E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XD721]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Parallel Thimble Shoal Tunnel Project, Virginia Beach, Virginia

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to the Chesapeake Tunnel Joint Venture (CTJV) to incidentally harass marine mammals during construction associated with the Parallel Thimble Shoal Tunnel Project (PTST) in Virginia Beach, Virginia**.**

DATES: This authorization is effective from February 15, 2024, through February 14, 2025.

ADDRESSES: Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed below.

FOR FURTHER INFORMATION CONTACT: Robert Pauline, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On July 28, 2023, NMFS received a request from CTJV for an IHA to take marine mammals incidental to in-water construction activities associated with the PTST project near Virginia Beach, VA. Following NMFS' review of the initial application, CTJV submitted several revised versions of the application based on NMFS' comments. The final version was submitted on November 7, 2023, and was deemed adequate and complete on November 13, 2023. CTJV's request is for take of 5 species by Level B harassment and, for a subset of three of these species, by Level A harassment. Neither

CTJV nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

NMFS most recently issued an IHA to CTJV for similar work on November 8, 2022, (87 FR 68462; November 15, 2022). CTJV complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous IHA, and information regarding their monitoring results may be found in the **Estimated Take** section.

This final IHA will cover 1 year of a larger project for which CTJV obtained IHAs for similar work (83 FR 36522, July 30, 2018; 85 FR 16061, March 20, 2020; 86 FR 14606, March 17, 2021; 86 FR 67024, November 24, 2021; and 87 FR 68462, November 15, 2022). The larger multi-year PTST project consists of the construction of a two-lane parallel tunnel to the west of the existing Thimble Shoal Tunnel, connecting Portal Island Nos. 1 and 2 as part of the 23-mile Chesapeake Bay Bridge-Tunnel (CBBT) facility.

Description of Activity

Overview

The purpose of the project is to build an additional two lane vehicle tunnel under the navigation channel as part of the CBBT. The PTST project will address existing constraints to regional mobility based on current traffic volume, improve safety, improve the ability to conduct necessary maintenance with minimal impact to traffic flow, and ensure reliable hurricane evacuation routes. In-water construction work will include the removal of a total of 158 36-inch steel piles on the temporary dock and trestle on Portal Islands Nos. 1 and 2 as well as the removal of steel mooring piles on both Portal Islands (97 total on Portal Island No.1); the removal of 36” steel piles on the trestle (34 total on Portal Island No. 2); and the removal of 36” steel mooring piles on both Island 1 (9 piles) and Island No. 2 (18 piles). All steel piles are hollow pipe piles. The planned impact and vibratory pile removal activities can introduce sound into the water environment which

can result in take of marine mammals by behavioral harassment and, for some species, by auditory injury. Planned construction activities are expected to be completed from January-April as well as in December 2024. Note that the term “pile driving” is only used to refer to pile removal activities. No pile installation activities are planned by CTJV.

The in-water removal of a total of 158 piles will occur over 80 days. Removal will begin on Portal Island No. 1 in January through April 2024 for 54 days then will resume on Portal Island No. 2 in December 2024 for 26 days. No pile removal work will take place in the interim. The project schedule is shown in table 1. The IHA is effective from February 15, 2024, through February 14, 2025.

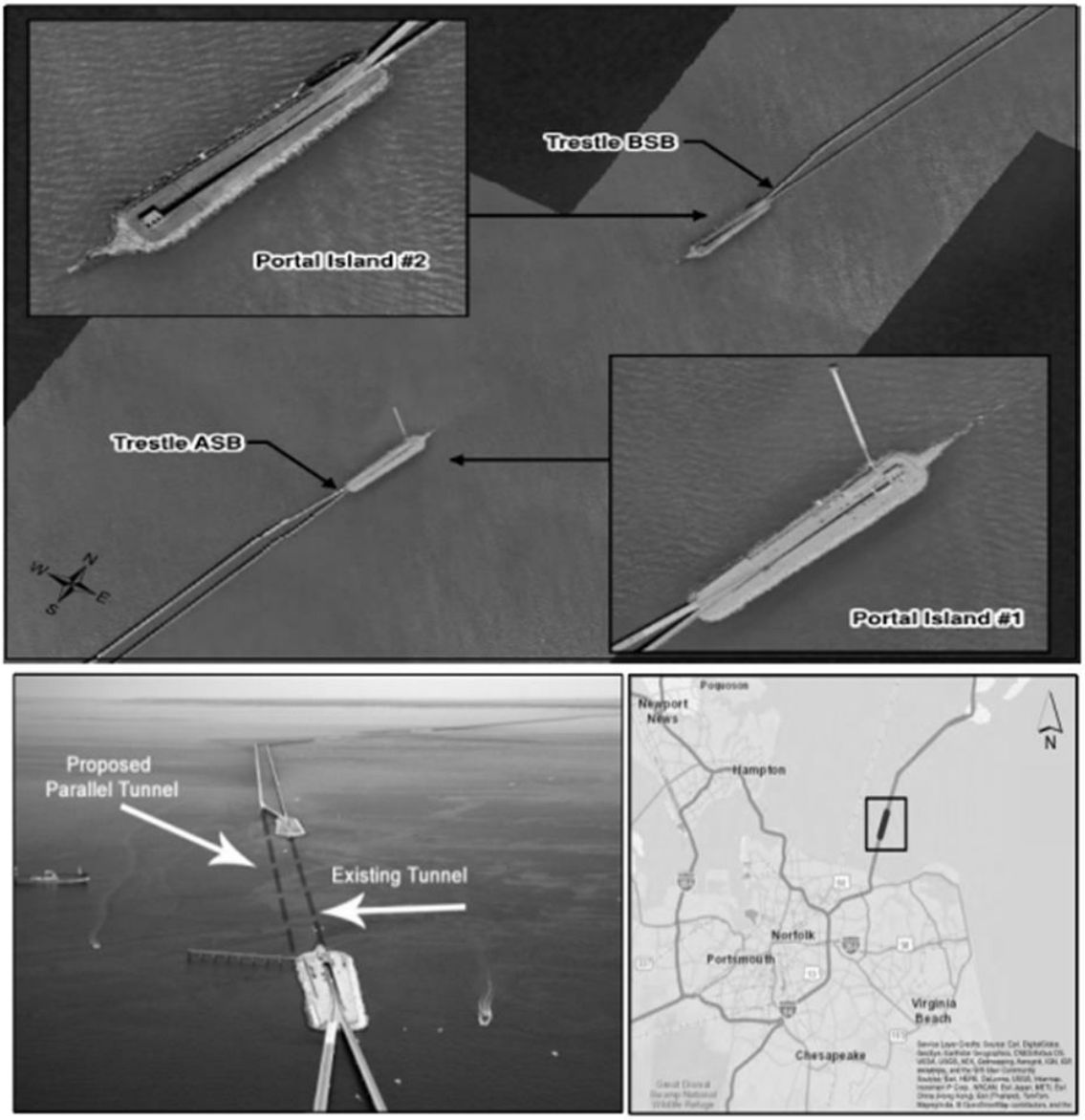

Figure 1 -- Map of Project Area near Virginia Beach, Virginia

Table 1 -- Anticipated Pile Installation Schedule (January 2024-December 2024)

Pile Location	Pile Function	Pile Type	Installation/ Removal Method	Bubble Curtain Yes/No	Number of Piles	Number of Days per Activity (Total)	Number of Piles/ Days per Activity (Per Hammer Type)	Anticipated Installation Date
Portal Island No. 1	Mooring dolphins	36-inch Diameter Steel Pipe Pile	Impact (if needed)	Yes	9	5	(2 Piles/Day)	**1 January through 28 February 2024**
			Vibratory (Removal)	Yes		5	(2 Piles/Day)	
Portal Island No. 1	Temporary Dock/ Trestle	36-inch Diameter Steel Interlocked Pipe Piles	Impact (if needed)	Yes	97	49	(2 Piles/Day)	**1 January through 30 April 2024**
			Vibratory (Removal)	Yes		49	(2 Piles/Day)	
Portal Island No. 2	Mooring dolphins	36-inch Diameter Steel Pipe Pile	Impact (if needed)	Yes	18	9	*(2 Piles/Day)*	**December 1-31, 2024**
			Vibratory (Removal)	Yes		9	(2 Piles/Day)	
Portal Island No. 2	Omega Trestle	36-inch Diameter Steel Interlocked Pipe Piles	Impact (if needed)	Yes	34	17	*(2 Piles/Day)*	**December 1-31, 2024**
			Vibratory (Removal)	Yes		17	*(2 Piles/Day)*	

A detailed description of the planned construction project is provided in the **Federal Register** notice for the proposed IHA (88 FR 89385, December 27, 2023). Since that time, no changes have been made to the planned activities. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity.

Mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Mitigation** and **Monitoring and Reporting**).

Comments and Responses

A notice of NMFS' proposal to issue an IHA to CTJV was published in the Federal Register on December 27, 2023 (88 FR 89385). That notice described, in detail, CTJV's activities, the marine mammal species that may be affected by the activities, and the anticipated effects on marine mammals. In that notice, we requested public input on the request for authorization described therein, our analyses, the proposed authorization, and any other aspect of the notice of proposed IHA, and requested that interested persons submit relevant information, suggestions, and comments. This proposed notice was available for a 30-day public comment period. No comments were submitted during the 30-day public comment period,

Changes from the Proposed IHA to Final IHA

Since the **Federal Register** notice of the proposed IHA was published (88 FR 89385, December 27, 2023), NMFS published the 2023 Draft Atlantic Marine Mammal Stock Assessment Report, which provide updates to the harbor porpoise Gulf of Maine/Bay of Fundy stock and the gray seal Western North Atlantic stock abundances, Potential Biological Removal values (PBRs), and Annual Mortality/ Serious Injury values (Annual M/SI). Updates have been made to Table 2 Species Likely Impacted by the Specified Activities as well as to our analysis of take (see **Estimated Take**) and small numbers determinations (see **Small Numbers**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments* and 2023 Draft SARS*; https://www.federalregister.gov/documents/2024/01/29/2024-01653/draft-2023-marine-mammal-stock-assessment-reports*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 2 lists all species or stocks for which take is expected and authorized for this activity and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known,

that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Atlantic and Gulf of Mexico SARs (Hayes *et al.* 2023) and 2023 Draft SARS*; https://www.federalregister.gov/documents/2024/01/29/2024-01653/draft-2023-marine-mammal-stock-assessment-reports*. All values presented in table 2 are the most recent available at the time of publication and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*.

Table 2 -- Species Likely Impacted by the Specified Activities

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	-,-; N	1,393 (0; 1,375, 2016)	22	12.15
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Bottlenose dolphin	*Tursiops truncatus*	WNA Coastal, Northern Migratory	-,-; Y	6,639 (0.41; 4,759; 2016)	48	12.2-21.5
		WNA Coastal, Southern Migratory	-,-; Y	3,751 (0.06; 2,353; 2016)	24	0-18.3
		Northern North Carolina Estuarine System	-,-; Y	823 (0.06; 782; 2017)	7.8	7.2-30
Family Phocoenidae (porpoises)						
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	-, -; N	85,765 (0.53, 56,420, 2021)	649	145
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Harbor seal	*Phoca vitulina*	WNA	-, -; N	61,336 (0.08, 57,637, 2018)	1,729	339
Gray seal[4]	*Halichoerus grypus*	WNA	-, -; N	27,911 (0.0,23624,2021)	1,512	4,570

[1] - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA

within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] - NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports*. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance.

[3] - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual Mortality/ Serious Injury (M/SI) often cannot be determined precisely and is in some cases presented as a minimum value or range.

[4] - The NMFS stock abundance estimate applies to U.S. population only, however the actual stock abundance is approximately 505,000. The PBR value is estimated for the U.S. population, while the M/SI estimate is provided for the entire gray seal stock (including animals in Canada).

A detailed description of the species likely to be affected by the construction project, including a brief introduction to the affected stock as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (88 FR 89385, December 27, 2023). Please refer to the **Federal Register** notice of the proposed IHA for the full description for all species. Please also refer to NMFS' website (*https://www.fisheries.noaa.gov/find-species*) for generalized species accounts.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the

approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in table 3.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).	

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth *et al*. 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

The underwater noise produced by CTJV's construction activities has the potential to result in behavioral harassment of marine mammals in the vicinity of the survey area. The **Federal Register** notice of the proposed IHA (88 FR 89385, December 27, 2023) included a discussion of the effects of anthropogenic noise on marine mammals

and the potential effects of underwater noise from CTJV's construction activities on marine mammals and their habitat. That information and analysis is incorporated by reference into this final IHA determination and is not repeated here; please refer to the notice of the proposed IHA (88 FR 89385, December 27, 2023).

Estimated Take

This section provides an estimate of the number of incidental takes authorized through the IHA, which will inform both NMFS' consideration of "small numbers," and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes will primarily be by Level B harassment, as use of the acoustic sources (*i.e.*, impact and vibratory driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency species and phocids because predicted auditory injury zones are larger than for mid-frequency species. Auditory injury is unlikely to occur for mid-frequency species. The required mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

As described previously, no serious injury or mortality is anticipated or authorized for this activity. Below we describe how the take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimates.

Acoustic Thresholds

NMFS recommends the use of 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 PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are

likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 μPa)) for continuous (*e.g.,* vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur. CTJV's planned activities include the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

Level A harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 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). CTJV's planned pile driving activities includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving) sources.

These thresholds are provided in table 4 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at:

https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

Table 4 -- Thresholds Identifying the Onset of Permanent Threshold Shift

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

** 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 (L_{pk}) has a reference value of 1 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 (LF, MF, and HF cetaceans, and PW and OW 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.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the planned project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.*, pile driving).

The project includes vibratory and impact pile driving. Source levels for these activities are based on reviews of measurements of the same or similar types and dimensions of piles available in the literature. Source levels for each pile size and activity are presented in table 5. Source levels for vibratory removal of piles of the same diameter are assumed to be the same. Note that CTJV will employ a bubble curtain during all impact and vibratory driving activities which NMFS assumes will reduce source levels by 5 dB.

Table 5 -- Estimates of Mean Underwater Sound Levels Generated During Vibratory and Impact Pile Driving

Pile Type	Hammer Type	Peak	RMS	SSsel	Source
36-in steel pipe	Impact/(with -5 dB bubble curtain)	210/(205)	193/(188)	183/(178)	Caltrans 2015, 2020
	Vibratory/ (with -5 dB bubble curtain)	180/(175)	170/(165)		Caltrans 2015

Note: CTJV will incorporate bubble curtain with a 5 dB reduction for all pile driving activities

Transmission loss (*TL*) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. *TL* parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater *TL* is:

$$TL = B * \text{Log10}\,(R1/R2), \text{ where}$$

TL = transmission loss in dB

B = transmission loss coefficient

*R*1 = the distance of the modeled SPL from the driven pile, and

*R*2 = the distance from the driven pile of the initial measurement

Absent site-specific acoustical monitoring with differing measured transmission loss, a practical spreading value of 15 is used as the transmission loss coefficient in the

above formula. Site-specific transmission loss data for the PTST project area are not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A harassment and Level B harassment thresholds.

The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources, such as pile driving, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur PTS. Inputs used in the optional User Spreadsheet tool are shown in table 6, and the resulting estimated isopleths are shown in table 7, as reported below.

Table 6 -- User Spreadsheet Inputs

	36-inch steel piles	
	Vibratory	Impact
Source Level (SPL)	170 RMS	183 SEL
Transmission Loss Coefficient	15	15
Weighting Factor Adjustment (kHz)	2.5	2
Activity Duration per day (minutes)	30	--
Number of strikes per pile	--	240

Number of piles per day	2	2
Distance of sound pressure level measurement	10	10

Table 7 -- Calculated Level A and Level B Harassment isopleths (Meters)

Scenario		Level A Harassment Zones				Level B Harassment Zones
		LF	MF	HF	Phocid Pinnipeds	
Driving Type	Pile Type	Island 1 & 2	Island 1 & 2	Island 1 & 2	Island 1& 2	Island 1 & 2
36-in Impact (with Bubble Curtain)	36-in. Steel	285	10	338	152	736
36-in Vibratory (with Bubble Curtain)	36-in. Steel	8	1	12	5	10,000

Marine Mammal Occurrence and Take estimation

In this section we provide information about the occurrence of marine mammals, including density or other relevant information which will inform the take calculations as well as how the information provided is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and authorized for take. Several approaches were utilized to estimate take for affected species depending on the best data that was available. For some species, survey or observational data was used to estimate take (*e.g.* harbor seal, gray seal). If density data was available, it was employed to develop the take estimate (*i.e.* bottlenose dolphin). In cases where the best available information consisted only of very low density values, NMFS assumed the average group to arrive at an estimate (*i.e*. humpback whale, harbor porpoise).

Humpback whale

Humpback whales are rare in the Chesapeake Bay. Density data for this species within the project vicinity were not available. Habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory (Roberts *et al*. 2016) represent the best available information regarding marine mammal densities offshore near the mouth of the Chesapeake Bay. At the closest point to the PTST project area, humpback densities showed a maximum monthly density of 0.107/ 100 km^2 in March. Because humpback whale occurrence is low, as mentioned above, the CTJV estimated, and NMFS concurred, that there will be a single humpback sighting every two months for the duration of in-water pile driving activities. There are 5 months of planned in-water construction. Using an average group size of two animals Kraus *et al*. (2016) and 5 months of active in-water pile driving work (Jan, Feb, Mar, Apr, Dec) provides an estimate of four takes during the January-April period. NMFS conservatively assumed that there will be an additional sighting of 2 humpback whales in December. Because it is expected that a full shutdown can occur before the mammal can reach the full extent of the Level A harassment zone, no takes by Level A harassment were requested or are authorized. Therefore, NMFS has authorized six takes of humpback whale by Level B harassment.

Bottlenose dolphin

There was insufficient monitoring data available from previous PTST IHAs to estimate dolphin take. Therefore, the expected number of bottlenose dolphins was estimated using a 2016 report on the occurrence, distribution, and density of marine mammals near Naval Station Norfolk and Virginia Beach, Virginia (Engelhaupt *et al*. 2016). This report provides seasonal densities of bottlenose dolphins for inshore areas in the vicinity of the project and along the coast of Virginia Beach. Like most wildlife, bottlenose dolphins do not use habitat uniformly. The heterogeneity in available habitat,

dietary items and protection likely results in some individuals preferring ocean and others estuary (Ballance 1992; Gannon and Waples 2004). Dolphins clearly have the ability to move between these habitat types. Gannon and Waples (2004) suggest individuals prefer one habitat over the other based on gut contents of dietary items. Therefore, a subset of survey data from Engelhaupt *et al*. (2016) was used to determine seasonal dolphin densities within the project area. A spatially refined approach was used by plotting dolphin sightings within a 12 km radius of the planned project location. Densities were determined following methodology outlined in Engelhaupt *et al.* 2016 and Miller *et al.* 2019 using the package DISTANCE in R statistical software (R. Core Team 2018). Calculated densities by season are provided in table 8.

Table 8 -- Densities (individual/km^2) of Bottlenose Dolphin from Inshore Areas of Virginia

Season	12 km Distance Around PTST Project Area
Spring	1.00
Winter	0.63

This information was then used to calculate the monthly takes based on the number of pile driving days per month. These were broken out by month as shown in table 9. The Level B harassment area for each pile and driving type was multiplied by the appropriate seasonal density and the anticipated number of days per activity per month to derive the total number of takes for each activity. Given this information, NMFS is authorizing 12,256 Level B harassment exposures for bottlenose dolphins. No take by Level A harassment has been authorized by NMFS since the shutdown zone is 20 m and should be readily visible to PSOs.

Table 9 -- Estimated Takes of Bottlenose Dolphin by Level B harassment By Month, Location, and Driving Activity

Month	Jan	Feb	Mar	Apr	Dec	Totals

Dolphin Density (/km^2)	0.63	0.63	1	1	0.63	
Impact: Portal Island 1 Mooring Dolphins (9 Piles)						
Refined Area(/ km^2)	1.38	1.38	1.38	1.38	1.38	
Driving Days	2	3	0	0	0	
Dolphin Harassments	2	3	0	0	0	5
Vibratory: Portal Island 1 Mooring Dolphins (9 Piles)						
Refined Area(/ km^2)	212	212	212	212	212	
Driving Days	2	3	0	0	0	
Dolphin Harassments	268	401	0	0	0	669
Impact: Portal Island 2 Mooring Dolphins (18 Piles)						
Refined Area(/ km^2)	1.32	1.32	1.32	1.32	1.32	
Driving Days	0	0	0	0	9	
Dolphin Harassments	0	0	0	0	8	8
Vibratory: Portal Island 2 Mooring Dolphins (18 Piles)						
Refined Area(/ km^2)	202	202	202	202	202	
Driving Days	0	0	0	0	9	
Dolphin Harassments	0	0	0	0	1146	1146
Impact: Portal Island 1 Trestle/ Dock Removal (97 Piles)						
Refined Area(/ km^2)	1.38	1.38	1.38	1.38	1.38	
Driving Days	13	15	13	8	0	
Dolphin Harassments	12	14	18	12	0	56
Vibratory: Portal Island 1 Trestle/ Dock Removal (97 Piles)						
Refined Area(/ km^2)	212	212	212	212	212	
Driving Days	13	15	13	8	0	
Dolphin Harassments	1737	2004	2756	1696	0	8193
Impact: Portal Island 2 Trestle Removal (34 Piles)						
Refined Area(/ km^2)	1.32	1.32	1.32	1.32	1.32	
Driving Days	0	0	0	0	17	
Dolphin Harassments	0	0	0	0	15	15
Vibratory: Portal Island 2 Trestle Removal (34 Piles)						
Refined Area(/ km^2)	202	202	202	202	202	
Driving Days	0	0	0	0	17	
Dolphin Harassments	0	0	0	0	2164	2164
Total						**12,256**

The total number of bottlenose dolphin Level B harassment events will be split between three bottlenose dolphin stocks: Western North Atlantic Southern Migratory Coastal; Western North Atlantic Northern Migratory Coastal; and NNCES. There is

insufficient information to apportion the requested takes precisely to each of these three stocks present in the project area. Given that most of the NNCES stock are found in the Pamlico Sound estuarine system, it is assumed that no greater than 200 of the takes will be from this stock. Since members of the Western North Atlantic Northern Migratory Coastal and Western North Atlantic Southern Migratory Coastal stocks are thought to occur in or near the project area in greater numbers, we conservatively assume that no more than half of the remaining animals will belong to either of these stocks.

Additionally, a subset of these takes will likely be comprised of Chesapeake Bay resident dolphins, although the size of that population is unknown. It is assumed that an animal will be taken once over a 24-hour period; however, the same individual may be taken multiple times over the duration of the project. Therefore, the number of takes for each stock is assumed to overestimate the actual number of individuals that may be affected.

Harbor porpoise

Harbor porpoises are known to occur in the coastal waters near Virginia Beach (Hayes *et al.* 2019), and although they have been reported on rare occasions in the Chesapeake Bay near the project area, they have not been seen by the Protected Species Observers in the PTST project area during the construction. Density data for this species within the project vicinity do not exist or were not calculated because sample sizes were too small to produce reliable estimates of density. Additionally, harbor porpoise sighting data collected by the U.S. Navy near Naval Station Norfolk and Virginia Beach from 2012 to 2015 (Engelhaupt *et al*. 2014, 2015, 2016) did not produce high enough sample sizes to calculate densities.

One group of two harbor porpoises was seen during spring 2015 (Engelhaupt *et al.* 2016). Therefore, it is assumed that there are two harbor porpoises exposed to noise exceeding harassment levels each month during the spring (March–April) for a total of

four harbor porpoises (i.e., 1 group of 2 individuals per month x 2 months per year = 4 harbor porpoises). Harbor porpoises are not expected to be present in the summer, fall or winter. Harbor porpoises are members of the high-frequency hearing group which will have Level A harassment isopleths as large as 338 m during impact driving of 36" steel pile, while the Level B harassment zone is 736 m. Given the relatively large Level A harassment zones for HF cetaceans during impact driving and a required shutdown zone of 200 m, NMFS will assume that 30 percent of porpoises are taken by Level A harassment. Therefore, NMFS is authorizing take of three porpoises by Level B harassment and one porpoise by Level A harassment.

Harbor seal

The expected number of harbor seals in the project area was estimated using systematic, land and vessel-based survey data for in-water and hauled-out seals collected by the U.S. Navy at the CBBT rock armor and Portal Islands from November 2014 through April 2022 (Rees *et al*. 2016; Jones *et al*. 2018; Jones and Rees 2020; Jones and Rees 2021; Jones and Rees 2022; Jones and Rees 2023) and shown in table 10. The number of harbor seals sighted by month ranged from 0 to 170 individuals.

Table 10 -- Summary of Historical Harbor Seal Sightings by Month from 2014 to 2022 at the Chesapeake Bay Bridge Tunnel

Month	2014	2015	2016	2017	2018	2019	2020	2021	2022	Monthly Average
January	-	-	33	120	170	7	18	49	34	61.6
February	-	39	80	106	159	21	0	43	14	57.7
March	-	55	61	41	0	18	6	26	37	30.5
April	-	10	1	3	3	4	0	6	1	3.5
December	4	9	24	8	29	0	4	11	11	12.5

Note: Seal counts began in November 2014 and were collected for 9 field seasons (2014/2015, 2015/2016, 2016/2017, 2017/2018, 2018/2019, 2019/2020, 2020/2021, 2021/2022) ending in 2022. In January 2015, no surveys were conducted.

Seal density data are in the format of seal per unit time; therefore, seal take requests were calculated as total number of potential seals per pile driving day (8 hours) multiplied by the number of driving days per month. For example, in December seal density data is reported at 14.3 seals per day * 26 workdays in December, resulting in the

potential of 372 instances of take for that month (table 11). The anticipated number of take events were summed across the months during which in-water pile driving is planned. The largest Level A harassment isopleth for phocid species is 153 m which will occur when piles are being removed via impact hammer with a bubble curtain. The smallest Level A harassment zone is 1 m which will occur when piles are removed via vibratory hammer with a bubble curtain. NMFS is requiring a shutdown zone for harbor seals of 100 m during impact driving which will theoretically result in no take by Level A harassment. However, a small number of harbor seals could enter into the shutdown zone unseen by a PSO and remain for sufficient duration to incur PTS. Given that harbor seals are common in the project area, NMFS assumed that a single harbor seal will experience Level A harassment during each in-water work day (80). Therefore, NMFS is authorizing the take of 80 harbor seals by Level A harassment and 2,634 harbor seals by Level B harassment for a total of 2,714 takes (table 11).

Table 11 -- Calculation of the Number of Harbor Seal Takes

Month	Estimated Seals per Work Day	Total Pile Driving Days per Month	Total Number of Requested Takes
January 2024	61.6	15	924
February 2024	57.8	18	1,040
March 2024	30.5	13	396.5
April 2024	3.5	8	28
December 2024	12.5	26	325
			2,714

Gray seal

The number of gray seals expected to be present at the PTST project area was estimated using the same methodology as was used for the harbor seal. Survey data collected by the U.S. Navy at the portal islands from 2015 through 2022 was utilized (Rees *et al*. 2016; Jones *et al*. 2018; Jones and Rees 2023). A maximum of 1 gray seal was seen during the months of February 2015, 2016, and 2022. Given this information NMFS assumed that a single gray seal will be taken per work day in February 2024.The

anticipated numbers of monthly takes were calculated following the same approach as for harbor seals, and the monthly takes were then summed (table 12). Although the project has not recorded any gray seal sightings to date, NMFS assumed that, over the duration of the project, a single gray seal could enter into the Level A harassment zone unseen by a PSO and remain for sufficient duration to incur PTS. Therefore, NMFS is authorizing the take of 1 gray seal by Level A harassment and 17 gray seals by Level B harassment for a total of 18 authorized takes.

Table 12 -- Calculation of the Number of Gray Seal Takes

Month	Estimated Seals per Work Day	Total Pile Driving Days per Month	Total Number of Requested Takes
January 2024	0	15	0
February 2024	1	18	18
March 2024	0	13	0
April 2024	0	8	0
December 2024	0	26	0
Total			18

Table 13 shows the take numbers authorized by NMFS as well as the percentage of each stock affected.

Table 13 -- Authorized Take by Stock and Harassment Type as a Percentage of Stock Abundance

Species	Stock	Level A Harassment	Level B Harassment	Total	Percent of Stock
Humpback Whale	Gulf of Maine	0	6	6	0.4
Harbor Porpoise	Gulf of Maine/ Bay of Fundy	1	3	4	<0.01
Bottlenose Dolphin	WNA Coastal, Northern Migratory	0	6,028	6,028	90.8
	WNA Coastal, Southern Migratory	0	6,028	6,028	160.7
	NNCES	0	200	200	24.3
Harbor Seal	Western North Atlantic	80	2,634	2,714	4.4

Gray Seal	Western North Atlantic	1	17	18	<0.01

The monitoring results from work conducted in 2020 and 2021 are found in table 14. The results demonstrate significantly fewer takes by harassment than were authorized, and it is important to note that estimates in the previous IHAs as well as in this IHA are based on conservative assumptions, including the size of identified harassment zones and the abundance of marine mammals. However, we note that these assumptions represent the best available information in this case.

Table 14 -- Marine Mammal Monitoring Results from IHAs issued in 2020 and 2021

Species	Stock	Level A Harassments Authorized in 2020 IHA	Level B Harassments Authorized in 2020 IHA	Observations in Level A Harassment Zones Under 2020 IHA	Observations in Level B Harassment Zones Under 2020 IHA	Level A Harassments Authorized in 2021 IHA	Level B Harassments Authorized in 2021 IHA	Observations in Level A Harassment Zones Under 2021 IHA	Observations in Level B Harassment Zones Under 2021 IHA
Humpback Whale	Gulf of Maine	-	12	-	-	-	12	-	-
Harbor Porpoise	Gulf of Maine/ Bay of Fundy	5	7	-	-	5	7	-	-
Bottlenose Dolphin	WNA Coastal, Northern Migratory	142	14,095	-	5	-	43,203	-	394
	WNA Coastal, Southern Migratory	142	14,095	-	-	-	43,203	-	-
	NNCES	2	198	-	-	-	250	-	-
Harbor Seal	Western North Atlantic	1,296	2,124	-	-	1154	1,730	-	-
Gray Seal	Western North Atlantic	1	3	-	-	16	24	-	-

Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

CTJV must conduct training between construction supervisors, crews, marine mammal monitoring team, and relevant CTJV staff prior to the start of all pile driving

activities and when new personnel join the work, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood.

Construction supervisors and crews, PSOs, and relevant CTJV staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction. If an activity is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone indicated in table 15 or 15 minutes have passed without re-detection of the animal.

Construction activities must be halted upon observation of a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met entering or within the harassment zone.

Shutdown Zones —For all pile driving activities, CTJV will implement shutdowns within designated zones. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity will occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones vary based on the activity type and marine mammal hearing group (table 7). In most cases, the shutdown zones are based on the estimated Level A harassment isopleth distances for each hearing group. However, in cases where it would be challenging to detect marine mammals at the Level A harassment isopleth, (*e.g.,* for high frequency cetaceans and phocids during impact driving activities), smaller shutdown zones have been established (table 15).

Table 15 -- Shutdown and Monitoring Zones (meters)

Method and Piles	LF Cetaceans	MF Cetaceans	HF Cetaceans	Phocids	Monitoring Zone

36-in Impact (with bubble Curtain)	285	20	200	160	736
36-in Vibratory (with bubble curtain)	10	10	15	10	10,000

Protected Species Observers —The number and placement of PSOs during all construction activities (described in the **Monitoring and Reporting** section as well as the Marine Mammal Monitoring Plan) will ensure that the entire shutdown zone is visible. A minimum of one PSO must be employed for all driving activities and placed at a location providing, at a minimum, adequate views of the established shutdown zones.

Monitoring for Level B Harassment —PSOs will monitor the shutdown zones and beyond to the extent that PSOs can see. Monitoring beyond the shutdown zones enables observers to be aware of and communicate the presence of marine mammals in the project areas outside the shutdown zones and thus prepare for a potential cessation of activity should the animal enter the shutdown zone. If a marine mammal enters the Level B harassment zone (or Level A harassment zone if larger than the Level B harassment zone), PSOs will document the marine mammal's presence and behavior.

Pre and Post-Activity Monitoring —Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs will observe the shutdown, Level A harassment, and Level B harassment zones for a period of 30 minutes. Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones are clear of marine mammals. If the shutdown zone is obscured by fog or poor lighting conditions, in-water construction activity will not be initiated until the entire shutdown zone is visible. Pile driving activities may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals. If a marine mammal is observed entering or within shutdown zones, pile driving activities must be

delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone or 15 minutes have passed for all other species without re-detection of the animal.

Soft Start —The use of soft-start procedures are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of three strikes from the hammer at reduced energy, with each strike followed by a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins. Soft start will be implemented at the start of each day's impact pile driving activities and at any time following cessation of impact pile driving activities for a period of 30 minutes or longer. Soft start is not required during vibratory pile driving activities.

Bubble Curtain — Use of a bubble curtain during impact and vibratory pile driving in water depths greater than 3 m (10 ft) will be required. It must be operated as necessary to achieve optimal performance, and there can be no reduction in performance attributable to faulty deployment. At a minimum, CTJV must adhere to the following performance standards: The bubble curtain must distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column. The lowest bubble ring must be in contact with the substrate for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent substrate contact. No parts of the ring or other objects shall prevent full substrate contact. Air flow to the bubblers must be balanced around the circumference of the pile.

Based on our evaluation of the applicant’s planned measures, NMFS has determined that the mitigation measures provide the means of effecting the least

practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;

- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

Visual Monitoring —Marine mammal monitoring must be conducted in accordance with the Marine Mammal Monitoring and Mitigation Plan. Marine mammal monitoring during pile driving activities must be conducted by NMFS-approved PSOs in a manner consistent with the following:

- PSOs must be independent of the activity contractor (for example, employed by a subcontractor), and have no other assigned tasks during monitoring periods;
- At least one PSO must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization;
- Other PSOs may substitute other relevant experience, education (degree in biological science or related field) or training for experience performing the duties of a PSO during construction activities pursuant to a NMFS-issued incidental take authorization.
- PSOs must be approved by NMFS prior to beginning any activity subject to this IHA.

PSOs should also have the following additional qualifications:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including identification of behaviors;

- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including, but not limited to, the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was note implemented when required); and marine mammal behavior; and
- 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 necessary.

Visual monitoring will be conducted by a minimum of one trained PSO positioned at a suitable vantage point that will allow coverage of the identified harassment zones. The Portal Islands and associated berms will constrain the ensonified area to only one side (*i.e.* east or west) of the bridge tunnel structure. Additionally, CTJV expressed concern that since they will only be using one drill for about two hours per week, it will be difficult to secure multiple observers willing to commit to the PTST project.

Monitoring will be conducted 30 minutes before, during, and 30 minutes after all in water construction activities. In addition, PSOs will record all incidents of marine mammal occurrence, regardless of distance from activity, and will document any behavioral reactions in concert with distance from piles being removed. Pile driving activities include the time to remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

Reporting

CTJV will submit a draft marine mammal monitoring report to NMFS within 90 days after the completion of pile driving activities, or 60 days prior to a requested date of

issuance of any future IHAs for the project, or other projects at the same location, whichever comes first. The marine mammal monitoring report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report will include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including: (1) The number and type of piles that were removed (*e.g.,* impact, vibratory); and (2) Total duration of driving time for each pile (vibratory) and number of strikes for each pile (impact);
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;
- Upon observation of a marine mammal, the following information: (1) Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting; (2) Time of sighting; (3) Identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species; (4) Distance and location of each observed marine mammal relative to the pile being removed for each sighting; (5) Estimated number of animals (min/max/best estimate); (6) Estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*); (7) Animal's closest point of approach and estimated time spent within the harassment zone; (8) Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the

activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

- Number of marine mammals detected within the harassment zones, by species; and,
- Detailed information about implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days, the draft final report will constitute the final report. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments. The Holder must submit all PSO data electronically in a format that can be queried such as a spreadsheet or database (*i.e.,* digital images of data sheets are not sufficient).

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the Holder must report the incident to the Office of Protected Resources (OPR), NMFS (*PR.ITP.MonitoringReports@noaa.gov* and *ITP.pauline@noaa.gov*) and to the Greater Atlantic Regional Stranding Coordinator (978-282-8478) as soon as feasible. If the death or injury was clearly caused by the specified activity, the Holder must immediately cease the activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. The Holder must not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);

- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the majority of our analysis applies to all the species listed in table 13, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated

individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are described independently in the analysis below.

Impact and vibratory pile driving have the potential to disturb or displace marine mammals. Specifically, the project activities may result in take, in the form of Level A and Level B harassment from underwater sounds generated from pile driving.

The takes from Level A and Level B harassment would be due to potential behavioral disturbance, TTS, and PTS. No serious injury or mortality is anticipated given the nature of the activity and measures designed to minimize the possibility of injury to marine mammals. The potential for harassment is minimized through the construction method and the implementation of the planned mitigation measures (see **Mitigation** section).

We anticipate that harbor porpoises, harbor seals and gray seals may sustain some limited Level A harassment in the form of auditory injury. However, animals in these locations that experience PTS will likely only receive slight PTS, *i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by pile driving, *i.e.,* the low-frequency region below 2 kHz, not severe hearing impairment or impairment in the regions of greatest hearing sensitivity. If hearing impairment occurs, it is most likely that the affected animal will lose a few decibels in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics. Impacts to individual fitness, reproduction, or survival are unlikely. As described above, we expect that marine mammals will be likely to move away from a sound source that represents an aversive stimulus, especially at levels that would be expected to result in PTS, given sufficient notice through use of soft start.

Behavioral responses of marine mammals to pile driving at the project site, if any, are expected to be mild and temporary. Marine mammals within the Level B harassment zone may not show any visual cues they are disturbed by activities or could become alert, avoid the area, leave the area, or display other mild responses that are not observable such as changes in vocalization patterns. Given the short duration of noise-generating activities per day, any harassment would be temporary. There are no other areas or times of known biological importance for any of the affected species.

We acknowledge the existence and concern about the ongoing humpback whale UME. We have no evidence that this project is likely to result in vessel strikes (a major correlate of the UME) and marine construction projects in general involve the use of slow-moving vessels, such as tugs towing or pushing barges, or smaller work boats maneuvering in the vicinity of the construction project. These vessel types are not typically associated with vessel strikes resulting in injury or mortality. More generally, the UME does not yet provide cause for concern regarding population-level impacts for humpback whales. Despite the UME, the West Indies breeding population or DPS, remains healthy.

For all species and stocks, take will occur within a limited, confined area (adjacent to the CBBT) of the stock's range and the amount of take authorized is extremely small when compared to stock abundance. In addition, it is unlikely that minor noise effects in a small, localized area of habitat will have any effect on the stocks' ability to recover. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activities will have only minor, short-term effects on individuals. The specified activities are not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;
- Authorized Level A harassment will be very small amounts and of low degree;
- No important habitat areas have been identified within the project area;
- For all species, the specified project area in Chesapeake Bay is a very small and peripheral part of their range;
- CTJV will implement mitigation measures such as bubble curtains, soft-starts, and shut downs; and
- Monitoring reports from similar work in Chesapeake Bay have documented little to no effect on individuals of the same species impacted by the specified activities.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only take of small numbers of marine mammals may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of

marine mammals. When the predicted number of individuals to be taken is less than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The amount of take NMFS is authorizing is below one-third of the estimated stock abundance for humpback whale, harbor porpoise, gray seal, and harbor seal (in fact, take is no more than 6 percent of the abundance of the affected stocks, see table 13). This is likely a conservative estimate because they assume all takes are of different individual animals which is likely not the case. Some individuals may return multiple times in a day, but PSOs will count them as separate takes if they cannot be individually identified.

There are three bottlenose dolphin stocks that could occur in the project area. Therefore, the estimated 12,256 dolphin takes by Level B harassment will likely be split among the western North Atlantic northern migratory coastal stock, western North Atlantic southern migratory coastal stock, and NNCES stock. Based on the stocks' respective occurrence in the area, NMFS estimated that there will be no more than 200 takes from the NNCES stock, representing 24.3 percent of that population, with the remaining takes split evenly between the northern (90.8 percent) and southern migratory coastal stocks (160.7 percent). Based on consideration of various factors described below, we have determined the numbers of individuals taken will comprise less than one-third of the best available population abundance estimate of either coastal migratory stock. Detailed descriptions of the stocks' ranges have been provided in **Description of Marine Mammals in the Area of Specified Activities**.

Both the northern migratory coastal and southern migratory coastal stocks have expansive ranges and they are the only dolphin stocks thought to make broad-scale, seasonal migrations in coastal waters of the western North Atlantic. Given the large ranges associated with these two stocks it is unlikely that large segments of either stock

will approach the project area and enter into the Chesapeake Bay. The majority of both stocks are likely to be found widely dispersed across their respective habitat ranges and unlikely to be concentrated in or near the Chesapeake Bay.

Furthermore, the Chesapeake Bay and nearby offshore waters represent the boundaries of the ranges of each of the two coastal stocks during migration. The northern migratory coastal stock is found during warm water months from coastal Virginia, including the Chesapeake Bay and Long Island, New York. The stock migrates south in late summer and fall. During cold water months dolphins may be found in coastal waters from Cape Lookout, North Carolina, to the North Carolina/Virginia. During January–March, the southern migratory coastal stock appears to move as far south as northern Florida. From April to June, the stock moves back north to North Carolina. During the warm water months of July–August, the stock is presumed to occupy coastal waters north of Cape Lookout, North Carolina, to Assateague, Virginia, including the Chesapeake Bay. There is likely some overlap between the northern and southern migratory stocks during spring and fall migrations, but the extent of overlap is unknown.

The Bay and waters offshore of the mouth are located on the periphery of the migratory ranges of both coastal stocks (although during different seasons). Additionally, each of the migratory coastal stocks are likely to be located in the vicinity of the Bay for relatively short timeframes. Given the limited number of animals from each migratory coastal stock likely to be found at the seasonal migratory boundaries of their respective ranges, in combination with the short time periods (~2 months) animals might remain at these boundaries, it is reasonable to assume that takes are likely to occur only within some small portion of either of the migratory coastal stocks.

Both migratory coastal stocks likely overlap with the NNCES stock at various times during their seasonal migrations. The NNCES stock is defined as animals that primarily occupy waters of the Pamlico Sound estuarine system (which also includes

Core, Roanoke, and Albemarle sounds, and the Neuse River) during warm water months (July–August). Members of this stock also use coastal waters (≤1 km from shore) of North Carolina from Beaufort north to Virginia Beach, Virginia, including the lower Chesapeake Bay. Comparison of dolphin photo-identification data confirmed that limited numbers of individual dolphins observed in Roanoke Sound have also been sighted in the Chesapeake Bay (Young, 2018). Like the migratory coastal dolphin stocks, the NNCES stock covers a large range. The spatial extent of most small and resident bottlenose dolphin populations is on the order of 500 km^2, while the NNCES stock occupies over 8,000 km^2 (LeBrecque *et al.,* 2015). Given this large range, it is again unlikely that a preponderance of animals from the NNCES stock will depart the North Carolina estuarine system and travel to the northern extent of the stock's range and enter into the Bay. However, recent evidence suggests that there is likely a small resident community of NNCES dolphins of indeterminate size that inhabits the Chesapeake Bay year-round (Eric Patterson, Personal Communication).

Many of the dolphin observations in the Bay are likely repeated sightings of the same individuals. The Potomac-Chesapeake Dolphin Project has observed over 1,200 unique animals since observations began in 2015. Re-sightings of the same individual can be highly variable. Some dolphins are observed once per year, while others are highly regular with greater than 10 sightings per year (Mann, Personal Communication). Similarly, using available photo-identification data, Engelhaupt *et al.* (2016) determined that specific individuals were often observed in close proximity to their original sighting locations and were observed multiple times in the same season or same year. Ninety-one percent of re-sighted individuals (100 of 110) in the study area were recorded less than 30 km from the initial sighting location. Multiple sightings of the same individual will considerably reduce the number of individual animals that are taken by harassment.

Furthermore, the existence of a resident dolphin population in the Bay will increase the percentage of dolphin takes that are actually re-sightings of the same individuals.

In summary and as described above, the following factors primarily support our determination regarding the incidental take of small numbers of a species or stock:

- The take of marine mammal stocks authorized for take comprises less than 10 percent of any stock abundance (with the exception of bottlenose dolphin stocks);
- Potential bottlenose dolphin takes in the project area are likely to be allocated among three distinct stocks;
- Bottlenose dolphin stocks in the project area have extensive ranges and it will be unlikely to find a high percentage of any one stock concentrated in a relatively small area such as the project area or the Bay;
- The Bay represents the migratory boundary for each of the specified dolphin stocks and it will be unlikely to find a high percentage of any stock concentrated at such boundaries;
- Many of the takes will be repeats of the same animal and it is likely that a number of individual animals could be taken 10 or more times.

Based on the analysis contained herein of the planned activity (including the required mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed species is expected to result from this activity or been authorized by NMFS. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NAO 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that will preclude this categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHA qualifies to be categorically excluded from further NEPA review.

Authorization

NMFS has issued an IHA to CTJV for the potential harassment of small numbers of five marine mammal species incidental to the Parallel Thimble Shoal Tunnel Project, In Virginia Beach, Virginia that includes the previously explained mitigation, monitoring and reporting requirements.

Dated: March 4, 2024.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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