of available habitat if these species avoid the project area during pile driving and pile removal activities. Pile driving noise may also disturb fish and other marine prey present within the project area, resulting in avoidance due to lack of prey availability and reduced foraging habitat in the southeastern corner of the Strait of Georgia. The reduction in forage area will be temporary and any disturbed prey species is anticipated to return to the project area when pile driving work is not occurring. The total forage habitat that will be temporarily impacted is a small percentage of the available forage habitat in the area. No documented haulouts are in the disturbance zones of the project which means no marine mammals are anticipated to be displaced from their haulout and residential habitat. Temporary increases in turbidity may occur during pile driving and pile removal. Any increase in turbidity is expected to be short term, localized and within the Washington State water quality standards for extraordinary water. Temporary turbidity increases are not anticipated to impact marine mammals or their habitat.

The project coincides with when the SRKW is in their summer core territory. While the project is within the summer core area, the SRKW are rarely observed in the project area and disturbance is a low risk. They are often seen in adjacent areas on the opposite side of the Strait of Georgia, in Boundary Pass and the Haro Strait. The project will still use marine mammal monitoring to closely watch for the SRKW coming near the project disturbance zone and stop work to prevent disturbance in their designated critical habitat. Due to their low population and thus low population density, temporary impacts to this habitat are not anticipated to affect this stock.

Transient killer whales and humpback whales may be found in the area but they are not regular visitors and this is not designated critical habitat for these stocks. The project will still use marine mammal monitoring to closely watch for transient killer whales and humpback whales and stop work before they enter the disturbance zone. Due to their low populations and thus low population densities, temporary impacts to this habitat are not anticipated to affect these stocks.

There are known haulouts for seal and sea lion on the islands adjacent to the project location and to the north and south on the eastern Georgian shorelines. There are healthy populations of harbor seals throughout the Salish Sea and population density calculations predict likely disturbances. They may be temporarily displaced as their habitat will be temporarily disturbed.

There are healthy populations of harbor porpoises throughout the Salish Sea and population density calculations predict likely disturbances. They may be temporarily displaced as their habitat will be temporarily disturbed.

This project is not anticipated to have any negative long term impacts to marine mammals or the habitat. Habitat impacts may result in temporary displacement for some species. Removal of old creosote treated timbers, a reduction in the total number of piles in the marine environment, and a reduction in impervious surface area over water are expected to be net long term benefits to the marine mammal habitat.

## **SECTION 11 - MITIGATION MEASURES TO PROTECT MARINE MAMMALS AND THEIR HABITAT**

Maintenance and repair of the Petrogas Pier has been designed to avoid and minimize potential impacts to the environment and marine mammals. This project will conform to the NMFS and US Army Corps approved project design criteria (PDC), general construction measures (GCM) and best management practices of the Salish Sea Nearshore Programmatic (SSNP). Listed below is a summary of the protective practices that will be implemented during maintenance work at the Petrogas Pier.

### **OPERATIONS COORDINATION:**

Petrogas shall conduct briefings between construction supervisors and crews, the marine mammal monitoring team, and staff prior to the start of all pile driving activity and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

### **MEASURES PROPOSED TO MINIMIZE IMPACTS TO MARINE MAMMALS:**

#### **MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES TO MINIMIZE PROJECT HYDROACOUSTIC AND ASSOCIATED PROJECT IMPACTS DURING VIBRATORY PILE DRIVING**

- A vibratory driver will be used as much as practicable to drive piles to minimize peak noise levels.
- Vibratory driving time will not exceed 3 hours in any 24-hour period.
- Pile removal and installation will be completed during the allowable in-water work period (between August 1 and February 1 of each year the permit is valid) when juvenile salmonids and forage fish are not likely to be in the project area.
- Replacement piles will be steel to prevent leaching as approved by the Washington State Department of Natural Resources.
- A marine mammal monitoring program will be implemented to protect marine mammals in the action area. The buffer area will be monitored before and during pile driving. The in-water work will not be initiated, or will be temporarily suspended if a

marine mammal is identified within the exclusion radius (shutdown zone) of the work site. See the Monitoring and Shutdown Procedures in Section 13.

- A soft start procedure will be implemented. The objective of a soft-start is to provide a warning and/or give animals in close proximity to pile driving a chance to leave the area prior to a vibratory or impact driver operating at full capacity thereby, exposing fewer animals to loud underwater and airborne sounds.
- Creosote pile removal will follow applicable practices per the DNR guidance manual: Washington Department of Natural Resources Derelict Creosote Piling Removal Best Management Practices for Pile Removal & Disposal (Updated 1/25/2017).
- All general maintenance Best Management Practices (BMPs) will be followed during in-water work.

#### **MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES TO MINIMIZE PROJECT HYDROACOUSTIC AND ASSOCIATED PROJECT IMPACTS DURING IMPACT PILE DRIVING**

- Pile driving time will not exceed 3 hours of impact driving time in any 24-hour period.
- A full depth bubble curtain will be placed around the piles during impact driving to attenuate impulsive noise. The contractor will start the bubble curtain prior to the initiation of impact pile driving to flush fish from the zone near the pile where SPL are highest.
- A soft-start procedure will be used for impact pile driving at the beginning of each day's in-water pile driving or any time pile driving has ceased for more than 1 hour. The contractor will provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent sets, regardless of whether other activities such as vibratory driving have occurred during the interim.
- A marine mammal monitoring program will be implemented to protect marine mammals in the action area. The buffer area will be monitored before and during pile driving. The in-water work will not be initiated, or will be temporarily suspended if a marine mammal is identified within the exclusion radius (shutdown zone) of the work site. See the Monitoring and Shutdown Procedures in Section 13.
- All general maintenance Best Management Practices (BMPs) will be followed during in-water work.

**GENERAL MAINTENANCE BMPS FOR ABOVE-WATER WORK (FOR ALL MAINTENANCE PROJECT ASPECTS):**

- All waste and construction materials will be collected and disposed of at an approved upland location.
- No waste material will enter the waterbody.
- All work windows will be observed including authorized in-water work windows defined per the requirements of the conditional use permits from Washington Department of Natural Resources, U.S. Army Corps of Engineers, and Washington Department of Fish and Wildlife.
- Barges will not enter the intertidal region or areas of marine vegetation.
- A written spill prevention, control, and countermeasures plan will be prepared for activities that include the use of heavy equipment or chemicals. The plan will describe measures to prevent or reduce impacts from accidental leaks or spills. It will contain a description of all hazardous materials that will be used, proper storage and handling for those materials, monitoring methods and emergency response / reporting procedures. A spill kit will be available on-site during construction and stored in a location that facilitates immediate deployment if needed.
- The contractor will place secondary containment around all equipment containing oils as necessary (fuel, hydraulic, motor oil, etc.). This containment will be kept free of water (to the best extent possible) in order to provide maximum effectiveness should a spill occur.
- Whenever blasting and/or grinding activities are conducted, secondary containment screening will be erected to capture debris from the work area.

## **SECTION 12 - MITIGATION MEASURES TO PROTECT SUBSISTENCE USES**

The Project will have no impact on subsistence. Therefore, mitigation measures to protect subsistence uses are not proposed.

## SECTION 13 - MONITORING AND REPORTING

### MONITORING PLAN:

To reduce impacts to marine mammals to the lowest extent practicable, a marine mammal monitoring plan will be approved by NMFS prior to the start of construction. The final monitoring plan will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft plan from NMFS.

One or more protected species observers (PSOs) or marine mammal monitors (MMMs), 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 for ESA listed marine mammals and WCTKW will be established (Figures 7, 8 and 9). In addition, monitoring zones and exclusion zones for harbor seals, sea lions, and harbor porpoises will also be established. See figures 10, 11 and 12.

### VISUAL MONITORING AND SHUTDOWN PROCEDURES FOR ESA LISTED MARINE MAMMALS:

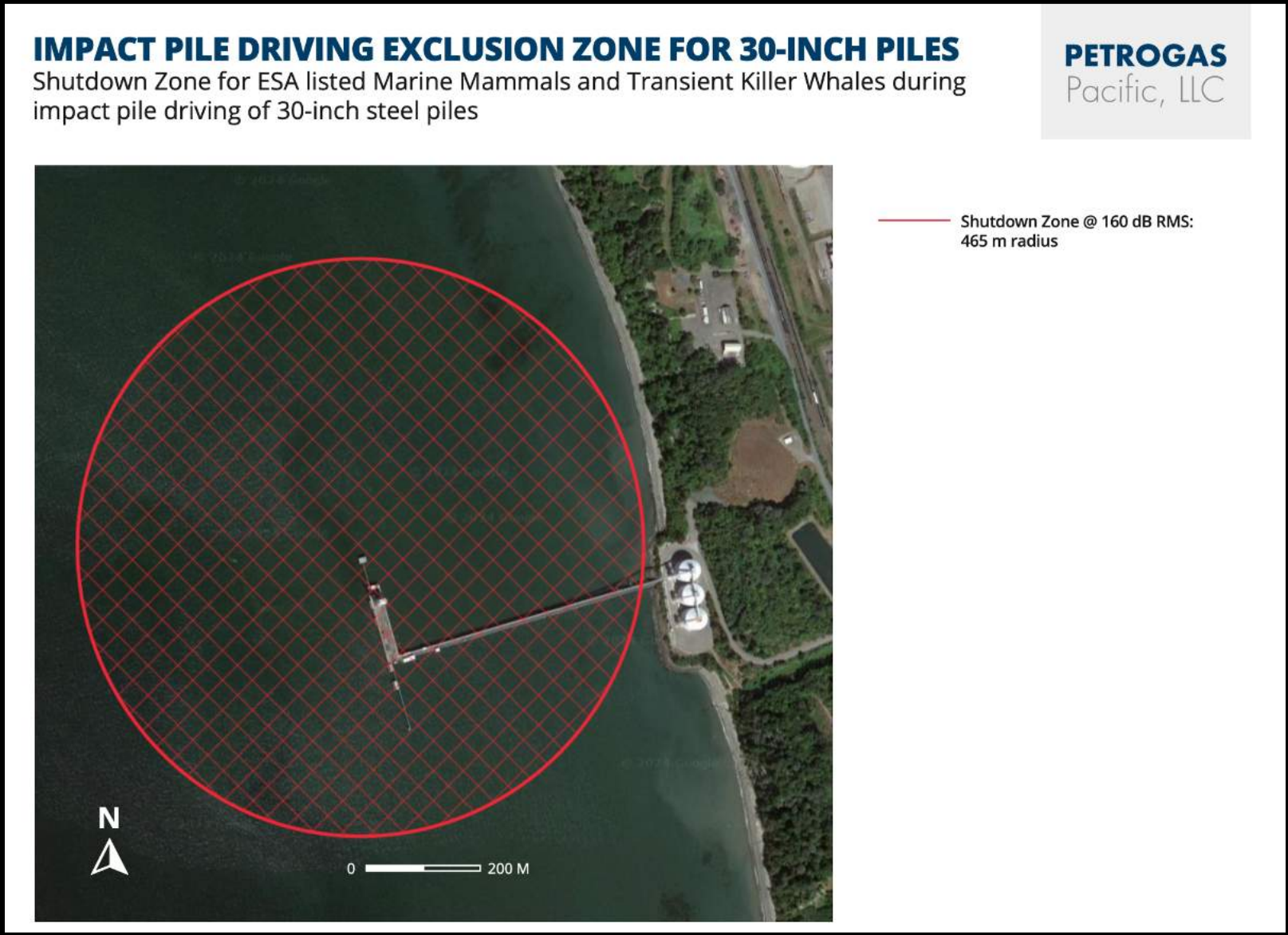
- To avoid impacts to ESA listed marine mammals and transient killer whales, a shutdown zone will be implemented during all pile removal and pile driving activities. The two ESA Listed species of specific concern are the SRKW and the humpback whale. As the transient killer whales may not be easily distinguishable from the SRKW, the same monitoring procedure will apply to the transient stock. The following in-water shutdown zones are proposed to avoid all potential Level A and Level B harassment of ESA listed marine mammals and transient killer whales:

**Table 13.** Exclusion zones for ESA listed marine mammals and WCTKW.

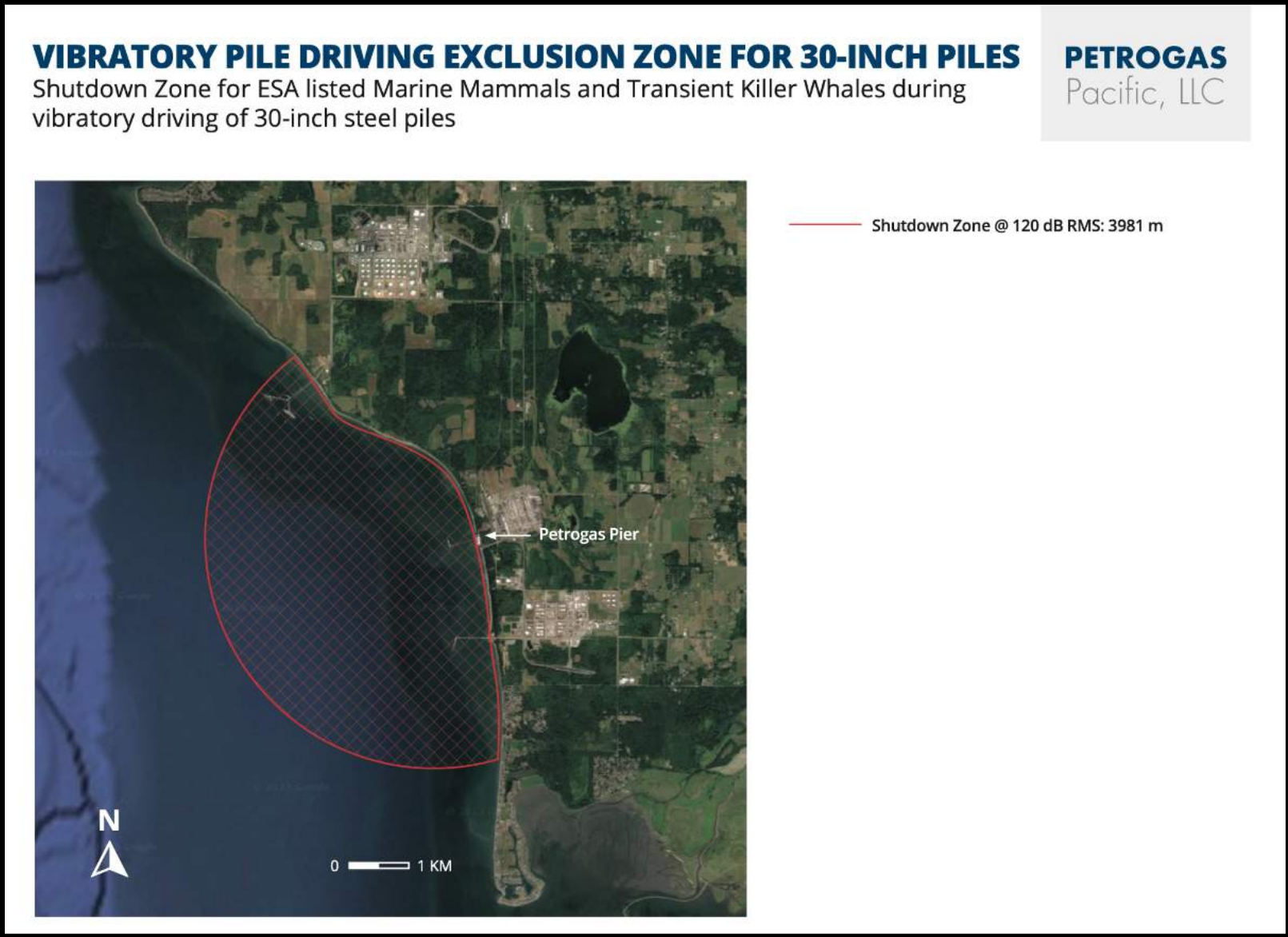
Pile size	Pile driving method	Radius of Exclusion Zone
30-inch Steel	Impact	465 m
30-inch Steel	Vibratory	3,981 m
16-inch timber	Vibratory	6,310 m



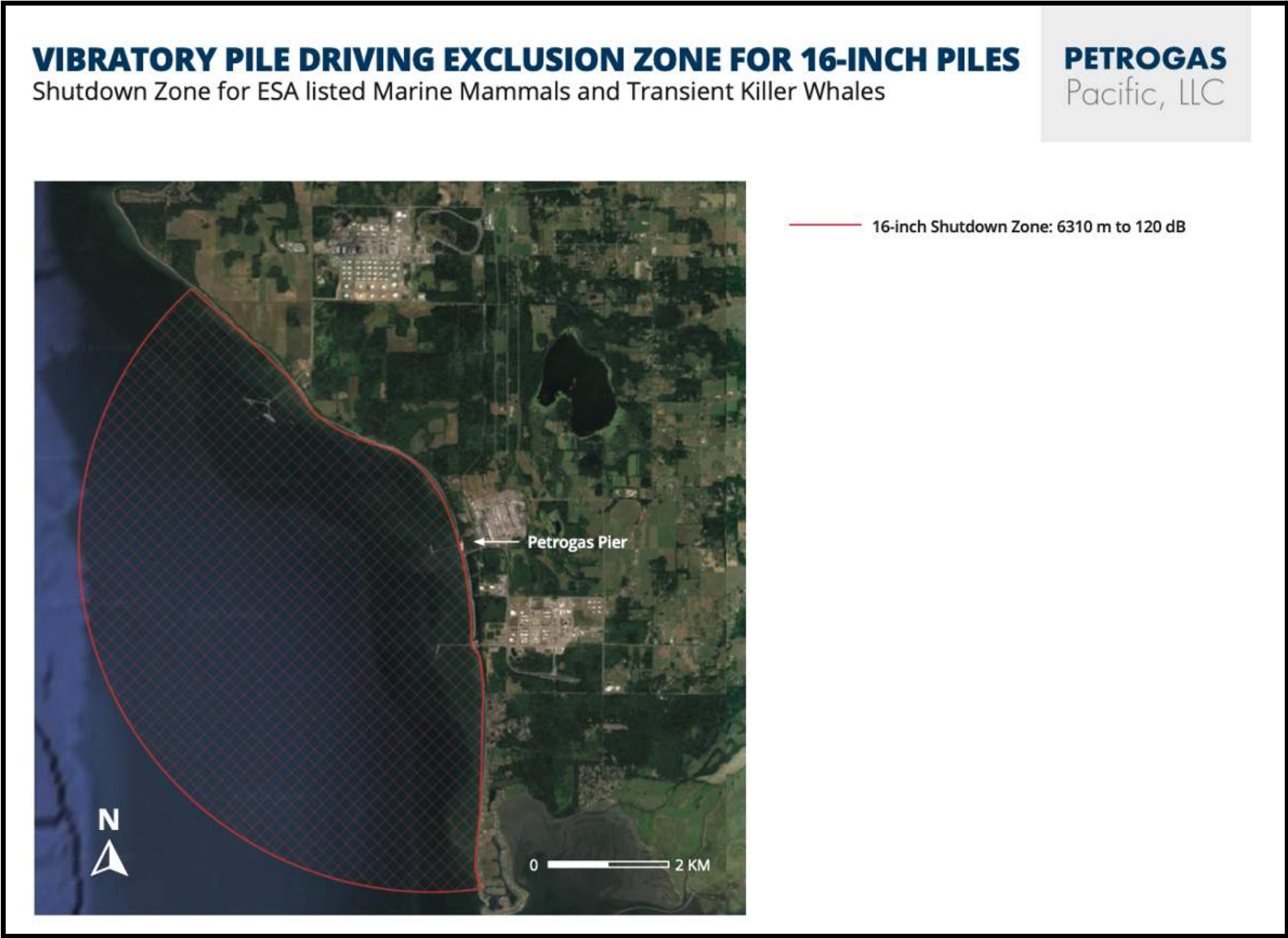
**Figure 7.** Shutdown zone for ESA listed marine mammals and WCTKW when impact driving 30-inch steel piles.



**Figure 8.** Shutdown zone for ESA listed marine mammals and WCTKW when vibratory driving 30-inch steel piles.



**Figure 9.** Shutdown zone for ESA listed marine mammals and WCTKW when vibratory pulling 16-inch steel piles.



**VISUAL MONITORING AND SHUTDOWN PROCEDURES FOR NON-ESA LISTED MARINE MAMMALS**

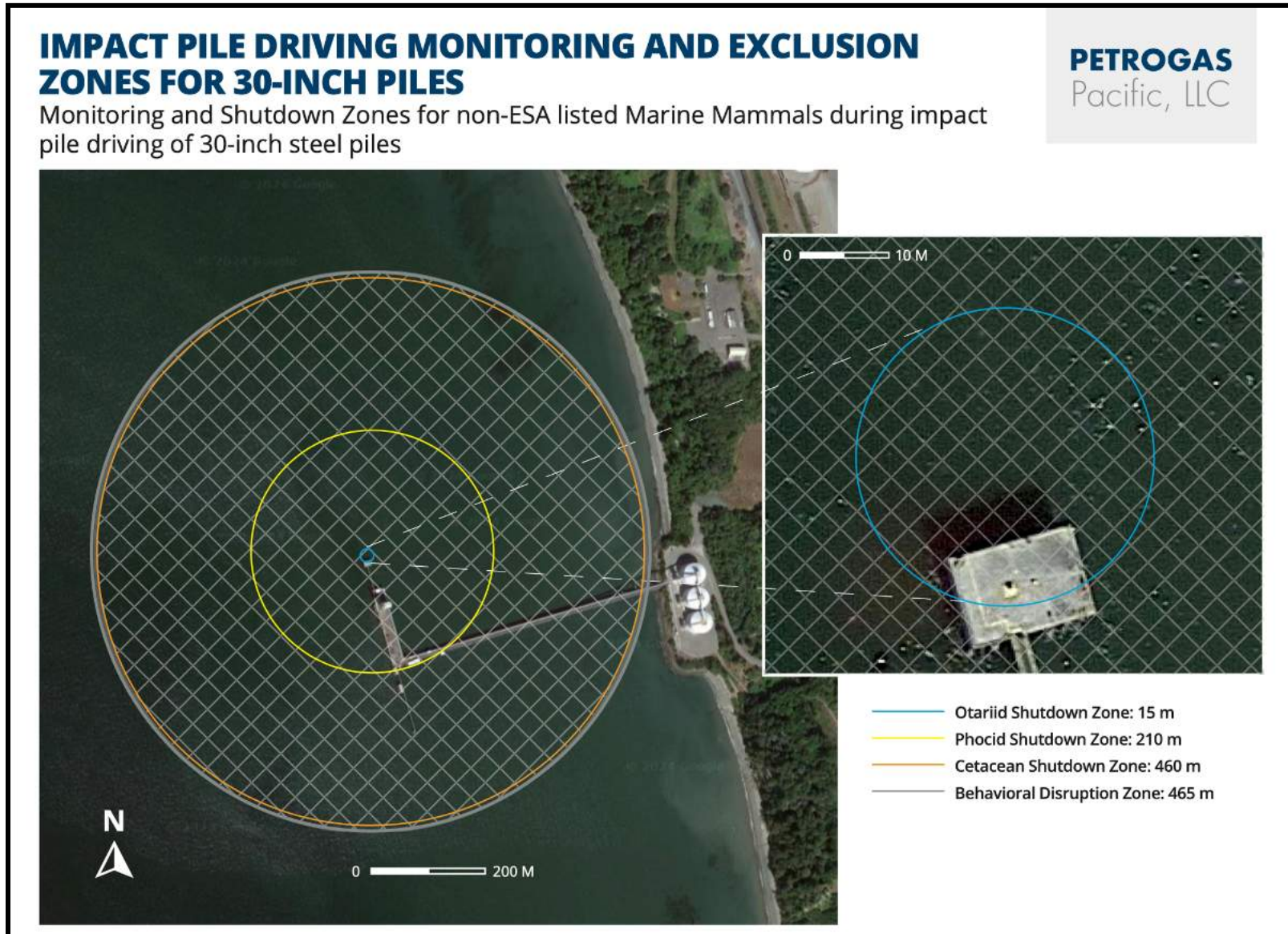
- The proposed Level A and Level B monitoring zones for harbor seals, harbor porpoises, california sea lions, and steller sea lions are based on the calculated zones of influence summarized in Section 6. The proposed exclusion zones have been developed to avoid all possible Level A take for harbor seals, sea lions and harbor porpoises. Although different functional hearing groups of cetaceans (i.e., mid-frequency) and pinnipeds (i.e., otariid) were evaluated, the threshold levels used to identify the exclusion zones were selected to be conservative for cetaceans (and therefore at the lowest levels); as such, the exclusion zones for cetaceans were based on the high frequency threshold (harbor porpoise). The proposed Level B monitoring zones are based on the noise disturbance standards for all marine mammals at 160 dB for impact driving and 120 dB for vibratory driving, identified in Table 14 and shown in Figures 10, 11 and 12.

**Table 14.** Monitoring and exclusion zones for non-ESA listed marine mammals.

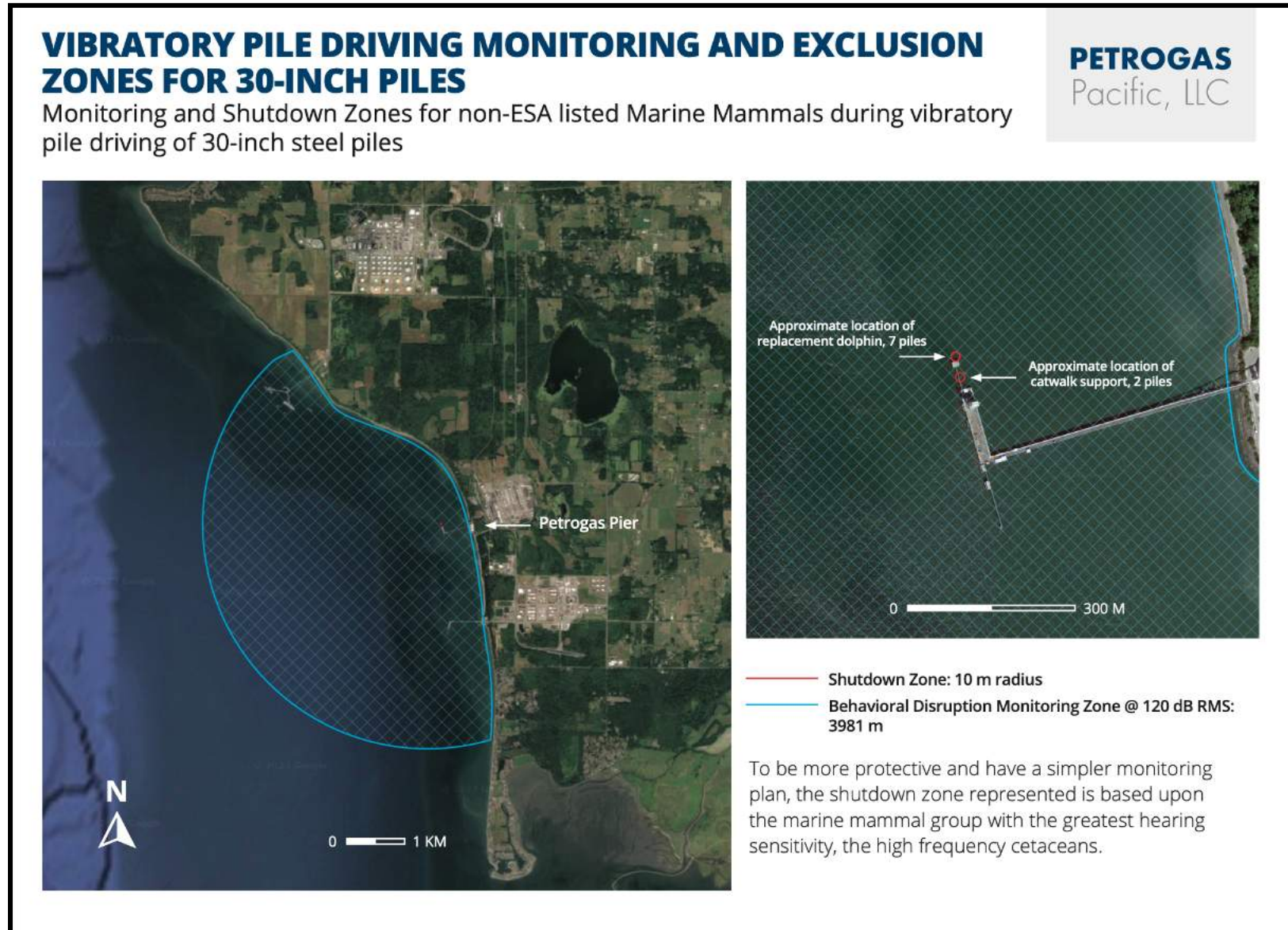
Pile Size / Type	Level A Exclusion Zone (meters)			Level B Monitoring Zones (meters)
	Cetaceans	Phocids	Otariids	
16-in timber / Vibratory	10	10	10	6310
30-in steel / Vibratory	10	10	10	3981
30-in steel / Impact	460	210	15	465



**Figure 10.** Monitoring and exclusion zones for non-ESA listed marine mammals during impact pile driving 30-inch piles.

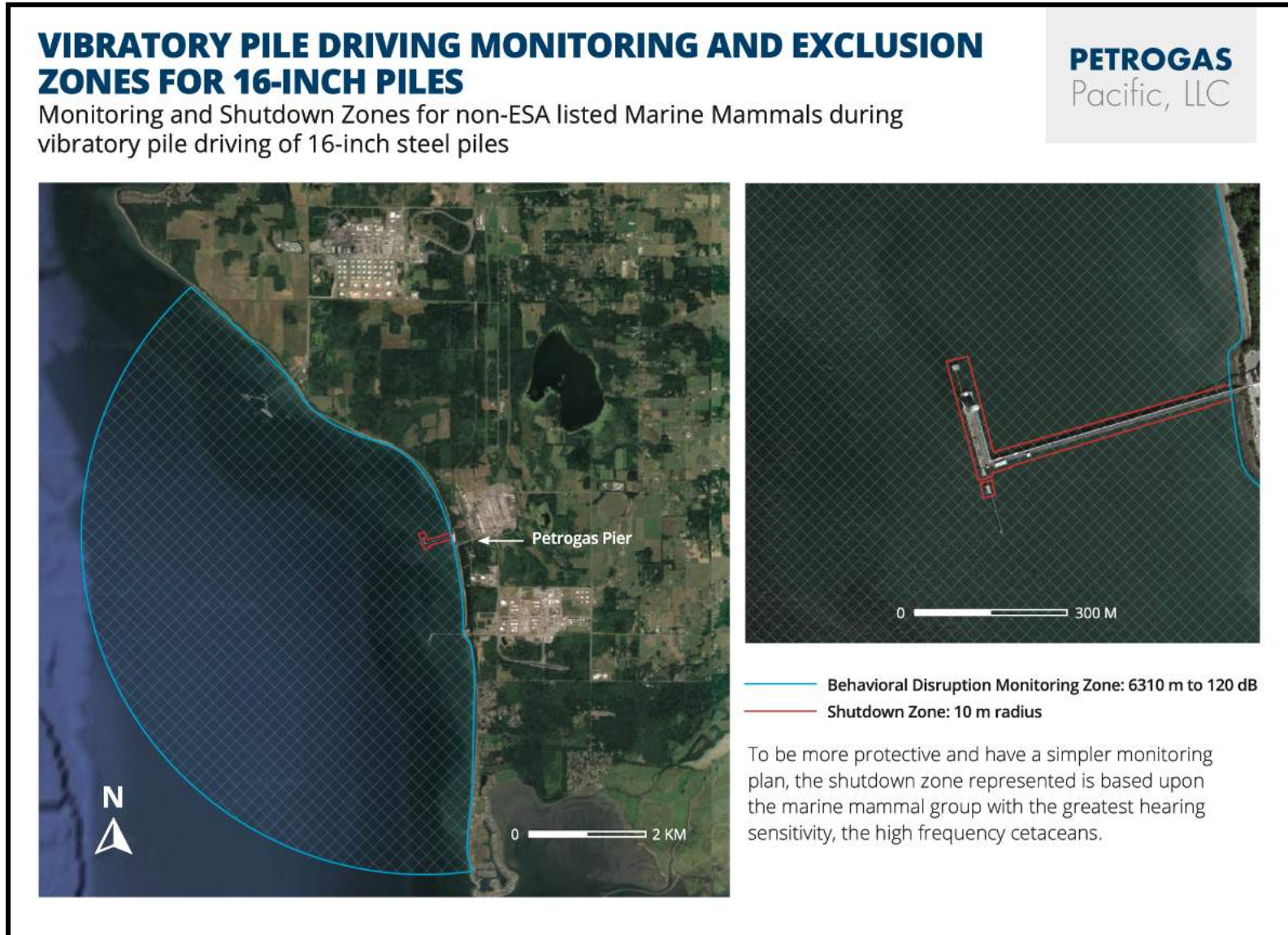


**Figure 11.** Monitoring and exclusion zones for non-ESA listed marine mammals during vibratory pile driving 30-inch piles.





**Figure 12.** Monitoring and exclusion zones for non-ESA listed marine mammals during vibratory pile driving 16-inch piles.



**ADDITIONAL PROCEDURAL DETAILS:**

- For all vibratory pile driving, a shutdown (Level A) and harassment zone (Level B) will be monitored;
- Visual monitoring will be conducted by qualified, trained protected species observers (PSO), or qualified marine mammal monitors (MMM). An observer for the project will have prior training and / or experience conducting marine mammal monitoring or surveys, and who has the ability to identify marine mammal species and describe relevant behaviors that may occur in proximity to in-water construction activities;
- A trained observer will be placed at the best vantage point(s) practicable (e.g., from a small boat, construction barges, on shore, or any other suitable location) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the pile driver operator;
- If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible;
- Monitoring will take place from 30 minutes prior to initiation through 30 minutes post-completion of pile driving. Prior to the start of pile driving, the shutdown zone will be monitored for 30 minutes to ensure that the shutdown zone is clear of marine mammals.
- Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals;
- If a marine mammal approaches or enters the shutdown zone during pile driving, work will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal; and
- If a marine mammal enters the Level A shutdown zone during pile driving, a level A “take” will be recorded.
- If a harbor seal, harbor porpoise, california sea lion, or steller sea lion is observed in the Level B harassment zone, but not approaching or entering the shutdown zone, a “take” will be recorded and the work will be allowed to proceed without cessation of pile driving. Marine mammal behavior will be monitored and documented.



**DATA TO BE COLLECTED:**

NMFS requires that at a minimum, the following information be collected on the sighting forms:

- Name of the PSOs / MMM;
- Date and time that pile removal or installation begins and ends;
- Construction activities occurring during each observation period;
- Weather parameters identified in the acoustic monitoring (e.g., percent cover, visibility);
- Water conditions (e.g., sea state, tidal state [incoming, outgoing, slack, low, and high]);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Time of sighting;
- Marine mammal behavior patterns observed, including bearing and direction of travel, and, if possible, the correlation to sound pressure levels;
- Distance from pile removal or installation activities to marine mammals and distance from the marine mammal to the observation point;
- Locations of all PSOs / MMMs;
- Other human activity in the area

The marine mammal observers / monitors will note in their behavioral observations, to the extent practicable, if an animal has remained in the area during construction activities. Therefore, it may be possible to identify if the same animal or a different individual are being taken. Harbor seals may be identified by spot patterns or scars and sea lions identified by scars, brands, or fore flipper tags.

**PSO / MMM REQUIREMENTS:**

Prior to project commencement, Petrogas or the construction contractor will hire one to two qualified PSO(s) / MMM(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 the Pier or a small boat(s). If necessary, observations may occur from multiple locations simultaneously.

The minimum qualifications for PSOs / MMMs 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).

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:

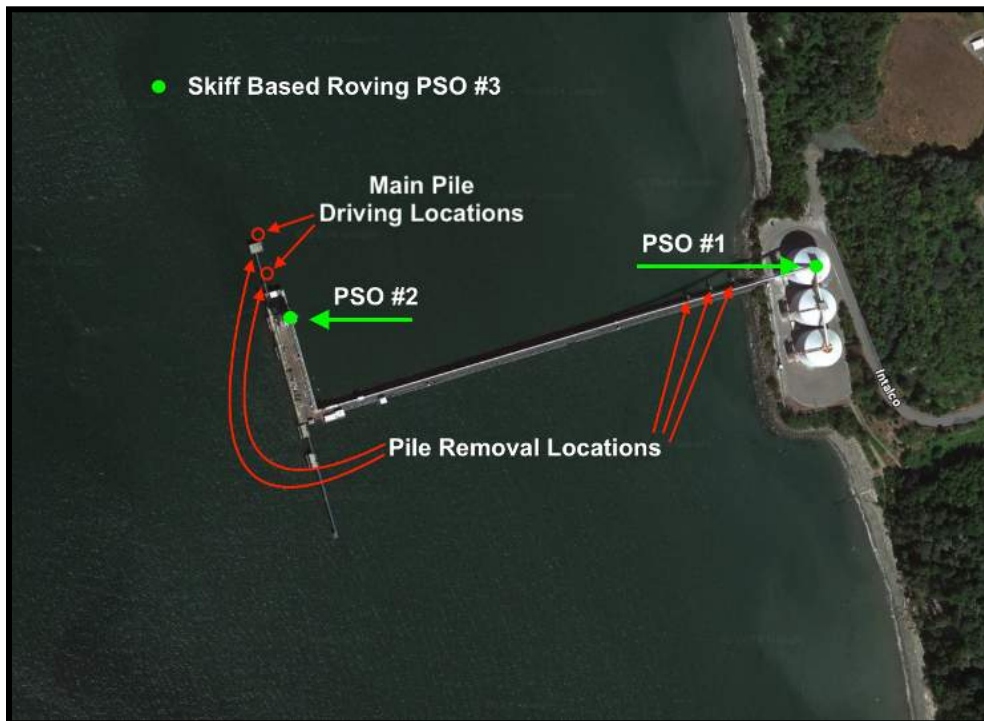
1. The monitoring expert(s) will be positioned such that the entire exclusion and monitoring zones are visible to them. If weather or sea conditions restrict the observer's ability to observe for species or become unsafe for the monitoring vessel(s) to operate, cease pile installation until conditions allow for monitoring to resume.
2. The monitoring expert(s) will have the following to aid in determining the location of observed listed species, to take action if listed species enter the exclusion or monitoring 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 logbook of all activities which will be made available to the U.S. Army Corps Engineers (USACE) and NMFS upon request.
3. The monitoring expert(s) will have no other primary duty than to watch for and report on events related to marine mammals.
4. The monitoring expert(s) will be in direct communication with on-site project lead and will have shutdown authority.
5. The monitoring expert(s) will scan the exclusion and monitoring zones of 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.

**PRELIMINARY MONITORING DETAILS:**

The facility has not yet selected a contractor to conduct the marine mammal monitoring. The facility tentatively proposes the following monitoring locations but may revise these locations if the contractor has equal or better monitoring plans and/or methods. There are elevated locations for protected species observers to be stationed to monitor the extensive exclusion zones, including on the alumina unloader and the alumina silos. The first observer may be on the alumina silos to the east, roughly 100 ft above the water to scan the wider area. The second observer may be on the alumina unloader at the north end of the Pier. This would place the observer roughly 50 ft above water, approximately 300 ft south of the pile driving activities. One PSO may be skiff based to track and verify any marine mammals identified near the exclusion zones if the contractor determines this is important.

**Figure 13:** Possible PSO monitoring locations.



**REPORTING:**

The monitoring report will be submitted to NMFS within 90 work days of the completion of the in-water work period monitoring. The report will detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed. The final report will be prepared and submitted to the NMFS within 30 days following receipt of comments on the draft report from the NMFS. The Marine Mammal Monitoring Plan will contain detailed reporting measures.

If an ESA listed marine mammal is taken (i.e. An ESA listed marine mammal(s) is observed entering the exclusion zone before pile-driving operations can be shut down), reinitiation of consultation is required, and the take must be reported to NMFS within one business day.

**MITIGATION EFFECTIVENESS:**

All observers utilized for mitigation activities will be experienced mariners and / or biologists with training in marine mammal detection and behavior. Due to their specialized training, it is expected that visual mitigation will be highly effective. The observers will be positioned in locations, which provide the best vantage point(s) for monitoring. In addition, the modest radius of the shutdown zone makes the likelihood of detecting a marine mammal in this zone extremely high.

## **SECTION 14 - SUGGESTED MEANS OF COORDINATION**

All marine mammal data gathered during construction will be made available to NMFS, researchers, and other interested parties. The project will coordinate activities as needed with relevant federal agencies.

The neighboring facility may also be conducting in-water pile work during this work window. Petrogas will attempt to coordinate monitoring efforts on the days in-water pile work is occurring at both facilities for more robust coverage of the monitoring zones and protection of marine mammals.

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