

## Technical Memorandum

Date: February 26, 2015

Subject: Icy Strait Point - Incidental Harassment Authorization Application Modification  
(File No. 18889)

From: Dan Gunderson, BergerABAM

To: Robert Pauline, NOAA Fisheries

CC: Kristin Mabry, NOAA Fisheries  
Randal Vigil, US Army Corps of Engineers

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### INTRODUCTION

BergerABAM submitted an application to the National Marine Fisheries Service (NMFS) for an Incidental Harassment Authorization (IHA) on behalf of the Huna Totem Corporation for the Icy Strait Point Cruise Ship Terminal Project (File No. 18889) on June 19, 2014. A revised IHA application was submitted on August 29, 2014, which addressed comments provided by Candace Nachman (NMFS) on the original IHA application. BergerABAM continued to coordinate closely with Candace Nachman, and subsequent NMFS review biologists Courtney Smith, and Robert Pauline throughout 2014 and early 2015.

NMFS recently provided supplemental comments on the IHA application, in an email dated February 16, 2015. One of the comments asked whether vibratory pile driving had been considered as a potential method for pile installation. At NMFS request, BergerABAM asked the pile contractor (Turnagain Marine Construction) to prepare a technical memorandum investigating an alternate method of pile installation which would incorporate vibratory pile installation methods to replace most of the proposed impact pile driving (Attachment A). This alternate methodology would minimize impacts to marine mammals and species listed under the Endangered Species Act (ESA), by reducing the amount of relatively higher energy impact pile driving.

The purpose of this memorandum is to document the proposed modifications to the pile installation method and marine mammal monitoring plan. The applicant requests

that NMFS consider these modifications in their review, and incorporate these modifications into the final IHA.

#### **MODIFIED PILE INSTALLATION METHODOLOGY**

The modified pile installation method that would be employed during construction will consist of the following (a detailed description of the modified pile installation methodology is attached as Attachment A):

- A vibratory hammer will be used to install and extract all falsework piles.
- A vibratory hammer will be used to seat structural piles prior to drilling.
- Pile seating/proofing may be conducted with either a vibratory or an impact hammer.

The only modification to the procedure proposed in the original IHA application and Biological Assessment (BA) is that a vibratory hammer will be employed. The impact pile driving, rock anchoring, and grouting processes remain unchanged, and are fully analyzed in the original IHA application and BA.

The original IHA application and BA stated that impact pile driving would require up to approximately 2.5 hours of impact hammer time per day, and a total of approximately 40 hours of actual impact hammer time, conducted on approximately 16-20 days of driving during the 4 month period in which pile driving would be conducted.

The modified pile installation approach will conduct no more than 30 minutes of continuous vibratory driving, and no more than 5 hours of vibratory driving in a 24-hour period. Impact proofing will be limited to 3-5 minutes per pile, so total estimated time of proofing would not exceed 10 hours of total impact hammer time. Since vibratory pile driving will likely proceed more quickly than impact driving, it may be possible to install up to 10 piles per day, though this is an estimate. In order to ensure that the timing estimate is conservative, the assumption of 16-20 days of actual pile driving time remains sufficiently conservative.

For proposed vibratory pile driving, NMFS has established a 120 dBRMS Level B harassment (behavioral disruption) threshold for underwater noise for pinniped and cetacean species. As there is no site specific evidence regarding baseline underwater noise levels in the vicinity of the action area, it is assumed, conservatively, that

vibratory pile driving could potentially result in underwater noise levels in excess of 120 dB throughout the underwater portion of the action area (identified in the IHA and BA).

Marine mammals present within this portion of the action area could potentially be exposed to underwater noise above the Level B harassment threshold. The Level B take estimates provided in the original IHA application and BA remain unchanged however. The original IHA application and BA included a marine mammal monitoring plan, to avoid Level A harassment, and to document the number of Level B takes during construction. The monitoring plan has been updated to reflect the Level B harassment zone that would be associated with vibratory pile driving. The updated plan is described in the next section of this memorandum.

#### **UPDATED MARINE MAMMAL MONITORING PLAN**

In order to document the extent of Level B takes that occur associated with vibratory pile driving, the marine mammal monitoring plan has been updated. The updated monitoring plan is included as Attachment B to this document.

Under the revised plan, three qualified observers will monitor the Level A and B harassment zones during impact pile driving, and the Level B harassment zone during vibratory pile driving.

During impact pile driving, the area within 100 meters of pile driving activity will be monitored and maintained as marine mammal buffer area in which pile installation, will not commence or will be suspended temporarily if any marine mammals are observed within the area of potential disturbance. This area will be monitored by one qualified field monitor stationed either on the pile driving rig or in the immediate vicinity.

The area within the Level B harassment threshold for impact driving will be monitored by the field monitor stationed either on the pile driving rig or in the vicinity, and by a second qualified field monitor stationed on or in the vicinity of Halibut Island near the 2,150 meter limit of the Level B harassment zone. A third qualified observer will also monitor from a boat that is conducting a transect along the 2,150 meter limit of the Level B harassment zone. Marine mammal presence within this Level B harassment zone, if any, will be monitored, but impact pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the

Level B harassment zone during impact driving would constitute a Level B take (harassment), and will be recorded and reported as such.

During vibratory pile driving, the area within the Level B harassment threshold for vibratory driving will also be monitored by three qualified marine mammal observers. One field monitor will be stationed either on the pile driving rig or in the immediate vicinity; a second qualified field monitor will be stationed on or in the vicinity of Halibut Island across Port Frederick; and a third qualified observer will monitor from a boat that is conducting meander transects throughout the Level B harassment zone. Marine mammal presence within this vibratory Level B harassment zone, if any, will be monitored, but vibratory pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the Level B harassment zone during vibratory driving would constitute a Level B take (harassment), and will be recorded and reported as such.

The revised marine mammal monitoring plan is included as Attachment B to this document.

#### **CONCLUSION**

The modified pile installation methodology will result in reduced impacts to marine mammals and ESA-listed species by reducing the extent of peak underwater noise generated during construction. This proposed modification would modify the area in which Level B harassment could potentially occur, and as a result the marine mammal monitoring plan has been revised accordingly. These impact minimization measures represent minor project modifications, undertaken as best management practices, at NMFS' request. The net result is an improved project, and reduced impact on the protected resources in question.

**Attachment A:**  
**Hoonah Berthing Facility – In-Water Work Procedure**  
**Memorandum from Turnagain Marine Construction**  
**Dated February 20, 2015**



Friday, February 20, 2015

Memo 002 – In Water Work Procedure

Hoonah Cruise Ship Dock Company, LLC  
Attn: Duck Point Development, LLC  
Mark Keller – Project Manager  
9301 Glacier Highway, Suite 200  
Juneau, AK 99801

Re: Hoonah Berthing Facility – In Water Work Procedure

Mr. Keller,

The subsurface conditions at the Hoonah Cruise Ship Berth Facility are conducive to an alternate pile installation procedure that will result in less environmental impact and less in water noise generation than relying solely on diesel impact driving to reach the required pile tip embedment. The site subsurface conditions consist of a 5 to 20 foot thick layer of loose marine sediments overlaying shallow bedrock. To achieve pile fixity solely with an impact hammer would require driving the pile between 20 and 40 feet with a very large diesel impact hammer. To achieve fixity in the rock the impact hammer would have to be a D-100 or larger sized hammer. The D-100 hammer imparts up to 246,000 foot pounds of energy into the pile. Driving into the rock would be a slow process and could take upwards of 4 hours per pile. If embedment could not be achieved from driving the pile directly a churn would be set in the pile and impacted with the diesel hammer to fracture the rock. This process could take up to 12 hours per pile when needed.

Turnagain proposes the following alternate installation procedure that reduces the required diesel impact hammer size to a D-46 and reduces the time the diesel impact hammer will be used to under 15 minutes per pile. For comparison a D-46 imparts about 107,000 foot lbs of energy, or about 44% of what the D-100 would generate.

**Pile Installation Procedure:**

1. A 350 foot pound eccentric moment vibratory hammer will be used to set the pile in position. To mitigate marine noise generation the vibratory hammer will not be used to advance the pile into or through bedrock.
  - a. Best Management Practices – The vibratory hammer will comply with soft start operating procedures where the hammer is started and operated at an idle. Only the minimum amount of energy needed to set the pile in location will be used.
  - b. Best Management Practices - Protective energy absorbing materials like UHMW or wood will be used to minimize pile chatter caused when a pile is in contact with steel guides. Wood or UHMW guide blocks dampen the energy and reduce noise.
  - c. Best Management Practices - The jaws will be inspected and tightly fit to insure the vibratory hammer does not chatter against the pile during driving.
  - d. Best Management Practices - Vibratory installation will cease as soon as the pile encounters bedrock. It is anticipated that the actual drive time required to set the piles will be between 10 and 30 minutes per pile. The vibratory hammer will not be used more than 30 minutes continuously or more than 5 hours in a 24 hour period.
2. Rock excavation- After the piles are set with a vibratory hammer, the piles will be drilled into the bedrock approximately 15 feet. Using a down the hole drilling system with an under reaming bit, the pile will be advanced to its tip elevation in approximately 3hours per pile. The down hole system is a low energy system air powered system that offers several advantages over a conventional diesel impact hammer.
  - a. System Operating Parameters – The down hole drill is contained inside the pile annulus so the energy from the drill is captured inside the pile
  - b. The tip of the pile will be between 5 and 20 feet below the mud line when rock excavation begins. Energy transmitted from the drill has to travel through the pile and through the marine sediments which dampen the energy before it can enter the water column.



**Turnagain**  
Marine Construction

- c. The interior of the pile is filled with air and air bubbles from the drilling process so the pile annulus and exhaust air works similar to a bubble curtain inside the pile to mitigate noise transmission.
  - d. The drill is much faster and imparts less energy than the diesel impact hammer. The pile will be taken to tip in approximately 1-1/2 to 2 hours of rock drilling time.
  - e. Best Management Practices – Only the minimum amount of compressed air needed to productively power the drill will be used.
  - f. A soft start startup will be utilized. Until the drill is well below the mud line only minimal air flow will be used.
  - g. The drill will not operate outside of a pile annulus and an air void will be maintained within the pile annulus to attenuate noise transmission into the pile.
  - h. Clarity biodegradable oil will be used to power the drill in place of diesel needed to power the impact hammer.
3. Proofing/ seating- Once the drilling is complete, the pile will be proofed or seated into the bottom of the drilled socket with either a vibratory or impact hammer. If a vibratory hammer is used, it is expected to take 3-5 minutes of vibrating. If an impact hammer (approximately 107,000 ft.-lbs.) is used, it is expected to take under 50 blows and only 3-5 minutes of impacting. The method of seating will depend on the rock encountered and must be selected in the field based on the actual sub surface conditions. In either case the total proofing effort will not exceed 15 minutes per pile.

This installation system utilizes lower energy equipment, reduces impact duration, and is better suited to the site than relying on impact driving alone. Turnagain has used this system in the past with great success in the types of soil to be encountered and warrants that it will result in the most efficient and least impact from pile installation.

Sincerely,

Jason Davis

President

Turnagain Marine Construction Corporation

**Attachment B:**  
**Revised Marine Mammal Monitoring Plan**  
**Dated February 26, 2015**

**APPENDIX B**  
**HUNA TOTEM CORPORATION**  
**ICY STRAIT POINT CRUISE SHIP TERMINAL**  
**MARINE MAMMAL MONITORING PLAN**

**REVISED FEBRUARY 2015**

**INTRODUCTION**

This monitoring plan has been prepared for the Huna Totem Corporation (HTC) for proposed improvements to the existing Icy Strait Point tourist facility in Hoonah, Alaska (proposed project). The plan has been prepared as an appendix to, and in support of, a request for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA) and the Biological Evaluation (BE) for Section 7 consultation with National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA).

This marine mammal monitoring plan is designed to ensure that the project does not result in Level A harassment to marine mammals within the action area (as identified in the IHA application and BE), and to monitor and record the extent of Level B harassment. For this reason the project will not result in Level A takes, and the project does not require a Letter of Authorization. Please refer to the IHA application and/or BE for a detailed discussion of the project and effects.

Nine marine mammal species, subspecies, or distinct population segments (DPSs) have known distribution ranges that include the portion of Icy Strait/Port Frederick in which construction activities will occur. These are humpback whale (*Megaptera novaeangliae*), Eastern and Western DPS Steller sea lion (*Eumatopius jubatus*), harbor seal (*Phoca vitulina*), Dall's porpoise (*Phocoenoides dalli*), gray whale (*Eschrichtius robustus*), harbor porpoise (*Phocoena phocoena*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*).

The project will require pile installation within the waters of Icy Strait/Port Frederick, which has the potential to generate elevated levels of underwater and terrestrial noise that could exceed established injury and disturbance thresholds for marine mammals. In order to ensure that no marine mammals are exposed to levels of underwater noise that exceed the established thresholds for Level A take, the area within approximately 100 meters of pile driving activity (also referred to as the "marine mammal buffer zone") will be monitored during impact pile driving. Impact pile driving will not commence, or will be suspended temporarily, if any

marine mammals are observed within this marine mammal buffer zone. Additionally, the areas within the Level B harassment threshold (see Figure B-2) will be monitored, during both impact and vibratory pile driving, for the purpose of documenting and reporting any Level B takes of marine mammals authorized under the IHA for this project.

## DISCUSSION

Tables 1 and 2 show the underwater and terrestrial injury and disturbance thresholds that NMFS has established for marine mammals (Tables 1 and 2).

**Table 1. Underwater Injury and Disturbance Threshold Decibel Levels for Marine Mammals**

Criterion	Criterion Definition	Threshold*
Level A harassment	PTS (injury) conservatively based on TTS**	190 dB RMS for pinnipeds 180 dB RMS for cetaceans
Level B harassment	Behavioral disruption for impulsive noise (e.g., impact pile driving)	160 dB RMS
Level B harassment	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120*** dB RMS

\*All decibel levels referenced to 1 micropascal (re: 1  $\mu$ Pa). Note all thresholds are based off root mean square (RMS) levels

\*\* PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

\*\*\*The 120 dB threshold may be adjusted slightly if background noise levels are at or above this level.

**Table 2. Terrestrial Injury and Disturbance Threshold Decibel Levels for Pinnipeds**

Criterion	Criterion Definition	Threshold*
Level A harassment	PTS (injury) conservatively based on TTS**	None established
Level B harassment	Behavioral disruption for harbor seals	90 dB RMS
Level B harassment	Behavioral disruption for non-harbor seal pinnipeds	100 dB RMS

\*All decibel levels referenced to 20 micropascal (re: 20  $\mu$ Pa). Note all thresholds are based off root mean square (RMS) levels

\*\* PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

## UNDERWATER NOISE

### IMPACT PILE DRIVING

Based on the results of the noise attenuation analysis for this project, it has been determined that the 190 dBRMS Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to approximately 22 meters during impact pile driving activities, and the 180 dBRMS Level A harassment (injury) threshold for cetacean species could be exceeded at a distance of up to approximately 100 meters during impact pile driving activities. Additionally, the 160 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped and cetacean species could be exceeded at a distance of up to approximately 2,150 meters during impact pile driving.

In order to avoid injury of marine mammals within the action area, the area within 100 meters of pile driving activity will be monitored and maintained as marine mammal buffer area in which pile installation, will not commence or will be suspended temporarily if any marine

mammals are observed within the area of potential disturbance. This area will be monitored by one qualified field monitor stationed either on the pile driving rig or in the immediate vicinity.

The area within the Level B harassment threshold for impact driving (see Figure 2) will be monitored by the field monitor stationed either on the pile driving rig or in the immediate vicinity, and by a second qualified field monitor stationed on or in the vicinity of Halibut Island near the 2,150 meter limit of the Level B harassment zone. A third qualified observer will monitor from a boat that is conducting a transect along the 2,150 meter limit of the Level B harassment zone. Marine mammal presence within this Level B harassment zone, if any, will be monitored, but impact pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the Level B harassment zone during impact driving would constitute a Level B take (harassment), and will be recorded and reported as such.

The impact pile driving monitoring plan is shown graphically on Figure 2.

### **VIBRATORY PILE DRIVING**

A conservative assessment of underwater noise attenuation indicates that the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped and cetacean species could potentially be exceeded throughout the underwater portion of the action area during vibratory pile driving.

The area within the Level B harassment threshold for vibratory driving (see Figure 3) will be monitored by three qualified marine mammal observers. One field monitor will be stationed either on the pile driving rig or in the immediate vicinity; a second qualified field monitor will be stationed on or in the vicinity of Halibut Island across Port Frederick; and a third qualified observer will monitor from a boat that is conducting meander transects throughout the Level B harassment zone.

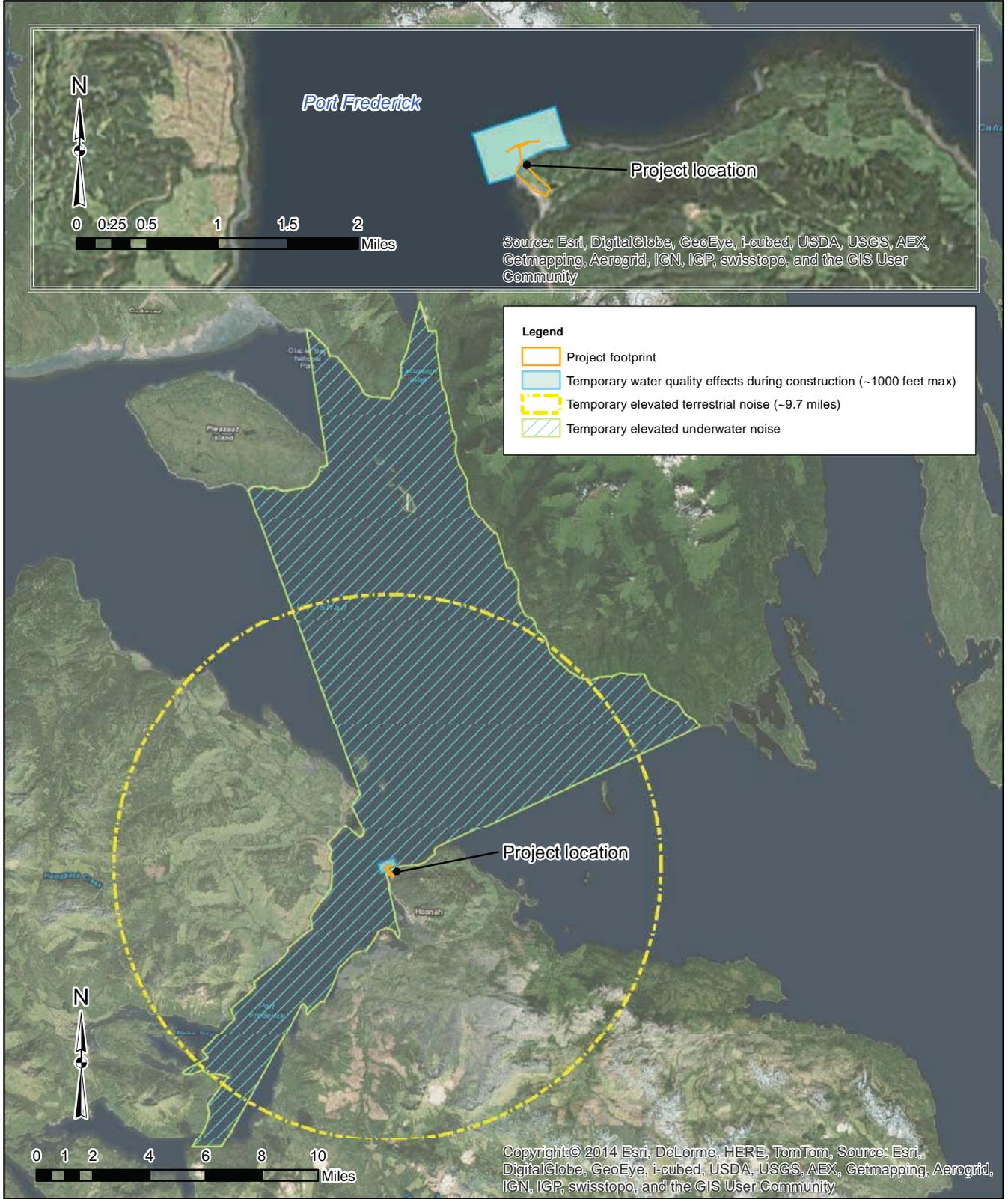
Marine mammal presence within this vibratory Level B harassment zone, if any, will be monitored, but vibratory pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the Level B harassment zone during vibratory driving would constitute a Level B take (harassment), and will be recorded and reported as such.

The vibratory pile driving monitoring plan is shown graphically on Figure 3.

### **TERRESTRIAL NOISE**

The loudest piece of equipment to be used at the site is an impact pile driver, which typically produce peak terrestrial noise levels of approximately 110 dB peak (BergerABAM 2014). The Level B harassment threshold for harbor seals is 90 dB RMS and for non-harbor seal pinnipeds is 100 dB RMS. A terrestrial noise attenuation analysis was performed using a Practical Spreading Loss model (BergerABAM 2014). The results of the analysis indicated that the 100 dB RMS threshold for non-harbor seal pinnipeds could be exceeded out to a distance of approximately 38 meters, while the 90 dB RMS threshold for harbor seals could be exceeded out

to a distance of approximately 97 meters. Since this area is entirely within the area that would be maintained as a marine mammal buffer area, no marine mammals would be exposed to any terrestrial noise levels above the established Level B harassment threshold.



**PROPOSED PROJECT:**  
 Proposed Hoonah Berthing Facility and Upland Improvements. Includes in-water and upland construction, upland demolition, and other activities.

**ADJACENT PROPERTY OWNERS:**

- 1) US Forest Service (Tongass)
- 2) City of Hoonah
- 3) Alaska Department of Natural Resources

**USACE REFERENCE NO:** NWS-POA-2012-0404

**APPLICANT:** Huna Totem Corporation

**LOCATION:** 108 Cannery Road, Hoonah, Alaska 99829

**LAT/LONG:** 58.1315306 / 135.465197

**IN:** Icy Strait & Port Frederick

**NEAR:** Hoonah, AK (1.5 miles NW)

**COUNTY:** Hoonah Angoon Borough      **STATE:** AK

**Appendix B - Marine Mammal Monitoring Plan**

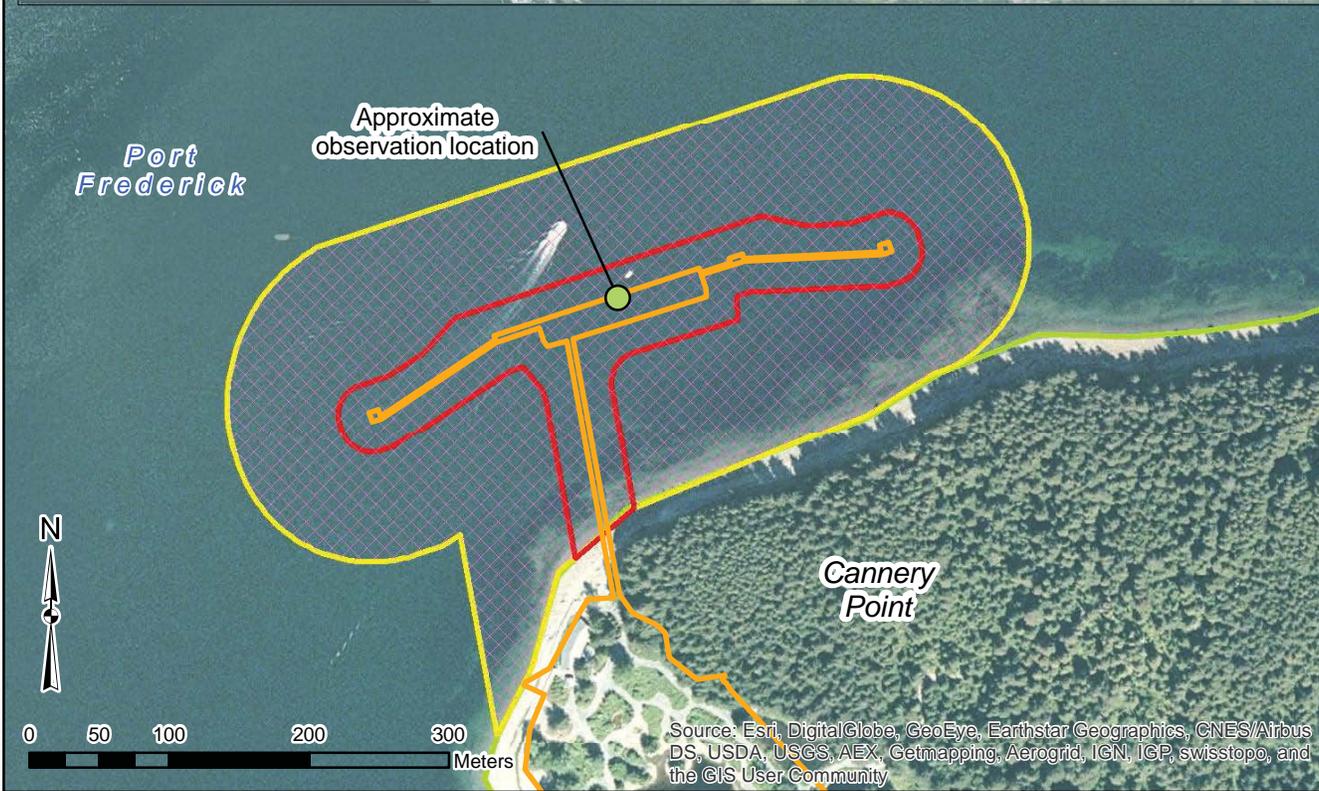
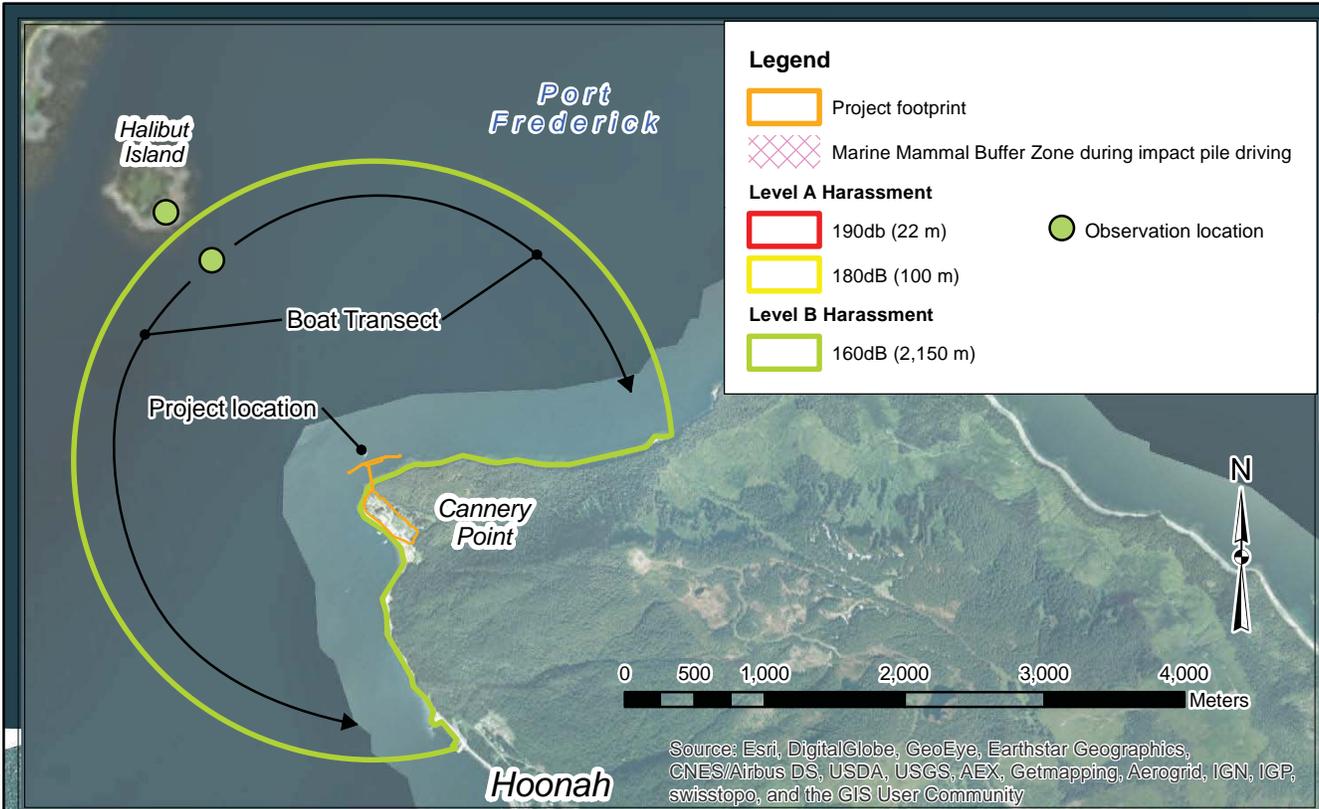
**Figure B-1: Action Area**

## MONITORING PROTOCOL

Marine mammal monitoring during the project will consist of the following procedure.

1. Three individuals meeting the minimum qualifications identified below will be present on site (on land or dock) at all times during all pile driving activities.
2. Pile driving will commence each day with soft-start measures to allow for any marine mammals to move away from the noise source and reduce the likelihood of noise-related injury. Pile driving will commence each day, and after each stoppage of 30 minutes or greater, with a gradual ramping up of piling power over 3 sets of 3 strikes until full operational power is achieved.
3. During impact pile driving, the area will be monitored by three qualified observers (Figure B-2). One individual will be stationed either on the pile driving rig or in the immediate vicinity, and will have clear line of sight views of the entire marine mammal buffer zone. This individual will be in charge of monitoring the marine mammal buffer zone (the 100 meter radius). A second individual will be stationed on either Halibut Island or a location in the vicinity near the perimeter of the Level B harassment zone (the 2,150 meter radius). A third observer will be located on a vessel traveling approximately along the perimeter of the Level B harassment zone. The monitoring staff will record any presence of marine mammals by species, will document any behavioral responses noted, and record Level B takes when sightings overlap with pile installation activities.
4. During vibratory pile driving, the area will be monitored by three qualified observers (Figure B-2). One individual will be stationed either on the pile driving rig or in the immediate vicinity, a second individual will be stationed on either Halibut Island or a location in the vicinity, and a third observer will be located on a vessel that is conducting meander transects throughout the Level B harassment zone. The monitoring staff will record any presence of marine mammals by species, will document any behavioral responses noted, and record Level B takes when sightings overlap with pile installation activities.
5. The individuals will scan the waters within each monitoring zone activity using binoculars (Vector 10X42 or equivalent), spotting scopes (Swarovski 20-60 zoom or equivalent), and visual observation.
6. The area within which the Level A harassment thresholds could be exceeded during impact pile driving (the 100 meter radius) will be maintained as a marine mammal buffer zone, in which impact pile driving will be shut down immediately if any marine mammal is observed with the area.
7. The area within which the Level B harassment thresholds could be exceeded during impact pile driving (Figure B-2) and vibratory pile driving (Figure B-3) will also be monitored for the presence of marine mammals during all impact and vibratory pile driving. Marine mammal presence within these zones, if any, will be monitored but pile driving activity will not be stopped if marine mammals were found to be present. Any marine mammal documented within the Level B harassment zone will constitute a Level B take, and will be recorded and used to document the number of take incidents.

8. If waters exceed a sea-state which restricts the observers' ability to make observations within the marine mammal buffer zone (the 100 meter radius) (e.g. excessive wind or fog), impact pile installation will cease until conditions allow the resumption of monitoring.
9. The waters will be scanned 20 minutes prior to commencing pile driving at the beginning of each day, and prior to commencing pile driving after any stoppage of 30 minutes or greater. If marine mammals enter or are observed within the designated marine mammal buffer zone (the 100m radius) during or 20 minutes prior to impact pile driving, the monitors will notify the on-site construction manager to not begin until the animal has moved outside the designated radius.
10. The waters will continue to be scanned for at least 30 minutes after pile driving has completed each day, and after each stoppage of 30 minutes or greater.



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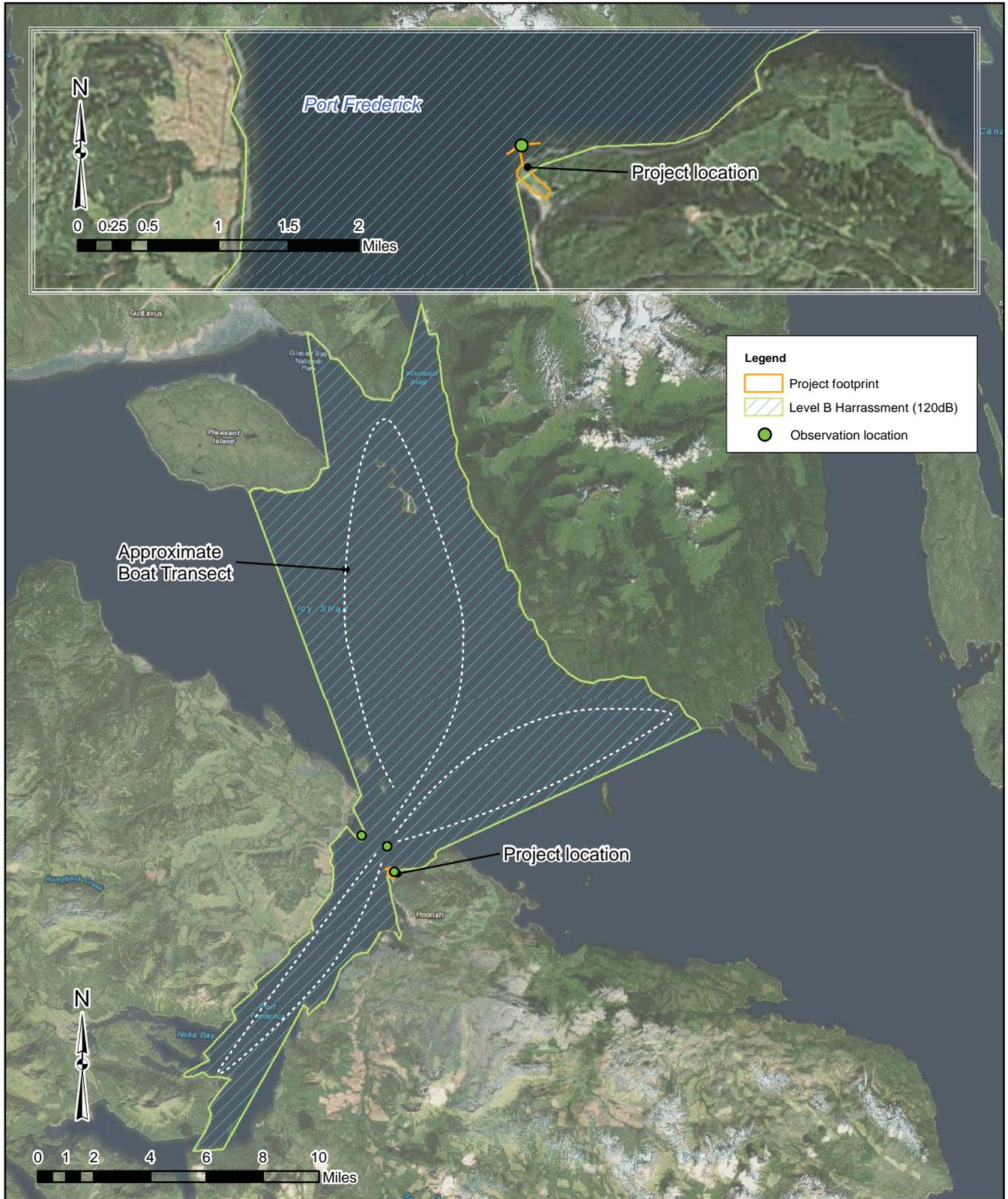
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**Appendix B - Marine Mammal Monitoring Plan**  
**Figure B-2: Impact Pile Driving Monitoring Plan**



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**Appendix B - Marine Mammal Monitoring Plan**

**Figure B-3: Vibratory Pile Driving Monitoring Plan**

Sheet 3 OF 3      Date: 2/26/15

## **MINIMUM QUALIFICATIONS FOR MARINE MAMMAL OBSERVERS**

1. Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with the ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.
2. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
3. Experience or training in the field identification of marine mammals (i.e. pinnipeds).
4. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
5. Writing skills sufficient to prepare a report of observations that will include such information as the number and types of marine mammals observed; the behavior of marine mammals in the project area during construction; the dates and times when observations were conducted; the dates and times when in-water construction activities were conducted; the dates and times when marine mammals were present at or within the defined disturbance zone; the dates and times when in-water construction activities were suspended to avoid incidental harassment by disturbance from construction noise; etc.
6. Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area.

## REFERENCES

BergerABAM. 2014. Biological Evaluation. Icy Strait Point Cruise Ship Terminal. Hoonah, Alaska. August 2014