



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910

DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
Letter of Authorization

Avangrid Renewables, LLC (Avangrid; LOA Holder) and those persons it authorizes or funds to conduct activities on its behalf in the specified geographical region described herein are authorized to take marine mammals incidental to construction of the New England Wind Project (hereafter known as the “Project”), located in state and Federal waters offshore Massachusetts, subject to the provisions of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*; MMPA) of 1972, as amended and the applicable regulations (50 CFR §§ 217.320 - 217.329), provided they are in compliance with all terms, conditions, and requirements described herein.

Effective Dates

This Letter of Authorization (LOA) is effective for a period of five years, beginning on March 27, 2025 and expiring after March 26, 2030.

Specified Geographical Region

The specified geographical region is the Mid-Atlantic Bight, defined as waters from Cape Hatteras, North Carolina to Cape Cod, Massachusetts and extending into the west Atlantic to the 100-m isobath, and includes, but it not limited to, the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf (OCS)-A 0534, OCS-A 0561, and portions of OCS-A 0501 Commercial Lease of Submerged Lands for Renewable Energy Development, along export cable routes, and at the sea-to-shore transition points in Barnstable County, Massachusetts (see Figure 1).

Specified Activities

The specified activities are impact pile driving, vibratory pile driving, and drilling of wind turbine generator (WTG) and electrical service platform (ESP) foundations; high-resolution geophysical (HRG) site characterization surveys; detonation of unexploded ordnances (UXOs) or munitions and explosives of concern (MECs); fisheries and benthic monitoring surveys; placement of scour protection; trenching, laying, and burial activities associated with the installation of the export cable from the ESP(s) to shore based converter stations and inter-array cables between WTG foundations; vessel transit within the specified geographical region to transport crew, supplies, and materials; and WTG operations.



1. Permissible Methods of Taking:

Avangrid, and those persons it authorizes or funds to conduct activities on its behalf, may incidentally, but not intentionally, take marine mammals within the specified geographical region in the course of conducting the specified activities, provided Avangrid is in compliance with all terms, conditions, and requirements described herein.

(a) Permissible methods of taking consist of:

- (1) By Level B harassment associated with the acoustic disturbance of marine mammals by impact and vibratory pile driving and drilling (foundation installation), UXO/MEC detonations, and HRG site characterization surveys; and
- (2) By Level A harassment associated with the acoustic disturbance of marine mammals by impact pile driving of WTG and ESP foundations and UXO/MEC detonations.

(b) Take by mortality or serious injury of any marine mammal species is not authorized.

(c) The incidental take of marine mammals by the specified activities described above is limited to only the species and stocks found in Table 1 below.

2. Prohibitions:

Except for the takings described under **Permissible Methods of Taking**, it is unlawful for any person to do any of the following in connection with the specified activities described herein:

- (a) Violate or fail to comply with the terms, conditions, and requirements of this LOA or the regulations;
- (b) Take any marine mammal not specified in Table 1;
- (c) Take any marine mammal in Table 1 in any manner other than those specified in **Permissible Methods of Taking** above or number greater than those specified in Table 1; and
- (d) Take any marine mammal in Table 1 after NMFS determines such takings results in more than a negligible impact on the species or stocks.

3. Mitigation Requirements:

When conducting the specified activities in the specified geographical region, Avangrid must implement the following mitigation measures:

- (a) *General conditions.* LOA Holder must comply with the following general measures:

- (1) A copy of any issued LOA must be in the possession of LOA Holder and its designees, all vessel operators, visual protected species observers (PSOs), passive acoustic monitoring (PAM) operators, pile driver operators, and any other relevant designees operating under the authority of the issued LOA;
- (2) LOA Holder must conduct training for construction, survey, and vessel personnel and the marine mammal monitoring team (PSO and PAM operators) prior to the start of all in-water construction activities in order to explain responsibilities, communication procedures, marine mammal detection and identification, mitigation, monitoring, and reporting requirements, safety and operational procedures, and authorities of the marine mammal monitoring team(s). This training must be repeated for new personnel who join the work during the project. A description of the training program must be provided to NMFS at least 60 days prior to the initial training before in-water activities begin. Confirmation of all required training must be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to initiating project activities;
 - (i) A copy of the Marine Mammal Monitoring Plan must be made available on all vessels and staffed platforms. A simple guide must be included with the Marine Mammal Monitoring Plan to aid personnel in identifying species if they are observed in the vicinity of the project area.
- (3) Prior to and when conducting any in-water activities and vessel operations, LOA Holder personnel and contractors (*e.g.*, vessel operators, PSOs) must use available sources of information on North Atlantic right whale presence in or near the Project Area including daily monitoring of the Right Whale Sightings Advisory System, and monitoring of Coast Guard VHF Channel 16 throughout the day to receive notification of any sightings and/or information regarding the establishment of mandatory or voluntary speed restrictions (*e.g.*, Dynamic Management Areas (DMAs), Seasonal Management Areas (SMAs), and/or acoustically-triggered slow zones), and any information regarding North Atlantic right whale sighting locations to provide situational awareness for both vessel operators, PSO(s), and PAM operators; The marine mammal monitoring team must monitor these systems no less than every 4 hours;
- (4) Any marine mammal observed by project personnel must be immediately communicated to any on-duty PSOs, PAM operator(s), and all vessel captains. Any large whale observation or acoustic detection by PSOs or PAM operators must be conveyed to all vessel captains;
- (5) LOA Holder must establish and implement minimum visibility, vessel separation, clearance, and shutdown zones as described in the LOA (see Tables 2, 3, and 4). For North Atlantic right whales, any visual detection by a PSO at any distance or acoustic detection by PAM operators within the PAM monitoring zone (where applicable for the specified activities) must trigger a delay to the commencement of pile driving (*i.e.*, impact pile driving and vibratory pile driving) and drilling;

- (6) PSOs and PAM operators have the authority to call for a delay or shutdown to an activity, and LOA Holder must instruct all vessel personnel regarding the authority of the PSOs and PAM operators. If a delay to commencing an activity is called for by the Lead PSO or PAM operator, LOA Holder must take the required mitigative action. If a shutdown of an activity is called for by a PSO or PAM operator, LOA Holder must take the required mitigative action unless shutdown would result in imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. Any disagreement between the PSO, PAM operator, and the activity operator regarding delays or shutdowns must only be discussed after the mitigative action has occurred;
- (7) If an individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant clearance zone prior to beginning a specified activity (*e.g.*, pile driving (impact and vibratory), drilling, UXO/MEC detonations, and HRG acoustic sources), the activity must be delayed. If an activity is ongoing and individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant shutdown zone, the activity must be shut down (*i.e.*, cease) immediately, unless shutdown would result in imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. The activity must not commence or resume until the animal(s) has been confirmed to have left the clearance area and is on a path away from the applicable zone or after 15 minutes with no further sightings for small odontocetes and pinnipeds or 30 minutes with no further sightings for all other species;
- (8) Foundation installation (*i.e.*, impact and vibratory pile driving, drilling), UXO/MEC detonation, and HRG survey activities must only commence when minimum visibility zones (for UXO/MEC detonations the visual clearance zones) are fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to initiation of equipment (*i.e.*, vibratory and impact pile driving, drilling, UXO/MEC detonations, and HRG surveys that use boomers, sparkers). Any marine mammals observed within a clearance or shutdown zone must leave (of their own volition) prior to the commencement of foundation installation activities, UXO/MEC detonation, or HRG surveys;
- (9) In the event that a large whale species is sighted or acoustically detected that cannot be confirmed as a non-North Atlantic right whale, it must be treated as if it were a North Atlantic right whale for purposes of mitigation;
- (10) For in-water construction heavy machinery activities listed in the **Specified Activities** section of this LOA, if a marine mammal is on a path towards or comes within 10 meters (m; 32.8 feet (ft)) of equipment, LOA Holder must cease operations until the marine mammal has moved more than 10 m on a path away from the activity to avoid direct interaction with equipment;

- (11) All vessels must be equipped with a properly installed, operational Automatic Identification System (AIS) device and LOA Holder must report all Maritime Mobile Service Identify (MMSI) numbers to NMFS Office of Protected Resources;
 - (12) By accepting a LOA, LOA Holder consents to on-site observation and inspections by Federal agency personnel (including NOAA personnel) during activities described in this LOA, for the purposes of evaluating the implementation and effectiveness of measures contained within the final rule (89 FR 52222; June 21, 2024) and the LOA; and
 - (13) It is prohibited to assault, harm, harass (including sexually harass), oppose, impede, intimidate, impair, or in any way influence or interfere with a PSO, PAM operator, or vessel crew member acting as an observer, or attempt the same. This prohibition includes, but is not limited to, any action that interferes with an observer's responsibilities, or that creates an intimidating, hostile, or offensive environment. Personnel may report any violations to the NMFS Office of Law Enforcement.
- (b) *Vessel strike avoidance measures.* LOA Holder must comply with the following vessel strike avoidance measures while in the specified geographical region, unless a deviation is necessary to maintain safe maneuvering speed and justified because the vessel is in an area where oceanographic, hydrographic, and/or meteorological conditions severely restrict the maneuverability of the vessel; an emergency situation presents a threat to the health, safety, life of a person; or when a vessel is actively engaged in emergency rescue or response duties, including vessel-in distress or environmental crisis response. An emergency is defined as a serious event that occurs without warning and requires immediate action to avert, control, or remedy harm.
- (1) Prior to the start of the Project's activities involving vessels, all vessel personnel must receive a protected species training that covers, at a minimum: Identification of marine mammals that have the potential to occur in the specified geographical region; detection and observation methods in good weather conditions (*i.e.*, clear visibility, low winds, low sea states) and bad weather conditions (*i.e.*, fog, high winds, high sea states, with glare); sighting communication protocols; all vessel strike avoidance mitigation requirements; and information and resources available to the project personnel regarding the applicability of Federal laws and regulations for protected species. This training must be repeated for any new vessel personnel who join the Project;
 - (i) Confirmation of the vessel personnel's training and understanding of the LOA requirements must be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to vessel activities.
 - (2) All vessel operators and dedicated visual observers must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course to avoid striking any marine mammal;

- (3) All underway vessels operating at any speed must have a dedicated visual observer on duty at all times to monitor for marine mammals within a 180 degree direction of the forward path of the vessel (90 degree port to 90 degree starboard) located at an appropriate vantage point for ensuring vessels are maintaining appropriate separation distances. Dedicated visual observers may be third-party observers (*i.e.*, NMFS-approved PSOs; see section (4)(a)) or trained crew members (see paragraph (b)(1) of this section). Dedicated visual observers must be equipped with alternative monitoring technology (*e.g.*, night vision devices, infrared cameras) for periods of low visibility (*e.g.*, darkness, rain, fog, *etc.*). The dedicated visual observer must not have any other duties while observing for marine mammals and must receive prior training on protected species detection and identification, vessel strike avoidance procedures, how and when to communicate with the vessel captain, and reporting requirements in this LOA;
- (4) All vessel operators and dedicated visual observers on each transiting vessel must continuously monitor U.S. Coast Guard VHF Channel 16, at the onset of transiting through the duration of transiting, over which North Atlantic right whale sightings are broadcasted. At the onset of transiting and at least once every 4 hours, vessel operators and/or trained crew member(s) must also monitor the project's Situational Awareness System (if applicable), WhaleAlert, and relevant NOAA information systems such as the Right Whale Sighting Advisory System (RWSAS) for the presence of North Atlantic right whales. Any large whale sighting by any Project personnel must be communicated immediately to all project-associated vessels;
- (5) Any observations of any large whale by any LOA Holder staff or contractor, including vessel crew, must be communicated immediately to on-duty PSOs, PAM operators, and all vessel captains to increase situational awareness;
- (6) All vessel operators must abide by existing applicable vessel speed regulations (50 CFR 224.105). Nothing in this LOA exempts vessels from any other applicable marine mammal speed or approach regulations
- (7) Vessels, regardless of size, must not travel over 10 kn (11.5 mph) from November 1st through April 30th, annually, in the specified geographical region. During all other time periods, all vessels must transit active Slow Zones (*i.e.*, DMAs or acoustically-triggered slow zone), and SMAs at 10 kn or less (11.5 mph);
 - (i) If vessel(s) are traveling at speeds greater than 10 kn (11.5 mph) (*i.e.*, no speed restrictions are enacted) in the transit corridor (defined as from a port to the Lease Area or return), in addition to the required dedicated visual observer, LOA Holder must monitor the transit corridor in real-time with PAM prior to and during transits.
- (8) All vessels operators, regardless of their vessel's size, must immediately reduce speed to 10 kn or less when any large whale (other than a North Atlantic right whale), mother/calf pairs, or large assemblages of cetaceans are observed within 500 m (0.31 mi) of a transiting vessel;

- (9) All vessels, regardless of size, must immediately reduce speed to 10 kn (11.5 mph) or less for at least 24 hours when a North Atlantic right whale is sighted at any distance by any project related personnel or acoustically detected by any project-related PAM system. Each subsequent observation or acoustic detection in the Project area must trigger an additional 24-hour period. If a North Atlantic right whale is reported via any of the monitoring systems (described in paragraph (b)(4) of this section) within 10 km of a transiting vessel(s), that vessel must operate at 10 kn (11.5 mph) or less for 24 hours following the reported detection. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection in the transit corridor in the past 24 hours;
- (10) All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. If underway, all vessels must steer a course away from any sighted North Atlantic right whale at 10 kn (11.5 mph) or less such that the 500-m minimum separation distance requirement is not violated. If a North Atlantic right whale is sighted within 500 m of an underway vessel, that vessel must turn away from the whale(s), reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. All vessels must comply with North Atlantic right whale approach restrictions at 50 CFR 224.103(c);
- (11) All vessels must maintain a minimum separation distance of 100 m (328 ft) from sperm whales and non-North Atlantic right whale baleen whales. If one of these species is sighted within 100 m of a transiting vessel, that vessel must turn away from the whale(s), reduce speed, and shift the engine(s) to neutral. Engines must then not be engaged until the whale has moved outside of the vessel's path and beyond 100 m;
- (12) All vessels must maintain a minimum separation distance of 50 m from all delphinid cetaceans and pinnipeds with an exception made for those that approach the vessel (*e.g.*, bow-riding dolphins). If a delphinid cetacean or pinniped is sighted within 50 m of a transiting vessel, that vessel must turn away from the animal(s), reduce speed, and shift the engine to neutral, with an exception made for those that approach the vessel (*e.g.*, bow-riding dolphins). Engines must not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m;
- (13) When a marine mammal(s) is sighted while a vessel is transiting, the vessel must take action as necessary to avoid violating the relevant separation distances (*e.g.*, attempt to remain parallel to the animal's course, slow down, and avoid abrupt changes in direction until the animal has left the area). This measure does not apply to any vessel towing gear or any situation where respecting the relevant separation distance would be unsafe (*i.e.*, any situation where the vessel is navigationally constrained);
- (14) All vessels underway must not divert or alter course to approach any marine mammal; and

- (15) LOA Holder must submit a Marine Mammal Vessel Strike Avoidance Plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of vessel activity. The plan must provide details on the vessel-based observer and PAM protocols for transiting vessels. The plan must also provide details on the transit corridor. If a plan is not submitted and approved by NMFS prior to vessel operations, all project vessels must travel at speeds of 10 kn (11.5 mph) or less. LOA Holder must comply with any approved Marine Mammal Vessel Strike Avoidance Plan.
- (c) *WTG and ESP foundation installation.* The following requirements apply to impact and vibratory pile driving and drilling activities associated with the installation of WTG and ESP foundations:
- (1) Impact pile driving and drilling must not occur January 1 through April 30, annually. Impact pile driving and drilling must not be planned in December; however, it may only occur if necessary to complete the Project within a given year with prior approval by NMFS. LOA Holder must notify NMFS in writing by September 1 of that year that pile driving or drilling cannot be avoided and circumstances are expected to necessitate pile driving or drilling in December;
 - (2) Vibratory pile driving (*e.g.*, vibratory setting of piles) must not occur December 1-May 31, annually;
 - (3) Monopiles must be no larger than 13-m in diameter. Pin piles must be no larger than 4 m in diameter. During all monopile and pin pile installation, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must be used. Hammer energies must not exceed 6,000 kilojoules (kJ) for monopile installations and 3,500 kJ for pin pile installation. No more than two monopiles or four pin piles may be installed per day. No concurrent pile driving (*i.e.*, impact pile driving or vibratory pile driving) or drilling may occur. All mitigation measures required for or applicable to jacket foundations are required for bottom-frame foundations that utilize pile foundations;
 - (i) LOA Holder must not initiate pile driving or drilling earlier than 1 hour after civil sunrise or later than 1.5 hours prior to civil sunset, unless LOA Holder submits, and NMFS approves, an Alternative Monitoring Plan for Nighttime Foundation Installation (*i.e.*, Nighttime Foundation Installation Plan), that demonstrates the efficacy of their night vision devices to effectively monitor the mitigation zones. LOA Holder must submit this plan or plans (if separate Daytime Reduced Visibility and Nighttime Monitoring Plans are prepared) at least 180 calendar days before foundation installation is planned to begin. This plan(s) must include, but is not limited to, a complete description of how LOA Holder will monitor foundation installation activities during reduced visibility conditions (*e.g.*, rain, fog) and at night, including proof of the efficacy of monitoring devices (*e.g.*, mounted thermal/infrared camera systems, hand-held or wearable night vision devices NVDs, spotlights) in detecting marine

mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance and shutdown zones under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS Office of Protected Resources' satisfaction that marine mammals can reliably and effectively be detected within the clearance and shutdown zones for monopiles and pin pile before and during pile driving and drilling, nighttime foundation installation (unless a pile was initiated 1.5 hours prior to civil sunset) may not occur. Additionally, this plan must contain a thorough description of how LOA Holder will monitor foundation installation activities during daytime when unexpected changes to lighting or weather occur during pile driving (*i.e.*, impact or vibratory) or drilling that prevent visual monitoring of the full extent of the clearance and shutdown zones.

- (4) LOA Holder must utilize soft-start at the beginning of monopile and pin pile impact pile driving and at any time following a cessation of impact pile driving of 30 minutes or longer;
- (5) LOA Holder must establish clearance and shutdown zones (see Table 2), which must be measured using the radial distance around the pile driving or drilling location;
- (6) LOA Holder must utilize PSO(s) and PAM operator(s), as described in section (4) of this LOA. At least nine on-duty PSOs must be actively observing marine mammals before, during, and after installation of foundation piles (*i.e.*, monopiles and pin piles). At least three on-duty PSOs must be stationed and observing on the foundation installation vessel/platform. A minimum of three PSOs must be active on each of the two dedicated PSO vessels. On-duty PSOs must be located at the best vantage point to observe and document marine mammal sightings in proximity to the clearance and, if applicable, shutdown zones. Concurrently, at least one PAM operator must be actively monitoring for marine mammals with PAM 60 minutes before, during, and 30 minutes after pile driving and drilling in accordance with a NMFS-approved PAM Plan;
- (7) PSOs must visually monitor clearance zones for marine mammals for a minimum of 60 minutes prior to commencing pile driving or drilling. At least one PAM operator must review data from at least 24 hours prior to pile driving or drilling and actively monitor hydrophones for 60 minutes prior to, at all times during, and for 30 minutes after pile driving and drilling. The entire minimum visibility zone must be visible (*i.e.*, not obscured by dark, rain, fog, *etc.*) for a full 60 minutes immediately prior to commencing pile driving or drilling. All clearance zones must be confirmed to be free of marine mammals for 30 minutes immediately prior to the beginning of pile driving, drilling, and soft-start procedures. PAM

operators must immediately communicate all detections of marine mammals at any distance to the Lead PSO, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination;

- (8) If a marine mammal is detected within or about to enter the applicable clearance zones during the clearance periods defined in paragraph (c)(7) of this section, activities must be delayed until the animal has been visually observed exiting the clearance zone or until a specific time period has elapsed with no further sightings. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species;
 - (i) For foundation installation activities between May 1–May 14 and November 1–December 31, if a North Atlantic right whale is observed at any distance or acoustically detected within the PAM monitoring zone of the pile being driven (impact or vibratory) or area being drilled, pile driving and drilling must be delayed or stopped (unless activities must proceed for human safety or installation feasibility concerns) and may not resume until the following day or until the animal is confirmed to have exited the zone via aerial or additional vessel surveys.
- (9) Regarding noise abatement systems, the LOA Holder must deploy, at a minimum, a double bubble curtain during all pile driving and drilling and comply with the following measures:
 - (i) The bubble curtain(s) must distribute air bubbles using an air flow rate of at least $0.5 \text{ m}^3/(\text{min} \cdot \text{m})$. The bubble curtain(s) must surround 100 percent of the piling perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtain(s) must adjust the air supply and operating pressure such that the maximum possible noise attenuation performance of the bubble curtain(s) is achieved;
 - (ii) The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact;
 - (iii) No parts of the ring or other objects may prevent full seafloor contact with a bubble curtain ring;
 - (iv) Construction contractors must train personnel in the proper balancing of airflow to the bubble curtain ring. LOA Holder must provide NMFS Office of Protected Resources with a bubble curtain performance test and maintenance report to review within 72 hours after each pile using a bubble curtain is installed. Additionally, a full maintenance check (*e.g.*, manually clearing holes) must occur prior to each pile being installed;
 - (v) Corrections to the bubble ring(s) to meet the performance standards in this paragraph (c)(9) must occur prior to pile driving and drilling of foundation

piles. For any noise mitigation device in addition to the bubble curtain, LOA Holder must inspect and carry out appropriate maintenance on the system and ensure the system is functioning properly prior to every pile driving event; and

- (vi) LOA Holder must inspect and carry out appropriate maintenance on any noise attenuation systems used (including those other than bubble curtains) prior to every foundation installation event (*i.e.*, for each pile driven foundation) and UXO/MEC detonation and prepare and submit a Noise Attenuation System (NAS) inspection/performance report to NMFS Office of Protected Resources. For piles for which Thorough sound field verification (SFV) is carried out, this report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the respective pile.
- (10) PAM operator(s) must review data from at least 24 hours prior to pile driving and drilling and actively monitor hydrophones for 60 minutes prior to pile driving and drilling. All clearance zones must be acoustically confirmed to be free of marine mammals for 60 minutes before activities can begin immediately prior to starting vibratory pile driving, drilling, and a soft-start of impact pile driving. PAM operators will continue to monitor for marine mammals for at least 30 minutes after pile driving or drilling concludes. The exact details for PAM requirements must be submitted to NMFS within the PAM plan.
- (i) LOA Holder must implement PAM in accordance with the NMFS-approved PAM Plan, as described in section (4)(c)(9). The PAM system components (*i.e.*, acoustic buoys) must not be placed closer than 1 km (0.6 mi) to the pile being driven so that the activities do not mask the PAM system. LOA Holder must demonstrate the detection range of the system they plan to deploy while considering potential masking from concurrent pile-driving and vessel noise. The PAM system must be designed to detect all marine mammals to the maximum extent practicable, maximize baleen whale detections, and must be capable of detecting North Atlantic right whales within the PAM monitoring zone.
- (11) For North Atlantic right whales, any visual observation by a PSO at any distance or acoustic detection within the PAM Monitoring Zone must trigger a delay to the commencement of pile driving. The North Atlantic right whale clearance zone may only be declared clear if no North Atlantic right whale acoustic or visual detections have occurred within the clearance zone during the 60-minute monitoring period. Any large whale sighting by a PSO or detected by a PAM operator that cannot be identified as a non-North Atlantic right whale must be treated as if it were a North Atlantic right whale;
- (12) If a marine mammal is detected (visually or acoustically) entering or within the respective shutdown zone after pile driving or drilling has begun, the PSO or PAM operator must call for a shutdown of pile driving or drilling. If a marine mammal is detected entering or within the respective shutdown zone after pile

driving or drilling has begun, LOA Holder must stop pile driving or drilling immediately unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals, or the lead engineer determines there is pile refusal or pile instability. If pile driving or drilling is not shut down, LOA Holder must reduce hammer energy to the lowest level practicable and the reason(s) for not shutting down must be documented and reported to NMFS Office of Protected Resources within the applicable monitoring reports (*e.g.*, weekly, monthly) (see section (4)(f));

- (13) A visual observation or acoustic detection of a North Atlantic right whale at any distance by PSOs or an acoustic detection within the PAM monitoring zone triggers shutdown requirements under paragraph (c)(12) of this section. If pile driving or drilling has been shut down due to the presence of a North Atlantic right whale, pile driving or drilling may not restart until the North Atlantic right whale has neither been visually or acoustically detected by on-duty PSOs and PAM operators for 30 minutes;
- (14) If pile driving or drilling has been shut down due to the presence of a marine mammal other than a North Atlantic right whale, pile driving or drilling must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and has been visually or acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections have occurred. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species. In cases where these criteria are not met, pile driving may restart only if necessary to maintain pile stability at which time LOA Holder must use the lowest hammer energy practicable to maintain stability; and
- (15) LOA Holder must conduct SFV during the following foundation installation activities in accordance with the following requirements:
 - (i) For the first construction year, Thorough SFV must be conducted for the first three monopiles installed with only an impact hammer (*i.e.*, impact pile driving); the first three monopiles installed with a vibratory hammer (*i.e.*, vibratory pile driving or setting) followed by an impact hammer; the first two jacket foundations (all piles) installed; the first foundation (regardless of type) where drilling is used; the first monopile and first jacket foundation (all piles) installed in December (winter sound speed profile); and, the first foundation for any foundation scenarios that were modeled for the exposure analysis (*e.g.*, rated hammer energy, number of strikes, representative location) that does not fall into one of the previously listed categories (*e.g.*, if the first two jacket foundation are installed with only an impact hammer, Thorough SFV would be required for the first jacket foundation installed with vibratory and impact pile driving);
 - (ii) For any subsequent construction year, Thorough SFV must be conducted on the first monopile and first jacket foundation (all piles) if there are no

changes to the pile driving equipment (*e.g.*, same hammer, same Noise Attenuation System); Thorough SFV requirements for the first construction year apply if a revised Facilities Design Report and Fabrication and Installation Report (FDR/FIR) or other information is submitted to BOEM and Bureau of Safety and Environmental Enforcement (BSEE) that details changes to the equipment (*e.g.*, different hammer, different noise attenuation system); if any foundation type or technique included in the requirements for the first construction year that was not installed until a subsequent construction year (*e.g.*, if drilling is not used until year 2 or 3, the first foundation where relief drilling is used must have Thorough SFV);

- (iii) Subsequent SFV measurements are also required should larger piles be installed or if additional monopiles are driven that may produce louder sound fields than those previously measured (*e.g.*, higher hammer energy, greater number of strikes, *etc.*).
- (iv) Regarding any Thorough SFV, installation of the next foundation (of the same type/foundation method) may not proceed until LOA Holder has reviewed the initial results from the Thorough SFV and determined that there were no exceedances of any distances to the identified thresholds based on modeling assuming 10 dB attenuation. If any of the Thorough SFV measurements from any pile indicate that the distance to any isopleth of concern for any species is greater than those modeled assuming 10 dB attenuation, LOA Holder must notify NMFS within 24 hours of reviewing the Thorough SFV measurements and must implement the following measures for the next pile of the same type/installation methodology, as applicable;
- (v) If any of the Thorough SFV measurements indicate that the distances to Level A harassment or Level B harassment thresholds for marine mammals (peak or cumulative) are greater than the modeled distances (assuming 10 dB attenuation), the following must occur:
 - (1) The clearance and shutdown zones for subsequent piles of the same type (*e.g.*, if triggered by SFV results for a monopile, for the next monopile) must be increased so that they are at least the size of the distances to those Level A harassment thresholds as indicated by SFV.
 - (2) For every 1,500 m that a marine mammal clearance or shutdown zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone; LOA Holder must deploy any additional PSOs consistent with the approved Marine Mammal Monitoring Plan in consideration of the size of the new zones and the species that must be monitored. Use of the expanded clearance and shutdown zones must continue for

additional piles until LOA Holder requests and receives concurrence from NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office (GARFO) to revert to the original clearance and shutdown zones.

- (3) LOA Holder must identify one or more additional, modified, and/or alternative noise attenuation measure(s) and/or operational change(s) included in the approved SFV plan that is expected to reduce sound levels to the modeled distances and must implement that measure for the next pile of the same type and pile driving method that is installed (*e.g.*, if triggered by SFV results for a monopile installed with vibratory pile driving followed by impact pile driving, for the next monopile with vibratory pile driving followed by impact pile driving). Attenuation measures that could reduce sound levels to the modeled distances include but are not limited to adding a noise attenuation device, adjusting hammer operations, and adjusting or otherwise modifying the noise mitigation system.
 - (4) LOA Holder must provide written notification to NMFS Office of Protected Resources of the changes implemented within 24 hours of their implementation.
 - (5) Following installation of a pile with additional, alternative, or modified noise attenuation measures/operational changes if Thorough SFV results indicate that all isopleths of concern are within distances to isopleths of concern modeled assuming 10 dB attenuation, Thorough SFV must be conducted on two additional piles of the same type/installation method (for a total of at least three piles with consistent noise attenuation measures). If the Thorough SFV results from all three of those piles are within the distances to isopleths of concern modeled assuming 10 dB attenuation, then LOA Holder must continue to implement the approved additional, alternative, or modified noise attenuation measures/operational changes. LOA Holder can request concurrence from NMFS Office of Protected Resources to return to the original clearance and shutdown zones;
- (vi) In addition to this SFV monitoring, which will follow a specific comprehensive methodology described in the SFV Plan required in section (4)(c)(8), LOA Holder also must conduct Abbreviated SFV for all other foundations, using at least one acoustic recorder for every foundation for which thorough SFV monitoring is not conducted. Abbreviated SFV consists of: SFV measurements made at a single acoustic recorder, consisting of a near-bottom and mid-water hydrophone, at approximately 750 m from the pile, in the direction of lowest modeled transmission loss, to record sounds throughout the duration of all pile driving (inclusive of relief drilling) of each foundation. If measured levels from Abbreviated

SFV for any pile are greater than expected levels, LOA Holder must evaluate the available information from the pile installation to determine if there is an identifiable cause of the exceedance (*i.e.*, a failure of the noise attenuation system), identify and implement corrective action, and report this information to NMFS Office of Protected Resources within 48 hours of completion of the installation of the pile (inclusive of all pile driving and drilling), during which the exceedance occurred. If LOA Holder can demonstrate that the exceedance was the result of a failure of the noise attenuation system (*e.g.*, loss of a generator supporting a bubble curtain such that one bubble curtain failed during pile driving) or other technical malfunction that can be remedied in a way that returns the noise attenuation system to pre-failure conditions, LOA Holder can request concurrence from NMFS Office of Protected Resources to proceed without Thorough SFV monitoring that would otherwise be required within 72 hours. LOA Holder is required to remedy any such failure of the noise attenuation system prior to carrying out any additional pile driving or drilling.

- (vii) Thorough SFV measurements must be made at a minimum of four distances from the pile(s) being driven, along a single transect, in the direction of lowest transmission loss (*i.e.*, projected lowest transmission loss coefficient), including, but not limited to, 750 m (2,460 ft) and three additional ranges, including at least, the modeled Level B harassment isopleth zones assuming 10 dB attenuation. At least one additional measurement at an azimuth 90 degrees from the array at 750 m must be made. At each location, there must be a near bottom and mid-water column hydrophone (measurement system).
- (viii) The recordings must be continuous throughout the duration of all pile driving and drilling of each foundation.
- (ix) The SFV measurement systems must have a sensitivity appropriate for the expected sound levels from pile driving and drilling received at the nominal ranges throughout the installation of the pile. The frequency range of SFV measurement systems must cover the range of at least 20 hertz (Hz) to 20 kilohertz (kHz); The SFV measurement systems must be designed to have omnidirectional sensitivity and so that the broadband received level of all pile driving and drilling activities exceeds the system noise floor by at least 10 dB. The dynamic range of the SFV measurement system must be sufficient such that at each location, and the signals avoid poor signal-to-noise ratios for low amplitude signals and avoid clipping, nonlinearity, and saturation for high amplitude signals.
- (x) All hydrophones used in SFV measurements systems are required to have undergone a full system, traceable laboratory calibration conforming to International Electrotechnical Commission (IEC) 60565, or an equivalent standard procedure, from a factory or accredited source to ensure the hydrophone receives accurate sound levels, at a date not to exceed 2 years

before deployment. Additional in situ calibration checks using a pistonphone are required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.*, high-pass, low-pass, *etc.*), which is not already accounted for by the calibration, the filter performance (*i.e.*, the filter's frequency response) must be known, reported, and the data corrected before analysis.

- (xi) LOA Holder must be prepared with additional equipment (hydrophones, recording devices, hydrophone calibrators, cables, batteries, *etc.*), which exceeds the amount of equipment necessary to perform the measurements, such that technical issues can be mitigated before measurement.
 - (xii) LOA Holder must submit interim reports within 48 hours after each foundation is measured with Thorough SFV (see (4)(f)(10) for interim and final reporting requirements).
 - (xiii) If SFV measurements collected during installation of foundation piles indicate ranges to the isopleths, corresponding to Level A harassment and Level B harassment thresholds, are greater than the ranges predicted by modeling (assuming 10 dB attenuation), LOA Holder must implement additional noise mitigation measures prior to installing the next foundation. Additional acoustic measurements must be taken after each modification.
 - (xiv) If, after additional measurements conducted pursuant to requirements of paragraph (c)(15)(i) and (ii) of this section, acoustic measurements indicate that ranges to isopleths corresponding to the Level A harassment and Level B harassment thresholds are less than the ranges predicted by modeling (assuming 10-dB attenuation), LOA Holder may request to NMFS Office of Protected Resources a modification of the clearance and shutdown zones. For NMFS Office of Protected Resources to consider a modification request for reduced zone sizes, LOA Holder must have conducted SFV measurements on an additional three foundations and ensure that subsequent foundations would be installed under conditions that are predicted to produce smaller harassment zones than those modeled assuming 10-dB of attenuation.
 - (xv) LOA Holder must conduct SFV measurements during turbine operations to estimate turbine operational source levels and transmission loss rates, in accordance with a NMFS-approved SFV Plan.
- (d) *UXO/MEC detonations.* The following requirements apply to Unexploded Ordnances and Munitions and Explosives of Concern (UXO/MEC) detonations:
- (1) Upon encountering a UXO/MEC, LOA Holder must only resort to high-order removal (*i.e.*, detonation) if all other means of removal are impracticable (*i.e.*, As

Low As Reasonably Practicable (ALARP) risk mitigation procedure)) and this determination must be documented and submitted to NMFS;

- (i) LOA Holder may detonate a maximum of 10 UXO/MECs, of varying sizes but no larger than 1,000 pounds (lbs; 454 kilograms (kg)) charge weight (*i.e.*, E12), over the effective period of this rulemaking and LOA(s); and
 - (ii) LOA Holder must provide NMFS Office of Protected Resources with notification of planned UXO/MEC detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk to human life or safety.
- (2) UXO/MEC detonations must not occur from December 1 through May 31, annually; however, LOA Holder may detonate a UXO/MEC in December or May with NMFS' approval on a case-by-case basis;
- (3) UXO/MEC detonations must only occur during daylight hours (1 hour after civil sunrise through 1.5 hours prior to civil sunset);
- (4) No more than one detonation can occur within a 24-hour period;
- (5) LOA Holder must deploy functional noise abatement system(s) during all UXO/MEC detonations and comply with the following requirements related to noise abatement:
 - (i) A single bubble curtain must not be used;
 - (ii) A big double bubble curtain may be used without being paired with another noise attenuation device;
 - (iii) The double bubble curtain must distribute air bubbles using an air flow rate of at least $0.5 \text{ m}^3/(\text{min} \cdot \text{m})$. The bubble curtain(s) must surround 100 percent of the UXO/MEC detonation perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtains must make appropriate adjustments to the air supply and operating pressure such that the maximum possible noise attenuation performance of the bubble curtain(s) is achieved;
 - (iv) The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact;
 - (v) No parts of the ring or other objects may prevent full seafloor contact;
 - (vi) Construction contractors must train personnel in the proper balancing of airflow to the ring. Construction contractors must submit an inspection/performance report for approval by LOA Holder within 72

hours following the performance test. LOA Holder must then submit that report to NMFS Office of Protected Resources;

- (vii) Corrections to the bubble rings to meet the performance standards in this paragraph (d)(5) must occur prior to UXO/MEC detonations. If LOA Holder uses a noise mitigation device in addition to the bubble curtain, LOA Holder must maintain similar quality control measures as described in this paragraph (d)(5); and
 - (viii) LOA Holder must inspect and carry out appropriate maintenance on the noise attenuation system prior to every UXO/MEC detonation and prepare and submit a NAS inspection/performance report to NMFS Office of Protected Resources.
- (6) LOA Holder must conduct SFV during all UXO/MEC detonations at a minimum of three locations (at two water depths at each location) from each detonation in a direction toward deeper water in accordance with the following requirements:
- (i) LOA Holder must empirically determine source levels (peak and cumulative sound exposure level), the ranges to the isopleths corresponding to the Level A harassment and Level B harassment thresholds in meters, and the transmission loss coefficient(s). LOA Holder may estimate ranges to the Level A harassment and Level B harassment isopleths by extrapolating from in-situ measurements conducted at several distances from the detonation location monitored.
 - (ii) The SFV measurement systems must have a sensitivity appropriate for the expected sound levels from detonations received at the nominal ranges throughout the detonation; the frequency range of the SFV measurement systems must cover the range of at least 20 Hz to 20 kHz; and the SFV measurement systems will be designed to have omnidirectional sensitivity and will be designed so that the predicted broadband received level of all UXO/MEC detonations exceeds the system noise floor by at least 10 dB. The dynamic range of the SFV measurement systems must be sufficient such that at each location, the signals avoid poor signal-to-noise ratios for low amplitude signals and the signals avoid clipping, nonlinearity, and saturation for high amplitude signals.
 - (iii) All hydrophones used in SFV measurements systems are required to have undergone a full system, traceable laboratory calibration conforming to IEC 60565, or an equivalent standard procedure, from a factory or accredited source to ensure the hydrophone receives accurate sound levels, at a date not to exceed 2 years before deployment. Additional in situ calibration checks using a pistonphone are required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.*, high-pass, low-pass, *etc.*), which is not already accounted for by the calibration, the filter

performance (*i.e.*, the filter's frequency response) must be known, reported, and the data corrected before analysis.

- (iv) LOA Holder must be prepared with additional equipment (hydrophones, recording devices, hydrophone calibrators, cables, batteries, *etc.*), which exceeds the amount of equipment necessary to perform the measurements, such that technical issues can be mitigated before measurement.
 - (v) LOA Holder must submit interim reports within 48 hours after each UXO/MEC detonation is measured (see (4)(f)(10) for interim and final reporting requirements).
 - (vi) If SFV measurements collected during UXO/MEC detonation indicate ranges to the isopleths, corresponding to Level A harassment and Level B harassment thresholds, are greater than the ranges predicted by modeling (assuming 10 dB attenuation), LOA Holder must implement additional noise mitigation measures prior to the next UXO/MEC detonation. Additional acoustic measurements must be taken after each modification. LOA Holder must also increase the clearance zone size to reflect the results of SFV in collaboration with NMFS Office of Protected Resources. Use of the expanded clearance zone must continue for all additional detonations until LOA Holder requests and receives concurrence from NMFS Office of Protected Resources to revert to the original clearance zone. LOA Holder must provide written notification to NMFS Office of Protected Resources of the changes planned for the next detonation within 24 hours of implementation.
 - (vii) LOA Holder must optimize the noise attenuation systems (*e.g.*, ensure hose maintenance, pressure testing, *etc.*) to, at least, meet noise levels modeled, assuming 10-dB attenuation, UXO/MEC detonation activities must cease until NMFS and LOA Holder can evaluate the situation and ensure future detonations will not exceed noise levels modeled assuming 10-dB attenuation.
 - (viii) LOA Holder must identify one or more additional, modified, and/or alternative noise attenuation measures or other change to the detonation plans (included in the SFV Plan) that is expected to reduce sound levels to the modeled distances. These measures must be implemented for the next detonation.
- (7) LOA Holder must establish and implement clearance zones for UXO/MEC detonation using both visual and acoustic monitoring, as described in the LOA;
 - (8) At least six on-duty PSOs must be actively observing marine mammals before, during, and after any UXO/MEC detonation. At least three on-duty PSOs must be stationed and observing on a vessel as close as safely possible to the detonation site and, in addition, at least three on-duty PSOs must be stationed on an additional PSO-dedicated vessel or aerial platform. Concurrently, at least one

acoustic monitoring PSO (*i.e.*, passive acoustic monitoring (PAM) operator) must be actively monitoring for marine mammals with PAM before, during, and after detonation;

- (i) Clearance zones must be increased to reflect the results of SFV. For every 1,500 m that a clearance zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded zone.
- (9) If the clearance zone is larger than 2 km (based on charge weight), LOA Holder must deploy an additional PSO-dedicated vessel or aircraft with at least three on-duty PSOs stationed on it and actively observing for marine mammals. If the clearance zone is larger than 5 km (based on charge weight), an aerial platform must be used unless LOA Holder is unable to secure an aerial platform(s) with the appropriately trained pilots and PSOs. In such a case, the LOA Holder must submit an alternative monitoring plan at least 90 days before any UXO/MEC detonation that would describe how they would effectively monitor clearance zones beyond 5 km, including an explanation of additional vessels/platforms and PSO deployments. This plan must be approved by NMFS before any UXO/MEC detonation may occur;
 - (i) If an aircraft is used, two on-duty PSOs must be used and located at the appropriate vantage point on the aircraft. These additional PSOs would maintain watch during the same time period as the PSOs on the primary monitoring vessel.
- (10) At least one PAM operator must review data from at least 24 hours prior to a detonation and actively monitor hydrophones for 60 minutes prior to detonation. All clearance zones must be acoustically confirmed to be free of marine mammals for 60 minutes prior to commencing a detonation. PAM operators will continue to monitor for marine mammals at least 30 minutes after a detonation;
- (11) All clearance zones must be visually confirmed to be free of marine mammals for 30 minutes before a detonation can occur. All on-duty PSOs must also maintain watch for 30 minutes after the detonation event;
- (12) If a marine mammal is observed entering or within the relevant clearance zone prior to the initiation of a detonation, detonation must be delayed and must not begin until either the marine mammal(s) has voluntarily left the specific clearance zones and have been visually and acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species;
- (13) For North Atlantic right whales, any visual observation or acoustic detection must trigger a delay to the detonation of a UXO/MEC. Any large whale sighting by a PSO or detected by a PAM operator that cannot be identified by species must be treated as if it were a North Atlantic right whale; and

- (14) A pressure transducer must be used to monitor pressure levels during all UXO/MEC detonations.
- (e) *HRG surveys*. The following requirements apply to HRG surveys operating sub-bottom profilers (SBPs) (*i.e.*, boomers, sparkers) (hereinafter referred to as “acoustic sources”):
- (1) SBPs must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Acoustic sources must be used at the lowest practicable source level to meet the survey objective, when in use, and must be turned off when they are not necessary for the survey;
 - (2) LOA Holder is required to have at least one PSO on active duty per HRG vessel during HRG surveys that are conducted during daylight hours (*i.e.*, from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at least two PSOs on active duty per vessel during HRG surveys that are conducted during nighttime hours;
 - (3) LOA Holder is required to ramp-up SBPs prior to commencing full power, unless the equipment operates on a binary on/off switch, and ensure visual clearance zones are fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to the initiation of survey activities using acoustic sources specified in the LOA;
 - (4) Ramp-ups must be scheduled so as to minimize the time spent with the source activated. Prior to a ramp-up procedure starting or activating acoustic sources, the acoustic source operator (operator) must notify a designated PSO of the planned start of ramp-up as agreed upon with the Lead PSO. The notification time should not be less than 60 minutes prior to the planned ramp-up or activation in order to allow the PSOs time to monitor the clearance zone(s) for 30 minutes prior to the initiation of ramp-up or activation (pre-start clearance). During this 30-minute pre-start clearance period, the entire applicable clearance zones must be visible. Ramp-up may occur at times of poor visibility, including nighttime, only if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up;
 - (i) A PSO conducting pre-start clearance observations must be notified again immediately prior to reinitiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
 - (5) Prior to starting the survey and after receiving confirmation from the PSOs that the clearance zone is clear of any marine mammals, LOA Holder is required to ramp-up acoustic sources to half power for 5 minutes prior to commencing full power, unless the source operates on a binary on/off switch (in which case ramp-up is not required). LOA Holder must also ensure visual clearance zones are fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to the initiation of survey activities using acoustic sources; Ramp-up and

activation must be delayed if a marine mammal(s) enters its respective shutdown zone. Ramp-up and activation may only be reinitiated if the animal(s) has been observed exiting its respective shutdown zone or until 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species, has elapsed with no further sightings;

- (6) LOA Holder must establish and implement clearance and shutdown zones for HRG surveys using visual monitoring; LOA Holder must implement a 30-minute clearance period of the clearance zones immediately prior to the commencing of the survey or when there is more than a 30 minute break in survey activities or PSO monitoring. A clearance period is a period when no marine mammals are detected in the relevant zone;
- (7) If a marine mammal is observed within a clearance zone during the clearance period, ramp-up or acoustic surveys may not begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until a specific time period has elapsed with no further sighting. The specific time period is 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species;
- (8) Any large whale sighted by a PSO within 1 km of the acoustic source(s) that cannot be identified by species must be treated as if it were a North Atlantic right whale and LOA Holder must apply the mitigation measure applicable to this species;
- (9) In any case when the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (infrared (IR)/thermal camera), and the Lead PSO has determined that the clearance zones are clear of marine mammals, survey operations may commence (*i.e.*, no delay is required) despite periods of inclement weather and/or loss of daylight;
- (10) Once the survey has commenced, LOA Holder must shut down acoustic sources if a marine mammal enters a respective shutdown zone, except in cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations may continue (*i.e.*, no shutdown is required) so long as no marine mammals have been detected. The shutdown requirement does not apply to small delphinids of the following genera: *Delphinus*, *Stenella*, *Lagenorhynchus*, and *Tursiops*. If there is uncertainty regarding the identification of a marine mammal species (*i.e.*, whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified in this paragraph (e)(10) is detected in the shutdown zone;
- (11) If an acoustic source has been shut down due to the presence of a marine mammal, the use of an acoustic source may not commence or resume until the animal(s) has been confirmed to have left the Level B harassment zone or until a full 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammals have elapsed with no further sighting;

- (12) LOA Holder must immediately shutdown any acoustic source if a marine mammal is sighted entering or within its respective shutdown zones. If there is uncertainty regarding the identification of a marine mammal species (*i.e.*, whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified in paragraph (e)(10) of this section is detected in the shutdown zone;
 - (13) If an acoustic source is shut down for a period longer than 30 minutes, all clearance and ramp-up procedures must be initiated. If an acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, acoustic sources may be activated again without ramp-up only if PSOs have maintained constant observation and no additional detections of any marine mammal occurred within the respective shutdown zones; and
 - (14) If multiple HRG vessels are operating concurrently, any observations of marine mammals must be communicated to PSOs on all nearby survey vessels.
- (f) *Fisheries monitoring surveys.* The following requirements apply to fishery monitoring surveys:
- (1) All captains and crew conducting fishery surveys must be trained in marine mammal detection and identification. Marine mammal monitoring will be conducted by the captain and/or a member of the scientific crew before within 1 nautical mile (nmi) (1.85 km; 1.2 mi) and 15 minutes prior to deploying gear), during, and for 15 minutes after haul back;
 - (2) Survey gear must be deployed as soon as possible once the vessel arrives on station. Gear must not be deployed if there is a risk of interaction with marine mammals. Gear may be deployed after 15 minutes of no marine mammal sightings within 1 nmi (1.85 km; 1.2 mi) of the sampling station;
 - (3) LOA Holder and/or its cooperating institutions, contracted vessels, or commercially-hired captains must implement the following “move-on” rule: If marine mammals are sighted within 1 nmi (1.2 mi) of the planned location and 15 minutes before gear deployment, then LOA Holder and/or its cooperating institutions, contracted vessels, or commercially-hired captains, as appropriate, must move the vessel away from the marine mammal to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, LOA Holder and its cooperating institutions, contracted vessels, or commercially-hired captains must move again or skip the station;
 - (4) If a marine mammal is at risk of interacting with deployed gear, all gear must be immediately removed from the water. If marine mammals are sighted before the gear is fully removed from the water, the vessel must slow its speed and maneuver the vessel away from the animals to minimize potential interactions with the observed animal;

- (5) LOA Holder must maintain visual marine mammal monitoring effort during the entire period of time that gear is in the water (*i.e.*, throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, LOA Holder must take the most appropriate action to avoid marine mammal interaction;
- (6) All fisheries monitoring gear must be fully cleaned and repaired (if damaged) before each use/deployment;
- (7) LOA Holder's fixed gear must comply with the Atlantic Large Whale Take Reduction Plan regulations at 50 CFR 229.32 during fisheries monitoring surveys;
- (8) Trawl tows will be limited to a maximum of a 20-minute trawl time and must not exceed 3.0 kn (3.45 mph);
- (9) All gear must be emptied as close to the deck/sorting area and as quickly as possible after retrieval;
- (10) During trawl surveys, vessel crew must open the codend of the trawl net close to the deck in order to avoid injury to animals that may be caught in the gear;
- (11) During any survey that uses vertical lines, buoy lines will be weighted and will not float at the surface of the water and all groundlines will consist of sinking line. All groundlines must be composed entirely of sinking line. Buoy lines must utilize weak links. Weak links must break cleanly leaving behind the bitter end of the line. The bitter end of the line must be free of any knots when the weak link breaks. Splices are not considered to be knots. The attachment of buoys, toggles, or other floatation devices to groundlines is prohibited
- (12) All in-water survey gear, including buoys, must be properly labeled with the scientific permit number or identification as LOA Holder- related research gear. All labels and markings on the gear, buoys, and buoy lines must also be compliant with the applicable regulations, and all buoy markings must comply with instructions received by the NOAA GARFO Protected Resources Division;
- (13) All survey gear must be removed from the water whenever not in active survey use (*i.e.*, no wet storage);
- (14) All reasonable efforts, that do not compromise human safety, must be undertaken to recover gear; and
- (15) All lost gear associated with the fishery surveys must be reported to NOAA GARFO Protected Resources Division (nmfs.gar.incidental-take@noaa.gov) within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.

4. Requirements for monitoring and reporting:

LOA Holder must implement the following monitoring and reporting requirements when conducting the specified activities (see also 50 CFR § 217.325):

- (a) *Protected species observer (PSO) and passive acoustic monitoring (PAM) operator qualifications.* LOA Holder must implement the following measures applicable to PSOs and PAM operators:
- (1) LOA Holder must use independent, NMFS-approved PSOs and PAM operators meaning that the PSOs and PAM operators must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant crew with regard to the presence of protected species and mitigation requirements;
 - (2) All PSOs and PAM operators must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO or PAM operator has acquired the relevant skills through a suitable amount of alternate experience. Requests for such a waiver must be submitted to NMFS Office of Protected Resources and must include written justification containing alternative experience. Alternate experience that may be considered includes but is not limited to: previous work experience conducting academic, commercial, or government sponsored marine mammal visual and/or acoustic surveys; or previous work experience as a PSO/PAM operator. All PSO's and PAM operators should demonstrate good standing and consistently good performance of all assigned duties;
 - (3) All PSOs and PAM operators must successfully complete a required training course within the last 5 years, including obtaining a certificate of course completion;
 - (4) PSOs must have visual acuity in both eyes (with correction of vision being permissible) sufficient enough to discern moving targets on the water's surface with the ability to estimate the target size and distance (binocular use is allowable); ability to conduct field observations and collect data according to the assigned protocols; sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations; writing skills sufficient to document observations, including but not limited to, the number and species of marine mammals observed, the dates and times of when in-water construction activities were conducted, the dates and time when in-water construction activities were suspended to avoid potential incidental take of marine mammals from construction noise within a defined shutdown zone, and marine mammal behavior; and the ability to communicate orally, by radio, or in-person, with project personnel to provide real-time information on marine mammals observed in the area;

- (5) PSOs and PAM operators are responsible for obtaining NMFS' approval. NMFS may approve PSOs and PAM operators as conditional or unconditional. A conditionally-approved PSO or PAM operator may be one who has completed training in the last 5 years but has not yet attained the requisite field experience. An unconditionally approved PSO or PAM operator is one who has completed training within the last 5 years and attained the necessary experience (*i.e.*, demonstrate experience with monitoring for marine mammals at clearance and shutdown zone sizes similar to those produced during the respective activity). Lead PSO(s) and Lead PAM operator(s) must be unconditionally approved and have a minimum of 90 days in a northwestern Atlantic Ocean offshore environment performing the role (either visual or acoustic), with the conclusion of the most recent relevant experience not more than 18 months previous. A conditionally approved PSO or PAM operator must be paired with an unconditionally approved PSO or PAM operator;
- (i) PSOs for HRG surveys may be unconditionally or conditionally approved. PSOs and PAM operators for foundation installation and UXO/MEC detonation must be unconditionally approved;
 - (ii) LOA Holder must submit NMFS previously approved PSOs and PAM operators to NMFS Office of Protected Resources for review and confirmation of their approval for specific roles at least 30 days prior to commencement of the activities requiring PSOs/PAM operators or 15 days prior to when new PSOs/PAM operators are required after activities have commenced;
 - (iii) For prospective PSOs and PAM operators not previously approved, or for PSOs and PAM operators whose approval is not current, LOA Holder must submit resumes for approval at least 60 days prior to PSO and PAM operator use. Resumes must include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO or PAM operator experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training and include which specific roles and activities the PSOs/PAM operators are being requested for. PAM operator experience must also include the information described in paragraph (a)(5)(iv) of this section;
 - (iv) PAM operators are responsible for obtaining NMFS approval. To be approved as a PAM operator, the person must meet the following qualifications: The PAM operator must demonstrate that they have prior large whale PAM experience with real-time acoustic detection systems and/or have completed specialized training for operating PAM systems that will be used for the Project; PAM operators must demonstrate that they are able to detect and identify Atlantic Ocean marine mammals sounds, in particular: North Atlantic right whale sounds, humpback whale sounds, and that they are able to deconflict humpback whale sounds from similar North Atlantic right whale sounds, and other co-occurring species'

sounds in the area including sperm whales; must be able to distinguish between whether a marine mammal or other species sound is detected, possibly detected, or not detected and similar terminology must be used across companies/projects; where localization of sounds or deriving bearings and distance are possible, the PAM operators must have demonstrated experience in the localization of sounds or deriving bearings and distance; PAM operators must be independent observers (*i.e.*, not construction personnel); PAM operators must demonstrate experience with relevant acoustic software and equipment; PAM operators must have the qualifications and relevant experience/training to safely deploy and retrieve equipment and program the software, as necessary; PAM operators must be able to test software and hardware functionality prior to operation; and PAM operators must have evaluated their acoustic detection software using the PAM Atlantic baleen whale annotated data set available at National Centers for Environmental Information (NCEI) and provide evaluation/performance metric.

- (6) All PSOs must be trained in northwestern Atlantic Ocean marine mammal identification and behaviors and must be able to conduct field observations and collect data according to assigned protocols. Additionally, PSOs must have the ability to work with all required and relevant software and equipment necessary during observations (as described in paragraphs (b)(5) and (7) of this section);
 - (7) At least one on-duty PSO and PAM operator, where applicable, for each activity (*i.e.*, foundation installation, UXO/MEC detonation activities, and HRG surveys) must be designated as the Lead PSO. The Lead PSO must be unconditionally approved; and
 - (8) PSOs may work as PAM operators and vice versa, pending NMFS-approval; however, they may only perform one role at any one time and must not exceed work time restrictions, which must be tallied cumulatively.
- (b) *General PSO and PAM operator requirements.* The following measures apply to PSOs and PAM operators and must be implemented by LOA Holder:
- (1) PSOs must monitor for marine mammals prior to, during, and following pile driving, drilling, UXO/MEC detonation activities, and HRG surveys that use sub-bottom profilers (with specific monitoring durations and needs described in paragraphs (c) through (f) of this section, respectively). Monitoring must be done while free from distractions and in a consistent, systematic, and diligent manner;
 - (2) PAM operator(s) must acoustically monitor for marine mammals prior to, during, and following all pile driving, drilling, and UXO/MEC detonation activities. PAM operators may be located on a vessel or remotely on-shore but must have the appropriate equipment (*i.e.*, computer station equipped with a data collection software system available wherever they are stationed) and be in real-time communication with PSOs and transiting vessel captains;

- (3) All PSOs must be located at the best vantage point(s) on any platform, as determined by the Lead PSO, in order to obtain 360-degree visual coverage of the entire clearance and shutdown zones around the activity area, and as much of the Level B harassment zone as possible, PAM operators may be located on a vessel or remotely on-shore. The PAM operator(s) must assist PSOs in ensuring full coverage of the clearance and shutdown zones;
- (4) All on-duty visual PSOs must remain in real-time contact with the on-duty PAM operator(s). PAM operators must immediately communicate all acoustic detections of marine mammals to PSOs, including any determination regarding species identification, distance, and bearing (where relevant) relative to the pile being driven and the degree of confidence (*e.g.*, detected, possibly detected, not detected) in the determination. All on-duty Lead PSOs and PAM operator(s) must remain in contact with the on-duty construction personnel responsible for implementing mitigations (*e.g.*, delay to pile driving or UXO/MEC detonation) to ensure communication on marine mammal observations can easily, quickly, and consistently occur between all on-duty PSOs, PAM operator(s), and on-water Project personnel;
 - (i) The on-duty PAM operator(s) must inform the on-duty Lead PSO(s) of animal detections approaching or within applicable ranges of interest to the activity occurring via the data collection software system, (*e.g.*, Mysticetus or similar system) who must be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.*, delay, shutdown); and
 - (ii) Any visual observations of marine mammals by any Project personnel must be communicated immediately to on-duty PSOs and vessel captains associated with other Project vessels to increase situational awareness.
- (5) PSOs must use high magnification (25x) binoculars, standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. During pile driving and drilling, at least the PSOs on the pile driving and drilling platform(s) and any dedicated PSO vessel that may be used must be equipped with functional Big Eye binoculars (*e.g.*, 25 x 150; 2.7 view angle; individual ocular focus; height control). These must be pedestal mounted on the deck at the best vantage point that provides for optimal sea surface observation and PSO safety. A minimum of three on-duty PSOs must be active on a dedicated PSO vessel. PAM operators must have the appropriate equipment (*i.e.*, a computer station equipped with a data collection software system available wherever they are stationed) in accordance with a NMFS-approved PAM Plan;
- (6) During all acoustic monitoring periods during the Project, PAM operators must use appropriate equipment (*i.e.*, a computer station equipped with a data collection software system available wherever they are stationed) in accordance with a NMFS-approved PAM Plan;

- (7) During periods of low visibility (*e.g.*, darkness, rain, fog, poor weather conditions, *etc.*), PSOs must use alternative technology (*e.g.*, infrared or thermal cameras) to monitor the clearance and shutdown zones as approved by NMFS;
 - (8) PSOs and PAM operators must not exceed 4 consecutive watch hours on duty at any time, must have a 2-hour (minimum) break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period;
 - (9) Any PSO or PAM operator has the authority to call for a delay or shutdown of project activities;
 - (10) PSOs must remain in real-time contact with the PAM operators and construction personnel responsible for implementing mitigation (*e.g.*, delay to pile driving or UXO/MEC detonation) to ensure communication on marine mammal observations can easily, quickly, and consistently occur between all on-duty PSOs, PAM operator(s), and on-water Project personnel; and
 - (11) LOA Holder is required to use available sources of information on North Atlantic right whale presence to aid in monitoring efforts. These include daily monitoring of the Right Whale Sightings Advisory System, consulting of the WhaleAlert app, and monitoring of the Coast Guard's VHF Channel 16 throughout the day to receive notifications of any sightings and information associated with any DMA, to plan construction activities and vessel routes, if practicable, to minimize the potential for co-occurrence with North Atlantic right whales.
- (c) *PSO and PAM operator requirements during WTG and ESP foundation installation.* The following measures apply to PSOs and PAM operators during WTG and ESP foundation installation and must be implemented by LOA Holder:
- (1) PSOs and PAM operator(s) must monitor for marine mammals 60 minutes prior to, during, and 30 minutes following all pile-driving and drilling. If PSOs cannot visually monitor the minimum visibility zone prior to pile driving and drilling at all times using the equipment described in paragraphs (b)(5) and (7) of this section, pile driving and drilling operations must not commence or must shutdown if they are currently active;
 - (2) All PSOs and PAM operators must begin monitoring 60 minutes prior to pile driving and drilling, during, and for 30 minutes after the activity. Pile driving and drilling must only commence when the minimum visibility zone is fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of pile driving or drilling. PAM operators must assist the visual PSOs in monitoring by conducting PAM activities 60 minutes prior to any pile driving or drilling, during, and after for 30 minutes for the appropriate size PAM clearance zone (dependent on season). The entire minimum visibility zone must be clear for at least 30 minutes, with no marine mammal detections within the visual or PAM clearance zones prior to the start of pile driving or drilling;

- (3) LOA Holder must conduct PAM for at least 24 hours immediately prior to pile driving and drilling activities, The PAM operator must review all detections from the previous 24-hour period immediately prior to pile driving or drilling.
- (4) During use of any real-time PAM system, at least one PAM operator must be designated to monitor each system by viewing data or data products that would be streamed in real-time or in near real-time to a computer workstation and monitor;
- (5) The PAM operator must inform the Lead PSO(s) on duty of animal detections approaching or within applicable ranges of interest to the pile driving activity via the data collection software system (*i.e.*, Mysticetus or similar system) who will be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.*, delay or shutdown);
- (6) All monitoring and reporting measures required for or applicable to jacket foundations are required for bottom-frame foundations that utilize pile foundations;
- (7) LOA Holder must prepare and submit a Marine Mammal Monitoring Plan to NMFS Office of Protected Resources for review and approval at least 180 days before the planned start of any pile driving or drilling and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division's concurrence with this plan prior to the start of any pile driving or drilling. No foundation pile installation can occur without NMFS' approval of the plan;
 - (i) The plan must include a description of how all relevant mitigation and monitoring requirements contained in the LOA and those included as part of the action will be implemented; a pile driving and drilling installation summary and sequence of events; a description of all monitoring equipment and evidence (*i.e.*, manufacturer's specifications, reports, testing) that it can be used to effectively monitor and detect marine mammals in the identified clearance and shutdown zones (*i.e.*, field data demonstrating reliable and consistent ability to detect large whales at the relevant distances in the conditions planned for use); communications and reporting details; The plan must include final foundation project design (*e.g.*, number and type of piles, hammer type, noise abatement systems, anticipated start date, *etc.*) and all information related to PAM and PSO monitoring protocols for foundation installation activities. The Plan(s) must demonstrate sufficient PSO and PAM Operator staffing (in accordance with watch shifts), PSO and PAM Operator schedules, and contingency plans for instances if additional PSOs and PAM Operators are required including any expansion of clearance and/or shutdown zones that may be required as a result of SFV. The plan(s) must contain a thorough description of how LOA Holder will monitor foundation installation activities (drilling, vibratory and impact pile driving) during reduced visibility conditions (*e.g.*, rain, fog) and in other low visibility conditions,

including proof of the efficacy of monitoring devices (*e.g.*, mounted thermal/infrared camera systems, hand-held or wearable NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance and shutdown zones under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. The plan must contain a thorough description of how LOA Holder will monitor foundation installation activities during daytime when unexpected changes to lighting or weather occur during pile driving or drilling that prevent visual monitoring of the full extent of the clearance and shutdown zones.

- (8) LOA Holder must submit an SFV plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to planned start of foundation installation activities (*i.e.*, impact pile driving, vibratory pile driving, or drilling) and abide by the plan if approved. At minimum, the SFV Plan must describe how LOA Holder would ensure that the required foundation installation sites selected for SFV measurements are representative of the rest of the installation sites such that future pile installation events are anticipated to produce similar sound levels to those piles measured. In the case that these sites/scenarios are not determined to be representative of all other pile installation sites, LOA Holder must include information in the SFV Plan on how additional sites/scenarios would be selected for SFV measurements. This SFV Plan must also include methodology for collecting, analyzing, and preparing SFV measurement data for submission to NMFS Office of Protected Resources and describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results. SFV for pile driving and drilling must not occur until NMFS approves the SFV Plan for this activity. For more information on SFV plan requirements, see section 4(f)(10);
- (9) LOA Holder must submit a Passive Acoustic Monitoring Plan (PAM Plan) to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of foundation installation activities and abide by the plan if approved. The authorization to take marine mammals would be contingent upon NMFS Office of Protected Resources approval of the PAM Plan. The PAM Plan must include a description of all proposed PAM equipment and hardware, the calibration data, bandwidth capability and sensitivity of hydrophones, and address how the proposed passive acoustic monitoring must follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind. The plan must describe all proposed PAM procedures, documentation, and protocols including (*i.e.*, testing, reports, equipment specifications) to support that it will be able to detect vocalizing North Atlantic right whales within the PAM Monitoring Zone including deployment locations, procedures, detection review methodology, and protocols; hydrophone detection

ranges with and without foundation installation activities and data supporting those ranges; communication time between call and detection, and data transmission rates between PAM Operator and PSOs on the pile driving vessel; where PAM Operators will be stationed relative to hydrophones and PSOs on pile driving vessel calling for delay/shutdowns; and a full description of all proposed software, call detectors, and filters. The Plan must also incorporate the requirements relative to North Atlantic right whale reporting. No pile installation can occur if LOA Holder's PAM Plan does not receive approval from NMFS Office of Protected Resources and NMFS GARFO Protected Resources Division; and

- (10) LOA Holder must submit a Nighttime Monitoring Plan for foundation installation if LOA Holder intends to pile drive or drill outside the daily restriction in 3(c)(3). This plan must be submitted to NMFS Office of Protected Resources at least 180 calendar days before foundation installation is planned to begin. This plan(s) must contain a thorough description of how LOA Holder will monitor foundation installation activities (drilling, vibratory and impact pile driving) and at night, including proof of the efficacy of monitoring devices (*e.g.*, mounted thermal/infrared camera systems, hand-held or wearable NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance and shutdown zones under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS' satisfaction that marine mammals can reliably and effectively be detected within the clearance and shutdown zones for monopiles and jacket foundations before and during foundation installation (drilling, vibratory and impact pile driving), nighttime foundation installation must not occur; the only exception would be if safety necessitates continuing pile installation after dark for a foundation that was initiated 1.5 hours prior to civil sunset, in which case the Low Visibility components of the Monitoring Plan would be implemented.

(d) *PSO requirements during UXO/MEC detonations.* The following measures apply to PSOs UXO/MEC detonations and must be implemented by LOA Holder:

- (1) All on-duty visual PSOs must remain in contact with the on-duty PAM operator, who would monitor the PAM systems for acoustic detections of marine mammals in the area, regarding any animal detection that might be approaching or found within the applicable zones no matter where the PAM operator is stationed (*e.g.*, onshore or on a vessel);
- (2) If PSOs cannot visually monitor the clearance zone at all times using the equipment described in paragraphs (b)(5) and (7) of this section; UXO/MEC operations must not commence or must shutdown if they are currently active;

- (3) All PSOs must begin monitoring 60 minutes prior to UXO/MEC detonation, during, and for 30 minutes after the activity. UXO/MEC detonation must only commence when the minimum visibility zone is fully visible (*e.g.*, not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of detonation. PAM operators must assist the visual PSOs in monitoring by conducting PAM activities 60 minutes prior to any UXO/MEC detonation, during, and after for 30 minutes for the appropriate size PAM clearance zone. The entire clearance zone must be clear for at least 30 minutes, with no marine mammal detections within the visual or PAM clearance zones prior to the initiation of detonation;
- (4) For North Atlantic right whales, any visual or acoustic detection must trigger a delay to the commencement of UXO/MEC detonation. In the event that a large whale is sighted or acoustically detected that cannot be confirmed by species, it must be treated as if it were a North Atlantic right whale;
- (5) LOA Holder must conduct PAM for at least 24 hours immediately prior to foundation installation and UXO/MEC detonation activities;
- (6) During use of any real-time PAM system, at least one PAM operator must be designated to monitor each system by viewing data or data products that would be streamed in real-time or in near real-time to a computer workstation and monitor;
- (7) LOA Holder must use a minimum of one PAM operator to actively monitor for marine mammals before, during, and after UXO/MEC detonation. The PAM operator must assist visual PSOs in ensuring full coverage of the clearance and shutdown zones. The PAM operator must inform the Lead PSO(s) on duty of animal detections approaching or within applicable ranges of interest to the activity occurring via the data collection software system (*i.e.*, Mysticetus or similar system) who will be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.*, delay or shutdown);
- (8) PSOs and PAM operators must be on watch for a maximum of 4 consecutive hours, followed by a break of at least 2 hours between watches, and must not exceed a combined watch schedule of more than 12 hours in a single 24-hour period;
- (9) LOA Holder must prepare and submit a Marine Mammal Monitoring Plan to NMFS Office of Protected Resources for review and approval at least 180 days before the start of any detonation and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division's concurrence with this Plan prior to the start of any UXO/MEC detonation. The plan must include a description of how all relevant mitigation and monitoring requirements contained in the LOA and those included as part of the action will be implemented; a detonation summary and sequence of events; a description of all

monitoring equipment and evidence (*i.e.*, manufacturer's specifications, reports, testing) that it can be used to effectively monitor and detect marine mammals in the identified clearance zone (*i.e.*, field data demonstrating reliable and consistent ability to detect large whales at the relevant distances in the conditions planned for use); communications and reporting details; final UXO/MEC detonation project design (*e.g.*, number and type of UXO/MECs, removal method(s), charge weight(s), anticipated start date, *etc.*) and all information related to PAM and PSO monitoring protocols (including number and location of PSOs) for UXO/MEC activities. The Plan(s) must demonstrate sufficient PSO and PAM Operator staffing (in accordance with watch shifts), PSO and PAM Operator schedules, and contingency plans for instances if additional PSOs and PAM Operators are required including any expansion of clearance zones that may be required as a result of SFV. The plan(s) must contain a thorough description of how LOA Holder will monitor detonations during reduced visibility conditions (*e.g.* rain, fog) and in other low visibility conditions, including proof of the efficacy of monitoring devices (*e.g.*, mounted thermal/infrared camera systems, hand-held or wearable NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance zone, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance zone under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. The plan must contain a thorough description of how LOA Holder will monitor detonations during daytime when unexpected changes to lighting or weather occur during the activity that prevent visual monitoring of the full extent of the clearance zone. No UXO/MEC detonation can occur without NMFS' approval of the Plan;

- (10) A Passive Acoustic Monitoring Plan ("PAM Plan") must be submitted to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of foundation installation and prior to the start of any UXO/MEC detonation(s). The authorization to take marine mammals would be contingent upon NMFS Office of Protected Resources approval of the PAM Plan. The Plan must include a description of all proposed PAM equipment and hardware, the calibration data, bandwidth capability and sensitivity of hydrophones, and address how the proposed passive acoustic monitoring will follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs *et al.*, 2021). The Plan must describe and include all procedures, documentation, and protocols including information (*i.e.*, testing, reports, equipment specifications) to support that it will be able to detect vocalizing whales within the clearance zone, including deployment locations, procedures, detection review methodology, and protocols; hydrophone detection ranges with and without foundation installation activities and data supporting those ranges; communication time between call and detection, and data transmission rates between PAM Operator and PSOs on the PSO-dedicated vessel/platform; where PAM Operators will be stationed relative to hydrophones and PSOs on the relevant vessel/platform calling for delays; and a full description

of all proposed software, call detectors, and filters. The Plan must also incorporate the requirements relative to North Atlantic right whale reporting. No UXO/MEC detonation can occur if LOA Holder's PAM Plan does not receive approval from NMFS Office of Protected Resources and NMFS GARFO Protected Resources Division; and

- (11) LOA Holder must submit an SFV plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to planned UXO/MEC detonation activities and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS GARFO Protected Resources Division's concurrence with this Plan prior to the start of any UXO/MEC detonations. At minimum, the SFV Plan must include methodology for collecting, analyzing, and preparing SFV measurement data for submission to NMFS Office of Protected Resources and describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results. SFV for UXO/MEC detonation must not occur until NMFS approves the SFV Plan for this activity. For more information on SFV plan requirements, see section 4(f)(10).
- (e) *PSO requirements during HRG surveys.* The following measures apply to PSOs during HRG surveys using boomers, and sparkers and must be implemented by LOA Holder:
- (1) Between four and six PSOs must be present on every 24-hour survey vessel and two to three PSOs must be present on every 12-hour survey vessel;
 - (2) At least one PSO must be on active duty monitoring during HRG surveys conducted during daylight (*i.e.*, from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at least two PSOs must be on activity duty monitoring during HRG surveys conducted at night;
 - (3) PSOs on HRG vessels must begin monitoring 30 minutes prior to activating acoustic sources, during the use of these acoustic sources, and for 30 minutes after use of these acoustic sources has ceased. Any observations of marine mammals must be communicated to PSOs on all nearby survey vessels during concurrent HRG surveys; and
 - (4) During daylight hours when survey equipment is not operating, LOA Holder must ensure that visual PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified acoustic sources. Off-effort PSO monitoring must be reflected in the monthly PSO monitoring reports.
- (f) *Reporting.* LOA Holder must comply with the following reporting measures:
- (1) Prior to initiation of the specified activities, LOA Holder must demonstrate in a report submitted to NMFS Office of Protected Resources that all required training for LOA Holder personnel (including the vessel crews, vessel captains, PSOs, and PAM operators) has been completed;

- (2) LOA Holder must use a standardized reporting system during the effective period of the LOA. All data collected related to the Project must be recorded using industry-standard software that is installed on field laptops and/or tablets. Unless stated otherwise, all reports must be submitted to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*), dates must be in MM/DD/YYYY format, and location information must be provided in Decimal Degrees and with the coordinate system information (*e.g.*, NAD83, WGS84, *etc.*);
- (3) For all monitoring efforts and marine mammal sightings, the following information must be collected and reported to NMFS Office of Protected Resources: Date and time that monitored activity begins or ends; the construction activities occurring during each observation period; the watch status (*i.e.*, sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform); the PSO who sighted the animal; the time of sighting; the weather parameters (*e.g.*, wind speed, percent cloud cover, visibility); the water conditions (*e.g.*, Beaufort sea state, tide state, water depth); all marine mammal sightings, regardless of distance from the construction activity; species (or lowest possible taxonomic level possible); the pace of the animal(s); the estimated number of animals (minimum/maximum/high/low/best); the estimated number of animals by cohort (*e.g.*, adults, yearlings, juveniles, calves, group composition, *etc.*); the description (*i.e.*, as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics); the description of any marine mammal behavioral observations (*e.g.*, observed behaviors such as feeding or traveling) and observed changes in behavior, including an assessment of behavioral responses thought to have resulted from the specific activity; the animal's closest distance and bearing from the pile being driven or specified HRG equipment and estimated time entered or spent within the Level A harassment and/or Level B harassment zone(s); the activity at time of sighting (*e.g.*, vibratory installation/removal, impact pile driving, construction survey), use of any noise attenuation device(s), and specific phase of activity (*e.g.*, ramp-up of HRG equipment, HRG acoustic source on/off, soft-start for pile driving, active pile driving, *etc.*); the marine mammal occurrence in Level A harassment or Level B harassment zones; the description of any mitigation-related action implemented, or mitigation-related actions called for but not implemented, in response to the sighting (*e.g.*, delay, shutdown, *etc.*) and time and location of the action; and other human activity in the area, and; other applicable information, as required in any LOA issued under the final rule;
- (4) If a marine mammal is acoustically detected during PAM monitoring, the following information must be recorded and reported to NMFS Office of Protected Resources: Location of hydrophone (latitude & longitude; in Decimal Degrees) and site name; bottom depth and depth of recording unit (in meters); recorder (model & manufacturer) and platform type (*i.e.*, bottom-mounted, electric glider, *etc.*), and instrument ID of the hydrophone and recording platform (if applicable); time zone for sound files and recorded date/times in data and metadata (in relation to Universal Coordinated Time (UTC); *i.e.*, Eastern Standard

Time (EST) time zone is UTC-5); duration of recordings (start/end dates and times; in International Organization for Standardization (ISO) 8601 format, yyyy-mm-ddTHH:MM:SS.sssZ); deployment/retrieval dates and times (in ISO 8601 format); recording schedule (must be continuous); hydrophone and recorder sensitivity (in dB re 1 microPascal (μPa)); calibration curve for each recorder; bandwidth/sampling rate (in Hz); sample bit-rate of recordings; and, detection range of equipment for relevant frequency bands (in meters);

- (5) For each detection, the following information must be noted:
 - (i) Species identification (if possible); call type and number of calls (if known); temporal aspects of vocalization (date, time, duration, *etc.*; date times in ISO 8601 format); confidence of detection (detected, or possibly detected); comparison with any concurrent visual sightings; location and/or directionality of call (if determined) relative to acoustic recorder or construction activities; location of recorder and construction activities at time of call; name and version of detection or sound analysis software used, with protocol reference; minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and name of PAM operator(s) on duty.
- (6) LOA Holder must compile and submit weekly reports to NMFS Office of Protected Resources that document the daily start and stop of all pile driving, drilling, UXO/MEC detonations, and HRG survey associated with the Project; the foundation/pile ID, type of pile, pile diameter, start and finish time of each drilling and pile driving event, hammer log (number of strikes, max hammer energy, duration of piling) per pile, any changes to noise attenuation systems and/or hammer schedule, the start and stop of associated observation periods by PSOs and PAM operators; details on the deployment of PSOs and PAM operators; a record of all detections of marine mammals (acoustic and visual) including time (UTC) of sighting/detection, species ID, behavior, distance (meters) from vessel to animal at time of sighting/detection (meters), animal distance (meters) from pile installation vessel and UXO/MEC detonation site, vessel/project activity at time of sighting/detection, platform/vessel name, and mitigation measures taken (if any) and reason. Sightings/detections during pile driving, drilling, and UXO/MEC activities (clearance, active pile driving and drilling, post-pile driving and drilling and detonation) and all other (transit, opportunistic, *etc.*) sightings/detection must be reported and identified as such; any mitigation actions (or if mitigation actions could not be taken, provide reasons why); and details on the noise attenuation system(s) used and its performance. Weekly reports are due on Wednesday for the previous week (Sunday – Saturday), can consist of Quality Assurance/Quality Compliance (QA/QC) reviewed data, and must include the information required under this section. The weekly report must also identify which turbines become operational and when (a map must be provided). This weekly report must also identify when, what charge weight size, and where UXO/MECs are detonated (a map must also be provided). The weekly reports must also confirm that the required SFV was

carried out for each pile and UXO/MEC detonation and that results were reviewed on the required timelines. Abbreviated SFV reports must be appended to the weekly report. Once all foundation pile installation and UXO/MEC detonations are completed, weekly reports are no longer required by LOA Holder;

- (7) LOA Holder must compile and submit monthly reports to NMFS Office of Protected Resources that include a summary of all information in the weekly reports, including project activities carried out in the previous month, including dates and location of any fisheries surveys carried out, vessel transits (number, type of vessel, MMIS number, number of transits, vessel activity, and route (origin and destination, including transits from all ports, foreign and domestic)), cable installation activities (including sea to shore transition), number of piles installed and pile IDs, UXO/MEC detonation, all detections of marine mammals (sightings/detections must include species ID, time, date, initial detection distance, vessel/platform name, vessel activity, vessel speed, bearing to animal, project activity), and any mitigative action taken (or if mitigation actions could not be taken, provide reasons why). Monthly reports are due on the 15th of the month for the previous month. The monthly report must also identify which turbines become operational and when (a map must be provided). This weekly report must also identify when, what charge weight size, and where UXO/MECs are detonated (a map must also be provided);
- (8) LOA Holder must submit a draft annual report to NMFS Office of Protected Resources no later than 90 days following the end of a given calendar year. LOA Holder must provide a final report within 30 days following resolution of NMFS's comments on the draft report. The draft and final reports must detail the following:
 - (i) A summary of all activities conducted, the dates and locations of all fisheries surveys, including location and duration for all trawl surveys summarized by month, number of vessel transits inclusive of port of origin and destination, and a summary table of any observations and captures of Endangered Species Act (ESA) listed species during these surveys. The report must also summarize all acoustic telemetry and benthic monitoring activities that occurred, inclusive of vessel transits. Each annual report is due by February 15 (*e.g.*, the report for 2024 activities is due by February 15, 2025). The total number of marine mammals of each species/stock detected and how many were within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity type; marine mammal detections and behavioral observations before, during, and after each activity; what mitigation measures were implemented (*i.e.*, number of shutdowns or clearance zone delays, *etc.*) or, if no mitigative actions was taken, why not; operational details (*i.e.*, days and duration of impact and vibratory pile driving, days and duration of drilling, days and number of UXO/MEC detonations, days and amount of HRG survey effort, *etc.*); any PAM systems used; The results, effectiveness, and which noise

attenuation systems were used during relevant activities (*i.e.*, impact and vibratory pile driving, drilling, and UXO/MEC detonations); summarized information related to situational reporting; and any other important information relevant to the Project, including additional information that may be identified through the adaptive management process. The final annual report must be prepared and submitted within 30 calendar days following the receipt of any comments from NMFS Office of Protected Resources on the draft report. If no comments are received from NMFS Office of Protected Resources within 60 calendar days of NMFS Office of Protected Resources' receipt of the draft report, the report must be considered final.

- (9) LOA Holder must submit its draft final report to NMFS Office of Protected Resources on all visual and acoustic monitoring conducted within 90 calendar days of the completion of the specified activities. A 5-year report must be prepared and submitted within 60 calendar days following receipt of any NMFS Office of Protected Resources comments on the draft report. If no comments are received from NMFS Office of Protected Resources within 60 calendar days of NMFS Office of Protected Resources receipt of the draft report, the report shall be considered final. The draft and final 5-year report must include, but is not limited to: the total number (annually and across all 5 years) of marine mammals of each species/stock detected and how many were detected within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity; a summary table(s) indicating the amount of each activity type (*e.g.*, pile installation, UXO/MEC detonations, HRG) completed in each of the 5 years and total; Geographic Information System (GIS) shapefile(s) of the final location of all piles, cable routes, and other permanent structures including an indication of what year installed and began operating; GIS shapefile of all North Atlantic right whale sightings, including dates and group sizes; a 5-year summary and evaluation of all SFV data collected; a 5-year summary and evaluation of all PAM data collected; a 5-year summary and evaluation of marine mammal behavioral observations; a 5-year summary and evaluation of mitigation and monitoring implementation and effectiveness; and a list of recommendations to inform environmental compliance assessments for future offshore wind actions;
- (10) LOA Holder must submit a SFV plan at least 180 days prior to the planned start of vibratory and impact pile driving, drilling, and UXO/MEC detonations. The plan must detail all plans and procedures for noise attenuation, including procedures for adjusting and optimizing the noise attenuation system(s), maintenance procedures and timelines, and detail the available contingency noise attenuation measures/systems if distances to modeled isopleths of concern are exceeded (as documented during SFV). At minimum, the plan must describe how LOA Holder would ensure that the first three monopile and two jacket (using pin piles) foundation installation sites selected for SFV are representative of the rest of the monopile and pin pile installation sites. LOA Holder must provide justification for why these locations are representative of the scenario modeled.

The plan must describe how LOA Holder will conduct the required Abbreviated SFV, inclusive of requirements to review results within 24 hours and triggers for Thorough SFV. The plan must provide a table of the identification number and coordinates of each foundation location, and specify the underwater acoustics analysis model scenario against which each foundation location's SFV results will be compared. The plan(s) must also include the piling schedule and sequence of events, communication and reporting protocols, and methodology for collecting, analyzing, and preparing SFV data for submission to NMFS, including instrument deployment, locations of all hydrophones (including direction and distance from the pile), hydrophone sensitivity, recorder/measurement layout, and analysis methods. The plan must also identify the number and distance of relative location of hydrophones for Thorough and Abbreviated SFV. The plan must include a template of the interim report to be submitted and describe all the information that will be reported in the SFV Interim Reports including the number, location, depth, distance, and predicted and actual isopleth distances that will be included in the final report(s). The plan must describe how the interim SFV report results will be evaluated against the modeled results, including which modeled scenario the results will be reported against, and include a decision tree of what happens if measured values exceed predicted values. The plan must address how LOA Holder will implement the measures associated with the required SFV which includes, but is not limited to, identifying additional or modified noise attenuation measures (*e.g.*, additional noise attenuation device, adjust hammer operations, adjust or modify the noise mitigation system) that will be applied to reduce sound levels if measured distances are greater than those modeled as well as implementation of any expanded clearance or shutdown zones, including deployment of additional PSOs. In the case that these sites/scenarios are not determined to be representative of all other monopile/pin pile installation sites, LOA Holder must include information on how additional sites/scenarios would be selected for SFV. The plan must also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS Office of Protected Resources. The plan must describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results.

- (i) LOA Holder must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS Office of Protected Resources in an interim report after each monopile for the first three piles, after two jacket foundation using pin piles are installed, and after each UXO/MEC detonation; The plan must describe how LOA Holder will conduct the required Thorough SFV for all planned UXO/MEC detonations. Thorough SFV consists of: SFV measurements made at a minimum of four distances from the detonation, along a single transect, in the direction of lowest transmission loss (*i.e.*, projected lowest transmission loss coefficient), including, but not limited to, 750 m and three additional ranges selected such that measurement of identified isopleths are accurate, feasible, and avoid extrapolation. At least one additional measurement at an azimuth 90 degrees from the array at approximately 750 m must be made. At each

location, there must be a near bottom and mid-water column hydrophone (measurement systems). The plan must describe how the interim SFV report results will be evaluated against the modeled results and decision tree of what happens if measured values exceed predicted values. The plan must address how LOA Holder will implement the measures associated with the required SFV which includes, but is not limited to, identifying additional or modified noise attenuation measures (*e.g.*, additional noise attenuation device, adjust hammer operations, adjust or modify the noise mitigation system) that will be applied to reduce sound levels if measured distances are greater than those modeled as well as implementation of any expanded clearance or shutdown zones, including deployment of additional PSOs;

- (ii) The interim report must include data from hydrophones identified for interim reporting in the SFV Plan and include a summary of pile installation activities (pile diameter, pile weight, pile length, water depth, sediment type, hammer type, total strikes, total installation time (start time, end time), duration of pile driving, max single strike energy, NAS deployments), pile location, recorder locations, modeled and measured distances to thresholds, received levels (rms, peak, and sound exposure level (SEL)) results from Conductivity, Temperature, and Depth (CTD) casts/sound velocity profiles, signal and kurtosis rise times, pile driving plots, activity logs, weather conditions. Additionally, any important noise attenuation device malfunctions (suspected or definite), must be summarized and substantiated with data (*e.g.* photos, positions, environmental data, directions, *etc.*). Such malfunctions include gaps in the bubble curtain, significant drifting of the bubble curtain, and any other issues which may indicate sub-optimal mitigation performance or are used by LOA Holder to explain performance issues;
- (iii) The SFV plan must also include how operational noise would be monitored. LOA Holder must estimate source levels (at 10 m from the operating foundation) based on received levels measured at distances described in a NMFS-approved SFV plan for operations. These data must be used to identify estimated transmission loss rates. Operational parameters (*e.g.*, direct drive/gearbox information, turbine rotation rate) as well as sea state conditions and information on nearby anthropogenic activities (*e.g.*, vessels transiting or operating in the area) must be reported;
- (iv) For those foundations and UXO/MEC detonations requiring Thorough SFV measurements, LOA Holder must provide the initial results of the SFV measurements to NMFS Office of Protected Resources in an interim report after each foundation installation event as soon as they are available and prior to any subsequent foundation installation, but no later than 48 hours after each completed foundation installation event. The report must include hammer energies/schedule used during pile driving or UXO/MEC

weight (including donor charge weight), the model-estimated acoustic ranges (R95%) to compare with the real-world sound field measurements, estimated source levels at 1 m and/or 10 m, peak sound pressure level (SPL_{pk}) and median, mean, maximum, and minimum root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPL_{rms}) and sound exposure level (SEL, in single strike for pile driving (SEL_{s-s}) and SEL_{cum}) for each hydrophone, including at least the maximum, arithmetic mean, minimum, median (L50) and L5 (95 percent exceedance) statistics for each metric; estimated marine mammal Level A harassment and Level B harassment acoustic isopleths, calculated using the maximum-over-depth L5 (95 percent exceedance level, maximum of both hydrophones) of the associated sound metric; comparison of modeled results assuming 10-dB attenuation against the measured marine mammal Level A harassment and Level B harassment acoustic isopleths; estimated transmission loss coefficients; pile identifier name, location of the pile and each hydrophone array in latitude/longitude; depths of each hydrophone; one-third-octave band single strike SEL spectra; if filtering is applied, full filter characteristics must be reported; and hydrophone specifications including the type, model, and sensitivity. LOA Holder must also report any immediate observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices. If any in situ calibration checks for hydrophones reveal a calibration drift greater than 0.75 dB, pistonphone calibration checks are inconclusive, or calibration checks are otherwise not effectively performed, LOA Holder must indicate full details of the calibration procedure, results, and any associated issues in the 48-hour interim reports;

- (v) All results from Abbreviated SFV must be included in the weekly reports. The report must include estimated source levels at 1 m or 10 m and the measured SEL_{cum} noise levels at distance. Any indications that distances to the identified Level A harassment and Level B harassment thresholds for marine mammals were exceeded must be addressed by LOA Holder, including an explanation of factors that contributed to the exceedance and corrective actions that were taken to avoid exceedance on subsequent piles;
- (vi) The final results of all SFV measurements from each foundation installation and UXO/MEC detonations must be submitted as soon as possible, but no later than within 90 days following completion of each event's SFV measurements. The final results of Thorough SFV for UXO/MEC detonations must be submitted as soon as possible, but no later than within 90 days following completion of each UXO/MEC detonation. Within 60 days of the end of each construction season, LOA Holder must compile and submit all final Abbreviated SFV reports. The final reports must include all details included in the interim report and descriptions of

any notable occurrences, explanations for results that were not anticipated, or actions taken during foundation installation. The final report must also include at least the maximum, mean, minimum, median (L50) and L5 (95 percent exceedance) statistics for each metric; the SEL and SPL power spectral density and/or one-third octave band levels (usually calculated as decidecade band levels) at the receiver locations should be reported; range of transmission loss coefficients; the local environmental conditions, such as wind speed, transmission loss data collected on-site (or the sound velocity profile); baseline pre- and post-activity ambient sound levels (broadband and/or within frequencies of concern); a description of depth and sediment type, as documented in the Construction and Operation Plan (COP), at the recording and foundation installation and UXO/MEC detonation locations; the extents of the measured Level A harassment and Level B harassment zone(s); hammer energies required for pile installation and the number of strikes per pile; and charge weights and other relevant characteristics of UXO/MEC detonations; the hydrophone equipment and methods (*i.e.*, recording device, bandwidth/sampling rate, distance from the monopile/pin pile and/or UXO/MEC where recordings were made; depth of recording device(s)); a description of the SFV measurement hardware and software, including software version used, calibration data, bandwidth capability and sensitivity of hydrophone(s), any filters used in hardware or software, any limitations with the equipment, and other relevant information; the spatial configuration of the noise attenuation device(s) relative to the pile and/or UXO/MEC charge; a description of the noise abatement system and operational parameters (*e.g.*, bubble flow rate, distance deployed from the pile and/or UXO/MEC, *etc.*) and any action taken to adjust the noise abatement system. A discussion which includes any observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices. LOA Holder must submit a revised report within 30 days following receipt of NMFS' comments on the draft final report;

- (vii) LOA Holder must submit SFV results from UXO/MEC detonation monitoring in a report prior to detonating a subsequent UXO/MEC or within the relevant weekly report, whichever comes first. The report must include, at minimum, the size of UXO/MEC detonated and donor charge weight, why detonation was necessary, current speeds, SEL_{cum}, a description of the noise abatement system and operational parameters (*e.g.*, bubble flow rate, distance deployed from the detonation, *etc.*) and any action taken to adjust the noise abatement system, modeled and SFV-based estimated ranges to all relevant NMFS explosive thresholds (including those from pressure transducer measurements); and
- (viii) If at any time during the project LOA Holder becomes aware of any issue or issues which may (to any reasonable subject-matter expert, including

the persons performing the measurements and analysis) call into question the validity of any measured Level A harassment or Level B harassment isopleths to a significant degree, which were previously transmitted or communicated to NMFS Office of Protected Resources, LOA Holder must inform NMFS Office of Protected Resources within 1 business day of becoming aware of this issue or before the next pile is driven, whichever comes first.

- (11) If a North Atlantic right whale is acoustically detected at any time by a project-related PAM system, LOA Holder must ensure the detection is reported as soon as possible to NMFS, but no longer than 24 hours after the detection via the 24-hour North Atlantic right whale Detection Template (<https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates>). Calling the hotline is not necessary when reporting PAM detections via the template. Full detection data, metadata, and location of recorders (or GPS tracks, if applicable) from all real-time hydrophones used for monitoring during construction must be submitted within 90 calendar days following completion of activities requiring PAM for mitigation via the ISO standard metadata forms available on the NMFS Passive Acoustic Reporting System website (<https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates>). Submit the completed data templates to nmfs.nec.pacmdata@noaa.gov. The full acoustic recordings from real-time systems must also be sent to the NCEI for archiving within 90 days following completion of activities requiring PAM for mitigation. Submission details can be found at: <https://www.ncei.noaa.gov/products/passive-acoustic-data>;
- (12) LOA Holder must submit situational reports if the following circumstances occur, including all instances wherein an exemption is taken must be reported to NMFS Office of Protected Resources within 24 hours (see sections 3(a)(6),(7); 3(c)(3); 3(c)(8); 3(d)(1), in specific circumstances, including but not limited to the following:
- (i) All sightings of North Atlantic right whale must be reported immediately (no later than 24 hours). If a North Atlantic right whale is sighted with no visible injuries or entanglement at any time by project PSOs or project personnel, LOA Holder must immediately report the sighting to NMFS. If immediate reporting is not possible, the report must be submitted as soon as possible but no later than 24 hours after the initial sighting. All North Atlantic right whale acoustic detections within a 24-hour period should be collated into one spreadsheet and reported to NMFS as soon as possible but no later than 24 hours.
 - (A) To report sightings and acoustic detections, download and complete the Real-Time North Atlantic Right Whale Reporting Template spreadsheet found here: <https://www.fisheries.noaa.gov/resource/document/template-datasheet-real-time-north-atlantic-right-whale-acoustic-and-visual>. Save the completed spreadsheet as a .csv file and email it to NMFS

Northeast Fisheries Science Center Protected Species Division (NEFSC-PSD) (*ne.rw.survey@noaa.gov*), NMFS GARFO Protected Species Division (PRD) (*nmfs.gar.incidental-take@noaa.gov*), and NMFS Office of Protected Resources (*pr.itp.monitoringreports@noaa.gov*). If the sighting is in the Southeast (North Carolina through Florida), report via the template and to the Southeast Hotline 877-WHALE-HELP (877-942-5343) with the observation information provided below (PAM detections are not reported to the Hotline). If unable to report a sighting through the spreadsheet within 24 hours, call the relevant regional hotline (Greater Atlantic Region [Maine through Virginia] Hotline 866-755-6622; Southeast Hotline 877-WHALE-HELP) with the observation information provided below (PAM detections are not reported to the Hotline).

- (B) The following information must be reported: the time (note time format), date (MM/DD/YYYY), location (latitude/longitude in decimal degrees; coordinate system used) of the observation, number of whales, animal description/certainty of observation (follow up with photos/video if taken), reporter's contact information, and lease area number/project name, PSO/personnel name who made the observation, and PSO provider company (if applicable) (PAM detections are not reported to the Hotline). If unable to report via the template or the regional hotline, enter the sighting via the WhaleAlert app (<http://www.whalealert.org/>). If this is not possible, report the sighting to the U.S. Coast Guard via channel 16. The report to the Coast Guard must include the same information as would be reported to the Hotline (see above). PAM detections are not reported to WhaleAlert or the U.S. Coast Guard.
 - (C) If a large whale species is observed that is not a North Atlantic right whale, LOA Holder must report the sighting via the WhaleAlert app (<http://www.whalealert.org/>) as soon as possible but within 24 hours.
- (ii) In the event that personnel involved in the Project discover a stranded, entangled, injured, or dead marine mammal, LOA Holder must immediately report the observation to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866-755-6622), and if in the Southeast Region (North Carolina through Florida) call the NMFS Southeast Stranding Hotline (877-WHALE-HELP (877-942-5343)). Separately, LOA Holder must report, within 24 hours, the incident to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and, if in the Greater Atlantic Region to the NMFS GARFO (*nmfs.gar.incidental-take@noaa.gov*) or if in the Southeast Region, to the NMFS Southeast Regional Office (SERO; *secmammalreports@noaa.gov*). Note, the

stranding hotline may request the report be sent to the local stranding network response team. The report must include contact information (*e.g.*, name, phone number, *etc.*); time, date, and location (*i.e.*, specify coordinate system) 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); photographs or video footage of the animal(s) (if available); and general circumstances under which the animal was discovered.

- (iii) In the event of a suspected or confirmed vessel strike of a marine mammal by any vessel associated with the Project or other means by which Project activities caused a non-auditory injury or death of a marine mammal, LOA Holder must immediately report the incident to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866-755-6622), and if in the Southeast Region (North Carolina through Florida) call the NMFS Southeast Stranding Hotline (877-WHALE-HELP (877-942-5343)). Separately, LOA Holder must immediately report the incident to NMFS Office of Protected Resources (PR.ITP.MonitoringReports@noaa.gov) and, if in the Greater Atlantic Region to the NMFS GARFO (nmfs.gar.incidental-take@noaa.gov) or if in the Southeast Region, to the NMFS SERO (secmammalreports@noaa.gov). The report must include time, date, and location (*i.e.*, specify coordinate system)) of the incident; species identification (if known) or description of the animal(s) involved (*i.e.*, identifiable features including animal color, presence of dorsal fin, body shape and size, *etc.*); vessel strike reporter information (name, affiliation, email for person completing the report); vessel strike witness (if different than reporter) information (*e.g.*, name, affiliation, phone number, platform for person witnessing the event, *etc.*); vessel name and/or MMSI number; vessel size and motor configuration (inboard, outboard, jet propulsion); vessel's speed leading up to and during the incident; vessel's course/heading and what operations were being conducted (if applicable); part of vessel that struck marine mammal (if known); vessel damage notes; status of all sound sources in use at the time of the strike; if the marine mammal was seen before the strike event; description of behavior of the marine mammal before the strike event (if seen) and behavior immediately following the strike; description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility, *etc.*) immediately preceding the strike; estimated (or actual, if known) size and length of marine mammal that was struck; if available, description of the presence and behavior of any other marine mammals immediately preceding the strike; other animal-specific details if known (*e.g.*, length, sex, age class); behavior or estimated fate of the marine

mammal post-strike (e.g., dead, injured but alive, injured and moving, external visible wounds (linear wounds, propeller wounds, non-cutting blunt-force trauma wounds), blood or tissue observed in the water, status unknown, disappeared); to the extent practicable, any photographs or video footage of the marine mammal(s); and, any additional notes the witness may have from the interaction. For any numerical values provided (i.e., location, animal length, vessel length, etc.), please provide if values are actual or estimated. LOA Holder must immediately cease activities until the NMFS Office of Protected Resources 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 the LOA(s). NMFS Office of Protected Resources may impose additional measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. LOA Holder must not resume their activities until notified by NMFS Office of Protected Resources.

- (13) LOA Holder must report any lost gear associated with the fishery surveys to the NOAA GARFO-PRD (nmfs.gar.incidental-take@noaa.gov) as soon as possible or within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear;
- (14) LOA Holder must provide NMFS Office of Protected Resources with notification of planned UXO/MEC detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk of human life or safety. This notification must include the coordinates of the planned detonation, the estimated charge size, and any other information available on the characteristics of the UXO/MEC. If an UXO/MEC detonation occurs, within 72 hours after a detonation but before the next detonation, whichever is sooner, LOA Holder must report to NMFS Office of Protected Resources the time, date, location (latitude/longitude Decimal Degrees), charge weight size, justification on why detonation was necessary and other means of removal or avoidance could not occur, all detections of marine mammals within the UXO/MEC zones, and any mitigative action taken; and
- (15) Performance reports for piles with SFV must be submitted by LOA Holder with the weekly pile driving reports. For UXO/MEC detonations, the performance report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the UXO/MEC detonation.
- (16) Performance reports for each bubble curtain deployed must include water depth, current speed and direction, wind speed and direction, bubble curtain deployment/retrieval date and time, bubble curtain hose length, bubble curtain radius (distance from pile), diameter of holes and hole spacing, air supply hose length, compressor type (including rated Cubic Feet per Minute (CFM) and model number), number of operational compressors, performance data from each compressor (including Revolutions Per Minute (RPM), pressure, start times, and

stop times), free air delivery (m³/min), total hose air volume (m³/(min m)), schematic of GPS waypoints during hose laying, maintenance procedures performed (pressure tests, inspections, flushing, re-drilling, and any other hose or system maintenance) before and after installation and timing of those tests, and the length of time the bubble curtain was on the seafloor prior to foundation installation.

- (i) The report must include any important observations regarding performance (before, during, and after pile installation or UXO/MEC detonation), such as any observed weak areas of low pressure. The report may also include any relevant video and/or photographs of the bubble curtain(s) operating during pile driving (inclusive of relief drilling) and UXO/MEC detonation.

Should you have questions regarding this LOA or the required conditions found herein, please contact NMFS Office of Protected Resources staff, Karolyn Lock (*Karolyn.Lock@noaa.gov*).

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Kimberly Damon-Randall,
Director, Office of Protected Resources,
National Marine Fisheries Service.

7/22/2024

Date

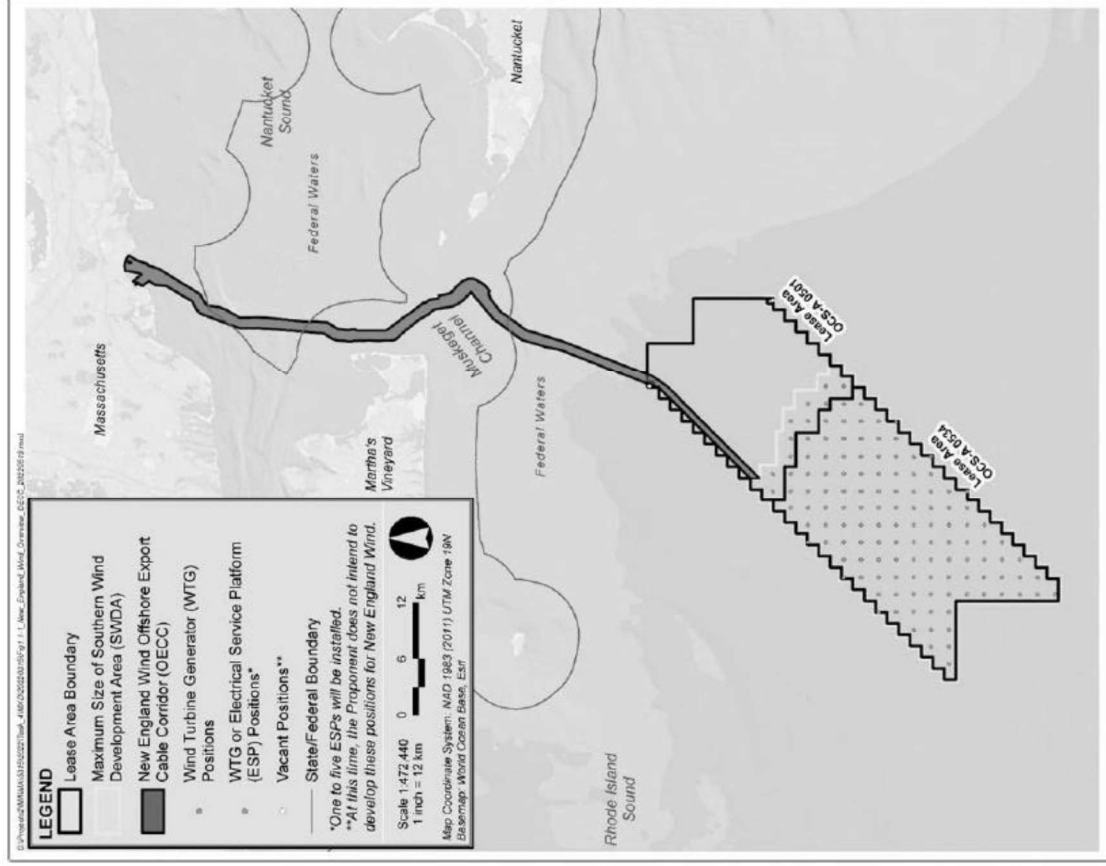


Figure 1 — Project Location

Table 1 – Maximum Annual and 5-year Total Take Authorized For the Project Incidental to All Specified Activities

Common Name	Scientific Name	Stock	Maximum Annual Take		5-year Total Take	
			Level A Harassment	Level B Harassment	Level A Harassment	Level B Harassment
Order Artiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale*	<i>Eubalaena glacialis</i>	Western Atlantic	0	60	0	126
Family Balaenopteridae (rorquals)						
Blue whale*	<i>Balaenoptera musculus</i>	Western North Atlantic	1	2	2	4
Fin whale*	<i>Balaenoptera physalus</i>	Western North Atlantic	21	201	35	386
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	18	134	31	270
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian Eastern Coastal	90	508	147	1,046
Sei whale*	<i>Balaenoptera borealis</i>	Nova Scotia	4	31	8	66
Family Physeteridae						
Sperm whale*	<i>Physeter macrocephalus</i>	North Atlantic	1	57	2	108
Family Kogiidae						

Dwarf sperm whale	<i>Kogia sima</i>	Western North Atlantic	2	2	4	4
Pygmy sperm whale	<i>Kogia breviceps</i>	Western North Atlantic	2	2	4	4
<i>Family Ziphiidae</i>						
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	Western North Atlantic	0	3	0	6
Blainville's beaked whale	<i>Mesoplodon densirostris</i>	Western North Atlantic	0	4	0	8
Gervais' beaked whale	<i>Mesoplodon europaeus</i>	Western North Atlantic	0	4	0	8
Sowerby's beaked whale	<i>Mesoplodon bidens</i>	Western North Atlantic	0	4	0	8
True's beaked whale	<i>Mesoplodon mirus</i>	Western North Atlantic	0	3	0	6
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>	Western North Atlantic	0	4	0	8
<i>Family Delphinidae</i>						
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Western North Atlantic	1	170	2	380
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic	1	1,716	2	3,329

Common bottlenose dolphin	<i>Tursiops truncatus</i>	Western North Atlantic, Offshore	1	2,067	2	3,541
Clymene dolphin	<i>Stenella clymene</i>	Western North Atlantic	0	167	0	334
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic	1	26,572	2	46,759
Long-finned pilot whales	<i>Globicephala melas</i>	Western North Atlantic	1	217	2	440
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Western North Atlantic	1	21	2	78
Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic	1	457	2	720
False killer whale	<i>Pseudorca crassidens</i>	Western North Atlantic	0	12	0	25
Fraser's dolphin	<i>Lagenodelphis hosei</i>	Western North Atlantic	0	192	0	384
Killer whale	<i>Orcinus orca</i>	Western North Atlantic	0	10	0	10
Melon-headed whale	<i>Peponocephala electra</i>	Western North Atlantic	0	109	0	218
Pantropical spotted dolphin	<i>Stenella attenuata</i>	Western North Atlantic	0	60	0	120

Pygmy killer whale	<i>Feresa attenuata</i>	Western North Atlantic	0	5	0	10
Rough-toothed dolphin	<i>Steno bredanensis</i>	Western North Atlantic	0	14	0	28
Spinner dolphin	<i>Stenella longirostris</i>	Western North Atlantic	0	51	0	102
Striped dolphin	<i>Stenella coeruleoalba</i>	Western North Atlantic	0	64	0	128
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	Western North Atlantic	0	44	0	150
<i>Family Phocoenidae (porpoises)</i>						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	67	1,119	125	2,343
<i>Order Carnivora – Superfamily Pinnipedia</i>						
<i>Family Phocidae (earless seals)</i>						
Gray seal	<i>Halichoerus grypus</i>	Western North Atlantic	9	1,537	15	3,290
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic	18	1,301	28	3,832
Harp seal	<i>Pagophilus grownlandicus</i>	Western North Atlantic	9	2,013	15	4,062

Hooded seal	<i>Cystophora cristata</i>	Western North Atlantic	0	1	0	2
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* *Endangered Species Act-listed species*

Table 2 - Minimum Visibility, Clearance, Shutdown, and Level B Harassment Zones During Foundation Installation and HRG

Activity	Marine Mammal	Minimum Visibility Zone (m) ⁴	Visual and Acoustic Clearance Zone (m) ⁵	Visual and Acoustic Shutdown Zone (m) ⁶	Acoustic Monitoring Zone (m)	Vessel Separation Zone (m)
Monopile ¹	North Atlantic right whale	2,100	Any distance visual detection from PSOs, any acoustic detection within 12-km acoustic monitoring zone		12,000 ⁷	500
	Other baleen and sperm		3,300	2,700		100
	Small whales and dolphins		200	200		50
	Harbor porpoise		250	250		50
	Seals		200	200		50
Jacket ²	North Atlantic right whale	3,400	Any distance visual detection from PSOs, any acoustic detection within 12-km acoustic monitoring zone		12,000 ⁷	500
	Other baleen and sperm		4,900	4,100		100
	Small whales and dolphins		200	200		50
	Harbor porpoise		250	250		50
	Seals		1,000	800		50
HRG ³	North Atlantic right whale	500	500	500	N/A	500

	All other ESA			500	100	100
	All other non-ESA			100	100	
						50

- 1 – The zones for monopiles apply to all impact pile driving, vibratory pile driving, and drilling activities and are based on the largest distances to Level A harassment ER95% thresholds across the monopile and hammer sizes (i.e., 12m, 13m, 5,000 kJ, 6,000 kJ). The exact size may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected. New zone sizes will be based on the definition provided in footnotes 5 and 6.
- 2 – The zones for the 4-m jacket pin piles apply to impact pile driving, vibratory pile driving, and drilling activities and are based on the largest distances to Level A harassment ER95% thresholds. The exact zone size may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected. New zone sizes will be based on the definition provided in footnotes 5 and 6.
- 3 – HRG zones are limited to visual clearance and shutdown zones as PAM is not required. Clearance and shutdown zones apply only when operating sound sources covered under the specified activities that may result in take (i.e., SBPs).
- 4 – The minimum visibility zone is based on the largest distance to the Level A harassment ER95% for low-frequency cetaceans, not including fin whales, rounded up for PSO clarity. The entire minimum visibility zone must be visible for a full 60 minutes immediately prior to commencing pile driving and drilling.
- 5 – The clearance zone for “other baleen and sperm” is based on the largest distance to the Level A harassment ER95% of the species group plus a 20 percent increase and then rounded up for PSO clarity. The clearance zones for the other species groups, not including North Atlantic right whale, is set as a minimum of 200 m for those species whose distance to Level A harassment was less than 200 m so as to place the clearance zone outside the NAS. For harbor porpoise, Avangrid proposed, and NMFS accepted, a zone of 250 m though the distance to Level A harassment ER95% was modeled at less than 200 m, therefore, no additional increase is warranted for the clearance zone. For seals, as its distance to Level A harassment was more than 200 m, the clearance zone was set as the largest distance to the Level A harassment ER95% of the species group plus a 20 percent increase and then rounded up for PSO clarity.
- 6 – The shutdown zone for “other baleen and sperm” is based on the largest distance to the Level A harassment ER95% then rounded up for PSO clarity. The shutdown zones for the other species groups, not including North Atlantic right whale, is set as a minimum of 200 m for those species whose distance to Level A harassment was less than 200 m so as to place the shutdown zone outside the NAS. For harbor porpoise, Avangrid proposed, and NMFS accepted, a zone of 250 m though the distance to Level A harassment ER95% was modeled at less than 200 m. For seals during jacket foundation installation, the distance to Level A harassment was more than 200 m (790 m) so the shutdown zone was rounded up to 800 m.
- 7- The PAM system must be designed to detect all marine mammals to the maximum extent practicable, maximize baleen whale detections, and must be capable of detecting North Atlantic right whales at 12 km. NMFS recognizes that other marine mammals (e.g., harbor porpoise) may not be detected at 12 km.

Table 3– Clearance, Level A Harassment, and Level B Harassment Zones During UXO/MEC Detonations, by Charge Weight and Assuming 10 dB of Sound Attenuation

UXO/MEC Charge Weights		Low-frequency cetaceans	Mid-frequency cetaceans	High-frequency cetaceans	Phocid Pinnipeds
E4 (2.3 kg)	Level A harassment (m)	552	50	1,820	182
	Level B harassment (m)	2,82	453	6,160	1,470
	Clearance Zone (m) ^{a, b, c}	2,500*	500	2,500	1,000
E6 (9.1 kg)	Level A harassment (m)	982	75	2,590	357
	Level B harassment (m)	4,680	773	8,000	2,350
	Clearance Zone (m) ^{a, b, c}	4,000*	600	4,000	1,500
E8 (45.5 kg)	Level A harassment (m)	1,730	156	3,900	690
	Level B harassment (m)	7,490	1,240	10,300	3,820
	Clearance Zone (m) ^{a, b, c}	6,000*	1,000	6,000	3,000
E10 (227 kg)	Level A harassment (m)	2,970	337	5,400	1,220

E12 (454 kg)	Level B harassment (m)	10,500	2,120	12,900	5,980
	Clearance Zone (m) ^{a, b, c}	9,000*	1,500	9,000	4,000
	Level A harassment (m)	3,780	461	6,200	1,600
	Level B harassment (m)	11,900	2,550	14,100	7,020
	Clearance Zone (m) ^{a, b, c}	10,000*	2,000	10,000	5,000

* The clearance zone size for the North Atlantic right whale is “any distance”. Detonation must not occur if a North Atlantic right whale is visually or acoustically detected at any distance from the detonation site.

a – The clearance zones, which are visually and acoustically monitored, presented here for the Level B harassment thresholds were derived based on an approximate proportion of the size of the Level B harassment (TTS) isopleth. The clearance zone sizes are contingent on Avangrid being able to demonstrate that they can identify charge weights in the field; if they cannot identify the charge weight sizes in the field then Avangrid would need to assume the E12 charge weight size for all detonations and must implement the E12 clearance zone. No minimum visibility zone is required for UXO/MEC detonation as the entire clearance zone must be visually clear.

b – Some of the zones have been rounded for PSO clarity.

c- The exact zone sizes may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected.

Table 4 – Vessel Separation Distances in Meters

North Atlantic right whale	500
Sperm whales and non-North Atlantic right whale baleen whales	100
Delphinids and pinnipeds*	50

*Note- An exception is made for bow-riding dolphins.