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**To:** Jeff Davidson and Steffani Lillie (Kitsap Transit)  
**From:** Joe Callaghan  
Shawn Mahugh  
**Date:** April 30, 2018  
**File:** 0199-026-02  
**Subject:** Revised Annapolis Ferry Dock Upgrade Incidental Harassment Authorization Application

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### SUMMARY OF THE REQUEST

Kitsap Transit (KT), pursuant to Section 101 (a)(5)(D) of the Marine Mammal Protection Act (MMPA), 16 United States Code (U.S.C.) 1371 (a)(5); 50 Code of Federal Regulations (C.F.R) Part 216, Subpart I, requests that the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) issues an Incidental Harassment Authorization (IHA) for incidental take of six marine mammal species or stocks during the expansion of the existing Annapolis Ferry Dock located in Sinclair Inlet, in Port Orchard, Washington starting in 2018.

The proposed upgrades to the Annapolis Passenger Ferry Dock would allow for the dock to accommodate larger vessels by extending the dock into deeper water and include upgrades to meet American Disability Act (ADA) accessibility standards. The project site is located within the Puget Sound of Washington State, along the southern shores of Sinclair Inlet. Activities requested to be covered under the IHA include removal of 10 piles and installation of 12 new steel piles using impact and vibratory pile driving equipment.

The project's timing and duration, and specific types of activities (such as pile driving and dredging) may result in the incidental taking by acoustical harassment (Level B take) of marine mammals protected under the MMPA. Seven marine mammal species may occur in the project vicinity: harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), Steller's sea lion (*Eumetopias jubatus*), humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), killer whale (*Orcinus orca*) (transient and southern resident distinct population segments), and harbor porpoise (*Phocoena phocoena*); two of which are listed as threatened under the Endangered Species Act (ESA) (southern resident killer whales and humpback whales). The application is requesting an IHA for three marine mammal species: harbor seal, California sea lion, Steller's sea lion. Marine mammal monitoring will be conducted and no pile driving will occur if humpback whale, gray whale or killer whale are known or observed to be approaching the monitoring zone. The 14 specific items required for this application, as set out by 50 CFR 216.104, Submission of Requests, are provided in Sections 1 through 14 of this application.

Based on personal communication with Ben Laws (NMFS, 2018b) a memorandum format for this IHA was requested. In addition, this IHA utilizes marine mammal estimates submitted as part of the Washington Department of Transportation (WSDOT) Manette Bridge IHA (Chestnut and Purdom, 2009) application and the Naval Base Kitsap Pile Removal and Replacement IHA (Naval Base Kitsap 2014). Additional feedback was received from Jaclyn Daly-Fuchs (NMFS, 2018a) requesting additional information and suggesting consideration of using density-based take estimates,

**SECTION 1: DESCRIPTION OF SPECIFIC ACTIVITY**

The Annapolis Ferry terminal is 34 years old with a useful life of 40 years. The concrete pier is in above-average condition, but the float and gangway do not meet ADA requirements. The proposed improvements include removing a portion of the existing pier, installing a longer gangway, removing the existing float and installing a larger float in deeper water. Other improvements include pedestrian protection from the weather, new railing, lighting, potable water and fendering. These improvements will significantly improve the ferry operation, environmental conditions, overall experience for all passengers and provide equal access for elderly and disabled passengers.

The project action area for potential impacts to marine mammals includes Sinclair Inlet and portions of Port Washington Narrows, Port Orchard Passage and Rich Passage. These waterbodies range up to 130 feet in depth and substrates include silt/mud, sand, gravel, cobbles and rock outcrops.

The project will consist of removing and replacing existing features of the facility. The project includes removal of approximately 2,160 square feet of existing concrete pier decking (located between -4 and -6 feet mean lower low water [MLLW]), gangway, and concrete float (located between -6 and -11 feet MLLW) as well as removal of 10 piles (six steel float piles and four concrete pier piles). Table 1 contains a summary of project demolition actions.

**TABLE 1. SUMMARY OF PROJECT DEMOLITION**

Type	Purpose	Quantity	Location	Area
16.5-in. concrete piles	Pier removal	4	In-water	6 SF <sup>1</sup>
18-in. steel piles	Float removal	6	In-water	10 SF <sup>1</sup>
			<b>In-Water Total</b>	<b>16 SF<sup>1</sup></b>
Concrete decking	Pier and float removal	1 each	Over-water	2,000 SF
Minimal grating	Gangway removal	1	Over-water	160 SF
			<b>Over-Water Totals</b>	<b>2,160 SF</b>

The proposed replacement pier, gangway, and float (to be located between -11 feet -27 feet MLLW) is approximately 4,268 square feet, which is a net increase of 2,108 square feet of new overwater structure. The proposed upgrades to the pier and gangway will occur within the same footprint and the new float will be located north of the existing footprint. A total of 12 new piles will be installed for the upgrade. Four new 12-inch diameter steel pipe pile will be installed for the proposed replacement pier section and eight new 24-inch diameter steel pipe piles will be installed for the proposed float. A summary of dock upgrades is contained in Table 2. Piles will be installed using impact and vibratory pile driving equipment and noise attenuation best management practices (BMPs) (i.e., bubble curtain or similar) will be utilized to reduce underwater sound pressures during impact pile installation. Impact minimization measures are included in the project design to avoid or minimize the adverse effects of the project on marine fish and wildlife species and their habitats. Mitigation is also proposed to offset unavoidable impacts. For more information on the project, minimization measures and mitigation see the Biological Assessment and Mitigation Summary Memo prepared for this project (GeoEngineers 2017a; 2017c).

**TABLE 2. SUMMARY OF DOCK UPGRADES**

Type	Purpose	Quantity	Location	Area
12-in. steel pipe piles	Pier replacement	4	In-water	3 SF <sup>1</sup>
24-in. steel pipe piles	Float replacement	8	In-water	25 SF <sup>1</sup>
<b>In-Water Total</b>				<b>28 SF<sup>1</sup></b>
Full grated decking	Pier and gangway replacement	1 each	Over-water	1,268 SF
50% grated decking	Float replacement	1	Over-water	3,000 SF
<b>Over-Water Totals</b>				<b>4,268 SF</b>

Note:

<sup>1</sup> impact area for piles is given as cross-sectional area

### Pile Driving and Demolition Activities Noise

Both structure removal and installation activities will generate in-air and underwater noise. A vibratory pile driver will be used to remove piles and install piles and an impact pile driver will be used to proof and install piles to embedment when needed. The next loudest piece of equipment will be a concrete saw used to demolish the portion of the existing pier.

### Underwater Noise

Underwater noise will be generated by the impact and vibratory pile drivers. In 2016, NMFS released updated technical guidance for assessing underwater sound effects on marine mammals, establishing new thresholds for permanent threshold shifts (PTS), which are considered Level A take. Cetacean thresholds were split into three categories based on auditory frequency range (low, medium and high) while pinnipeds were split into two groups based on family: phocid and otariid. These thresholds are shown on Table 3 and provide the basis for stop-work zones.

**TABLE 3. LEVEL-A TAKE UNDERWATER AUDITORY THRESHOLDS ESTABLISHED BY NMFS (2016)<sup>1</sup>**

Hearing Group	Permanent Threshold Shift (PTS) dB	
	Impulsive	Non-Impulsive
Low-Frequency (LF) cetaceans	183	199
Mid-Frequency (MF) cetaceans	185	198
High-Frequency (HF) cetaceans	155	173
Phocid Pinnipeds	185	201
Otariid Pinnipeds	203	219

Note:

<sup>1</sup> Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016c).

Washington State Department of Transportation (WSDOT) and California Department of Transportation (Caltrans) compiled underwater acoustic monitoring data for sound pressure levels (SPLs) associated with various pile-driving projects (WSDOT 2016, Caltrans 2015). These data was reviewed and identified that driving steel piles with an impact driver will generate an SPL of 178 dB<sub>SEL</sub> (Sound Exposure Level) for 24-inch piles (WSDOT 2016, Caltrans 2015) and driving steel piles with a vibratory pile driver will generate SPLs of 155 dB<sub>RMS</sub> (Root Mean Squared) for 12-inch piles (Caltrans 2015), 160 dB<sub>RMS</sub> for 18-inch piles and 175 dB<sub>RMS</sub> for 24-inch piles (Caltrans 2015). A specific SEL estimate for impact installation of 12-inch piles was not available from Caltrans (2015). Therefore, NMFS calculated an estimated that impact driving of 12-inch piles will

generate an SPL of 167dB<sub>SEL</sub>. Additionally, a specific estimate for vibratory installation of 18-inch piles was not available. Therefore, NMFS applied the same extrapolation procedure described above for estimating the 10-meter RL for 24-inch steel piles, suggesting an estimated 10-meter RL 175 dB<sub>peak</sub>, and 160 dB<sub>RMS</sub>/dB<sub>SEL</sub> for vibratory extraction of 18-inch steel piles. This assessment is based on the assumption that vibratory extraction of 16.6-inch concrete piles would have the same acoustic signature as the 18-inch steel pipe piles described above. This approach would over-estimate the noise levels because impact driving steel piles is typically louder than impact driving concrete piles of the same size, and NMFS expects that the same would be true for vibratory driving and extraction (NMFS 2018). Table 4 contains the sound level generated by project activities. Tables 5 and 6 and Figures 2 through 6 show the monitoring and stop-work zone distances and areas based on the calculated sound levels.

SPL calculations were based on the following assumptions:

- Impact pile driving will require up to 1,000 strikes per pile and up to two piles will be installed per day for a total of up to 2,000 strikes per day (PND Engineering 2018)
- Vibratory pile driving will occur for up to six continuous hours per day

#### **Airborne Noise**

Operation of construction equipment, including a concrete saw and impact and vibratory pile drivers, will generate airborne noise from construction that could impact marine mammals. NMFS has established pinniped in-air acoustic thresholds for Level B disturbance take as shown in Table 4. Pinniped injury (Level A) take thresholds or any cetacean in-air noise thresholds have not been established. These values, and the corresponding distances to which construction noise will extend, are contained Table 5 and shown on Figure 7.

Airborne noise is not discussed in detail throughout this request for incidental harassment authorization because there is extremely limited potential for an airborne disturbance take to occur that would not already be counted under an associated in water Level B take. Additionally, the only haul-out opportunity within the airborne noise zones would occur during impact pile driving of the new 12-inch pilings along the shoreline immediately adjacent to the pier.

#### **Noise Summary**

Table 4 below summarizes underwater sound levels generated by project activities, Table 5 shows the monitoring and stop-work zone distances, and Table 6 shows the corresponding monitoring and stop-work zone areas.

**TABLE 4. SOUND LEVELS GENERATED BY PROJECT ACTIVITIES**

		Sound Exposure Level		
		Peak		
<b>Waterborne Noise</b>				
Impact	12	192	177	167
	24	207	194	178
Vibratory	12	171	155	155
	24	178	165	165
Vibratory Pile Removal	16.5 - 18	175	160	160
<b>Airborne Noise</b>		<b>Actual Measured Average L<sub>max</sub><sup>1</sup> at 50 feet</b>		
Concrete Saw	-	90		
Impact	12 - 24	110		
Vibratory	12 - 24	101		

Note: 1) L<sub>max</sub> is the maximum value of a noise level that occurs running a single event.

**TABLE 5. MONITORING AND STOP-WORK ZONE DISTANCES FOR MARINE MAMMALS**

Noise Generation Type	Pile Size (inches)	Waterborne Noise Threshold Distances (meters)					
		Marine Mammal Disturbance	Permanent Threshold Shift (PTS)				
			LF Cetacean Injury	MF Cetacean Injury	HF Cetacean Injury	Phocid Pinniped Injury	Otariid Pinniped Injury
Impact Installation	12	136	136.0	4.8	162.0	72.8	5.3
	24	1,848	735.8	26.2	876.4	393.8	28.7
Vibratory Installation	12	2,154	9.0	0.8	13.3	5.5	0.4
	24	10,000	41.7	3.7	61.6	25.3	1.8
Vibratory Removal	16.5 - 18	4,612	19.3	1.7	28.6	11.8	0.8
<b>In-Air Noise Threshold Distances (Level B Disturbance; meters)<sup>1</sup></b>							
Noise Generation Type	Harbor Seals (90 dB)			Other Pinnipeds (100 dB)			
Concrete Saw	15.2			-			
Impact	152			48			
Vibratory	54			17			

Note:

<sup>1</sup> In-air noise propagation was calculated based on hard surface transmission loss only due to overwater conditions in the surrounding affected area.

**TABLE 6. MONITORING AND STOP-WORK ZONE AREAS FOR MARINE MAMMALS**

Pile Driver Type	Pile Size (in)	Area <sup>1</sup>					
		Marine Mammal Monitoring Zones 120 dB (V); 160 dB (I)	Permanent Threshold Shift (PTS)				
			LF Cetacean Stop-Work Zones 199 dB (V); 183 dB (I)	MF Cetacean Stop-Work Zones 198 dB (V); 185 dB (I)	HF Cetacean Stop-Work Zones 173 dB (V); 155 dB (I)	Phocid Pinniped Stop-Work Zones 201 dB (V); 185 dB (I)	Otariid Pinniped Stop-Work Zones 219 dB (V); 203 dB (I)
Impact Installation	12	0.1 (square km)	0.1 (square km)	72.4 (square meters)	0.1 (square km)	16,650 (square meters)	88.2 (square meters)
	24	5.5 (square km)	1.2 (square km)	2,157 (square meters)	1.6 (square km)	0.4 (square km)	2,588 (square meters)
Vibratory Installation	12	6.5 (square km)	255 (square meters)	2.0 (square meters)	556 (square meters)	95 (square meters)	0.5 (square meters)
	24	19.2 (square km)	5,463 (square meters)	43 (square meters)	11,921 (square meters)	2,010 (square meters)	10.2 (square meters)
Vibratory Removal	16.5 - 18	14.3 (square km)	1,170 (square meters)	9.1 (square meters)	2,570 (square meters)	437 (square meters)	2.0 (square meters)
<b>In-Air Noise Threshold Area (Level B Disturbance, square meters)</b>							
<b>Noise Generation Type</b>		<b>Harbor Seals (90 dB)</b>			<b>Other Pinnipeds (100 dB)</b>		
Concrete Saw		110 (square meters)			-		
Impact		72,583 (square meters)			7,238 (square meters)		
Vibratory		9,160 (square meters)			835 (square meters)		

Note:

<sup>1</sup> Areas will vary slightly by each pile location based on their position relative to surrounding land masses.

## SECTION 2: DATES, DURATION, AND SPECIFIED GEOGRAPHIC REGION

**Dates and Duration.** The project is scheduled to occur in 2018 and is expected to take 8 weeks. The construction window for in-water work in Sinclair Inlet is July 2 to March 2 (USACE, 2012) to protect salmon and “year-round” for surf smelt. Demolition is expected to be completed intermittently over the course of 1 to 3 weeks. The existing float, gangway and outer portion of the pier will be removed, and 10 existing piles will be removed using vibratory extraction methods. Pile removal has been conservatively estimated to occur at a rate of two piles removed per day, which would require 5 days to remove 10 piles. Pile installation was conservatively estimated to occur at a rate of one pile per day, which would require 12 days to install 12 piles. Pile removal and

installation operations will not occur during nighttime hours and work that is above the OHWM may be completed outside the in-water work window.

**TABLE 7. ESTIMATED NUMBER OF DAYS EXCEEDING MARINE MAMMAL THRESHOLDS**

Construction Activities	No. of New Piles	No. Piles Removed	Total Days of Activity
Concrete saw (pier removal)	--	--	5
Vibratory pile removal	--	10	5
Impact and vibratory driving	12	--	12
<b>Totals</b>	<b>12</b>	<b>10</b>	<b>22</b>

**Region of Activity.** The project is located within the limits of the City of Port Orchard in Kitsap County, Washington in Sections 24 and 25, of Township 24 North, Range 1 East of the Willamette Meridian. It is within Water Resources Inventory Area (WRIA) 15 – Kitsap and Hydrologic Unit Code (HUC) 17110019 – Puget Sound Watershed.

### SECTION 3: SPECIES AND NUMBERS OF MARINE MAMMALS

This section of the IHA includes data provided by NMFS as well as data presented in recent IHA applications in Sinclair Inlet and Hood Canal. Seven marine mammal species may occur in the vicinity of project and are considered in this application. These seven species, their timing and frequency of occurrence are shown in Table 1. All seven have been observed in southern Puget Sound during certain periods of the year and may occur in Sinclair Inlet, although direct observation in the vicinity of the Annapolis Ferry Dock may not be documented. Further discussion on these seven species and their distribution specific to the project area is discussed in detail below.

**TABLE 8. MARINE MAMMAL SPECIES THAT MAY OCCUR WITHIN ACTIVITY AREA**

Species	Stock Estimate Abundance	ESA Status	MMPA Status	Timing of Occurrence	Frequency of Occurrence
Harbor seal <i>Southern Puget Sound</i>	1,568	--	Not strategic, non-depleted	Year-round	Likely <sup>2</sup>
California sea lion <i>U.S. Stock</i>	296,750 <sup>1</sup>	--	Not strategic, non-depleted	August-April	Seasonal (unlikely in July) <sup>2</sup>
Steller sea lion <i>Eastern U.S. DPS</i>	52,139 <sup>1</sup>	--	Not strategic, non-depleted	August-April	Seasonal (unlikely June – September) <sup>2</sup>
Gray whale <i>Eastern North Pacific</i>	20,990 <sup>1</sup>	--	Not strategic, non-depleted	January – May	Occasional <sup>3</sup>
Killer Whale <i>Southern Resident</i>	76 <sup>4</sup>	Endangered	Strategic, depleted	October - November	Infrequent <sup>3</sup>
Killer Whale <i>Transient</i>	354 <sup>2</sup>	--	Not strategic, non-depleted		Rare <sup>3</sup>
Humpback Whale <i>CA/OR/WA Stock</i>	1,918 <sup>1</sup>	Endangered	Strategic, depleted	Not known <sup>5</sup>	Rare
Harbor porpoise <i>WA Inland Waters</i>	11,233 <sup>1</sup> (CV=0.37)	--	Not strategic, non-depleted	Year-round	Likely <sup>6</sup>

Key: DPS = Distinct Population Segment; CV = coefficient of variation

Notes:

<sup>1</sup> NMFS marine mammal stock assessment reports at: <http://www.nmfs.noaa.gov/pr/sars/species.htm> (updated June 27, 2017)

<sup>2</sup> Obtained from Naval Base Kitsap 2014

<sup>3</sup> Obtained from Chestnut and Purdom 2009

<sup>4</sup> Southern resident demographics at: [https://www.orcanetwork.org/Main/index.php?categories\\_file=Births%20and%20Deaths](https://www.orcanetwork.org/Main/index.php?categories_file=Births%20and%20Deaths)

<sup>5</sup> The majority of humpback whale sightings are in the northern Puget Sound; however, humpback whales have been observed utilizing the waters of the southern Puget Sound as well (Orca Network 2018).

<sup>6</sup> Obtained from Naval Facilities Engineering Command Northwest 2017

## **Pinnipeds**

### **Harbor Seal**

Harbor seals are the most common, widely distributed pinniped found in Washington waters (Jefferies et al. 2003). Pupping in Puget Sound south of Admiralty Inlet occurs from late June through September (Jefferies et al. 2000). Individuals are frequently observed in Sinclair Inlet. Harbor seals were observed during eight of the 10 WSDOT surveys between July 2006 and January 2007 (Chestnut and Purdom 2009). There are no documented harbor seal haul-out areas within the vicinity of the project; the nearest harbor seal haul-out is located in Dyes Inlet with less than 100 estimated individuals, over four miles from the site (Jefferies et al. 2000).

### **California Sea Lion**

California sea lions are the most frequently sighted otariid in Washington waters and use haul-out sites along the outer coast, Strait of Juan de Fuca, and in Puget Sound (Jefferies et al. 2000). Haul-out sites include offshore rocks, marina docks, and navigation buoys and they can be found rafted in groups resting in Puget Sound (Jefferies et al. 2000). Jefferies et al. (2000) estimated that between approximately 3,000 and 5,000 male California sea lion move into Washington and British Columbia during the fall and remain until late spring. There are documented California sea lion haul outs just over one mile from the project area along the floating security at Naval Base Kitsap (Naval Base Kitsap 2014). More than four miles to the east are two California sea lion haul-outs estimated at less than 10 animals on buoys in Rich Passage (Jefferies et al. 2000).

### **Steller Sea Lion**

Steller sea lion is the largest otariid in Washington waters and they use haul-outs primarily along the outer coast (Jefferies et al. 2000). The population in Washington varies seasonally with peak numbers present in the fall and winter (Jefferies et al. 2000). The nearest Steller sea lions haul-out site to the project area is approximately 10 nautical miles away, at the Manchester Fuel Depot Finger Pier (Naval Base Kitsap 2014).

## **Cetaceans**

### **Gray Whale**

The North Pacific gray whale stock is divided into two distinct stocks: eastern and western (NMFS 2015b; Chestnut and Purdom 2009). The eastern North Pacific stock ranges from Alaska, where they summer to Baja California, where they migrate to calve in the winter (Chestnut and Purdom 2009).

Gray whales occur frequently off the coast of Washington during their southerly migration in November and December, and northern migration from March through May (AFSC, 2018; Chestnut and Purdom 2009). Gray whales are observed in Washington inland waters regularly between the months of January and September, with peaks between March and May (Chestnut and Purdom 2009).

### **Killer Whale**

Killer whales that may occur in the project vicinity have been divided into two Distinct Population Segments (DPSs); transient whales, which have a specialized diet of marine mammals, and resident whales, which primarily prey on fish (NMFS 2017c). Southern resident killer whale are seasonal visitors to inland waters of Sinclair and Dyes Inlets and typically follow fall chum salmon (*Oncorhynchus keta*) runs. Killer whales prefer deeper waters and are expected to be most prevalent in Sinclair Inlet during the fall chum salmon migration.

Southern resident killer whales are seen year-round in Washington's inland waters, primarily in the north Puget Sound in the vicinity of the San Juan Islands and can be predictably encountered in some areas at certain times of the year (Calambokidis and Baird, 1994). The southern residents are actually a large extended family, or clan, comprised of three pods: J, K, and L Pods and as of September 2017, collectively number 76 individuals (Orca Network 2017). J Pod is the pod is present in Washington's inland waters during at least part of every month of the year. They are frequently observed near the San Juan Islands, in the lower Puget Sound near Seattle and Vashon Island, and in Georgia Strait at the mouth of the Fraser River.

Transient killer whale presence in the south Puget Sound is considered rare. However, on February 20, 2018, several observations of four transients were reported by a local citizen in Dyes Inlet (Orca Network 2018).

### **Humpback Whale**

Humpback whales are known to occasionally travel into the Puget Sound. The majority of humpback whale sightings are in the northern Puget Sound; however, humpback whales have been observed utilizing the waters of the southern Puget Sound as well (Orca Network 2018). Although a few sightings have been reported in the waters of southern Puget Sound, they are very infrequent and short in duration (Orca Network 2018). A juvenile female humpback whale carcass was found beneath a Puget Sound Naval Shipyard dock in Sinclair Inlet in June 2016. The necropsy found that the cause of death appears likely a result of the subadult whale becoming trapped beneath the pier (Cascadia Research 2016). Because this sighting is an exception to the normal occurrence of the species in Washington inland waters, the species is not included in the analysis in this application.

### **Harbor Porpoise**

Harbor porpoise are known to occur year-round in Washington waters with distinct seasonal changes in abundance noted, but not fully understood (NMFS 2017a). Aerial surveys of Washington waters between 2013 and 2015 detected the highest densities of harbor porpoise in North Puget Sound and the lowest in South Puget Sound, Vashon and Bainbridge areas (NMFS 2017a).

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

This section includes information on each species' stock status and distribution (including seasonal information if available).

### **Harbor Seal**

Harbor seals are not considered to be "depleted" under the MMPA or listed as "threatened" or "endangered" under the ESA (NMFS 2014). Based on currently available data, the level of human-caused mortality and

serious injury is 3.4 harbor seals per year including 1.0 from fishery sources listed in Table 1, 0.4 from recreational hook and line fisheries, and 2.0 from non-fishery sources. PBRs cannot be calculated for these stocks because there are no current abundance estimates. Human-caused mortality relative to PBR is unknown for these stocks, but is considered to be small relative to stock size. Therefore, the Southern Puget Sound stock of harbor seals are not classified as a “strategic” stock. Harbor seals range along the northern coasts of North America, Europe and Asia, and are widely distributed in the Puget Sound.

#### **California Sea Lion**

California sea lions are not listed as "endangered" or "threatened" under the ESA nor as "depleted" under the MMPA. They are not considered a "strategic" stock under the MMPA (NMFS 2015a). California sea lions occur in the North Pacific Ocean from Mexico to Vancouver Island and dispersing males occur in the Puget Sound.

#### **Steller Sea Lion**

Steller sea lions were listed as “threatened” range-wide under the ESA on 26 November 1990 (55 FR 49204). The population is comprised of two recognized management stocks (eastern and western), separated at 144 west longitude. The western stock was listed as “endangered” under the ESA on May 4, 1997 and the eastern stock was delisted on November 4, 2013 due to recovery (78 FR 66139). Only the eastern stock is considered in this application because the western stock occurs outside of the geographic area of the activities under consideration. The eastern stock of Steller sea lions is not considered “depleted” under the MMPA and is classified as non-strategic (NMFS 2016b).

Steller sea lions occur along the North Pacific Rim from southern California north to Alaska, the Aleutian Islands and across to Siberia and Japan. Individuals occur along the outer coast of Washington and occasionally in the Puget Sound.

#### **Gray Whale**

Gray whales were removed from listing under the Endangered Species Act in 1994. The Eastern North Pacific stock of gray whales is not classified as a strategic stock. Eastern North Pacific gray whales are not considered “depleted” and are not classified as a strategic stock (NMFS 2015b).

Gray whales are observed in Sinclair Inlet, the Port Washington Narrows or Dyes Inlet occasionally during the winter and spring months. Individual animals do not appear to remain in the area for more than 2 weeks.

#### **Killer Whale**

On November 18, 2005 the Southern Resident stock was listed as an endangered distinct population segment (DPS) under the ESA (70 FR 69903). On November 29, 2006, the NMFS published a final rule designating critical habitat for the Southern Resident killer whale DPS (71 FR 69054). Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, but areas less than 20 feet deep (relative to extreme high water) are not designated as critical habitat (71 FR 69054). A final recovery plan for southern residents was published in January of 2008 (NMFS 2008). Due to their federal listing as endangered, Southern Resident killer whales are automatically considered strategic. This stock was considered depleted prior to its 2005 listing under ESA (NMFS 2017b).

Transient killer whales are not listed as “endangered” or “threatened” under the ESA nor as “depleted” under the MMPA. The West Coast transient stock of killer whales is not classified as a strategic stock (NMFS 2013).

Southern residents are seen year-round in Washington’s inland waters, primarily in the north Puget Sound in the vicinity of the San Juan Islands. Southern resident presence in the project vicinity is most likely in the fall associated with the chum salmon run to Chico Creek in Dyes Inlet. The whales have been documented staying in Dyes Inlet for up 30 days in October and November.

### **Humpback Whale**

The humpback whale is listed as “endangered” under the ESA, and therefore designated as “depleted” under the MMPA. As a result, the central North Pacific stock of humpback whale is classified as a strategic stock (NMFS 2016a). Humpback whales are known to occasionally travel into the Puget Sound. The majority of humpback whale sightings are in the northern Puget Sound; however, humpback whales have been observed utilizing the waters of the southern Puget Sound as well (Orca Network 2018). Although a few sightings have been reported in the waters of southern Puget Sound, they are very infrequent and short in duration (Orca Network 2018). A juvenile female humpback whale carcass was found beneath a Puget Sound Naval Shipyard dock in Sinclair Inlet in June 2016. The necropsy found that the cause of death appears likely a result of the subadult whale becoming trapped beneath the pier (Cascadia Research, 2016).

### **Harbor Porpoise**

Harbor porpoise are not listed as “depleted” under the MMPA or listed as threatened or endangered under the ESA. The Washington Inland Waters stock is also not classified as “strategic” (NMFS 2017a). Harbor porpoise are found in coastal and inland waters from Alaska to California, including the Puget Sound and Sinclair Inlet.

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

Kitsap Transit requests issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B acoustical harassment of five species. Incidental take may result from exposure to underwater noise during the approximately 8-week construction period during the 2018 construction window.

The activities outlined in Section 1.0 have the potential to take marine mammals by exposure to underwater sound. Take will potentially result from waterborne noise from impact pile driving and vibratory pile driving (pile installation and removal). It is anticipated that marine mammals that enter the monitoring zone will be subject to Level B harassment and exposed to pile driving noise only briefly as they are transiting the area (i.e., no injury or mortality expected). The monitoring zones vary by pile size and installation or removal activity and are shown on Figures 2 through 6.

Harbor seals and possibly California sea lions and harbor porpoise are expected to forage in the monitoring zone with any frequency and could be exposed multiple times during the project. Because of the habituated behavior of pinnipeds in the work area, there is also the very minor potential for them to occupy areas within the small stop-work zones for pile installation. The stop-work zones for 12-inch and 24-inch impact and vibratory pile installation are contained in Tables 5 and 6. However, these animals will be protected from exposure to the stop-work zone by the marine mammal monitoring program which will shut down pile driving before they enter. No Level A take is requested for the pinnipeds or any other marine mammals. Additionally, the monitoring

zone will be monitored for gray whale, killer whale and humpback whale. If any of these three species are known or observed to be approaching the monitoring zone, pile driving will stop. Therefore, no Level A or B take is requested for these species.

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

This section summarizes potential incidental take of marine mammals during the proposed construction work described in Section 1.0 of this IHA application. Incidental take is estimated for each species by estimating the likelihood of a marine mammals being present within the monitoring and the stop-work zones during pile driving activities.

Due to the expected impact and vibratory pile driving sound levels, this IHA application requests incidental take authorization by Level B acoustical harassment for harbor seals, California sea lions, and harbor porpoise. It is possible that the marine mammals that enter a Level B acoustical monitoring zone will be exposed multiple times during the project. Level A take is not expected to occur due to the small area of potential injury threshold and implementation of the marine mammal monitoring plan.

### **Estimated Duration of Construction Noise**

Estimated construction duration is presented in Section 2 and Table 9 by activity that would produce underwater and/or airborne noise level above the thresholds for marine mammals. Pile driving installation is estimated to occur for a total of about 12 days, pile removal is estimated to occur for five days, and pier demolition using a concrete saw is estimated to occur for five days.

### **Monitoring and Stop-Work Areas**

The airborne and underwater distances for Level B (harassment) take of marine mammals from construction activities were calculated using the following transmission loss equations:

#### **Airborne Noise Transmission Loss:**

$$D = D_0 * 10^{((\text{Construction Noise} - \text{Threshold Sound Level in dBA})/20)}$$

Where D = monitoring zone distance (Level B threshold) from the noise source  
Do = the reference measurement distance (50 feet in this case)

#### **Underwater SPL Transmission Loss:**

$$R1 = R2 * 10^{(TL/15)}$$

Where R1 = monitoring zone distance (Level B threshold) from the noise source  
R2 = the distance of the measured sound level from the source  
TL = the difference between the measured source sound level at distance R2 and the Level B threshold

The Level A stop-work zones were calculated using the auditory thresholds shown in Table 3 and the sound pressure levels shown in Table 4. These values were used in the NMFS marine mammal spreadsheet (NMFS 2016d) to generate the areas contained in Table 5 and shown on Figures 2 through 6. Monitoring and stop-work distances are presented in Table 5 and the associated monitoring zone areas are presented in Table 6.

Construction activities included in these tables are impact and vibratory pile installation, vibratory pile removal, and the use of a concrete saw during pier demolition.

### Estimate Incidental Takes

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within the monitoring zone during active construction activities that produce underwater and/or airborne sound levels above the marine mammal thresholds. Expected marine mammal presence is determined for harbor seal, Steller sea lion, and harbor porpoise using the density estimate for each species that is likely to occur with the monitoring zone multiplied by the size of the respective monitoring zone and number of days of the activity. Densities for these three species were obtained from the *Pacific Navy Marine Species Density Database* (Navy 2014). Because the California sea lion haul-out at Naval Base Kitsap – Bremerton contains a disproportionately large number of individuals when compared to the density estimate for the Northwest Training and Testing study area and is located within the monitoring zone, the number of California sea lions used in the exposure calculation is the estimated sea lions per day obtained from the U.S. Navy Marine Structure Maintenance and Pile Replacement in Washington IHA (83 FR 9366).

The calculation for harbor seal, Steller sea lion, and harbor porpoise exposures is estimated by the following equation:

$$\text{Level B exposure estimate} = N (\text{number of animals/day}) \times \text{days of noise generating activities}$$

Where  $N$  (number of animals/day) = species density estimate/km<sup>2</sup> × monitoring zone area (km<sup>2</sup>)

The calculation for California sea lion exposures is estimated by the following equation:

$$\text{Level B Exposure estimate} = N (\text{estimated animals/day}) \times \text{days of noise generating activities}$$

Both impact and vibratory pile driving are expected to occur each day and may include installation of both 12-inch and 24-inch piles. Therefore, the largest monitoring zone area (24-inch pile vibratory installation) was used to calculate Level B take estimates for the full 12-day pile installation period. For each calculation, the calculated number was rounded up to the nearest whole animal.

The exposure estimate was calculated for each of these species for both underwater pile removal and pile installation as well as airborne noise associated with pier removal for harbor seals. Airborne noise associated with pile removal and installation (Level B) is contained within the Level B monitoring zones for underwater sound; therefore, these individuals will already be counted in the underwater exposure calculations.

Most species will be present only occasionally. It is assumed that take request will include multiple harassments of the same individuals.

### Harbor Seal

The *Pacific Navy Marine Species Density Database* (Navy 2014) estimates an average of 11 harbor seals present in the project vicinity per day, though some animals were likely counted multiple times. There will be an estimated 15 days of pile removal and installation. So, the Level B acoustical harassment take estimate for harbor seals is:

$1.22 \text{ harbor seals/km}^2 \times 0.0007 \text{ km}^2 \times 5 \text{ days} = \sim 1 \text{ harbor seal during concrete saw use}$

and

$1.22 \text{ harbor seals/km}^2 \times 14.3 \text{ km}^2 \times 5 \text{ days} = \sim 88 \text{ harbor seals during pile removal}$

and

$1.22 \text{ harbor seals/km}^2 \times 6.5 \text{ km}^2 \times 4 \text{ days} = \sim 32 \text{ harbor seals during pile installation}$

and

$1.22 \text{ harbor seals/km}^2 \times 19.2 \text{ km}^2 \times 8 \text{ days} = \sim 188 \text{ harbor seals during pile installation}$

Level B exposure estimate = 309 harbor seals

### **California Sea Lion**

NMFS estimates in the U.S. Navy Marine Structure Maintenance and Pile Replacement in Washington IHA (83 FR 9366) an average of 69 California sea lion present in the project vicinity per day. There will be an estimated 15 days of pile removal and installation. So, the Level B acoustical harassment take estimate for California sea lion is:

$69 \text{ California sea lion /day} \times 17 \text{ days} = 1,173 \text{ California sea lion}$

Level B exposure estimate = 1,173 California sea lion

### **Steller Sea Lion**

The Pacific Navy Marine Species Density Database (Navy 2014) estimates an average of 1 Steller sea lion present in the project vicinity per day. There will be an estimated 15 days of pile removal and installation. So, the Level B acoustical harassment take estimate for Steller sea lion is:

$0.036 \text{ Steller sea lion /km}^2 \times 14.3 \text{ km}^2 \times 5 \text{ days} = \sim 3 \text{ Steller sea lion during pile removal}$

and

$0.0368 \text{ Steller sea lion /km}^2 \times 6.5 \text{ km}^2 \times 4 \text{ days} = \sim 1 \text{ Steller sea lion during pile installation}$

and

$0.0368 \text{ Steller sea lion /km}^2 \times 19.2 \text{ km}^2 \times 8 \text{ days} = \sim 6 \text{ Steller sea lion during pile installation}$

Level B exposure estimate = 10 Steller sea lion

### **Gray Whale**

The project will be completed with marine mammal monitoring as described in the *Marine Mammal Monitoring Plan* (GeoEngineers, 2017c), which is included with this memo as Attachment A. As described in both the Naval

Base Kitsap (2014) and WSDOT Manette Bridge (Chestnut and Purdom, 2009) IHAs, no pile removal or installation will occur if gray whales are in the monitoring zone. Therefore, based on the rare occurrence of gray whales in Sinclair Inlet and the monitoring procedures outlined in Attachment A, exposure of gray whales to Level B acoustical harassment from pile driving will not occur.

#### **Transient Killer Whale**

The project will be completed with marine mammal monitoring as described in the *Marine Mammal Monitoring Plan* (GeoEngineers 2017c), which is included with this memo as Appendix A. As described in both the Naval Base Kitsap (2014) and WSDOT Manette Bridge (Chestnut and Purdom 2009) IHAs, no pile removal or installation will occur if killer whales are in the monitoring zone. Therefore, based on the rare occurrence of killer whales in Sinclair Inlet and the monitoring procedures outlined in Attachment A, exposure of killer whales to Level B acoustical harassment from pile driving is unlikely to occur.

#### **Humpback Whale**

The project will be completed with marine mammal monitoring as described in the *Marine Mammal Monitoring Plan* (GeoEngineers 2017c), which is included with this memo as Attachment A. No pile removal or installation will occur if humpback whales are in the monitoring zone. Therefore, based on the rare occurrence of humpback whales in Sinclair Inlet and the monitoring procedures outlined in Appendix A, exposure of humpback whales to Level B acoustical harassment from pile driving will not occur.

#### **Harbor Porpoise**

Estimates of harbor porpoise density and abundance from aerial surveys between 2013 and 2015 (Jefferson et al. 2016) identify a density of 0.89 individuals per square kilometer present in the project vicinity. There will be an estimated 5 days of pile removal and 12 days of pile installation. So, the Level B acoustical harassment take estimate for harbor porpoise is:

$$0.89 \text{ harbor porpoise/km}^2 \times 14.3 \text{ km}^2 \times 5 \text{ days} = \sim 64 \text{ harbor porpoise during pile removal}$$

and

$$0.89 \text{ harbor porpoise/km}^2 \times 6.5 \text{ km}^2 \times 4 \text{ days} = \sim 24 \text{ harbor porpoise during 12-inch pile installation}$$

and

$$0.89 \text{ harbor porpoise/km}^2 \times 19.2 \text{ km}^2 \times 8 \text{ days} = \sim 137 \text{ harbor porpoise during 24-inch pile installation}$$

$$\text{Level B exposure estimate} = 225 \text{ harbor porpoise}$$

#### **Take Request Summary**

The total number of takes for which Level B acoustical harassment authorization is requested is presented in Table 9.

**TABLE 9. SUMMARY OF ACOUSTICAL INJURY AND HARASSMENT TAKE REQUESTS**

Species	Level B Harassment Takes	Abundance of Stock	Percentage of Stock Taken
Harbor Seal ( <i>Southern Puget Sound</i> )	309 <sup>1</sup>	1,568	20
California sea lion ( <i>U.S. Stock</i> )	1,173 <sup>1</sup>	296,750	1.5
Steller sea lion ( <i>Eastern U.S. DPS</i> )	10 <sup>1</sup>	52,139	0.02
Gray Whale ( <i>Eastern North Pacific</i> )	0	20,990	0.0
Killer Whale ( <i>Southern Resident</i> )	0	76	0.0
Killer Whale ( <i>Transient</i> )	0	354	0.0
Humpback whale ( <i>CA/OR/WA Stock</i> )	0	1,918	0.0
Harbor porpoise ( <i>WA Inland Waters</i> )	225 <sup>1</sup>	11,233	2.0

Notes:

1 Likely will be the same animal over multiple days.

2 The Pacific Coast Feeding Group (PCFG) is not a formal DPS, however the population utilizing SE Alaska down through the continental US west coast is well studied, with a population estimate calculated, so the more specific numbers are included.

**SECTION 7: ANTICIPATED IMPACT OF THE ACTIVITY**

Anticipated impacts resulting from the project include disturbance from increased human presence and marine traffic while they are foraging, resting or traveling in the project area, and harassment or injury resulting from pier demolition and pile driving activities conducted. Pier demolition and pile removal and installation generate airborne noise, which may disturb pinnipeds. Underwater sound pressures generated by pile driving activities may cause harm to hearing or damage air filled internal organs, alter feeding behavior or cause animals to disperse from the area. Other project activities may result in temporary modification in behavior such as avoidance of the project area or changes in foraging patterns due to increased traffic and human activity. Long term impacts are not anticipated.

Potential direct effects on marine mammals resulting from the project fall into two categories: the effects of short-term construction related noise, and sediment suspension.

**Construction-Related Noise**

Airborne noise can alter movement patterns or delay or eliminate feedings. Underwater noise can alter movement patterns, delay or eliminate feedings, or cause direct damage or mortality to individuals at close range. In the project action area, construction-related noise and underwater sound pressure, particularly pile driving, and removal activities may affect marine mammals that occur in the project area. However, exposure will be limited by monitoring marine mammal’s movements during pile driving. Pile driving, and removal will not begin until the monitoring zone is determined clear of ESA listed marine mammals and gray whales and the shut-down zone clear of all marine mammals per the approved protocol. If a non-ESA listed species approach the shut-down zone during pile driving, pile driving will cease until the individual(s) has left the shut-down zone. If ESA listed species are known or observed to be approaching the monitoring zone, pile driving will cease.

**Exposure to Contaminated Sediment**

Pile removal and installation activities are unlikely to result in the re-suspension of contaminated sediments due to the proposed methods of pile installation. Pile installation activities will be conducted during the

approved window for in-water work, during which time most ESA-listed species will be absent from the project area. Effects from suspended contaminants are unlikely to occur due to the minimal amount of sedimentation that is likely to result from pile driving. Short-term, minor sedimentation may also occur from the intertidal debris removal mitigation activities. In addition, analysis of sediment collected in February 2014 indicated that chemicals of concern were either not detected or were detected at concentrations less than the respective SQO marine criteria (GeoEngineers 2014). Sediment exposure effects are limited to the footprint of the site, where piles will be removed and installed and where intertidal debris will be removed.

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

There are no relevant subsistence uses of marine mammals implicated by this action.

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

The project will remove approximately 2,160 square feet of existing concrete pier, gangway, and concrete float and 10 piles. The proposed pier, gangway, and float is approximately 4,130 square feet, which is a net increase of 2,108 square feet of new overwater structure. To mitigate this impact, Kitsap Transit will remove approximately 2,108 square feet of artificial debris from the site and enhance approximately 8,800 square feet of riparian shoreline habitat.

Installation of 12 steel piles is the major habitat alteration that will occur during the proposed project. The project will also result in less shading of intertidal habitats than currently exist because the float will be in deeper waters and the deck will be grated. Therefore, habitat alteration is not expected to have negative effects on listed species for this project. The removal of intertidal debris, enhancement of riparian habitat and modification of lighting along the pier will also have beneficial impacts on listed species that may use the project area after construction. The proposed project is not expected to impact marine mammal prey species. No new barriers will be created. See the GeoEngineers Biological Assessment for more information regarding the anticipated impacts on habitat and refer to Section 11 below for mitigation details.

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

The proposed project will not result in the loss of habitat available to marine mammals. The project will however modify habitat by removing artificial debris from the site, enhancing the shoreline and reduce shading of intertidal habitats. The finished project will increase access to intertidal habitat ultimately benefiting marine mammals.

## **SECTION 11: MITIGATION MEASURES**

The project will avoid and minimize impacts to marine mammals and habitats through specific design elements and by implementing impact minimization measures including BMPs that will be incorporated into the construction plans. Impacts from the operation of the structure have been avoided or minimized by using grated decking, moving the float into deeper water, utilizing the existing footprint to the extent possible, maintaining the existing north-south orientation of the pier, installing lighting modifications, and conducting in-water work

within the approved fish work window. Specific construction BMPs that will be implemented to reduce impacts to sensitive habitats or species are discussed below.

### **General Construction Impact Minimization Measures**

Impact minimization measures that will be applied to this project include:

- A Temporary Erosion and Sedimentation Control (TESC) Plan will be developed and implemented as part of the Stormwater Pollution Prevention Plan (SWPPP) required under the National Pollution Discharge Elimination System (NPDES) stormwater regulations for construction sites. Construction techniques will utilize BMPs such as those described in the current version of Washington State Department of Transportation's (WSDOT's) Standards and Specifications for Road, Bridge, and Municipal Construction and Washington State Department of Ecology's (Ecology's) Stormwater Management Manual for Western Washington. TESC measures are required to prevent discharge of sediment-laden runoff from entering surface waters. Measures that will be employed to achieve this purpose may include silt fencing, straw bales/wattles, retention of runoff, and/or other similar BMPs that are determined to meet erosion control objectives.
- The contractor will prepare a construction Spill Prevention, Control and Countermeasures (SPCC) Plan for this project. Any potential spills will be handled and disposed of in a manner that does not contaminate the surrounding area. Adequate materials and procedures to respond to unanticipated weather conditions or accidental releases of materials (sediment, petroleum hydrocarbons, etc.) will be available on site. This will include materials necessary to cover stockpiles (e.g., tarpaulins), isolate pollutants from the environment (e.g., protective containers), and contain and absorb spills (e.g., disposable absorbent materials). The SPCC Plan will also ensure the proper management of oil, gasoline and solvents used in the operation and maintenance of construction equipment and that equipment remain free of external petroleum-based products prior to entering the work area and during the work, and for making any necessary repairs prior to returning the equipment to operation in the work area. The SPCC Plan will be consistent with 40 Code of Federal Regulations (CFR) 112.3 as well as the State of Washington Oil Spill Contingency Plan (WAC 173-182).
- An emergency spill containment kit must be located on-site along with a pollution prevention plan detailing planned fueling, materials storage and equipment storage. Waste storage areas must be prepared to address prevention and cleanup of accidental spills.
- To reduce the potential for spills and leaks, the barge will contain an adequate supply of materials (such as a vacuum pump, booms, diapers, and other absorbent material) to control and contain deleterious materials in the event of an accidental spill.
- The contractor will limit work at the site to daylight hours and comply with local, state and federal permit restrictions.
- All construction-related debris will be cleaned up daily. Proper conservation measures will be taken to ensure that debris will not contaminate the marine shoreline or marine waters.
- All equipment used for construction activities will be cleaned and inspected prior to arriving at the project site, and daily thereafter prior to commencing work, to ensure no potentially hazardous materials are exposed, no leaks are present and the equipment is functioning properly. Fueling of land-based equipment

will be limited to upland areas on the street (southwest) side of the existing fire station building and will not be allowed immediately adjacent to or over the water.

- Waste materials, including riprap, derelict piles, miscellaneous garbage and/or other debris removed from the shoreline environment, will be transported off site for disposal in accordance with applicable regulations.
- Work will follow all other local, state and federal regulations and restrictions (e.g., WDFW Hydraulic Project Approval [HPA], local Critical Areas Ordinance and land use regulations, Shoreline Master Plan, State Environmental Policy Act [SEPA], and United States Army Corps of Engineers [USACE] Nationwide Permit [Section 10, Rivers and Harbors Act]).

#### **Additional Conservations Measures to Reduce Impacts to Marine Mammals**

- The project will obtain and comply with conditions that will be outlined in the HPA permit issued for the project by WDFW and the Nationwide Permit issued by the USACE.
- The monitoring zone will be monitored for all impact and vibratory pile removal and installation as described in Section 13 of this application and Attachment A.
- All work below Ordinary High Water (OHW) will be conducted during the approved work windows for fish species that may occur in the project area.
- During impact pile driving, noise attenuation BMPs (i.e., bubble curtain or similar) will be utilized to reduce underwater sound pressures.
- The barge hull will not contact the substrate of Sinclair Inlet. Work at high tide, low draft barges and/or other engineering controls will be employed.
- The contractor will limit construction impacts to the minimum area necessary to complete the project.
- The contractor will implement a “soft start” for impact pile driving to warn marine mammals and flush fish from the area closest to the pile with the highest SPLs.
  - The initial sound from the hammer will be at reduced energy levels for a minimum of three strikes, followed by a 30 second wait period, then two subsequent sets.

#### **SECTION 12: ARCTIC PLAN OF COOPERATION**

Not applicable. The proposed activity will take place off the Kitsap County shoreline, and no activities will take place in or near a traditional Arctic subsistence hunting area. Therefore, there are no relevant subsistence uses of marine mammals implicated by this action.

#### **SECTION 13: MONITORING AND REPORTING**

Kitsap Transit and GeoEngineers developed a detailed Marine Mammal Monitoring Plan for this project (attached; GeoEngineers 2017c). The Marine Mammal Monitoring Plan will be implemented during all in-water pile-driving and pile removal activities. Monitoring is not proposed for airborne noise associated with use of a concrete saw. Concrete saw noise will only exceed the 90dB threshold within 15.2 meters of the pile to be installed and no haul-out opportunities are available within this range.

Monitoring will include one qualified observer positioned at the on-shore vantage point at the outer portion of the pier to be retained at the project site when water conditions are a Beaufort level 2 or less. If water conditions exceed a Beaufort level 2, or if visibility is limited by rain or fog, an additional on-shore observer will be positioned at the Bremerton Marina and/or a monitor will patrol the monitoring zone in a boat. The boat operator will not act as a marine mammal observer. The final boat monitoring path may be adjusted during construction but monitoring methods will allow for a complete view of the monitoring zone.

The monitoring zone is defined as the area in which marine mammals could be disturbed by in-water pile driving noise. For the project site, the monitoring zone for marine mammals is defined as the distance at which underwater sound attenuates to 160 dBrms for impact driving and 120 dBrms for vibratory pile driving. For 12-inch piles, attenuation is expected to occur within 0.1 miles (136 meters) for impact installation and within 1.3 miles (2,154 meters) for vibratory installation. For 16.5 and 18-inch vibratory pile removal, underwater sound is expected to attenuate to below disturbance thresholds within 2.9 miles (4,612 meters) and 24-inch pile installation underwater sound is expected to attenuate to below disturbance thresholds within 6.2 miles (10,000 meters) for vibratory pile installation and 1.1 miles (1,848 meters) for impact installation.

The Orca Network website will be accessed each morning prior to in-water construction activities that may produce noise levels above the disturbance threshold and if pile removal or installation ceases for more than two hours. The Orca Network website identifies the most recent opportunistic sighting locations of Southern Resident killer whales and other ESA-listed marine mammals, which can assist in identifying potential presence within the monitoring zone. Using scopes and binoculars, the monitors will search for marine mammals within the monitoring zone. If no ESA-listed marine mammals or gray whales are observed within or approaching the monitoring zone, the monitors will notify the construction superintendent to begin pile driving.

During pile driving operations, monitors will continue to scan the monitoring zone for marine mammals. All monitors will have two-way radios to allow for effective communication during pile driving. If ESA-listed marine mammal species or gray whales are seen within or approaching the monitoring zone during pile driving, the monitors will immediately notify the construction superintendent and he/she will stop pile driving. Pile driving will not resume until ESA-listed marine mammals or gray whales have left the disturbance zone. If non-ESA-listed marine mammals (other than gray whales) move into the monitoring zone during pile driving, the monitors will observe and record the animal's behavior, but pile driving will not be ordered to stop. If any marine mammal is observed with or approaching the stop-work zone, the monitors will immediately notify the construction superintendent and he/she will stop pile driving to avoid Level A take.

#### **Minimum Qualifications for Marine Mammal Observers**

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water surface with ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred).
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).

- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in-water construction activities were conducted; dates and times when marine mammals were present at or within the defined disturbance zone; dates and times when in-water construction activities were suspended to avoid incidental harassment by disturbance from construction noise; etc.
- Ability to communicate orally, by two-way radio, cell phone or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.

### **Data Collection and Reporting**

Observers will use standardized data forms. Among other pieces of information, observers will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and a description of specific actions that ensued and resulting behavior of the animal. At a minimum, the following information be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., wind speed, percent cloud cover, visibility);
- Water conditions (e.g., sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Description of implementation of mitigation measures (e.g., shutdown or delay);
- Locations of all marine mammal observations; and
- Other human activity in the area.

Monitors will note in 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 different individuals are being exposed.

Collected data will be compiled into one monitoring report and submitted to NMFS within 90 days of completion of work. The report will contain the information listed above as well as an extrapolated total take estimate based on the number of marine mammals observed during the construction monitoring period. A final report will be submitted with 30 days of resolution of comments on the draft report.

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

In-water and in-air noise generated by vibratory and impact pile driving, pile removal at the construction area are the primary issue of concern to local marine mammals during this project. Potential impacts on marine mammals have been studied, with the results used to establish the noise criteria for evaluating take.

Kitsap Transit plans to coordinate with NMFS and Orca Network (when appropriate) to gather information on the location of marine mammals prior to initiating pile driving. Marine mammal monitoring will be conducted to avoid Level A take and document potential Level B take.

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SMM:JOC:tt:cam

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Attachments:

Figure 1. Vicinity Map

Figure 2. 12-inch Impact Pile Driving Marine Mammal SPL Thresholds

Figure 3. 24-inch Impact Pile Driving Marine Mammal SPL Thresholds

Figure 4. 12-inch Vibratory Pile Driving Marine Mammal SPL Thresholds

Figure 5. 24-inch Vibratory Pile Driving Marine Mammal SPL Thresholds

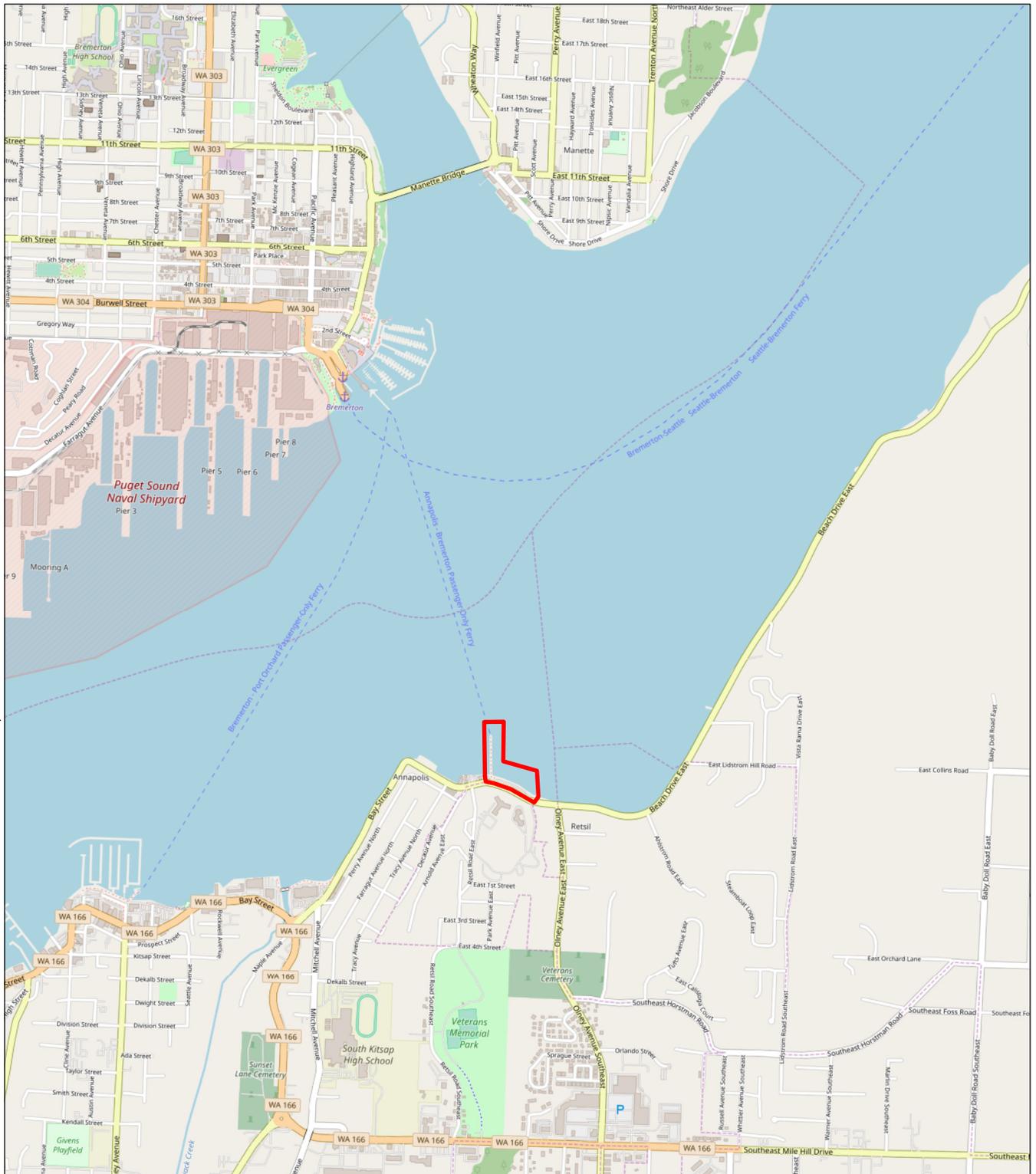
Figure 6. Vibratory Pile Removal Marine Mammal SPL Thresholds

Figure 7. Airborne Noise Monitoring Zones for Pinnipeds

Appendix A. Marine Mammal Monitoring Plan, Annapolis Ferry Dock Upgrade Project

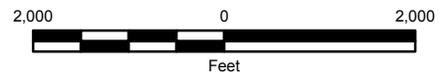
Map Revised: 3/27/2018

Path: AnnapolisVicinityMap2016  
TACO



**Legend**

 Project Area



**Notes:**

1. The locations of all features shown are approximate.
  2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.
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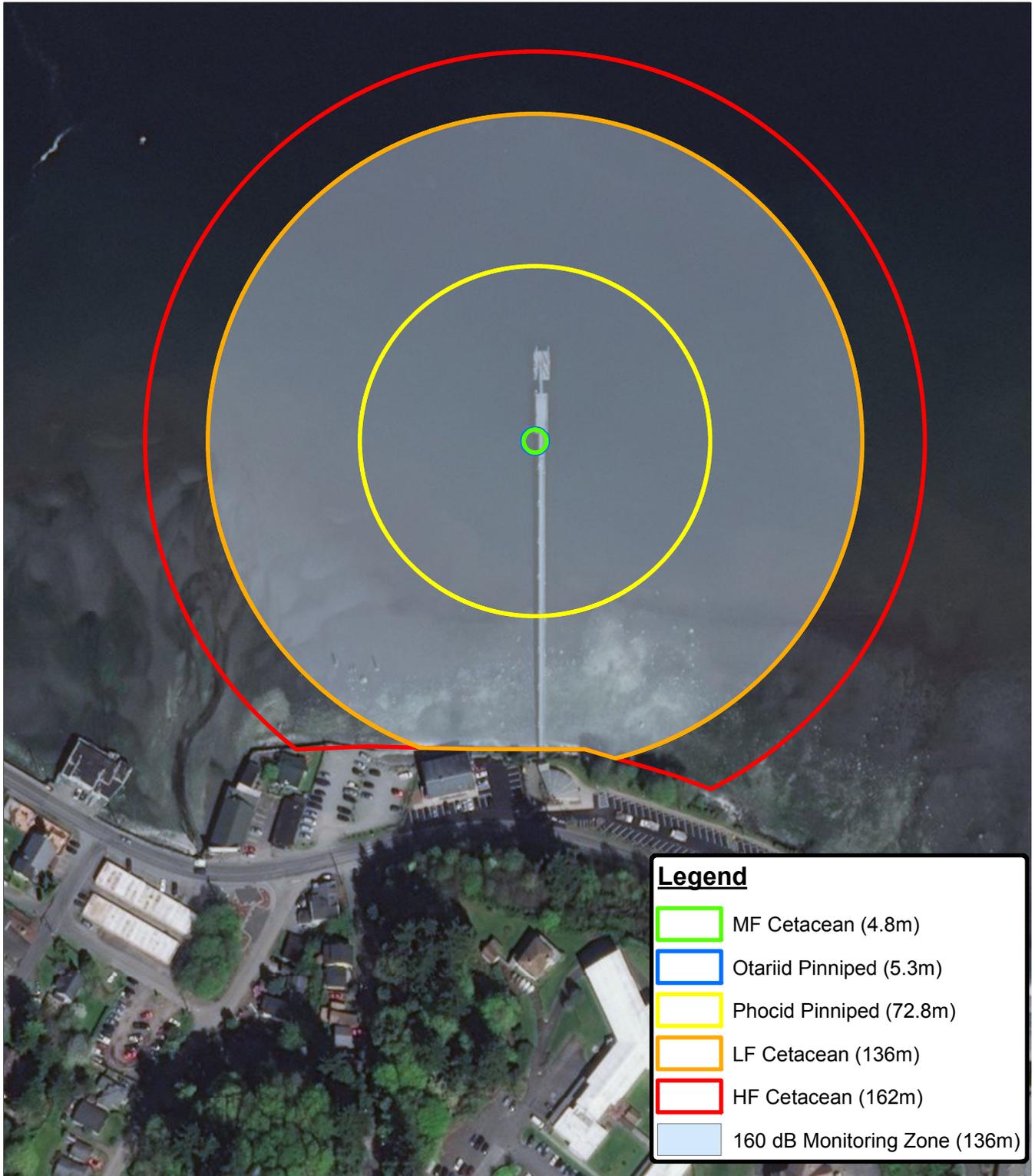
**Vicinity Map**

**Annapolis Ferry Dock Upgrade  
Port Orchard, Washington**

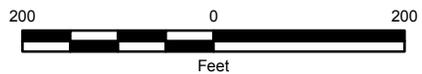


**Figure 1**

Map Revised: 4/30/2018



Legend	
	MF Cetacean (4.8m)
	Otariid Pinniped (5.3m)
	Phocid Pinniped (72.8m)
	LF Cetacean (136m)
	HF Cetacean (162m)
	160 dB Monitoring Zone (136m)



Notes:  
 1. The locations of all features shown are approximate.  
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.  
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**12-inch Impact Pile Driving  
 Marine Mammal SPL Thresholds**

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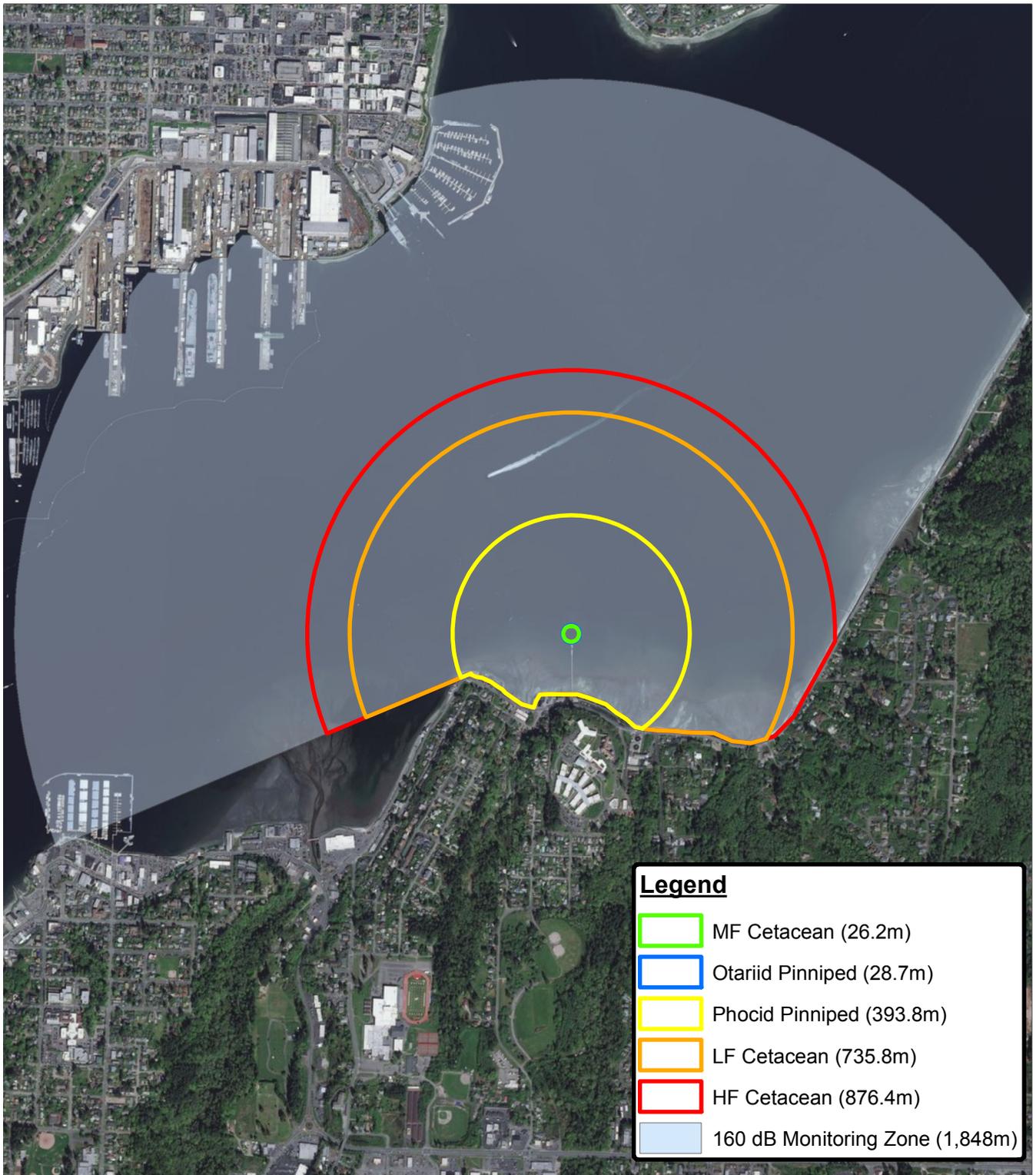
Annapolis Ferry Dock Upgrade  
 Port Orchard, Washington

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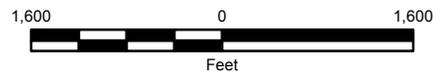
**GEOENGINEERS** **Figure 2**

Path: MIMMP12\_J  
TACO

Map Revised: 4/29/2018



Legend	
	MF Cetacean (26.2m)
	Otariid Pinniped (28.7m)
	Phocid Pinniped (393.8m)
	LF Cetacean (735.8m)
	HF Cetacean (876.4m)
	160 dB Monitoring Zone (1,848m)



Notes:  
 1. The locations of all features shown are approximate.  
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.  
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**24-inch Impact Pile Driving  
 Marine Mammal SPL Thresholds**

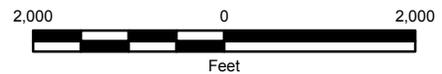
Annapolis Ferry Dock Upgrade  
 Port Orchard, Washington



**Figure 3**

Path: MIMMP24\_J  
TACO

Map Revised: 4/30/2018



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### 12-inch Vibratory Pile Driving Marine Mammal SPL Thresholds

Annapolis Ferry Dock Upgrade  
Port Orchard, Washington



**Figure 4**

Path: MIMMP12V  
TACO

Map Revised: 4/30/2018



Notes:

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**24-inch Vibratory Pile Driving  
Marine Mammal SPL Thresholds**

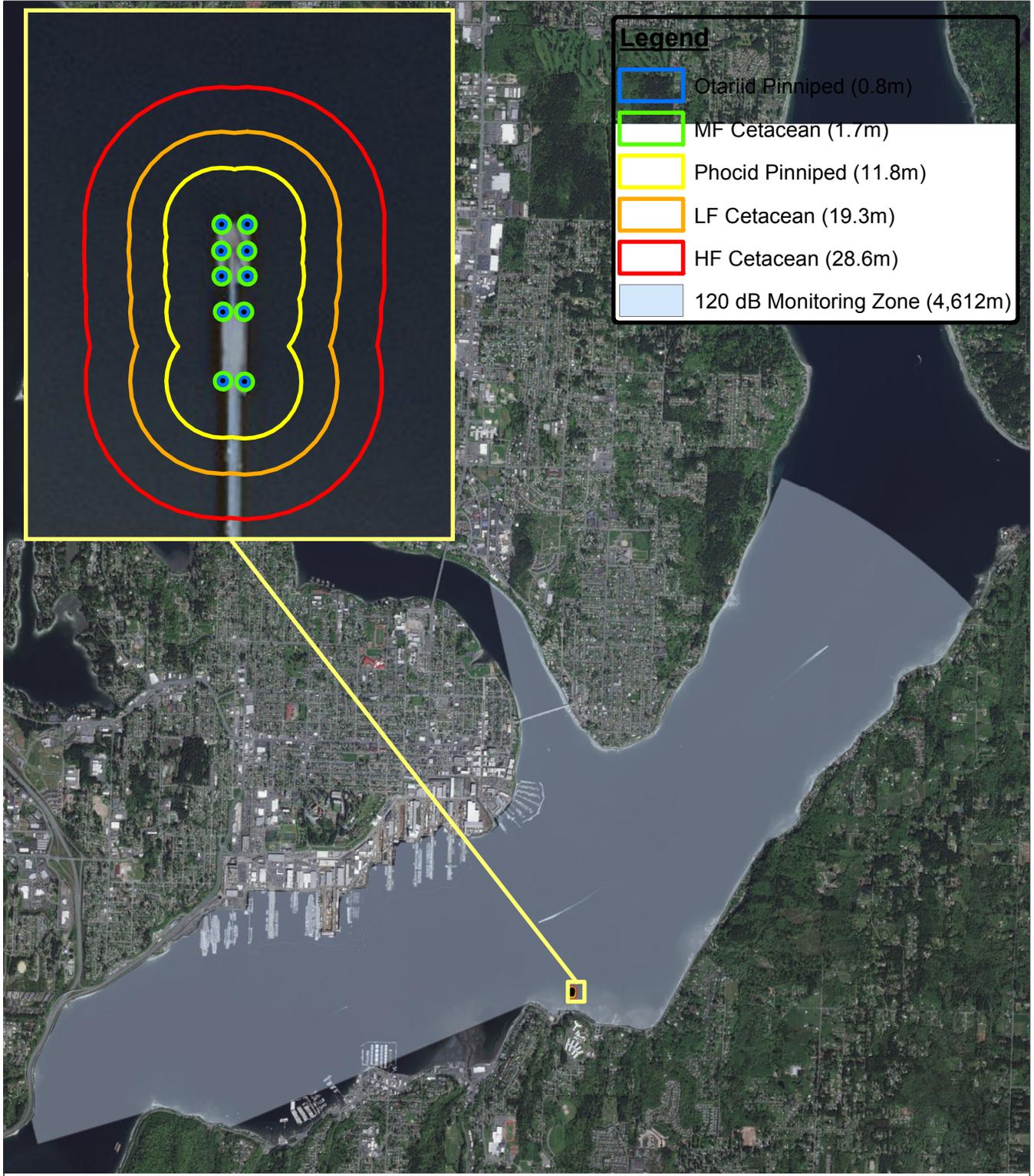
Annapolis Ferry Dock Upgrade  
Port Orchard, Washington



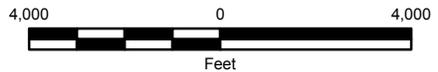
**Figure 5**

Path: MIMMP24V  
TACO

Map Revised: 4/30/2018



Legend	
	Otariid Pinniped (0.8m)
	MF Cetacean (1.7m)
	Phocid Pinniped (11.8m)
	LF Cetacean (19.3m)
	HF Cetacean (28.6m)
	120 dB Monitoring Zone (4,612m)



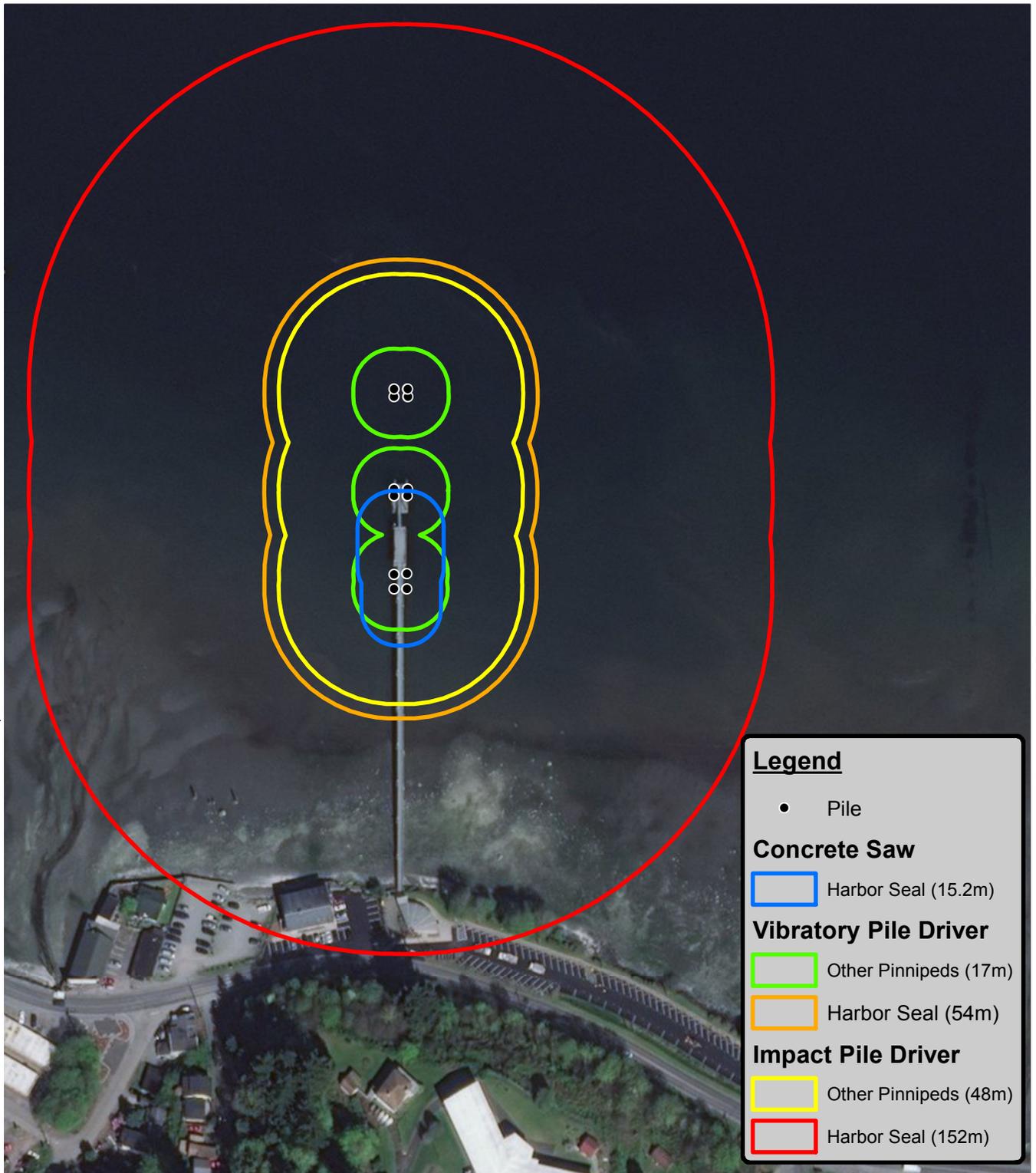
Notes:  
 1. The locations of all features shown are approximate.  
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.  
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<b>Vibratory Pile Removal Marine Mammal SPL Thresholds</b>	
Annapolis Ferry Dock Upgrade Port Orchard, Washington	
	<b>Figure 6</b>

Path: Removal  
TACO

Map Revised: 4/5/2018



**Legend**

- Pile

**Concrete Saw**

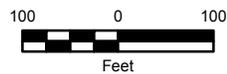
- Harbor Seal (15.2m)

**Vibratory Pile Driver**

- Other Pinnipeds (17m)
- Harbor Seal (54m)

**Impact Pile Driver**

- Other Pinnipeds (48m)
- Harbor Seal (152m)



Notes:

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**Airborne Noise Monitoring  
Zones for Pinnipeds**

Annapolis Ferry Dock Upgrade  
Port Orchard, Washington



Figure 7

Path: Air\_Threshn  
TACO

**APPENDIX A**  
**Marine Mammal Monitoring Plan**  
**Annapolis Ferry Dock Upgrade Project**

June 13, 2017

Kitsap Transit  
60 Washington Avenue, Suite 200  
Bremerton, Washington 98337

Attention: Steffani Lillie

Subject: Marine Mammal Monitoring Plan  
Kitsap Transit  
Annapolis Ferry Dock Upgrade Project  
Kitsap County, Washington  
File No. 0199-026-00

## **INTRODUCTION**

This letter serves to describe the construction monitoring plan related to marine mammals for the proposed Annapolis Ferry Dock Upgrade Project (project) located in Puget Sound along Beach Drive East in Kitsap County, Washington (Figure 1). The project proposes to utilize vibratory and impact pile driving, which will require marine mammal monitoring during construction. The 2017 Biological Assessment (BA) was prepared by GeoEngineers, Inc. (GeoEngineers) and should be referenced for more detailed information regarding the project and potential species impacts.

## **PROJECT DESCRIPTION**

The proposed project will upgrade the existing facility by removing a portion of the existing pier, installing a longer gangway, removing the existing float and constructing a larger float in deeper water. Removal and installation of piles will require the use of a vibratory pile driver and pile installation will likely require the use of an impact pile driver to advance the piles to embedment and for proofing. A total of 10 piles (four 16.5-inch concrete piles and six 18-inch steel piles) will be removed and 12 piles (four 12-inch piles and eight 24-inch piles) will be installed. The new pier will allow safe public access from both the shore and water and comply with the American with Disabilities Act (ADA). The pier is located within Puget Sound (Hydrologic Unit Code 17110019) in Water Resource Inventory Area (WRIA) 15 (Kitsap). Additional project information is included in the BA prepared for the project (GeoEngineers, 2017).



## MARINE MAMMAL MONITORING PROTOCOL

### Objective

The intent of the monitoring protocol is to:

- Comply with the requirements of the Endangered Species Act (ESA) Section 7 consultation.
- Avoid disturbance to marine mammals from elevated underwater sound pressure associated with in-water construction noise, including pile driving.

All methods identified herein have been developed through coordination between the National Marine Fisheries Service (NMFS) and based on monitoring plans prepared for the Washington State Department of Transportation (WSDOT). The methods are based on professional judgment supported by knowledge of marine mammal behavior, site conditions and proposed project activities. Because marine mammal monitoring has not previously been conducted at this site, aspects of these methods may warrant modification. Any modifications to this protocol will be coordinated with NMFS.

### Listed Marine Mammal Occurrence within the Project Area

As identified in the BA prepared for this project (GeoEngineers 2017), the two federally listed marine mammal species that may occur in the project area are southern resident killer whale (SRKW) (*Orcinus orca*) and humpback whale (*Megaptera novaeangliae*).

#### **Southern Resident Killer Whale**

The Southern Resident killer whale was listed as an endangered species under the ESA (70 FR 69903). Southern Resident killer are seasonal visitors to inland waters of Sinclair and Dyes Inlets and typically follow salmon runs. Killer whales prefer deeper waters and are expected to be most prevalent in Sinclair Inlet during the chum salmon migration, which occurs in the fall. Therefore, it is possible that Southern Resident killer whales may be in the project action area during construction. The disturbance threshold for underwater noise for whales is 160 dB<sub>RMS</sub> for impulse noises (i.e., impact driving) and 120 dB<sub>RMS</sub> for non-impulse noises (i.e., vibratory driving) (WSDOT 2017). Underwater noise levels above this threshold are shown for impact and vibratory pile installation of 12- and 24-inch piles on Figures 2 through 5. Should Southern Resident killer whales occur within the disturbance zone during pile installation activities, all work will stop until the killer whales leave the identified disturbance zone.

#### **Humpback Whale**

Humpback whales are known to occasionally travel into the Puget Sound. The majority of humpback whale sightings are in the northern Puget Sound; however, humpback whales have been observed utilizing the waters of the southern Puget Sound as well (Orca Network 2016). Although a few sightings have been reported in the waters of southern Puget Sound, they are very infrequent and short in duration (Orca Network 2016). A juvenile female humpback whale carcass was found beneath a Puget Sound Naval Shipyard dock in June 2016. The necropsy found that the cause of death appears likely a result of the subadult whale becoming trapped beneath a pier (Cascadia Research 2016). Should humpback whales occur offshore of the project site and within the disturbance zone during pile installation activities, all work will stop until the whales leave the identified disturbance zone.



## Monitoring

Marine mammals could be injured or disturbed by underwater sound pressure generated by in-water construction activities during vibratory and impact pile driving. Assumptions used in calculating the distances underwater sound pressure levels will travel above the injury and disturbance thresholds for marine mammals include:

- Impact pile driving for 24-inch steel piles produces single-strike sound levels of 207 dB<sub>PEAK</sub>, 194 dB<sub>RMS</sub>, and 178 dB<sub>SEL</sub> when measured at 10 meters (32.8 feet) from the source (WSDOT, 2017). Impact pile driving for 12-inch steel piles produces single-strike sound levels of 207 dB<sub>PEAK</sub>, 189 dB<sub>RMS</sub>, and 173 dB<sub>SEL</sub> when measured at 10 meters (32.8 feet) from the source (WSDOT 2017). Eight (8) 24-inch-diameter piles and four (4) 12-inch-diameter piles are proposed for the project. Impact pile installation calculations assumed up to 800 pile strikes per day (200 strikes/pile and 4 piles/day) for both 12- and 24-inch steel piles.
- Vibratory pile removal and installation will have an underwater noise level of 175 dB<sub>RMS</sub> for 24-inch steel pipe (typical) piles (Data was only available for 36-inch diameter piles, which was used as a surrogate for 24-inch steel pipe piles) and 155 dB<sub>RMS</sub> for 12-inch steel pipe piles. Vibratory injury calculations for marine mammals were conservative and assumed a 10-hour continuous work duration within a 24-hour period. Therefore, vibratory hammer underwater noise should attenuate to baseline conditions (120 dB<sub>RMS</sub>) within less than 0.29 miles (464 meters) and 28.8 miles (46,416 meters) from the project site for 12- and 24-inch steel pipe piles, respectively.
- A bubble curtain will be employed during impact pile driving. Proper implementation of a bubble curtain is anticipated to reduce noise levels by a minimum of 10 dB<sub>RMS</sub> at 10 meters (Laughlin 2009). However, the following noise calculations did not incorporate reduced underwater noise values from bubble curtain sound attenuation.

The practical spreading loss method was used to identify the distances to attenuation at each threshold level (WSDOT 2017). These thresholds levels and the injury or disturbance distances are provided in Table 5 below, and shown on Figures 2 through 5.



**TABLE 5. ANIMAL THRESHOLDS AND UNDERWATER DISTANCES TO ATTENUATION**

Species	Threshold Levels	12-inch Piles	24-inch Piles
Marine Mammals	<b>Disturbance</b> (V) Vibratory: 120 dB <sub>RMS</sub> (I) Impact: 160 dB <sub>RMS</sub>	(V) 1.33 miles (2,154 meters) (I) 2,812 feet (858 meters)	(V) 28.8 miles (46,416 meters) (I) 1.15 miles (1,848 meters)
	LF Cetaceans 183 dB <sub>RMS</sub>	(V) 41.3 feet (12.6 meters) (I) 608 feet (185.4 meters)	(V) 892 feet (271.9 meters) (I) 1,310 feet (399.5 meters)
	MF Cetaceans 185 dB <sub>SEL(CUM)</sub>	(V) 3.6 feet (1.1 meters) (I) 21.7 feet (6.6 meters)	(V) 79.1 feet (24.1 meters) (I) 46.6 feet (14.2 meters)
	<b>Injury<sup>1</sup></b> HF Cetaceans 155 dB <sub>SEL(CUM)</sub>	(V) 61.4 feet (18.7 meters) (I) 725 feet (220.9 meters)	(V) 1,319 feet (402 meters) (I) 1,561 feet (475.8 meters)
	Phocid Pinnipeds 185 dB <sub>SEL(CUM)</sub>	(V) 25.3 feet (7.7 meters) (I) 325 feet (99.2 meters)	(V) 542 feet (165.3 meters) (I) 701 feet (213.8 meters)
	Otariid Pinnipeds 203 dB <sub>SEL(CUM)</sub>	(V) 1.6 feet (0.5 meters) (I) 23.6 feet (7.2 meters)	(V) 38.1 feet (11.6 meters) (I) 51.2 feet (15.6 meters)

Notes: 1) (V) = Vibratory and (I) = Impact

Monitoring will only occur in the vicinity of in-water construction activities that may produce underwater sound pressure levels above the disturbance threshold of 160 dB<sub>RMS</sub> for impact driving and 120 dB<sub>RMS</sub> for vibratory pile driving. No monitoring is necessary during out-of-water construction.

### Equipment

- Binoculars - quality 8 or 10 power;
- Spotting scopes;
- Two-way radios;
- Log books;
- Marine mammal identification guides;
- Life vest or other personal flotation device for observers when in boats; and
- Cellular phone to contact construction superintendent or NMFS if necessary.

### Locations

Monitoring will occur in the vicinity of all in-water construction activities that may produce underwater noise levels in excess of 120 dB<sub>RMS</sub> for vibratory pile driving and 160 dB<sub>RMS</sub> for impact driving as shown on Figures 2 through 5. Shore based views of the monitoring zone are available from the project site, Bremerton, and Manette shorelines. Monitoring conducted by boat will provide rapid monitoring of the entire area using less monitors. Construction will only occur when weather conditions are suitable for effective visual monitoring of the action area.

### Monitoring Techniques

Two monitoring method options are proposed to meet the marine mammal monitoring requirements. One or both of these methods will be used during pile installation and will be determined in the field based on

the current weather conditions and forecast for each day, as well as the likelihood of encountering marine mammals during the construction time-frame. The first option includes one or more qualified observer(s) positioned at on-shore vantage points at the project site or Bremerton Marina. The second option will require one or more monitors patrolling the disturbance areas in a boat. The final monitoring path may be adjusted during construction, but monitoring methods will allow for a complete view of the monitoring zone. Proposed water-based monitoring routes are shown on Figures 2 through 5. The monitoring method and number of monitors may be adjusted based on site specific weather conditions and visibility.

The monitoring area is defined as the area in which marine mammals could be disturbed by in-water pile driving noise. For the project site, the area of potential disturbance for cetaceans and pinnipeds is defined as the distance at which underwater sound attenuates to 160 dBrms for impact driving and 120 dBrms for vibratory pile driving. For 12-inch piles, this attenuation is expected to occur within 1,522 feet (464 meters) for vibratory installation and within 1.33 miles (2,154 meters) for impact installation. 24-inch pile installation underwater sound is expected to attenuate to below disturbance thresholds within 28.8 miles (46,416 meters) for vibratory pile installation and 1.15 miles for impact installation. If the sea state exceeds a Beaufort level 2, additional monitors may be needed to effectively cover the monitoring zone.

The Orca Network website will be accessed each morning prior to in-water construction activities that may produce noise levels above the disturbance threshold. The Orca Network website identifies the most recent opportunistic sighting locations of Southern Resident killer whales and other ESA-listed marine mammals, which can assist in identifying potential presence within the monitoring zone. Using scopes and binoculars, the monitors will search for marine mammals within the monitoring zone. If no ESA-listed marine mammals are within the disturbance zone, the monitors will notify the construction superintendent to begin pile driving.

During pile driving operations, monitors will continue to scan the area for marine mammals. All monitors will have two-way radios to allow for effective communication during pile driving. If ESA-listed marine mammal species are seen within the monitoring zone during pile driving, the monitors will immediately notify the construction superintendent and he/she will stop pile driving. Pile driving will not resume until ESA-listed marine mammals have left the disturbance zone. If non-ESA-listed marine mammals move into the disturbance zone during pile driving, the monitors will observe and record the animal's behavior but pile driving will not be ordered to stop.

#### **Minimum Qualifications for Marine Mammal Observers**

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water surface with ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred).
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.

- Writing skills sufficient to prepare a report of observations that would include such information as the number and type of marine mammals observed; the behavior of marine mammals in the project area during construction, dates and times when observations were conducted; dates and times when in-water construction activities were conducted; dates and times when marine mammals were present at or within the defined disturbance zone; dates and times when in-water construction activities were suspended to avoid incidental harassment by disturbance from construction noise; etc.
- Ability to communicate orally, by two-way radio, cell phone or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.

## SUMMARY

This monitoring plan was developed to address potential impacts to marine mammals during certain construction activities (vibratory and impact pile driving). Marine mammal monitoring will be land and/or water based with one to two monitors during seas of Beaufort scale 2 or less. Additional monitors will be used as needed if seas reach a Beaufort scale of greater than 2. A final monitoring report will be prepared to document results of the monitoring and changes to the monitoring protocol, which may occur during construction.

## LIMITATIONS

GeoEngineers has prepared this monitoring plan in general accordance with the scope and limitations of our proposal. No warranty or other conditions, express or implied, should be understood. This report has been prepared for the exclusive use of the Kitsap Transit, its authorized agents, and regulatory agencies following the described methods and information available at the time of the work. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. The information contained herein should not be applied for any purpose or project except the one originally contemplated.

## REFERENCES

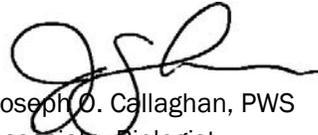
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- Washington State Department of Transportation, 2017. “Chapter 7, Noise Impact Assessment, Biological Assessment Preparation for Transportation Projects: Advanced Training Manual.” Updated April 2017. Available at: <http://www.wsdot.wa.gov/Environment/Biology/BA/BAGuidance.htm#manual>.

Thank you for your review of this Monitoring Plan letter. If you have any questions, please do not hesitate to contact Joe Callaghan at 253.383.4940 with questions.

Sincerely,  
GeoEngineers, Inc.



Shawn M. Mahugh  
Senior Habitat Biologist



Joseph O. Callaghan, PWS  
Associate, Biologist

SMM:JOC:cam

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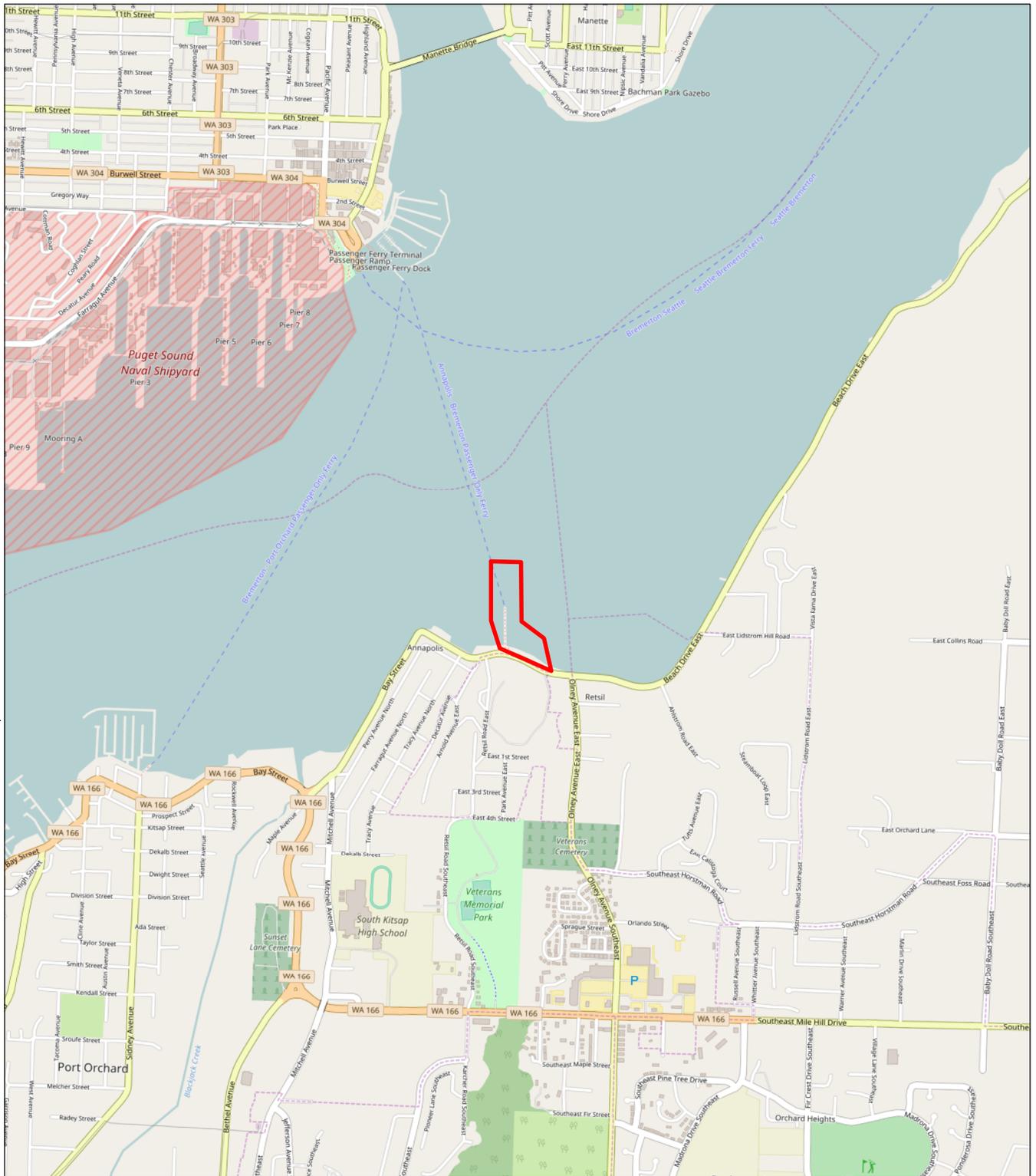
Attachments:

- Figure 1. Vicinity Map
- Figure 2. 24-inch Pile Impact Driving Marine Mammal Noise Thresholds
- Figure 3. 24-inch Pile Vibratory Driving Marine Mammal Noise Thresholds
- Figure 4. 12-inch Pile Impact Driving Marine Mammal Noise Thresholds
- Figure 5. 12-inch Pile Vibratory Driving Marine Mammal Noise Thresholds



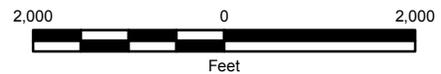
Map Revised: 6/9/2017

Path: AnnapolisVicinityMap2016  
TACO



**Legend**

 Project Area



**Notes:**

- 1. The locations of all features shown are approximate.
  - 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.
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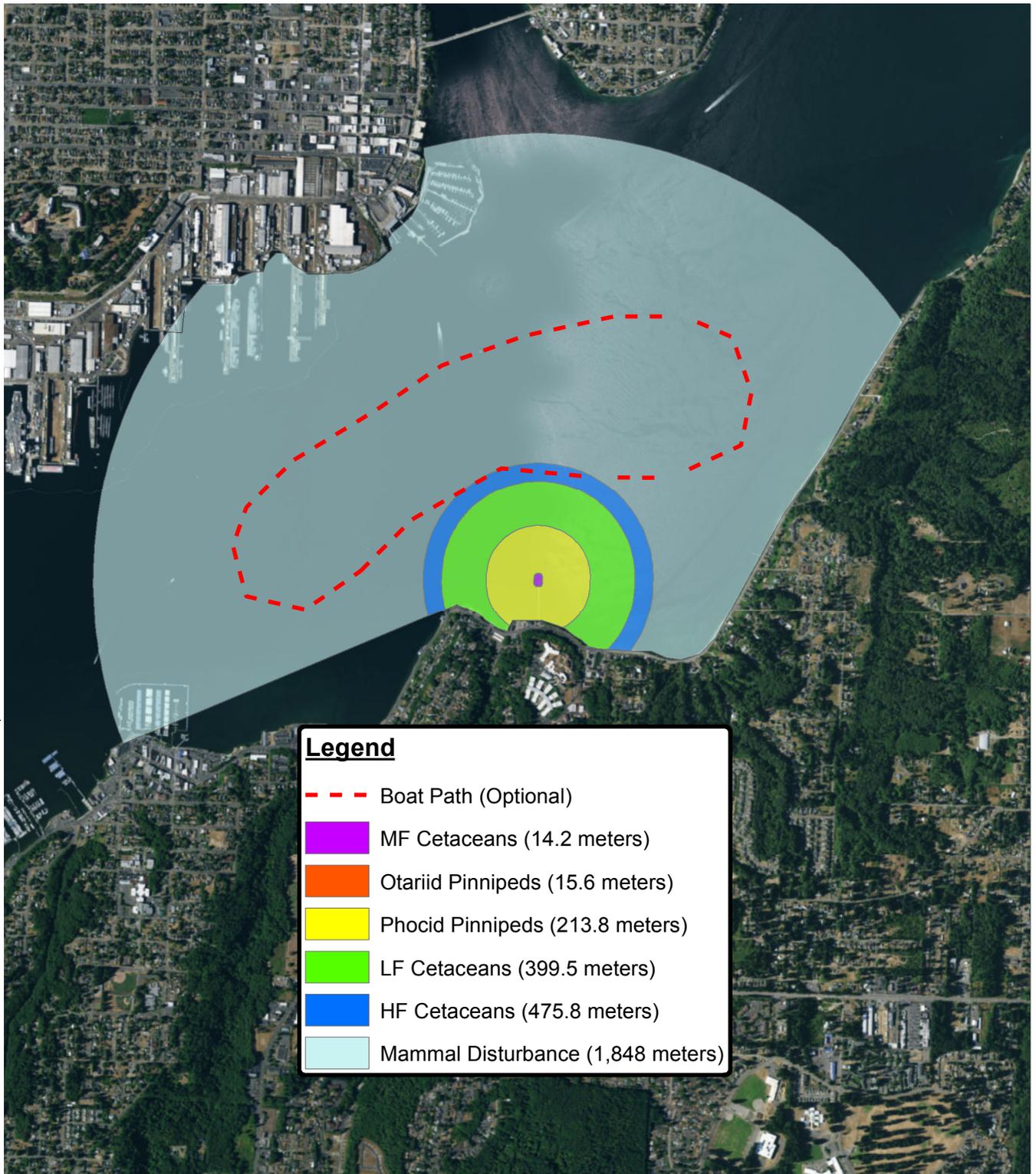
**Vicinity Map**

**Annapolis Ferry Dock Upgrade  
Port Orchard, Washington**



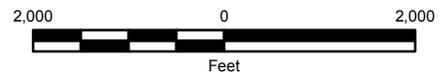
**Figure 1**

Map Revised: 6/9/2017



**Legend**

- - - Boat Path (Optional)
- MF Cetaceans (14.2 meters)
- Otariid Pinnipeds (15.6 meters)
- Phocid Pinnipeds (213.8 meters)
- LF Cetaceans (399.5 meters)
- HF Cetaceans (475.8 meters)
- Mammal Disturbance (1,848 meters)



**Notes:**

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**24-inch Pile Impact Driving  
Marine Mammal Noise Thresholds**

Annapolis Ferry Dock Upgrade  
Port Orchard, Washington



**Figure 2**

Path: MIMMP241  
TACO

Map Revised: 6/9/2017



Path: MMMP24V  
TACO

**Notes:**

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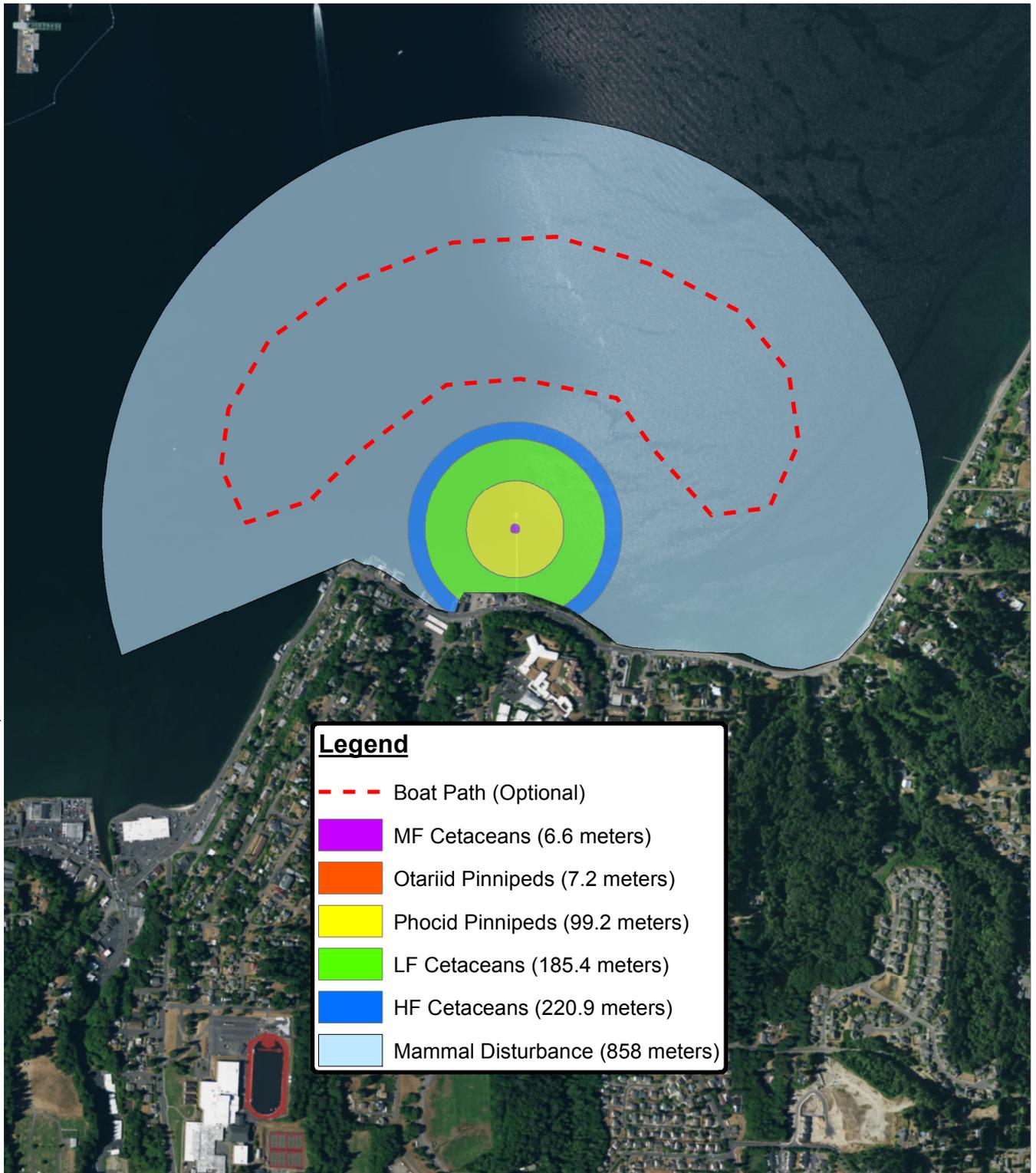
**24-inch Pile Vibratory Driving  
Marine Mammal Noise Thresholds**

Annapolis Ferry Dock Upgrade  
Port Orchard, Washington

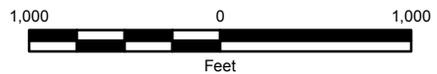


**Figure 3**

Map Revised: 6/9/2017



Legend	
	Boat Path (Optional)
	MF Cetaceans (6.6 meters)
	Otariid Pinnipeds (7.2 meters)
	Phocid Pinnipeds (99.2 meters)
	LF Cetaceans (185.4 meters)
	HF Cetaceans (220.9 meters)
	Mammal Disturbance (858 meters)



Notes:

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### 12-inch Pile Impact Driving Marine Mammal Noise Thresholds

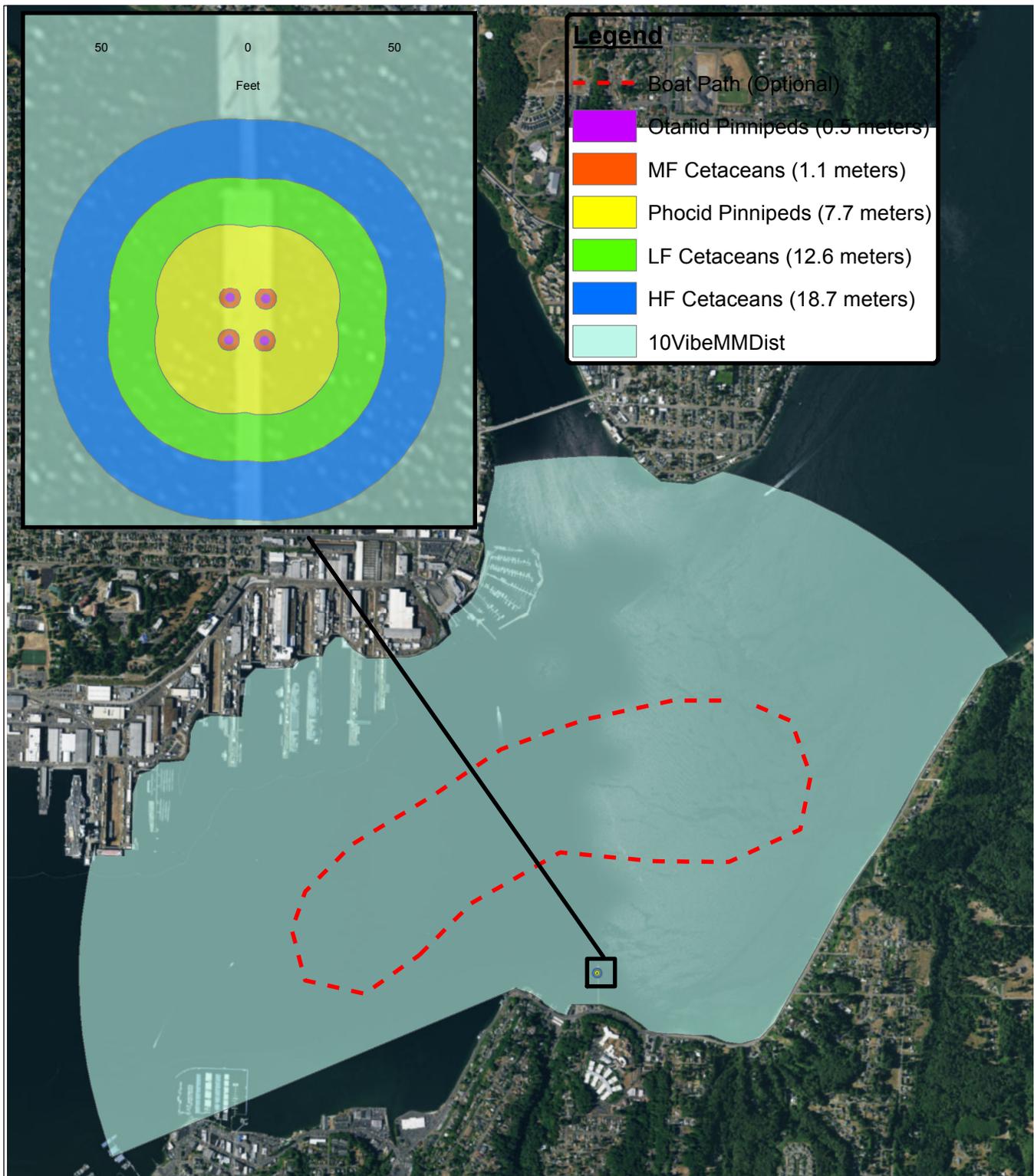
Annapolis Ferry Dock Upgrade  
Port Orchard, Washington



Figure 4

Path: MIMMP121  
TACO

Map Revised: 6/9/2017



**Legend**

- Boat Path (Optional)
- Otarid Pinnipeds (0.5 meters)
- MF Cetaceans (1.1 meters)
- Phocid Pinnipeds (7.7 meters)
- LF Cetaceans (12.6 meters)
- HF Cetaceans (18.7 meters)
- 10VibeMMDist

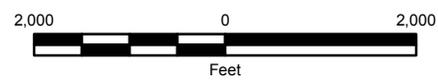
Path: MIMMP12V  
TACO

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**12-inch Pile Vibratoy Driving  
Marine Mammal Noise Thresholds**

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Annapolis Ferry Dock Upgrade  
Port Orchard, Washington

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**Figure 5**