Request for an Incidental Harassment Authorization

City of Hoonah
Hoonah Marine Industrial Complex Cargo Dock Project
Port Frederick, Hoonah, Alaska

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DRAFT

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TABLE OF CONTENTS

1 DESCRIPTION OF SPECIFIC ACTIVITY 1
1.1 OVERVIEW 1
1.2 DETAILED DESCRIPTION OF SPECIFIC ACTIVITIES 1
1.3 ACOUSTIC THRESHOLDS AND ESONIFIED AREA 11
2 DATES, DURATION, AND REGION OF ACTIVITY 16
2.1 DATES AND DURATION 16
2.2 SPECIFIC GEOGRAPHIC REGION 16
2.3 Seasonal Issues 17
3 SPECIES AND NUMBERS OF MARINE MAMMALS 18
4 AFFECTED SPECIES STATUS AND DISTRIBUTION 20
4.1 MINKE WHALE 20
4.2 HUMPBACK WHALE 20
4.3 GRAY WHALE 23
4.4 KILLER WHALE 24
4.5 PACIFIC WHITE-SIDED DOLPHIN 25
4.6 DALL'S PORPOISE 26
4.7 HARBOR PORPOISE 26
4.8 HARBOR SEAL 28
4.9 STELLER SEA LION 29
5 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED 32
6 TAKE ESTIMATES FOR MARINE MAMMALS 33
6.1 ESTIMATED TAKE 33
6.2 ALL MARINE MAMMAL TAKE REQUESTED 36
7 ANTICIPATED IMPACT OF THE ACTIVITY 38
8 ANTICIPATED IMPACTS ON SUBSISTENCE USES 39
9 ANTICIPATED IMPACTS ON HABITAT 40
9.1 IMPACTS TO PHYSICAL HABITAT 40
9.2 EFFECTS OF PROJECT ACTIVITIES ON MARINE MAMMAL HABITAT 40
9.3 EFFECTS OF PROJECT ACTIVITIES ON MARINE MAMMAL PREY HABITAT 40
10 ANTICIPATED EFFECT OF HABITAT IMPACTS ON MARINE MAMMALS 42
10.1 LOSS OF MARINE MAMMAL HABITAT DUE TO NOISE 42
10.2 LOSS OF MARINE MAMMAL HABITAT DUE TO TURBIDITY 42
10.3 DISTURBANCE OR LOSS OF PREY SPECIES 42
11 MITIGATION MEASURES 43
11.1 MITIGATION MEASURES DESIGNED TO REDUCE PROJECT IMPACTS 43
11.2 OIL AND SPILL PREVENTION 43
11.3 MITIGATION MEASURES DESIGNED TO REDUCE IMPACTS TO MARINE MAMMALS 43
11.4 SHUTDOWN AND MONITORING ZONES 44
12 ARCTIC PLAN OF COORDINATION 51
13 MONITORING AND REPORTING 52
13.1 MONITORING PROTOCOLS 52
13.2 MONITORING REPORT 52
14 SUGGESTED MEANS OF COORDINATION 54
15 REFERENCES 55

TABLES

Table 1. HMIC Cargo Dock Project Pile Summary 10
Table 2. Thresholds Identifying the Onset of Permanent Threshold Shift 11
Table 3. Calculated Distances to NMFS Level A and B Acoustic Thresholds 13
Table 4. Marine Mammal Species with Ranges Extending into the Project Area 19
Table 5. Species Occurrence Information and Take Calculation 34
Table 6. Take Requests for Marine Mammals and Percent of Stock 37
Table 7. HMIC Pile Driving Level A Shutdown and Monitoring Zones 46
Table 8. HMIC Level B Monitoring Zones 49

FIGURES

Figure 1. Proposed Project Location and Vicinity Map 2
Figure 2. Location of Project Components 3
Figure 3. Proposed Cargo Dock Location 3
Figure 4. Proposed Action Site Plan 5
Figure 5. HMIC Cargo Dock Project Proposed Action Area 15
Figure 6. NOAA Nautical Chart #17302 Hoonah Area Bathymetry 17
Figure 7. HMIC Level A Shutdown Zones 47
Figure 8. HMIC Level A Monitoring Zones 48
Figure 9. HMIC Level B Monitoring Zones 50

APPENDICES

Appendix A: Project Drawings
Appendix B: Threshold Calculation Spreadsheets
Appendix C: Marine Mammal Monitoring and Mitigation Plan

ACRONYMS AND ABBREVIATIONS

ADFG	Alaska Department of Fish & Game
AFSC	Alaska Fisheries Science Center
AMHS	Alaska Marine Highway System
ANSI	American National Standards Institute
COH	City of Hoonah
dB	decibels
DPS	distinct population segment
DTH	down-the-hole
EDPS	eastern distinct population segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESCA	Endangered Species Conservation Act
Hz	hertz
HDPE	high-density polyethylene
HIA	Hoonah Indian Association
HMIC	Hoonah Marine Industrial Complex
hr	hour
IHA	Incidental Harassment Authorization
IPCoMM	Indigenous People's Council for Marine Mammals
kHz	kilohertz
km	kilometer
LOA	Letter of Authorization
lf	linear feet
min	minutes
MMPA	Marine Mammal Protection Act
µPa	microPascal
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PSO	Protected Species Observer
PTS	permanent threshold shift
rms	root mean square
SEL	sound exposure level
SPL	sound pressure level
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
UHMW	ultra-high-molecular-weight polyethylene
WDPS	western distinct population segment
4MP	Marine Mammal Monitoring and Mitigation Plan

1 DESCRIPTION OF SPECIFIC ACTIVITY

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 OVERVIEW

The City of Hoonah (COH) proposes to make upgrades to the city-owned Marine Industrial Center (HMIC) in Port Frederick Inlet on Chichagof Island in Hoonah, Alaska. Upgrades to the site would include the installation of three breasting dolphins, a sheet pile bulk cargo dock, fender piles, and a catwalk. The proposed upgrades are needed to continue safely accommodating barges and other vessels delivering essential goods to Hoonah.

Upgrades to the gravel loading ramp includes in-water pile driving of steel piles and the placement of fill in marine waters that support several marine mammal species. Pile driving may result in auditory injury (Level A harassment) and behavioral harassment (Level B harassment) of select marine mammal species. All pile driving is expected to occur on 110 days (not necessarily consecutive)

The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; take is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an Incidental Harassment Authorization (IHA), provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

COH is requesting an IHA for Level B take of nine marine mammal species and Level A take of three marine mammal species that may occur in vicinity of the project area extending through Port Frederick Inlet. The species for which Level B take is requested are: minke whale (*Balaenoptera acutorostrata*), humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), killer whale (*Orcinus orca*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and Steller sea lion (*Eumetopias jubatus*). The species for which Level A take is requested are: Dall's porpoise, harbor porpoise, and harbor seal.

As set out by 50 CFR 216.104, Submission of Requests, the specific items required for this application follow in Sections 1 through 14.

1.2 DETAILED DESCRIPTION OF SPECIFIC ACTIVITIES

1.2.1 Location

The proposed project at the HMIC is located in Port Frederick Inlet, approximately 0.8 kilometers (0.5 miles) northwest of downtown Hoonah 0.24 kilometers (0.15 miles) east of the State of Alaska Ferry Terminal. in Southeast Alaska; T43S, R61E, S20, Copper River Meridian, USGS Quadrangle Juneau A5 NE; latitude 58.11549 and longitude -135.4547 (Figure 1, 2, 3, and Appendix A, Sheet 1).

Figure 1. Proposed Project Location and Vicinity Map

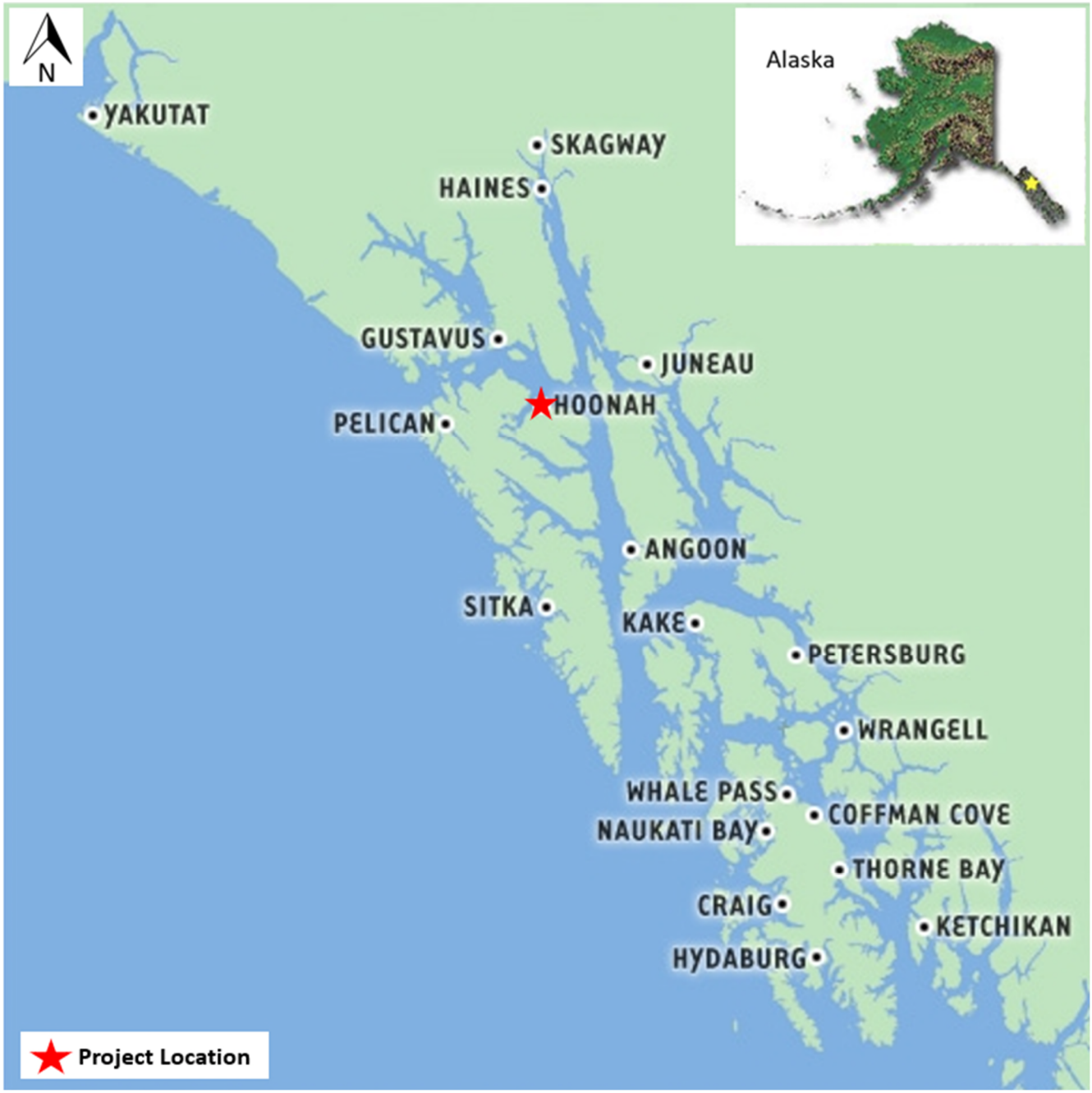


Figure 2. Location of Project Components

Figure 3. Proposed Cargo Dock Location

Looking south from the current gravel loading ramp (USACE 2010)

1.2.2 Purpose and Need

Hoonah is only accessible by air and water. Small amounts of cargo are transported into the community by plane; however, the majority is delivered weekly by barges from April through September (AML 2020). When weather permits, front load barges utilize a gravel landing located next to the existing City Dock. The gravel landing provides a makeshift location to unload heavy cargo using a ramp and forklifts. During winter months, inclement weather events, and for more frequent deliveries, locals utilize the Alaska Marine Highway System (AMHS) ferries and the local ferry terminal.

The existing gravel landing at HMIC was not originally designed for barges and requires an additional ramp and favorable weather conditions to safely unload cargo. Even during favorable weather, the space and depth places the barges and crew at risk, and the landing cannot safely accommodate the fleet of barges delivering to Hoonah. With the decrease in AMHS ferry service (due to State funding cuts) it is imperative that a reliable way to receive goods in Hoonah is available.

The HMIC cargo dock is one component of the HMIC, which is a phased approach to enhance the Hoonah waterfront and to provide infrastructure to support the Cruise Ship Industry and various other maritime industries, shown in Figure 4. The purpose of HMIC Cargo Dock project is to make improvements to the existing gravel landing to enable barges to land during all conditions. The project is needed because the existing facility cannot provide consistent and safe berthing for barges. Once the project is completed, Hoonah will be able to reliably receive goods year-round and in all weather conditions.

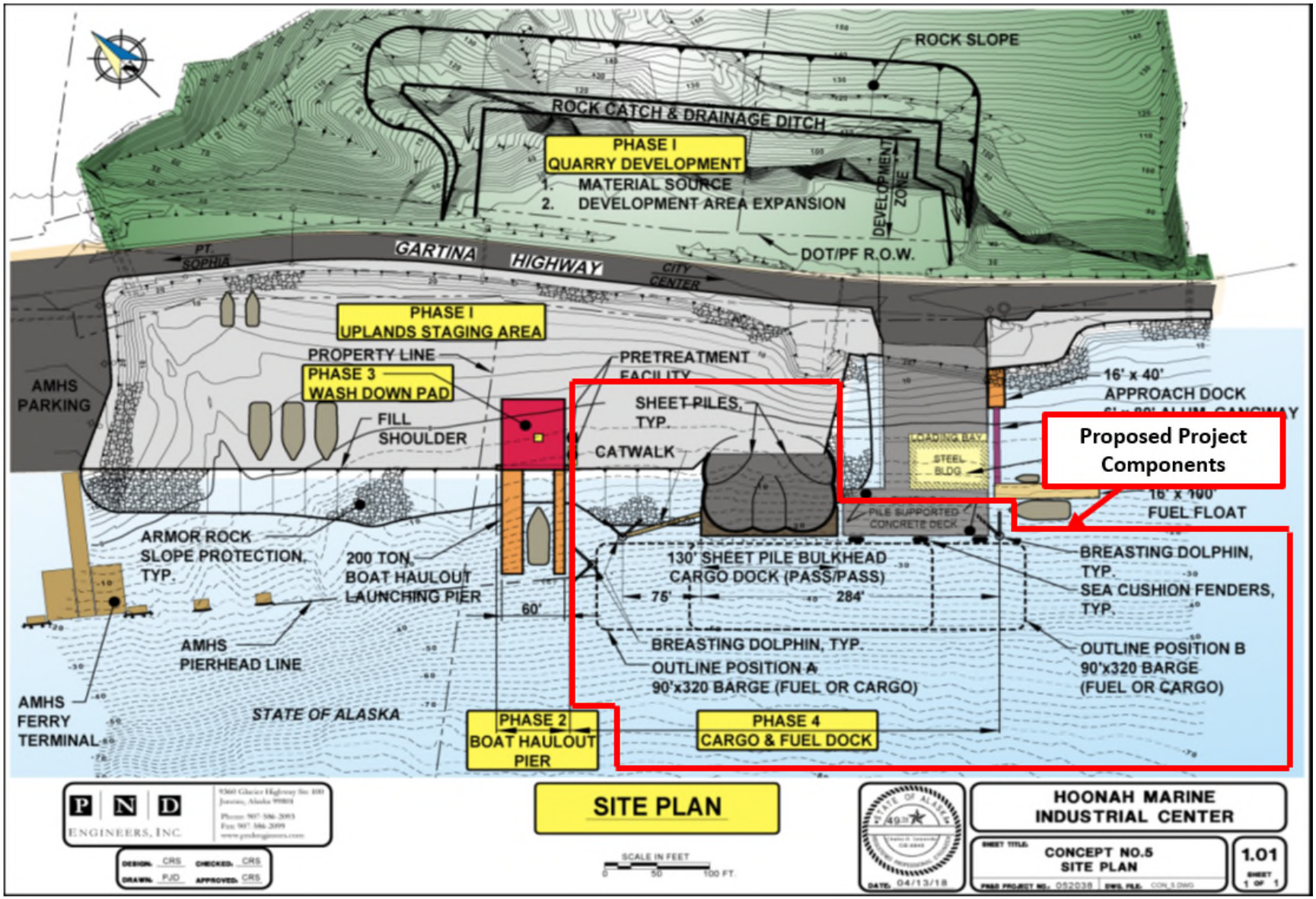
1.2.3 Anticipated Changes in Vessel Traffic

Currently, Alaska Marine Line barges offers seasonal ramp barge service into Hoonah; however, this project will allow for year-round, weekly deliveries by ocean going barges.

1.2.4 Proposed Action

The COH proposes to install three breasting dolphins, sheet pile bulk cargo dock, and fender piles adjacent to and within the footprint of the existing gravel landing to safely accommodate barges (Figures 4; Appendix A).

Figure 4. Proposed Action Site Plan



1.2.5 Construction Methods

The project would involve installing breasting dolphins, a solid fill sheet pile dock, and fender piles.

1.2.5.1 Barge Breasting Dolphin Construction Methods and Components

Constructing the three breasting dolphins would involve:

- Installing 10 temporary 30-inch-diameter steel piles as templates to guide proper installation of permanent piles (these piles would be removed prior to project completion);
- Installing 9 permanent 36-inch-diameter piles (Figure 4; Appendix A: Sheets 3), including:
  - Breasting Dolphin 1
    - One vertical 36-inch steel pile
    - Two 36-inch batter steel piles
  - Breasting Dolphin 2
    - One vertical 36-inch steel pile
    - Two 36-inch batter steel pile
  - Breasting Dolphin 3
    - One vertical 36-inch steel pile
    - Two 36-inch batter steel pile
  - Installing an 80-foot slatted above-water catwalk

1.2.5.2 Sheet Pile Bulk Cargo Dock Construction Methods and Components

Constructing the bulk cargo dock would involve (Figure 4; Appendix A: Sheets 3-4):

- Installing 20 temporary 30-inch-diameter steel piles as templates to guide proper installation of permanent H-piles (these piles would be removed prior to project completion)
- Installing 12 permanent H-piles to guide proper installation of sheets
- Installing 500 permanent sheet piles (130 linear feet)
- Filling the area within sheet piles with 9,600 cubic yards of fill

1.2.5.3 Fender Pile Construction Methods and Components

Installing the fender piles would include (Figure 4; Appendix A: Sheet 3):

- Installing 20 temporary 30-inch-diameter steel piles as templates to guide proper installation of permanent fender piles (these piles would be removed prior to project completion)
- Installing 6 permanent 20-inch-diameter fender piles in front of sheet pile cargo dock

1.2.5.4 Equipment

The following equipment or similar is expected to be used (a final determination will be made by the selected contractor):

- Vibratory Hammer: ICE 448 1800VPM
- Diesel Impact Hammer: APE D36-42/Max Energy 89,303 feet-pounds
- 10,000 feet-pounds Top Drive
- Excavator: Hitachi 450-470

1.2.5.5 Transport of Materials and Equipment

Materials and equipment would be expected to be transported from Washington to the project site by barge. While work is conducted in the water, the barge would be secured in place by four anchors. The anchors would be below the surface and would not be a hazard to navigation. Local barge moves to the next pile installation area (approximately 60 feet away) would occur at a speed of less than 2 miles per hour.

1.2.5.6 Transport of Workers to and from Work Platform

Workers will be transported from shore to the barge work platform by a 25-foot skiff with a 125–250 horsepower motor (expected). The travel distance will be less than 100 feet. There could be multiple shore-to-barge trips during the day; however, the area of travel will be relatively small and close to shore.

1.2.5.7 Other In-water Construction and Heavy Machinery Activities

In addition to the activities described above, the proposed action will involve other in-water construction and heavy machinery activities. Examples of other types of activities include using standard barges, tug boats; and positioning piles on the substrate via a crane (i.e., “stabbing the pile”), and heavy machinery to place fill.

1.2.5.8 Construction Sequence

In-water construction of the HMIC cargo dock components is expected to occur via the following sequence:

1) Vibrate twenty 30-inch temporary piles to use as a guide to install H-piles for the cargo dock.
2) Vibrate and impact 12 H-piles to depth to hold the sheets into place.
3) Remove the temporary piles.
4) Using the H-piles as a guide, vibrate and impact 500 sheets into place to create a barrier prior to placing fill.
5) Using an excavator place 9,600 cubic yards of fill within the newly constructed cargo dock frame.

After the completion of the cargo dock, the barge will move over to install the six fender piles at the existing city dock face using the following sequence:

1) Vibrate 20 temporary 30-inch piles a minimum of ten feet into bedrock to create a template to guide installation of the permanent piles.

2) Weld a frame around the temporary piles.
3) Within the frame: vibrate, impact, and down the hole drill (DTH)/socket six permanent 20-inch fender piles into place.
4) Remove the frame and temporary piles.
5) Perform this sequence at the other six fender pile locations.

The three breasting dolphins will be constructed as the barge moves off shore and will install temporary and permanent piles as follows:

1) Vibrate 10 temporary 30-inch piles a minimum of ten feet into bedrock to create a template to guide installation of the permanent piles.
2) Weld a frame around the temporary piles.
3) Within the frame: vibrate, impact, and DTH/socket one vertical and two batter 36-inch pile into place.
4) Remove the frame and temporary piles.
5) Perform this sequence at the second and third location working farther from the shoreline.

Please see Table 1 at the end of this section for the specific amount of time required to install and remove piles, and see Section 1.3.3 for construction duration information.

1.2.5.9 Installation Methods

Installation and Removal of Temporary (Template) Piles

Temporary 30-inch-diameter piles would be installed and removed using a vibratory hammer.

Installation of Permanent Piles

The permanent H-piles, 20-inch, and 36-inch piles would be installed through sand and gravel with a vibratory hammer until advancement stops. Then, the pile will be driven to depth with an impact hammer. If design tip elevation is still not achieved, the contractor will utilize a drill to secure the pile. (Note: this socketing method can also be referred to as DTH drilling. It is referred to as socketing throughout this document.) Pile depths are expected to be approximately 40 to 70 feet below the mudline and estimated to take approximately 1.25-10.5 hours per pile to complete.

If design embedment is not achieved after installing H-piles with the vibratory and impact hammer, the pile will be removed using the deadpull method and/or vibratory hammer. Following removal, a 20-inch diameter hole will be drilled at the pile location, the H-pile will be inserted into the drilled hole and grouted into place. After the first time the vibratory/impact method is not successful, the contractor will continue to install all the H-piles via the drilled hole/grouting method.

The permanent sheets would be installed using a vibratory hammer and impact hammer following the same criteria as above to achieve design tip elevation. It is expected that it will take around 20 minutes to install each sheet.

Table 1 provides a conservative estimate of the amount of time required for pile removal and installation.

Table 1. HMIC Cargo Dock Project Pile Summary: Number, Size, and Estimated Number of Hours Required by Installation Method

Description	Project Component					
	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation			
Vibratory Hammer						
Diameter of Steel Pile (inches)	30	30	36	H-piles	Sheets	20
# of Piles	50	50	9	12	500 (130lf)	6
Max # Piles Vibrated per Day	4	4	4	4	30 sheets	4
Vibratory Time per Pile (min)	15	15	15	15	15	15
Vibratory Time per Day (min)	60	60	60	60	450 (7.5 hr)	45
Number of Days	12.5	12.5	2.25	3	17	2
Vibratory Time Total	12 hrs 30 mins	12 hrs 30 mins	2 hr 15 mins	3 hrs	292 hrs	1 hr 30 min
Impact Hammer						
Diameter of Steel Pile (inches)	-	-	36	H-piles	Sheets	20
# of Piles	-	-	9	12	500 (130lf)	6
Max # Piles Impacted per Day	-	-	2	4	20 sheets	2
Impact Time per Pile (min)	-	-	15	5	5	5
Impact Time per Day (min)	-	-	30	20	100	10
Number of Days	-	-	4.5	3	25	3
Impact Time Total	-	-	2 hr 15 mins	1 hr	41 hr 40 mins	30 min
DTH Drilling/Socketing						
Diameter of Steel Pile (inches)	-	-	36	H-Piles	-	20
Total Quantity	-	-	9	12	-	6
DTH/Socket Diameter	-	-	33	20	-	20
Max # Piles DTH/Socketed per Day	-	-	2	2	-	2
Time per Pile	-	-	5-10 hrs	3-4 hrs	-	1 hr
Actual Time Spent Driving per Pile	-	-	30-60 mins	60 mins	-	40 min
Time per Day	-	-	12 hrs (max)	12 hrs (max)	-	12 hrs (max)
Actual Time Spent Driving per Day	-	-	2 hrs (max)	2 hrs (max)	-	1 hr (max)
Blows per pile	-	-	27,000-54,000	54,000	-	15,000
Number of Days	-	-	5	12	-	3
Drilling Total Time	-	-	45-90 hours	36-48 hours	-	6 hours

1.3 ACOUSTIC THRESHOLDS AND ESONIFIED AREA

Vibratory pile driving and removal, impact pile driving, and DTH/socketing installation would generate in-water and in-air noise that may result in take of marine mammals.

Using the best available science, National Marine Fisheries Service (NMFS) has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur permanent threshold shifts (PTS) of some degree (equated to Level A harassment).

1.3.1 Level A Harassment

NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing* (NMFS 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive) (NMFS 2018). COH's activity includes the use of both impulsive (impact pile driving and DTH/socketing) and non-impulsive (vibratory pile driving and removal) sources. The thresholds for auditory injury are provided in Table 2.

Table 2. Thresholds Identifying the Onset of Permanent Threshold Shift

	PTS Onset Thresholds*(received level)	
Hearing Group	**Impulsive (Impact Pile Driving and DTH/Socketing)**	**Non-impulsive (Vibratory Pile Driving)**
Low-Frequency Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds, Underwater	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds, Underwater	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

Adapted from: NMFS 2018

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure has a reference value of 1 microPascal (µPa), and cumulative sound exposure level (L_E)has a reference value of 1µPa^{2}s. In this table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI; 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (low frequency, mid-frequency, and high-frequency cetaceans, and phocid pinnipeds and otariid pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

1.3.2 Level B Harassment

NMFS predicts that all marine mammals are likely to be behaviorally harassed in a manner that they consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 decibels (dB) re 1µPa root mean square (rms) for continuous and above 160 dB re 1µPa rms for non-explosive impulsive sources.

1.3.3 Calculated Distances to Level A and Level B Thresholds

For this project, distances to the Level A and Level B thresholds were calculated based on various source levels, expressed in sound pressure level (SPL)[1] or sound exposure level (SEL)[2] for a given activity and pile type and, for Level A harassment, accounted for the maximum duration of that activity per day using the practical spreading model in the spreadsheet tool developed by NMFS. Calculated distances to thresholds are shown in Table 3 and range from approximately 1 meter to 17.4 kilometers.

[1] Sound pressure is the sound force per unit µPa, where 1 pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 µPa, and the units for underwater sound pressure levels are decibels (dB) re 1 µPa (NMFS 2018).

[2] A measure of sound level that takes into account the duration of the signal (NMFS 2018).

Table 3. Calculated Distances to NMFS Level A and B Acoustic Thresholds

		Distance (in meters, m) to Level A and Level B Thresholds[1]					
		Level A[2]					
Activity	Received Level at 10 m	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid	Level B
Vibratory Pile Driving/Removal							
30-inch steel temporary installation (50 piles; ~1 hrs per day on 12.5 days)	161.9 RMS[3]	7.8	0.7	11.6	4.8	0.3	6,213
30-inch steel removal (50 piles; ~1 hr per day on 12.5 days)	161.9 RMS[3]	7.8	0.7	11.6	4.8	0.3	6,213
36-inch steel permanent installation (9 piles; ~1 hr per day on 2.25 days)	168.2 RMS[4]	20.6	1.8	30.5	12.5	0.9	16,343
20-inch fender pile installation (6 piles; ~45 mins per day on 2 days)	161.9RMS[3]	7.8	0.7	11.6	4.8	0.3	6,213
H-pile installation (12 piles; ~1 hr per day on 3 days)	168 RMS[5]	22.0	2.0	32.5	13.4	0.9	17,434
Sheet pile installation (500 sheets; ~7.5 hrs per day on 17 days)	160 RMS[6]	22.4	2.0	33.2	13.6	1.0	4,642
Impact Pile Driving [5,6]							
36-inch steel permanent installation (9 piles; ~30 mins per day on 4.5 days)	186.7 SEL/ 198.6 SPL[4]	602.7	21.7	717.9	322.5	23.5	3,744
20-inch fender pile installation (6 piles; ~10 mins per day on 3 days)	161 SEL/184.9 PK[7]	11.7	0.4	13.9	6.2	0.5	97
H-pile installation (12 piles; ~20 mins per day on 3 days)	163 SEL/194 PK[8]	43.8	1.6	52.2	23.4	1.7	204
Sheet pile installation (500 sheets; ~100 mins per day on 25 days)	163 SEL/194 PK[8]	43.8	1.6	52.2	23.4	1.7	204
DTH/Socketed Pile Installation							
36-inch steel permanent installation (9 piles; ~12 hrs max per day on 5 days)	164 SEL[9]/166 SPL	1,225.6	43.6	1,459.9	655.9	47.8	11,659
20-inch fender pile installation (6 piles; ~12 hr per day on 3 days)	154 SEL[9]/166 SPL	264.1	9.4	314.5	141.3	10.3	11,659
H-pile installation (12 piles; ~12 hrs max per day on 12 days)	154 SEL[9]/166 SPL	264.1	9.4	314.5	141.3	10.3	11,659

[1] Distances, in meters, refer to the maximum radius of the zone.
[2] The values provided here represent the distance at which an animal may incur PTS if that animal remained at that distance for the entire duration of the activity within a 24-hour period. For example, a humpback whale would have to remain 7.8 meters from 30-inch piles being installed via vibratory methods for 1 hour for PTS to occur.
[3] The 30-inch-diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch-diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).
[4] The 36-inch-diameter pile source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16). The calculated distances to impact pile driving Level A thresholds for 36-inch piles assumes 100 strikes per pile and a maximum of 4 piles installed in 24 hours; for 42-inch piles 135 strikes per pile and a maximum of 2 piles installed in 24 hours is assumed.
[5] H-pile source levels are proxy from median measured source levels from vibratory pile driving of H piles for the Port of Anchorage test pile project (Yurk et al. 2016 as cited in Denes et al. 2016; Appendix H, Table 2)
[6] Sheet source levels are proxy from median measured source levels from vibratory pile driving of 24-inch sheets for Berth 30 at the Port of Oakland, CA (Buehler et al 2015; Table I.6-2)
[7] The 20-inch diameter pile source levels are proxy from median measured source levels from vibratory driving of 24-inch piles for the Kodiak Ferry Terminal project (Denes et al. 2016, Table 40).

[8] H-Pile and Sheets Impacting source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) h-piles and sheets for the Port of Anchorage test pile project (Yurk et al. 2016 as cited in Denes et al. 2016). The calculated distances to impact pile driving Level A thresholds for H-piles and sheets assumes 100 strikes per pile and a maximum of 25 sheets installed in 24 hours.
[9] DTH/Socketing sound proxy for Level A and Level B from pile measured in the JASCO study (Denes et al. 2016).

1.3.4 Action Area

The action area is located on Southeast Alaska's Chichagof Island, 64 kilometers (40 miles) southwest of Juneau. The new cargo dock is located approximately 0.8 kilometers (0.5 miles) northwest of downtown Hoonah on the eastern shore of Port Frederick Inlet.

The vicinity of the project area that will be affected directly by the action, referred to as the action area in this document, has been determined by the area of water that will be ensonified above acoustic thresholds in a day. In this case, the action area is the area where received noise levels from vibratory driving of H-piles (the farthest-reaching noise associated with the project) are expected to decline to 120 dB. As shown in Table 3, this area extends 17.5 kilometers from the source. The action area would be truncated where land masses obstruct underwater sound transmission; thus, the action area extends into Port Frederick Inlet approximately 15.7 kilometers and encompasses approximately 50 square kilometers (Figure 5).[3]

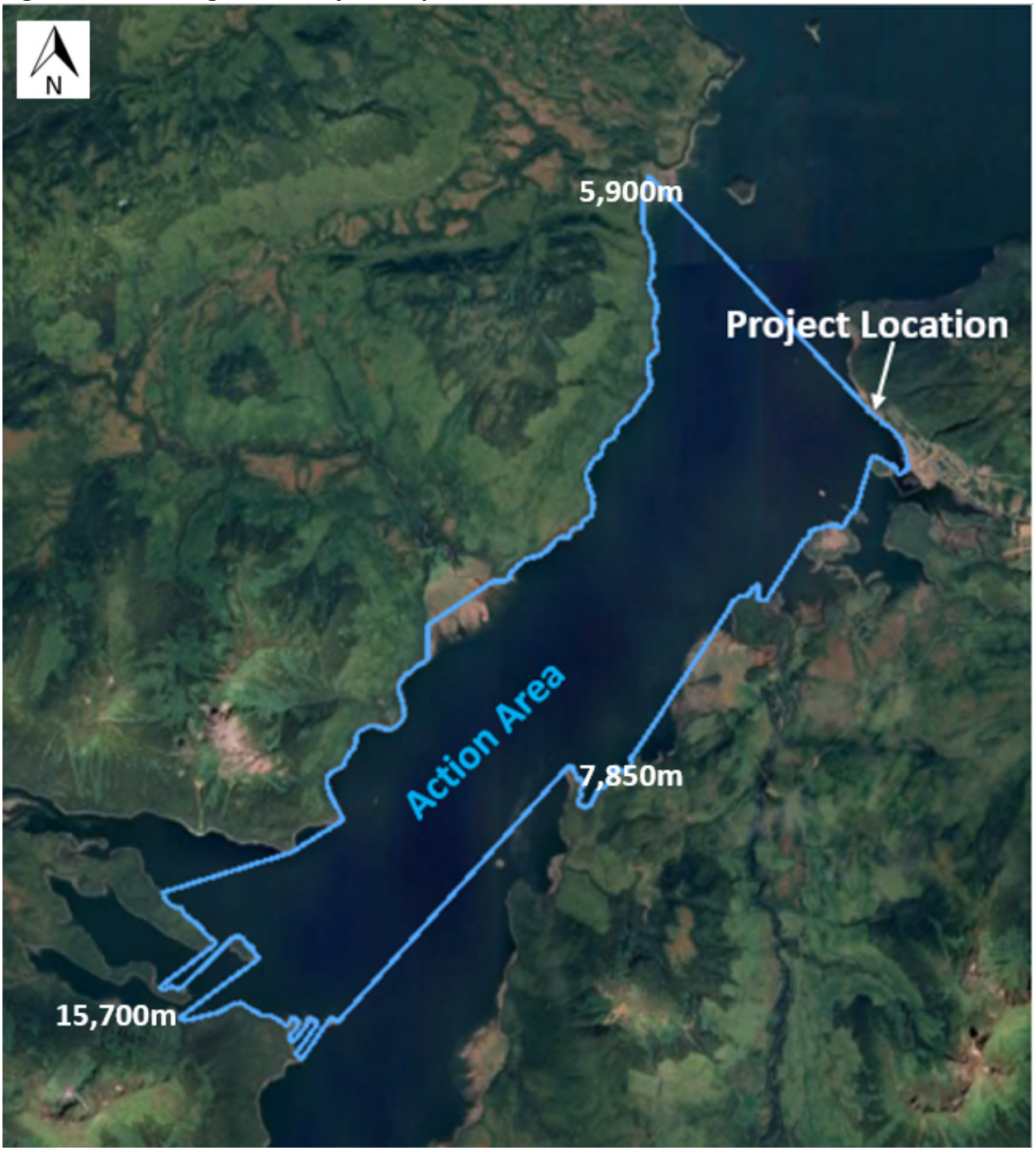
In addition to in-water noise, pinnipeds can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. NMFS has established an in-air noise disturbance threshold of 90dB rms for harbor seals and 100 dB rms for all other pinnipeds. Pile driving and removal associated with this project will generate in-air noise above ambient levels within Port Frederick Inlet; however, the predicted distances to the in-air noise disturbance threshold for hauled-out individuals will not extend more than 22 meters from any type of pile being vibrated or impacted.[4] The nearest sea lion haul out is more than 50 kilometers away (Alaska Fisheries Science Center [AFSC] 2018; NMFS No date). No in-air disturbance to hauled-out individuals are anticipated as a result of the proposed project; thus, land area is not included in the action area.

To minimize impacts to protected species, shutdown and monitoring of harassment zones will be implemented to protect and document these species in the action area. Please see Table 3

[3] Note, this document also refers to the project vicinity. This term refers to an area larger than the action area, which includes Port Frederick and adjacent waterbodies. This term is used because some of the information available about marine mammals near Hoonah is based on sightings outside the action area.
[4] Predicted distances for in-air threshold distances. The Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). Maximum levels were used to extrapolate distances for the project's largest (36-inch-diameter) piles. In-air sound levels for impact hammering of 36-inch-diameter piles were not available; the Port of Anchorage, AK, Austin et al. (2016) found source levels of 101 dB at 15 meters during impact installation of 48-inch-diameter steel piles.

for calculated distances to the Level A and B thresholds and Section 11.4 for mitigation information and shutdown and monitoring zones and figures. The attached Marine Mammal Monitoring and Mitigation Plan (4MP) gives detailed mitigation, shutdown, and monitoring procedures (Appendix B).

Figure 5. HMIC Cargo Dock Project Proposed Action Area



2 DATES, DURATION, AND REGION OF ACTIVITY

The date(s) and duration of such activity and the specific geographical region where it will occur.

2.1 DATES AND DURATION

Construction is expected to begin in May 2021 or when this IHA is issued, but could extend into summer.

Pile installation activities are expected to occur for a total of approximately 456-513 hours over 110 days (not necessarily consecutive days). Please see Table 1 for the specific amount of time required to install (and remove temporary) piles.

The total construction duration accounts for the time required to mobilize materials and resources and construct the project. The duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

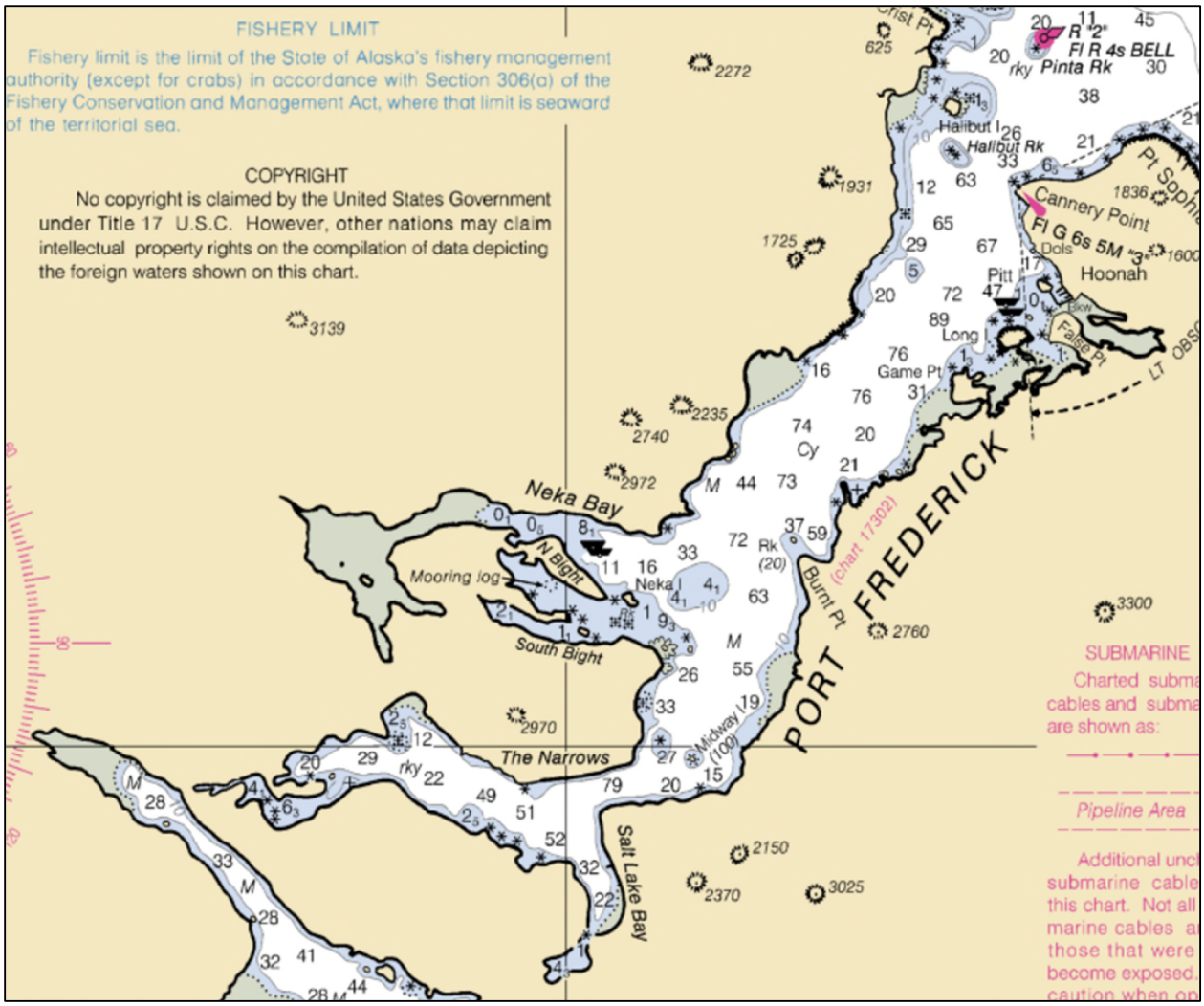
2.2 SPECIFIC GEOGRAPHIC REGION

The action area is located on Southeast Alaska's Chichagof Island, 64 kilometers (40 miles) southwest of Juneau. The new cargo dock is located approximately 0.8 kilometers (0.5 miles) north of downtown Hoonah on the eastern shore of Port Frederick Inlet. For more detailed location information, see Section 1.

2.2.1 Physical Environment

Port Frederick is a 24-kilometer inlet that dips into northeast Chichagof Island from Icy Strait, leading to Neka Bay and Salt Lake Bay. The inlet varies between 4 and almost 6 kilometers wide with a depth of up to 150 meters (Figure 6). According to charts published by the National Oceanic and Atmospheric Administration (NOAA), near the proposed project the inlet is 12 to 28 meters deep (NOAA 2018). NMFS's ShoreZone Mapper details the proposed project site as a semi-protected/partially mobile/sediment or rock and sediment habitat class with gravel beaches environmental sensitivity index (NMFS 2020).

Figure 6. NOAA Nautical Chart #17302 Hoonah Area Bathymetry



2.3 Seasonal Issues

Marine mammal species can occur year-round in the action area; however, concentrated numbers are most likely to occur during seasonal prey aggregation. Herring, Walleye Pollock, salmon, and Eulachon are among the species that congregate ephemerally, and marine mammals tend to be more common in the action area in late spring/early summer when these prey species tend to be more abundant (Straley et al. 2017). As project construction would be initiated in the spring, this seasonal variation has been factored into take estimates.

3 SPECIES AND NUMBERS OF MARINE MAMMALS

The species and numbers of marine mammals likely to be found within the activity area.

The marine waters surrounding Chichagof Island support many species of marine mammals. Based on their Online Species Mapper, NMFS Alaska identifies nine species of marine mammals that could occur in the vicinity of the proposed project (NMFS 2020a). Table 4 lists these species and summarizes key information regarding stock status and abundance.

Table 4. Marine Mammal Species with Ranges Extending into the Project Area

Species [a]	Stock and Abundance Estimate [c]	Endangered Species Act (ESA) Status	MMPA Status	Occurrence in Action Area [b]
Minke Whale (*Balaenoptera acutorostrata*)	Alaska N/A	Not listed	Not strategic, non-depleted	Rare
Humpback Whale (*Megaptera novaeangliae*)	Hawaii DPS 9,487 [c]	Not listed	Strategic, depleted	Common
	Mexico DPS 606 [c]	Threatened	Strategic, depleted	Common
Gray Whale (*Eschrichtius robustus*)	Eastern North Pacific 27,000 [d]	Not listed	Not strategic, non-depleted	Rare
Killer Whale (*Orcinus orca*)	West Coast Transient 243	Not listed	Not strategic, non-depleted	Frequent
	Northern Resident (BC) 302	Not listed	Not strategic, non-depleted	
	Alaska Resident 2,347	Not listed	Not strategic, non-depleted	
Pacific White-Sided Dolphin (*Lagenorhynchus obliquidens*)	North Pacific 26,880	Not listed	Not strategic, non-depleted	Rare
Dall's Porpoise (*Phocoenoides dalli*)	Alaska (occurs in Southeast Alaska in summer) 2,680 [e]	Not listed	Not strategic, non-depleted	Infrequent
Harbor Porpoise (*Phocoena phocoena*)	Southeast Alaska 6,980 [f]	Not listed	Strategic, non-depleted	Common
Harbor Seal (*Phoca vitulina*)	Glacier Bay/Icy Strait 7,455	Not listed	Not strategic, non-depleted	Common
Steller Sea Lion (*Eumetopias jubatus)*	Western U.S. 53,624	Endangered	Strategic, depleted	Common
	Eastern U.S. 43,201	Not listed	Not strategic, non-depleted	

[a] Species listed with ranges extending into the project area derived from the NOAA Online Species Mapper (NMFS 2020a) and monitoring conducted for other projects in the area.

[b] Occurrence estimates based on marine mammal monitoring during construction of Icy Strait Cruise Ship Terminal Berth I and II (BergerABAM 2016; SolsticeAK 2020). Common=multiple sightings every month, could occur each day; Frequent=multiple sightings every year, could occur each month; Infrequent=few sightings each year, could occur each month; Rare=no sightings in recent years. Occurrence information for killer whales is not refined to stock level.

[c] Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, they are divided here to account for distinct population segments (DPSs) listed under the ESA. Using the stock assessment from Muto et al. 2020 for the Central North Pacific stock (10,103) and calculations in Wade et al. 2016, 93.9% of the humpback whales in Southeast Alaska are expected to be from the Hawaii DPS and 6.1% are expected to be from the Mexico DPS.

[d] NMFS 2020j

[e] Jefferson et al. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4%), lower numbers in summer (N=2,680, CV=19.6%), and lowest in fall (N=1,637, CV=23.3%). NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2020). However, this estimate does not include coastal or inland waters of Southeast Alaska. For this application, the most current estimate for Southeast Alaska in the summer is applied.

[f] Hobbs and Waite 2010

Based on the above information it is believed that minke whales, humpback whales, gray whales, killer whales, Pacific white-sided dolphin, Dall's porpoise, harbor porpoises, harbor seals, and Steller sea lions could occur in the action area during construction. This IHA application requests take and assesses the potential impacts of the project on these nine species, which are discussed more fully in Section 4.

4 AFFECTED SPECIES STATUS AND DISTRIBUTION

A description of the status and distribution of each species or stocks or marine mammals likely to be affected by the activity.

4.1 MINKE WHALE

4.1.1 Hearing Ability

Minke whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz; NMFS 2018).

4.1.2 Status

No estimates have been made for the number of minke whales or population trends in the entire North Pacific.

4.1.3 Distribution

Northern minke whales have a widespread distribution in the Northern Hemisphere and are found throughout the northern Atlantic and Pacific Oceans. Their range extends from the ice edge in the Arctic during the summer to close to the equator during winter (NMFS 2020b).

4.1.4 Presence in Project Area

Minke whales are rare in the action area, but they could be encountered during any given day of construction. Minke whales are observed in Alaska's nearshore waters during the summer months (National Park Service [NPS] 2018). Minke whales are usually sighted individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals (NMFS 2020b). The protected species observers (PSOs) for construction of Icy Strait Cruise Ship Berth I only reported one sighting of a minke whale (June 2015-January 2016; BergerABAM 2016). During Berth II construction there was also only one reported sighting of a minke whale throughout the duration of monitoring (June 2019 –October 2019; SolsticeAK 2020).

4.2 HUMPBACK WHALE

4.2.1 Hearing Ability

Humpback whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 Hz to 35 kHz (NMFS 2018). However, because of the lack of captive subjects and logistical challenges of bringing experimental subjects into the laboratory, no direct measurements of mysticete (baleen whale) hearing are available. Consequently, hearing in mysticetes is estimated based on other means such as vocalizations (Wartzok and Ketten 1999), anatomy (Houser et al. 2001; Ketten 1997), behavioral responses to sound (Edds-Walton 1997), and nominal natural background noise conditions in their likely frequency ranges of hearing

(Clark and Ellison 2004). The combined information from these and other sources strongly suggests that mysticetes are likely most sensitive to sound from perhaps tens of Hz to approximately10 kHz. However, evidence suggests that humpbacks can hear sounds as low as 7 Hz (Southall et al. 2007) up to 24 kHz, and possibly as high as 30 kHz (Au et al. 2006; Ketten 1997).

4.2.2 Status

In 1970, the humpback whale was listed as endangered worldwide, under the Endangered Species Conservation Act (ESCA) of 1969 (35 FR 8491; June 2, 1970), primarily due to decimation from whaling. Congress replaced the ESCA with the ESA in 1973, and some stocks of humpback whales continued to be listed as threatened or endangered. Following the cessation of most legal whale harvesting, humpback whale numbers increased.

NMFS conducted a global status review of humpback whales (Bettridge et al. 2015) and changed the status of humpback whales under the ESA. The globally-listed species was divided into 14 DPSs, 4 of which are endangered and 1 is threatened, and the remaining 9 are no longer listed under the ESA (81 FR 62260; September 8, 2016). Wade et al. (2016) provides information on the basis for DPS designation and the status of each DPS.

Using fluke identification photographs from 2004 through 2006, Barlow et al. (2011) estimates that the abundance of humpback whales in the North Pacific is 21,063 animals. More recently, using a multi-strata analysis, Wade et al. (2016) estimates the abundance of humpback whales in the North Pacific is 16,132 for the winter areas and 15,805 for the summer areas. The population in the North Pacific has increased substantially since the cessation of major commercial whaling operations, and the current abundance estimate exceeds some pre-whaling estimates.

Humpback whales have been steadily increasing in southeast Alaska. According to the SPLASH (Structure of Populations, Levels of Abundance, and Status of Humpbacks) report, the southeast Alaska-specific rate of increase is approximately 5.6% annually (Calambokidis et al. 2008), and the latest estimate of abundance for Southeast Alaska and northern British Columbia is between 3,005 and 6,137 animals, depending on the modeling approach employed.

Conversely, declines have been observed in recent years the Glacier Bay/Icy Strait area. Over 32 years of humpback whale monitoring in the Glacier Bay/Icy Strait area reveals a substantial decline in population since 2014; a total of 164 individual whales were documented in 2016 during surveys conducted between June and August, making it the lowest count since 2008. Additionally, in more recent years fewer whales have been observed in Glacier Bay/Icy Strait (Neilson et al. 2017).

4.2.3 Distribution

The humpback whale is distributed worldwide in all ocean basins and a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere.

The humpback whales that forage throughout British Colombia and Southeast Alaska undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer. They may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Hawaii. In the spring, the animals migrate back to Alaska where food is abundant.

Within Southeast Alaska, humpback whales are found throughout all major waterways and in a variety of habitats, including open-ocean entrances, open-strait environments, near-shore waters, area with strong tidal currents, and secluded bays and inlets. They tend to concentrate in several areas, including northern Southeast Alaska. Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (Clapham 2000).

4.2.4 Presence in Project Area

Humpback whales may be found in and around Chichagof Island, Icy Strait, and Port Frederick Inlet at any given time. While many humpback whales migrate to tropical calving and breeding grounds in winter, they have been observed in Southeast Alaska in all months of the year (Bettridge et al. 2015). Diet for humpback whales in the Glacier Bay/Icy Strait area mainly consists of small schooling fish (capelin, juvenile Walleye Pollock, Sand Lance, and Pacific Herring) rather than euphausiids (krill). They migrate to the northern reaches of Southeast Alaska (Glacier Bay) during spring and early summer following these fish and then move south towards Stephens Passage in early fall to feed on krill, passing the project area on the way (Krieger and Wing 1986).

During construction of the first Icy Strait Cruise Ship Berth from June 2015 through January 2016, humpback whales were observed in the action area on 84 of the 135 days of monitoring; most often in September and October. Up to 18 humpback sightings were reported on a single day (October 2, 2015), and a total of 226 Level B harassments were recorded during project construction (BergerABAM 2016). Additionally, during construction of Icy Strait Cruise Ship Berth II in 2019, humpback whales were observed in the action area on 45 of the 51 days of monitoring; most often in July and September. Up to 24 humpback sightings were reported on a single day (July 30, 2019), and a total of 108 Level B harassments were recorded during project construction (SolsticeAK 2020). In the project vicinity, humpback whales typically occur in groups of 1-2 animals, with an estimated maximum group size of 8 animals.

4.2.5 Humpback Whale Critical Habitat

On October 9, 2019, a proposed rule to designate critical habitat for the Central America, Mexico, and Western North Pacific DPS of humpback whales was published in the Federal Register (84 FR 54354). The comment period closed on January 31, 2020. A final rule has not been made; however, due to the timeline of the proposed action it is assumed that critical habitat for the Mexico DPS humpback whales will be designated prior to the start of in-water work (NOAA 2019).

Proposed critical habitat for Mexico DPS humpback whales was divided into ten units and assigned a conservation rating based upon available data for the unit. Unit 10 encompasses Southeast Alaska, including Port Frederick and Icy Strait. The area is of medium conservation importance on a scale from very low to very high.

4.3 GRAY WHALE

4.3.1 Hearing Ability

Gray whales are classified by NMFS as low-frequency cetaceans, with an estimated hearing range of approximately 10 Hz to 30 kHz (NMFS 2018).

4.3.2 Status

There are two recognized gray whale stocks in the Pacific Ocean. The endangered Western North Pacific stock largely migrates along the Russian coastline and is unlikely to be found in Southeast Alaska. The Eastern North Pacific stock is found in Southeast Alaska. At one time, the Eastern North Pacific stock of gray whales was also listed as endangered under the ESA but was removed from the list in 1994. Today this stock is abundant, with a population estimated to be near 27,000 whales (NMFS 2020c).

4.3.3 Distribution

Gray whales are found exclusively in the North Pacific Ocean. The Eastern North Pacific stock of gray whales inhabit the Chukchi, Beaufort, and Bering Seas in northern Alaska in the summer and fall and California and Mexico in the winter months, with a migration route along the coastal waters of Southeast Alaska. Gray whales have also been observed feeding in waters off Southeast Alaska during the summer and fall months (NMFS 2020d, Calambokidis et al 2010).

4.3.4 Presence in Project Area

The migration pattern of gray whales appears to follow a route along the western coast of Southeast Alaska, traveling northward from British Columbia through Hecate Strait and Dixon Entrance, passing the west coast of Chichagof Island from late March to May (Jones et al. 1984, Ford et al. 2013). Since the project area is on the east coast of Chichagof Island, it is less likely there will be gray whales sighted during project construction; however, the possibility exists. During the 2016 construction of Berth I and 2019 construction of Berth II at Icy Strait Point, no gray whales were sighted (BergerABAM 2016; SolsticeAK 2020).

4.4 KILLER WHALE

4.4.1 Hearing Ability

Killer whales are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2018). The hearing of killer whales is well developed. Szymanski et al. (1999) found that they responded to tones between 1 and 120 kHz, with the most sensitive range between 18 and 42 kHz. Their greatest sensitivity is at 20 kHz, which is lower than many other odontocetes, but it matches peak spectral energy reported for killer whale echolocation clicks.

4.4.2 Status

Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the Pacific U.S. Exclusive Economic Zone, seven of which occur in Alaska. Three stocks are most likely to occur in northern Southeast Alaska (Muto et al. 2020); the Alaska Resident stock, the Northern Resident stock, and the West Coast Transient stock.

At present, NMFS has preliminary genetic information on killer whales in Alaska which indicated that the current stock structure needs to be reassessed (Muto et al. 2020); however, the populations that are known to occur in Southeast Alaska are not strategic or depleted under the MMPA. The West Coast Transient stock population size is 243; The Northern Resident stock population size is 302; and Alaskan Resident stock size is 2,347 (Muto et al. 2020).

4.4.3 Distribution

Killer whales have been observed in all oceans and seas of the world, but the highest densities occur in colder and more productive waters found at high latitudes. Killer whales are found throughout the North Pacific and occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS 2020e).

The Alaska Resident stock occurs from Southeast Alaska to the Aleutian Islands and Bering Sea. The Northern Resident stock occurs from Washington State through part of Southeast Alaska; and the West Coast Transient stock occurs from California through Southeast Alaska (Muto et al. 2020) and are thought to occur frequently in Southeast Alaska (Straley et al. 2017).

4.4.4 Presence in Project Area

Transient killer whales pass through the waters surrounding Chichagof Island, in Icy Strait and Glacier Bay, feeding on marine mammals. Because of their transient nature, it is difficult to predict when they will be present in the area. Whales from the Alaska Resident stock and the Northern Resident stock are thought to primarily feed on fish. Like the transient killer whales, they can pass through Icy Strait at any given time (North Gulf Oceanic Society 2020).

Killer whales were observed infrequently during construction of the first Icy Strait Cruise Ship Berth in 2015. During the 6-month marine mammal construction observation period, killer whales were observed a few times a month. Usually a singular animal was observed, but a group containing 8 individuals was seen in the action area on one occasion. A total of 24 animals observed during in-water work (BergerABAM 2016). During construction of the second Icy Strait Cruise Ship Berth in 2019 (51 days), killer whales were observed on 8 days. Usually, a single animal or pairs were observed, but a group containing five individuals was seen in the action area on one occasion. A total of 20 animals observed during in-water work on Berth II (SolsticeAK 2020).

4.5 PACIFIC WHITE-SIDED DOLPHIN

4.5.1 Hearing Ability

Pacific white-sided dolphins are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2018).

4.5.2 Status

Pacific white-sided dolphins are not designated as depleted under the MMPA or listed as threatened or endangered under the ESA. With a population of 26,880; the North Pacific stock of Pacific white-sided dolphins is not classified as a strategic stock. Population trends and status of this stock are currently unknown (Muto et al. 2020).

4.5.3 Distribution

Pacific white-sided dolphins are a pelagic species. They are found throughout the temperate North Pacific Ocean, north of the coasts of Japan and Baja California, Mexico (Muto et al. 2020). They are most common between the latitudes of 38° North and 47° North (from California to Washington). The distribution and abundance of Pacific white-sided dolphins may be affected by large-scale oceanographic occurrences, such as El Niño, and by underwater acoustic deterrent devices (NPS 2015).

4.5.4 Presence in Project Area

Pacific white-sided dolphins are rare in the action area, likely because they are pelagic and prefer more open water habitats than are found in Port Frederick Inlet. Pacific white-sided dolphins have been observed in Alaska waters in groups ranging from 20 to 164 animals, with the sighting of 164 animals occurring in Southeast Alaska near Dixon Entrance (Muto et al. 2020).

During the first cruise ship berth construction in 2015, no Pacific white-sided dolphins were sighted (BergerABAM 2016). However, a pod of two Pacific white-sided dolphins was observed during construction of the second cruise ship berth from June 2019 to October 2019 (SolsticeAK 2020).

4.6 DALL'S PORPOISE

4.6.1 Hearing Ability

Dall's porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 275 Hz to 160 KHz (NMFS 2018).

4.6.2 Status

NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2020). However, this estimate does not include coastal or inland waters of Southeast Alaska. Jefferson et al. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4%), lower numbers in summer (N=2,680, CV=19.6%), and lowest in fall (N=1,637, CV=23.3%). According to the NMFS, Dall's porpoises are considered reasonably abundant (NMFS 2020f).

4.6.3 Distribution

Dall's porpoises are widely distributed across the entire North Pacific Ocean. They show some migration patterns, inshore and offshore and north and south, based on morphology and type, geography, and seasonality (Muto et al 2020). They are common in most of the larger, deeper channels in Southeast Alaska and are rare in most narrow waterways, especially those that are relatively shallow and/or with no outlets (Jefferson et al. 2019). In Southeast Alaska, abundance varies with season with an increase in spring and summer months.

4.6.4 Presence in Project Area

Jefferson et al. (2019) recently analyzed Dall's porpoise density and abundance survey data collected between 1991 and 2012 in Southeast Alaska. They found Dall's porpoise were most abundant in spring, observed with lower numbers in summer, and lowest in fall. Surveys found Dall's porpoise to be common in Icy Strait and sporadic with very low densities in Port Frederick. During another 16-year survey of cetaceans in Southeast Alaska, Dall's porpoises were commonly observed during spring, summer, and fall in the nearshore waters of Icy Strait (Dahlheim et al. 2009).

Individual Dall's porpoises were observed on two occasions during construction of the first cruise ship berth (BergerABAM 2016). A total of 21 Dall's porpoises were observed on eight days during construction of the second cruise ship berth (SolsticeAK 2020). Dall's porpoises generally occur in groups from 2-12 individuals (NMFS 2020f).

4.7 HARBOR PORPOISE

4.7.1 Hearing Ability

Harbor porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 0.125 kHz to 150 kHz. Harbor porpoises have the highest upper-frequency

limit of all odontocetes investigated. Kastelein et. al. (2017) found that the range of best hearing was from 16 to 140 kHz, with a reduced sensitivity around 63 kHz. Maximum sensitivity (about 44 dB to 47 dB re 1 µPa) occurred at 125 kHz. This maximum sensitivity corresponds with the peak frequency of echolocation pulses produced by harbor porpoises (120–130 kHz) (Kastelein et al. 2017).

4.7.2 Status

In Alaska, harbor porpoises are currently divided into three stocks, based primarily on geography: the Bering Sea stock, the Southeast Alaska stock, and the Gulf of Alaska stock. In areas outside of Alaska, studies have shown that stock structure is more finely scaled than is reflected in the Alaska Stock Assessment Reports; however, no data are yet available to define stock structure for harbor porpoises on a finer scale in Alaska (Muto et al. 2020). Only the Southeast Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration.

No consensus on population estimates for this stock of harbor porpoise has been reached. The entire Southeast Alaska stock of harbor porpoise is currently estimated from aerial surveys to be 11,146 individuals (Hobbs and Waite 2010) and from line-transect vessel surveys to be 975 individuals (Dahlheim et al. 2015). A report by Dahlheim et al. (2015) calculated region-specific abundance estimates for Southeast Alaska and found the northern region's (Cross Sound/Icy Strait/Glacier Bay) population to be close to 400 harbor porpoises. According to Muto et al. (2020), the estimates by Dahlheim et al. are likely underestimates. No reliable information is available to determine trends in abundance. For the purposes of this application, the lower 95% confidence limit of 6,980 animals from Hobbs and Waite's aerial surveys is assumed (2010, Table 2).

4.7.3 Distribution

The Southeast Alaska stock ranges from Cape Suckling, Alaska to the northern border of British Columbia. Within the inland waters of Southeast Alaska, harbor porpoises' distribution is clustered with greatest densities observed in the Glacier Bay/Icy Strait region and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Dahlheim et al. 2015).

4.7.4 Presence in Project Area

Harbor porpoises are common in the shallow nearshore area surrounding the project area. A total of 32 harbor porpoises were observed from June to October 2015 during construction of Berth I (BergerABAM 2016). During monitoring within the action area, the largest group size reported was 4 individuals, with most group sizes consisting of 3 or fewer animals (BergerABAM 2016). During the test pile program conducted at the Berth II project site in May 2018, 8 harbor porpoises were observed over a 7-hour period (SolsticeAK 2018).

The PSOs for construction of the second cruise ship berth in 2019 recorded harbor porpoises on 38 days from June to October (SolsticeAK 2020). A total of 120 harbor porpoises were observed during that time. During monitoring within the action area, the largest group size reported was 8 individuals, and most group sizes consisting of 4 or fewer animals (SolsticeAK 2020).

4.8 HARBOR SEAL

4.8.1 Hearing Ability

Harbor seals are classified by NMFS as phocid pinnipeds with a generalized in-water hearing range of 50 Hz to 86 kHz (NMFS 2018). They respond to underwater sounds from approximately 1 to 180 kHz, with the functional high-frequency limit around 60 kHz and peak sensitivity at about 32 kHz. Hearing ability in the air is greatly reduced (by 25 to 30 dB); they respond to sounds from 1 to 22.5 kHz, with a peak sensitivity of 12 kHz (Kastak and Schusterman 1995).

4.8.2 Status

Harbor seals are not listed as depleted under the MMPA or as threatened or endangered under the ESA. In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). The status of the 12 stocks relative to their Optimum Sustainable Population size is unknown. The Glacier Bay/Icy Strait stock of harbor seals, the stock that would be expected in the project vicinity, is not classified as strategic.

The current statewide abundance estimate for Alaskan harbor seals is 243,938 based on aerial survey data collected between 1996 and 2018 (Boveng et al. 2019). The abundance estimate for the Glacier Bay/Icy Strait stock is 7,455 (Muto et al. 2020). The current Glacier Bay/Icy Strait population trend shows a decrease of 216 seals per year, with a 0.904 probability that the stock is decreasing (Muto et al. 2020).

4.8.3 Distribution

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals are generally non-migratory and, with local movements associated with such factors as tide, weather, season, food availability and reproduction.

Distribution of the Glacier Bay/Icy Strait stock, the only stock considered in this application, ranges along the coast from Cape Fairweather and Glacier Bay south through Icy Strait to Tenakee Inlet on Chichagof Island (Muto et al. 2020).

4.8.4 Presence in Project Area

The Glacier Bay/Icy Strait stock of harbor seals are common residents of the action area and can occur on any given day in the area, although they tend to be more abundant during the fall months (Womble and Gende 2013).

A total of 63 harbor seals were seen during the 2015 cruise ship berth construction. Harbor seals typically occurred in groups of 1 to 3 animals, although larger groups (16 and 22 individuals each) were observed on two occasions (BergerABAM 2016). In 2019, a total of 33 harbor seals were seen during the Berth II project. Only solo individuals where sighted during that time (SolsticeAK 2020).

There are two known harbor seal haulouts within the project area. According to the AFSC list of harbor seal haul-out locations, the closest listed haulout (id 1,349: name CF39A) is located in Port Frederick, approximately 3,400 meters west of the project location. The second haulout (id: 8; name: CE79A) within the project action area is approximately 10,200 meters south of proposed pile driving activities (AFSC 2020).

4.9 STELLER SEA LION

4.9.1 Hearing Ability

Steller sea lions are classified by NMFS as otariid pinnipeds with a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2018). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein, van Schie, Verboom & de Haan 2005) and in air between 30 kHz and 250Hz (Muslow and Reichmuth 2010).

4.9.2 Status

Due to significant population decline, the Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). Speculated causes of the decline included competition with commercial fisheries, environmental change, disease, predation, incidental take, and shooting (NMFS 2020g). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345; May 7, 1997). At that time, the eastern DPS (EDPS) (which includes animals born east of Cape Suckling, Alaska, at 144°W) was listed as threatened, and the WDPS (which includes animals breeding west of Cape Suckling, both in Alaska and Russia) was listed as endangered. On November 4, 2013, the EDPS was removed from the endangered species list (78 FR 66140). The WDPS remains on the ESA's endangered list.

The most recent population assessment for the U.S. portion of the WDPS and EDPS Steller sea lion stocks is 53,624 and 43,201 animals, respectively, based on aerial photographic and land-based survey data (Muto et al. 2020, Appendix 2).

4.9.3 Distribution

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Loughlin et al. 1984).

Of the two Steller sea lion populations in Alaska, the EDPS includes sea lions born on rookeries from California north through Southeast Alaska and the WDPS includes those animals born on rookeries from Prince William Sound westward, with an eastern boundary set at 144°W (NMFS 2020g). Both WDPS and EDPS Steller sea lions are considered in this application because the WDPS are common within the geographic area under consideration (north of Summer Strait) (Fritz et al. 2013; NMFS 2013).

Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July), leading to intermixing of stocks (Jemison et al. 2013; Allen and Angliss 2015).

4.9.4 Presence in Project Area

Steller sea lions are common in the inside waters of Southeast Alaska. They are residents of the project vicinity and are common year-round in the action area, moving their haulouts based on seasonal concentrations of prey from exposed rookeries nearer the open Pacific Ocean during the summer to more protected sites in the winter (Alaska Department of Fish & Game [ADF&G] 2020).

During the construction of the Icy Strait cruise ship Berth I, a total of 180 Steller sea lion sightings occurred over 135 days in 2015, amounting to an average of 1.3 sightings per day (BergerABAM 2016). In May 2018, a test pile program performed at the Berth II project location PSOs documented a total of 15 Steller sea lions over the course of 7 hours in one day (SolsticeAK 2018). During construction of Berth II, a total of 197 Steller sea lion sightings over 42 days in 2019 were reported, amounting to an average of 4.6 sightings per day (SolsticeAK 2020). According to NMFS (2020g), Steller sea lions typically occur in groups of 1-10 animals, but may congregate in larger groups near rookeries and haulouts. No documented rookeries or haulouts are near the project area.

4.9.5 Steller Sea Lion Critical Habitat

Critical habitat has been defined in Southeast Alaska at major haulouts and major rookeries (50 CFR 226.202). The nearest rookery is on the White Sisters Islands near Sitka and the nearest major haulouts are at Benjamin Island, Cape Cross, and Graves Rocks (NMFS No date). The

White Sisters rookery is located on the west side of Chichagof Island, about 72 kilometers southwest of the project area. Benjamin Island is about 60 kilometers northeast of Hoonah. Cape Cross and Graves Rocks are both about 70 kilometers west of Hoonah. Steller sea lions are known to haul out on land, docks, buoys, and navigational markers. However, during the spring/summer months when the proposed project would be constructed Steller sea lions are more likely to be in the protected waters around the project area feeding on spawning aggregations of forage fish before heading to exposed rookeries on the western shores of Southeast Alaska to breed (NOAA 2019a). Identified critical haulout sites are far beyond in-air noise disturbance threshold for hauled-out pinnipeds as described in Section 1.3.

5 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury, and/or death) and the method of incidental taking.

COH requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B harassment of nine species (humpback whale, minke whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion) and Level A take of three species (Dall's porpoise, harbor porpoise, and harbor seal) that may occur in the COH HMIC Cargo Dock Project harassment zones during construction.

The activities outlined in Section 1 have the potential to take marine mammals by exposure to in-water sound. Level B take of the nine species listed above will potentially result from noise associated with pile installation (and temporary pile removal) using the methods mentioned above (vibrating, impacting, and DTH/socketing). Pile driving will be shut down if species enter or appear likely to enter within shutdown zones for pile driving activities (varies by species and activity, see Table 7), thereby decreasing potential Level A take of marine mammals. However, zones where Level A take could occur are larger than the shutdown zones for some species and activities. Please see Section 11 for a description of mitigation measures including shutdown zones and procedures that will prevent most Level A take.

The applicant requests an IHA for incidental take of marine mammals described within this application for 1 year, beginning on May 1, 2021 (or the issuance date, whichever is later). COH is not requesting a Letter of Authorization at this time because the activities described herein are expected to be completed within 1 year from the date of authorization and are not expected to rise to the level of serious injury or mortality, which would require an LOA.

6 TAKE ESTIMATES FOR MARINE MAMMALS

The number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

6.1 ESTIMATED TAKE

Incidental take is estimated for each species considering: 1) Acoustic thresholds above which NMFS believes marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the size of the action area (the area of water that will be ensonified above acoustic thresholds in a day); 3) the density or occurrence of marine mammals in the action area; and 4) the number of days of pile driving and removal activity.

The marine mammal monitoring summary reports from the Icy Strait Point cruise ship Berths I and II (BergerABAM 2016; SolsticeAK 2020), and available scientific literature is used to estimate the density or occurrence of marine mammals in the action area.

For Level A take of Dall's porpoise, harbor porpoise, and harbor seal, , the take calculation is based on typical group size multiplied by the number of days or month of in-water work. Since distances to Level A thresholds for project activities (vibratory pile driving/removal, impact driving, and DTH/socketing) extend across the opening of Port Frederick into Icy Strait, Level A take for smaller species that may enter the shutdown zone prior to being sighted is requested.

Throughout all pile driving activity, the Level B monitoring zone will be scanned to monitor for the presence of MMPA and ESA-listed species.

Species occurrence information used to estimate take and the take calculation are shown in Table 5.

Table 5. Species Occurrence Information and Take Calculation

Species	Group and Occurrence Information [1]	Previous Authorized Takes [2]	Level B Take Calculation	Level A Take Calculation
Minke Whale	**Generally:** Individually or in small groups of 2-3; reports of loose aggregations of hundreds of animals **Berth I:** 1 sighting **Berth II:** 1 sighting	Berth I Level B: **0** of 8 authorized Berth II Level B: 0 of 9 authorized	3 whales per group x 1 group per month x 4 months construction= 12	0
Humpback Whale	**Generally:** 1-2 animals; estimated maximum group size of 8 animals; observed in Southeast Alaska in all months of the year **Berth I:** 84 sightings; up to 18/day **Berth II:** 45 sightings; up to 24/day; most often in July and September	Berth I Level B**: 226** of 316 authorized Berth II Level B: **108** of 434 authorized	8 whales per group x 1 group per day x 110 days=880 *827 non-listed and 53 listed humpback whales could be taken (Mexico DPS listed percentage 0.0601 %)*	0
Gray Whale	**Generally:** Glacier Bay and nearby waters two sightings of 1 gray whale per sighting over a 10-year period; no sightings during in southeast Alaska 1998-2008 between June and November **Berth I:** no sightings **Berth II**: no sightings	Berth I Level B**: 0** of 12 authorized Berth II Level B: **0** of 3 authorized	1 whale per group x 1 sighting per month x 4 months= 4	0
Killer Whale	**Generally:** Resident killer whale pods in Icy Strait area 42-79; occur in every month of the year; greatest number of transient sightings (1993) 32 sightings over two months **Berth I:** 24 sightings; largest group was 8 **Berth II:** 2 sightings; largest group recorded was 5	Berth I Level B: **24** of 412 authorized Berth II Level B: **10** of 570 authorized	79 whales per group x 1 of each group per month x 4 months = 316 killer whales	0
Pacific White-Sided Dolphin	**Generally:** 20 to 164 animals, 64 animals observed near Dixon Entrance **Berth I:** no sightings **Berth II:** 1 sighting of 2	Berth I Level B: **0** of 153 authorized Berth II Level B: **0** of 164 authorized	164 dolphins per group x 1 group every other month x 4 months= 328	0
Dall's Porpoise	**Generally:** common in Icy Strait and sporadic with very low densities in Port Frederick; most abundant in spring and least abundant in fall **Berth I:** 2 solo sightings **Berth II:** 8 sightings; group sizes 2 - 12	Berth I Level B: **2** of 692 authorized Berth II Level B: **6** of 1,992 authorized	9 porpoise per group x 1 group a week x 16 weeks=144	2 porpoise per group x 1 group every 5 days during 15 days of DTH of 36-in piles and 5 days of 36-in impact (20 days) = 8

Species	Group and Occurrence Information [1]	Previous Authorized Takes [2]	Level B Take Calculation	Level A Take Calculation
Harbor Porpoise	**Generally:** 332 resident harbor porpoises occur in the Icy Strait area; very low densities from spring through fall. **Berth I:** unknown number of sightings; 32 takes; most common group size 3 or less, sometimes 4 **Berth II:** 245 sightings; group size 4-8	Berth I Level B: **32** of 1,288 authorized Berth II Level B: **62** of 1,992 authorized	4 porpoise per group x 1 group per day x 110 days =440	4 porpoise per group x 1 group every 5 days during 15 days of DTH of 36-in piles and 5 days of 36-in impact (20 days) = 16
Harbor Seal	**Generally:** an average of 26 sightings occurred each month between June and August of 2014 in Glacier Bay and Icy Strait. **Berth I:** unknown number of sightings; **8** groups sizes 1 to 3; 22 individuals observed 1 day **Berth II:** 33 solo seals sightings	Berth I Level B: **63** or 480 authorized Berth II Level B: **8** of 156 authorized	3 seals per group x 2 groups per day x 110 days = 660	3 seals per group x 1 groups per day during 15 days of DTH of 36-in piles and 5 days of 36-in impact (20 days) = 60
Steller Sea Lion	**Generally:** groups of 1-10 animals, in Icy Strait year-round with increases during herring spawn (March-May) and salmon runs (June-October). **Berth I:** 180 sightings; average of 1.3 sightings per day **Test Pile Program:** 15 sightings on 1 day **Berth II:** 197 sightings; average of 4.6 sightings per day	Berth I Level B: **180** of 528 authorized Berth II Level B: **79** of 559 authorized	5 sea lions per group x 1 groups per day x 110 days=550 *511 non-listed and 39 listed Steller sea lions (DPS percentage 0.0703 %)*	0

Notes:

[1] General occurrence information from: NMFS 2020b; Bettridge et al. 2015; Keller et al 2017; Calambokidis et al 2010; Dahlheim et al 2008; Jefferson et al. 2019; NMFS 2020g Pierszalowski et al. 2017.

[2] Hoonah Berth I monitoring (BergerABAM 2016) = 135 days of construction monitoring; Hoonah Berth II monitoring (SolsticeAK 2020) = 51 days of construction monitoring

6.2 ALL MARINE MAMMAL TAKE REQUESTED

This analysis for the COH HMIC Cargo Dock Project predicts 12 potential takes of minke whales, 827 potential take of non-listed and 53 potential takes of listed humpback whales, 4 potential takes of gray whales, 316 potential takes of killer whales, 328 potential takes of Pacific white-sided dolphins, 144 potential takes of Dall's porpoises, 440 potential takes of harbor porpoises, 660 potential takes of harbor seals, and 511 potential take of non-listed and 39 potential takes of listed Steller sea lions classified as Level B harassment under the MMPA. Potential Level A takes are predicted for three species; Dall's Porpoise (8 takes), harbor porpoise (16 takes), and harbor seal (60 takes). See Tables 5 and 6.

Table 6. Take Requests for Marine Mammals and Percent of Stock

Species	Stock (N_{EST}) [a]	Level A	Level B	Percent of Stock [b]
Minke Whale	N/A	0	12	N/A
Humpback Whale	Hawaii DPS (9,487) [c] Mexico DPS (606) [c]	0	827 53	8.7 8.8
Gray Whale	Eastern North Pacific (27,000) [d]	0	4	Less than 1 percent
Killer Whale	Alaska Resident (2,347) Northern Resident (302) West Coast Transient (243)	0	256 33 27	10.9 [e] 10.9 [e] 11.1 [e]
Pacific White-Sided Dolphin	North Pacific (26,880)	0	328	Less than 1 percent
Dall's Porpoise	Alaska (83,400) [f]	8	366	Less than 1 percent
Harbor Porpoise	Southeast Alaska (6,980) [g]	16	440	Less than 1 percent
Harbor Seal	Glacier Bay/Icy Strait (7,455)	60	660	8.9
Steller Sea Lion	Eastern U.S. (43,201) Western U.S. (53,624)	0	511 39	1.2 [h] Less than 1 percent [h]

[a] Stock estimate from Muto, M. M. et al. 2020. Appendix 2. Stock Summary Table (last revised 12.30.19). NOAA-TM-AFSC-378 unless otherwise noted.
[b] Percent of stock refers to Level B and Level A take (if requested).
[c] Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, we have divided them here to account for DPSs listed under the ESA. Using the stock assessment from Muto et al. 2020 for the Central North Pacific stock (10,103 whales) and calculations in Wade et al. 2016; 9,487 whales are expected to be from the Hawaii DPS and 606 from the Mexico DPS.
[d] NMFS 202j
[e] Take estimates are weighted based on calculated percentages of population for each distinct stock, assuming animals present would follow same probability of presence in project area.
[f] NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2020). However, this estimate does not include coastal or inland waters of Southeast Alaska.
[g] Estimate is the lower 95% confidence limit from Hobbs and Waite 2010.
[h] Take estimate based on 0.0703 percent of Steller sea lions in action area from the WDPS (Lauri Jemison DRAFT).

7 ANTICIPATED IMPACT OF THE ACTIVITY

The anticipated impact of the activity to the species or stock of marine mammal.

COH is requesting authorization for Level A and Level B take of marine mammals as listed in Table 6 which shows take requests in relation to the overall stock size of each species. Incidental takes of marine mammals will likely be multiple takes of individuals, rather than single takes of unique individuals. The stock take calculations in Tables 5 and 6 assume takes of individual animals, instead of repeated takes of a smaller number of individuals; therefore, the stock take percentage calculations are conservative.

Incidental Level B take is expected to result primarily in short-term changes in behavior, such as avoidance of the project area, changes in swimming speed or direction, and changes in foraging behavior. Level B exposure could occur on 110 days when pile driving and removal occurs. Because of the limited time that marine mammals could be exposed to Level B harassment, the HMIC Cargo Dock project would be unlikely to have any impact on stock recruitment or survival, and therefore, would have a negligible impact on the stocks of these species.

COH is requesting minimal Level A take that may occur for Dall's porpoise, harbor porpoises, and harbor seals during 15 days of DTH/socketing of 36-in piles and 5 days of 36-in impact (20 days) (see Table 8). Incidental Level A take can cause injury including permanent, partial, or full hearing loss if marine mammals are exposed to underwater sounds exceeding the injury threshold, which vary by species. Marine mammals exposed to high received sound levels may experience non-auditory physiological effect such as increased stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage.

Because of the limited area over which Dall's porpoise, harbor porpoises, and harbor seals could experience Level A harassment (3 km^2), it is not expected that there would be any impact on stock recruitment or survival, and therefore, there would be no impact on the stocks of these species.

8 ANTICIPATED IMPACTS ON SUBSISTENCE USES

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years. Since surveys of harbor seal and sea lion subsistence harvest in Alaska began in 1992, there have been declines in the number of households hunting and harvesting seals in Southeast Alaska while the number of household hunting and harvesting sea lions has remained relatively constant at low levels (Wolfe et al. 2013). In Hoonah specifically, the number of hunters participating in subsistence harvest of harbor seals has decreased in recent years. Native households in Hoonah reporting participation in subsistence take of harbor seals declined from 30 households in 2000 to 15 households in 2012, but average take estimates have increased, possibly reflecting an improvement in the efficiency of those participating (Wolfe et al. 2013). Subsistence harvest data for the Glacier Bay/Icy Strait stock indicates an average annual harvest in the years 2004-2008 of 52 harbor seals and an average annual harvest in the years 2011-2012 of 104 harbor seals (summarized in Muto et al. 2020 from Wolfe et al. 2013). For the most recent years of collected data (2005-2008 and 2012) the average number of EDPS Steller sea lions harvested from 16 Southeast Alaska communities is 11 animals (Muto et al. 2020). In 2012, Hoonah had an estimated subsistence take of 40 harbor seals and 7 Steller sea lions (Wolf et al. 2013).

In September 2020, the Indigenous People's Council for Marine Mammals (IPCoMM), the Alaska Sea Otter and Steller Sea Lion Commission, Huna Totem Corporation, and the Hoonah Indian Association (HIA) were contacted to determine potential project impacts on local subsistence activities. No comments were received from IPCoMM or the Alaska Sea Otter and Steller Sea Lion Commission. On September 14, 2020, Huna Totem Corporation expressed support for the project and indicated that they do not anticipate any marine mammal or subsistence impacts.

The proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that are commonly used for subsistence purposes or to impact subsistence harvest of marine mammals in the region because:

- construction activities are localized and temporary;
- mitigation measures will be implemented to minimize disturbance of marine mammals in the action area; and,
- the project will not result in significant changes to availability of subsistence resources.

9 ANTICIPATED IMPACTS ON HABITAT

The anticipated impact of the activity upon the habitat of the marine mammal populations and the likelihood of restoration of the affected habitat.

9.1 IMPACTS TO PHYSICAL HABITAT

9.1.1 Project Footprint

The HMIC Cargo Dock would likely not impact any marine mammal habitat since its proposed location is within an area that is currently used by large shipping vessels and in between two existing, heavily-traveled docks, and within an active marine commercial and tourist area.

9.1.2 Turbidity/ Sedimentation

Throughout the duration of pile driving and removal, a temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are placed. These sediments will be disturbed during pile driving; however, suspension will be brief and very localized and is unlikely to measurably affect marine mammals or their prey in the area.

9.2 EFFECTS OF PROJECT ACTIVITIES ON MARINE MAMMAL HABITAT

9.2.1 Animal Avoidance or Abandonment

All of these species discussed in this application could experience a temporary loss of suitable habitat, depending on the degree that they use the area, within the action area if elevated noise levels associated with in-water construction result in their displacement from the area. However, displacement of species by noise is expected to be temporary and will not result in long-term effects to the local populations.

9.3 EFFECTS OF PROJECT ACTIVITIES ON MARINE MAMMAL PREY HABITAT

The action area supports marine habitat for prey species including large populations of anadromous fish including Pacific salmon (five species), Cutthroat (*Oncorhynchus clarkia*) and Steelhead Trout (*O. mykiss irideus*), and Dolly Varden and other species of marine fish such as halibut, Northern Rock Sole (*Lepidopsetta polyxystra*), sculpins, Pacific Cod (*Gadus macrocephalus*), herring, and Eulachon (*Thaleichthys pacificus)* (NMFS 2020i).

The following essential fish habitat (EFH) species may occur in the project area during at least one phase of their lifestage: Alaska Plaice (*Pleuronectes quadrituberculatus*), Dover Sole (*Solea solea*), Walleye Pollock (*Gadus chalcogrammus*), Flathead Sole (*Hippoglossoides elassodon*), ReS sole (*Glyptocephalus zachirus*), Yellowfin Sole (*Limanda aspera*), Arrowtooth Flounder (*Atheresthes stomias*), Northern Rock Sole, Pacific Cod, Pacific Ocean Perch (*Sebastes alutus*), Sablefish (*Anoplopoma fimbria*), Southern Rock Sole (*Lepidopsetta bilineata*), Chum Salmon (*O. keta*), Pink Salmon (*O. gorbuscha*), Coho Salmon (*O. kisutch*), Sockeye Salmon (*O. nerka*), and Chinook Salmon (*O. tshawytscha*). No habitat areas of particular concern or EFH areas protected from fishing are identified near the project area (NMFS 2020h).

There are two documented anadromous fish streams in the project area. Halibut Creek (AWC: 114-34-10200) is approximately 5,100 meters north west of the proposed project site and Humpback Creek (AWC: 114-34-10100) is approximately 7,600 meters southwest of the proposed project site. Each anadromous waterbody supports Chum, Coho, and Pink Salmon and Dolly Varden (ADF&G 2020a).

Since the proposed project has a small benthic footprint and is within a previously disturbed area, the project is not likely to adversely affect prey habitat including EFH.

Fish populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. High underwater sound pressure levels have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper 2005).

In general, impacts to marine mammal prey species are expected to be minor and temporary. The area impacted by the project is very small compared to the available habitat in Port Frederick Inlet. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during construction are not expected to be substantial.

10 ANTICIPATED EFFECT OF HABITAT IMPACTS ON MARINE MAMMALS

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The most likely effects on marine mammal habitat from the proposed project would be temporary, short duration in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts, and other construction activity is expected to be short-term and minimal.

10.1 LOSS OF MARINE MAMMAL HABITAT DUE TO NOISE

One potential impact on marine mammals associated with the project could be a temporary loss of habitat because of elevated noise levels. Displacement of marine mammals by construction noise is not expected to be permanent nor is it anticipated to have long-term effects on the species. Project activities are not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations, because pile driving and other construction-related noise sources will be temporary and intermittent. However, minor increased vessel traffic in the area may result in an overall increased level of ambient noise in near Hoonah. This may deter marine mammals from inhabiting or traveling through the area and result in a minor loss of habitat.

10.2 LOSS OF MARINE MAMMAL HABITAT DUE TO TURBIDITY

Another potential impact on marine mammals associated with the project could be temporary sediment suspension and increased turbidity associated with pile driving and removal in Port Frederick. The temporary and localized turbidity associated with the expansion project is unlikely to measurably affect marine mammals or their prey in the area.

10.3 DISTURBANCE OR LOSS OF PREY SPECIES

As stated in Section 9, fish populations in the project area that serve as marine mammal prey could be affected by noise or turbidity generated from in-water pile-driving. It is expected that most fish will be able to move away from the proposed activity to avoid harm and will still be available to marine mammals as a food source. The quantity, quality, and availability of adequate food resources are therefore not likely to be reduced (due to the small area affected, mobility of fish, anticipated recolonization, and the temporary nature of the project).

These temporary impacts on habitat were discussed in more detail in Section 9.

11 MITIGATION MEASURES

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Mitigation measures and construction techniques will be employed to minimize effects to marine mammal species and habitat. These measures are described below and presented in detail in the HMIC Cargo Dock Project 4MP (Appendix C).

11.1 MITIGATION MEASURES DESIGNED TO REDUCE PROJECT IMPACTS

The project uses the most compact design possible, while meeting the demands of the vessels that would use the facility.

- The project uses a design that does not require dredging or blasting.
- The project uses a design that incorporates the smallest-diameter piles and footprint practicable while still minimizing the overall number of piles and area.
- All fill will be placed within the constructed sheet pile bulk cargo dock.

11.2 OIL AND SPILL PREVENTION

- The contractor will provide and maintain a spill cleanup kit on-site at all times, to be implemented as part of the Shipboard Oil Pollution Emergency Plan for oil spill prevention and response.
- Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and similar equipment will be checked regularly for drips or leaks, and would be maintained and stored properly to prevent spills.
- Oil booms will be readily available for oil or other fuel spill containment should any release occur.
- All chemicals and petroleum products will be properly stored to prevent spills.
- No petroleum products, cement, chemicals, or other deleterious materials will be allowed to enter surface waters.

11.3 MITIGATION MEASURES DESIGNED TO REDUCE IMPACTS TO MARINE MAMMALS

- To minimize noise during impact pile driving, pile caps (pile softening material) will be used. Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor will use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.
- COH is required to conduct briefings for construction supervisors and crews, the monitoring team, and COH staff prior to the start of all pile driving activity, and when

new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

- COH is required to employ PSOs during all in-water construction activities per the Marine Mammal Monitoring Plan (Appendix C), dated February 2021, and Monitoring Measures described in section 13 of this IHA.
- Marine mammal monitoring must take place from 30 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone (Table 7), their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin.
- If a marine mammal is entering or is observed within an established shutdown zone (Table 7), pile driving must be halted or delayed. Pile driving may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone; 15 minutes have passed without subsequent detections of small cetaceans and pinnipeds; or 15/30 minutes have passed without subsequent detections of large cetaceans. NMFS may adjust the shutdown zones pending review and approval of an acoustic monitoring report.
- COH must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.
- If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed approaching or within the monitoring zone (Table 8), pile driving and removal activities must shut down immediately using delay and shut-down procedures. Activities must not resume until the animal has been confirmed to have left the area or the observation time period, as indicated in the conditions above, has elapsed

11.4 SHUTDOWN AND MONITORING ZONES

COH is requesting Level B take for minke whale, humpback whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion and Level A take of and Dall's porpoise, harbor porpoise, harbor seal incidental to construction of HMIC Cargo Dock. COH is not requesting take for any other marine mammal. Shutdown and monitoring zones are described in the following sub-sections.

11.4.1 Level A Shutdown and Monitoring Zones

There will be a nominal 10-meter shutdown zone for construction-related activity where acoustic injury is not an issue. This type of work could include (but is not limited to) the following activities:

- movement of the barge to the pile location;
- positioning of the pile on the substrate via a crane (i.e., stabbing the pile); or
- the placement of sound attenuation devices around the piles.

For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.

COH will implement additional shutdowns to protect marine mammals from Level A harassment and prevent auditory injury to all hearing groups during pile installation and removal project activities as shown in Table 7 and Figure 7. Because Dall's porpoise, harbor porpoise, and harbor seals are more difficult to see and due to the high likelihood of their presence within the project area and extent of shutdown distances, Level A take has been requested for these species in those instances in which they occur within the Level A harassment zone but outside of the shutdown zone *or* if they were to occur within the shutdown zone and were not visualized in time for the project to be shut down (Figure 8).[5]

[5] Although humpback whales are also common in the action area; however, the largest shutdown zone, equal to the Level A threshold for this species of 1,230 meters during 36 inch pile DTH/socketing, is considered to be a reasonable observation distance for these larger animals.

Table 7. HMIC Pile Driving Level A Shutdown and Monitoring Zones

Activity	Distance (in meters, m) to Level A				
	Level A				
	Low-Frequency Cetaceans (humpback whale, gray whale, minke whale)	**Mid-Frequency Cetaceans** (killer whale, Pacific white-sided dolphin)	**High-Frequency Cetaceans** (Dall's porpoise, harbor porpoise)	**Phocid** (harbor seal)	**Otariid** (Steller sea lion)
In-Water Construction Activities*					
Barge movements, pile positioning, sound attenuation placement*	10	10	10	10	10
Vibratory Pile Driving/Removal					
30-inch steel temporary installation (50 piles; ~1 hour per day on 12.5 days)	10	10	15	10	10
30-inch steel removal (50 piles; ~1 hour per day on 12.5 days)	10	10	15	10	10
36-inch steel permanent installation (9 piles; ~1 hour per day on 2.25 days)	35	10	35	15	10
20-inch fender pile installation (6 piles; ~45 mins per day on 2 days)	10	10	15	10	10
H-pile installation (12 piles; ~1 hour per day on 3 days)	35	10	35	15	10
Sheet pile installation (500 sheets; ~7.5 hours per day on 17 days)	35	10	35	15	10
Impact Pile Driving					
36-inch steel permanent installation (9 piles; ~30 mins per day on 4.5 days)	605	35	720 *(Monitoring)* 200 *(Shutdown)*	325 *(Monitoring)* 200 *(Shutdown)*	35
20-inch fender pile installation (6 piles; ~10 mins per day on 3 days)	15	10	15	10	10
H-pile installation (12 piles; ~20 mins per day on 3 days)	55	10	55	35	10
Sheet pile installation (500 sheets; ~25 mins per day on 25 days)	55	10	55	35	10
DTH/Socketed Pile Installation					
36-inch steel permanent installation (9 piles; ~12 hours max per day on 5 days)	1,230	45	1,460 *(Monitoring)* 200 *(Shutdown)*	660 *(Monitoring)* 200 *(Shutdown)*	55
20-inch fender pile installation (6 piles; ~12 hours max per day on 3 days)	265	10	315 *(Monitoring)* 200 *(Shutdown)*	145	15
H-pile installation (12 piles; ~12 hours max per day on 12 days)	265	10	315 *(Monitoring)* 200 *(Shutdown)*	145	15

Shutdown zone distances refer to the maximum radius of the zone and are rounded (see Table 3 for calculated distances).
*Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

Figure 7. HMIC Level A Shutdown Zones

HMIC Cargo Dock Level A Shutdown Zones		
Distance	Activity	Species
10 meters	Vibratory: 20-inch and 30-inch	LF, MF, Phocids, and Otariid
	Vibratory: 36-inch, H-piles, and Sheets	MF and Otariids
	Impact: 20-inch	MF, Phocids, Otariids
	Impact: H-piles and Sheets	MF and Otariids
	Socketing: H-piles and Sheets	MF
15 meters	Vibratory: 20-inch and 30-inch	HF
	Vibratory: 36-inch, H-piles, and Sheets	Phocid
	Impact: 20-inch	LF and HF
	Socketing: 20-inch and H-piles	Phocid
35 meters	Vibratory: 36-inch, H-piles, and Sheets	LF and HF
	Impact: 36-inch	MF and Phocid
	Impact: H-piles and Sheets	Phocid
45 meters	Socketing: 36-inch	MF
55 meters	Impact: H-piles and Sheets	LF and HF
	Socketing: 36-inch	Otariids
145 meters	Socketing: 20-inch and H-piles	Phocid
200 meters	Impact: 36-inch	HF and Phocid
	Socketing: 20-inch and H-piles	HF
	Socketing: 36-inch	HF and Phocid
265 meters	Socketing: 20-inch and H-piles	LF
1,230 meters	Socketing: 36-inch	LF

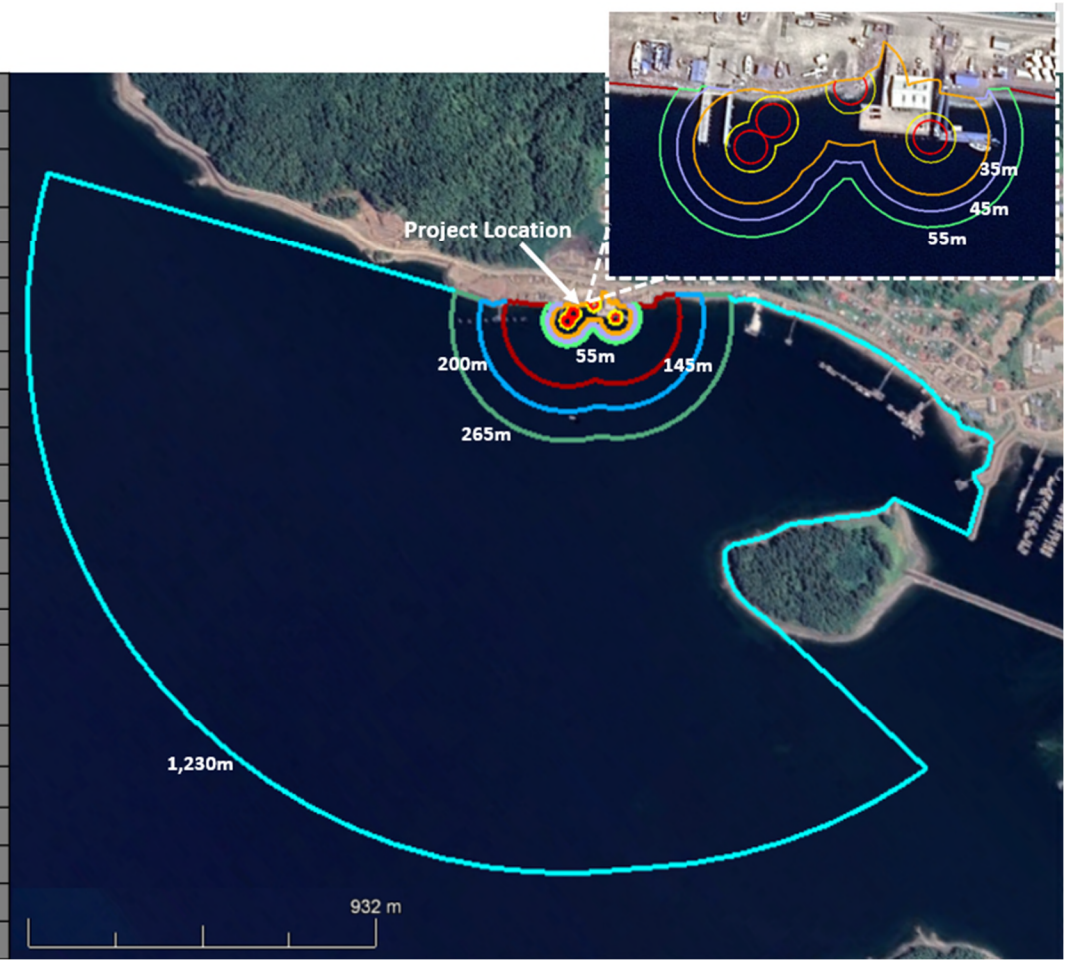
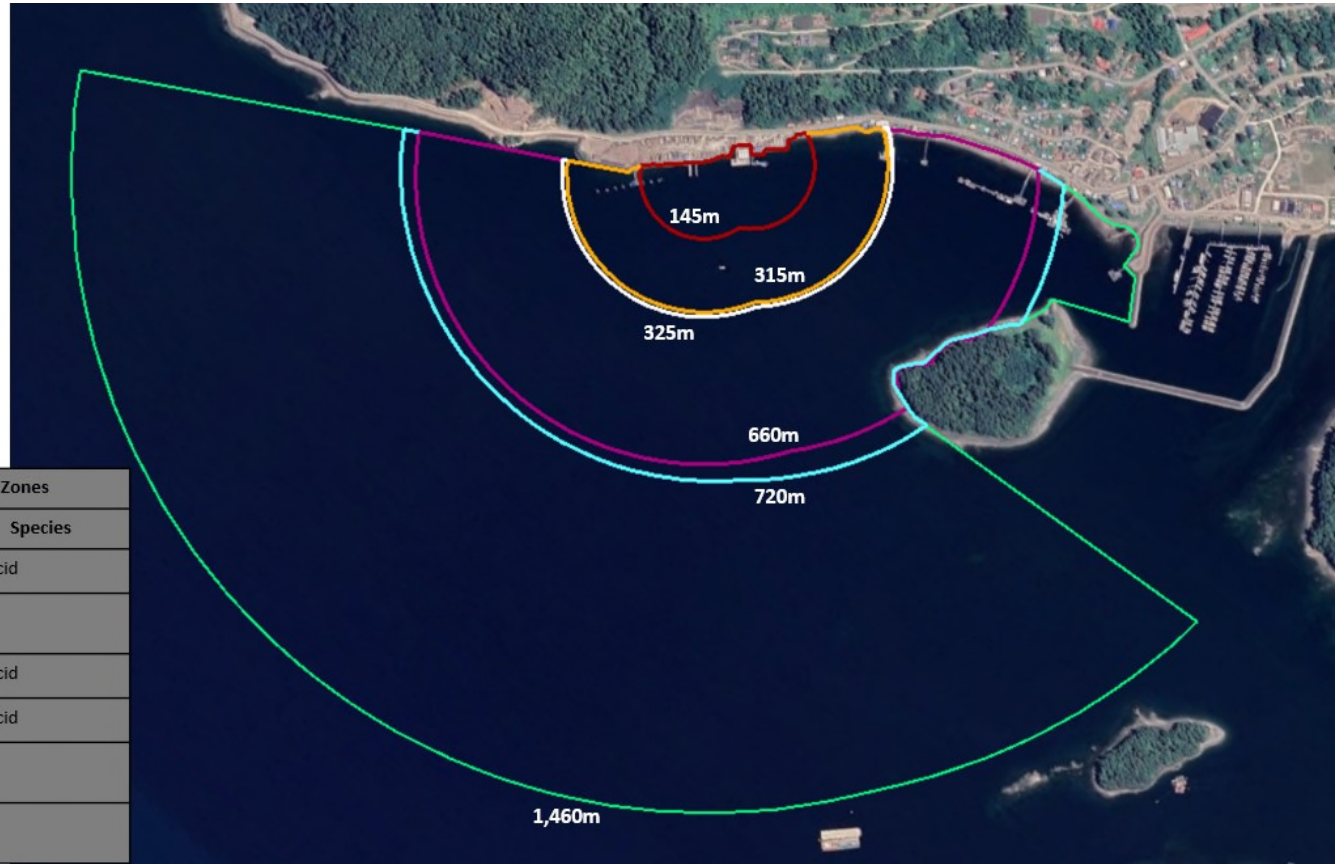


Figure 8. HMIC Level A Monitoring Zones



HMIC Cargo Dock Level A Monitoring Zones		
Distance	Activity	Species
145 meters	Impact: 20-inch	Phocid
315 meters	Impact: H-piles and Sheets	HF
325 meters	Impact: 36-inch	Phocid
660 meters	Vibratory: Sheets	Phocid
720 meters	Vibratory: 20-inch and 30-inch	HF
1,460 meters	Socketing: 36-inch, 20-inch, and H-piles	HF

11.4.2 Level B Monitoring Zones

COH is requesting Level B take of minke whale, humpback whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion incidental to constructing HMIC Cargo Dock and shutdowns associated with Level B harassment of these species are not proposed. Although the calculated distance to Level B thresholds extends 100km out from the source, all Level B zones are truncated at 15,700m from the source where land masses block sound transmission (Figure 9). The monitoring zones associated with Level B disturbance are outlined in Table 8 and Figure 9.

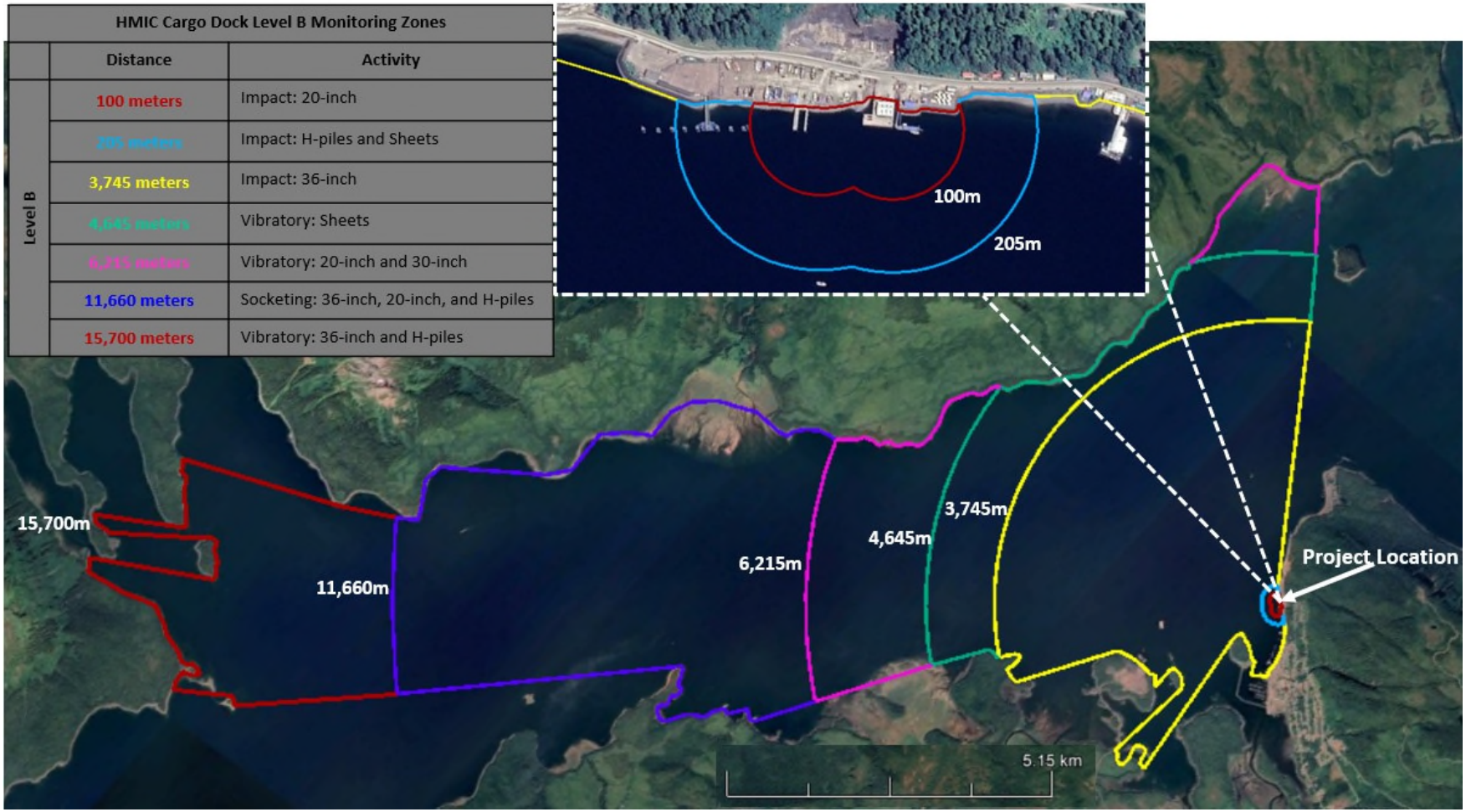
If species other than those listed above were to enter the Level B area, pile driving would be shut down.

Table 8. HMIC Level B Monitoring Zones

Source	Monitoring Zones (meters)*
Vibratory Pile Driving/Removal	
20-inch steel temporary installation (6 piles; ~45 mins per day on 3 days)	6,215
30-inch steel temporary installation (50 piles; ~1 hour per day on 12.5 days)	6,215
30-inch steel removal (50 piles; ~1 hour per day on 12.5 days)	6,215
36-inch steel permanent installation (7 piles; ~1 hour per day on 2.25 days)	15,700 *(16,345)*
Sheets (500 sheets; ~7.5 hours per day on 17 days)	4,645
H-piles (12 piles; ~1 hour per day on 3 days)	15,700 *(17,435)*
Impact Pile Driving	
20-inch steel fender piles (6 piles; ~10 mins per day on 3 days)	100
36-inch steel (7 piles; ~30 minutes per day on 4.5 days)	3,745
Sheets (500 sheets; ~25 mins per day on 100 days)	205
H-piles (12 piles; ~20 mins per day on 3 days)	205
DTH/Socketed Pile Installation	
20-inch steel fender piles (6 piles; ~12 hours max per day on 3 days)	11,660
36-inch steel permanent installation (9 piles; ~12 hours max per day on 15 days)	11,660
H-piles (12 piles; ~12 hours max per day on 17 days)	11,660

*Numbers rounded up to the nearest 5 meters; see Table 3 for calculated distances.

Figure 9. HMIC Level B Monitoring Zones



HMIC Cargo Dock Level B Monitoring Zones		
	Distance	Activity
Level B	100 meters	Impact: 20-inch
	205 meters	Impact: H-piles and Sheets
	3,745 meters	Impact: 36-inch
	4,645 meters	Vibratory: Sheets
	6,215 meters	Vibratory: 20-inch and 30-inch
	11,660 meters	Socketing: 36-inch, 20-inch, and H-piles
	15,700 meters	Vibratory: 36-inch and H-piles

12 ARCTIC PLAN OF COORDINATION

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. (This requirement is applicable only for activities that occur in Alaskan waters north of 60° North latitude.)

Although the action area is located south of 60° north, the latitude NMFS regulations consider Arctic waters and no activities will take place in or near traditional Arctic subsistence hunting areas, there are subsistence uses of marine mammals in Southeast Alaska including the community of Hoonah. Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years.

Section 11 describes mitigation measures designed to reduce project impacts and Section 8 details subsistence information and consultations with subsistence users in the project vicinity.

13 MONITORING AND REPORTING

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

13.1 MONITORING PROTOCOLS

To minimize impacts of project activities on marine mammals, a detailed 4MP has been developed for the project and is included as Appendix C. Project shutdown and monitoring zones as outlined in Appendix C and Section 11.3 would be implemented during any in-water pile driving activities associated with the project. If the number of animals of a species exposed to Level A or B harassment approaches the number of takes allowed by the IHA, COH will notify NMFS and seek further consultation.

13.2 MONITORING REPORT

13.2.1 Monthly Report

During construction, COH will submit brief, monthly reports to the NMFS Alaska Region Protected Resources Division that summarize PSO observations and recorded takes. Monthly reporting will allow NMFS to track the amount of take (including extrapolated takes), to allow reinitiation of consultation in a timely manner, if necessary. The monthly reports will be submitted by email to akr.section7@noaa.gov.

The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by close of business on the tenth day of the month following the end of the reporting period (e.g., the monthly report covering March 1–31, 2021, would be submitted to the NMFS by close of business on April 14, 2021).

13.2.2 Final Report

COH will submit a draft report to NMFS not later than 90 days following the end of construction activities or 60 days prior to the issuance of any subsequent IHA for the project. COH will provide a final report within 30 days following resolution of NMFS' comments on the draft report. Reports will contain, at minimum, the following:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period)
- Construction activities occurring during each daily observation period, including how many and what type of piles driven
- Deviation from initial proposal in pile numbers, pile types, average driving times, etc.
- Weather parameters in each monitoring period (e.g., wind speed, percent cloud cover, visibility)

- Water conditions in each monitoring period (e.g., sea state, tide state);
- For each marine mammal sighting:
  - Species, numbers, and, if possible, sex and age class of marine mammals
  - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity
  - Type of construction activity that was taking place at the time of sighting;
  - Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point
  - Reason why shutdown was implemented (if needed)
  - If shutdown was implemented, behavioral reactions noted and if they occurred before or after shutdown
  - Estimated amount of time that the animals remained in the Level A or B zone
- Description of implementation of mitigation measures within each monitoring period (e.g., shutdown or delay)
- Other human activity in the area within each monitoring period
- A summary of the following:
  - Total number of individuals of each species detected within the Level B Zone and estimated as taken if correction factor appropriate
  - Total number of individuals of each species detected within the Level A Zone and estimated as takes
  - Daily average number of individuals of each species detected within the Level B Zone, and estimated as taken, if appropriate

COH will also immediately report injured or dead marine mammals to NMFS, and, if the specified activity clearly causes the take of marine mammals in a manner prohibited by the IHA (e.g., serious injury or mortality), COH will immediately cease pile activities and report the incident to NMFS by calling the NOAA Fisheries statewide 24-hour Stranding Hotline (877) 925-7773.

14 SUGGESTED MEANS OF COORDINATION

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

In-water and in-air noise generated by vibratory, impact, and DTH/socketing pile driving at the HMIC Cargo Dock is 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.

The data recorded during marine mammal monitoring for the proposed project will be provided to NMFS in the monitoring report (Section 13.2). The report will provide information on marine mammals' use of Port Frederick Inlet, including numbers before, during, and after pile driving activities. The monitoring data may also inform NMFS and future permit applicants generally about the behavior of marine mammals during pile installation and removal for future projects of a similar nature.

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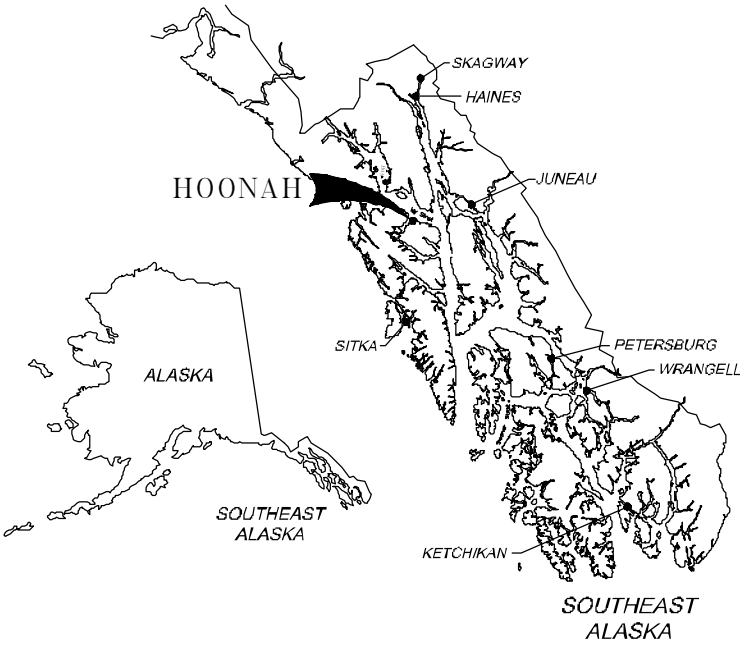
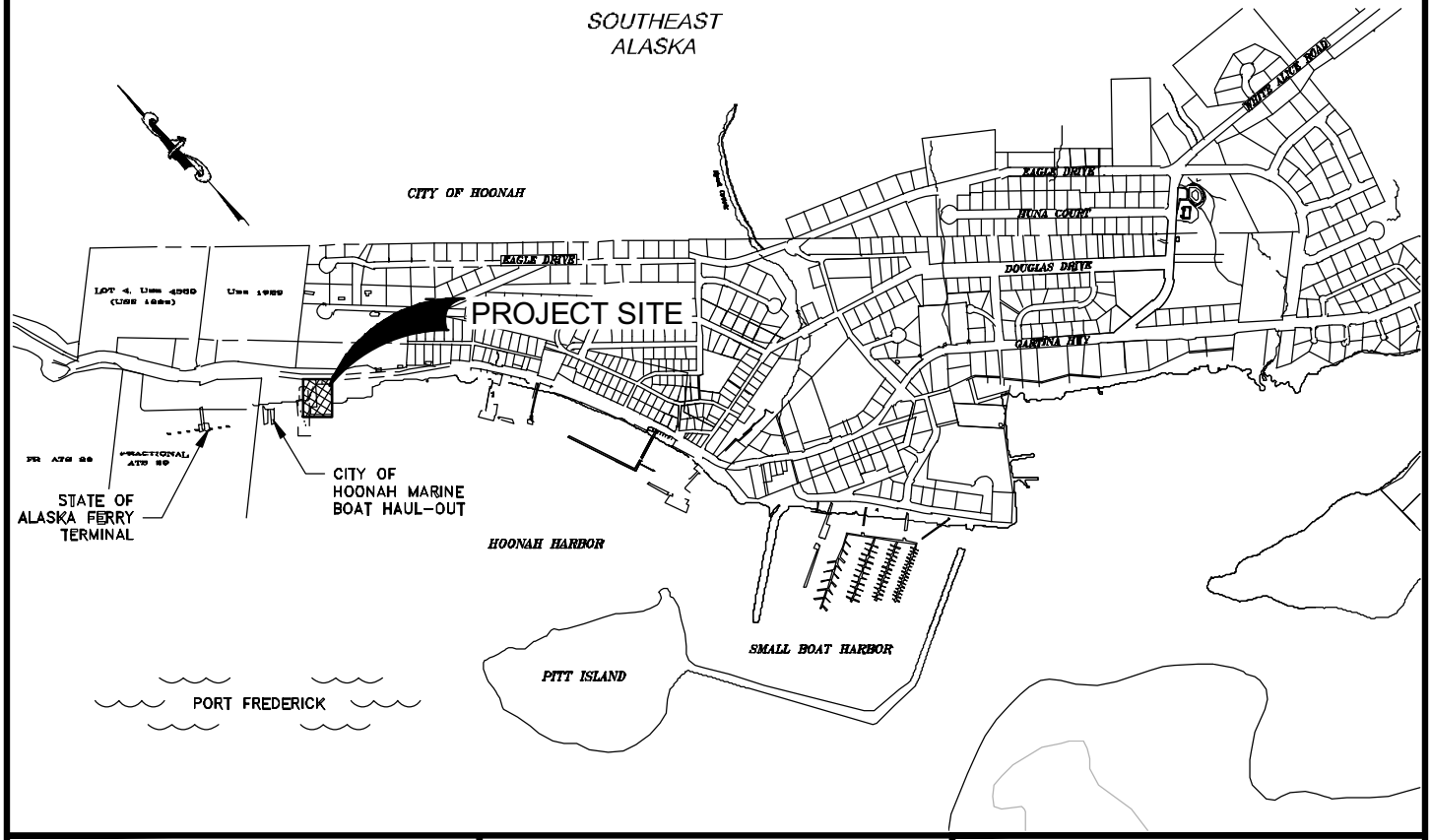
Appendix A: Project Drawings

SHEET INDEX

SHEET	DESCRIPTION
1	COVER, VICINITY MAP AND SHEET INDEX
2	SITE LOCATION MAP, ADJACENT OWNERS
3	SYMBOLS, QUANTITIES & ABBREVIATIONS
4	SITE PLAN
5	TYPICAL SECTION





PORT FREDRICK
HOONAH, ALASKA
(PUBLICATION DATED 6/27/2018)
TIDAL DATUM
*HTL . . . . . 19.34'
MHW. . . . . 14.08'
MLLW. . . . . 0.00'

Vincinty Map

GRAPHIC SCALE
0' 625' 1250' 1875'

PROPOSED PERMIT MODIFICATION FOR CITY OF HOONAH AML BARGE RAMP
POA-1985-696

IN: PORT FREDRICK
AT: HOONAH, ALASKA
APPLICANT: CITY OF HOONAH
P.O. BOX 675
HOONAH, ALASKA 99829

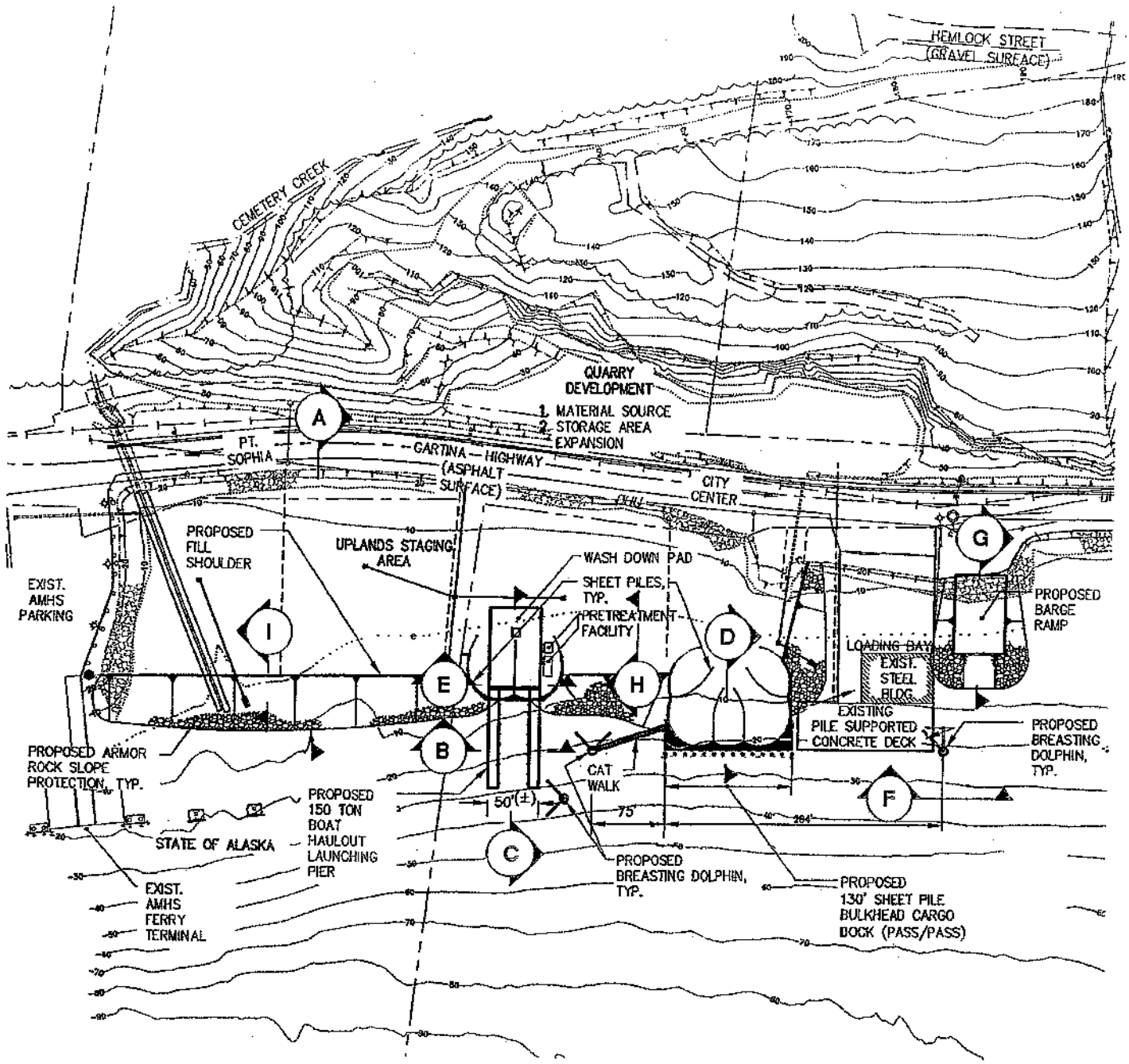
Sheet 1

DATE: NOV 21, 2019

PROJECT PURPOSE: THE PURPOSE OF PROJECT IS TO INSTALL BREASTING DOLPHINS ADJACENT TO THE CITY OF HOONAH WAREHOUSE FOR ALLOWING SAFE LANDING FOR AML BARGES.
*HTL DATA NOT AVAILABLE FOR PORT FREDRICK, VALUE DERIVED FROM COMPARISON OF PORT FREDRICK TO JUNEAU.

PDC PROJ.: 19249JN

P:\2019\19249JN-COH_AML\C\Permitting\19249JN_USACE Permit.dwg PLOT: November 21, 2019 at: 3:27pm johnmalaby



PURPOSE:

TO CONSTRUCT A MARINE INDUSTRIAL CENTER
TO SERVICE BOAT HAULOUT & MARINE CARGO OPERATIONS

HTL = 19.3'
MHW = 13.9'
MLLW = 0.0'

DATUM: MLLW = 0.0 ft

SITE PLAN

SCALE IN FEET

0 150 300 FT.

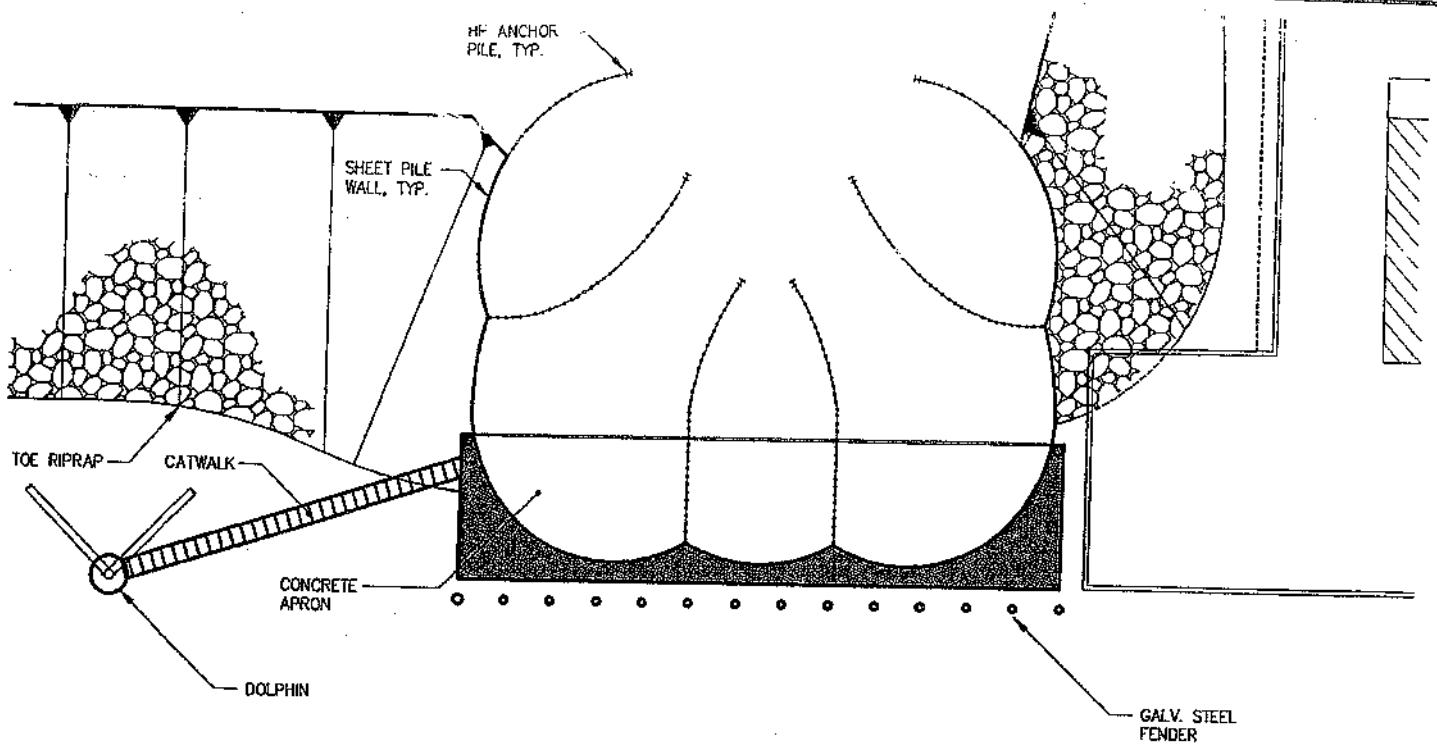
CITY OF HOONAH
P.O. BOX 360
HOONAH, ALASKA 99829-0360

PND#: 052038.01

Sheet 2

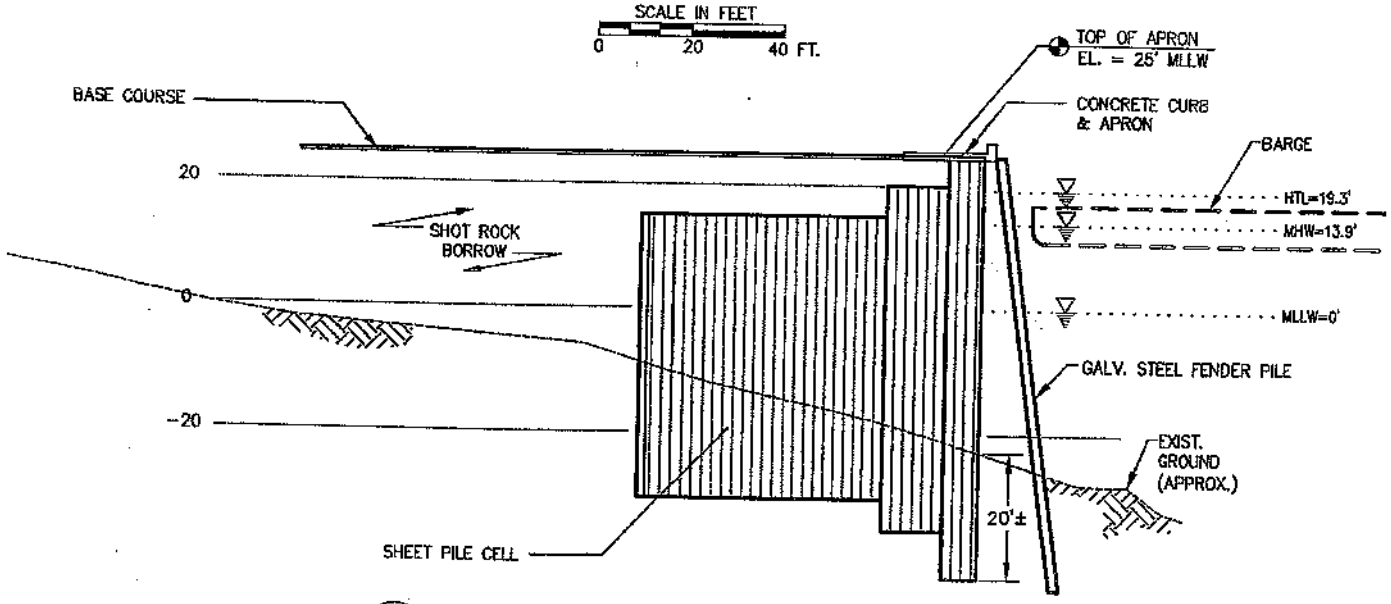
POA-1985-696-2 (Port Frederick)
City of Hoonah
Marine Industrial Center

December 14, 2005



TYPICAL SHEET PILE BULKHEAD PLAN

SCALE IN FEET
0 20 40 FT.



(D) TYPICAL SHEET PILE BULKHEAD ELEVATION

SCALE IN FEET
0 15 30 FT.

PURPOSE:

TO CONSTRUCT A MARINE INDUSTRIAL CENTER
TO SERVICE BOAT HAULOUT & MARINE CARGO OPERATIONS

HTL = 19.3'
MHW = 13.9'
MLLW = 0.0'

DATUM: MLLW = 0.0 ft

SHEET PILE BULKHEAD PLAN & SECTION

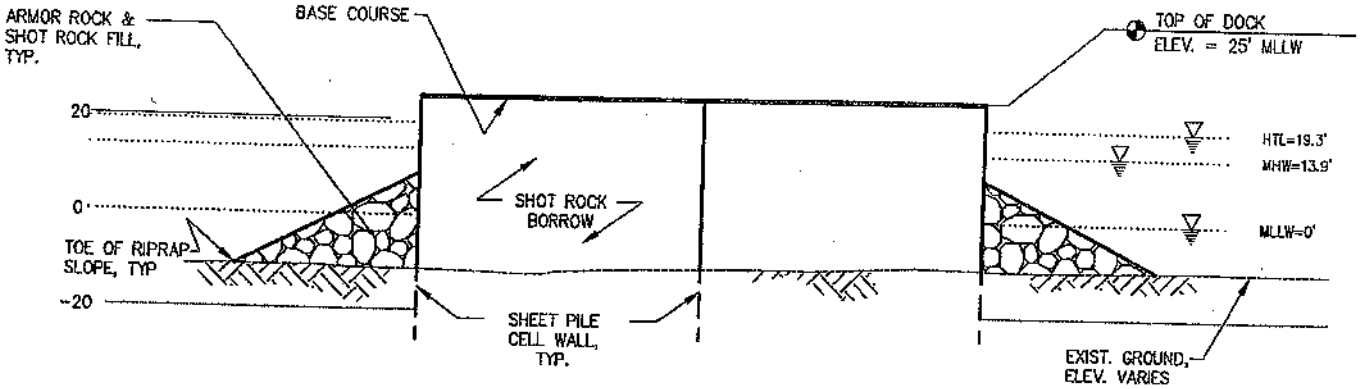
CITY OF HOONAH
P.O. BOX 360
HOONAH, ALASKA 99829-0360

PND#: 052038.01

Sheet 3

POA-1985-696-2 (Port Frederick)
City of Hoonah
Marine Industrial Center

December 14, 2005



(E) TYPICAL SHEET PILE BULKHEAD ELEVATION

SCALE IN FEET
0 20 40 FT.

PURPOSE:

TO CONSTRUCT A MARINE INDUSTRIAL CENTER
TO SERVICE BOAT HAULOUT & MARINE CARGO OPERATIONS

HTL = 19.3'
MHW = 13.9'
MLLW = 0.0'

DATUM: MLLW = 0.0 ft

SHEET PILE BULKHEAD ELEVATION

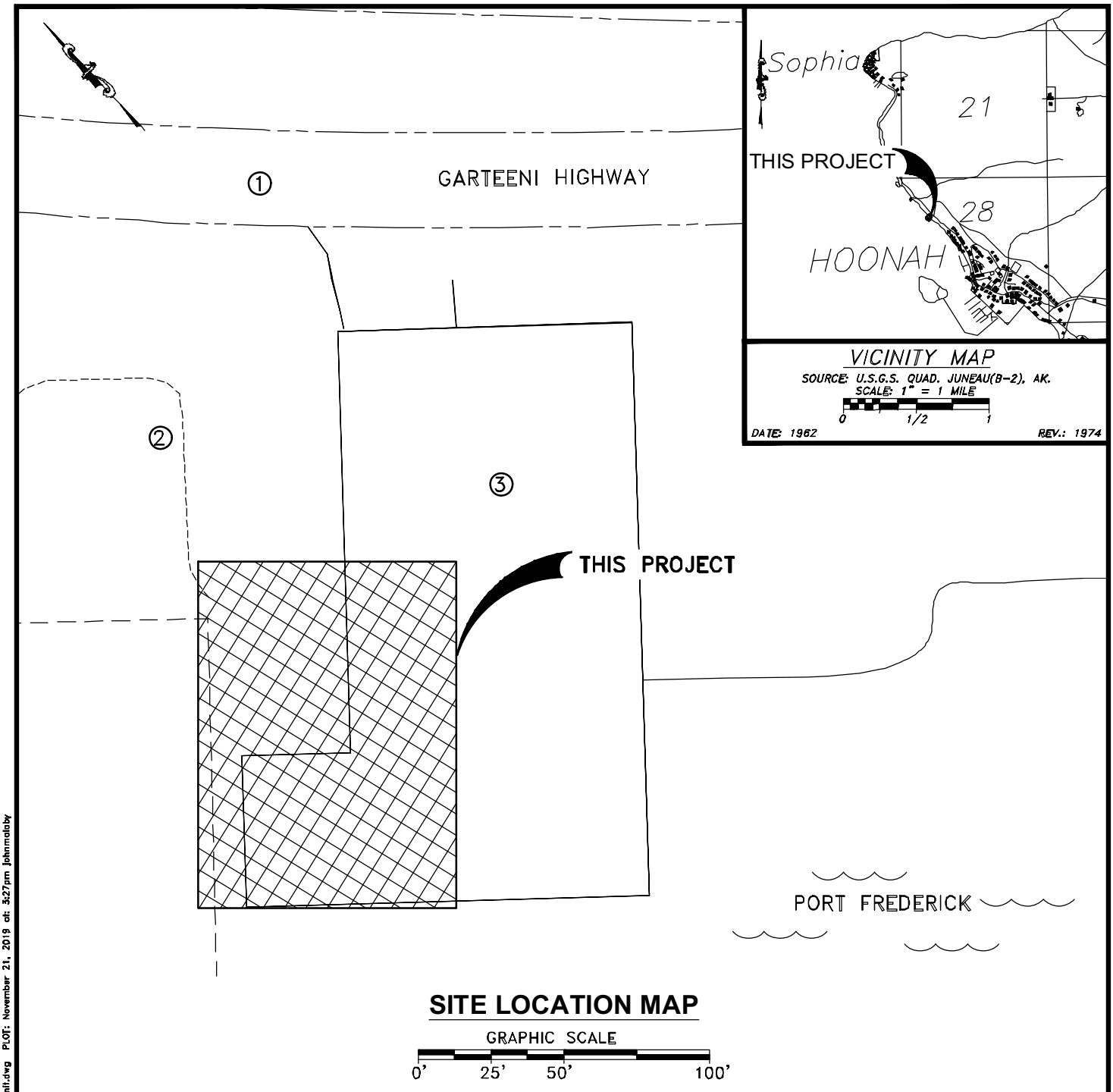
CITY OF HOONAH
P.O. BOX 360
HOONAH, ALASKA 99829-0360

PND#: 052038.01

Sheet 4

POA-1985-696-2 (Port Frederick)
City of Hoonah
Marine Industrial Center

December 14, 2005



SITE LOCATION MAP

GRAPHIC SCALE

0' 25' 50' 100'

ADJACENT PROPERTY OWNERS

① STATE OF ALASKA

② CITY OF HOONAH

③ CITY OF HOONAH

PROPOSED PERMIT MODIFICATION FOR CITY OF HOONAH AML BARGE RAMP POA-1985-696

IN: PORT FREDRICK

Sheet 5

AT: HOONAH, ALASKA

APPLICANT: CITY OF HOONAH
P.O. BOX 675
HOONAH, ALASKA 99829

DATE: NOV 21, 2019

PDC PROJ.: 19249JN

P:\2019\19249JN-COH_AML\C\Permitting\19249JN_USACE Permit.dwg PLOT: November 21, 2019 at: 3:27pm johnmalaby

Appendix B: Threshold Calculation Spreadsheets

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**20" and 30" vibrating.** Source: source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		161.9
Distance =		10

Spreading Model	Fish Meters to Threshold Peak(180 dB)	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	39	dB = 20*log(R1/R2)	1	12	1245
Cylindrical spreading	0	155	dB = 10*log(R1/R2)	0	15	154882
Practical spreading	0	62	dB = 15*log(R1/R2)	1	13	6213

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**Sheets vibrating.** Source: Sheet source levels are proxy from median measured source levels from vibratory pile driving of 24-inch sheets for Berth 30 at the Port of Oakland, CA (Buehler et al 2015; Table I.6-2)
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		160
Distance =		10

Spreading Model	Fish Meters to Threshold Peak(180 dB)	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	32	dB = 20*log(R1/R2)	1	10	1000
Cylindrical spreading	0	100	dB = 10*log(R1/R2)	0	10	100000
Practical spreading	0	46	dB = 15*log(R1/R2)	0	10	4642

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**H-pile vibrating.** Source: H-pile source levels are proxy from median measured source levels from vibratory pile driving of H piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		168
Distance =		11

Spreading Model	Fish Meters to Threshold Peak(180 dB)	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	87	dB = 20*log(R1/R2)	3	28	2763
Cylindrical spreading	0	694	dB = 10*log(R1/R2)	1	69	694053
Practical spreading	0	174	dB = 15*log(R1/R2)	2	38	17434

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**36" vibrating.** Source: The 36-inch diameter pile source levels are proxy from median measured source levels from vibratory pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		168.2
Distance =		10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	81	dB = 20*log(R1/R2)	3	26	2570
Cylindrical spreading	0	661	dB = 10*log(R1/R2)	1	66	660693
Practical spreading	0	163	dB = 15*log(R1/R2)	2	35	16343

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**20" impacting.** Source: The 20-inch diameter pile source levels are proxy from median measured source levels from vibratory driving of 24-inch piles for the Kodiak Ferry Terminal project (Austin et al. 2016, Table 40).
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =	184.9	174.8
Distance =	10	10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	18	174	dB = 20*log(R1/R2)	5	55	5495
Cylindrical spreading	31	3020	dB = 10*log(R1/R2)	3	302	3019952
Practical spreading	21	450	dB = 15*log(R1/R2)	5	97	45013

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**36" impacting.** Source: The 30-inch and 36-inch diameter pile source levels are proxy from median measured source levels from vibratory driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 9).
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		198.6
Distance =		10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	2692	dB = 20*log(R1/R2)	85	851	85114
Cylindrical spreading	0	724436	dB = 10*log(R1/R2)	724	72444	724435960
Practical spreading	0	17378	dB = 15*log(R1/R2)	174	3744	1737801

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**H-pile and Sheet impacting.** Source:source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) H-piles and Sheets for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16). We calculated the distances to impact pile driving Level A thresholds for H-piles and Sheets assuming 100 strikes per pile and a maximum of 5 piles installed in 24 hours
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		177
Distance =		15

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	336	dB = 20*log(R1/R2)	11	106	10619
Cylindrical spreading	0	7518	dB = 10*log(R1/R2)	8	752	7517809
Practical spreading	0	946	dB = 15*log(R1/R2)	9	204	94644

GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATIONPlease include any assumptions	**For: 36", 20", and H-pile Socketting.** From: Denes et al. (2016)
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		166
Distance =		10

Spreading Model	Fish Meters to Threshold Peak(180 dB)	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	63	dB = 20*log(R1/R2)	2	20	1995
Cylindrical spreading	0	398	dB = 10*log(R1/R2)	0	40	398107
Practical spreading	0	117	dB = 15*log(R1/R2)	1	25	11659

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	30" vibrating (temporary install/removal) and 20-inch permanent. Source: The 24-inch and 30-inch diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72)
Please include any assumptions	
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	161.9
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	15
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS isopleth to threshold (meters)	**7.8**	**0.7**	**11.6**	**4.8**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	36" vibrating. Source: The 36-inch and 42-inch diameter pile source levels are proxy from median measured source levels from vibratory pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	168.2
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	15
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**20.6**	**1.8**	**30.5**	**12.5**	**0.9**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	Sheets vibrating. Source: Sheet source levels are proxy from median measured source levels from vibratory pile driving of 24-inch sheets for Berth 30 at the Port of Oakland, CA (Buehler et al 2015; Table I.6-2)

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	160
Number of piles within 24-h period	30
Duration to drive a single pile (minutes)	15
Duration of Sound Production within 24-h period (seconds)	27000
10 Log (duration of sound production)	44.31
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**22.4**	**2.0**	**33.2**	**13.6**	**1.0**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	H-pile vibrating. Source: H-pile source levels are proxy from median measured source levels from vibratory pile driving of H piles for the Port of Anchorage test pile project (Yurk et al. 2016 as cited in Denes et al. 2016; Appendix H/Table 2)

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	168
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	15
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	11

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**22.0**	**2.0**	**32.5**	**13.4**	**0.9**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	20" impacting. Source: The 20-inch diameter pile source levels are proxy from median measured source levels from vibratory driving of 24-inch piles for the Kodiak Ferry Terminal project (Denes et al. 2016, Table 40).

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2	default

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**179.5**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B32)	161
Number of strikes per pile	35
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	10

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	184.9
Distance of $L_{p,0\text{-}pk}$ measurement (meters)♦	10
$L_{p,0\text{-}pk}$ Source level	199.9

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**5.8**	**0.2**	**6.9**	**3.1**	**0.2**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**NA**	**NA**	**NA**	**NA**	**NA**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

E.1-2: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B53)	
Number of piles per day	
Strike (pulse) Duration$^{\Delta}$ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Transmission loss coefficient	
Distance of sound pressure level (L_{rms}) measurement (meters)	

$^{\Delta}$Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G47)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)♦	
$L_{p,0\text{-}pk}$ Source level	#NUM!

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	30" Impacting Source: The 30-inch and 42-inch-diameter pile source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 15). We
Please include any assumptions	
PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2	default

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**209.7**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B32)	186.7
Number of strikes per pile	100
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	10

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	
$L_{p,0\text{-}pk}$ Source level	#NUM!

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**602.7**	**21.4**	**717.9**	**322.5**	**23.5**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

E.1-2: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B53)	
Number of piles per day	
Strike (pulse) Duration^Δ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Transmission loss coefficient	
Distance of sound pressure level (L_{rms}) measurement (meters)	

^Δ Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G47)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)*	
$L_{p,0\text{-}pk}$ Source level	#NUM!

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

E.2: DTH PILE DRIVING/INSTALLATION (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	For: 36" From: 36" and 42" Sound Source Characterization of Down the Hole Hammering in Thimble Shoal, VA (JASCO 2019).

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 50), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**214.3**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B30)	164
Strike rate (average strikes per second)	15
Duration to drive pile (minutes)	60
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	10
Total number of strikes in a 24-h period	108000

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G26)	190
Distance of $L_{p,0\text{-}pk}$ measurement (meters)✦	10
$L_{p,0\text{-}pk}$ Source level	205.0

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**1,225.6**	**43.6**	**1,459.9**	**655.9**	**47.8**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**NA**	**NA**	**1.6**	**NA**	**NA**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	H-pile and Sheet impacting. Source:source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) H-piles and Sheets for the Port of Anchorage test pile project (Yurk et al. 2016 as cited in Denes et al. 2016). We calculated the distances to impact pile driving Level A thresholds for H-piles and Sheets assuming 35 strikes per pile and a maximum of 5 piles installed in 24 hours

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2	default

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) PREFERRED METHOD (pulse duration not needed)

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**185.4**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B32)	163
Number of strikes per pile	35
Number of piles per day	5
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	15

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	194
Distance of $L_{p,0\text{-}pk}$ measurement (meters)♦	15
$L_{p,0\text{-}pk}$ Source level	211.6

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**21.8**	**0.8**	**25.9**	**11.6**	**0.8**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**NA**	**NA**	**4.4**	**NA**	**NA**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

E.1-2: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B53)	
Number of piles per day	
Strike (pulse) Duration^Â (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Transmission loss coefficient	
Distance of sound pressure level (L_{rms}) measurement (meters)	

^Â Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G47)	
Distance of $L_{p,0\text{-}pk}$ measurement (meters)♦	
$L_{p,0\text{-}pk}$ Source level	#NUM!

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.2: DTH PILE DRIVING/INSTALLATION (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.1: 2020

KEY

	Action Proponent Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	HMIC Cargo Dock
PROJECT/SOURCE INFORMATION	For: 20" and H-piles From: Denes et al. (2016)

Please include any assumptions

PROJECT CONTACT	Emerald Hagy; emerald@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2	

¥ Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 50), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**204.3**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B30)	154
Strike rate (average strikes per second)	15
Duration to drive pile (minutes)	60
Number of piles per day	2
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	10
Total number of strikes in a 24-h period	108000

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G26)	190
Distance of $L_{p,0\text{-}pk}$ measurement (meters)✦	10
$L_{p,0\text{-}pk}$ Source level	205.0

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**264.1**	**9.4**	**314.5**	**141.3**	**10.3**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**NA**	**NA**	**1.6**	**NA**	**NA**

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

Appendix C: Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

City of Hoonah

Hoonah Marine Industrial Complex Cargo Dock Project

Port Frederick, Hoonah, Alaska

~~August 2020~~
~~December 2020~~

Revised February 2021

Prepared for:
City of Hoonah
P.O. Box 360
Hoonah, Alaska 99829

Prepared by:
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Submitted to:
National Marine Fisheries Service
and
U.S. Fish and Wildlife Service

CONTENTS

INTRODUCTION 1
PROJECT DESCRIPTION 2
SPECIES COVERED UNDER THE IHA 2
MONITORING AND SHUTDOWN ZONES 3
Monitoring Zones 4
Shutdown Zones 6
MITIGATION MEASURES 10
General Conditions and Requirements 10
Observer Qualifications and Requirements 11
Data Collection 11
Equipment 13
Number and Location of PSOs 13
Strike Avoidance 15
Monitoring Techniques 15
REPORTING 18
Notification of Intent to Commence Construction 18
Weekly Sighting Counts 19
Interim Monthly Reports 19
Final Report 19
Reporting Injured or Dead Marine Mammals 20

FIGURES

Figure 1. Project Location 1
Figure 2. HMIC Cargo Dock Level B Monitoring Zones 5
Figure 3. HMIC Cargo Dock NMFS Distances to Level A Shutdown Zones 8
Figure 4. HMIC Cargo Dock NMFS Distances to Level A Monitoring Zones 9
Figure 4. HMIC Cargo Dock Project PSO Locations 14
Figure 5. HMIC Cargo Dock PSO Monitoring Locations During Inclement Weather 17

TABLES

Table 1. HMIC Cargo Dock Project Pile Size, Quantity, and Installation Method 2
Table 2. Species Most Likely to Occur in Project Area and Requested Take Numbers, by Species and Manner of Take 3
Table 3. HMIC Cargo Dock Project Level B Monitoring Zones 4
Table 4. HMIC Cargo Dock Project Distances to NMFS Level A Monitoring or Shutdown Zones 7

APPENDICES

Appendix A: Marine Mammal Sighting Forms and Grid
Appendix B: Construction Activity and Communication Log

ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
BO	Biological Opinion
COH	City of Hoonah
DPS	distinct population segment
DTH	down the hole drilling (or socketing)
ESA	Endangered Species Act
HDPE	high-density polyethylene
HMIC	Hoonah Marine Industrial Complex
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NMFS AKR	National Marine Fisheries Service Alaska Region
OPR	Office of Protected Resources (NMFS)
PSO	protected species observer
rms	root mean square
SPL	sound pressure level
UHMW	ultra-high-molecular-weight polyethylene
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service
WDPS	Western Distinct Population Segment

INTRODUCTION

The City of Hoonah (COH) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation during construction of the Hoonah Marine Industrial Complex (HMIC) Cargo Dock near Hoonah, Alaska (Figure 1). The project is in water of the U.S., within the range of Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA)-listed marine mammals and has the potential to generate noise that could exceed Level A and B harassment thresholds established by the National Marine Fisheries Service (NMFS). This 4MP was developed in support of the Incidental Harassment Authorization (IHA) application under the MMPA, Section 101(a)(5)(D) permitting. Monitoring and shutdown zones will be implemented to reduce Level A and Level B impacts to marine mammals.

The overall goal of this 4MP is to ensure compliance with the ESA and the MMPA when the 4MP is implemented by the protected species observers (PSOs) at the project site. The project will comply with the terms and conditions outlined in the following requested permits and authorizations:

- U.S. Army Corp of Engineers (USACE) Permit POA-1985-696, Port Frederick for activities in Waters of the U.S. (Authorized through September 30, 2021)
- NMFS Office of Protected Resources (OPR) Incidental Harassment Authorization (IHA) (requested)

Figure 1. Project Location

PROJECT DESCRIPTION

The COH proposes to complete the cargo dock phase of the HMIC adjacent to downtown Hoonah on the eastern side of Port Frederick, Alaska to safely accommodate barges that deliver essential goods to the community.

Completion of the cargo dock phase will include constructing a sheet pile bulk head cargo dock (will require fill), three breasting dolphins, and the addition of fender piles to the new cargo dock (Table 1). The project would occur in and over waters of the United States. No blasting is proposed as a part of this project.

Table 1. HMIC Cargo Dock Project Pile Size, Quantity, and Installation Method

Description	Project Component					
	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation			
Vibratory Hammer						
Diameter of Steel Pile (inches)	30	30	36	H-piles	Sheets	20
# of Piles	50	50	9	12	500 (130 lf)	6
Impact Hammer						
Diameter of Steel Pile (inches)	-	-	36	H-piles	Sheets	20
# of Piles	-	-	9	12	500 (130 lf)	6
Down the Hole (DTH)/Socketing						
Diameter of Steel Pile (inches)	-	-	36	H-Piles	-	20
Total Quantity	-	-	9	12	-	6
Anchor Diameter	-	-	33	20	-	20

SPECIES COVERED UNDER THE IHA

Nine species of marine mammals are expected to be within the project area. Take has been requested for species known to frequent the area (Table 2).

The shutdown of work will occur if any other marine mammal enters the project area. Other species that may occur include to northern sea otters (*Enhydra lutris kenyoni*).

Table 2. Species Most Likely to Occur in Project Area and Requested Take Numbers, by Species and Manner of Take

Species	Level A	Level B
Minke Whale (*Balaenoptera acutorostrata*)	0	12
Humpback Whale (*Megaptera novaeangliae*)	0	880
Gray Whale (*Eschrichtius robustus*)	0	4
Killer Whale (*Orcinus orca*)	0	316
Pacific White-Sided Dolphin (*Lagenorhynchus obliquidens*)	0	328
Dall's Porpoise (*Phocoenoides dalli*)	8	366
Harbor Porpoise (*Phocoena phocoena*)	16	440
Harbor Seal (*Phoca vitulina*)	60	660
Steller Sea Lion (*Eumetopias jubatus)*	0	550

MONITORING AND SHUTDOWN ZONES

The harassment zones will be monitored throughout the permitted in-water or over-water construction activity. The following mitigation measure will be taken based upon species, activity, and distance from the project location:

- If a permitted marine mammal (Table 2) enters a monitoring zone, an exposure will be recorded and animal behaviors documented. However, permitted construction activities would continue without cessation unless the animal approaches or enters the shutdown zone.
- If a non-permitted marine mammal approaches or enters a Level A shutdown zone, all permitted construction activities will be immediately halted until the marine mammal has left the shutdown zone or has not been sighted for the appropriate amount of time .
- If a non-permitted marine mammal approaches or enters a Level B zone, all permitted construction activities will be immediately halted until the marine mammal has left the shutdown zone or has not been sighted for the appropriate amount of time.
- If a Dall's porpoise, harbor porpoise, or harbor seal enters their respective Level A zone, but are not within their respective Level A shutdown zone, an exposure will be recorded and animal behaviors documented. However, permitted construction activities would continue without cessation unless the animal approaches or enters the shutdown zone. (See Table 4 and Figures 3 and 4 for an explanation of these zones.)
- Take, in the form of Level A or Level B harassment, of marine mammals other than permitted species is not authorized and will be avoided by shutting down construction activities before individuals of these species enter the Level B harassment zone

Because species are impacted by noise in different ways, species-specific monitoring and shutdown zones have been calculated for this project. These monitoring and shutdown zones are shown in Figures 2-4 and are summarized in Tables 3 and 4.

Monitoring Zones

The COH has established and will observe different Level B monitoring zones depending on the type of pile driving activity that is occurring. Level B monitoring zones represent areas where the SPLs generated from pile driving activities meet or exceed 120 dB root mean square (rms) during vibratory pile driving and 160 dB rms during impact pile driving. These monitoring zones serve as an area within which to document instances of marine mammal harassment (if permitted), and enable PSOs to be aware of the presence of marine mammals near the project's shutdown zone and prepare for communication of required shutdowns.

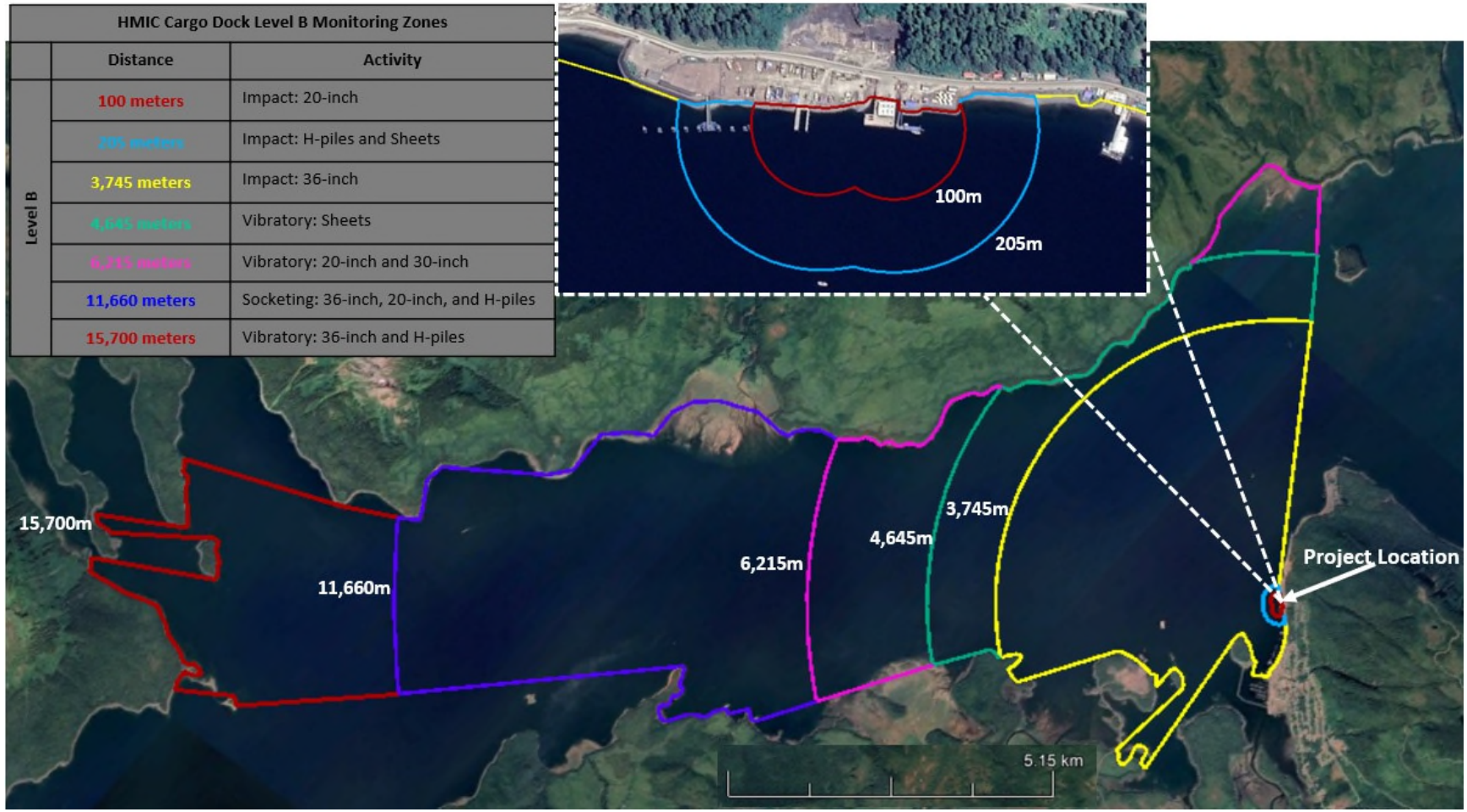
Level B monitoring zones for the project are presented in Table 3 below and shown in Figure 2.

Table 3. HMIC Cargo Dock Project Level B Monitoring Zones

Source	Monitoring Zones (meters)*
Vibratory Pile Driving/Removal	
20-inch steel fender pile (6 piles; ~45 mins per day on 2 days)	6,215
30-inch steel temporary installation (50 piles; ~1 hour per day on 12.5 days)	6,215
30-inch steel removal (50 piles; ~1 hour per day on 12.5 days)	6,215
36-inch steel permanent installation (9 piles; ~1 hour per day on 2.25 days)	15,700 *(16,345)*
Sheets (500 sheets; ~7.5 hours per day on 17 days)	4,645
H-piles (12 piles; ~1 hour per day on 3 days)	15,700 *(17,435)*
Impact Pile Driving	
20-inch steel fender piles (6 piles; ~10 mins per day on 3 days)	100
36-inch steel (9 piles; ~30 minutes per day on 4.5 days)	3,745
Sheets (500 sheets; ~25 mins per day on 25 days)	205
H-piles (12 piles; ~20 mins per day on 3 days)	205
DTH/Socketed Pile Installation	
20-inch steel fender piles (6 piles; ~12 hours max per day on 3 days)	11,660
36-inch steel permanent installation (9 piles; ~12 hours max per day on 5 days)	11,660
H-piles (12 piles; ~12 hours max per day on 12 days)	11,660

[a] These monitoring zones apply to all marine mammal species with authorized level B take.
[b] Although the calculated distance to Level B thresholds extends these distances, all Level B zones are truncated at 15,700m from the source where land masses block sound transmission.

Figure 2. HMIC Cargo Dock Level B Monitoring Zones



HMIC Cargo Dock Level B Monitoring Zones		
	Distance	Activity
Level B	100 meters	Impact: 20-inch
	205 meters	Impact: H-piles and Sheets
	3,745 meters	Impact: 36-inch
	4,645 meters	Vibratory: Sheets
	6,215 meters	Vibratory: 20-inch and 30-inch
	11,660 meters	Socketing: 36-inch, 20-inch, and H-piles
	15,700 meters	Vibratory: 36-inch and H-piles

*LF=Low-frequency Cetacean, MF=Mid-frequency Cetacean, and HF=High-Frequency Cetacean

Shutdown Zones

Shutdown zones are intended to protect marine mammals from auditory injury. They define an area in which sound pressure levels (SPLs) equal or exceed the level that would cause auditory injury to marine mammals that are present. Pile driving activity would be halted upon sighting of a marine mammal within the zone (or in anticipation of an animal entering the zone).

Because of their size, Dall's porpoise, harbor seals, and harbor porpoises can be difficult to see at great distances. During impact pile driving and DTH/socketing, their Level A harassment zone is large enough that they may be difficult to spot. Level A take has been requested for Dall's porpoise, harbor porpoises, and harbor seals in those instances in which they occur within the Level A harassment zone but outside of the shutdown zone *or* if they were to occur within the shutdown zone and were not visualized in time for the project to be shut down (Figure 4).

Further, there will be a nominal 10-meter shutdown zone for construction-related activity where acoustic injury is not the primary concern. This type of work could include (but is not limited to) the following activities: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); and (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete. This can be monitored by the vessel operator when a PSO is not present. Radial distances to Level A shutdown zone boundaries are defined in Table 4 and shown in Figure 3.

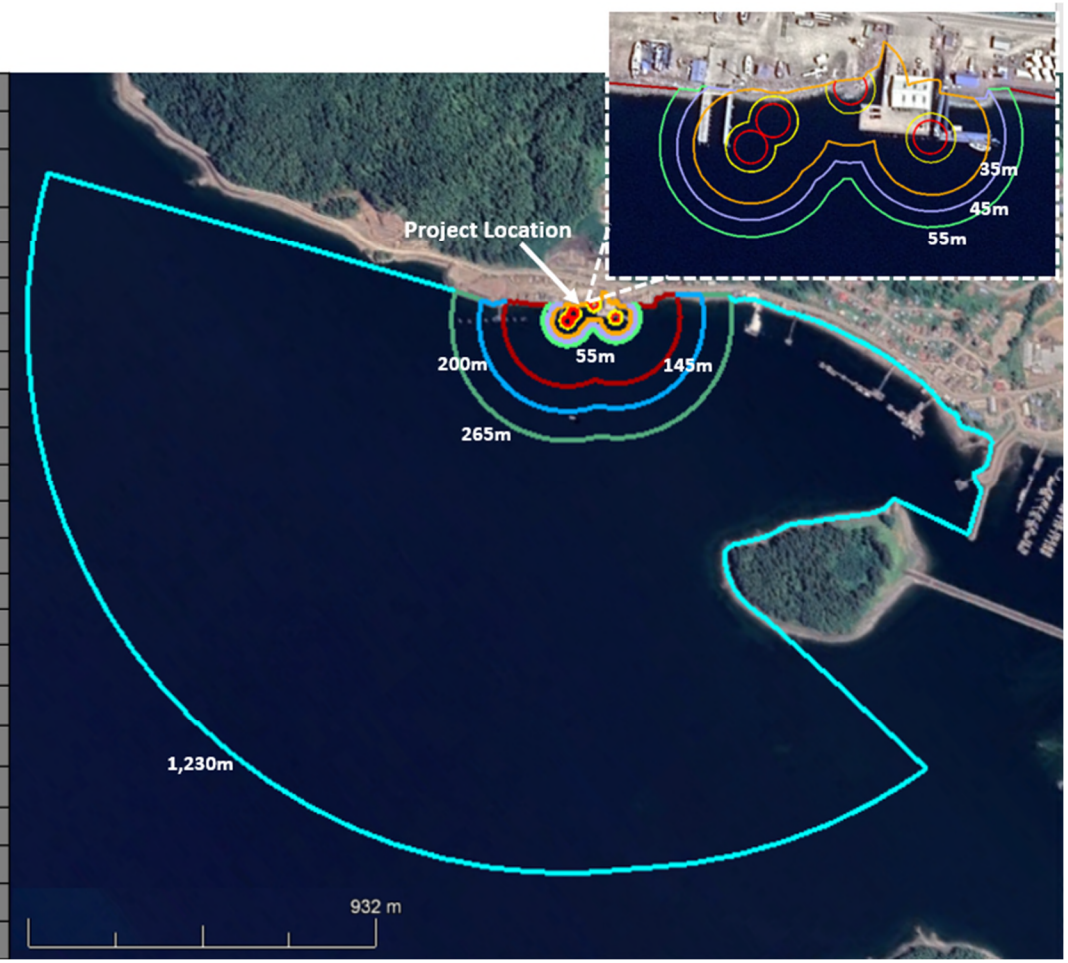
Table 4. HMIC Cargo Dock Project Distances to NMFS Level A Monitoring and Shutdown Zones

Activity	Distance (in meters, m) to Level A				
	Level A				
	Low-Frequency Cetaceans (humpback whale, gray whale, minke whale)	**Mid-Frequency Cetaceans** (killer whale, Pacific white-sided dolphin)	**High-Frequency Cetaceans** (Dall's porpoise, harbor porpoise)	**Phocid** (harbor seal)	**Otariid** (Steller sea lion)
In-Water Construction Activities*					
Barge movements, pile positioning, sound attenuation placement*	10	10	10	10	10
Vibratory Pile Driving/Removal					
30-inch steel temporary installation (50 piles; ~1 hour per day on 12.5 days)	10	10	15	10	10
30-inch steel removal (50 piles; ~1 hour per day on 12.5 days)	10	10	15	10	10
36-inch steel permanent installation (9 piles; ~1 hour per day on 2.25 days)	35	10	35	15	10
20-inch fender pile installation (6 piles; ~45 mins per day on 2 days)	10	10	15	10	10
H-pile installation (12 piles; ~1 hour per day on 3 days)	35	10	35	15	10
Sheet pile installation (500 sheets; ~7.5 hours per day on 17 days)	35	10	35	15	10
Impact Pile Driving					
36-inch steel permanent installation (9 piles; ~30 mins per day on 4.5 days)	605	35	720 *(Monitoring)* 200 *(Shutdown)*	325 *(Monitoring)* 200 *(Shutdown)*	35
20-inch fender pile installation (6 piles; ~10 mins per day on 3 days)	15	10	15	10	10
H-pile installation (12 piles; ~20 mins per day on 3 days)	55	10	55	35	10
Sheet pile installation (500 sheets; ~25 mins per day on 25 days)	55	10	55	35	10
DTH/Socketed Pile Installation					
36-inch steel permanent installation (9 piles; ~12 hours max per day on 5 days)	1,230	45	1,460 *(Monitoring)* 200 *(Shutdown)*	660 *(Monitoring)* 200 *(Shutdown)*	55
20-inch fender pile installation (6 piles; ~12 hours max per day on 3 days)	265	10	315 *(Monitoring)* 200 *(Shutdown)*	145	15
H-pile installation (12 piles; ~12 hours max per day on 12 days)	265	10	315 *(Monitoring)* 200 *(Shutdown)*	145	15

Shutdown zone distances refer to the maximum radius of the zone and are rounded.
*Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

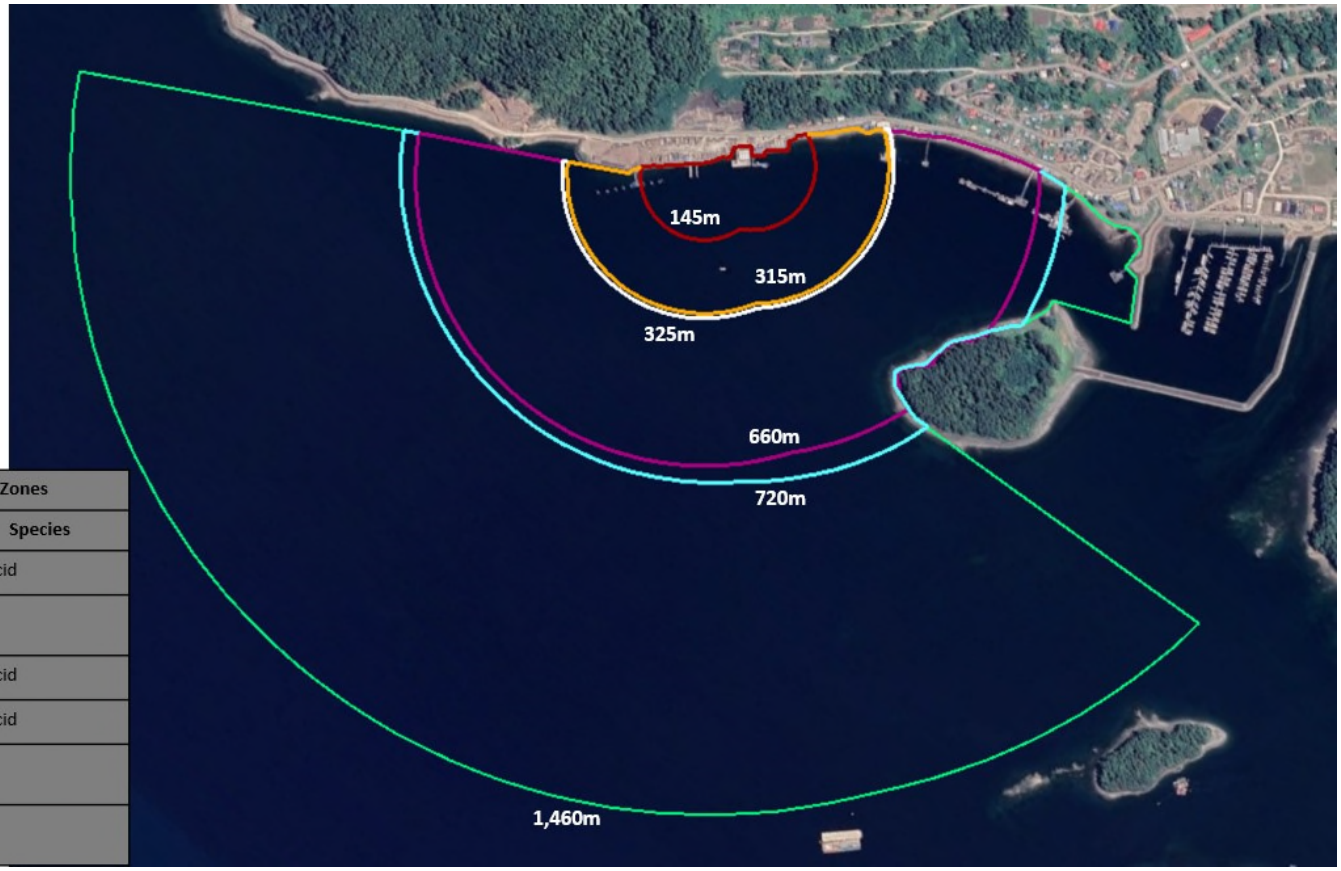
Figure 3. HMIC Cargo Dock NMFS Distances to Level A Shutdown Zones

HMIC Cargo Dock Level A Shutdown Zones		
Distance	**Activity**	**Species**
10 meters	Vibratory: 20-inch and 30-inch	LF, MF, Phocids, and Otariid
	Vibratory: 36-inch, H-piles, and Sheets	MF and Otariids
	Impact: 20-inch	MF, Phocids, Otariids
	Impact: H-piles and Sheets	MF and Otariids
	Socketing: H-piles and Sheets	MF
15 meters	Vibratory: 20-inch and 30-inch	HF
	Vibratory: 36-inch, H-piles, and Sheets	Phocid
	Impact: 20-inch	LF and HF
	Socketing: 20-inch and H-piles	Phocid
35 meters	Vibratory: 36-inch, H-piles, and Sheets	LF and HF
	Impact: 36-inch	MF and Phocid
	Impact: H-piles and Sheets	Phocid
45 meters	Socketing: 36-inch	MF
55 meters	Impact: H-piles and Sheets	LF and HF
	Socketing: 36-inch	Otariids
145 meters	Socketing: 20-inch and H-piles	Phocid
200 meters	Impact: 36-inch	HF and Phocid
	Socketing: 20-inch and H-piles	HF
	Socketing: 36-inch	HF and Phocid
265 meters	Socketing: 20-inch and H-piles	LF
1,230 meters	Socketing: 36-inch	LF



*LF=Low-frequency Cetacean, MF=Mid-frequency Cetacean, and HF=High-Frequency Cetacean

Figure 4. HMIC Cargo Dock NMFS Distances to Level A Monitoring Zones



HMIC Cargo Dock Level A Monitoring Zones		
Distance	Activity	Species
145 meters	Impact: 20-inch	Phocid
315 meters	Impact: H-piles and Sheets	HF
325 meters	Impact: 36-inch	Phocid
660 meters	Vibratory: Sheets	Phocid
720 meters	Vibratory: 20-inch and 30-inch	HF
1,460 meters	Socketing: 36-inch, 20-inch, and H-piles	HF

*LF=Low-frequency Cetacean, MF=Mid-frequency Cetacean, and HF=High-Frequency Cetacean

MITIGATION MEASURES

The basic premise of a marine mammal monitoring plan is to observe for marine mammals in the defined area of potential sound effects. Stop or do not start work if a marine mammal is sighted in the monitoring area. Do not start work again until the marine mammal has moved out of the monitoring area on its own accord.

In order to limit impacts to marine mammals, including ESA-listed species, the COH would implement the following mitigation measures during pile driving activities.

General Conditions and Requirements

- To minimize noise during impact pile driving, pile caps (pile softening material) will be used. Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor will use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.
- COH is required to conduct briefings for construction supervisors and crews, the monitoring team, and COH staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.
- COH is required to employ PSOs during all in-water construction activities.
- Marine mammal monitoring must take place from 30 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone (Table 4), their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin.
- If a marine mammal is entering or is observed within an established shutdown zone (Table 4), pile driving must be halted or delayed. Pile driving may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone; 15 minutes have passed without subsequent detections of small cetaceans and pinnipeds; or 15/30 minutes have passed without subsequent detections of large cetaceans. NMFS may adjust the shutdown zones pending review and approval of an acoustic monitoring report.
- COH must use soft start techniques when impact pile driving.
- If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed approaching or within the monitoring zone (Table 3 or 4), pile driving and removal activities must shut down immediately using delay and shut-down procedures. Activities must not resume until the animal has been confirmed to have left the area or the observation time period, as indicated in the conditions above, has elapsed.

- Should light or environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.
- PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).

Observer Qualifications and Requirements

- 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.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred), or equivalent Alaska Native traditional knowledge (PSOs may substitute education or training for experience).
- 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 vessel operation and pile driving operations to provide for personal safety during observations.
- 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.
- 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.
- Independent PSOs (*i.e.*, not construction personnel) who have no other assigned tasks during monitoring periods must be used.
- Where a team of three or more PSOs are required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience working as a marine mammal observer during construction.
- COH must submit PSO CVs for approval by NMFS prior to the onset of pile driving.

Data Collection

Environmental Conditions and Construction Activities

PSOs will use the environmental conditions and construction activities log to document the following (Appendix A):

- Environmental Conditions
    - Environmental conditions will be recorded at the beginning and end of every monitoring period or as conditions change.
    - Include PSO names, location of the observation station, time and date of the observation, weather conditions, air temperature, sea state, cloud cover, visibility, glare, tide, and ice coverage (if applicable).
- Construction Activities:
    - PSOs will record the time that observations begin and end as well as the durations of shutdowns.
    - PSOs will document the reason for stopping work, time of shutdown, and type of pile installation or other in-water work taking place
    - PSOs will document other, non-project-related activities that could disturb marine mammals in the area, such as the presence of large and small vessels

PSOs will record all communications with the construction crew. The environmental conditions and construction activities log will be checked for quality assurance and quality control (QA/QC) by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS along with the final report.

Sightings

Observers will use a National Marine Fisheries Service (NMFS)-approved Marine Mammal Sighting Form (Appendix A) which will be completed by each observer for each survey day and location. Sighting forms will be used by observers to record the following:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state (the Beaufort Wind Force Scale will be used to determine sea-state);
- Species, numbers, and, if possible, sex and age class of observed marine mammals;
- Construction activities occurring during each sighting;
- Marine mammal behavior patterns observed, including bearing and direction of travel;
- Specific focus should be paid to behavioral reactions just prior to, or during, soft-start and shutdown procedures;
- Location of marine mammal, distance from observer to the marine mammal, and distance from pile removal activities to marine mammals;
- Record of whether an observation required the implementation of mitigation measures, including shutdown procedures and the duration of each shutdown.
- Observer rotations with time of rotation and incoming observer initials

The observation record forms will be checked for quality assurance and quality control (QA/QC) by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS along with the final report.

Equipment

The following equipment will be required to conduct observations for this project:

- Appropriate Personal Protective Equipment;
- Portable VHF radios for the observers to communicate with the pile driving supervisor and other observers;
- Cellular phone as backup for radio communication;
- Contact information for the other observers, pile driving supervisor, and NMFS point of contact;
- Daily tide tables for the project area;
- Binoculars (quality 7 x 50 or better) and rangefinder;
- Hand-held GPS unit, map and compass, or grid map to record locations of marine mammals;
- Copies of 4MP, IHA, and/or other relevant permit requirement specifications in sealed clear plastic cover;
- Notebook with pre-standardized monitoring Observation Record forms and Grid Maps (Appendix A)

Number and Location of PSOs

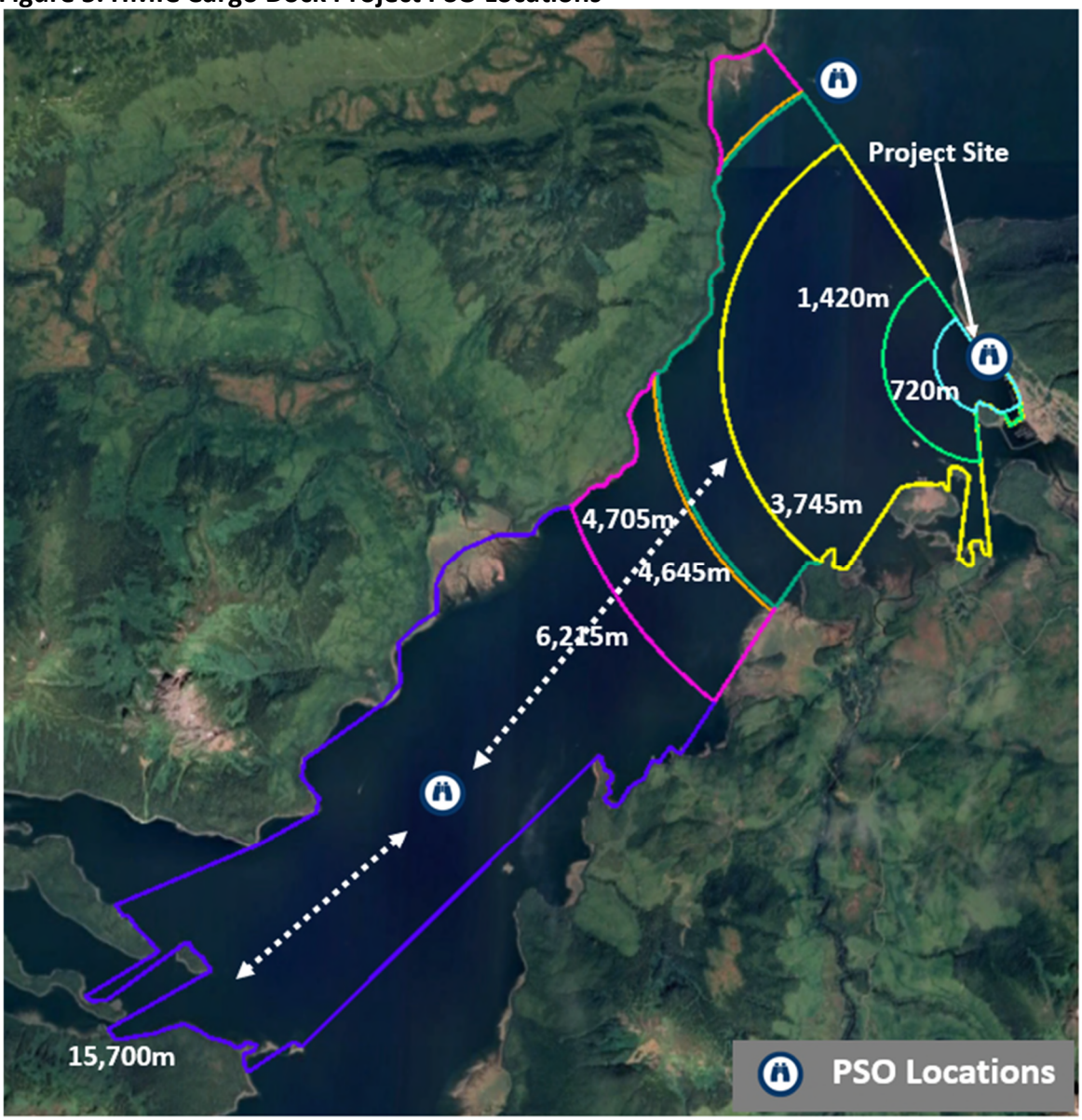
Observers and their positions are designed to ensure that there is full coverage of the entire action area during all in-water activities. Locations are chosen based upon accessibility and field of view.

Three PSOs will be onsite during all in-water activities associated with the HMIC Cargo Dock Project, with locations as follows (Figure 5):

- PSO 1: stationed at the pile site on the existing City Dock
- PSO 2: stationed on Halibut Island facing south
- PSO 3: stationed on a vessel running a transect through southern portion of the action area in Port Frederick[1]

[1] A separate individual will serve as a boat captain. The boat captain can also be approved as a PSO to rotate with the vessel-based PSO to ensure mitigation measures to prevent observer fatigue are followed.

Figure 5. HMIC Cargo Dock Project PSO Locations



Strike Avoidance

Vessels will adhere to the Alaska Humpback Whale Approach Regulations when transiting to and from the project site (see 50 CFR §§ 216.18, 223.214, and 224.103(b)). These regulations require that all vessels:

- Not approach within 100 yards of a humpback whale, or cause a vessel or other object to approach within 100 yards of a humpback whale,
- Not place vessel in the path of oncoming humpback whales causing them to surface within 100 yards of vessel,
- Not disrupt the normal behavior or prior activity of a whale, and
- Operate at a slow, safe speed when near a humpback whale (safe speed is defined in regulation (see 33 CFR § 83.06)).

Vessels will also follow the NMFS Marine Mammal Code of Conduct for other species of marine mammals, which recommend maintaining a minimum distance of 100 yards; not encircling, or trapping marine mammals between boats, or boats and shore; and putting engines in neutral if approached by a whale or other marine mammal to allow the animals(s) to pass.

Monitoring Techniques

Pre-Activity Monitoring

The following monitoring methodology will be implemented prior to commencing permitted activities:

- At the start of each day the Lead PSO and Contractor Superintendent will meet to discuss planned construction activities for the day and to conduct a radio/phone check.
- Prior to the start of permitted activities, observers will conduct a 30-minute pre-watch of the shutdown and monitoring zones. They will ensure that no marine mammals are present within the shutdown zone before permitted activities begin.
- The shutdown zone will be cleared when marine mammals have not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes (for pinnipeds) and 30 minutes (for cetaceans).
- When all applicable exclusion zones are clear, the observers will radio the pile driving supervisor. Permitted activities will not commence until the pile driving supervisor receives verbal confirmation the zones are clear.
- If permitted species are present within the monitoring zone, work will not be delayed, but observers will monitor and document the behavior of individuals that remain in the monitoring zone.
- In case of fog or reduced visibility, observers must be able to see the entirety of the largest shutdown zone before permitted activities can be initiated.

Soft Start Procedures

Soft start procedures will be used prior to periods of vibratory and impact driving to allow marine mammals to leave the area prior to exposure to maximum noise levels.

- For vibratory hammers, the contractor shall run the vibratory hammer for no more than 30 seconds followed by a quiet period of at least 60 seconds without vibratory removal of piles. The process shall be repeated twice more within 10 minutes before beginning vibratory removal operations that last longer than 30 seconds.
- For impact hammers, the soft start technique must initiate approximately three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.
- If work ceases for more than 30 minutes, soft start procedures must recommence prior to performing additional work.

During Activity Monitoring

The following monitoring methodology will be implemented during permitted activities:

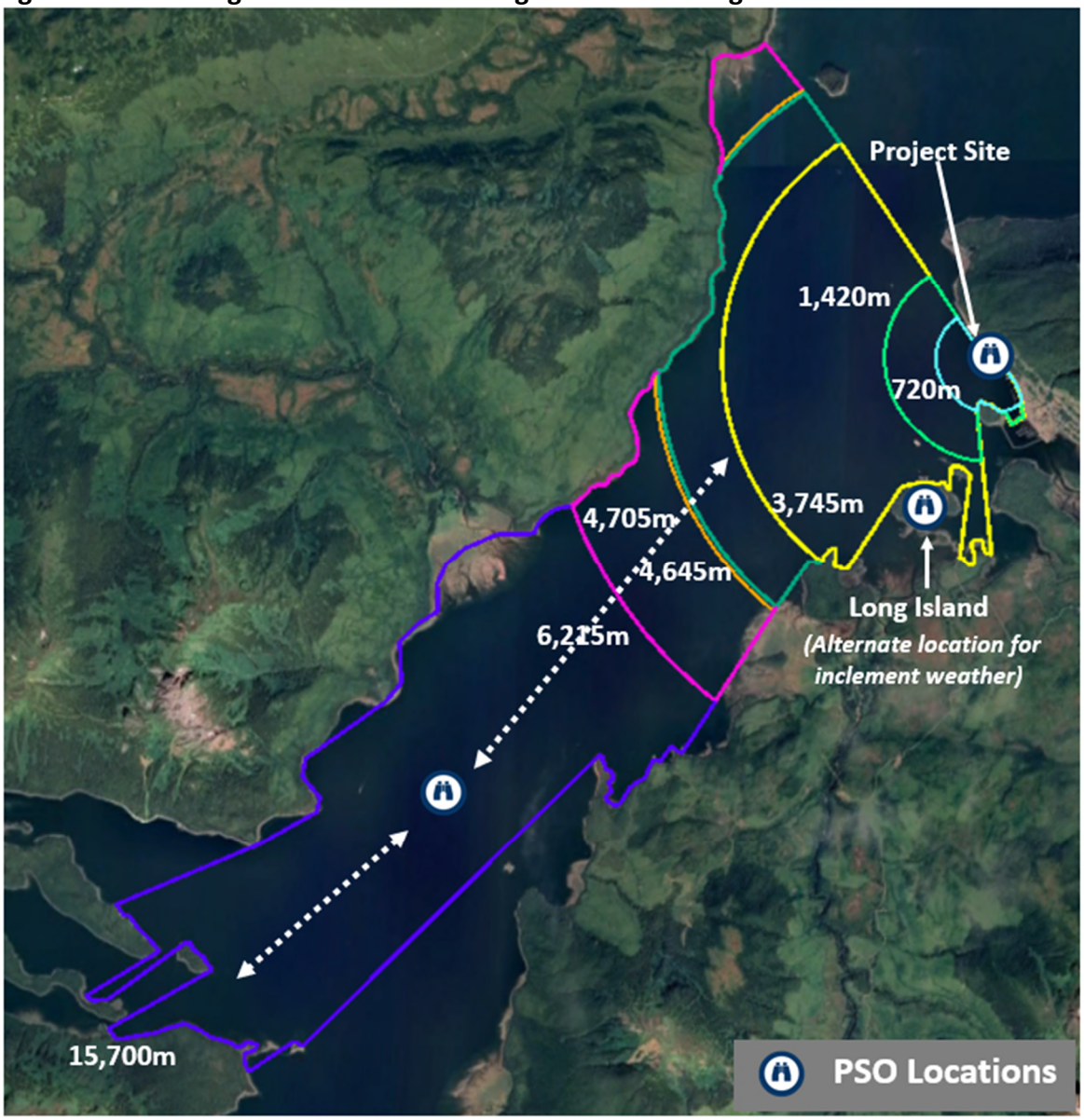
- If permitted species are observed within the monitoring zone during permitted activities, an exposure will be recorded and behaviors documented. Work will not stop unless an animal enters or appears likely to enter the shutdown zone.

Inclement Weather

During inclement weather, periods of limited visibility, or increased sea state that restricts the observers' ability to make observations within the marine mammal shutdown zone, pile driving activities will cease. Pile driving activities will not be initiated or continue until the entire largest shutdown zone for the activity is visible.

Icy Strait often experiences increased sea states and more frequent inclement weather compared to the relatively protected Port Frederick Inlet. Halibut Island’s exposure to Icy Strait may make it unsafe to place an observer at this location during increased sea state events. If this occurs, Long Island may be used as an alternate location for that monitoring period (Figure 5). The lead PSO will document the change and takes will be extrapolated.

Figure 6. HMIC Cargo Dock PSO Monitoring Locations During Inclement Weather



Shutdowns

If a marine mammal enters or appears likely to enter the shutdown zone:

- The observers shall immediately radio or call to alert the pile driving supervisor.
- All permitted activities will be immediately halted.
- In the event of a shutdown of pile installation or removal operations, permitted activities may resume only when:
    - The animal(s) within or approaching the shutdown zone has been visually confirmed beyond or heading away from the shutdown zone, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) have passed without re-detection of the animal;
    - Observers will then radio or call the pile driving supervisor that activities can re-commence.

Breaks in Work

During an in-water construction delay, the shutdown and monitoring zones will continue to be monitored. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. Work can begin following the 30-minute pre-watch monitoring protocols. Work cannot begin if an animal is within the shutdown zone or if visibility is not clear throughout the shutdown and monitoring zones.

Post Activity Monitoring

Monitoring of the shutdown and monitoring zones will continue for 30 minutes following completion of in-water activities. During this post-watch period PSOs will continue to record observations, focusing on observing and reporting unusual or abnormal behavior of marine mammals.

If construction were to resume during the post-watch period, PSOs will follow pre-watch protocols to ensure that that the shutdown and monitoring zones are clear prior to work resuming.

REPORTING

Notification of Intent to Commence Construction

COH will inform NMFS OPR and the NMFS Alaska Region Protected Resources Division one week prior to commencing construction activities (name to be determined).

Weekly Sighting Counts

At the conclusion of each week of construction activity (Friday evening) a summary of the following will be submitted to COH and the contractor:

- Completed monitoring forms for the week
- Completed environmental conditions and construction activity logs for the week
- Preliminary counts of sightings and takes per species

Interim Monthly Reports

During construction, COH will submit brief, monthly reports to the NMFS Alaska Region Protected Resources Division that summarize PSO observations and recorded takes. Monthly reporting will allow NMFS to track the amount of take (including extrapolated takes), to allow reinitiation of consultation in a timely manner, if necessary. The monthly reports will be submitted by email to akr.section7@noaa.gov.

The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by close of business on the tenth day of the month following the end of the reporting period (e.g., the monthly report covering March 1–31, 2021, would be submitted to the NMFS by close of business on April 14, 2021).

Final Report

COH will submit a draft final report by email to akr.section7@noaa.gov no later than 90 days following the end of construction activities. COH will provide a final report within 30 days following resolution of NMFS's comments on the draft report. If no comments are received from NMFS within 30 days, the draft final report will be considered the final report.

The final reports will contain, at minimum, the following information:

- Summary of construction activities, including beginning and completion dates
- Description of any deviation from initial proposal in pile numbers, pile types, average driving times, etc.
- Table summarizing all marine mammal sightings during the construction period including:
    - dates, times, species, number, location, and behavior of any observed ESA-listed marine mammals, including all observed humpback whales and Steller sea lions
    - daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level A and Level B zones, and estimated as taken, if appropriate
    - number of shut-downs throughout all monitoring activities
- Brief description of any impediments to obtaining reliable observations during construction period
- Description of any impediments to complying with these mitigation measures
- Appendices containing all PSO daily logs and marine mammal sighting forms

Reporting Injured or Dead Marine Mammals

If it is clear that project activity has caused the take of a marine mammal in a manner prohibited by the (requested) IHA, such as unauthorized Level A harassment, serious injury, or mortality, COH shall immediately cease the specified activities and report the incident to NMFS OPR, the NMFS Alaska Region Protected Resources Division, and the NOAA Fisheries statewide 24-hour Stranding Hotline (877) 925-7773.

The report must include the following:

- Time and date of the incident
- Description of the incident
- Environmental conditions (e.g., wind speed and direction, Beaufort Sea state, cloud cover and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and;
- Photographs or video footage of the animal(s) (if available).

Activities will not resume until NMFS is able to review the circumstances of the unauthorized take. NMFS would work with COH to determine what measures are necessary to minimize the likelihood of further unauthorized take and ensure ESA and MMPA compliance. COH may not resume their activities until notified by NMFS.

In the event that COH discovers an injured or dead marine mammal within the action area, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), COH will immediately report the incident to the NMFS OPR, and the NMFS Alaska Regional Stranding Coordinator or Hotline.

The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with COH to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that COH discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), COH must report the incident to the NMFS OPR and the NMFS Alaska Regional Stranding Coordinator or Hotline within 24 hours of the discovery. COH will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS.

Appendix A. Marine Mammal Sighting Forms and Grid

MARINE MAMMAL OBSERVATION RECORD

Project Name: _____

Monitoring Location: _____

Date: _____

Time Effort Initiated: _____

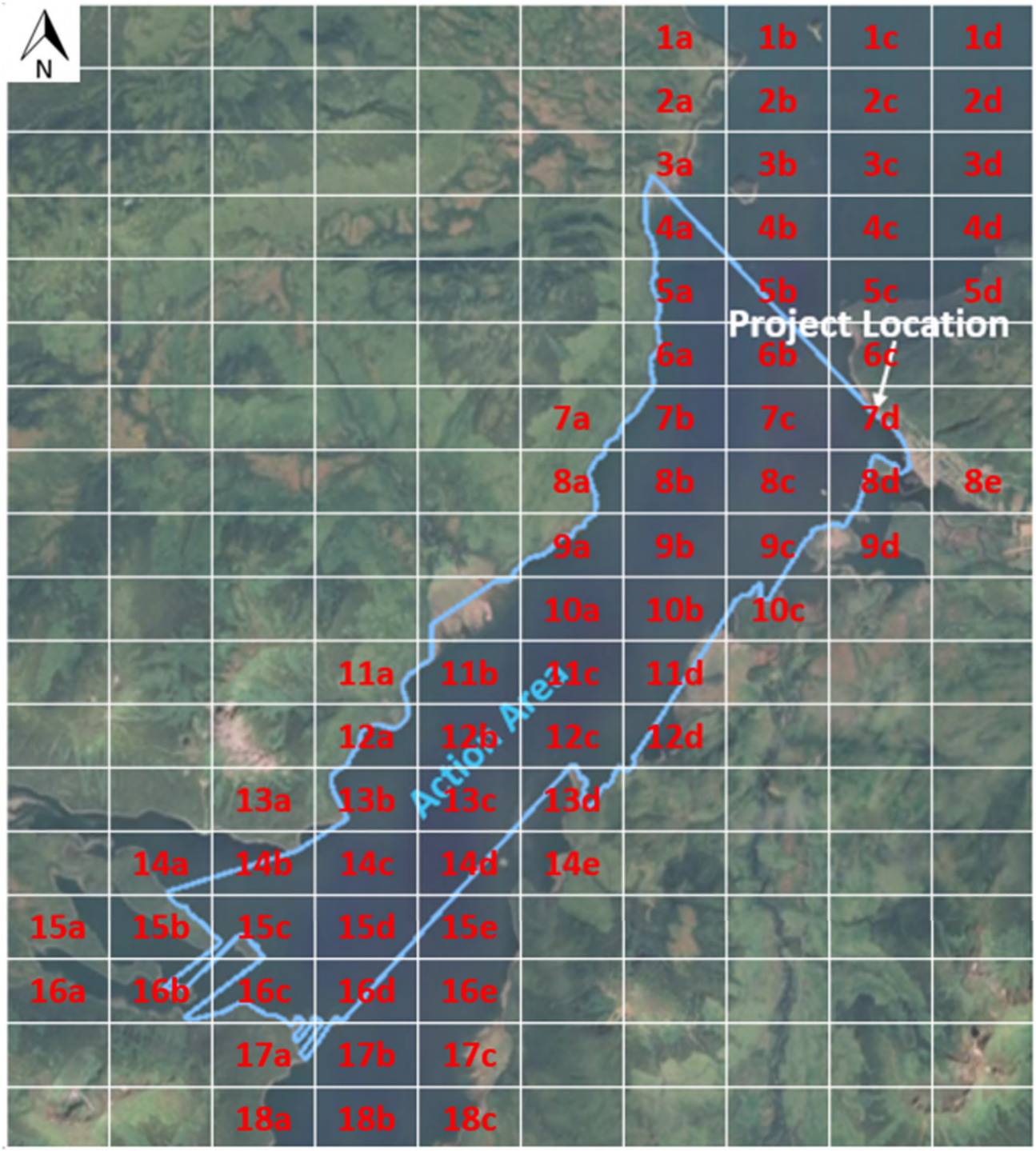
Time Effort Completed: _____

Page _____ of _____

Time	Visibility	Glare	Weather Condition	Wave Height	BSS	Wind	Swell
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W

Event Code	Sight # (1 or 1.1 if re-sight)	Time/Dur (Start/End time if cont.)	WP/ Grid #/ DIR of travel	Distance from Pile	Obs.	Sighting Cue	Species	Group Size	Behavior Code (see code sheet)	Construction Type	Mitigation Type	Exposure (Y/N)	Behavior Change/ Response to Activity/Comments/Human Activity/Vessel Hull # or Name/ Visibility Notes
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BC BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BC BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BC BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	_____ Grid N or S W or E			BL BC BR DF SA OTHER		Min: Max: Best:		DD FL OWC NOWC NONE	DE SD None		

Marine Mammal Sighting Form: Project Area Grid Map



Filling Out Sighting Forms	
Data Columns	**Definition and How to Record Data**
General Information *(Top of Form)*	
Project Name	HMIC Cargo Dock
Monitoring Location	City Dock, Halibut Island, Long Island, or Vessel
Date	MM/DD/YYYY
Time effort initiated and completed	Time started pre-watch and time post-watch ended (military time). If there is more than one monitoring period in a day, start a new form for each period.
Environmental Conditions	
Environmental Conditions	Record at the start of monitoring period, when changes, and at the end of monitoring period.
Visibility	B-bad, P-poor, M-moderate, G-good, and E-excellent
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, or another direction)
Weather conditions	Dominant weather conditions: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wave Height	Lt-light, Mod-moderate, Hvy-heavy
Wind and Swell direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Beaufort Sea State	Scale 1-12. See BSS sheet.
Sightings	
Event Code	Indicates what events are happening at the time of the sighting, what events may have occurred due to the sighting, and observer rotations.
Time/Duration	Time first sighted and time of last sighting (military time).
Sighting Number	Chronological (1,2,3, etc.) If the same marine mammal is resighted at a distances greater than 25 meters from the original sighting location record as a resight (Ex. 1.1- same marine mammal as sighting 1, but sighted for a second time in different location)
WP/Grid #/DIR of Travel	Grid number that marine mammal was sighted in and direction of travel
Distance from pile	Distance in meters from in-water work
Observer (Obs.)	Initials of the Observer who sighted the marine mammal or who is coming on shift during a rotation
Sighting Cue	How was the marine mammal sighted
Species	Appropriate species abbreviation from code sheet

Group Size	Record the minimum and maximum number of individuals that were sighted. Then determine and record the best number of individuals.
Behavior	Behaviors observed using appropriate abbreviations from code sheet
Construction Type	Circle construction type that is actively occurring at the time and for the duration of the sighting.
Mitigation Type	Circle mitigation type, if any. Based upon monitoring and shutdown zones does a delay of work (pre-watch and post-watch) or a shutdown (monitoring period) need to occur.
Exposure	If a marine mammal enters its Level A or Level B distance and work is actively occurring it will be an exposure indicate yes (Y). If no work is actively occurring indicate no (N)

Marine Mammal Observation Record – Sighting Codes

Behavior Codes

Code	Behavior	Definition
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail etc.
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progress in a direction. Note general direction of travel when last seen [Example: "SW (N)" for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: "TR (N)" for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
AWA	Approach Work	
LWA	Leave Work Area	
Pinniped only		
EW	Enter Water (from haul out)	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out)	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc.
Cetacean only		
LG	Logging	Resting on surface of water with no obvious signs of movement

Sea State and Wave Height: Use Beaufort Sea State Scale for Sea State. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also considers the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

Glare: Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

Swell Direction: Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

Wind Direction: Wind direction should also be where the wind is coming from.

Event

Code	Activity Type
E ON	Effort On
E OFF	Effort Off
PRE	Pre-Construction Watch
POST	Post-Construction Watch
CON	Construction (see types)
S	Sighting
M	Mitigation (see types)
OR	Observer Rotation

Sighting Cues

Code	Distance Visible
BL	Blow
BO	Body
BR	Breach
DF	Dorsal Fin
SA	Surface Activity
OTHR	Other

Marine Mammal Species

Code	Marine Mammal Species
HSEA	Harbor Seal
STSL	Steller Sea Lion
HPBK	Humpback Whale
HAPO	Harbor Porpoise
DAPO	Dall's Porpoise
MINK	Minke Whale
ORCA	Killer Whale

Construction Type

Code	Activity Type
V	Vibratory Pile Driving
I	Impact Pile Driving
ST	Stabbing
DR	Drilling
OWC	Over-Water Construction
NOWC	No Over-Water Construction
NONE	No Construction

Mitigation Codes

Code	Activity Type
SS	Soft Start
BC	Bubble Curtain
DE	Delay onset of In-Water Work
SD	Shut down In-Water Work

Visibility

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5 – 0.9km)
M	Moderate (0.9 – 3km)
G	Good (3 - 10km)
E	Excellent (>10km)

Weather Conditions

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	Fog
OC	Overcast
SN	Snow
HR	Heavy Rain

Wave Height

Code	Wave Height
Light	0 – 3 ft
Moderate	4 – 6 ft
Heavy	>6 ft

Estimating Wind Speed and Sea State with Visual Clues

Beaufort number	Wind Description	Wind Speed	Wave Height	Visual Clues
0	Calm	0 knots	0 feet	Sea is like a mirror. Smoke rises vertically.
1	Light Air	1-3 kts	< 1/2	Ripples with the appearance of scales are formed, but without foam crests. Smoke drifts from funnel.
2	Light breeze	4-6 kts	1/2 ft (max 1)	Small wavelets, still short but more pronounced, crests have glassy appearance and do not break. Wind felt on face. Smoke rises at about 80 degrees.
3	Gentle Breeze	7-10 kts	2 ft (max 3)	Large wavelets, crests begin to break. Foam of glassy appearance. Perhaps scattered white horses (white caps). Wind extends light flag and pennants. Smoke rises at about 70 deg.
4	Moderate Breeze	11-16 kts	3 ft (max 5)	Small waves, becoming longer. Fairly frequent white horses (white caps). Wind raises dust and loose paper on deck. Smoke rises at about 50 deg. No noticeable sound in the rigging. Slack halyards curve and sway. Heavy flag flaps limply.
5	Fresh Breeze	17-21kts	6 ft (max 8)	Moderate waves, taking more pronounced long form. Many white horses (white caps) are formed (chance of some spray). Wind felt strongly on face. Smoke rises at about 30 deg. Slack halyards whip while bending continuously to leeward. Taut halyards maintain slightly bent position. Low whistle in the rigging. Heavy flag doesn't extended but flaps over entire length.
6	Strong Breeze	22-27 kts	9 ft (max 12)	Large waves begin to form. White foam crests are more extensive everywhere (probably some spray). Wind stings face in temperatures below 35 deg F (2C). Slight effort in maintaining balance against wind. Smoke rises at about 15 deg. Both slack and taut halyards whip slightly in bent position. Low moaning, rather than whistle, in the rigging. Heavy flag extends and flaps more vigorous.
7	Near Gale	28-33 kts	13 ft (max 19)	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of wind. Necessary to lean slightly into the wind to maintain balance. Smoke rises at about 5 to 10 deg. Higher pitched moaning and whistling heard from rigging. Halyards still whip slightly. Heavy flag extends fully and flaps only at the end. Oilskins and loose clothing inflate and pull against the body.
8	Gale	34-40 kts	18 ft (max 25)	Moderately high waves of greater length. Edges of crests begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind. Head pushed back by the force of the wind if allowed to relax. Oilskins and loose clothing inflate and pull strongly. Halyards rigidly bent. Loud whistle from rigging. Heavy flag straight out and whipping.
9	Strong Gale	41-47 kts	23 ft (max 32)	High waves. Dense streaks of foam along direction of wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.
10	Storm	48-55 kts	29 ft (max 41)	Very high waves with long overhanging crests. The resulting foam, in great patches is blown in dense streaks along the direction of the wind. On the whole, the sea takes on a whitish appearance. Tumbling of the sea becomes heavy and shock-like. Visibility affected.
11	Violent Storm	56-63 kts	37 ft (max 52)	Exceptionally high waves (small and medium-sized ships might be for time lost to view behind the waves). The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere, the edges of the wave crests are blown into froth. Visibility greatly affected.
12	Hurricane	64+ kts	45+ ft	The air is filled with foam and spray. The sea is completely white with driving spray. Visibility is seriously affected.

Appendix B. Construction Activity and Communication Log

Construction Activity and Communication Log

Project:_____ **Location:** _____ **Observer(s):** _____ **Date:**_____

Time	Pile Size	Pile Type	Construction Type	Obs.	Construction Personnel	Communication/Comments

Filling Out Construction Activity and Communication Logs	
Data Columns	**Definition and How to Record**
General Information *(top of form)*	
Project	Time that monitoring by MMOs/PSOs began and ended, without interruption (military time)
Project Name	HMIC Cargo Dock
Monitoring Location	City Dock, Halibut Island, Long Island, or Vessel
Observer	Names of Observers at that location
Date	MM/DD/YYYY
Construction and Communication Activities	
Time of event	Time that construction activities and all communications between MMOs/PSOs and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, type of pile installation technique, pile size, and pile type (permanent or temporary)
Communication	Information communicated between MMOs/PSOs and construction crew