1 Introduction

The United States (U.S.) Coast Guard (USCG) has prepared a Request for Regulations and a Letters of Authorization (LOA) for the incidental taking of marine mammals during in-water maintenance activities at eight USCG facilities within the USCG Civil Engineering Unit (CEU) Juneau Area of Responsibility (AOR) in compliance with the Marine Mammal Protection Act (MMPA) of 1972, as amended (Title 16 of the U.S. Code [USC] Section 1371(a)(5)).

This memorandum serves as an addendum to the Request for Regulations and LOA to request additional consideration for use of composite piles in place of timber piles at six of the eight USCG facilities. USCG staff have identified composite piles as a potentially more durable and environmentally sustainable option compared to typical use of creosote-treated timber piles. Further, it is anticipated that the use of composite piles in place of timber piles would generate lower levels of underwater noise than that for timber piles. Therefore, the use of composite piles would have reduced potential to result in the incidental harassment or injury of marine mammals and inclusion of the composite piles would not alter the conclusions of the analysis and authorization.

The following analysis is provided to support this conclusion and facilitate incorporation of composite piles in place of timber piles as relevant.

2 Project Locations

The LOA application includes a total of eight USCG facilities across the CEU Juneau AOR, of which six include maintenance activities involving timber piles that could be replaced, under this request, with composite piles (bolded):

- **Base Kodiak**
- **Moorings Sitka**
- **Base Ketchikan**
- **Moorings Valdez**
- Moorings Cordova
- **Station Juneau**
- **Moorings Petersburg**
- Moorings Seward

USCG proposes to replace previously considered timber piles with more durable and less environmentally impactful composite piles on a one-to-one basis as deemed appropriate by USCG designers. For instance, the requested annual maintenance workload at Base Kodiak included the replacement of 20 total piles split between timber or steel piles. No changes to the schedule of maintenance activities in the LOA are proposed here.

3 Supplemental Noise Analysis for Composite Pile Installation

The LOA application included analyses of underwater noise expected to be generated by maintenance activities for a range of pile materials specific to the eight USCG facilities. This section includes both a summary of noise generation associated with timber pile maintenance activities from the LOA, additional proxy noise data for removal of composite piles using a pile clipper and installation using an impact pile driver, and comparison of the timber and composite noise levels and threshold distances.

3.1 Non-Impulsive Noise for Timber and Composite Piles

Non-impulsive sound sources used for timber piles in the proposed Program are associated with vibratory removal and installation, pile clipping, and pile cutting using a hydraulic chainsaw. The proxy noise data used in the LOA for non-impulsive, noise -generating activities for timber piles is summarized in **Table 1** while the same data for this supplement is summarized for composite piles in **Table 2**.

Measurements of vibratory removal of 14-inch timber piles at the Pier 62 Project in Seattle, Washington were reported by the Greenbusch Group (2018). Sound source monitoring of vibratory removal of timber piles recorded values at 152 dB RMS at 10 meters (m) (33 feet [ft]; using transmission loss factor of 15). Vibratory extraction of timber piles is expected to require 10 minutes per pile.

Measurements of pile clipping of 13-inch polycarbonate (composite piles used as a proxy for timber piles in the LOA) were reported by the Navy during demolition of the former fuel pier at Naval Base Point Loma in San Diego at 153.8 dB RMS for timber piles (NAVFAC SW 2020). Removal of timber piles with a pile clipper is expected to require approximately 2:30 minutes per pile.

Measurements of pile cutting using a hydraulic chainsaw were reported by the Navy during the demolition of the former fuel pier at Naval Base Point Loma in San Diego Bay at 151 dB RMS. Cutting of timber piles with a hydraulic chainsaw is expected to require approximately five minutes per pile.

Table 1 *Observed Source Data for Non-Impulsive Noise-Generating Activities for Timber Piles*

Activity	Observed Mean RMS SPL (db re 1 µPa at 10m)	Estimated Duration per Pile (mm:ss)	Proxy Data Source
Vibratory Extraction / Installation	152	10:00	Greenbusch Group 2018
Clipper[1]	153.8	2:22	NAVFAC SW 2020
Hydraulic Chainsaw	151	4:50	NAVFAC SW 2020

[1] Use of hydraulic clipper for timber piles was assessed using data for composite piles in San Diego Bay and determined to be similar to noise levels for timber piles by Navy sources

Non-impulsive sound sources for composite piles for the proposed Program supplement are associated with the use of pile clipper. The measurements for pile clipping composite piles are the same as the proxy sound source data used in the LOA as an estimate for timber piles as described above.

Table 2 *Observed Source Data for Non-Impulsive Noise Generating Activities for Composite (Plastic) Piles*

Activity	Observed Mean RMS SPL (db re 1 µPa at 10m)	Estimated Duration per Pile (mm:ss)	Proxy Data Source
Clipper	153.8	2:22	NAVFAC SW 2020

Based on the use of proxy data from the use of a pile clipper to remove composite piles for timber piles in the LOA, the request to use the same data for removal of composite piles would not alter the conclusions and request for incidental take of marine mammals from the LOA application. It should be noted that removal of composite piles would only occur if any of these piles are installed at USCG facilities as none currently exist.

3.2 Impulsive Noise for Timber and Composite Piles

Impulsive sound sources used for timber piles in the proposed Program are associated with impact pile driving to install timber piles. The proxy noise data used in the LOA for impulsive, noise - generating activities for timber piles is summarized in **Table 3** while the same data for this supplement is summarized for composite piles in **Table 4**.

Measurements for impact pile driving of timber piles were recorded during installation of four 12-inch timber piles at the Ballena Bay Marina and reported by the California Department of Transportation (Caltrans 2020; and WSDOT, 2020). Piles took approximately 30 minutes to drive each pile, but pile strikes were infrequent since a drop hammer was used and strikes typically occurred at a rate of one to two per minute and conservatively assumed here to require 100 strikes. Reported sound levels generated by impact driving of 12-inch timber piles include a mean RMS value of 170 dB RMS and a single-strike SEL of 160 dB SEL at 10 m.

Table 3 *Observed Source Data for Impulsive Noise-Generating Activities for Timber Piles*

Activity	Observed Mean (at 10m)		Proxy Data Source
	RMS SPL (dB re 1µPA)	Single Strike SEL (dB SEL_{s-s})	
Impact Driving	170	160	Ballena Bay Marine Caltrans 2020; WSDOT 2020

Measurements for impact driving of 13-inch composite (plastic) piles were recorded during installation of composite piles as part of the Route 37 Napa River Bridge Fender Repair Project and reported by the California Department of Transportation (Caltrans 2020). Piles took approximately two minutes and typically required 120 strikes per pile. Reported sound levels generated by impact driving of 13-inch composite piles include a mean RMS value of 153 dB and SEL value of 145 dB at 10 m.

Table 4 *Observed Source Data for Impulsive Noise-Generating Activities for Composite (Plastic) Piles*

Activity	Observed Mean (at 10m)		Proxy Data Source
	RMS SPL (dB re 1µPA)	Single Strike SEL (dB SEL_{s-s})	
Impact Driving	153	145	Napa River Bridge Fender Repair Caltrans 2020

3.3 Sound Propagation

Pile removal and installation activities included in the LOA and this supplement would generate underwater noise that potentially could result in disturbance of marine mammals swimming near or within the individual USCG facility maintenance project areas. The methods used to calculate the minimum distances to the relevant Level A and B distances in this supplement are the same as those used in the large LOA application, including use of the NMFS 2020 Spreadsheet for Level A distances. The tables below demonstrate that the resultant Level A Harassment Zones and Level B Harassment Zones for composite piles are smaller than those for timber piles included in the LOA application.

Table 5 *Projected Level A Harassment Zones by Marine Mammal Hearing Group for Timber and Composite Piles*

Pile Removal/Installation Activity	Projected Distances to Level A Thresholds (m)				
	LF	MF	HF	PW	OW
Vibratory Extraction/Installation – Timber 152 dB RMS for 3,000 seconds per day	1.5	0.1	2.2	0.9	0.1
Pile Clipper – Timber & Composite 153.8 dB RMS for 710 seconds per day	0.1	0.0	0.1	0.0	0.0
Hydraulic Chainsaw – Timber 151.0 dB RMS for 1,455 seconds per day	0.1	0.0	0.1	0.0	0.0
Impact Drive – Timber 170 dB RMS, 160 dB SEL_{s-s} 184 strikes per pile, 5 piles/day	18.4	0.7	21.9	9.9	0.7
Impact Drive – Composite 153 dB RMS, 145 dB SEL_{s-s} 120 strikes per pile, 5 piles/day	2.1	0.1	2.5	1.1	0.1

Table 6 *Comparison of Level B Threshold Distances for Impact Driving of Timber and Composite Piles*

Impact Driving	Distance from Source to Level B Thresholds (m)
Timber (170 dB RMS)	46
Composite (153 dB RMS)	3

3.4 Summary

Overall, based on proxy sound source data described above, the use of composite piles would generate lower underwater noise levels in place of timber piles as analyzed in the LOA application. This in turn results in smaller areas where incidental take of marine mammals could occur during maintenance activities.

Based on this conclusion, USCG requests the addition of composite piles, in place of timber piles where identified as appropriate by USCG designers, be incorporated into the mix of maintenance activities considered and authorized by NMFS and USFWS in compliance with the MMPA. For instances where composite piles would replace timber piles, USCG proposes to use the same exclusion zones and Protected Species Observer locations figured and considered in the existing LOA application and included proposed Marine Mammal Monitoring Program.

4 References

Austin, M. 2017. Acoustic Monitoring of a Gas Pipeline Leak and Repair Activities: Middle Ground Shoal, Cook Inlet, Alaska. Document 01396, Version 1.0 Technical Report by JASCO Applied Sciences for Hilcorp Alaska, LLC. 32 pp.

Caltrans. 2020. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. Available online at: https://dot.ca.gov/-/media/dot-media/programs/enviornmental-analysis/documents/env/hydroacoustic-manual.pdf

Greenbusch Group. 2018. Pier 62 Project Acoustic Monitoring Season 1 (2017/2018) Report (NWS-2016-WRD, WCR-2016-5583, 01EWF00-2016-F-1325. April 9, 2018.

Naval Facilities Engineering Systems Command SW (NAVFAC SW). 2020. Compendium of Underwater and Airborne Sound Data During Pile Installation During Pile Installation and In-Water Demolition Activities in San Diego Bay, California. October 2020. Prepared by Tierra Data, Inc.

Washington State Department of Transportation (WSDOT). 2020. Biological Assessment Preparation Manual Chapter 7. Updated 2020.