New England Wind

AVANGRID RENEWABLES

Construction and Operations Plan

Lease Area OCS-A 0534

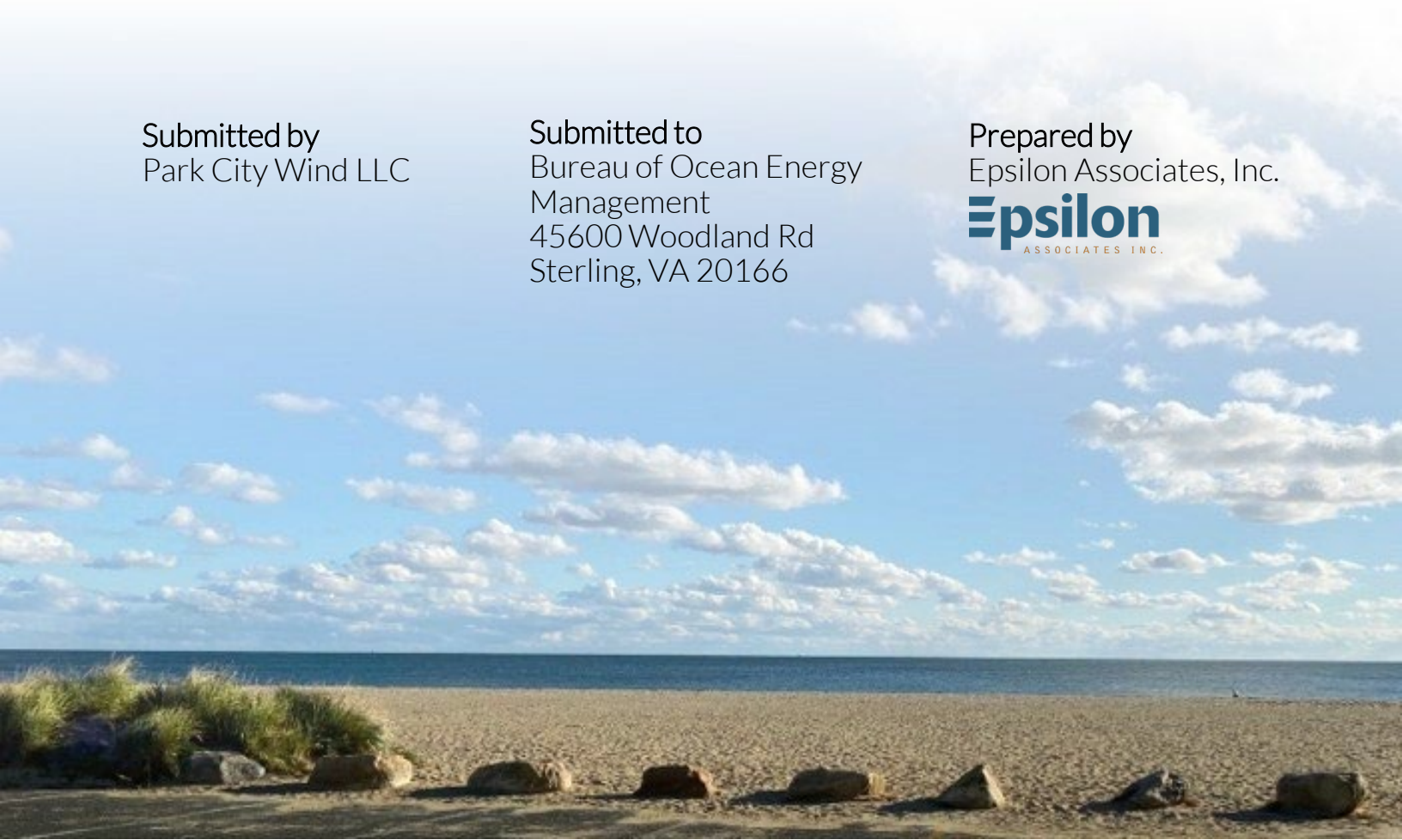
Volume III Appendices

June 2022

Submitted by
Park City Wind LLC

Submitted to
Bureau of Ocean Energy Management
45600 Woodland Rd
Sterling, VA 20166

Prepared by
Epsilon Associates, Inc.



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In Association with:

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Biodiversity Research Institute
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RPS
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SEARCH, Inc.
Wood Thilsted Partners Ltd

June 2022

On April 29, 2022, modifications were made to the project design Envelope that involved changing the maximum wind turbine generator (WTG) and electrical service platform (ESP) topside parameters for Phase 1 (Park City Wind) to match those of Phase 2 (Commonwealth Wind) (see Table 1). As a result of this change, the potential minimum footprint of Phase 1 decreased, and correspondingly the potential maximum footprint of Phase 2 increased (see Table 2). Additionally, the maximum capacity in megawatts for both phases was eliminated to accommodate the rapid advancement in commercially available wind turbine generator size and technology.

Table 1 Modifications to the Phase 1 WTG and ESP Parameters[1]

Maximum WTG Parameters	Previous Dimension	New Dimension[2]
Tip Height	319 m (1,047 ft)	357 (1,171 ft)
Top of the Nacelle Height	199 m (653 ft)	221 m (725 ft)
Hub Height	192 m (630 ft)	214 m (702 ft)
Rotor Diameter	255 m (837 ft)	285 m (935 ft)
Minimum Tip Clearance[3]	27 m (89 ft)	27 m (89 ft)
Blade Chord	8 m (26 ft)	9 m (30 ft)
Tower Diameter	9 m (30 ft)	10 m (33 ft)[4]
Maximum ESP Parameters	**Previous Dimension**	**New Dimension[2]**
Width	45 m (148 ft)	60 m (197 ft)
Length	70 m (230 ft)	100 m (328 ft)
Height	38 m (125 ft)	No change
Height of Topside (above MLLW[5])	70 m (230 ft)	No change

1. Maximum WTG dimensions are included in Table 3.2-1 and maximum ESP dimensions are included in Table 3.2-3 of COP Volume I
2. The new Phase 1 WTG and ESP maximum parameters were revised to match those of Phase 2
3. All parameters are maximum values except tip clearance, where the minimum tip clearance represents the maximum potential impact
4. To accommodate the slight increase in tower diameter, the maximum transition piece diameter/width for Phase 1 monopile foundations was also increased from 9 m (30 ft) to 10 m (33 ft) (see Table 3.2-2 of COP Volume I)
5. MLLW: Mean Lower Low Water

To accommodate the larger Phase 1 WTG dimensions and greater capacity range, the minimum footprint of Phase 1 decreased and the maximum footprint of Phase 2 increased, thus also adjusting the potential number of WTG/ESP positions within each Phase (see Table 2).

Table 2 Modifications to the Phase 1 and Phase 2 Layout and Size

		Previous Layout and Size	New Layout and Size
Phase 1	Number of WTGs	50-62	41-62
	Area	182-231 km^2 (44,973-57,081 acres)	150-231 km^2 (37,066-57,081 acres)
Phase 2	Number of WTGs	64-79	64-88
	Area	222-271 km^2 (54,857-66,966 acres)	222–303 km^2 (54,857–74,873 acres)

These revisions remain within the maximum design scenario considered for this report and the maximum potential impacts are still representative considering these modifications. Therefore, this report was not updated to reflect these minor modifications, as the findings are not affected.

The Proponent has also identified two variations of the Phase 2 Offshore Export Cable Corridor (OECC)— the Western Muskeget Variant and the South Coast Variant—in the event that technical, logistical, grid interconnection, or other unforeseen issues arise during the engineering and permitting processes that preclude one or more Phase 2 offshore export cables from being installed within all or a portion of the OECC (see Section 4.1.3 of COP Volume I). This Appendix considers the potential impacts associated with the Western Muskeget Variant; an assessment of the South Coast Variant in federal waters is provided separately in the COP Addendum.

New England Wind

Benthic Habitat Monitoring Plan Framework

Prepared for:

Park City Wind LLC

Prepared by:

RPS & Epsilon Associates, Inc.

June 2022

APPENDIX III-U BENTHIC HABITAT MONITORING PLAN FRAMEWORK

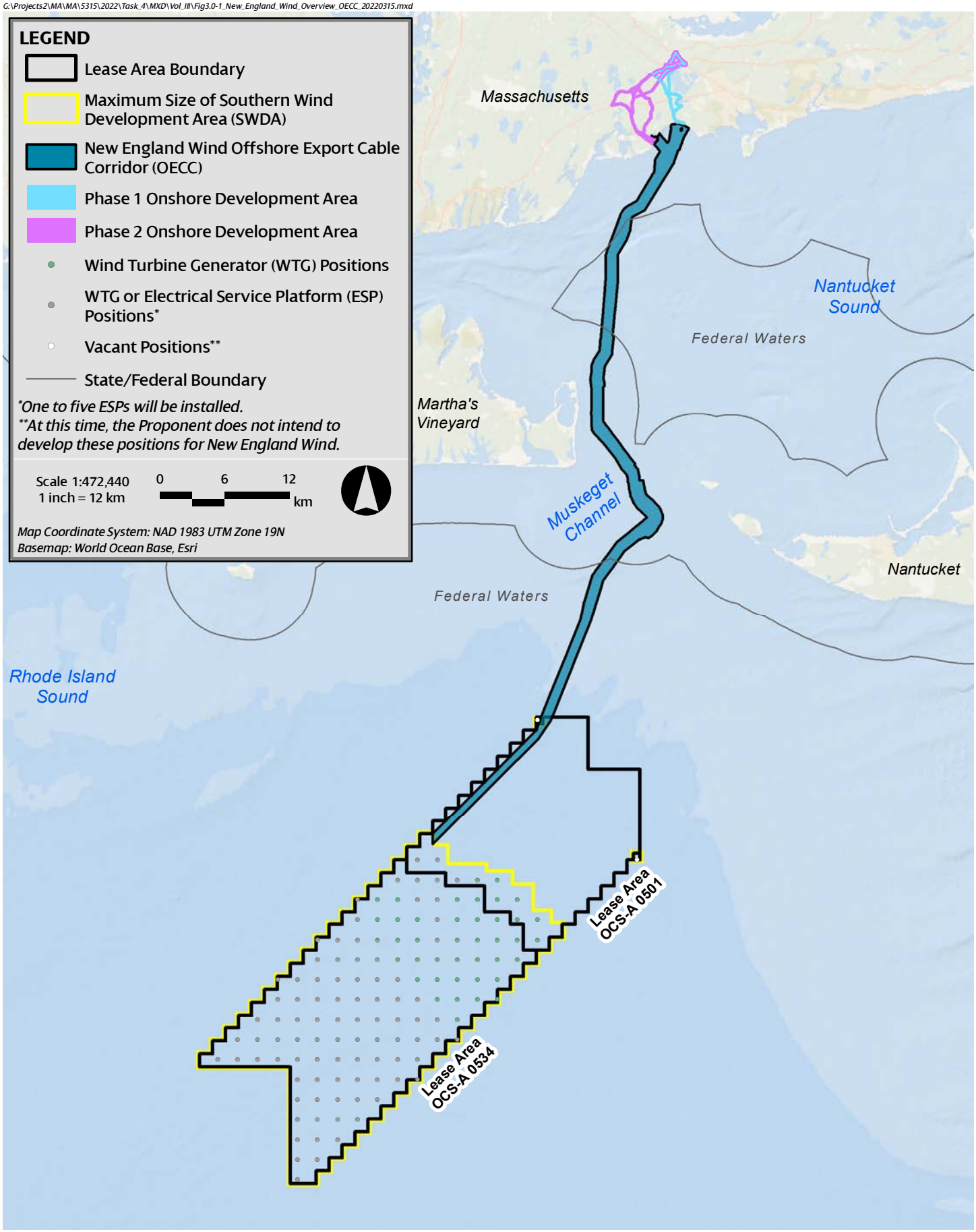
1.0 Overview

New England Wind is the proposal to develop offshore renewable wind energy facilities in Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0534 along with associated offshore and onshore cabling, onshore substations, and onshore operations and maintenance (O&M) facilities. Lease Area OCS-A 0534 is within the Massachusetts Wind Energy Area identified by BOEM, following a public process and environmental review, as suitable for wind energy development. Park City Wind LLC, a wholly owned subsidiary of Avangrid Renewables, LLC, is the Proponent of this Construction and Operations Plan (COP) and will be responsible for the construction, operation, and decommissioning of New England Wind.

New England Wind will be developed in two Phases with a maximum of 130 wind turbine generator (WTG) and electrical service platform (ESP) positions. New England Wind will occupy all of Lease Area OCS-A 0534 and potentially a portion of Lease Area OCS-A 0501 in the event that Vineyard Wind 1 does not develop "spare" or extra positions included in Lease Area OCS-A 0501 and Vineyard Wind 1 assigns those positions to Lease Area OCS-A 0534. The Southern Wind Development Area (SWDA) is defined as all of Lease Area OCS-A 0534 and the southwest portion of Lease Area OCS-A 0501. Four or five offshore export cables—two cables for Phase 1 and two or three cables for Phase 2, also known as Commonwealth Wind, will transmit electricity from the SWDA to shore. Figure 1 provides an overview of New England Wind.

The SWDA may be 411-453 square kilometers (km^2) (101,590 -111,939 acres) in size depending upon the final footprint of the Vineyard Wind 1 Project (also known as 501 North). At this time, the Proponent does not intend to develop the two positions in the separate aliquots located along the northeastern boundary of Lease Area OCS-A 0501 as part of New England Wind. The SWDA (excluding the two separate aliquots that are closer to shore) is just over 32 kilometers (km) (20 miles [mi]) from the southwest corner of Martha's Vineyard and approximately 38 km (24 mi) from Nantucket. Within the SWDA, the closest WTG is approximately 34 km (21 mi) from Martha's Vineyard and 40 km (25 mi) from Nantucket. The WTGs and ESP(s), in the SWDA will be oriented in fixed east-to-west rows and north-to-south columns with one nautical mile (1.85 km) spacing between positions.

Four or five offshore export cables—two cables for Phase 1 and two or three cables for Phase 2—will transmit electricity from the SWDA to shore. Unless technical, logistical, grid interconnection, or other unforeseen issues arise, all New England Wind offshore export cables will be installed within a shared Offshore Export Cable Corridor (OECC) that will travel from the northwestern corner of the SWDA along the northwestern edge of Lease Area OCS-A 0501 (through Vineyard Wind 1) and then head northward along the eastern side of Muskeget Channel



New England Wind
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Figure 1
New England Wind Overview

toward landfall sites in the Town of Barnstable (see Figure 1).[1] The OECC for New England Wind is largely the same OECC proposed in the approved Vineyard Wind 1 COP, but it has been widened to the west along the entire corridor and to the east in portions of Muskeget Channel. The two Vineyard Wind 1 offshore export cables will also be installed within the New England Wind OECC. To avoid cable crossings, the Phase 1 cables are expected to be located to the west of the Vineyard Wind 1 cables and, subsequently, the Phase 2 cables are expected to be installed to the west of the Phase 1 cables.

Each Phase of New England Wind will have a separate onshore transmission system located in the Town of Barnstable.[2] The Phase 1 onshore facilities will ultimately include one of two potential landfall sites, one of two potential Onshore Export Cable Routes, one new onshore substation, and one of two potential Grid Interconnection Routes. Phase 2 will include one or two landfall sites, one or two Onshore Export Cable Routes, one or two onshore substation sites, and one or two Grid Interconnection Routes. The Phase 2 onshore substation site(s) will be located generally along the Phase 2 onshore routes. See Figure 1 for more detail.

2.0 Benthic Habitat Monitoring

The Proponent is committed to developing an appropriate benthic habitat monitoring plan (BHMP) for the Project in consultation with federal and state agencies. The framework for the plan, as presented herein, provides a guide for additional agency consultations. The Proponent intends to continue to work cooperatively with federal and state agencies during the permitting process to develop a final plan.

The benthic monitoring framework relies on the approved BHMP for Vineyard Wind 1 as a starting point. The BHMP for Vineyard Wind 1 focuses on seafloor habitat and benthic communities to measure potential impacts and the recovery of these resources compared to control sites located outside of the areas potentially impacted by construction activities. The following text reviews the BHMP for Vineyard Wind 1, then provides a benthic habitat monitoring framework for New England Wind.

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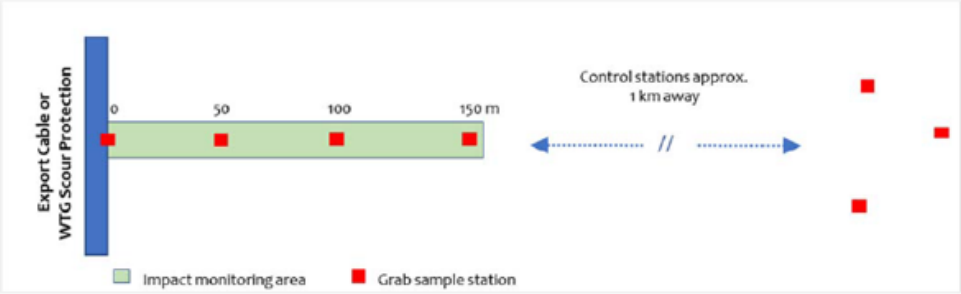
[1] As described further in Section 4.1.3 of COP Volume I, the Proponent has identified two variations of the Phase 2 OECC in the event that technical, logistical, grid interconnection, or other unforeseen issues arise during the COP review and engineering processes that preclude one or more Phase 2 offshore export cables from being installed within all or a portion of the OECC.

[2] One or more Phase 2 offshore export cables may deliver power to a second grid interconnection point if technical, logistical, grid interconnection, or other unforeseen issues arise. Under this scenario, Phase 2 could include one onshore transmission system in Barnstable and/or an onshore transmission system(s) in proximity to the second grid interconnection point (see Section 4.1.4 of COP Volume I).

2.1 Approved Benthic Habitat Monitoring Plan for Vineyard Wind 1

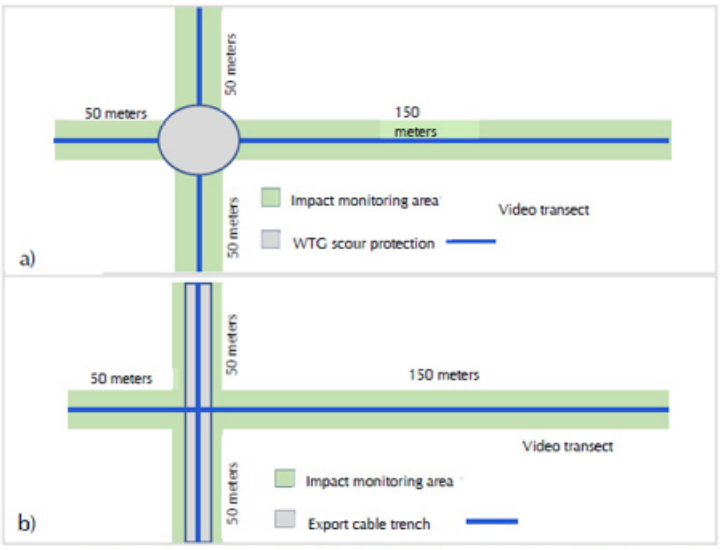
Under the approved BHMP for Vineyard Wind 1, each of six habitat zones in the Project area (five of which are located in the OECC and one of which is located in federal waters in Lease Area OCS-A 0501) will contain two randomly placed benthic monitoring sites. At each site, video and multi-beam echo sounder (i.e., bathymetry) surveys will be performed in a "t" pattern, with the long axis oriented perpendicular to the easternmost export cable and the short axis oriented parallel to the cable alignment. The transects will extend 490 feet (150 m) to the east and 165 feet (50 m) to the north, west, and south. Four grab stations, with three replicate grab samples collected at each station, will be sampled along a gradient extending east from the impact area. Stations will be positioned within the impact area immediately adjacent to the impact source (0 m) and at distances of 165 feet (50 m), 330 feet (100 m), and 490 feet (150 m). Three control stations will be located an additional approximately 0.6 miles (1 km) to the east in an area with similar physical and environmental characteristics. At each control station, three replicate grabs and 330 feet (100 m) of underwater video will be collected. See Figures 2 and 3 for more detail.

Figure 2 Infauna Benthic Grab Sampling



Schematic of infauna benthic grab sampling layout. The expected potential impact area covers approximately 150 m out from the base of the wind turbine generator WTG scour protection or export cable. Each red square represents a sample station at which three replicate benthic grab samples will be obtained. Control stations will be placed 1 km away for all OECC transects, with WDA control stations placed outside the WDA boundary.

Figure 3 Epifauna/Benthic Habitat Video Survey Layout



Schematic of epifauna/benthic habitat video survey layout. One transect extends 150 m out from the base of the wind turbine generator WTG scour protection (a) or export cable trench (b) over the same locations where grab sampling occurs. Shorter transects (50 m) will radiate from the WTG and along/ across the export cable to capture a more complete picture of the area of disturbance.

Collected grab sample and video data will be used to monitor the following parameters (as recommended by McCann 2012[3]):

- Changes in the infaunal density, diversity, and community structure (benthic grabs);
- Changes to the seafloor morphology and structure (multi-beam echo sounder);
- Changes in median grain size (benthic grab and underwater video); and
- Changes in abundance, diversity, and cover of epibenthic species, with focus on important species and those colonizing hard structures (i.e., reef effects; underwater video).

The configuration of the survey for the Vineyard Wind 1 BHMP was designed to document the benthic variability in and around the zone of potential disturbance and allow for comparison between samples at different distances from the impact source. Impact monitoring sample sites

[3] McCann, J. 2012. Developing Environmental Protocols and Modeling Tools to Support Ocean Renewable Energy and Stewardship. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Herndon, VA., OCS Study BOEM 2012-082, 626 pp.

were placed within 490 feet (150 m) of the direct impact location since this extent is expected to capture potential near-field impacts based on sediment transport modeling that predicted deposition from export cable installation would primarily occur within 260 to 330 feet (80-100 m) of the route centerline.

For OECC transects, a minimum of 0.6 miles (1 km) will be maintained between control and impact stations where geography allows within the bounds of a habitat zone, based on the distance at which differences in community indices observed in a gradient sampling design around an oil platform leveled off.[4]

To inform sample size, an a priori power analysis was conducted with GPower software for the BHMP for Vineyard Wind 1 using benthic grab sample data collected in the Project area in 2017 and 2018. Research into monitoring designs and impact analyses in the offshore wind field is ongoing and another (likely similar) power analysis will be conducted for New England Wind with updated Project area data once a survey design is selected.

In addition to benthic invertebrate community monitoring, the presence of Sand Lance (*Ammodytes dubius* and *A. americanus*) will be assessed in ten additional monitoring sites within the project area. A total of ten monitoring sites will be sampled with nighttime benthic grabs to capture fish during their nocturnal burial. Based on their preferred habitat and historic distribution, the monitoring sites will be distributed throughout Zones 1, 2, and 5 along the OECC. Within each site, three replicate grabs within a 330-foot (100-m) radius of the station position will be taken.

Post-construction monitoring of Vineyard Wind 1 will occur in year 1 (2024), year 3 (2026), and possibly year 5 (2028) (year 5 monitoring will occur unless benthic community metrics indicate recovery has occurred and it is agreed that monitoring may cease). The long axis of monitoring as well as the control sites are all focused east of the Vineyard Wind 1 to avoid a situation where installation of New England Wind cables could affect control sites or monitoring stations.

2.2 Proposed Benthic Habitat Monitoring Framework for New England Wind

2.2.1 Constraints

Developing a benthic habitat survey design for the New England Wind OECC presents unique challenges not encountered in Vineyard Wind 1 given that it includes two Phases and will be installed in the same OECC as Vineyard Wind 1. Specifically, the cable pair for Vineyard Wind 1 (expected to be installed in 2022-2023) will be located east of New England Wind Phase 1 (Park City Wind) offshore cables, preventing New England Wind cable monitoring from extending to the

[4] Ellis, J.I., and D.C. Schneider. 2007. Evaluation of a gradient sampling design for environmental impact assessment. Environmental Monitoring and Assessment 48: 157-172.

east. As shown in Figure 4, the Phase 2 (Commonwealth Wind) cables are planned to be installed to the west of Phase 1 cables. Therefore, the proposed framework is focused on monitoring in a manner that avoids interruption by other cable installation in the same corridor.

The Proponent considered the following logistical constraints when developing the proposed monitoring locations. The Phase 2 cables will be installed farthest to the west in the OECC and the Proponent does not intend to install any other cables to the west of the Phase 2 cables. In contract, the cable pair for Phase 1 will be positioned between other cable pairs. Construction in adjacent areas would make it difficult to identify impacts and recovery specifically associated with the Phase 1 cables and may lessen the scientific validity of any monitoring done for Phase 1 due to the confounding factors associated with adjacent projects. It would also be logistically challenging to monitor the cable pair for Phase 1 if construction is ongoing for Phase 2 cables farther west because safety zones around installation equipment and anchor spreads may interfere with access to monitoring sites (i.e., construction-period safety zones and anchor spreads for Phase 2 may overlap with, and temporarily preclude access from, potential monitoring sites for Phase 1).

With these technical and logistical considerations in mind, the Proponent has formulated the draft plan below.

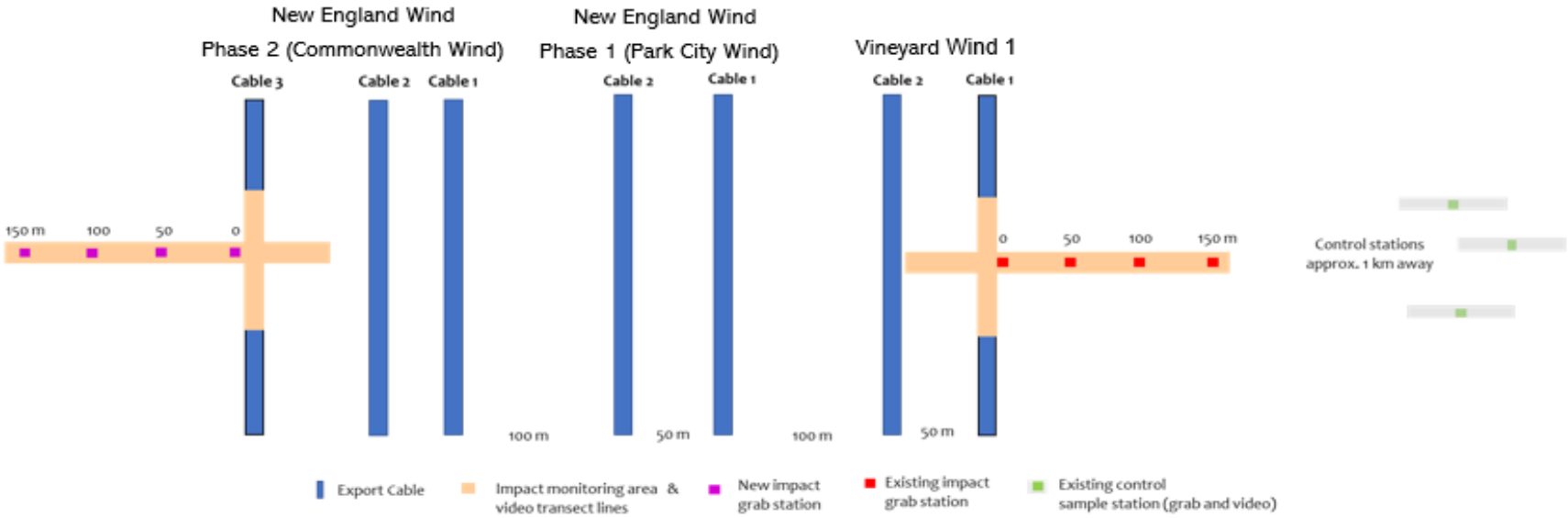
2.2.2 Draft Benthic Habitat Monitoring Framework

The plan for the benthic monitoring framework would mirror the sampling from the Vineyard Wind 1 BHMP for the SWDA and along the westernmost cable for New England Wind Phase 2 (Commonwealth Wind) (Figure 4). This acknowledges that the New England Wind Phase 1 (Park City Wind) cable pair will likely be positioned between adjacent projects with multiple cables themselves and does not propose direct sampling of the New England Wind Phase 1 (Park City Wind) cable pair, but instead proposes monitoring of the New England Wind Phase 2 (Commonwealth Wind) to address the technical, logistical, and scientific constraints described above.

Sampling for the SWDA and along the Phase 2 cable pair would occur at monitoring sites within each habitat zone, preferably in the same general area as the two monitoring sites sampled per habitat zone for the Vineyard Wind 1 (Figure 2 and Figure 3). Each monitoring site would include three grab sample stations spaced 165 feet (50 m) apart, with three replicate grabs collected at each station. Underwater video and multibeam data would be collected for 330 feet (100 m) along the cable route and 655 feet (200 m) perpendicular to the cable in a “t” shape mirroring the approved design from the Vineyard Wind 1 BHMP (see Figure 4).

Data collected along the Phase 2 cable pair would assess recovery by comparing conditions at various distances from the impact source to the community metrics at the same control sites used for Vineyard Wind 1. Statistical analyses would be performed to determine the significance of any changes to benthic community metrics (e.g., abundance, diversity, or other indicator). Grain size, epibenthic species composition, and seafloor morphology and structure would also be monitored and qualitatively compared.

Figure 4 Proposed Benthic Habitat Sampling Framework



Based upon preliminary construction schedules for New England Wind Phase 1 and Phase 2, it is currently expected that sampling would occur in 2024 (pre-construction), 2027 (Year 1), 2029 (Year 3), and possibly 2031 (Year 5).

Repeating the BAG sample design would capture the impact and recovery of habitats to the east and west of the entire corridor over the duration of the installation process, which may capture any differences in recovery that could result from oceanographic or environmental factors like patterns of sediment deposition or larval transport, without confounding the assessment by sampling in areas with temporally overlapping construction impacts.

3.0 Conclusion

The option described above establishes a framework for benthic habitat monitoring that will be further refined into a BHMP during the state and federal permitting processes. The methodologies described herein represent the Proponent's current assessment about how such monitoring could proceed, but the Proponent fully expects these methods will be further developed in consultation with federal and state agencies.