Volume I

Construction and Operations Plan

SOUTH FORK WIND FARM

Submitted to:
Bureau of Ocean Energy Management
Office of Renewable Energy Programs

Mail Stop VAM-OREP
45600 Woodland Road
Sterling, Virginia 20166

BOEM
Bureau of Ocean Energy Management

Submitted by:
Deepwater Wind South Fork, LLC

Deepwater Wind South Fork, LLC
56 Exchange Terrace
Providence, Rhode Island 02903

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Construction and Operations Plan

30 CFR Part 585

South Fork Wind Farm

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

Submitted by:
Deepwater Wind South Fork, LLC

Prepared by:
CH2M HILL Engineers, Inc.

With Support from:

AECOM
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Executive Summary

This *South Fork Wind Farm and South Fork Export Cable Construction and Operations Plan* (COP) is being submitted by Deepwater Wind South Fork, LLC (DWSF or the Applicant) to support the siting and development of the South Fork Wind Farm (SFWF) and the South Fork Export Cable (SFEC), collectively the Project.

The SFWF includes up to 15 wind turbine generators (WTGs or turbines) with a nameplate capacity of 6 to 12 MW per turbine, submarine cables between the WTGs (Inter-array Cables), and an offshore substation (OSS), all of which will be located within federal waters on the outer continental shelf (OCS), specifically in the Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area OCS-A 0486 (Lease Area)[1], approximately 19 miles (30.6 kilometers [km], 16.6 nautical miles [nm]) southeast of Block Island, Rhode Island, and 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York. The SFWF also includes an Operations and Maintenance (O&M) facility that will be located onshore at either Montauk in East Hampton, New York, or Quonset Point in North Kingstown, Rhode Island.

The SFEC is an alternating current (AC) electric cable that will connect the SFWF to the existing mainland electric grid in East Hampton, New York. The SFEC includes both offshore and onshore segments. Offshore, the SFEC is located in federal waters (SFEC – OCS) and New York State territorial waters (SFEC – NYS) and will be buried to a target depth of 4 to 6 feet in the seabed. Onshore, the terrestrial underground segment of the export cable (SFEC – Onshore) will be located in East Hampton, New York. The SFEC – NYS will be connected to the SFEC – Onshore via the sea-to-shore transition where the offshore and onshore cables will be spliced together. The SFEC also includes a new Interconnection Facility where the SFEC will interconnect with the Long Island Power Authority (LIPA) electric transmission and distribution system in the town of East Hampton, New York.

The approximate location of the entire Project is shown on Figure ES-1. The landing site options and route variants of the SFEC – Onshore are shown on Figure ES-2.

The Project is scheduled to be installed during 2021 and 2022, and to be commissioned and operational by the end of 2022.

The Project components and locations presented in this COP have been selected based on environmental and engineering site characterization studies completed to date and will be refined in the Facility Design Report (FDR) and Fabrication and Installation Report (FIR), which will be reviewed by BOEM pursuant to Title 30 of the *Code of Federal Regulations* (CFR) Parts 585.700-702 before the commencement of installation. In addition, a Certified Verification Agent (CVA), approved by BOEM, will conduct an independent assessment and verify that the Project components are fabricated and installed in accordance with both this COP and the FIR.

The purpose of the Project is to generate electricity from an offshore wind farm located in the Lease Area and to transmit it to the East Hampton Substation. The Project addresses the need identified by the LIPA for new sources of power generation that can cost-effectively and reliably supply the South Fork of Suffolk County, Long Island, as an alternative to constructing new transmission facilities. The Project will also help LIPA achieve its renewable energy goals. The Project will enable DWSF to fulfill its contractual commitments to LIPA

[1] The leaseholder of Renewable Energy Lease Area OCS-A 0486 is Deepwater Wind New England, LLC. Deepwater Wind New England, LLC will be assigning a portion of its lease to DWSF.

pursuant to a Power Purchase Agreement executed in 2017 resulting from LIPA's technology-neutral competitive bidding process.

This COP includes the following information:

- An overview of the Project, including details on the regulatory framework in which the Project will be reviewed, a description of the agency and stakeholder outreach, a tentative schedule and other key project information requested by BOEM (Section 1);
- A summary of the siting and route selection process for both the SFWF and SFEC, including a siting history, details on steps taken to identify and evaluate potential SFEC routes, and description of technologies and installation methods considered (Section 2);
- A description of all planned facilities, including onshore and support facilities; and all proposed activities, including construction activities, commercial O&M, and conceptual decommissioning plans (Section 3); and
- A characterization and assessment of potential impacts during construction, O&M, and decommissioning activities, which will support relevant project reviews and consultations (Section 4).

This COP was prepared in accordance with 30 CFR § 585. BOEM is expected to be the lead federal agency under the National Environmental Policy Act (NEPA). For activities related to the SFEC – NYS and SFEC – Onshore in New York State, the New York Public Service Commission will lead the review of the Project activities under Article VII of the New York Public Service Law.

In addition to the federal and state level permits, the Project must also comply with applicable provisions of the Endangered Species Act, the Marine Mammals Protection Act, the Migratory Bird Treaty Act, the Magnuson-Stevens Fishery Conservation and Management Act, the National Historic Preservation Act, the Coastal Zone Management Act, the Clean Air Act, the Rivers & Harbors Act, and the Clean Water Act.

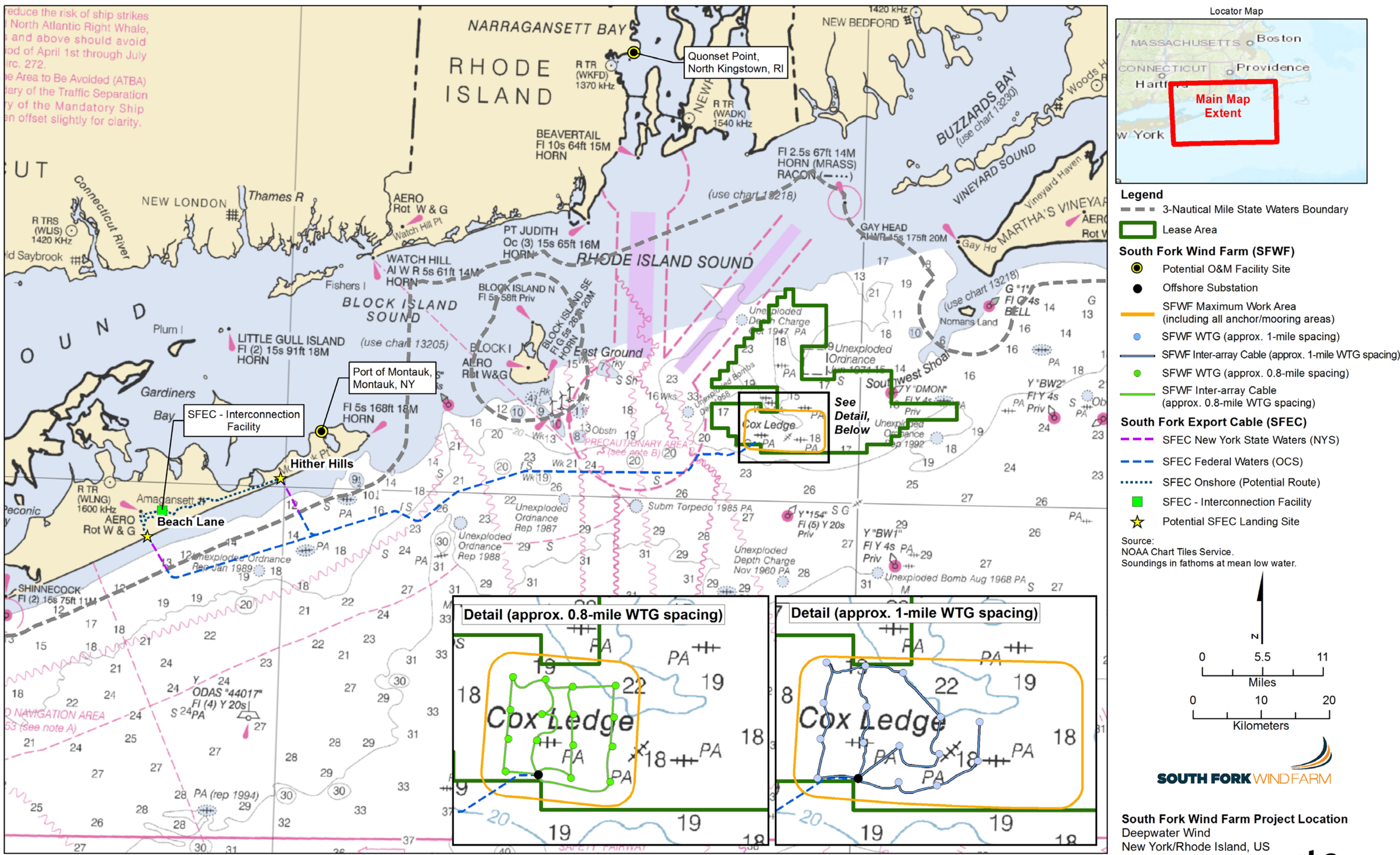

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Figure ES-1. Project Location of the SFWF and SFEC

Depiction of the SFWF and SFEC, shown on a nautical chart. The SFWF detail includes two different spacing options.

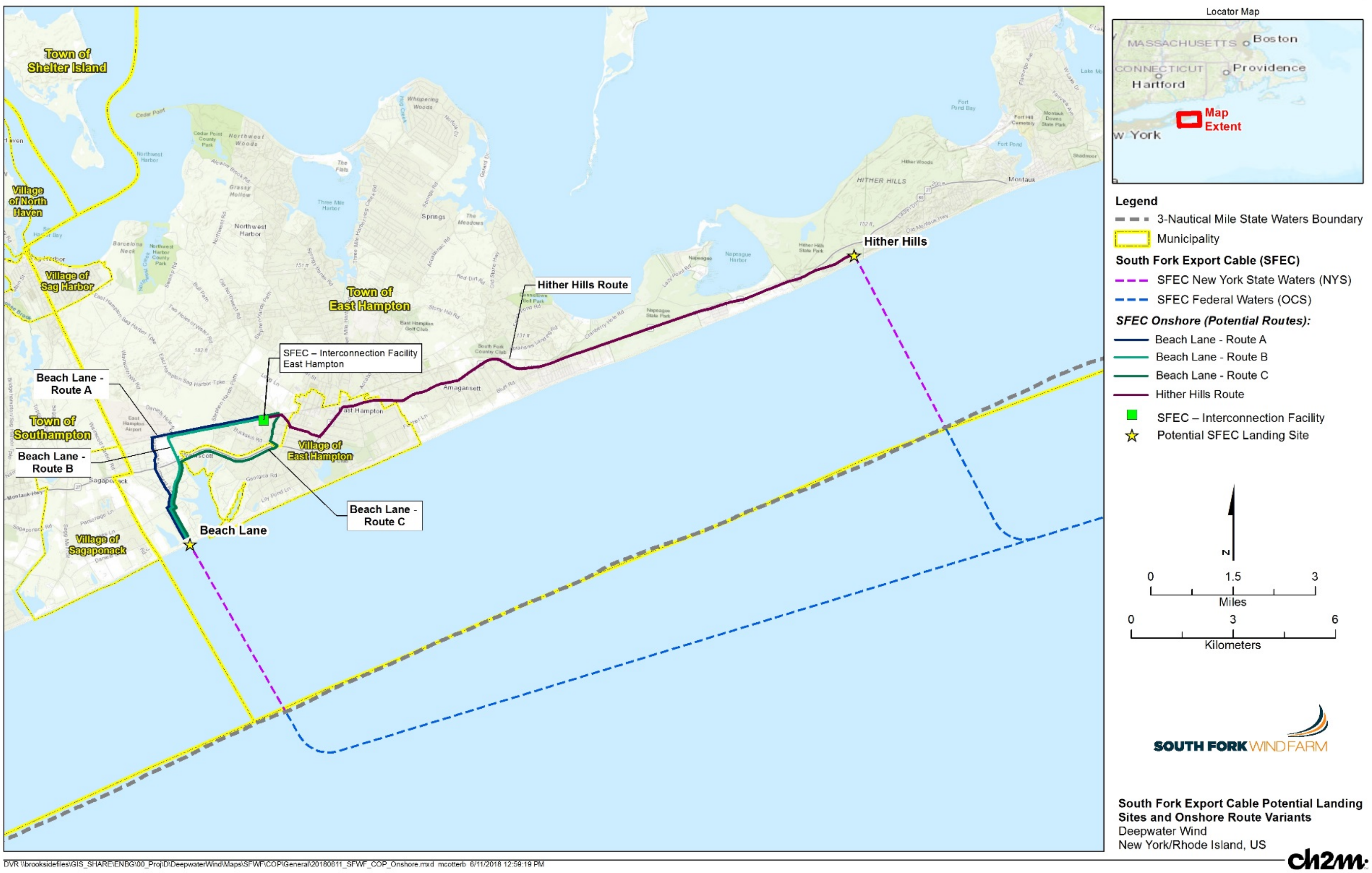

Figure ES-2. Location of the SFEC – Onshore and Interconnection Point

Depiction of the SFEC – NYS and SFEC – Onshore, including landing site options, route variants, and interconnection point.

Since 2010, DWSF has conducted a variety of activities that have informed the design and characteristics of the Project. For example, DWSF has:

- Engaged in outreach relating to the Project with federal and state agencies, federally-recognized Native American tribes, municipal organizations in East Hampton, New York, stakeholders representing a broad range of perspectives, and the public.
- Evaluated several offshore and onshore cable routes and substation locations to fulfill the Project's objective to deliver power into eastern Long Island, New York.
- Completed geophysical and geotechnical surveys in 2017 to inform a site characterization of the Project. These surveys were conducted for both the SFWF and along multiple routes considered for the SFEC. Where possible, the Project was sited to avoid areas with boulders, and to avoid or minimize impacts to commercial fishing areas, archaeological resources, and shallow hazards.
- Completed extensive studies and assessments in 2017 to characterize the offshore resources that may be impacted by construction and installation, O&M, and decommissioning activities.
- Completed conceptual engineering and planning discussions with municipal and state agencies to identify potential landing sites and conducted field surveys for multiple onshore route options from the landing sites to the SFEC – Interconnection Facility.

Consistent with BOEM's *Draft Guidance Regarding the Use of a Project Design Envelope in a Construction and Operations Plan* (January 2018), DWSF considered several potential technologies and installation methods for the SFWF and SFEC. This envelope approach results in a range of characteristics and locations for components that will be considered in the environmental review for the Project. The key characteristics for the Project, which may include relevant variations in the Project Envelope, are:

- SFWF foundation type (monopile, jacket, or gravity base)
- SFWF WTG size (6 to 12 megawatts [MW]) and spacing (0.8 to 1.0 mile [1.3 to 1.6 km, 0.7 to 0.86 nm]) with an approximate north-south/east-west grid pattern
- SFEC landing site (Beach Lane or Hither Hills)
- SFEC installation method for offshore cable (buried via a trench and lay process using a combination mechanical/hydro-jet and plow to achieve the target burial depth of 4 to 6 feet (1.22 to 1.83 meters [m])
- SFEC installation method for sea-to-shore transition (a conduit installed by horizontal directional drilling [HDD] under the beach and intertidal water; may also include a temporary cofferdam located offshore beyond the intertidal zone)

This COP includes site characterization and assessment of potential impacts for the Project and recognizes that impacts may be different for the SFWF and SFEC during the phases of construction, operations and maintenance and decommissioning. The assessment is based upon the requirements set forth in 30 CFR § 585.627 and is also informed by input from federal and state agencies and other public and private stakeholders in the region. The approach to characterization and assessment included several steps:

- Impact-producing Factors(IPFs): Project activities that could impact resources were identified as IPFs, which include seafloor and land disturbance; sediment suspension and deposition; noise; electric and magnetic fields; discharges and releases; trash and debris; traffic; air emissions; visible structures; and lighting.
- Affected Environment: Physical, biological, cultural, visual, and socioeconomic resources were characterized based upon extensive desktop studies, targeted field studies, predictive modeling, and data analysis. These assessments provided a detailed background on the condition of these resources in the affected environment. Desktop studies included literature reviews; examination of publicly-available datasets; direct communication with academic and government science researchers; and consultation with state and federal government entities.

  The Rhode Island Ocean Special Area Management Plan, the New York Ocean Plan, and the Massachusetts Ocean Plan provided important insight on environmental conditions and existing human activities in and near the SFWF and SFEC. The resource characterizations also relied on the material published in recent BOEM NEPA documents, such as the *Final Programmatic Environmental Impact Statement (PEIS) for Alternative Energy Development and Production and Alternate Use of Facilities on the Outer Continental Shelf* (BOEM, 2007).
- Impact Assessment: The type and degree of potential impacts from proposed Project activities varies based on the characteristics of the resource (e.g., GBS presence/absence, conservation status, abundance) and the IPF that may affect each resource. Potential impacts are discussed separately for the SFWF and SFEC. Where relevant and distinct, potential impacts for different segments of the SFEC are discussed separately. Where applicable, potential impacts were identified as direct or indirect; short term or long term; and negligible, minor, moderate, or major. If measures are proposed to avoid and minimize potential impacts, the impact evaluation included consideration of these environmental protection measures.

The SFWF and SFEC were sited, planned, and designed to avoid and minimize impacts. Most potential impacts to affected physical, biological, cultural, visual, and socioeconomic resources will be mitigated. Resources that may be impacted by the SFWF and SFEC are expected to recover given that impacts will be limited temporally and/or spatially.

Table ES-1 summarizes the potential impacts expected from the implementation of the activities described in this COP and the environmental protection measures that DWSF will adopt to minimize these potential impacts.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Air Quality	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: Negligible – Minor • Visible Structures: No Impact • Lighting: No Impact	• Vessels providing construction or maintenance services for the SFWF will use low sulfur fuel where possible. • Vessels constructed on or after January 1, 2016 will meet Tier III nitrogen oxide requirements when operating within Emission Controls Areas. • Equipment and fuel suppliers will provide equipment and fuels that comply with the applicable U.S. Environmental Protection Agency or equivalent emission standards. • Marine engines with a model year of 2007 or later and non-road engines complying with the Tier 3 standards (in 40 CFR 89 or 1039) or better will be used to satisfy BACT. • The use of wind to generate electricity reduces the need for electricity generation from new traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Water Quality	• Seafloor and Land Disturbance: Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact	• Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur via a mechanical/hydro-jet plow. Compared to open cut dredging/trenching, this method will minimize sediment disturbance and alteration and reduce associated turbidity and total suspended solids. • Vessels will comply with regulatory requirements related to the prevention and control of discharges and accidental spills. • Accidental spill or release of oils or other hazardous materials will be managed through the Oil Spill Response Plan (OSRP) (Appendix D to this COP). • At the onshore HDD work area for the SFEC, drilling fluids will be managed within a contained system to be collected for reuse as necessary • An HDD Inadvertent Release Plan will minimize the potential risks associated with release of drilling fluids or a frac-out. • A Stormwater Pollution Prevention Plan, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to water quality during construction of the SFEC - Onshore.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Geological Resources	• Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact	• The SFWF and SFEC - Offshore will avoid, to the extent practicable, identified shallow hazards. • Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur via a mechanical/hydro-jet plow. Compared to open cut dredging/trenching, this method will minimize impacts to surficial geology. • Use of dynamic positioning (DP) vessel for cable installation for the SFWF Inter-array Cable and SFEC - Offshore will minimize impacts to surficial geology, as compared to use of a vessel relying on multiple-anchors. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the maximum work area (MWA) to protect sensitive areas or other areas to be avoided. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. SFEC - Onshore is sited within previously disturbed existing rights-of-way (ROWs).
Oceanographic and Meteorological Conditions	• Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: Negligible • Lighting: No Impact	• DWSF has designed the Project to account for site-specific oceanographic and meteorological conditions within the Project Area; therefore, no additional measures are necessary.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Coastal and Terrestrial Habitat	• Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: No Impact • Air Emissions: No Impact • Visible Structure: No Impact • Lighting: No Impact	• SFEC - Onshore is sited within previously disturbed existing ROWs. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • A Stormwater Pollution Prevention Plan, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to water quality during construction of the SFEC - Onshore.
Benthic and Shellfish Resources	• Seafloor and Land Disturbance: Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: Negligible – Minor • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: Negligible	• The SFWF and SFEC - Offshore will minimize impacts to harder and rockier bottom habitats to the extent practicable. • Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur via a mechanical/hydro-jet plow. Compared to open cut dredging/trenching, this method will minimize long-term impacts to the benthic habitat. • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • Use of DP vessel for cable installation for the SFWF Inter-array Cable and SFEC - Offshore will minimize impacts to surficial geology, as compared to use of a vessel relying on multiple-anchors. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Finfish and Essential Fish Habitat	• Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: Negligible – Minor • Noise: Negligible – Moderate • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible – Minor • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: Negligible	• The SFWF and SFEC - Offshore will minimize impacts to important habitats for finfish species. • Installation of the SFWF Inter-array Cable and SFEC - Offshore will occur via a mechanical/hydro-jet plow. Compared to open cut dredging/trenching, this method will minimize sediment disturbance and alteration of demersal finfish habitat. • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • Siting of the SFWF and SFEC - Offshore were informed by site-specific benthic habitat assessments and Atlantic cod spawning surveys. • DWSF is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP).
Marine Mammals	• Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Major • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible – Moderate • Air Emissions: No Impact • Visible Structures: Negligible • Lighting: Negligible	• Exclusion and monitoring zones for marine mammals will be established for pile driving and HRG survey activities. • Mitigation measures will be implemented for pile driving and HRG survey activities These measures will include soft-start measures, shut-down procedures, marine mammal monitoring protocols, and use of qualified and National Oceanic and Atmospheric Administration (NOAA)-approved protected species observers, as appropriate. • Pile driving activities will not occur at the SFWF from November 1 to April 30 to

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		minimize potential impacts to the North Atlantic right whale. • Vessels will follow NOAA guidelines for marine mammal strike avoidance measures, including vessel speed restrictions. • All personnel working offshore will receive training on marine mammal awareness and marine debris awareness. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m).
Sea Turtles	• Seafloor and Land Disturbance: Negligible - Minor • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Moderate • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Minor – Moderate • Air Emission: No Impact • Visible Structure: Negligible • Lighting: negligible	• Exclusion and monitoring zones will be established for sea turtles during pile driving activities and HRG survey activities • Mitigation measures will be implemented for pile driving and HRG survey activities. These measures will include soft-start measures, shut-down procedures, marine mammal monitoring protocols, and use of qualified and NOAA-approved protected species observers, as appropriate. • Vessels will follow NOAA guidelines for sea turtle strike avoidance measures, including vessel speed restrictions. • All personnel working offshore will receive training on sea turtle awareness and marine debris awareness. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • The SFWF Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m).

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Avian Species	• Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Minor • Electromagnetic Field: No Impact • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible – Minor • Air Emissions: No Impact • Visible Structures: Negligible – Minor • Lighting: Negligible – Minor	• The SFWF WTGs will be spaced at least 0.8 mile (1.3 km, 0.7 nm) apart; this wide spacing will allow avian species to avoid individual WTGs and minimize risk of potential collision. • The location of the SFWF, more than 18 miles (30 km, 16 nm) offshore, avoids the coastal areas, which are known to attract birds, particularly shorebirds and seaducks. • Lighting during operations will be limited to the minimum required by regulation and for safety, therefore minimizing the potential for attraction or disorientation. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. • An avian management plan for listed species will be prepared for the SFEC - Onshore. • The SFEC - Onshore cable will be buried; therefore, avoiding the risk to birds associated with overhead lines.
Bat Species	• Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structures: Negligible – Minor • Lighting: Negligible – Minor	• Lighting during operations will be limited to the minimum required by regulation and for safety, therefore minimizing the potential for attraction (or attraction of insect prey) and possibly collision of bats at night. • SFEC - Onshore will be located underground in previously disturbed areas, such as roadways and railroad ROW, therefore, minimizing potential impacts from clearing.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Above-Ground Historic Properties	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Minor • Lighting: Negligible – Minor	• The location of SFWF WTGs, approximately 18.9 miles (30.4 km, 16.4 nm) from Block Island, 22 miles (35.4 km, 19.1 nm) from Martha's Vineyard, and 34.9 miles (56.2 km, 30.3 nm) from Montauk, restricts available views from visually sensitive above-ground historic properties. • SFWF WTGs will have uniform design, speed, height, and rotor diameter. • The color of the SFWF WTGs (less than 5 percent grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips. • The SFEC - Onshore cable will be buried; therefore, minimizing potential visual impacts to above ground historic properties. • The SFEC - Interconnection Facility will be located adjacent to an existing substation on parcel zoned for commercial and industrial/utility use. • The SFEC - Interconnection Facility land parcel is currently screened by mature trees. After construction, additional screening will be considered to further reduce potential visibility and visual impact.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Marine Archaeological Resources	• Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: Negligible • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact	• The SFWF and SFEC - Offshore will avoid or minimize impacts to potential submerged cultural sites, to the extent practicable. • Native American tribes were involved, and will continue to be involved, in marine survey protocol design, execution of the surveys, and interpretation of the results. • A plan for vessels will be developed prior to construction to identify no-anchor areas inside the MWA to protect sensitive areas or other areas to be avoided. An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation. • As appropriate, DWSF will conduct additional archaeological analysis and/or investigation to further assess potential sensitive areas.
Terrestrial Archaeological Resources	• Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: No Impact • Air Emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact	• The route for the SFEC - Onshore will minimize impacts to, or avoid, potential terrestrial archeological resources, to the extent practicable. • Native American tribes were involved, and will continue to be involved, in terrestrial survey protocol design, execution of the surveys, and interpretation of the results. • Analysis shows that the majority of the SFEC - Onshore route has been previously disturbed; therefore, the risk of potentially encountering undisturbed archaeological deposits is minimized. • An Unanticipated Discovery Plan will be implemented that will include stop-work and notification procedures to be followed if a cultural resource is encountered during installation. • DWSF will conduct additional archaeological investigation to further assess potential sensitive areas.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Visual Resources	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Minor • Air Emissions: No Impact • Visible Structures: Minor • Lighting: Minor	• The location of SFWF WTGs, approximately 18.9 miles (30.4 km, 16.4 nm) from Block Island, 22 miles (35.4 km, 19.1 nm) from Martha's Vineyard, and 34.9 miles (56.2 km, 30.3 nm) from Montauk, restricts available views from visually sensitive public resources and population centers. • SFWF WTGs will have uniform design, speed, height, and rotor diameter. • The color of the SFWF WTGs (less than 5 percent grey tone) generally blends well with the sky at the horizon and eliminates the need for daytime lights or red paint marking of the blade tips. • Use of an Aircraft Detection Lighting System will mitigate nighttime visual impacts if the technology is commercially available and approved by BOEM. • The SFEC - Interconnection Facility will be located adjacent to an existing substation on a parcel zoned for commercial and industrial use. • At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise.
Population, Economy, & Employment	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible - minor • Lighting: No Impact	• Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning. • The location of SFWF WTGs restricts available views from visually sensitive public resources and population centers. • The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Property Values	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible • Lighting: Negligible	• The SFEC - Onshore cable will be buried; therefore, minimizing potential impacts to adjacent properties. • The location of SFWF WTGs restricts available views from visually sensitive public resources and population centers. • The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • At the SFEC - Interconnection Facility, additional screening will be considered to further reduce potential visibility and noise. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures.
Public Services	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air emissions: No Impact • Visible Structures: No Impact • Lighting: No Impact	• The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC – Onshore construction to minimize local traffic impacts. • A comprehensive communication plan will be implemented during offshore construction. DWSF will submit information to the U.S. Coast Guard (USCG) to issue Local Notice to Mariners during offshore installation activities.
Recreation & Tourism	• Seafloor and Land Disturbance: Negligible • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: Negligible	• The location of SFWF WTGs restricts available views from visually sensitive public resources and population centers. • A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
	• Trash and Debris: Negligible • Traffic: Negligible • Air Emissions: No Impact • Visible Structures: Negligible – Minor • Lighting: Negligible – Minor	facilitated through a Project website, public notices to mariners and vessel float plans, and a fisheries liaison. DWSF will submit information to the USCG to issue Local Notice to Mariners during offshore installation activities. • The communication plan will also include outreach to stakeholders in the offshore recreational and tourism industry to minimize impacts to recreational events (e.g., sailboat races). • The SFEC - Onshore construction schedule has been designed to minimize impacts to the local community during the summer tourist season. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.
Commercial and Recreational Fishing	• Seafloor and Land Disturbance: Minor – Moderate • Sediment Suspension and Deposition: Negligible • Noise: Negligible – Minor • Electromagnetic Field: Negligible • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Minor • Air Emissions: No Impact • Visible Structures: Minor • Lighting: No Impact	• The SFWF WTGs will be spaced at least 0.8 mile (1.3 km, 0.7 nm) apart, and in an approximate east-west/north-south grid layout, to maintain navigability for fishing vessels and fishing activity. • The Inter-array Cable and SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m). • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone, including. sensitive shoreline habitats and shoreline fishing areas. • As appropriate and feasible, Best Management Practices will be implemented to minimize impacts on fisheries, as described in the *Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development* (BOEM, 2015). • Siting of the SFWF and SFEC - Offshore were informed by site-specific benthic habitat

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
		assessments and Atlantic cod spawning surveys. • DWSF is committed to collaborative science with the commercial and recreational fishing industries pre-, during, and post-construction. • Each WTG will be marked and lit with both USCG and approved aviation lighting. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • Communications and outreach with the commercial and recreational fishing industries will be guided by the Project-specific Fisheries Communications Plan (Appendix B to this COP). This outreach will be led by the DWSF Fisheries Liaisons. Fisheries Representatives from the ports of Montauk, Point Judith, and New Bedford represent the fishing community. • A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, a Project website, and public notices to mariners and vessel float plans (in coordination with USCG).

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Commercial Shipping and Other Marine Uses	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible – Minor • Air Emissions: No Impact • Visible Structures: Negligible • Lighting: Negligible	• The SFWF WTGs will be spaced at least 0.8 mile (1.3 km, 0.7 nm) apart, and in an approximate east-west/north-south grid layout, to maintain navigability. • Each WTG will be marked and lit with both USCG and approved aviation lighting. An Automatic Identification System will be installed at the SFWF marking the corners of the wind farm to assist in safe navigation. • All appropriate lighting and marking schemes, based on current regulations, will be implemented. • DWSF will require all construction and operations vessels to comply with regulatory requirements related to the prevention and control of spills and discharges. • Accidental spill or release of oils or other hazardous materials will be managed through the OSRP (Appendix D to this COP). • Project construction, O&M, and decommissioning activities will be coordinated with appropriate contacts at USCG and U.S. Department of Defense command headquarters. • A comprehensive communication plan will be implemented during offshore construction to inform all mariners, including commercial and recreational fishermen, and recreational boaters of construction activities and vessel movements. Communication will be facilitated through a Fisheries Liaison, Project website, and public notices to mariners and vessel float plans (in coordination with USCG).

Table ES-1. Summary of Potential Impacts and Environmental Protection Measures, by Resource

Resource	Potential Impacts by IPF	Environmental Protection Measures
Coastal Land Use & Infrastructure	• Seafloor and Land Disturbance: Negligible – Minor • Sediment Suspension and Deposition: No Impact • Noise: No Impact • Electromagnetic Field: No Impact • Discharges and Releases: Negligible • Trash and Debris: Negligible • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible • Lighting: Negligible	• SFEC - Onshore will be located underground in previously disturbed areas, such as roadways and railroad ROW. • The SFEC sea-to-shore transition will be installed via HDD to avoid impacts to the dunes, beach, and near-shore zone. New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC - onshore construction to minimize local traffic and noise impacts. • A Stormwater Pollution Prevention Plan, including erosion and sedimentation control measures, and a Spill Prevention, Control, and Countermeasures Plan, will minimize potential impacts to adjacent lands uses during construction of the SFEC - Onshore.
Environmental Justice	• Seafloor and Land Disturbance: No Impact • Sediment Suspension and Deposition: No Impact • Noise: Negligible • Electromagnetic Field: No Impact • Discharges and Releases: No Impact • Trash and Debris: No Impact • Traffic: Negligible • Air Emissions: No Impact • Visible Structure: Negligible • Lighting: No Impact	• The use of wind to generate electricity will have a beneficial impact on air emissions in East Hampton, as it reduces the need for electricity generation from traditional fossil fuel powered plants on the South Fork of Long Island that produce greenhouse gas emissions. • Where possible, local workers will be hired to meet labor needs for Project construction, O&M, and decommissioning. • New York State Law requires that the SFEC - Onshore be constructed in compliance with a detailed plan that includes traffic and other control measures. • DWSF will also coordinate with local authorities during SFEC - Onshore construction to minimize local traffic and noise impacts.

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Contents

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Acronyms and Abbreviations

$\mu g/m^3$	microgram(s) per cubic meter
μPa	micropascal(s)
μT	microtesla(s)
AC	alternating current
ACCSP	Atlantic Coastal Cooperative Statistics Program
ACS	American Community Survey
ADLS	Aircraft Detection Lighting System
AEP	auditory evoked potential
AIA	American Institute of Architects
AIS	Automatic Identification System
AMAPPS	Atlantic Marine Assessment Program for Protected Species
AMI	area of mutual interest
ANSI	American National Standards Institute
APE	Area of Potential Effects
APPEA	Australian Petroleum Production and Exploration Association
ASMFC	Atlantic States Marine Fisheries Commission
ATON	Aids to Navigation
ATT	Admiralty Total Tide
AWOIS	Automated Wreck and Obstruction Information System
BACT	best available control technology
BEA	Bureau of Economic Analysis
BERR	U.K. Department for Business Enterprise and Regulatory Reform
bgs	below ground surface
BIL	Basic Insulation Level
BIWF	Block Island Wind Farm
BMP	best management practice
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BP	before present day
BSEE	Bureau of Safety and Environmental Enforcement
BTEX	benzene, toluene, ethylbenzene, and xylenes
CAA	Clean Air Act
CDP	Census Designated Place
CECPN	Certificate of Environmental Compatibility and Public Need
CEQ	Council on Environmental Quality
CETAP	Cetacean and Turtle Assessment Program
CFR	*Code of Federal Regulations*
CFSR	Climate Forecast System Reanalysis
CH4	methane
cm	centimeter(s)
C-MAN	Coastal-Marine Automated Network

CMECS	Coastal and Marine Ecological Classification Standard
CMR	Code of Massachusetts Regulations
CO	carbon monoxide
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
COA	corresponding onshore area
COLREGs	International Regulations for Preventing Collisions at Sea 1972
COP	Construction and Operations Plan
CPT	cone penetration testing
CRESLI	Coastal Research and Education Society of Long Island, Inc.
CRIS	Cultural Resources Information System
CRMP	Coastal Resource Management Program
CT DEEP	Connecticut Department of Energy and Environmental Protection
CTV	crew transfer vessel
CVA	Certified Verification Agent
CWA	Clean Water Act of 1972
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	decibel
dBA	A-weighted decibel
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DFO	Fisheries and Oceans Canada
DFWMR	Division of Fish, Wildlife & Marine Resources (New York State)
DO	dissolved oxygen
DOI-MMS	Department of the Interior, Minerals Management Service
DoN	U.S. Department of the Navy
DP	dynamic positioning
DPS	distinct population segment
DPV	dynamically positioned vessel
DSM	digital surface model
DTM	digital terrain model
DVAR	dynamic volt-amperes-reactive
DWSF	Deepwater Wind South Fork, LLC
DWT	dead-weight tonnage
DWW	Deepwater Wind New England, LLC
EC4	Executive Climate Change Coordinating Council
ECNYS	Ecological Communities of New York State
EcoMon	Ecosystem Monitoring
EFH	essential fish habitat
EM&CP	environmental management and construction plan
EMF	electromagnetic field

EMS	emergency medical services
ENC	Electronic Navigational Charts
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERC	Emission Reduction Credits
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FD	Fire Department
FDR	Facility Design Report
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee
FHWA	Federal Highway Administration
FIR	Fabrication and Installation Report
FMP	Fishery Management Plan
FPV	fallpipe vessel
FRES	Fire, Rescue, and Emergency Services
ft/s	foot (feet) per second
ft^2	square foot (feet)
FTE	full-time equivalent
FWRAM	Full Waveform Range-dependent Acoustic Model
g	gram(s)
$g\ C\ m^{-2}\ day^{-1}$	gram(s) of carbon per meter square per day
G&G	geophysical and geotechnical
GARFO	NOAA Greater Atlantic Regional Fisheries Office
GBS	gravity based structure
GDP	gross domestic product
GHG	greenhouse gas
GIS	geographic information system
GLD	Geographic Location Description
GW	gigawatt(s)
HAP	hazardous air pollutant
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HF	high-frequency
HFC	high-frequency cetaceans
hp	horsepower
HRG	high-resolution geophysical
HRVEA	Historic Resources Visual Effects Analysis
HSD	hydro sound damper
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
HYCOM	Hybrid Coordinate Ocean Model

Hz	hertz
IBTrACS	International Best Tracks for Climate Stewardship
IHA	Incidental Harassment Authorization
IOWAGA	Integrated Ocean Waves for Geophysical and Other Applications
IPF	impact-producing factor
km	kilometer(s)
KOP	key observation point
kV	kilovolt(s)
kW	kilowatt(s)
LE	exposure thresholds
LF	low-frequency
LFC	low-frequency cetaceans
LICAP	Long Island Commission on Aquifer Protection
lidar	light detection and ranging
LIPA	Long Island Power Authority
LIRR	Long Island Railroad
LNMs	Local Notice to Mariners
LOA	length overall
L_P	unweighted sound pressure level
$L_{P,flat}$	flat-peak sound pressure
L_{PK}	peak sound pressure
LSZ	landscape similarity zone
m	meter(s)
M.G.L.	Massachusetts General Law
m/s	meter(s) per second
m^2	square meter(s)
m^3	cubic meter(s)
MACEC	Massachusetts Clean Energy Center
MACZM	Massachusetts Office of Coastal Zone Management
MADMF	Massachusetts Department of Marine Fisheries
MARPOL	marine pollution
MassDEP	Massachusetts Department of Environment Protection
MBES	multibeam echo sounder
MERRA-2	Modern-Era Retrospective Analysis for Research and Applications, Version 2
MFC	mid-frequency cetaceans
Mft^3	million cubic feet
mG	milligauss
mg/L	milligram(s) per liter
MHWL	mean high water line
mm	millimeter(s)
Mm^3	million cubic meters
MMPA	Marine Mammal Protection Act of 1972
MMS	Minerals Management Service

MNL	Marine Navigation Lighting
MPa	megaPascal(s)
MRE	Marine Renewable Energy
MRIP	Marine Recreational Information Program
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	mean sea level
mV/m	millivolt(s)/meter
MVA	megavolt(s) amperes
MVAr	megavolt(s) amperes-reactive
MW	megawatt(s)
MWA	Maximum Work Area
N_2O	nitrous oxide
NAA	nonattainment area
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NASA	National Aeronautics and Space Administration
NBPA	New Bedford Port Authority
NCCA	National Coastal Condition Assessment
NCCR	National Coastal Condition Report
NCDC	National Climatic Data Center
NCEP	National Centers for Environmental Prediction
NCODA	Navy Coupled Ocean Data Assimilation
NDBC	National Data Buoy Center
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NESEC	Northeast States Emergency Consortium
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGO	nongovernmental organization
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NNSR	nonattainment new source review
NO2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NODE	Navy OPAREA Density Estimate
NOx	nitrogen oxide(s)
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRHP	National Register of Historic Places
NSRA	navigational safety risk assessment
NSR	new source review
NTL	Notice to Lessee
NWI	National Wetlands Inventory

NWR	National Wildlife Refuge
NYAC	New York Archaeological Council
NYCRR	New York Codes, Rules and Regulations
NYISO	New York Independent System Operator
NYNHP	New York Natural Heritage Program
NYPSC	New York Public Service Commission
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation
NYSDPS	New York State Department of Public Service
NYSERDA	New York State Energy Research and Development Authority
NYSOGS	New York State Office of General Services
NYSOPRHP	New York State Office of Parks, Recreation and Historic Preservation
NYSPSC	New York State Department of Public Service Commission
O&M	operations and maintenance
OCS	outer continental shelf
OCS Lands Act	Outer Continental Shelf Lands Act
OPAREA	Special Operating Area
OSRP	Oil Spill Response Plan
OSS	offshore substation
OW	otariid pinnipeds in water
PAH	polycyclic aromatic hydrocarbon
PBN	*Providence Business News*
PCB	polychlorinated biphenyl
PD	Police Department
PLGR	pre-lay grapnel run
PM	particulate matter
PM_{10}	particulate matter less than 10 micrometers in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in aerodynamic diameter
PPA	Power Purchase Agreement
ppm	part(s) per million
PPW	phocid pinnipeds in water
Project	South Fork Wind Farm and South Fork Export Cable
PSD	Prevention of Significant Deterioration
PSL	New York Public Service Law
PSO	Protected Species Observer
PTS	permanent threshold shift
PV	Plan View
RCNM	Roadway Construction Noise Model
RI CRMC	Rhode Island Coastal Resources Management Council
RI CRMP	Rhode Island Coastal Resources Management Program

RI DEM	Rhode Island Department of Environmental Management
RIHPHC	Rhode Island Historical Preservation and Heritage Commission
RI-MA WEA	Rhode Island/Massachusetts Wind Energy Area
rms	root mean square
ROI	region of influence
ROW	right(s)-of-way
RV	recreational vehicle
SAMP	Special Area Management Plan
SAP	site assessment plan
SAPVE	Study Area for Potential Visual Effects
SASS	Scenic Area of Statewide Significance
SAV	submerged aquatic vegetation
SCADA	Supervisory Control and Data Acquisition
SCFWH	Significant Coastal Fish and Wildlife Habitats
SD	standard deviation
SEL	sound exposure limit
SERDP	Strategic Environmental Research and Development Program
SFEC	South Fork Export Cable
SFEC - NYS	South Fork Export Cable – New York State Territorial Waters
SFEC - OCS	South Fork Export Cable – Outer Continental Shelf Waters
SFEC - Onshore	South Fork Export Cable – Onshore East Hampton
SFWF	South Fork Wind Farm
SHPO	State Historic Preservation Office
SIP	state implementation plan
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasure
SPDES	State Pollutant Discharge Elimination System
SPI	Sediment Profile Imaging
SPL	sound pressure level
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Office(r)
TNC	The Nature Conservancy
tpy	tons per year
TSS	total suspended solids
TTS	temporary threshold shift
U.S.C.	*United States Code*
UDP	unanticipated discovery plan
URI	University of Rhode Island
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
USN	Unique Site Number
UTC	Coordinated Universal Time
UXO	unexploded ordnance
VIA	Visual Impact Assessment
VMS	vessel monitoring system
VOC	volatile organic compound
VRA	Visual Resource Assessment
VRAP	Visual Resource Assessment Procedure
VTR	Vessel Trip Report
WEA	Wind Energy Area
WTG	wind turbine generator
WTS	Waterson Terminal Services
XLPE	cross-linked polyethylene
yd^3	cubic yard(s)
ZOI	zone of influence
ZVI	zone of visual influence

Glossary and Terms

Term	Definition
Certified Verification Agent (CVA)	An individual or organization, experienced in the design, fabrication, and installation of offshore marine facilities or structures, who will conduct specified third-party reviews, inspections, and verifications in accordance with 30 CFR 585.705.
Deepwater Wind South Fork, LLC (DWSF)	Owner and future operator of the Project, the Project Applicant.
Environmental Protection Measure (EPM)	Measure proposed to avoid or minimize potential impacts.
Foundation	The bases to which the WTGs and OSS are installed on the seabed. Three types are being considered for the project: jacket, monopile, or gravity base structure (GBS).
– Jacket (skirt and pin pile)	One steel lattice structure per WTG secured to the sea floor by four steel piles. Could be skirt pile or pin pile design. Skirt Pile: circular braces called skirt sleeves are mounted at the corners of the jacket foundation. The piles are inserted into each corner of the jacket skirts and driven to their final penetration design depth. Pin Pile: The pin pile jacket structure is lowered over pre-driven piles that have been placed on the seabed, and the jacket tubes fit over the pin piles.
– Monopile	One steel monopile per WTG embedded into the sea floor.
– Gravity Base Structure (GBS)	One pre-cast concrete, ballasted base per WTG shallowly penetrating the sea floor.
horizontal directional drill (HDD)	Subsurface installation technique that will create an underground conduit through which the SFEC – Offshore will come ashore and join the SFEC - Onshore within a transition vault (i.e., the sea-to-shore transition). HDD avoids impacts to the beach and near shore environment.
hydro-jet plow	Generic term for submarine cable installation equipment that primarily uses pressurized water to create a temporary trench in the sea bed. The submarine cable falls into the trench and the sediment then settles on top of the buried cable.
Impact determinations	Direct or indirect; short term or long term; and negligible, minor, moderate, or major.
Impact Producing Factor (IPF)	Project activities and infrastructure that could impact resources were identified as IPFs.
Inter-array Cable	AC cable that connects individual WTGs and transfers power between the WTGs and the OSS. The cable contains three conductors and a series of screens, insulators, fillers, sheathing, armor, and fiber optic communications cables.
Landing site	Locations on the shore of East Hampton, New York considered for the Sea-to-Shore Transition.

Term	Definition
mechanical plow	Method of submarine cable installation equipment that cuts or digs a trench that allows cable to be gradually lowered into the trench and later backfilled.
Offshore Substation (OSS)	Collects electric energy generated by the WTG through the inter-array cables for transmission through the SFEC. Mounted on dedicated foundation or co-located on one foundation with a WTG.
Operations and Maintenance (O&M) Facility	An ancillary facility of the SFWF that will be located either in a port in Montauk in East Hampton, New York or at Quonset Point in North Kingstown, Rhode Island. The SFWF O&M facility will support remote monitoring of the wind farm and offshore maintenance activities.
Power Purchase Agreement (PPA)	A financial agreement between two parties. This Project has a PPA with Long Island Power Authority.
pre-lay grapnel run (PLGR)	Process to remove possible obstructions and debris, such as abandoned fishing nets, wires, and hawsers, along the inter-array and SFEC - Offshore.
scour protection	Consists of engineered rock that may be placed at the base of each foundation to prevent undesirable seabed erosion.
Sea-to-Shore Transition	Connects the SFEC – NYS to the SFEC - Onshore. Comprised of the onshore transition vault where the offshore cable and the onshore cable will be spliced together and the underground conduit that leads from onshore transition vault to the exit point of the horizontal directional drill (HDD).
SFEC – Interconnection Facility	New facility to be located adjacent to the existing LIPA East Hampton substation. This facility is also referred to as “SFEC Onshore Substation” in the COP Appendices.
SFEC - Offshore	The export cable located in both federal waters (SFEC – OCS) and New York State territorial waters (SFEC – NYS), and the sea-to-shore transition vault in East Hampton, New York. – SFEC – OCS: the submarine segment of the export cable buried beneath the seabed within federal waters on the OCS from the OSS to the boundary of New York State territorial waters. – SFEC – NYS: the submarine segment of the export cable buried beneath the seabed within state territorial waters from the boundary of New York State territorial waters to a sea-to-shore transition vault located in the town of East Hampton on Long Island, Suffolk County, New York.
SFEC - Onshore	The terrestrial underground segment of the export cable from the sea-to-shore transition vault to a new SFEC - Interconnection Facility where the SFEC will interconnect with the Long Island Power Authority (LIPA) electric transmission and distribution system in the town of East Hampton on Long Island, Suffolk County, New York.
South Fork Export Cable (SFEC)	Comprised of an alternating current (AC) electric cable that will connect the SFWF to the existing mainland electric grid in East Hampton, New York. The SFEC includes both the SFEC – Offshore and SFEC – Onshore.

Term	Definition
South Fork Wind Farm (SFWF)	Comprised of up to 15 wind turbine generators (WTGs, turbines), submarine cables between the WTGs (inter-array cables), and an offshore substation (OSS), all of which will be located within federal waters on the outer continental shelf (OCS). SFWF also includes an Operations and Maintenance (O&M) facility that will be located onshore.
Supervisory Control and Data Acquisition (SCADA)	Fiber optic system embedded in the Project cables that provides remote wind farm monitoring and control between the WTG, substations, and remote operation center(s). The SCADA provides a live status of environmental conditions within the SFWF, as well as mechanical and electrical state of each WTG.
Wind Turbine Generator (WTG)	Electricity-generating wind turbine made of a tower, nacelle, rotor, and blades, with a nameplate capacity of 6 to 12 megawatts (MW) per turbine.

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Section 1—Introduction

This Construction and Operations Plan (COP) is being submitted by Deepwater Wind South Fork, LLC (DWSF, the Applicant) to support the siting and development of the South Fork Wind Farm (SFWF) and the South Fork Export Cable (SFEC), collectively the Project.

The purpose of this COP is to provide information about the Project to the Bureau of Ocean Energy Management (BOEM) and other federal and state agencies. The COP was prepared in accordance with Title 30 of the *Code of Federal Regulations* (CFR) Part 585 (30 CFR § 585), BOEM's *Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (COP)* (BOEM, 2016), and other BOEM policy, guidance and regulations as summarized in Table 1.0-1. Table 1.0-2 includes the relevant lease stipulations for the Project. The COP includes the following:

- A description of all planned facilities, including onshore and support facilities
- A description of all proposed activities, including construction activities, commercial operations, maintenance, and conceptual decommissioning plans
- The basis for the analysis of the environmental and socioeconomic impacts and operational integrity of the proposed construction, operation, maintenance, and decommissioning activities
- Information to support relevant federal permit applications and consultations

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement	Compliance Statement/Location within COP
30 CFR §585.105(a)	
1) Design your projects and conduct all activities in a manner that ensures safety and will not cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.	Sections 1-4 Appendices A-Y
30 CFR §585.621(a-g)	
a) The project will conform to all applicable laws, implementing regulations, lease provisions, and stipulations or conditions of the lease.	Section 1.3.
b) The project will be safe.	Appendix E - Safety Management System Appendix F - Project Supplemental Information Appendix G - Project Plans and Conceptual Drawings Appendix H - Geophysical and Geotechnical Survey Reports
c) The project will not unreasonably interfere with other uses of the outer continental shelf (OCS), including those involved with National security or defense.	Section 4.6.4. Recreation and Tourism Section 4.6.5. Commercial and Recreational Fishing Section 4.6.6. Commercial Shipping Section 4.6.7. Coastal Land Use and Infrastructure Section 4.6.8. Other Marine Uses
d) The project will not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine, coastal, or human environment; or sites, structures, or objects of historical or archeological significance.	Executive Summary, specifically Table ES-1 Section 4.7

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
e) The project will use the best available and safest technology.		Section 2.3 Appendix G - Project Plans and Conceptual Drawings
f) The project will use best management practices.		Executive Summary, specifically Table ES-1 Section 4.7
g) The project will use properly trained personnel.		DWSF will comply.
30 CFR § 585.626(a) - You must submit the results of the following surveys for the proposed site(s) of your facility(ies). Your COP must include the following information:		
1) Shallow hazards: The results of the shallow hazards survey with supporting data. Information sufficient to determine the presence of the following features and their likely effects on your proposed facility, including: (i) Shallow faults; (ii) Gas seeps or shallow gas; (iii) Slump blocks or slump sediments; (iv) Hydrates; or (v) Ice scour of seabed sediments.		Appendix H - Geophysical and Geotechnical Survey Reports
2) Geological survey relevant to the design and siting of your facility.	The results of the geological survey with supporting data. Assessment of: (i) Seismic activity at your proposed site; (ii) Fault zones; (iii) The possibility and effects of seabed subsidence; and (iv) The extent and geometry of faulting attenuation effects of geologic conditions near your site.	Appendix H - Geophysical and Geotechnical Survey Reports Appendix I - Sediment Survey and Analysis Report DWSF has requested to submit the information necessary to satisfy 30 CFR § 585.626(a)(2) for the expanded MWA following completion of additional survey in that area.

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
3) Biological: The results of the biological survey with supporting data. A description of the results of biological surveys used to determine the presence of:	Live bottoms and hard bottoms	Section 4.2.3 - Geological Resources Section 4.3.2 - Benthic and Shellfish Resources Appendix H4 and N - Benthic Resources Survey Report DWSF has requested to submit the information necessary to satisfy 30 CFR §§ 585.626(a)(3) for the expanded MWA following completion of additional survey in that area.
	Topographic features	Section 4.2.3 - Geological Resources Section 4.2.4 - Physical Oceanography and Meteorology Appendix H - Geophysical and Geotechnical Survey Reports DWSF has requested to submit the information necessary to satisfy 30 CFR §§ 585.626(a)(3) for the expanded MWA following completion of addition survey in that area.
	Surveys of other marine resources such as fish populations (including migratory populations)	Section 4.3.2 - Benthic and Shellfish Resources Section 4.3.3 - Finfish and Essential Fish Habitat Appendix N - Benthic Resources Survey Report Appendix O - Essential Fish Habitat Report
	Marine mammals	Section 4.3.4 - Marine Mammals Appendix R - Marine Mammal, Sea Turtle and Sturgeon Reports

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	Sea turtles	Section 4.3.5 - Sea Turtles Appendix R - Marine Mammal, Sea Turtle and Sturgeon Reports
	Sea birds	Section 4.3.6 - Avian Species Appendix Q - Avian and Bat Reports
4) Geotechnical survey: The results of your sediment testing program with supporting data, the various field and laboratory test methods employed, and the applicability of these methods as they pertain to the quality of the samples, the type of sediment, and the anticipated design application. You must explain how the engineering properties of each sediment stratum impact the design of your facility. In your explanation, you must describe the uncertainties inherent in your overall testing program, and the reliability and applicability of each test method.	(i) The results of a testing program used to investigate the stratigraphic and engineering properties of the sediment that may impact the foundations or anchoring systems for your facility.	Section 4.2.3 - Geological Resources Appendix H - Geophysical and Geotechnical Survey Reports Appendix I - Sediment Survey and Analysis Report DWSF has requested to submit the information necessary to satisfy 30 CFR §§ 585.626(a)(4)(ii) and (iii) for the expanded MWA following completion of additional survey in that area.
	(ii) The results of adequate *in situ* testing, boring, and sampling at each foundation location, to examine all important sediment and rock strata to determine its strength classification, deformation properties, and dynamic characteristics.	
	(iii) The results of a minimum of one deep boring (with soil sampling and testing) at each edge of the project area and within the project area as needed to determine the vertical and lateral variation in seabed conditions and to provide the relevant geotechnical data required for design.	

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
5) Archaeological resources. The results of the archaeological resource survey with supporting data.	A description of the historic and prehistoric archaeological resources, as required by the National Historic Preservation Act (NHPA) (54 *United States Code* [U.S.C.] 300101 *et. seq*.), as amended.	Section 4.4 - Cultural Resources Appendix S - Marine Archaeological Report Appendix T - Archaeological Resources Report-Onshore DWSF has requested to submit the information necessary to satisfy 30 CFR §§ 585.626(a)(5) for the expanded MWA following completion of additional survey in that area.
6) Overall site investigation. An overall site investigation report for your facility that integrates the findings of your shallow hazards surveys and geologic surveys, and, if required, your subsurface surveys with supporting data.	An analysis of the potential for: (i) Scouring of the seabed;	The site investigation report, provided in Appendix H (Geophysical and Geotechnical Survey Reports), integrates the findings of the shallow hazards survey and geological surveys. DWSF has requested to submit the information necessary to satisfy 30 CFR §§ 585.626(a)(6)(i) through (xi) in the Facility Design Report (FDR).
	(ii) Hydraulic instability;	
	(iii) The occurrence of sand waves;	
	(iv) Instability of slopes at the facility location;	
	(v) Liquefaction, or possible reduction of sediment strength due to increased pore pressures;	
	(vi) Degradation of subsea permafrost layers;	
	(vii) Cyclic loading;	
	(viii) Lateral loading;	
	(ix) Dynamic loading;	
	(x) Settlements and displacements;	
	(xi) Plastic deformation and formation collapse mechanisms; and	

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	(xii) Sediment reactions on the facility foundations or anchoring systems.	
30 CFR § 585.626(b) - Your COP must include the following project-specific information, as applicable.		
1) Contact Information.	The name, address, e-mail address, and phone number of an authorized representative.	Section 1.6.1 - Authorized Representative and Operator
2) Designation of operator, if applicable	As provided in § 585.405.	Section 1.6.1 - Authorized Representative and Operator
3) The construction and operation concept	A discussion of the objectives	Section 1.2 - Project Purpose
	Description of the proposed activities,	Section 1.1 - Introduction Section 3 - Project Description
	Tentative schedule from start to completion, and	Section 1.5 - Tentative Schedule
	Plans for phased development, as provided in § 585.629.	Not applicable - the Project is a single, complete, and independent project that will not be developed in phases
4) Commercial lease stipulations and compliance	A description of the measures you took, or will take, to satisfy the conditions of any lease stipulations related to your proposed activities.	Section 1.1 - Project Overview, Table 1.2
5) A location plat	The surface location and water depth for all proposed structures, facilities, and appurtenances located both offshore and onshore, including all anchor/mooring data.	Section 1.1 - Project Overview, Figure 1.1 Appendix F - Project Supplemental Information Appendix G - Project Engineering Plans and Construction Drawings

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	The surface location and water depth for all existing structures, facilities, and appurtenances located both offshore and onshore, including all anchor/mooring data.	Section 1.1 - Project Overview, Figures 1.1 and 1.2 Section 3.1.3.1 - Ports, Vessels and Vehicles, and Material Transportation, Figure 3.1-7
6) General structural and project design, fabrication, and installation.	Information for each type of structure associated with your project and, unless BOEM provides otherwise, how you will use a Certified Verification Agent (CVA) to review and verify each stage of the project.	Section 1.6.3 - Certified Verification Agent Nominations Section 3.1.1 - SFWF Project Location Section 3.1.2 - SFWF Facilities Section 3.2.1 - SFEC Project Location Section 3.2.2 - SFEC Facilities Appendix C - CVA Nomination Appendix F - Project Supplemental Information Appendix G - Project Plans and Conceptual Drawings
7) All cables and pipelines, including cables on project easements.	Location, design and installation methods, testing, maintenance, repair, safety devices, exterior corrosion protection, inspections, and decommissioning.	Section 2 - Project Siting and Future Activities Section 3.1.2.5 - (SFWF) Inter-Array Cable Section 3.1.3.5 - Inter-Array Cable Installation Section 3.1.5.6 - (Operations and Maintenance) Inter-Array Cable Section 3.2 - South Fork Export Cable Appendix E - Safety Management System Appendix F - Project Supplemental Information

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
8) A description of the deployment activities	Safety, prevention, and environmental protection features or measures that you will use.	Section 1.6.5 - Safety Management System Section 2.2 - Water Quality and Water Resources Section 4.7 - Summary of Potential Impacts and Environmental Protection Measures Appendix D - Oil Spill Response Plan Appendix E - Safety Management System Appendix F - Project Supplemental Information Appendix X - Navigational Risk Assessment
9) A list of solid and liquid wastes generated	Disposal methods and locations.	Section 4.1.5 – Discharges and Releases Appendix F - Project Supplemental Information
10) A listing of chemical products used (if stored volume exceeds Environmental Protection Agency (EPA) Reportable Quantities).	A list of chemical products used; the volume stored on location; their treatment, discharge, or disposal methods used; and the name and location of the onshore waste receiving, treatment, and/or disposal facility. A description of how these products will be brought onsite, the number of transfers that may take place, and the quantity that that will be transferred each time.	Appendix D - Oil Spill Response Plan Appendix F - Project Supplemental Information
11) A description of any vessels, vehicles, and aircraft you will use to support your activities.	An estimate of the frequency and duration of vessel/vehicle/aircraft traffic.	Section 2.3 - Review of Construction Technologies Section 3.1.3 - (SFWF) Construction Section 3.2.3 - (SFEC) Construction Section 4.1.7 - Traffic (vessels, vehicles, air) Appendix X - Navigational Risk Assessment

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
12) A general description of the operating procedures and systems.	(i) Under normal conditions.	Section 1.6 - Other Project Information Section 3.1.5 - (SFWF) Operations and Maintenance Section 3.2.5 - (SFEC) Operations and Maintenance Appendix F - Project Supplemental Information
	(ii) In the case of accidents or emergencies, including those that are natural or manmade.	Section 3.1.5 - (SFWF) Operations and Maintenance Section 3.2.5 - (SFEC) Operations and Maintenance Appendix D - Oil Spill Response Appendix E - Safety Management System Appendix F - Project Supplemental Information
13) Decommissioning and site clearance procedures	A discussion of general concepts and methodologies.	Section 2.3 - Review of Construction Technologies Section 3.1.6 - (SFWF) Conceptual Decommissioning Section 3.2.6 - (SFEC) Conceptual Decommissioning
14) A listing of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations.	(i) The U.S. Coast Guard (U.S. Coast Guard), U.S. Army Corps of Engineers (USACE), and any other applicable authorizations, approvals, or permits, including any Federal, State or local authorizations pertaining to energy gathering, transmission or distribution (e.g., interconnection authorizations).	Section 1.3 - Regulatory framework Appendix A - Coastal Zone Management Federal Consistency Statements
	(ii) A statement indicating whether you have applied for or obtained such authorization, approval, or permit.	Section 1.3.1 - Permits, Approvals, and Consultations

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
15) Your proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts.	A description of the measures you will use to avoid or minimize adverse impacts and any potential incidental take before you conduct activities on your lease, and how you will mitigate environmental impacts from your proposed activities, including a description of the measures you will use as required by subpart H of this part.	Section 4.7 - Summary of Potential Impacts and Proposed Environmental Protection Measures
16) Information you incorporate by reference	A listing of the documents you referenced	Section 5 - References
17) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with your proposed activities.	Contact information and issues discussed.	Section 1.5 - Agency and Stakeholder Outreach
18) Reference	A list of any document or published source that you cite as part of your plan. You may reference information and data discussed in other plans you previously submitted or that are otherwise readily available to BOEM.	Section 5 - References Appendices A–Y
19) Financial assurance	Statements attesting that the activities and facilities proposed in your COP are or will be covered by an appropriate bond or security, as required by §§ 585.515 and 585.516.	Section 1.6.2 - Financial Assurance
20) CVA nominations for reports required in subpart G of this part.	CVA nominations for reports in subpart G of this part, as required by § 585.706, or a request for a waiver under § 585.705(c).	Section 1.6.3 - Certified Verification Agent Nomination Appendix C - Certified Verification Agent Nomination

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
21) Construction schedule	A reasonable schedule of construction activity showing significant milestones leading to the commencement of commercial operations.	1.5 - Tentative Schedule
22) Air quality information	As described in § 585.659 of this section	Section 4.1.8 - Air Emissions Section 4.2.1 - Air Quality Appendix L - Air Emissions Inventory
23) Other information	Additional information as required by BOEM	N/A
30 CFR § 585.627(a) - You must submit with your COP detailed information to assist BOEM in complying with NEPA and other relevant laws. Your COP must describe those resources, conditions, and activities listed in the following table that could be affected by your proposed activities, or that could affect the activities proposed in your COP, including:		
1) Hazard Information	Meteorology and oceanography	Section 4.2.4 - Physical Oceanography and Meteorology
	Sediment transport, geology, and shallow geological or manmade hazards.	Section 4.2.3 - Geological Resources Appendix H - Geophysical and Geotechnical Survey Reports Appendix I - Sediment Transport Analysis
2) Water Quality	Turbidity and total suspended solids from construction	Section 2.3 - Review of Construction Technologies Section 4.1.2 - Sediment Suspension and Deposition Section 4.2.2 - Water Quality and Water Resources Appendix I - Sediment Transport Analyses

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
3) Biological resources	Benthic communities	Section 4.3.4 - Benthic and Shellfish Resources Appendix N - Benthic Resources Survey Report
	Marine mammals	Section 4.3.4 - Marine Mammals Appendix R - Marine Mammal, Sea Turtle and Sturgeon Reports
	Sea turtles	Section 4.3.5 - Sea Turtles Appendix R - Marine Mammal, Sea Turtle and Sturgeon Reports
	Coastal and marine birds	Section 4.3.6 - Avian Species Appendix R - Avian and Bat Reports
	Fish and shellfish	Section 4.3.3 - Finfish and Essential Fish Habitat Appendix N - Benthic Resources Survey Report Appendix O - Essential Fish Habitat Report
	Plankton	Section 4.3.3 - Finfish and Essential Fish Habitat Appendix O - Essential Fish Habitat Report
	Seagrasses	Section 4.3.1 - Coastal Habitat Section 4.3.2 - Benthic and Shellfish Resources Appendix O - Essential Fish Habitat Report

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	Plant life	Section 4.3.1 - Coastal Habitat Section 4.3.3 - Finfish and Essential Fish Habitat Appendix O - Essential Fish Habitat Report
4) Threatened or endangered species	As defined by the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.).	Section 4.3 - Biological Resources Appendix P - Marine Mammal, Sea Turtle and Sturgeon Reports Appendix Q - Avian and Bat Assessment Report
5) Sensitive biological resources or habitats	Essential fish habitat	Section 4.3.3 - Finfish and Essential Fish Habitat Appendix O - Essential Fish Habitat Report
	Refuges and preserves	Section 4.6.8 - Other Marine Uses
	Special management areas identified in coastal management programs, sanctuaries, rookeries	Section 4.6.8 - Other Marine Uses
	Hard bottom habitat	Section 4.3.2 - Benthic and Shellfish Resources Appendix H - Geophysical and Geotechnical Survey Reports Appendix N - Benthic Resources Survey Report
	Chemosynthetic communities	N/A
	Calving grounds	N/A
	Barrier islands, beaches, and dunes	Section 4.3.1 - Coastal Habitat

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	Wetlands	Section 4.3.1 - Coastal Habitat
6) Archaeological resources	As required by the NHPA (54 U.S.C. 300101 et seq.), as amended.	4.4 - Cultural Resources Appendix R - Marine Archaeological Report Appendix S - Archaeological Resources Report-Onshore Appendix T - Historic Resources Report for Substation
7) Social and Economic resources	Employment	4.6 - Socioeconomic Resources 4.6.1 - Population, Economy, and Employment
	Existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water)	4.6.3 - Public Services 4.6.6 - Commercial Shipping 4.6.7 - Coastal Land Use and Infrastructure 4.6.8 - Other Marine Uses
	Land use	4.4.1 - Above Ground Historic Properties 4.6.7 - Coastal Land Use and Infrastructure
	Subsistence resources and harvest practices	4.6.5 - Commercial and Recreational Fishing 4.6.9 - Environmental Justice
	Recreation, recreational and commercial fishing (including typical fishing seasons, location, and type)	Section 4.6.5 - Commercial and Recreational Fishing Appendix B - Fisheries Communication Plan Appendix Y - Commercial and Recreational Fisheries Technical Report
	Minority and lower income groups	Section 4.6.1 - Population, Economy, and Employment Section 4.6.2 - Housing and Property Values Section 4.6.9 - Environmental Justice

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
	Coastal zone management programs	Section 1.3.4 - Coastal Zone Management Act Consistency Appendix A - Coastal Zone Management Federal Consistency Statements
	Viewshed	Section 4.1.9 - Visible Structures Section 4.5 - Visual Resources Appendix V - Visual Impact Assessment Report Appendix W - Historic Resources Visual Effects Assessment
8) Coastal and marine uses	Military activities	Section 4.6.6 - Commercial Shipping Section 4.6.8 - Other Marine Uses Appendix X - Navigational Risk Assessment
	Vessel traffic	
	Energy and nonenergy mineral exploration or development	
9) Consistency Certification	As required by the Coastal Zone Management Act (CZMA): (i) 15 CFR part 930, subpart D, for noncompetitive leases. (ii) 15 CFR part 930, subpart E, for competitive leases.	Section 1.3.4 - Coastal Zone Management Act Consistency Appendix A - Coastal Zone Management Federal Consistency Statements
10) Other resources, conditions, and activities	As identified by BOEM	N/A

Table 1.0-1. Summary of Information Requirements for a Construction and Operations Plan
Details on the federal requirements for a COP and where to find relevant information for the SFWF and SFEC

Requirement		Compliance Statement/Location within COP
30 CFR § 585.627(b) - You must submit one paper copy and one electronic copy of your consistency certification. Your consistency certification must include:		
CZMA Consistency Certification	1) One copy of your consistency certification under subsection 307(c)(3)(B) of the CZMA (16 U.S.C. 1456(c)(3)(B)) and 15 CFR 930.76 stating that the proposed activities described in detail in your plans comply with the State(s) approved coastal management program(s) and will be conducted in a manner that is consistent with such program(s); 2) ‘‘Information,’’ as required by 15 CFR 930.76(a) and 15 CFR 930.58(a)(2), and ‘‘Analysis,’’ as required by 15 CFR 930.58(a)(3).	Section 1.3.4 - Coastal Zone Management Act Consistency Appendix A - Coastal Zone Management Federal Consistency Statements
30 CFR § 585.627(c)		
Oil Spill Response Plan	In accordance with 30 Part 254.	Appendix D - Oil Spill Response Plan
30 CFR § 585.627(d)		
Safety Management System	In accordance with 30 CFR 585.810	Appendix E - Safety Management System

Table 1.0-2. Summary of Lease Requirements for SFWF and SFEC
Details on the lease teams and stipulations relevant to construction and operations for SFWF and SFEC

Lease Requirements	Description	Compliance Statement/ Location within COP
Section 4: Payments (a)	The lessee must make all rent payments to the Lessor in accordance with applicable regulations, unless otherwise specified Appendix B	DWSF will comply.
Section 4: Payments (b)	The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum "B".	DWSF will comply.
Section 5: Plans	The Lessee may conduct those activities described in Addendum "A" only in accordance with a Site Assessment Plan (SAP) or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP except as provided in applicable regulations in 30 CFR Part 585.	Understood.
Section 6: Associated Project Easements	Pursuant to 30 CFR 585.200(b), the Lessee has the right to one or more project easements, without further competition, for the purpose of installing, gathering, transmission, and distribution cables, pipelines, and appurtenances on the OCS, as necessary for the full enjoyment of the lease, and under applicable regulations in 30 CFR Part 585. As part of submitting a COP for approval, the Lessee may request that one or more easement(s) be granted by the Lessor. If the Lessee requests that one or more easements by granted when submitting a COP for approval, such project easements will be granted by the Lessor in accordance with the Act and applicable regulations in 30 CFR Part 585 upon approval of the COP in which the Lessee has demonstrated a need for such easements. Such easements must be in a location acceptable to the Lessor, and will be subject to such conditions as the Lessor may require. The project easements that would be issued in conjunction with an approved COP under this lease will be described in Addendum "D" to this lease, which will be updated as necessary.	With approval of this COP, DWSF requests that BOEM issue a project easement for the portions of SFEC located in federal waters, under the applicable regulations in 30 CFR Part 585.

Table 1.0-2. Summary of Lease Requirements for SFWF and SFEC
Details on the lease teams and stipulations relevant to construction and operations for SFWF and SFEC

Lease Requirements	Description	Compliance Statement/ Location within COP
Section 7: Conduct of Activities	The Lessee must conduct, and agrees to conduct, all activities in the leased area in accordance with an approved SAP or COP, and with all applicable laws and regulations.	DWSF will comply.
Section 10: Financial Assurance	The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum "B".	Section 1.6.2 - Financial Assurance)
Section 13: Removal of Property and Restoration of the Leased Area on Termination of Lease.	Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seabed of all obstructions created by activities on the leased area, including any project easements within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.	Section 3.1.6 (for the SFWF) Section 3.2.6 (for the SFEC)
Section 14: Safety Requirements	The Lessee must (a) Maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free from recognized hazards to employees of the Lessee or of any contractor or subcontractor operating under this lease; (b) Maintain all operations within the leased areas in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other Federal agencies with jurisdiction, intended to protect persons, property and the environment on the OCS; and (c) Provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other Federal agency with jurisdiction.	Section 1.3 Appendix E - Safety Management System Appendix F - Project Supplemental Information Appendix G - Project Engineering Plans and Construction Drawings Appendix H - Geophysical and Geotechnical Survey Reports

Table 1.0-2. Summary of Lease Requirements for SFWF and SFEC
Details on the lease teams and stipulations relevant to construction and operations for SFWF and SFEC

Lease Requirements	Description	Compliance Statement/ Location within COP
Section 15: Debarment Compliance	The Lessee must comply with the Department of the Interior's non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply with these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.	DWSF will comply.
Section 16: Notices	All notices or reports provided from one party to the other under the terms of this lease must be in writing except as provided herein and in the applicable regulations in 30 CFR Part 585. Written notices must be delivered to the party's Lease Representative, as specifically listed in Addendum "A," either electronically, by hand, by facsimile, or by United States first class mail, adequate postage prepaid. Either party may notify the other of a change of address by doing so in writing. Until notice of any change of address is delivered as provided in this section, the last recorded address of either party will be deemed the address for all notices required under this lease. For all operational matters, notices must be provided to the party's Operations Representative, as specifically listed in Addendum "A," as well as the Lease Representative.	DWSF will comply.
Addendum B - Lease Term and Financial Schedule; Section III - Payments:	Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described below (see Lease document for payment schedule).	DWSF will comply.

1.1 Project Overview

DWSF will be responsible for the construction, operations and maintenance (O&M), and decommissioning of the Project, which consists of the following components:

- **South Fork Wind Farm (SFWF):** includes up to 15 wind turbine generators (WTGs, turbines) with a nameplate capacity of 6 to 12 megawatts (MW) per turbine, submarine cables between the WTGs (inter-array cables), and an offshore substation (OSS), all of which will be located within federal waters on the OCS, specifically in BOEM Renewable Energy Lease Area OCS-A 0486 (Lease Area),[2] approximately 19 miles (30.6 kilometers [km], 16.6 nautical miles [nm]) southeast of Block Island, Rhode Island, and 35 mi (56.3 km, 30.4 nm) east of Montauk Point, New York. The SFWF also includes an O&M facility that will be located onshore at either Montauk in East Hampton, New York or Quonset Point in North Kingstown, Rhode Island.
- **South Fork Export Cable (SFEC):** an alternating current (AC) electric cable that will connect the SFWF to the existing mainland electric grid in East Hampton, New York. The SFEC includes both offshore and onshore segments.
  - **SFEC - OCS:** the submarine segment of the export cable buried beneath the seabed within federal waters on the OCS from the OSS to the boundary of New York State territorial waters.
  - **SFEC - New York State (NYS):** the submarine segment of the export cable buried beneath the seabed within state territorial waters from the boundary of New York State waters to a sea-to-shore transition vault located in the Town of East Hampton on Long Island, Suffolk County, New York. The SFEC - NYS includes the sea-to-shore transition.
  - **SFEC - Onshore**: the terrestrial underground segment of the export cable from the sea-to-shore transition vault to the interconnection facility where the SFEC will interconnect with the Long Island Power Authority (LIPA) electric transmission and distribution system East Hampton. The SFEC - Onshore includes the SFEC - Interconnection Facility.

The general operational concept for the Project is shown on Figure 1.1-1. The kinetic energy in the wind turns the WTG rotor by creating lift on the blades to generate electricity. Electricity generated from each WTG is collected through a series of inter-array cables that terminate at an offshore substation. The offshore substation connects to an export cable that carries the power to the onshore interconnection facility, which will connect to an existing substation where power is transmitted to the electric grid.

The approximate location of the Project is shown on Figure 1.1-2. The SFWF layout allows for WTGs to be spaced approximately 0.8 to 1.0 statute miles (1.3 to 1.60 km, 0.70 to 0.86 nm) apart. For illustrative purposes, these WTG layouts are shown on Figure 1.2-2 and described further in Section 3.1.1. The proposed location of the SFEC - NYS and SFEC - Onshore, including two landing sites and multiple onshore route variants, are shown in detail in Figure 1.1-3. Section 3 provides a detailed description of the SFWF and SFEC.

Port facilities in New York, Rhode Island, Massachusetts, and/or Connecticut may be utilized to support construction, O&M, and decommissioning (described in Section 3.1.3.1).

[2] The leaseholder of Renewable Energy Lease Area OCS-A 0486 is Deepwater Wind New England, LLC. Deepwater Wind New England, LLC will be assigning a portion of its lease to DWSF.

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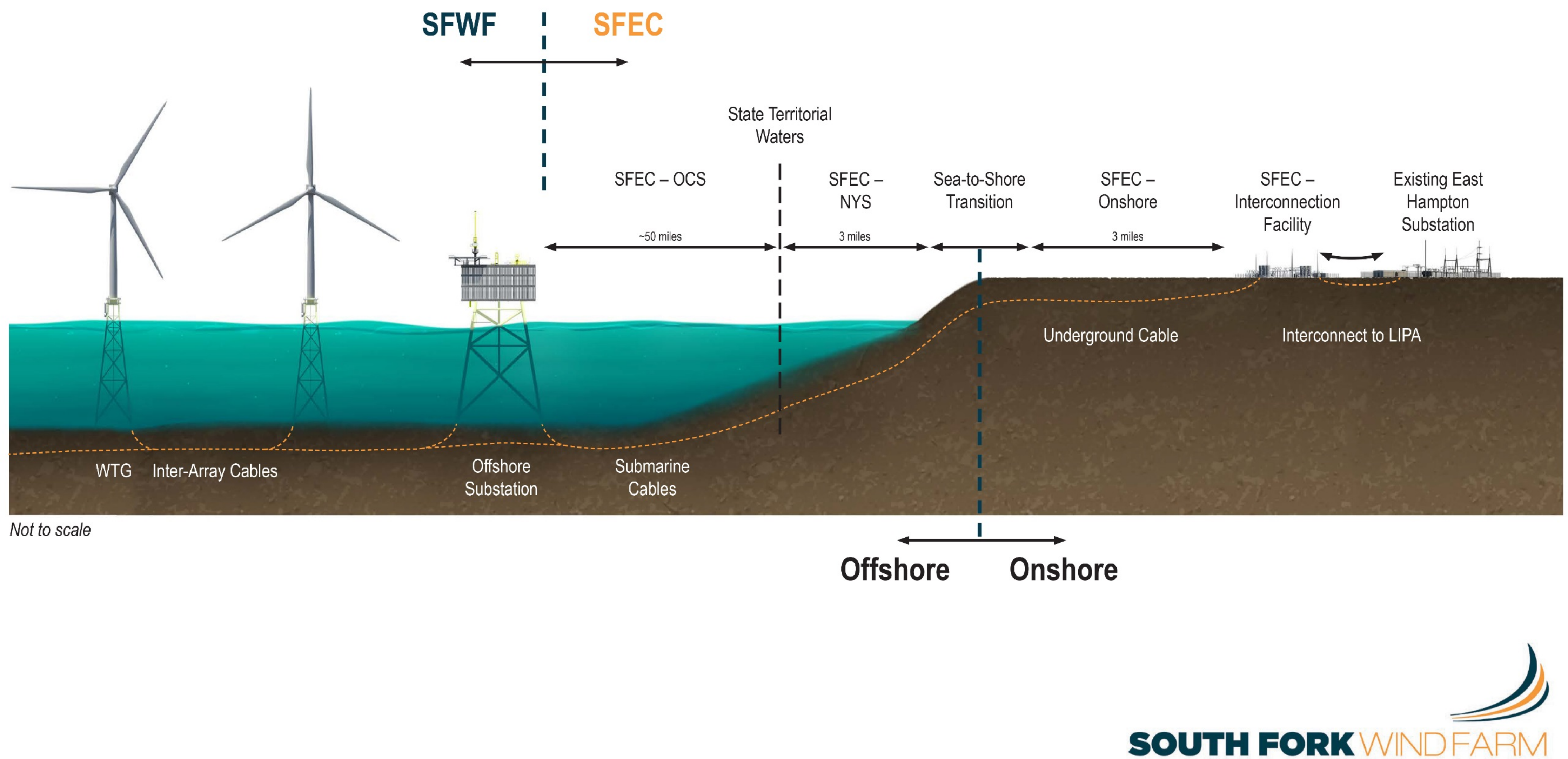

Figure 1.1-1. Project Operational Concept

Illustrated components of the Project. Note: offshore structures are depicted on Jacket foundations (see Section 3.0 for other foundation options).

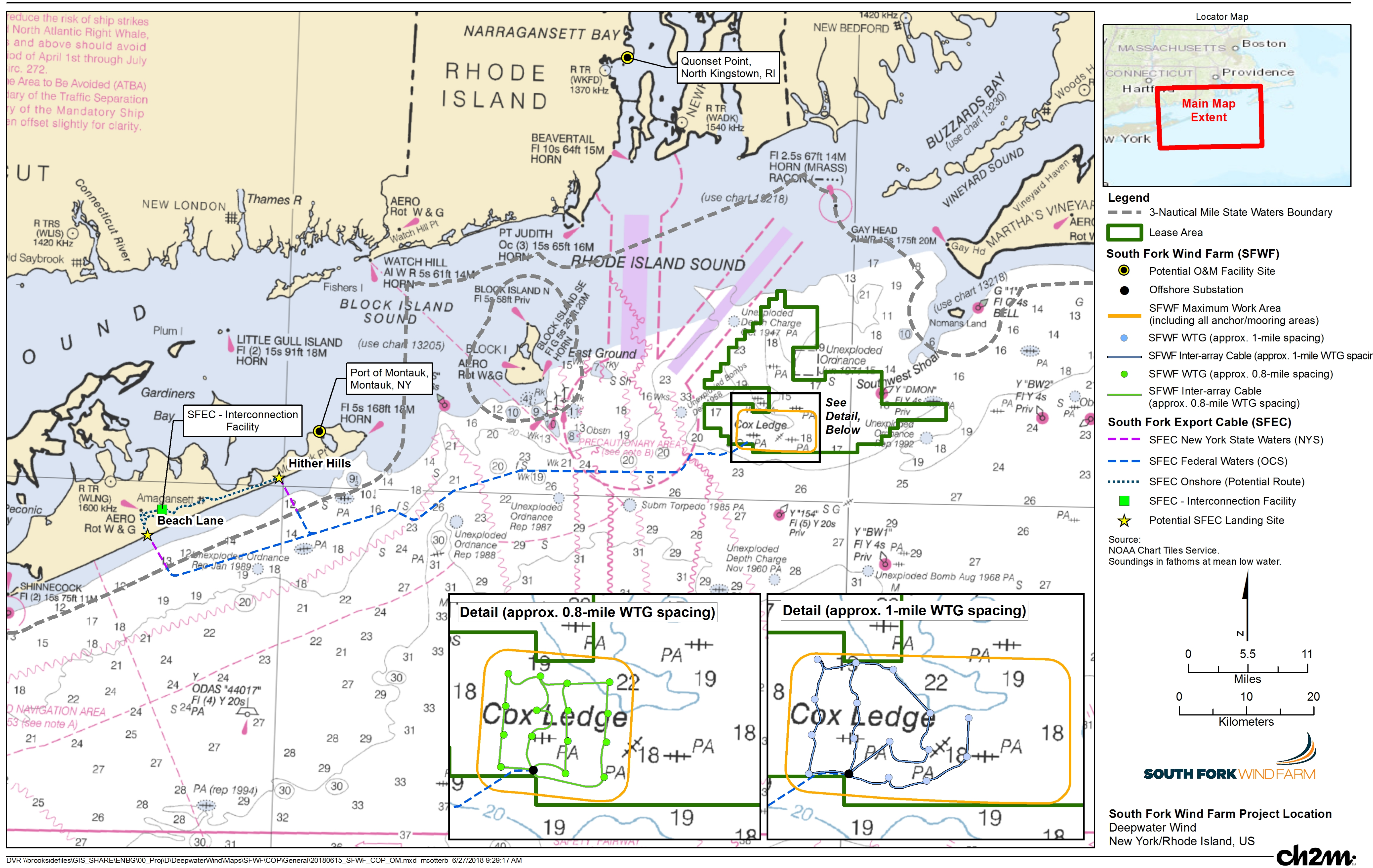

Figure 1.1-2. Project Location of SFWF and SFEC

Depiction of the SFWF and SFEC, shown on a nautical chart. SFWF detail includes two different spacing options.

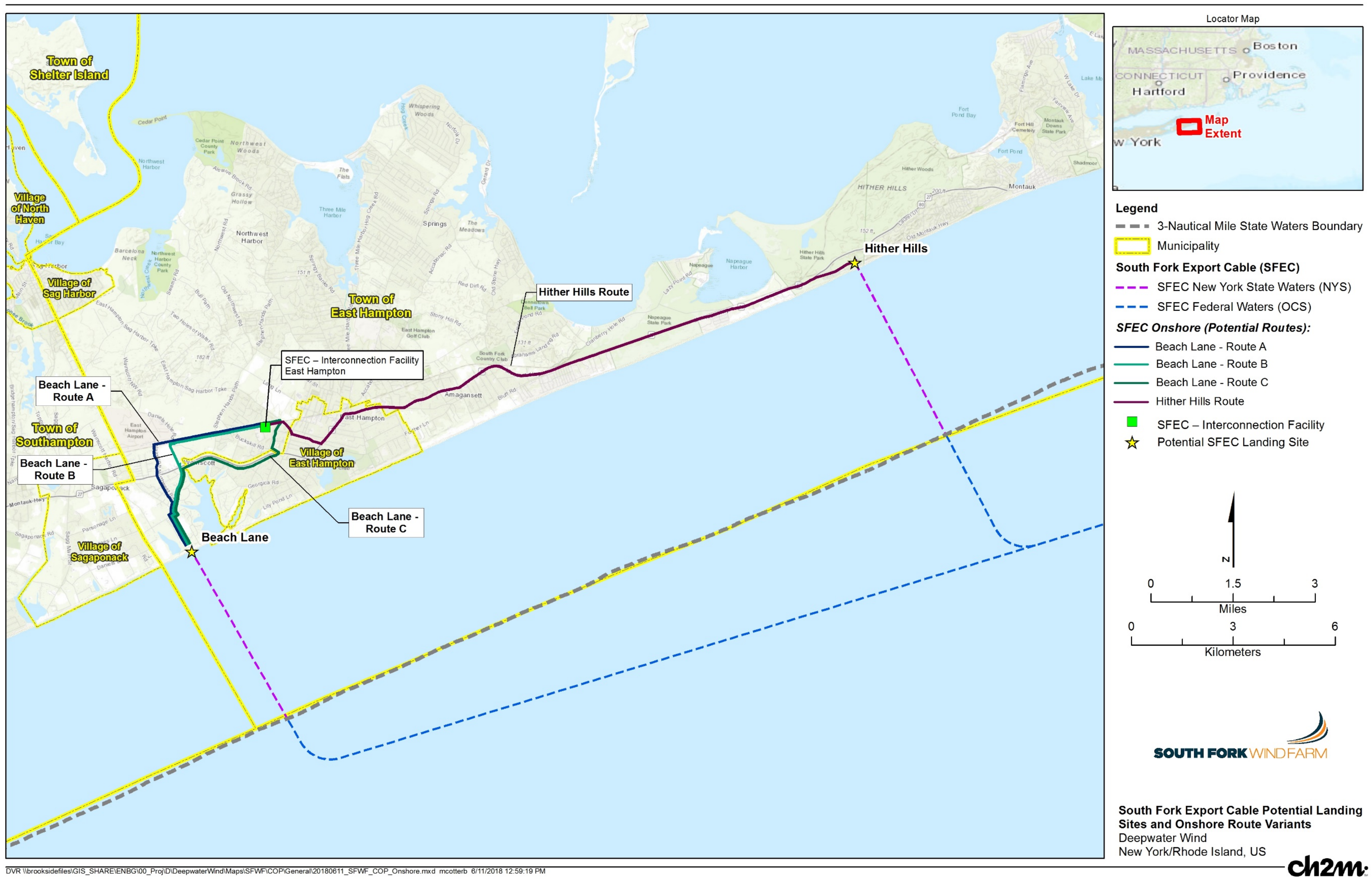

Figure 1.1-3. Location of SFEC - Onshore and Interconnection Point

Depiction of the SFEC - NYS and SFEC - Onshore, including landing site options, route variants, and interconnection point at SFEC - Interconnection Facility.

1.2 Project Purpose

The purpose of the Project is to generate electricity from an offshore wind farm located in the Lease Area and to transmit it to the East Hampton Substation. The Project addresses the need identified by the LIPA for new sources of power generation that can cost-effectively and reliably supply the South Fork of Suffolk County, Long Island, as an alternative to constructing new transmission facilities. The Project will also help LIPA achieve its renewable energy goals. The Project will enable DWSF to fulfill its contractual commitments to LIPA pursuant to a Power Purchase Agreement (PPA) executed in 2017 resulting from LIPA's technology-neutral competitive bidding process.

1.3 Regulatory Framework

As described in Section 1.1, Project components are proposed in federal waters on the OCS, waters of New York State, and at onshore locations in Long Island, New York. As a result, multiple federal and state agencies have regulatory authority over components of the Project. The SFWF and SFEC - OCS are proposed in federal waters on the OCS. The SFEC - NYS and SFEC - Onshore are proposed in waters of New York State, and onshore in New York State, respectively.

BOEM has the responsibility to regulate activities associated with the production, transportation, or transmission of renewable energy resources on the OCS under the Outer Continental Shelf Lands Act (OCS Lands Act) (43 U.S.C. § 1337). Associated with this authority, BOEM has issued a lease to the applicant to develop renewable energy projects within the Lease Area. With approval of this COP, DWSF requests that BOEM issue a project easement for the portions of the SFEC located in federal waters. In addition, BOEM is expected to be the lead federal agency during the review of the Project under the NEPA.

The New York State Department of Public Service Commission (NYSPSC) will lead the review of the SFEC - NYS and SFEC - Onshore within the territory of the State of New York under Article VII of the New York Public Service Law (PSL), which will include review under Section 401 of the Clean Water Act of 1972 (CWA).

Table 1.3-1 includes a list of the required federal and state permits and approvals, and the date of anticipated issuance. A listing of agency consultations relating to those permits and approvals are included in Table 1.4-1. Due to the preemptive effect of PSL § 130, the procedural requirements to obtain any local approval, consent, permit, certificate or other condition for the construction and operation of the Project do not apply.

1.3.1 Federal Permits, Approvals, and Consultations

The construction and operation of the Project will require a COP that is compliant with BOEM regulations (30 CFR § 585) and approved by BOEM prior to the start of construction.

The Applicant will also obtain various other federal approvals including:

- USACE Individual Permit
  - Clean Water Act Section 404 (33 U.S.C. § 1344) - Required for activities associated with the discharge of dredged or fill material in waters of the United States, in accordance with 33 CFR 328.4. These activities may include side-casting of material during installation of the SFEC, temporary excavation material associated with a temporary offshore cofferdam, placement of permanent rock or concrete matting associated with cable protection, and any temporary or permanent fill associated with the SFEC – Onshore.

  - Rivers and Harbors Act of 1899 Section 10 (33 U.S.C. § 403) - Required for all structures and work conducted in waters of the United States, as well as fixed structures on the OCS. These activities include installation of WTGs on the OCS, as well as installation of the SFEC under the seabed.

- U.S. Environmental Protection Agency (EPA) Clean Air Act (CAA) Outer Continental Shelf Air Permit(42 U.S.C. § 7627; 40 CFR Part 55, 60) – EPA regulates air quality on the OCS, including emissions from the construction, operation, and decommissioning of the SFWF and SFEC, including any equipment, activity, or facility that emits, or has the potential to emit, any air pollutant; is regulated or authorized under the OCS Lands Act; and is located on the OCS or in or on waters above the OCS. This definition includes vessels when they are permanently or temporarily attached to the seabed (40 CFR 55.2), as well as vessels associated with the Project while operating at the SFWF or within 25 nautical miles (46.3 km) of the activity.
- National Marine Fisheries Service (NMFS) Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization (IHA) - For the unintentional “take” of marine mammals incidental to certain noise producing activities associated with the Project, including pile driving.

The Project is also required to undergo environmental review under NEPA (42 U.S.C. § 4321 *et seq*.) and comply with a variety of other federal regulations. Consultation and review will occur with NMFS under the Magnuson-Stevens Fisheries Conservation and Management Act and the Marine Mammal Protection Act; with U.S. Fish and Wildlife Service (USFWS) and NMFS under Section 7 of the ESA; with National Park Service (NPS) for the Abandoned Shipwreck Act; and with the USCG, the U.S. Department of Defense, and the Bureau of Safety and Environmental Enforcement (BSEE). In addition, federal agency review of the Project must also occur under Section 106 of the NHPA and Section 307 of the CZMA.

1.3.2 National Environmental Policy Act

The NEPA and implementing regulations (40 CFR §§ 1500-1508) require that federal agencies consider the impacts of their actions on the environment. Actions that are not listed as categorically excluded or considered an administrative action not subject to NEPA must be reviewed, and an Environmental Assessment or an Environmental Impact Statement, must be prepared to document the analysis. Approval of the COP by BOEM and issuance of an Individual Permit by USACE are both considered federal actions for the Project that will trigger review under NEPA. It is expected that BOEM will act as the Lead Federal Agency for the NEPA review of the Project.

1.3.3 New York State Permits, Approvals, and Consultations

The SFEC has a design capacity that exceeds 125 kilovolts (kV) and extends more than 1 mile (1.6 km, 0.87 nm); therefore, it is considered an electric transmission facility (16 New York Codes, Rules and Regulations [NYCRR] Subpart 85-2.1). As such, the portion of the SFEC in New York State territorial waters (3 miles [4.8 km, 2.6 nm] offshore) to its onshore interconnection point with the LIPA transmission system (SFEC - NYS and SFEC - Onshore) is subject to review and approval by the NYSPSC under Article VII of the New York Public Service Law (16 NYCRR Parts 85 through 88), which authorizes the Siting of Major Utility Transmission Facilities.

The Article VII process provides a full review of the need for and environmental impact of the siting, design, construction, and operation of the SFEC and results in the issuance of a Certificate of Environmental Compatibility and Public Need (CECPN). The CECPN will include Water Quality Certification, pursuant to Section 401 of the CWA and Implementing Regulations (6 NYCRR Parts 701, 702, 704, 754 and Part 800 to 941), and relevant authorizations under Article 15 (6 NYCRR Part 608 and 621), and/or Article 25 (6 NYCRR Part 661).

Prior to construction, the NYSPSC must also approve an Environmental Management and Construction Plan that describes the practices during construction that will demonstrate compliance with the CECPN. In addition, prior to the start of construction, DWSF will apply for coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity from New York State Department of Environmental Conservation (NYSDEC), a Utility Work Permit from New York State Department of Transportation (NYSDOT), and a Grant to Use New York State Lands Under Water from New York State Office of General Services (NYSOGS), Bureau of Land Management.

Consultation and review will also occur with NYSDEC for state-listed threatened and endangered species and unique or significant habitats; New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) for cultural and historic resources; and New York State Department of Agriculture and Markets (NYSDAM) for agricultural lands.

Table 1.3-1. Summary of Permits and Approvals
Details on the status for required permits and approvals

Permit / Approval and Statute/Regulation	Regulatory Authority	Date of Approval or Anticipated Approval
FEDERAL		
Approval of SAP, pursuant to BOEM Regulations (30 CFR 585.606, 610, 611)	BOEM	Approved, 10/12/2017
Approval of COP, pursuant to BOEM regulations (30 CFR 585.626)	BOEM	Q1 2020[†]
Issuance of Individual Permit, pursuant to Section 10, Rivers and Harbors Act (33 U.S.C. 333, 403) and Section 404, CWA (33 U.S.C 1344)	USACE, New England District	Q1 2020
Issuance of OCS Air Permit, pursuant to Clean Air Act (40 CFR 55, 60; 42 U.S.C. 7627)	EPA Region 1	Q1 2020
Approval of IHA, pursuant to the Marine Mammals Protection Act (50 CFR 216, 16 U.S.C. 1361 et seq)	NMFS	6–9 months prior to construction start
Approval for Private Aids to Navigation, pursuant to USCG regulations (33 CFR 64.11)	USCG	3–6 months prior to construction start
STATE		
New York		
CECPN, pursuant to Article VII of the New York Public Service Law (16 NYCRR Parts 85 through 88), Article 15 (6 NYCRR Part 608 and 621), and Article 25 (6 NYCRR Part 661)	NYSPSC, New York State Department of Public Service (NYSDPS)	Q1 2020
Environmental Management and Construction Plan, pursuant to Article VII (16 NYCRR Parts 85 through 88)		
Section 68 Petition (permission to exercise the grants of municipal rights), pursuant to Article VII (Section 68(1))		
Water Quality Certification, pursuant to Section 401 of the CWA and Implementing Regulations (6 NYCRR Parts 701, 702, 704, 754 and Part 800 to 941)		

Table 1.3-1. Summary of Permits and Approvals
Details on the status for required permits and approvals

Permit / Approval and Statute/Regulation	Regulatory Authority	Date of Approval or Anticipated Approval
SPDES General Permit GP-0-15-002 for Stormwater Discharges from Construction Activity, pursuant to 6 NYCRR Part 750-757	NYSDEC	6–9 months prior to construction start
Utility Work Permit - Form Perm 32, pursuant to New York State Highway Law (Article 3, design2)	NYSDOT - Region 10	3–6 months prior to construction start
Grant to use New York State Lands Under Water, pursuant to New York State Public Lands Law (Article 2, Section 3, Subsection 2)	NYSOGS, Bureau of Land Management	Q1 2020
Concurrence with Coastal Zone Management Program (CZMP) Federal Consistency Certification, pursuant to Coastal Zone Management Act (CZMA) (16 U.S.C. 1451 et seq, 15 CFR Part 930, and 30 CFR 585.611(b), 627(b)) and State Article 42 of the Executive Law (19 NYCRR Part 600 and 6 NYCRR Part 617)	New York State Department of State (NYSDOS) - Division of Coastal Resources	Prior to COP approval
Rhode Island		
Concurrence with CZMP Federal Consistency Determination, pursuant to CZMA (16 U.S.C. 1451 et seq, 15 CFR 930, and 30 CFR 585.611(b), 627(b)) and Rhode Island Coastal Resources Management Program (RI CRMP) (Section 400)	Rhode Island Coastal Resources Management Council (RI CRMC)	Prior to COP approval
Massachusetts		
Concurrence with CZMP Federal Consistency Determination, pursuant to CZMA (16 U.S.C. 1451 et seq, 15 CFR 930, and 30 CFR 585.611(b), 627(b)), Massachusetts General Law (M.G.L)(21A, Subpart 4A) and Massachusetts Coastal Zone Management Program Policies (310 Code of Massachusetts Regulations [CMR] 20.00 and 21.00)	Massachusetts Office of Coastal Zone Management (MACZM)	Prior to COP approval

Notes:
Q1 = first quarter (Jan, Feb, Mar)
Q2 = second quarter (Apr, May, Jun)
Q3 = third quarter (Jul, Aug, Sep)
Q4 = fourth quarter (Oct, Nov, Dec

† - Anticipated date of the BOEM Record of Decision. Final Environmental Impact Statement anticipated Q3 2019.

1.3.4 Coastal Zone Management Act Consistency

The CZMA requires that federal actions impacting any coastal use or resource (defined as land or water use, or natural resource of a state's coastal zone), be conducted in a manner that is consistent with the enforceable policies of a state's federally approved CZMP or CRMP. Within this authority of the CZMA, state coastal programs that have been approved by National Oceanic and Atmospheric Administration (NOAA) may review federal actions impacting their coastal uses or resources or both, to verify that such activities are consistent with the state's enforceable program policies.

The federal actions associated with the Project include approval of the COP by BOEM and issuance of an Individual Permit by USACE, under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. The specific components and activities associated with those federal actions include construction, O&M, and decommissioning of the SFWF, SFEC-OCS, and SFEC-NYS. The construction, operations and maintenance, and decommissioning of the SFEC-NYS and SFEC-Onshore will also be reviewed and authorized under Article VII of the PSL by the NYSPSC. Their review will include review for consistency with the New York State CZMP.

DWSF has voluntarily prepared consistency statements for review by each of New York, Rhode Island, and Massachusetts to confirm consistency with each state's enforceable policies impacting any coastal use or resource, see Appendix A. In accordance with the "consistency" requirement of the CZMA (16 U.S.C. § 1456), as well as 307(c)(3)(A) and 15 CFR Part 930, Appendix A presents a tabular summary of applicable enforceable policies under the CZMP or CRMP for these states and an evaluation of how the SFWF and/or SFEC will be consistent with each policy, as well as cross references to specific sections of the COP where the policy is addressed.

1.4 Agency and Stakeholder Outreach

Since 2010, DWSF has been engaged in extensive outreach relating to the Project with federal and state agencies, federally-recognized Native American tribes (tribes), municipal organizations in East Hampton, New York, stakeholders representing a broad range of perspectives, and the public.

DWSF is committed to stakeholder communications and public outreach during Project development. A wide and varied range of communication methods will allow stakeholders and the public to be informed respecting the Project, such that appropriate outreach is occurring to meet the information needs of a diverse audience of stakeholders. The public involvement program for the Project includes:

- Regular briefings with federal and state agencies, tribes, elected officials, and other stakeholders to provide Project updates, solicit input and concerns, and respond to inquiries.
- Communications and regular briefings with the commercial and recreational fishing industry, including individual discussions and open house meetings in ports to provide Project updates, identify key concerns, and share relevant survey findings. Appendix B includes the Fisheries Communication Plan for the Project, including a summary of fisheries outreach to date. This outreach has been led by:
  - Rodney Avila, Deepwater Wind New England, LLC (DWW) Fisheries Liaison, who has knowledge and understanding of the regional fishing industry, leads outreach with the

commercial and recreational fishing industries. Mr. Avila is supported by Ms. Julia Prince, DWW Long Island Fisheries Liaison who is a resident of Montauk in the Town of East Hampton, NY. Both Mr. Avila and Ms. Prince have made it a priority to engage with fishermen in home ports whenever possible.

- Fisheries Industry Representatives from the ports of Montauk, Point Judith and New Bedford.

- Regular outreach and briefings to civic, community, and business groups to encourage them to join advisory working groups, attend public information meetings, and sign-up for email updates and newsletters.
- A community outreach office in Amagansett, New York with regular offices hours that provides a central location where Project information is available to the public and where small group meetings can be held.
- Informational meetings that will be conducted on a regular basis to keep the public informed and provide opportunities for input on topics related to the Project.

Table 1.4-1 identifies the federal and state agencies, federally-recognized Native American tribes, and municipal entities with which DWSF has met to discuss the Project through May 2018.

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
February 2011	USFWS	Avian and Bat Survey Protocol
April 2011	Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE)	Introduction Meeting
May 2011	BOEMRE; Rhode Island Historical Preservation and Heritage Commission (RIHPHC); Rhode Island Senate Policy, RI CRMC; Massachusetts Executive Office of Energy and Environmental Affairs	BOEMRE RI Public Meeting
June 2011	BOEMRE	BOEMRE RI Public Meeting re: leasing process
April 2014	BOEM; NYSDOS; New York State Energy Research and Development Authority (NYSERDA)	Workshop to Discuss the Offshore Leasing Process and Best Management Practices to Reduce User Conflict
May 2015	BOEM	SAP Survey, Pre-Survey Meeting
August 2015	Narragansett Indian Tribe	SAP Survey, Pre-Survey Meeting
May 2016	BOEM; Massachusetts Department of Marine Fisheries (MADMF); Massachusetts Clean Energy Center (MassCEC)	Offshore Wind Habitat Working Group Meeting
June 2016	BOEM; MADMF; MassCEC; Habitat Working Group	MA Offshore Wind Habitat Working Group Meeting

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
June 2016	BOEM; MADMF; MassCEC; Fisheries Working Group	MA Offshore Wind Fisheries Working Group Meeting
October 2016	BOEM	Survey planning and Pre-Application Meeting
November 2016	NYS Parks, Recreation, and Historic Preservation	Project Intro Meeting
February 2017	NYSDPS; NYSOGS; NYSDOS; NYSDEC	Project Intro Meeting
February 2017	RI CRMC	Project Intro Meeting
February 2017	MACZM	Project Intro Meeting and Discussion of Coastal Zone Management
March 2017	BOEM	Project Intro Meeting and Pre-Application Consultation for COP
March 2017	USACE; BOEM	Project Intro Meeting
March 2017	USCG	Project Intro Meeting
March 2017	EPA; BOEM	Project Intro Meeting, Air Quality and Emissions
March 2017	Shinnecock Indian Nation	Project Intro Meeting
March 2017	NYSDEC; NYSDPS	Project Intro Meeting
March 2017	NYS State Historic Preservation Office (SHPO)	Project Intro Meeting
March 2017	RI CRMC	Habitat Advisory Board and Fisheries Advisory Board Meeting
April 2017	BOEM	COP Pre-Survey Meeting
April 2017	New England Fisheries Management Council (NEFMC)	Project Discussion Meeting
April 2017	NMFS; BOEM	Project Intro Meeting and Fisheries Discussion
April 2017	USFWS; BOEM	Project Intro Meeting
April 2017	East Hampton Trustees	Project Intro Meeting
April 2017	RI CRMC	Rhode Island Fisheries Advisory Board Meeting
May 2017	BOEM	Rhode Island and Massachusetts Task Force Meeting

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
May 2017	Mashpee Wampanoag Tribe; Wampanoag Tribe of Gay Head Aquinnah; Narragansett Indian Tribe; Shinnecock Indian Nation	COP Tribal Pre-Survey Meeting
May 2017	NYS Parks, Recreation, and Historic Preservation	Project Intro Meeting
May 2017	RI CRMC	Rhode Island Fisheries Advisory Board Meeting
May 2017	BOEM; MADMF; MassCEC; Habitat Working Group	Massachusetts Offshore Wind Habitat Working Group Meeting
May 2017	BOEM; MADMF; MassCEC; Fisheries Working Group	Massachusetts Offshore Wind Fisheries Working Group Meeting
June 2017	BOEM	COP Work Session
June 2017	MACZM	MACZM Coastal Energy Conference
June 2017	BOEM; Multiple Agencies	Agency Webinar on Foundations
June 2017	Wampanoag Tribe of Gay Head Aquinnah; Mashantucket Pequot Tribal Nation; Shinnecock Indian Nation	COP Survey Data Training
June 2017	NYSDPS; NYSDEC	Agency Webinar on Foundations
June 2017	NYSDOS; USACE	COP Survey Plan Discussion
June 2017	RI CRMC	Project Update Meeting
June 2017	East Hampton Trustees	Project Intro Meeting with Harbor Management Committee
June 2017	East Hampton Trustees	Fisheries Discussion with Harbor Management Committee
July 2017	BSEE; BOEM	COP Discussion - Oil Spill Response Plan
July 2017	Wampanoag Tribe of Gay Head Aquinnah; Mohegan Indian Tribe	Tribal Field review of Onshore Routes and Facilities
July 2017	RI CRMC	Fisheries Discussion
August 2017	NMFS; BOEM	Fisheries Discussion
August 2017	EPA; BOEM	OCS Air Permitting; Conformity Determination
August 2017	USFWS; BOEM	Project Update and Discussion of Wildlife and Protected Species

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
August 2017	Wampanoag Tribe of Gay Head Aquinnah; Mohegan Indian Tribe; Mashantucket Pequot Tribal Nation	Visual/Indirect Effects Meeting
August 2017	Mashantucket Pequot Tribal Nation	Beach Lane & Napeague Lane Archaeology Tribal Monitoring
August 2017	Wampanoag Tribe of Gay Head Aquinnah; Mohegan Indian Tribe	Geophysical Data Review Webinar
August 2017	Rhode Island Department of Environmental Management (RI DEM)	Fisheries Discussion
August 2017	MACZM	Fisheries Discussion
August 2017	East Hampton Trustees	Project Discussion with Trustee Harbor Management Committee
September 2017	BOEM	COP Outline Review
September 2017	NMFS; BOEM	Fisheries Discussion, including Essential Fish Habitat
September 2017	Wampanoag Tribe of Gay Head Aquinnah; Shinnecock Indian Nation; Mohegan Indian Tribe; Mashantucket Pequot Tribal Nation	Geophysical Review Webinar
September 2017	NYSDPS	Project Discussion
September 2017	NYSDEC; NYSDPS; NYSDOS; NYSOGS	Project Update and Fisheries Discussion
September 2017	Connecticut Department of Energy and Environmental Protection (CT DEEP)	Project Intro Meeting
October 2017	BOEM	New York State Task Force Meeting
October 2017	BOEM	COP Survey Update Meeting
October 2017	Wampanoag Tribe of Gay Head Aquinnah	Visual Effects - Aquinnah Tribal Trust Land
October 2017	Wampanoag Tribe of Gay Head Aquinnah; Shinnecock Indian Nation; Mashpee Wampanoag Tribe; Mashantucket Pequot Tribal Nation	Geophysical Data Review Webinar
October 2017	NYSDOS	Project Update and Discussion of CZMA
October 2017	East Hampton Trustees	Presentation to Harbor Management Committee and Energy Sustainability Committee

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
October 2017	NEFMC	NEFMC Habitat Advisory Board Meeting
November 2017	NMFS; BOEM	Project Update Meeting
November 2017	RI DEM	Project Update Meeting
November 2017	CT DEEP Fisheries Division	Marine Fisheries Science Overview
November 2017	East Hampton Trustees	Project Discussion
December 2017	BOEM	Project Discussion and Air Emissions Inventory and Modeling
December 2017	BOEM	COP Discussion
December 2017	BOEM; NYSDEC, NYSDPS, NYSDOS; RI DEM	Cod Spawning Survey Plan
December 2017	Mashantucket Pequot Tribal Nation; Wampanoag Tribe of Gay Head Aquinnah	Geotechnical Core Splitting Presentation
December 2017	NYSDOS	Project Update and Discussion of CZMA Consistency Review
December 2017	East Hampton Town Board	Project Discussion
December 2017	East Hampton Trustees	Project Discussion, Science at Block Island Wind Farm
December 2017	East Hampton Trustees	Project Discussion with Trustee Harbor Management Committee
December 2017	NEFMC	NEFMC Habitat Advisory Board Meeting
January 2018	BSEE; BOEM	COP Discussion - Safety Management System
January 2018	USACE; BOEM	Project Update and Permitting Discussion
January 2018	East Hampton Town Board	Project Discussion
January 2018	East Hampton Trustees	Project Discussion with Trustee Harbor Management Committee
February 2018	NYSDEC; USFWS; BOEM; USACE	Project Update and Discussion of Protected Species
February 2018	BOEM; MADMF; MassCEC; Fisheries Working Group	Massachusetts Offshore Wind Fisheries Working Group Meeting

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
March 2018	NYSDPS; NYSDOS	Project Update and Discussion of Protected Species
March 2018	NMFS; BOEM	Project Discussion and Review of Benthic Habitat Surveys
April 2018	NYSDPS	Project Update Meeting
April 2018	RI CRMC	Habitat Advisory Board and Fisheries Advisory Board Meeting
April 2018	RI SHPO	Project Update Meeting
April 2018	East Hampton Town Board	Project Discussion
April 2018	NEFMC Habitat Committee	Project Update Meeting
April 2018	NYS Park Recreation, and Historic Preservation	Project Update Meeting
April 2018	BOEM	Rhode Island and Massachusetts Task Force Meeting
April 2018	USCG, Niantic CT	Offshore Wind Informational Meeting
May 2018	EPA; BOEM; Massachusetts Department of Environment Protection (MassDEP)	OCS Air Permitting; Conformity Determination
May 2018	NYSDOS	Project Update and Discussion of CZMA Consistency Review
May 2018	USCG; New Bedford Port Authority (NBPA); BOEM; MassCEC	USCG discussion on fishing traffic
May 2018	BOEM; NMFS; MassCEC; NBPA	Fisheries Regional Research Discussions
May 2018	Massachusetts Clean Energy Center; BOEM; NMFS	Workshop on Marine Mammals and Offshore Wind
May 2018	BOEM; MADMF; MassCEC; Fisheries Working Group	MA Offshore Wind Fisheries Working Group Meeting
June 2018	BOEM	CVA Nomination Meeting
June 2018	BOEM	COP Geotechnical Survey Pre-Survey Meeting
June 2018	Mashpee Wampanoag Tribe; Wampanoag Tribe of Gay Head Aquinnah; Narragansett Indian Tribe; Shinnecock Indian Nation	COP Geotechnical Survey Tribal Pre-Survey Meeting

Table 1.4-1. Summary of Federal, Tribal, State, and Municipal Meetings
Overview of Project meetings with federal and state agencies, tribes, and municipal entities

Date	Entity	Topic
June 2018	MACZM	MACZM Coastal Energy Meeting
June 2018	NYSDPS	Project Update Meeting

In addition to these meetings, DWSF has met with the following organizations and will continue to conduct outreach throughout Project development. These organizations include:

- American Association of Retired Persons
- Amagansett Citizens Advisory Committee
- Audubon Society of Rhode Island
- Brown Learning Collaborative
- Citizens Campaign for the Environment
- College of Staten Island, City University of New York
- Concerned Citizens of Montauk
- Conservation Law Foundation
- Cornell Cooperative Extension
- East Hampton Historical Society
- East Hampton Rotary Club
- Eastern Fisheries
- ECO Rhode Island
- Environment Business Council of New England
- Environment Massachusetts
- Environmental League of Massachusetts
- Fisherman’s Advisory Board and Habitat Advisory Board
- Group for the East End
- Inlet Seafood Corp
- Long Island Commercial Fishing Association
- Long Island Pine Barrens Society
- Massachusetts Audubon Society
- Massachusetts Clean Energy Center
- Massachusetts Fishermen’s Partnership and Support Services
- Massachusetts Fishery Working Group
- Massachusetts Habitat Working Group

- Massachusetts Lobstermen’s Association
- Mid Atlantic Fisheries Management Council
- Montauk Captain’s Association
- Montauk Chamber of Commerce
- Montauk Citizens Advisory Committee
- National Oceanic and Atmospheric Administration
- National Wildlife Federation
- Natural Resources Defense Council
- New Bedford Economic Development Council
- New Bedford Port Authority
- New England Aquarium
- New England Energy and Commerce Association
- New England Fisheries Management Council - Habitat Working Group
- New England Fisheries Science Center
- North Fork Environmental Council
- *Providence Business News* (PBN)
- Peconic Chapter of the American Institute of Architects (AIA)
- Port of New Bedford
- Propeller Club
- Rhode Island Building Owner’s Association
- School of Marine and Atmospheric Sciences at Stonybrook
- Sierra Club
- Surfrider Foundation, Eastern Long Island Chapter
- The Nature Conservancy (TNC)
- Town of East Hampton Energy Sustainability Committee
- Town of Southampton Sustainability Committee
- University of Rhode Island (URI) - Offshore Energy Department
- URI Labor Focus Group
- Wainscott Citizens Advisory Committee

DWSF has also conducted outreach activities with local stakeholders on Long Island and in ports in New York, Massachusetts, Rhode Island, and Connecticut. These activities include:

- American Planning Association Long Island Chapter-Fall East End Conference
- AIA, Peconic Chapter May Program Host

- Building Blocks Workshop: Parrish Art Museum
- East End Environmental Nongovernmental Organization (NGO) Meeting (North Fork Environmental Council, Group for East End, Long Island Pine Barrens Society, Concerned Citizens of Montauk)
- East Hampton Good Government Panel
- East Hampton Trustee Harbor Management Committee Meeting
- East Hampton Village Spring Fair
- Environmental NGO Roundtable at Guild Hall (Group for East End, Defend H20, TNC, Surfrider Foundation, Concerned Citizens of Montauk, and others)
- Environmental NGO Science Presentations (Group for East End, TNC, Riverhead Marine Foundation, Perfect Earth Project, Surfrider Foundation, Concerned Citizens of Montauk)
- Fisheries Open House at Port in Montauk, NY
- Fisheries Open House at Port in Shinnecock Inlet, NY
- Fisheries Open House at Port in Jones Inlet, NY
- Fisheries Open House at Port in New Bedford, MA
- Fisheries Open House at Port in Point Judith, RI
- Fisheries Open House at Port in Stonington, CT
- Fisheries discussions with local stakeholders
- International Energy and Sustainability Conference 2017 at Farmingdale State College
- Long Island Association Meeting and AERTC Boat Trip to Block Island Wind Farm (BIWF)
- Long Island Fisherman's Expo
- Long Island Traditions - Working the Waters
- Massachusetts Coastal Zone Management Nantucket Energy Conference
- MTK Water Life Events: Sole East Resort
- Nantucket Energy Conference
- National Academy of Sciences, Offshore Renewable Energy Development and Fisheries Conference
- NY Bight Taskforce Meeting
- NY Workforce Development Institute Presentation
- Ocean Frontiers III Film Screening and Panel Discussion at Farmingdale State College
- Office Open House Event
- Offshore Wind Habitat Working Group Meeting
- Open House at Clinton Academy in East Hampton
- Presentation to League of Women Voters at Rogers Memorial Library in Southampton

- Rhode Island Public Meeting (TNC, URI, others)
- Sag Harbor Expressions Event: Renewable Energy Panel
- Southampton Village Earth Day Panel & Fair
- The 2nd Annual South Fork 100 percent Renewable Energy Forum
- Tours to BIWF
- Town of Southampton Earth Day Event at Good Ground Park
- Trustee Harbor Management Committee Meeting
- United States Coast Guard Offshore Wind Training
- URI Energy Lecture Series
- URI Offshore Wind Science Forum
- West Long Beach, NJ Fisheries Meeting Host

1.5 Tentative Schedule

As summarized in Table 1.5-1, installation of the SFWF and SFEC is scheduled to occur in 2021 and 2022 with the Project commissioned and operational by the end of 2022. The Project schedule assumes that permits will be obtained in early 2020 in order to allow for one year of final engineering and design, contract negotiations, procurement, and manufacturing prior to the start of installation.

The installation schedule is based on several factors, including the timeframe when permits are received; regulatory time of year restrictions; environmental conditions; planning, construction, and installation logistics.

Table 1.5-1. Tentative Schedule
Installation schedule for the SFWF and SFEC

Project Component	Milestone	Expected Duration	Expected Timeframe
SFWF	Contracting, Mobilization, Fabrication, Transportation, and Verification	36 to 48 months	2019 to 2022
	Foundation installation [a]	4 months	2021 to 2022
	Inter-array cable installation	4 months	2022
	WTG installation	2 months	2022
	OSS installation	1 month	2021 to 2022
	Commissioning	3 months	2022
	Construction and installation of SFWF O&M facility	9 to 12 months	2021 to 2022

Table 1.5-1. Tentative Schedule
Installation schedule for the SFWF and SFEC

Project Component	Milestone	Expected Duration	Expected Timeframe
SFEC	Contracting, Mobilization, Fabrication, Transportation, and Verification	36 to 48 months	2019 to 2022
	Interconnection facility construction	6 to 9 months	September 2020 to May 2022
	Sea-to-Shore installation (including horizontal directional drilling [HDD])	6 to 9 months	September 2020 to May 2022
	Offshore cable installation	2 months	2022
	Onshore cable installation	9 to 12 months	September 2020 to May 2022
	Commissioning	6 months	2021 to 2022

[a] Pile driving activities will not occur at the SFWF from November 1 to April 30 during the North Atlantic right whale migration period.

1.6 Other Project Information

The following sections provide other relevant Project-specific information to meet the requirements of the OCS Lands Act, NEPA, and other applicable laws and regulations, as recommended in the COP information requirements guidance document (BOEM, 2016).

1.6.1 Authorized Representative and Operator

DWSF will be the operator of the SFWF and the SFEC. The contact information for the Authorized Representative for the SFWF and SFEC is included in Table 1.6-1.

Table 1.6-1. Authorized Representative and Operator
Contact information for DWSF Representative and Operator

Required Detail	Contact Information
Name of Authorized Representative	Aileen Kenney
Title	Senior Vice President of Development
Phone Number	401.648.0607
Email	akenney@dwwind.com
Address	56 Exchange Terrace Suite 300, Providence, RI 02903-1772

DWSF is a wholly-owned indirect subsidiary of Deepwater Wind Holdings, LLC, the parent company of the Deepwater Wind group of companies. Deepwater Wind is headquartered in

Rhode Island and is actively planning offshore wind projects to serve Rhode Island and Maryland.

Deepwater Wind is led by a veteran management team with extensive experience in developing renewable energy and marine projects around the globe. Deepwater Wind won two competitive state solicitations to become the preferred offshore developer for both Rhode Island and New Jersey and won the first-ever competitive auction for offshore wind sites held by the U.S. government. With BIWF, Deepwater Wind is the only company to have successfully navigated the permitting, legal, financial, installation and operational challenges of offshore wind in the United States. The BIWF required over 20 federal, state and local approvals, was constructed on time and on budget, and began commercial operations in December 2016. The financing of the BIWF was awarded Renewable Energy Deal of the Year in 2015 by both Project Finance International and IJ Global. The BIWF was also selected as the 2018 Safety in Seas award winner for offshore safety practices by the National Ocean Industries Association, the trade group for offshore industries in the US, including wind, oil and gas.

In connection with BIWF, Deepwater Wind also fully developed the Block Island Transmission System including a 30-mile (48.3 km) onshore and offshore transmission system that connected Block Island to the mainland of Rhode Island for the first time. This was the first offshore renewable energy transmission system developed in the United States.

1.6.2 Financial Assurance

DWSF will provide financial assurance in accordance with 30 CFR § 585.516, prior to BOEM approval of this COP.

Deepwater Wind's principal owners are entities of the D.E. Shaw group, a global investment and technology development firm with more than 1,000 employees, approximately $43 billion in investment and committed capital as of July 1, 2017, and offices in North America, Europe, and Asia. Since its organization in 1988, the firm has earned an international reputation for financial innovation and technological leadership. The D.E. Shaw group has helped to raise over $10 billion in capital for renewable energy projects in the United States in recent years, making it one of the largest sponsors of renewable energy in the nation.

1.6.3 Certified Verification Agent Nominations

Pursuant to 30 CFR § 585.705, a CVA must be used to certify to BOEM that the proposed facility is designed to withstand the environmental and functional load conditions for the intended life of the Project at its proposed location. The CVA will also review the relevant design standards and environmental loading for the structural design of the facilities.

Nomination Statement

In accordance with 30 CFR § 585.706, DWSF nominates ABS Group to serve as the CVA.

Qualification Statement

The Statement of Qualifications for CVA Services is provided in Appendix C. The Statement addresses:

- Previous experience of the nominated CVA in third-party verification and BOEM procedures
- Technical capabilities of the CVA and staff members
- Size and type of organization

- Availability of technology
- Ability to perform
- Conflict of interest
- Professional Engineer supervision

Scope of Work and Verification Plan

The CVA Scope of Work and Verification Plan are also provided in Appendix C. This document specifies the level of work to be performed by the CVA at all phases of the Project and identifies the list of documents and subject matter that the CVA will review.

1.6.4 Oil Spill Response Plan

Pursuant to 30 CFR § 585.627(c), an Oil Spill Response Plan must be submitted to the BSEE. In accordance with 30 CFR Part 254, DWSF has developed an Oil Spill Response Plan which is provided in Appendix D.

1.6.5 Safety Management System

Pursuant to 30 CFR § 585.627(d), a Safety Management System must be submitted to BOEM. In accordance, with 30 CFR § 585.810, DWSF has developed a Safety Management System which is provided in Appendix E.

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Section 2—Project Siting and Future Activities

This section presents a description of the siting and route selection process for the SFWF and SFEC as conducted by DWSF. Section 2.1 presents the siting history leading to the proposed location of the SFWF. Section 2.2 provides a summary of the steps taken to identify and evaluate the potential offshore and onshore SFEC routes. Section 2.3 presents a description of the construction methods, equipment, and installation technologies DWSF has reviewed and considered for the SFWF and SFEC.

2.1 South Fork Wind Farm Siting

In 2013, BOEM divided and auctioned the Rhode Island/Massachusetts Wind Energy Area (RI-MA WEA) as two lease areas (North Lease OCS-A 0486 and South Lease OCS-A 0487). It opened competitive bidding and eventually awarded both leases to Deepwater Wind New England, LLC. The North Lease Area consisted of 97,498 acres and the South Lease Area consists of approximately 67,250 acres (Figure 2.1-1). The SFWF is located within a portion (11,387 acres) of the North Lease Area. This section provides the history of the siting and screening of the RI-MA WEA, and how the SFWF was located.

2.1.1 Siting and Screening of the Deepwater Wind Lease Areas

The location of the RI-MA WEA was the result of a multi-year effort by state and federal regulatory agencies to identify OCS areas suitable for offshore renewable energy development. The area was identified based on 4 years of preliminary site characterization, environmental assessment, and stakeholder discussions occurring primarily during the development of the Rhode Island Ocean SAMP. Significant investment of public resources went into the compilation and review of site characterization data and the assessment of potential environmental impacts. A wide range of impacts were examined including environmental, economic, cultural and visual resources, and use conflicts.

Several planning efforts organized by federal and state entities involving private and public interest groups, as well as members of the academic community and the public, led to the identification of the areas that were eventually leased. The primary efforts and process milestones were as follows:

- BOEM's 2009 Intergovernmental Renewable Energy Task Forces in Massachusetts and Rhode Island
- Massachusetts Ocean Management Plan, 2015 (update of 2009 version)
- *Rhode Island Ocean Special Area Management Plan*, 2010, assessed environmental, economic, cultural and visual resource data, and use conflicts of the entire Ocean SAMP region, creating a baseline of information that was considered during the designation of the RI-MA WEA (RI CRMC, 2015).
- Executive Order (EO) 13547 of July 19, 2010, which was signed on July 19, 2010, established the National Ocean Policy and provided a national framework and governance structure for sustainable management of U.S. ocean, coastal, and Great Lakes resources. This

EO began a multi-year process which resulted in the Northeast Regional Ocean Plan (The White House, 2010).

- Memorandum of Understanding signed by the Governors of Rhode Island and Massachusetts in 2010, forming a partnership to collaborate with BOEM and defining an Area of Mutual Interest (AMI) for wind energy project development (Figure 2.1-2). The AMI was a contiguous block of 45 OCS lease blocks (256,199 acres or 1,035 square kilometers [km^2] or 302 square nm) (BOEM et al., 2010)
- In 2011, BOEM published in the *Federal Register* a Commercial Leasing for Wind Power on the Outer Continental Shelf Offshore Rhode Island and Massachusetts-Call for Information and Nominations (Docket No. BOEM-2011-0049, 76 *Federal Register* 51383-51391), requesting expressions of interest from potential wind project developers (BOEM, 2011a).
- In compliance with its obligations under NEPA, BOEM published in the *Federal Register* a *Notice of Intent to Prepare an Environmental Assessment* (Docket No. BOEM-2011-0063, 76 Federal Register 51391-51393) in 2011 (BOEM, 2011b).
- On July 2, 2012, BOEM published a Notice of Availability for the Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Rhode Island and Massachusetts Environmental Assessment (77 *Federal Register* 39508). A 30-day comment period was opened, and BOEM held public informational meetings in Massachusetts and Rhode Island (BOEM, 2012).
- BOEM revised the 2012 environmental assessment for the RI-MA WEA in May 2013 to address issues raised by stakeholders and agency consultation about lease issuances and site assessment activities. BOEM issued a Finding of No Significant Impact for these activities within the RI-MA WEA (BOEM, 2013a).

BOEM reduced the original area considered for leasing based on environmental constraints, efforts to decrease user group conflicts, navigational safety, public health and safety, and stakeholder concerns (e.g., commercial fishing) (Figure 2.1-2). Much of the information assessed during the Ocean SAMP supported the BOEM siting process. The result was the RI-MA WEA and eventually the North and South Lease Areas. The key considerations used to refine the RI-MA WEA included:

- The Governors of Massachusetts and Rhode Island agreement to a boundary that was at least 6 nm (16.7 km or 10.4 miles) away from any coastal area of either state.
- A lengthy stakeholder and scientific review process that identified "high value" fishing grounds and excluded those areas from the RI-MA WEA (Figure 2.1-2, exclusion zone). High value fishing includes the overlap between fixed gear fisheries (traps, pots, and gillnets) and mobile fisheries (trawls, dredges). Areas excluded from the RI-MA WEA had three to four types of fishing pressure from participating fisheries such as bottom trawling, scallop dredging, and lobster trap fisheries.
- Removal of certain aliquots to avoid marine traffic, navigation zones, and an area of unexploded ordinance.

The RI-MA WEA was designated for offshore renewable energy development as the result of a coordinated, rigorous, and thorough siting and screening process consistent with the objectives of the National Ocean Policy and NEPA.

2.1.2 South Fork Wind Farm Siting and Location

As described in Section 1, the Project purpose is driven by DWSF's PPA with the LIPA, which requires that power from the SFWF be delivered to the LIPA substation in East Hampton, New York. The southwestern corner of the North Lease Area was selected as the preliminary investigation area for the SFWF due to its proximity to Long Island (Figure 2.1-3, top panel). This portion of the North Lease Area minimizes the length of the interconnection to LIPA's system.

DWSF conducted comprehensive desktop studies of oceanographic, geologic, shallow hazards, archeological, and environmental resources in the North Lease Area. These desktop studies informed the Project COP survey plan, which was submitted to BOEM in 2017. The purpose of the 2017 COP survey was to conduct site characterization, marine archeological, and benthic studies necessary to further evaluate the seabed in the southwestern corner of the North Lease Area and along multiple potential export cable routes. The area proposed for survey in the COP survey plan is shown in Figure 2.1-3, middle panel. The 2017 COP survey plan was submitted in accordance with the stipulations of the North Lease, as well as BOEM regulations and BOEM's guidelines:

- *Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to CFR Title 30, Part 585* dated July 2, 2015 (BOEM, 2015a)
- *Guidelines for Submission of Spatial Data for Atlantic Offshore Renewable Energy Development Site Characterization Survey* dated February 1, 2013 (BOEM, 2013b)
- *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* dated July 2015 (BOEM, 2015b)
- *Guidelines for Providing Benthic Habitat Survey Information for Renewable Energy Development on the Atlantic Outer Continental Shelf* dated November 2013 (BOEM, 2013c)
- *Guidelines for Information Requirements for a Renewable Energy COP* dated October 22, 2014 (Version 2.0) (BOEM, 2014)

On June 22, 2017, BOEM notified DWSF that the 2017 COP survey plan was compliant and survey activities were initiated. DWSF conducted the 2017 COP survey between June and December 2017 in accordance with the approved COP Survey Plan.

During the execution of the geophysical survey, the detection of potentially challenging seabed conditions led to the decision to shift the SFWF area eastward. Multi-beam survey data identified the presence of dense cobble, rock, and boulders on the seabed in the western-most region of the originally proposed SFWF survey area. In contrast, areas just to the east were observed to have sparser rock and boulders with larger expanses of sand and mud on the seabed. Based on these findings, DWSF shifted the SFWF area and consequently the SFEC-OCS slightly to the east shown in Figure 2.1-3 (bottom panel).

DWSF has considered various scenarios for the layout of the foundations for the WTGs and the OSS. The first scenario includes approximately 0.8 mile (1.3 km, 0.70 nm) spacing between each foundation. Since the conclusion of the 2017 COP survey, in response to feedback from federal and state agencies, the USCG, and both commercial and recreational fishing, DWSF is also evaluating an additional layout with approximately 1 mile (1.60 km, 0.86 nm) spacing between foundations (see Section 3.1 for more details). The MWA depicted in Figure 2.1-3 (bottom panel) reflects these two layout scenarios. Additional surveys will be conducted in summer and fall 2018 in the expanded MWA.

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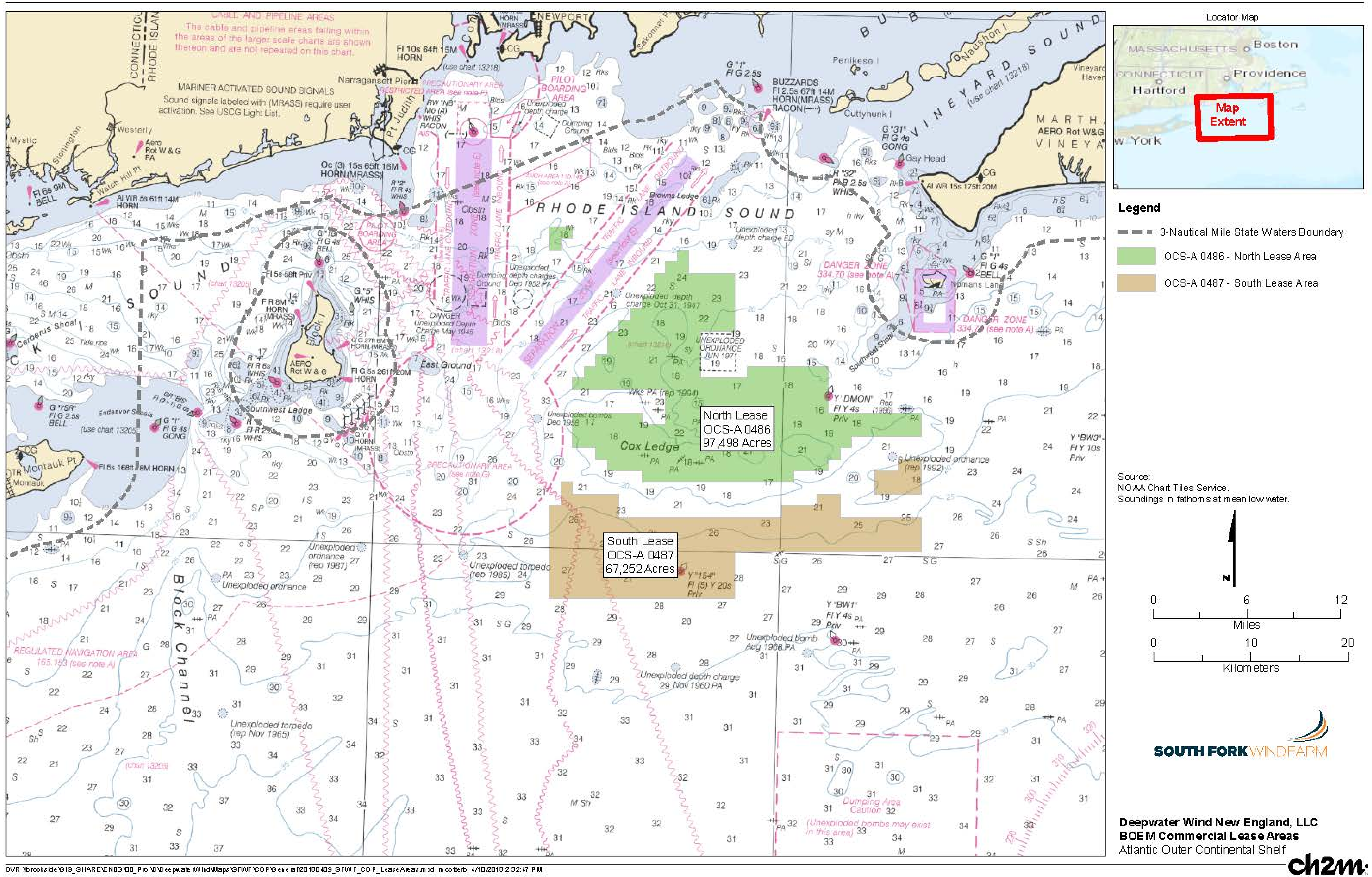

Figure 2.1-1. Deepwater Wind New England, LLC Commercial Lease Areas
Illustration of the lease areas held by Deepwater Wind.

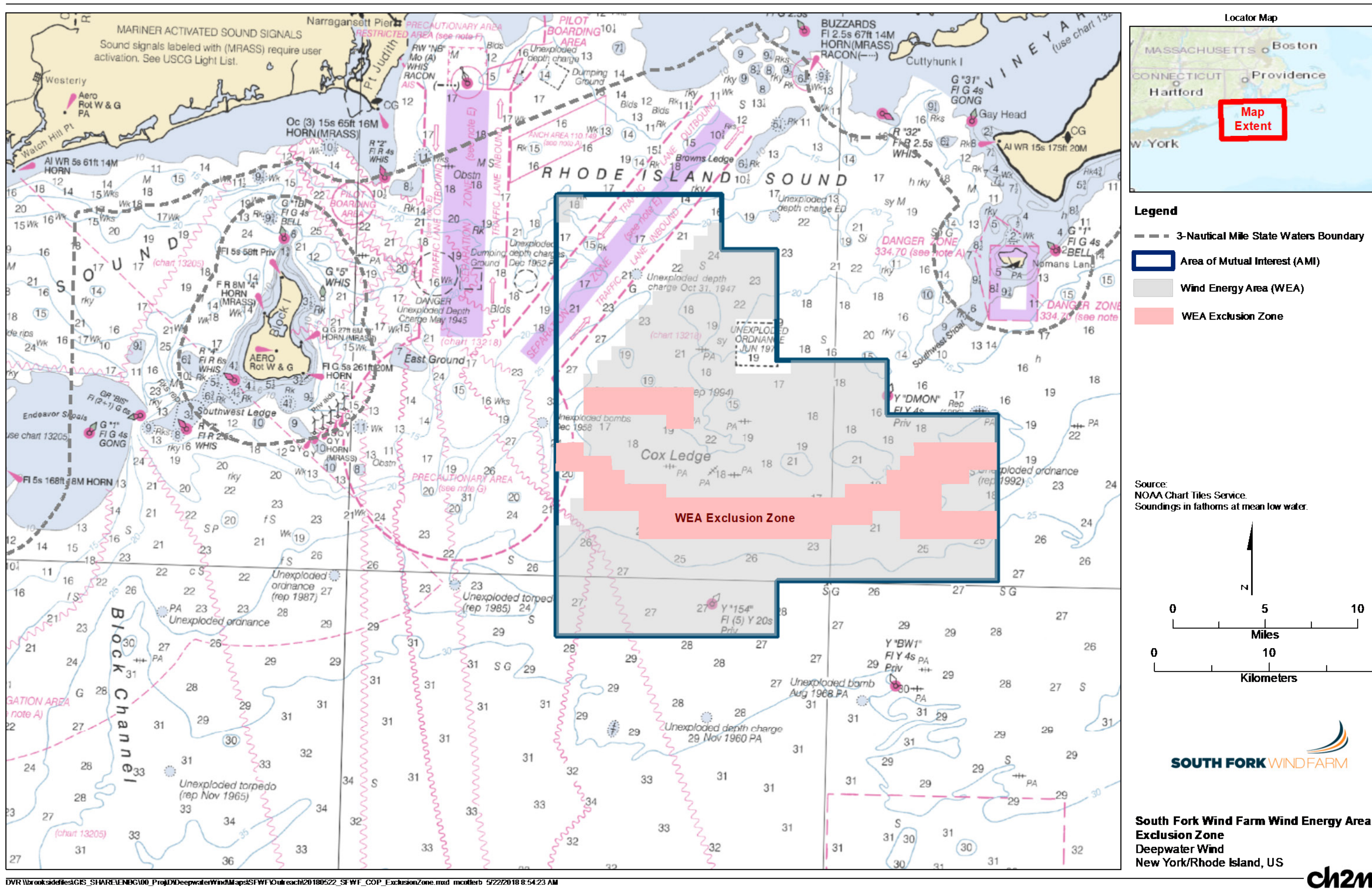

Figure 2.1-2. Rhode Island-Massachusetts Wind Energy Area Siting History

Map depicting the area of mutual interest, current Rhode Island-Massachusetts wind energy area and areas excluded from the wind energy area.

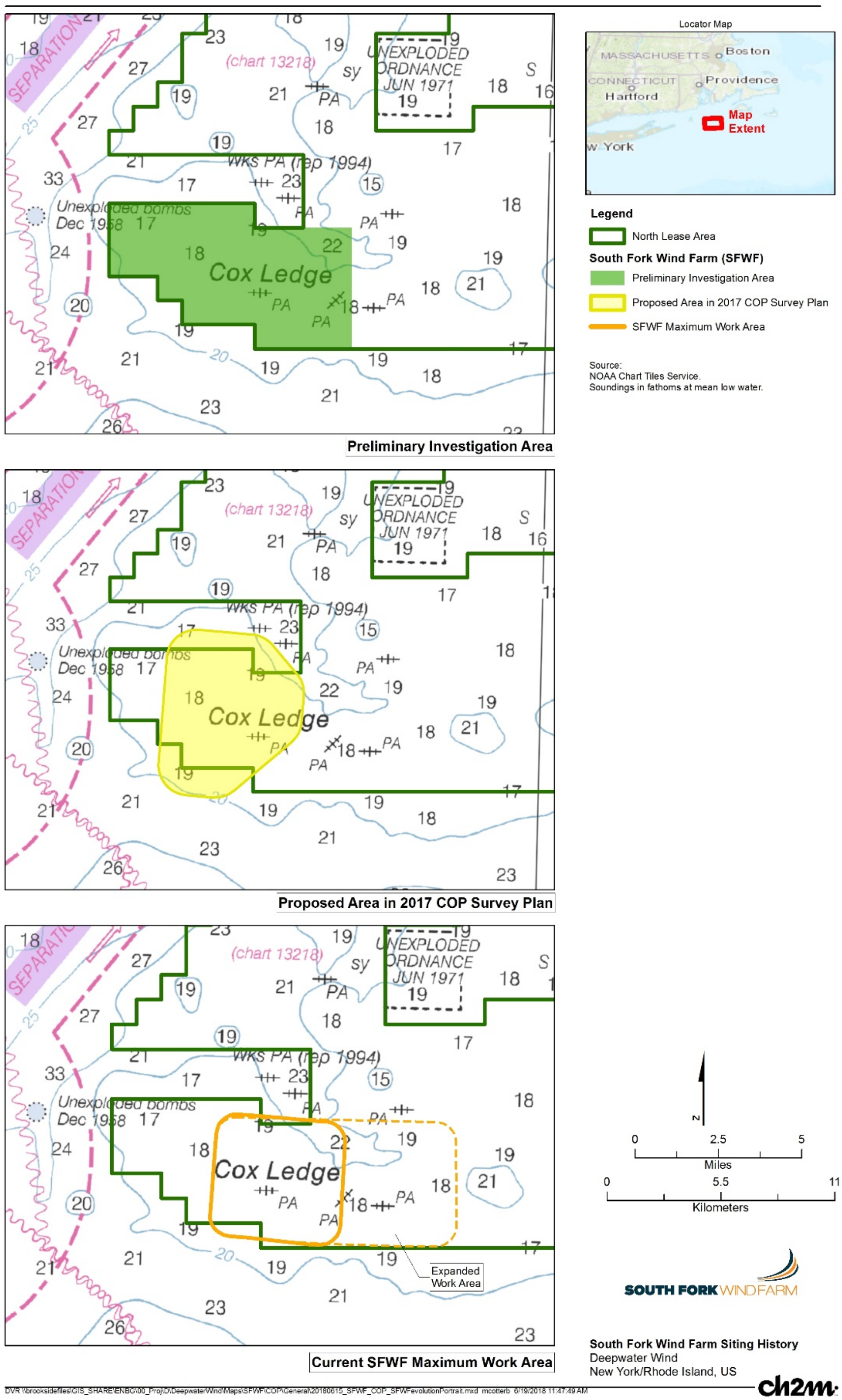

Figure 2.1-3. South Fork Wind Farm Siting History within North Lease Area OCS-A 0486
Graphical illustration of the evolution of siting the South Fork Wind Farm based on site evaluations.

2.2 South Fork Export Cable Siting History

DWSF identified several potential offshore and onshore cable routes for the SFEC based on both desktop analysis and field assessment activities, all of which supported the Project purpose.

Pursuant to 30 CFR § 585.200(b), DWSF has the right to one or more project easements for the purpose of installing cables on the OCS to support activities within the lease. As part of the approval of this COP, DWSF requests that BOEM issue a Project easement for the portions of the SFEC located in federal waters. In New York State, review of a preferred and alternative cable routes, via analysis of a wide variety of siting factors, occurs under Article VII of the New York State PSL. This section provides a synopsis of the routing assessment completed to identify both the offshore and onshore routes for the SFEC.

2.2.1 South Fork Export Cable - Offshore Route Siting

DWSF completed a desktop evaluation for the SFEC route corridors based on publicly available information on oceanographic, geologic, shallow hazards, archeological, and environmental resources. Bottom conditions, bathymetry, as well as environmental constraints were mapped and investigated. Both the northern and the southern route options were included in the 2017 COP survey plan (Figure 2.2-1).

DWSF initially identified one potential offshore corridor to reach the eastern end of Long Island. This corridor ran southwest from the SFWF, passing north of Montauk Point and into Napeague Bay on the north shore of the South Fork in the town of Easthampton, New York (Northern Route) (Figure 2.2-1). DWSF met with local, state, and federal agencies, tribes, and stakeholders (commercial and recreational fishing, environmental non-governmental organizations) to discuss the locations of the SFEC route. Stakeholders identified concerns with the Northern Route into Napeague Bay. Both the commercial fishing community and the Town of East Hampton voiced strong concerns and requested that DWSF consider landing the SFEC at a location on the south shore of the South Fork. Therefore, DWSF added three potential landing sites on the south shore and developed an associated SFEC route (Southern Route) (Figure 2.2-1).

Initial geophysical field surveys during the 2017 COP survey were conducted for both the Northern and Southern Routes to obtain more detailed site-specific information. Based on the preliminary results of these surveys and through continued agency and stakeholder consultation, DWSF determined that the Northern Route would have limited viability due to engineering constraints and environmental considerations including commercial fisheries interests. Several engineering constraints were identified, such as significant portions of shallow water in Napeague and Gardiners Bays and areas near Endeavor Shoals east of Montauk Point where large dynamic sand waves exist. Environmental constraints were identified along the Northern Route including heavily utilized fishing grounds (e.g., fixed gear areas to the east and north of Montauk), nearby shellfish and eelgrass beds, and the presence of municipal aquaculture lease areas in Napeague Bay. Napeague Bay, as a more sheltered coastal embayment, has high ecological sensitivity and supports significant populations of finfish and shellfish.

The south shore of Long Island is an open ocean environment as compared to the lower energy Napeague Bay. The Southern Route presented fewer engineering and environmental constraints as compared to the Northern Route. There is commercial fishing activity along the Southern Route including fixed and mobile gear; however, there are no known aquaculture lease areas. The subtidal coastal habitat along the south shore is subjected to higher wave action and, thus, has coarser sandy deposits. The benthic community along the south shore will recover faster from any potential impacts caused by the Project as compared to Napeague Bay. Given these results and agency and stakeholder preference, DWSF selected the Southern Route as the preferred route.

Geophysical data along the Southern Route were collected as the 2017 COP survey continued. Data were collected over a 590-foot (180-meter [m])-wide corridor. The position of the route centerline was revised and micro-sited as data were collected and reviewed during the survey in an iterative fashion. Feedback from the fishing community during the siting process also helped refine the location of the route. The Southern Route corridor was adjusted to avoid or minimize possible impacts to heavily commercially fished areas, archeological resources such as shipwrecks, and hazard areas identified as having greater potential for unexploded ordinances. The resulting adjusted Southern Route corridor is pictured in Figure 2.2-1 as the blue-hashed line.

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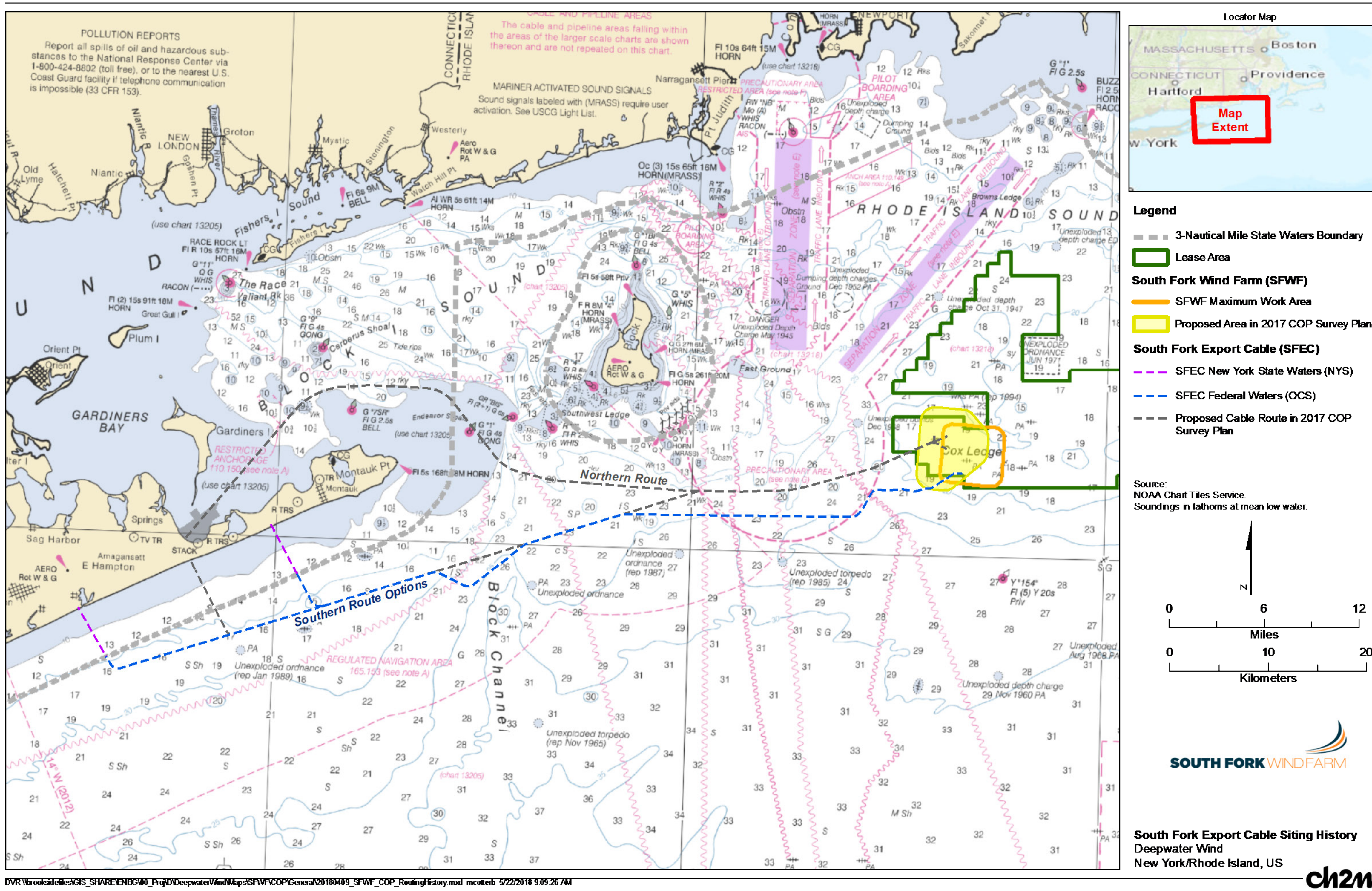

Figure 2.2-1. South Fork Export Cable Siting History

Northern and Southern South Fork export cable options considered during site assessment activities.

2.2.2 South Fork Export Cable - Onshore Route Siting

As discussed in Section 1, a Certificate of Environmental Compatibility and Public Need under Article VII of the New York State Public Service Law is required. The segment of the SFEC from the point it enters New York State territorial waters at the 3-mile (4.8-km, 2.6-nm) state seawater boundary to the SFEC - Interconnection Facility will be subject to comprehensive routing, economic, and environmental evaluations set forth in the rules and regulations under Article VII.

A total of five landing sites were investigated in East Hampton, New York.

Two landing sites associated with the offshore Northern Route were identified on the north shore in East Hampton. Both landing sites, described as Fresh Pond and Promised Land, are located in Napeague Bay (Figure 2.2-2). Fresh Pond landing site is located on town of East Hampton-owned right-of-way (ROW), while Promised Land is located in New York State park land. These landing sites were deemed not viable by DWSF based on the offshore route siting process described in the previous section.

Three landing sites associated with the offshore Southern Route were investigated on the south shore in East Hampton (Figure 2.2-2):

- Beach Lane - The Beach Lane landing site is located at the south end of Beach Lane on town of East Hampton-owned ROW. The Beach Lane landing site is comprised of paved parking in its northern extent and the remainder of the ROW is beach.
- Hither Hills - The Hither Hills landing site is located within an upper parking lot of the eastern portion of state-owned Hither Hills State Park, south of Old Montauk Highway.
- Napeague Lane - The Napeague Lane landing site is located at the end of Napeague Lane on town of East Hampton-owned ROW, south of Marine Boulevard. The Napeague Lane landing site is comprised of approximately 20 marked parking spots and beach.

After engineering and environmental analysis as well as discussion with municipal and state agencies, the Beach Lane and Hither Hills landing sites were identified as the two viable landing sites for the SFEC. The topographic conditions at Beach Lane and Hither Hills were found to be suitable for horizontal directional drilling (HDD) operations and conduit installation. Based on this evaluation, DWSF identified the following route variants or options: Beach Lane - Route A, Beach Lane - Route B, Beach Lane - Route C, and Hither Hills (Figure 2.2-3).

Of the landing sites investigated, the onshore route variants associated with Beach Lane minimize impacts to onshore traffic, heavily traveled roadways (e.g., Montauk Highway), and sensitive terrestrial habitats (e.g., wetlands). Routes associated with the Beach Lane landing site also have the shortest distance to the existing East Hampton Substation; therefore, impacts of linear route construction are minimized. The Beach Lane route options utilize, to the extent possible, less traveled roadways and leverage the Long Island Railroad ROW.

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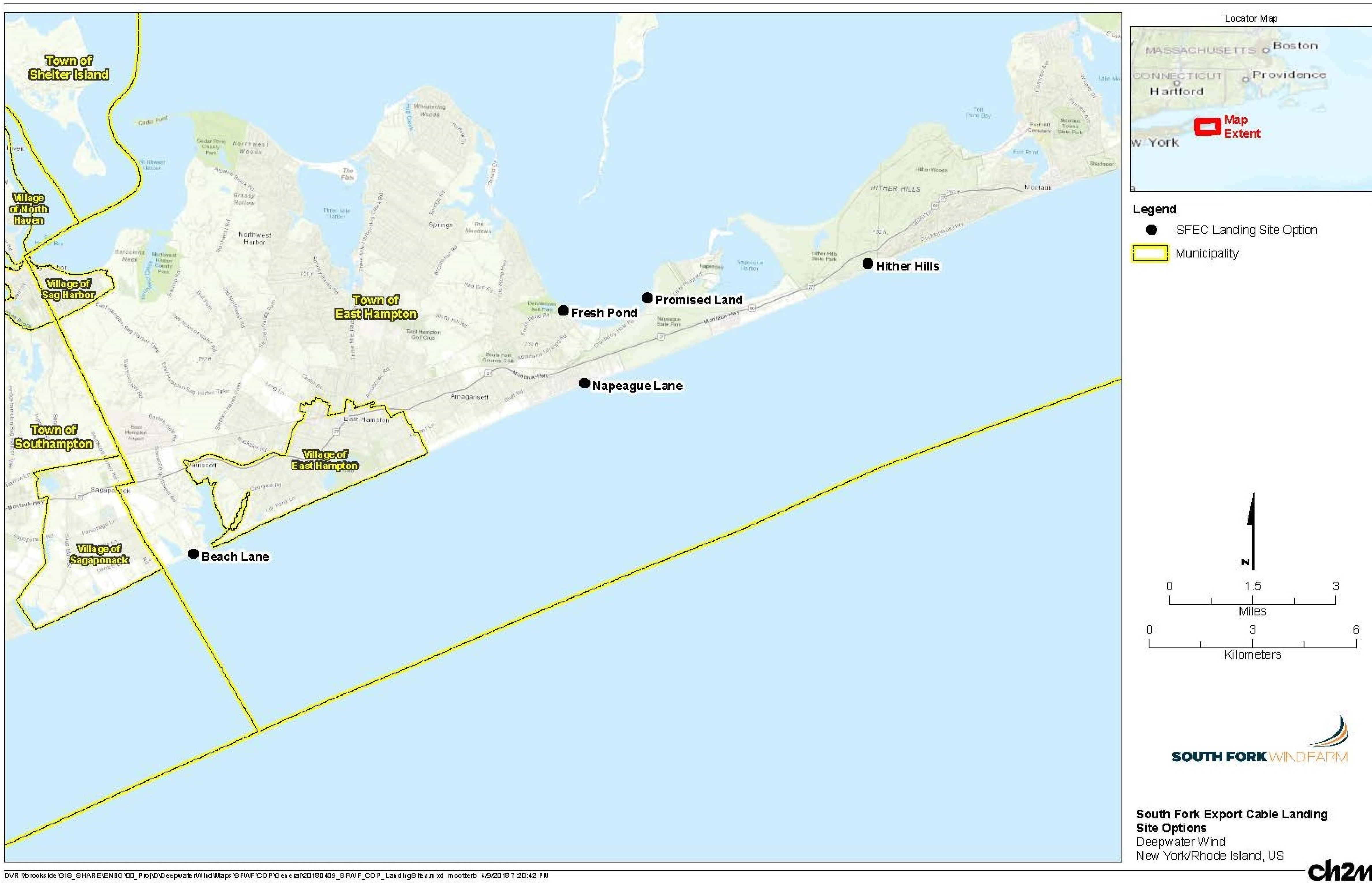

Figure 2.2-2. South Fork Export Cable Landing Site Options

Five landing site options considered for the South Fork Export Cable landing site on the South Fork of Long Island, New York.

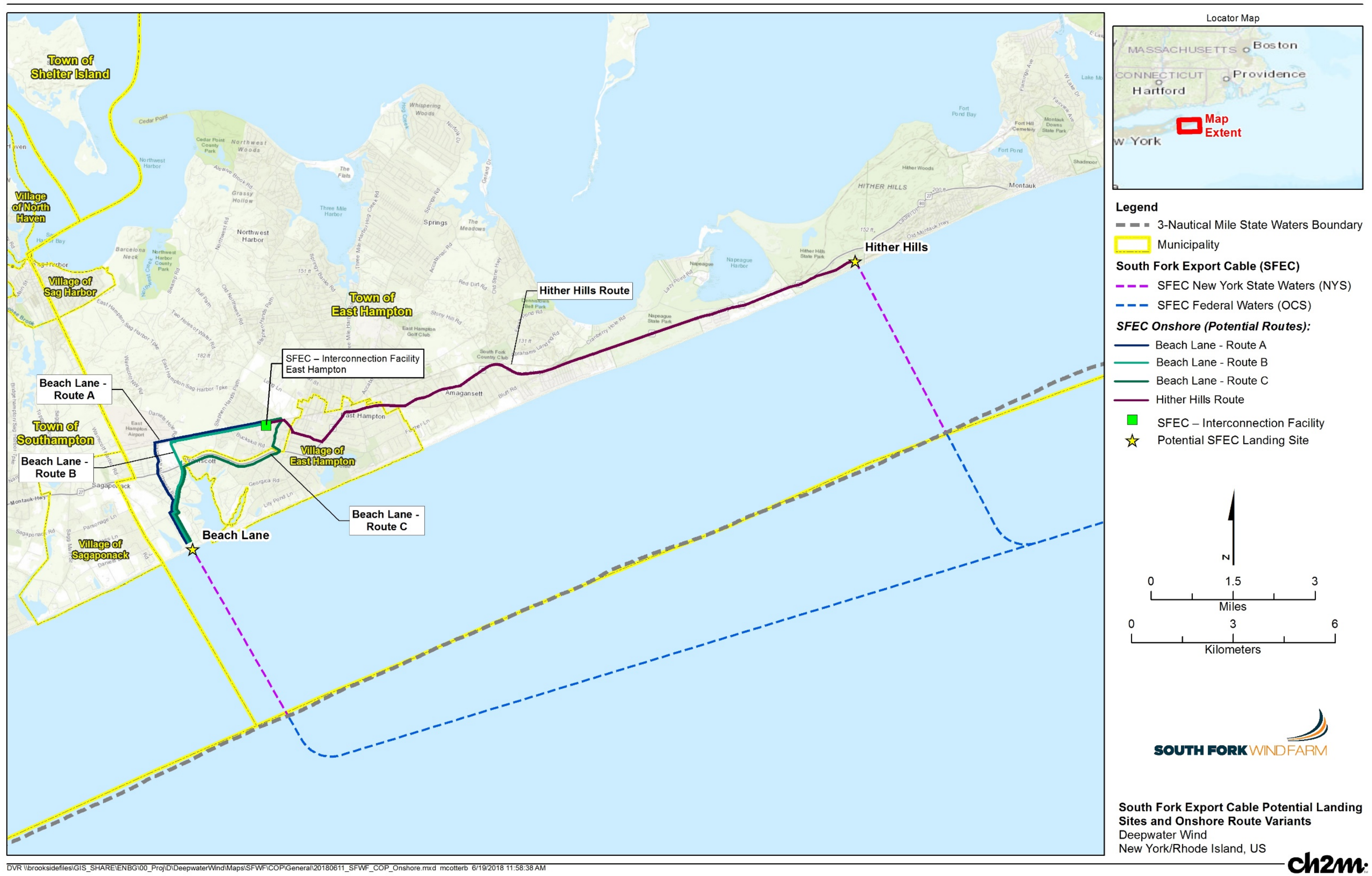

Figure 2.2-3. South Fork Export Cable Onshore Route Options

Four onshore cable route variants under consideration to interconnect with the Long Island Power Authority transmission system at the East Hampton Substation.

2.3 Review of Technologies and Installation Methods

DWSF considered several potential technologies and installation methods for the SFWF and SFEC. The feasible technologies and installation methods are described in detail in Section 3. Technologies and installation methods that are not considered viable are described in this section.

2.3.1 South Fork Wind Farm - Technologies and Methods

Turbines

DWSF considered multiple offshore turbine models based on various sizes of WTGs that are commercially available. DWSF evaluated WTG sizes based on environmental, technical, and financial suitability for the SFWF. Selection of a turbine model will define the total number of WTGs required to meet the power supply need identified by LIPA in the PPA. Smaller, lower-capacity turbine models would require installation of a greater number of WTGs compared to larger, higher-capacity turbine models. The use of fewer WTGs improves the cost effectiveness of the Project by streamlining installation and minimizing environmental and socio-economic impacts, particularly visual impacts and bottom disturbances. Due to economies of scale and lack of commercial availability, WTG models smaller than 6 MW are not considered feasible for the SFWF.

Foundations

DWSF evaluated several potential types of foundations, three of which (monopile, jacket, and gravity base) are described in Section 3. DWSF evaluated each foundation type based on suitability for subsurface conditions and water depths at the SFWF. Two other foundation types, including suction bucket foundation and floating platforms, were initially evaluated and then removed from additional consideration because the conditions in the SFWF area are not suitable.

Suction bucket foundations have been installed at a few offshore wind projects in Europe and are planned for one project within the United States (Icebreaker in Lake Erie). The majority of these foundations have been installed via mono-bucket due to shallow water depths (less than 66 feet [20 m]). In deeper waters, this foundation type has not been fully evaluated and is considered to be suitable only for specific soil types and subsurface conditions. As such, suction bucket foundations are not considered feasible for the SFWF.

Floating platforms are still in the prototype development stage and have not been deployed for commercial offshore wind projects. Floating platforms are generally considered appropriate for installations at much deeper water depths than are present at the SFWF. Floating platforms are not considered appropriate for the SFWF given the prototypical nature of the platform and because the water is not deep enough to justify the additional costs and engineering considerations. As such, floating platforms are not considered feasible for the SFWF.

2.3.2 South Fork Export Cable - Technologies and Methods

DWSF evaluated different current types for the SFEC. The SFEC is designed to use high-voltage alternating current (HVAC), rather than high-voltage direct current (HVDC) transmission lines due to the considerably lower costs to connect HVAC into a primarily alternating current LIPA system. HVDC is a considerably larger investment than HVAC and is only cost-effective for wind farms with a larger nameplate capacity than planned for the SFWF or for long transmission lines carrying very large power capacities. The transmission distance and power rating of the

SFEC makes it suitable for the more cost-effective HVAC system. Therefore, HVDC was not selected for the SFEC.

South Fork Export Cable - Offshore Installation Methods

DWSF considered various options for installation of the SFEC - Offshore, including placement on the seabed and burial beneath the seabed. Although placement on the seabed would minimize installation time and cost as well as potential sediment disturbance, DWSF plans to bury the cable beneath the seabed. Burying the cable is a means of protecting it from potential damage caused by various external forces (e.g., fishing equipment, anchors). Burying the cable also minimizes the need for maintenance and associated potential for seabed disturbance.

DWSF also considered various installation methods for the SFEC - Offshore, including hydraulic plow, mechanical plow, rock-dumping, and mechanical dredging. Due to the variability of surface and subsurface seabed conditions, DWSF plans to utilize a combination of hydraulic jet and mechanical plow to install the cable at the target burial depth. Both methods create a trench along the seabed in which the cable is simultaneously laid and buried in a single pass.

Mechanical dredging is not considered a feasible installation method because it requires mobilization of a dredge operation for an extended period of time due to the considerable route length and water depths. Mechanical dredging results in both a significant seabed footprint, suspended sediments, and greater potential impacts to marine navigation.

DWSF considered multiple installation methods for the sea-to-shore transition at the cable landing site. Jet plowing (i.e., trenching via high pressure seawater) could be used to bury the cable in the nearshore zone up to the mean high-water line (MHWL) on the beach. In this scenario, either an open trench or an HDD (likely with a cofferdam on the beach) would be used to install the cable from the MHWL to the transition vault located at an onshore location. These methods are not considered feasible based on impacts to intertidal, beach, and dune habitats during construction.

Instead, DWSF plants to conduct a longer HDD from the transition vault onshore, boring deep under the dunes and beach, and terminating offshore in deeper water (well past the MHWL). DWSF recognizes the importance of preserving the coastal habitats along the south shore of Long Island. This method avoids impacts to intertidal, beach, and coastal habitats and maintains safety for beachgoers.

South Fork Export Cable - Onshore Installation Methods

DWSF considered various options for installation of the SFEC - Onshore, including use of aboveground structures and burying the cable. Although aboveground installation would minimize construction time and cost, a buried cable increases safety and reliability, particularly during adverse weather conditions, and reduces noise, interference with communications, and visual impact. Therefore, DWSF plans to bury the cable within existing ROWs.

2.4 Summary of Future Activities

This section presents Deepwater Wind's approach to the reasonably foreseeable future development of offshore wind projects within the RI-MA WEA. Future activities are defined for the purposes of this section as those activities that are additional, adjacent, and/or concurrent offshore wind projects undertaken by Deepwater Wind that could intersect in time and space with the SFWF and SFEC. This includes projects that could be located within either of two lease areas (North Lease OCS-A 0486 and South Lease OCS-A 0487) awarded to Deepwater Wind New England, LLC.

Future projects will be developed based on current and upcoming renewable and/or offshore renewable energy procurements in the region. Each project will be developed to serve independent markets, will be electrically independent of other projects, and will be developed and operated by a financially independent entity. Each wind farm will have its own generator feed that connects directly to the onshore grid, or will connect to an offshore transmission system owned and developed by a third party (e.g., as was proposed by the Atlantic Wind Connection).

Commercial development of the RI-MA WEA is anticipated to take place over many years. Due to the anticipated sequential construction schedule of each offshore wind project, construction schedule overlap is unlikely or minimal and it is not expected to impact the entire area at the same time. Future projects considered within the RI-MA WEA are presented in Table 2.4-1.

Table 2.4-1. Potential Reasonably Foreseeable Future Activities Intersecting with South Fork Wind Farm and South Fork Export Cable
Details on activities by Deepwater Wind New England, LLC. SFWF is the current project as described in this COP

Project Details	South Fork Wind Farm (NY)	Revolution Wind Farm (RI & CT)
Project Capacity (MW)	90-120	~600
WTG Size	6-12 MW	8-12 MW
Number of WTGs	Up to 15	Up to ~75
Foundation Type	Monopile, jacket, or GBS	Monopile, jacket, or GBS
Inter-Array Cables	34.5 kV or 66 kV	34.5 kV or 66 kV
Export Cable	138 kV or 230 kV	230 kV
Construction Schedule	2021-2022	~ 2022-2023
Commissioning	2022	~ 2023

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Section 3—Project Description

This section provides a description of the Project components for the SFWF and SFEC. Activities associated with construction and installation, commissioning, O&M, and conceptual decommissioning are also discussed in this section.

- **SFWF:** includes up to 15 WTGs with a nameplate capacity of 6 to 12 MW per turbine, submarine cables between the WTGs (inter-array cables), and an OSS, all of which will be located within federal waters on the OCS, specifically in BOEM Renewable Energy Lease Area OCS-A 0486, approximately 19 miles (30.6 km, 16.6 nm) southeast of Block Island, Rhode Island, and 35 mi (56.3 km, 30.4 nm) east of Montauk Point, New York.
- **SFEC:** an AC electric cable that will connect the SFWF to the existing mainland electric grid. The SFEC includes the following:
  - **SFEC - OCS:** the submarine segment of the export cable within federal waters on the OCS from the OSS to the boundary of New York State territorial waters.
  - **SFEC - NYS:** the submarine segment of the export cable from the boundary of New York State waters to a sea-to-shore transition vault located in the Town of East Hampton on Long Island, Suffolk County, New York.
  - **SFEC - Onshore**: the terrestrial underground segment of the export cable from the sea-to-shore transition vault to the interconnection facility where the SFEC will interconnect with the LIPA electric transmission and distribution system in the town of East Hampton on Long Island, Suffolk County, New York.
- **SFWF O&M facility:** DWSF expects that the SFWF O&M facility will be located on an existing waterfront parcel at either Montauk in the Town of East Hampton, New York, or in Quonset Point in the Town of North Kingstown, Rhode Island.

Port facilities in New York, Rhode Island, Massachusetts, and Connecticut will support offshore installation activities for the SFWF and SFEC - Offshore, and construction activity for the SFEC - Onshore will occur in East Hampton, New York.

Figure 1.1-1 (Section 1) depicts the operational concept of the Project and Figures 1.1-2 and 1.1-3 (Section 1) provide overview maps of the location of the various Project components.

Appendix F includes supplemental information with additional details on Project location, and regarding activities that occur during construction, operations, and decommissioning. Appendix F includes location plats for all spacing options, including tables that list surface locations and water depths for Project components. Appendix F also presents a tabular summary of the information identified in Attachment B of BOEM's *Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (COP)* (BOEM, 2016). In addition, Appendix F includes information, pursuant to 30 CFR 585.626(b)(9) and (10), including a sample inventory of materials consistent with the expected methods for installation and an inventory of anticipated chemical use and management. Finally, Appendix F includes information on locations where the SFEC will cross existing telecommunications cables, including copies of DWSF correspondence with owners of those cables.

Appendix G includes conceptual plans and drawings for both the SFWF and SFEC. Throughout Section 3, conceptual drawings such as cross-sections and installation sequences are referenced to provide additional information about specific components. Appendix G also includes figures showing the corridor for the SFEC - Offshore, in both plan and profile format, as well as the corridor for the SFEC - Onshore.

The SFWF and SFEC are being developed based on an envelope approach, consistent with BOEM's Draft *Guidance Regarding the Use of a Project Design Envelope in a COP* (January 2018). This approach results in a range of characteristics and locations for components that will be considered in the environmental review for the Project. As such, the components and locations for the SFWF and SFEC have been selected based on environmental and engineering site characterization studies completed to date and will be refined and then finalized in the FDR and Fabrication and Installation Report (FIR), which also will be reviewed by BOEM pursuant to 30 CFR § 585.700-702, before installation begins. In addition, a CVA, approved by BOEM, will conduct an independent assessment of the engineering design described in the FDR. The CVA will also verify, based on monitoring and inspections conducted during construction, that the Project components are fabricated and installed in accordance with both the COP and FIR.

The Project Envelope for the SFWF and SFEC includes several general characteristics that vary by component (Table 3.0-1). These characteristics are further described in Sections 3.1 and 3.2.

Table 3.0-1. Project Components and Envelope
Project characteristics by component, and range of options within project envelope of that characteristic (if applicable).

<table>
<tr><th colspan="2">Project Component</th><th>Project Envelope Characteristic</th></tr>
<tr><td rowspan="5">SFWF</td><td>Foundations</td><td>Jacket, Monopile, or GBS</td></tr>
<tr><td>WTGs</td><td>• Up to 15 WTGs
• 6 to 12 MW each
• Spaced approximately 0.8–1.00 miles (1.3–1.6 km) apart</td></tr>
<tr><td>Inter-Array Cable</td><td>34.5 kV or 66 kV</td></tr>
<tr><td>OSS</td><td>Mounted on a dedicated foundation or co-located with a WTG</td></tr>
<tr><td>O&M Facility</td><td>Located in Montauk, New York, or Quonset Point, Rhode Island</td></tr>
<tr><td rowspan="3">SFEC</td><td>Export Cable (Offshore and Onshore)</td><td>• 138 kV or 230 kV
• Offshore located within a surveyed corridor 590-feet (180-m) wide, target burial depth 4–6 feet (1.2–1.8 m)
• Onshore duct bank located within existing paved road and railroad ROWs, target burial 8 feet (2.4 m)</td></tr>
<tr><td>Sea-to-Shore Transition</td><td>• Landing site located at either Beach Lane or Hither Hills in East Hampton, New York
• Installed using HDD between onshore underground cable transition vault and the offshore HDD exit location
• Offshore sheet pile cofferdam, gravity cell cofferdam, or no cofferdam at the HDD exit location</td></tr>
<tr><td>Interconnection Facility</td><td>Newly constructed, air-insulated facility located adjacent to existing East Hampton substation</td></tr>
</table>

Table 3.0-1. Project Components and Envelope
Project characteristics by component, and range of options within project envelope of that characteristic (if applicable).

Project Component		Project Envelope Characteristic
SFWF and SFEC	Port Facilities	Located in New York, Rhode Island, Massachusetts, and/or Connecticut

Installation of the SFWF and SFEC is scheduled to take place over a 2-year period; however, installation could also be completed within a 1-year period. Construction will be completed in the following general sequence:

- Transportation of the foundations to the SFWF
- Installation of the foundations
- Installation of the OSS
- Installation of the cable systems
- Installation of the WTGs and OSS

3.1 South Fork Wind Farm

3.1.1 Project Location

The SFWF will be located in federal waters. The WTG closest to land will be approximately 19 miles (30.6 km, 16.5 nm) southeast of Block Island, Rhode Island, and approximately 35 miles (56.3 km, 30.4 nm) east of Montauk Point, New York (Figure 1.1-2). Water depths, in the area where WTGs are proposed to be installed, range from approximately 108 to 125 feet (33 to 38 m).

The SFWF will also include an O&M facility in either New York or Rhode Island, as well as offshore construction staging areas located at port facilities in New York, Rhode Island, Massachusetts, or Connecticut.

Site-specific investigations were conducted in 2017 at the SFWF (described further in Section 4 and Appendix H). Data coverage for these surveys are depicted with gray shading in Figures 3.1-1 and 3.1-2; white shading indicates areas with no data coverage.

These surveys informed the positioning of the WTGs and inter-array cable (Figures 3.1-1 and 3.1-2). DWSF has evaluated various preliminary layout scenarios with WTG spacing considerations ranging from approximately 0.8 mile (1.3 km, 0.70 nm) to 1.0 mile (1.6 km, 0.86 nm). Figures 3.1-1 and 3.1-2 depict these preliminary layouts in an approximate north-south/east-west grid pattern.

The MWA shown in Figures 3.1-1 and 3.1-2 is the designated area where installation and supporting activities having seabed disturbance (e.g., anchoring) will occur. The MWA has an approximate buffer of at least 3,280 feet (1,000 m) around the outer edge of the WTG layout for increased work space. While the MWA includes limited areas outside the boundary of the Lease Area, all WTGs and foundations will be installed inside the Lease Area. Additional surveys will be conducted in summer and fall 2018 in the expanded portion of the MWA depicted in Figure 3.1-2 where there is limited data coverage from the 2017 surveys.

Positioning of WTGs and foundations, as well as the inter-array cable is constrained due to the heterogeneous composition of the seabed. The SFWF Project Area contains obstructions that must be avoided (e.g., boulders, hard bottom, potential cultural and archeological resources), as presented in Figures 3.1-1 and 3.1-2. Boulder density on the seabed is shown in Figures 3.1-1 and 3.1-2.

Layout of the SFWF may be refined based on further consultation with agencies and stakeholders, ongoing offshore geophysical and geotechnical surveys, and detailed engineering and design.

Required engineering criteria considered for the final SFWF layout include:

- WTG size and number
- Seabed soil and sub-bottom characteristics must align with foundation design requirements
- Seabed surface characteristics must align with constructability requirements, including:
  - Areas clear of boulders where foundations can be installed and installation vessels can anchor or jack-up
  - Areas accessible to cable lay operations, where inter-array cables can be installed to and from the foundation

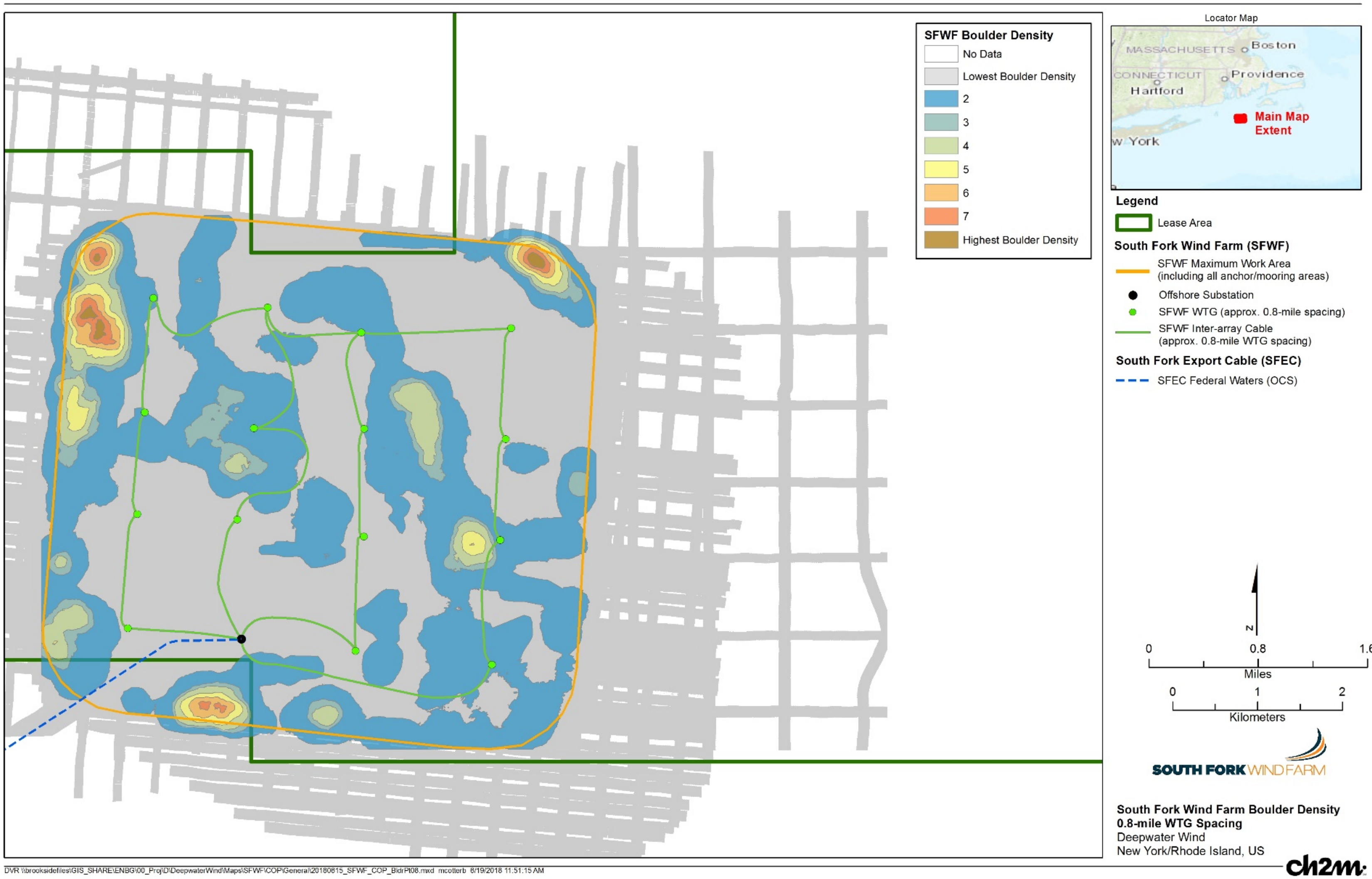


Figure 3.1-1. South Fork Wind Farm 0.8-mile Wind Turbine Generator Layout and Boulder Density

Illustration of area where components will be located, where work will occur, and where boulder obstruction on the seabed exists.

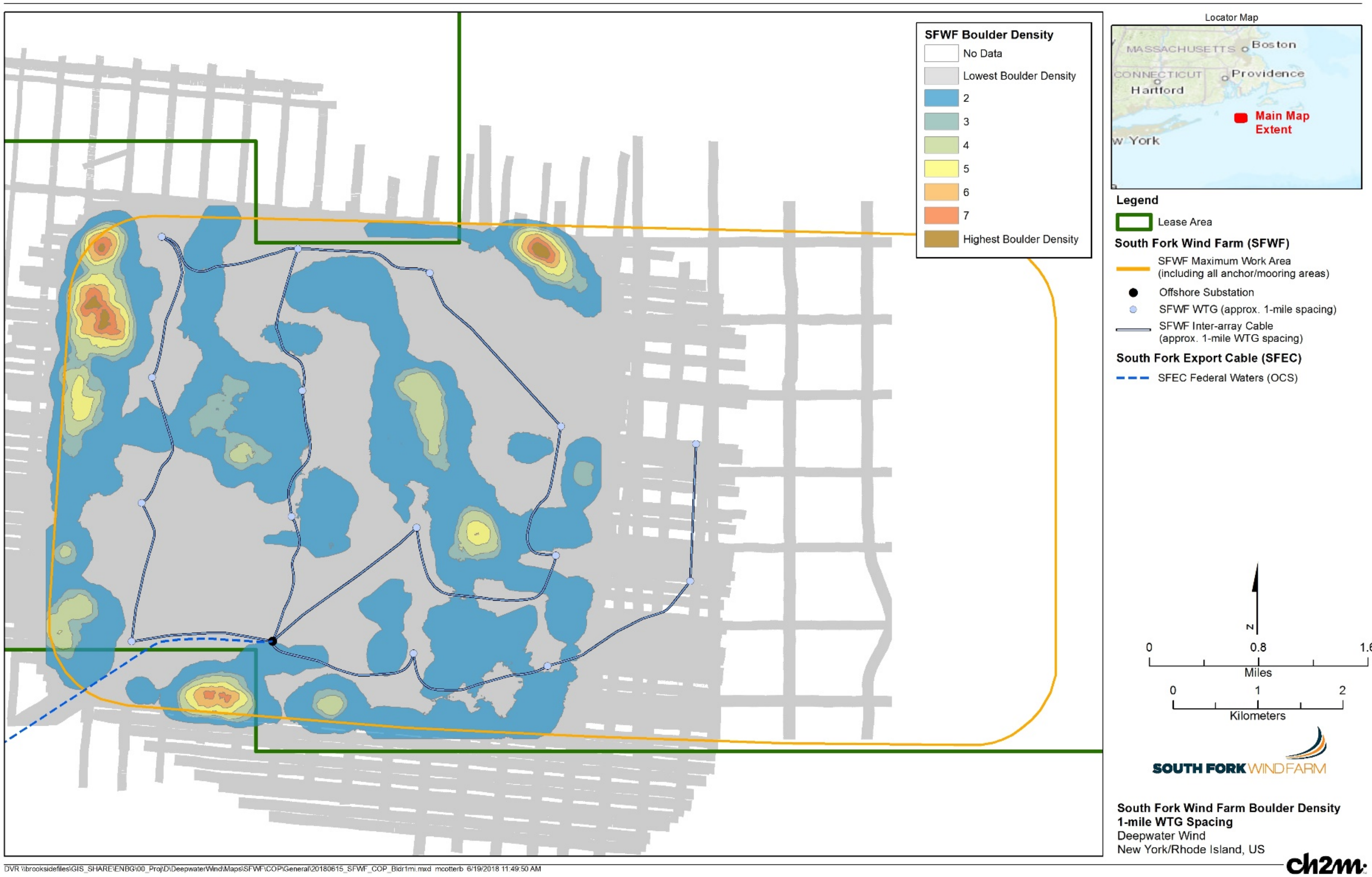


Figure 3.1-2. South Fork Wind Farm 1.0-mile Wind Turbine Generator Layout and Boulder Density

Illustration of area where components will be located, where work will occur, and where boulder obstruction on the seabed exists.

3.1.2 South Fork Wind Farm Facilities

The SFWF will consist of foundations, WTGs, inter-array cables, and an OSS, as well as the O&M facility located onshore. The major characteristics that may vary, including Project construction staging areas (i.e., ports), within the SFWF Project Envelope are listed in Table 3.0-1. The temporary and permanent footprints on the seabed for each SFWF component or activity are summarized in Table 3.1-1. Each of the SFWF components are described in the following sections. The tables included further describe parameters that may vary by each component. Where applicable, these estimates are presented with a range of minimum and maximum values.

Table 3.1-1. Footprint of South Fork Wind Farm Project Component or Activity
Maximum temporary and permanent seabed footprint for components of South Fork Wind Farm.

Project Component/Activity	Construction (Temporary)	Operation (Permanent)
Foundations [a, b]	Jacket: 2.3 acres (0.9 ha) Monopile: N/A GBS: N/A	Jacket: 4.3 acres (1.7 ha) Monopile: 14.6 acres (5.9 ha) GBS: 18.0 acres (7.3 ha)
Foundation cable protection	N/A	5.2 acres (2.1 ha)
Inter-array cable [c]	35.0 acres (14.1 ha)	10.09 acres (4.4 ha)
Inter-array cable protection [d]	N/A	12.5 acres (5.1 ha)
Vessel anchoring/mooring [e]	821 acres (332 ha)	N/A

Notes:

[a] Conservatively assumes up to 16 foundations will be installed, including 15 foundations for WTGs and 1 foundation for the OSS.

[b] In accordance with 33 CFR § 323.3(c)(2), the pilings associated with the jacket foundation are not considered fill; however, in accordance with 33 CFR § 322.3(b), all pilings placed on the OCS require authorization under Section 10 of the River and Harbors Act. Temporary footprint conservatively assumes the pile driving template used for pre-piled jacket foundations has dimensions of 150 feet by 150 feet (45.7 m by 45.7 m) and will be used for 16 foundations (see Section 3.1.3.2). Permanent footprint includes scour protection for 16 foundations. There is no pile driving template used for monopile or GBS.

[c] Conservatively assumes the inter-array cable has a maximum length of 30 miles (48.3 km, 26.1 nm), a total permanent width of 3 feet (0.9 m), with an additional temporary width of 10.4 feet (3.2 m) for temporary seabed disturbance during installation.

[d] Additional cable protection consisting of concrete matting, concrete bags, or rock for 300 feet (91.4 m) adjacent to each foundation for inter-array cable approach and for up to 10 percent of inter-array cable route.

[e] Conservatively assumes that, during typical installation, three vessels will use anchors and that three vessels will use spud cans, and all six vessels will visit each of the 16 foundations. The vessels with anchors will have a total maximum ground disturbance of 4.51 acres (1.8 ha) per foundation and this ground-disturbing activity will happen 11 times at 16 foundations. The vessels with spud cans will have a total maximum ground disturbance of 0.15 acre (0.06 ha) per foundation and this ground-disturbing activity will happen 11 times at 16 foundations. Table 3.1-7 includes additional details about the maximum ground disturbance for each of these vessels.

ha = hectare(s)

3.1.2.1 Foundations

Each WTG will be supported by a foundation installed into the seabed. Three foundation types are under consideration for the SFWF. Figure 3.1-3 provides actual examples of each foundation type and Figure 3.1-4 includes conceptual diagrams for each foundation type:

- Jacket: one steel lattice structure per WTG secured to the sea floor by four steel piles
- Monopile: one steel monopile per WTG embedded into the sea floor

- GBS: one pre-cast concrete, ballasted base per WTG shallowly penetrating the sea floor

DWSF will select the foundation type that is best suited for the SFWF area based on the site-specific physical data collected during site characterization surveys as well as detailed engineering and design.

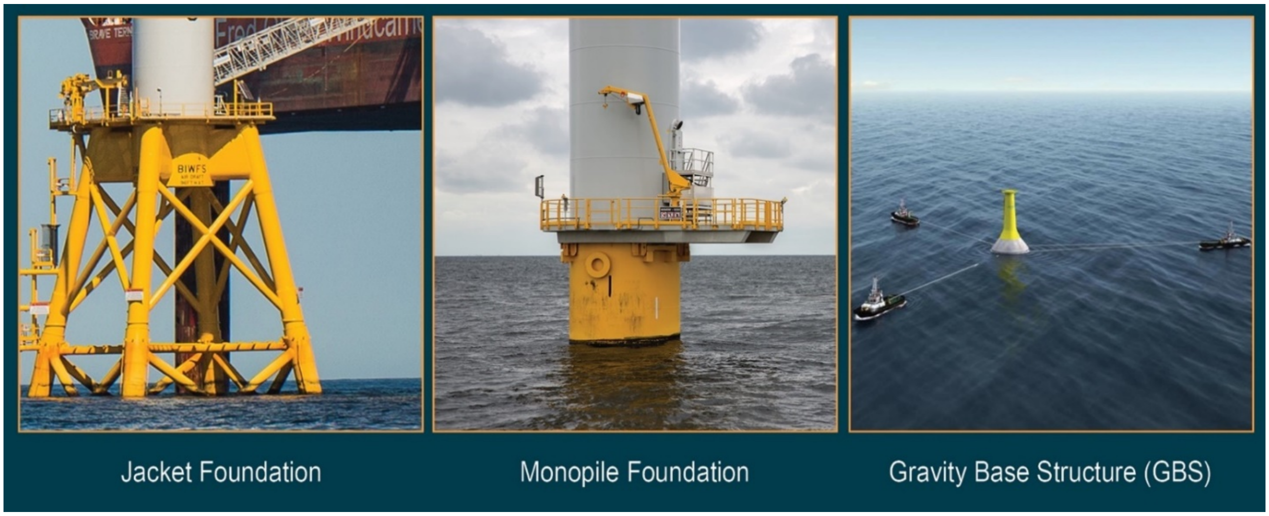


Figure 3.1-3. South Fork Wind Farm Foundation Types
Photographs and three-dimensional rendering showing examples of foundation types included in the Project Envelope.

The SFWF Project Envelope includes foundation designs that encompass a conservative range of design parameters (Table 3.1-2) and includes potential scour protection for all foundation types (see Section 3.1.3.2 for more details on scour protection, which can vary by foundation type). Typical figures of these foundation types are included in Appendix G, and will be confirmed in the FDR.

Table 3.1-2. South Fork Wind Farm Parameters: Foundations
Summary of parameters for each foundation type.

Foundation Parameter	Footprint by Foundation Type		
	Jacket	Monopile	GBS
Foundation base diameter (feet per foundation)[a]	36 feet (11.0 m)	36 feet (11.0 m)	150 feet (45.7 m)
Maximum total area of seabed disturbance—no scour protection (ft^2 [m^2] per foundation)[b]	2,180 ft^2 (203 m^2)	1,025 ft^2 (95 m^2)	17,675 ft^2 (1,642 m^2)
Maximum permanent footprint—with scour protection (ft^2 [m^2] per foundation) [c]	11,835 ft^2 (1,100 m^2)	39,765 ft^2 (3,694 m^2)	49,087 ft^2 (4,560 m^2)

Notes:

[a] Jacket foundation has four piles, each with a base with a diameter up to 9 feet (2.7 m).

[b] Conservatively assumes seabed disturbance for jacket includes the four piles as well as the footprint of the braces in the case of the skirt pile design.

[c] Conservatively assumes scour protection is placed around the base of each foundation in a circle with the following diameters: jacket includes 56 feet (17 m) for each base; monopile includes 225 feet (68 m); and GBS includes 250 feet (76 m).

ft^2 = square feet

m^2 = square meters

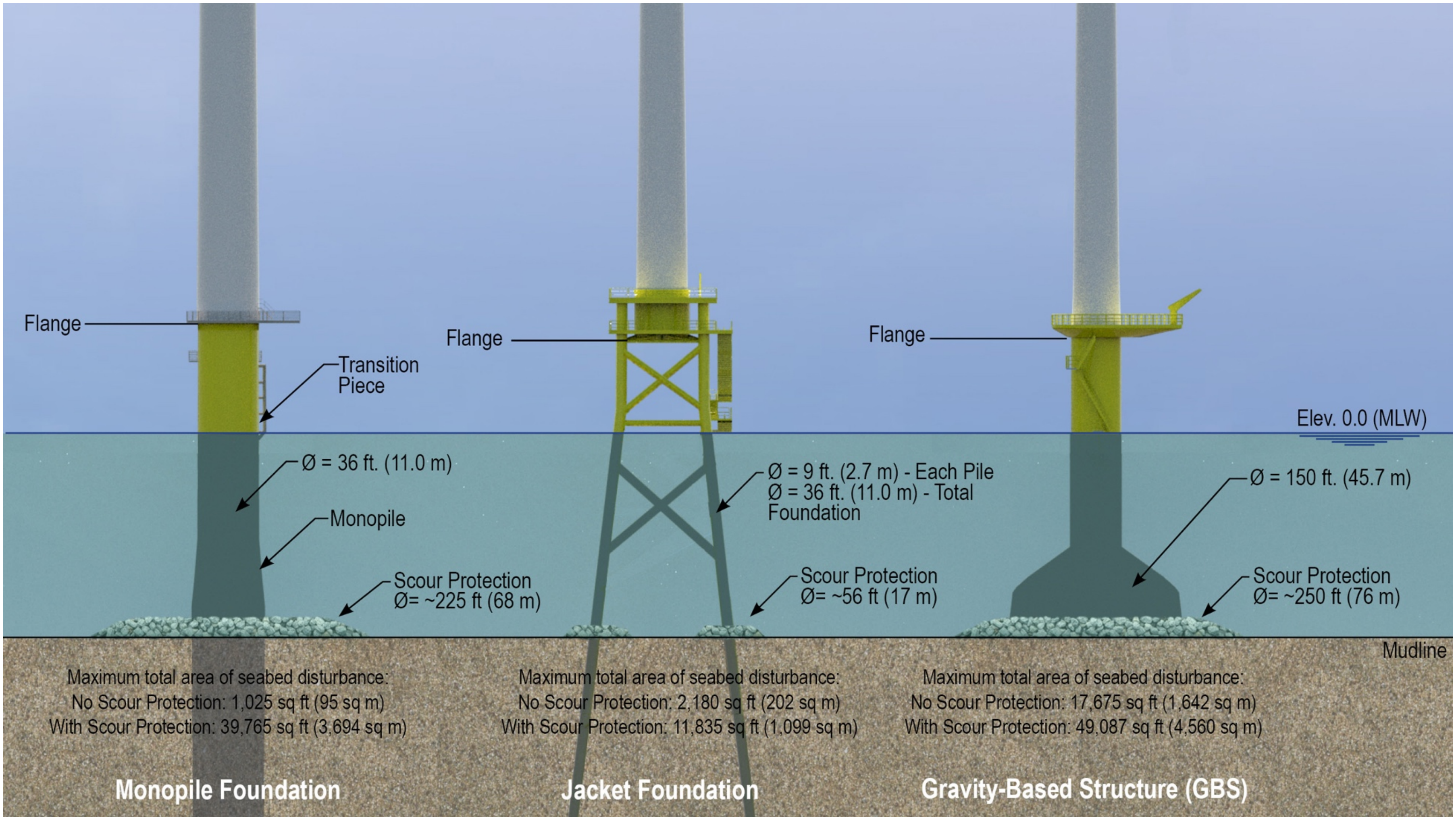


Figure 3.1-4. South Fork Wind Farm Foundation Types

Conceptual illustration of foundation types included in the Project Envelope, diameter (∅) of foundation base and scour protection rings shown.

3.1.2.2 Wind Turbine Generators

The SFWF will consist of up to 15 WTGs. DWSF will select the WTG model that is best suited for the Project and that is commercially available to support the Project schedule. The selected WTG model and nameplate capacity will ultimately determine the number of WTGs to be installed for the SFWF. Figure 3.1-5 depicts the project envelope area where the WTGs will be installed. The SFWF Project Envelope includes a conservative range of minimum and maximum parameters for the anticipated class of WTGs that could be used for the Project, which is expected to range from 6 to 12 MW (Figure 3.1-5, Table 3.1-3).

Table 3.1-3. South Fork Wind Farm Parameters: Turbines
Summary of parameters for the anticipated class of turbines.

WTG Parameter	Minimum Turbine Size (6 MW)	Maximum Turbine Size (12 MW)
Hub height (mean sea level [MSL])	331 feet (100.9 m)	472 feet (143.9 m)
Rotor diameter	492 feet (150 m)	735 feet (224 m)
Total height (top of the blade above MSL)	577 feet (175.9 m)	840 feet (256 m)
Rotor swept zone area	190,117 ft^2 (17,662 m^2)	424,173 ft^2 (39,406 m^2)
Air gap (bottom of the blade above MSL)	85 feet (25.9 m)	105 feet (32 m)
Blade length (feet)	246 feet (75 m)	358 feet (109.1 m)
Deck height above MSL	66 feet (20.1 m)	75 feet (22.9 m)

Each WTG will be comprised of the following major components: a tower, nacelle and rotor which includes the blades. Control, lighting, marking, and safety systems will be installed on each WTG; the specific systems will vary depending on the turbine selected, and will be reviewed by the CVA in the FDR. There will be small amounts of lubrication, grease, oil and cooling fluids within the WTG to support the operation of the WTG bearing, pitch, and hydraulic systems as well as the WTG transformer. In addition, there will be lubrication oil if the selected WTG has a gearbox. Heating, ventilation, and air conditioning, used for climate control, will be included within the WTG; the specific systems will vary depending on the WTG selected, and will be reviewed by the CVA in the FDR. There also may be a small, temporary diesel generator at each WTG location on the work deck of the foundation. If present, the generator would have a maximum power of 200 horsepower (hp) and up to a 50-gallon diesel tank with secondary containment.

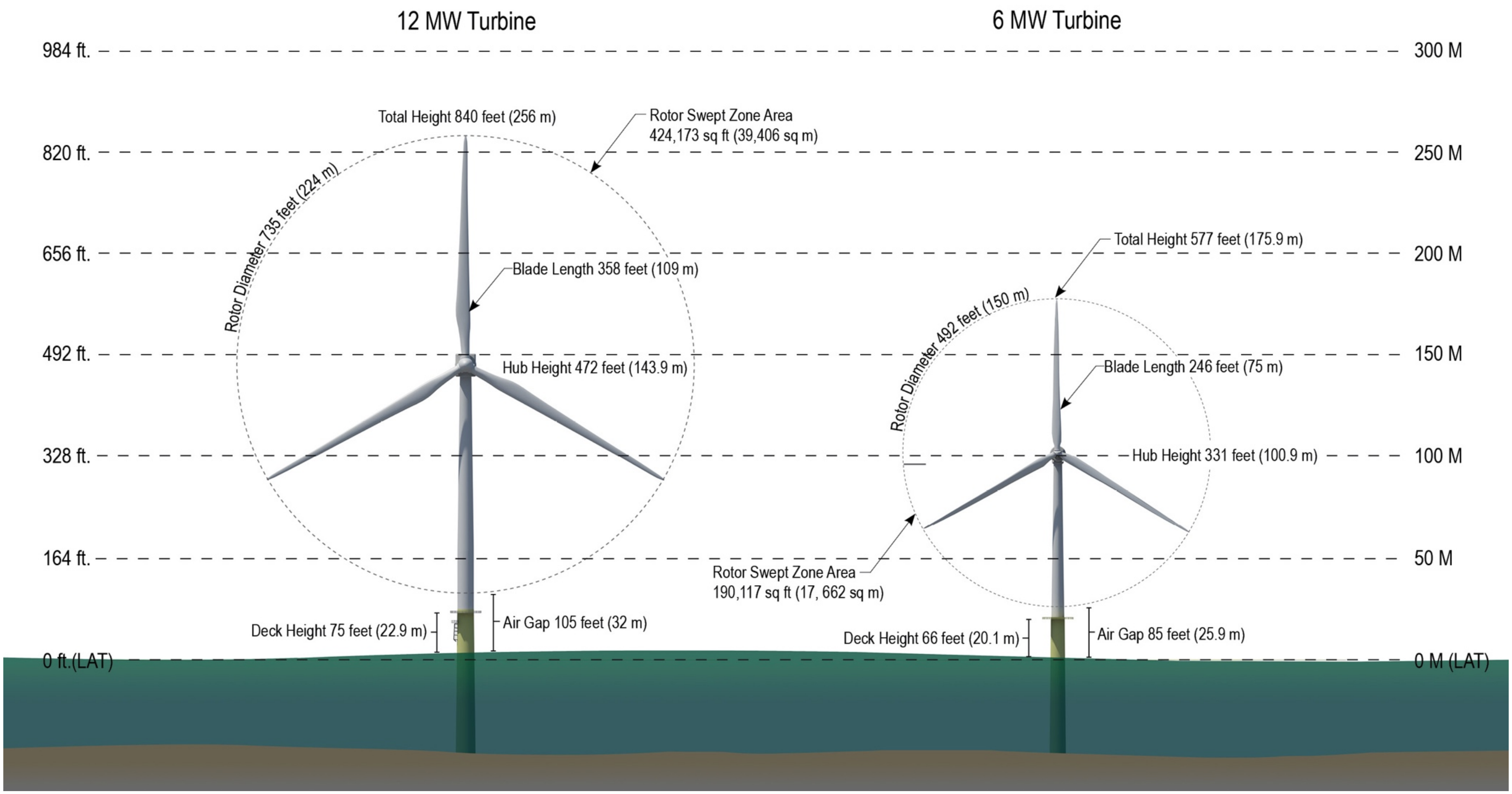


Figure 3-1.5. South Fork Wind Farm Wind Turbine Generator Illustration
Illustration of minimum and maximum range for wind turbine generator dimensions. Dimensions are the same for all foundation types. Illustration depicts wind turbine generators installed on monopile foundation.

3.1.2.3 Inter-Array Cable

Inter-array cables will connect the individual WTGs and transfer power between the WTGs and the OSS. Figure 3.1-1 and Figure 3.1-2 depicts the approximate routes where the inter-array cable will be installed between the WTG foundations for each layout option. The SFWF Project Envelope includes a cable design that encompasses a conservative range of parameters (Table 3.1-4). The inter-array cable will either be a 34.5 kV or 66 kV 3-phase alternating current cable. Depending on the WTG selected, a 33-kV cable may be identified during the FDR. However, the physical characteristics of this 33-kV cable fall within the same range as the 34.5-kV cable described in Table 3.1-4. The final voltage of the inter-array cable will be determined based upon the finalized engineering design specifications for the SFWF, and will be reported in the FDR, which will be reviewed by the CVA.

The inter-array cable contains three conductors, screens, insulators, fillers, sheathing, and armor, as well as fiber optic cables; it does not contain lubricants, liquids, oils, or other insulating fluids.

Table 3.1-4. South Fork Wind Farm Parameters: Inter-array Cable
Summary of parameters for the inter-array cable.

Inter-array cable Parameter	Design Specifications
Cable diameter	6–12 inches (15.2–30.5 centimeters [cm])
Anticipated burial depth[a]	4–6 feet (1.2–1.8 m)
Maximum trench depth	10 feet (3 m)
Maximum permanent footprint for inter-array cable[b]	10.9 acres (4.4 ha)
Cable length	21–30 miles (33.8–48.3 km, 18.2–26.1 nm)
Trench width	3 feet (0.9 m)
Maximum permanent footprint for cable protection[c]	12.5 acres (5.1 ha)
Cable protection at approach to each foundation[d]	12,000–36,000 ft^2 (1,114.8–3,344.5 m^2)
Additional cable protection [e]	316,800 ft^2 (29,431.7 m^2)
Maximum temporary seabed disturbance for inter-array cable installation[f]	35.0 acres (14.1 ha)

Notes:

[a] Burial depth is measured from the seabed to the top of the cable.

[b] Conservatively assumes a length of 30 miles (48.3 km, 26.1 nm) and a width of 3 feet (0.9 m).

[c] Conservatively assumes cable protection will be needed for both the approach for each foundation, and for up to 10 percent of the inter-array cable, where the burial depth may be less than 4 feet (1.2 m). Under these assumptions, total cable protection for the approach to each foundation will be 5.2 acres (2.1 ha), based on a total length of 2.2 miles (3.5 km, 1.9 nm) and a width of 20 feet (6.1 m). In addition, the estimated maximum footprint of cable protection for the inter-array cable will be 7.3 acres (2.9 ha), based on a total length of 3 miles (4.8 km, 2.6 nm) and a width of 20 feet (6.1 m).

[d] The amount of cable protection necessary for the cable approach to a foundation will be the same for each foundation type. Each cable approach to a foundation will require approximately 300 feet (91.4 m) of cable protection, including concrete matting (8 feet long by 20 feet wide [2.4 m long by 6.1 m wide]). The number of cable approaches per foundation will vary by foundation; 13 WTG may have two cable approaches (12,000 ft^2 [1,114.8 m^2]) of cable protection), two WTG may have three cable approaches (18,000 ft^2 [1,672.3 m^2]), and the OSS may have up to six cable approaches (36,000 ft^2 [3,344.5 m^2]).

[e] Conservatively assumes additional cable protection, consisting of rock or concrete matting (8 feet long by 20 feet wide [2.4 m long by 6.1 m wide]), for up to 10 percent of the inter-array cable, where burial depth may be less than 4 feet.

[f] Conservatively assumes that cable installed by equipment with two tracks, each of which has a maximum width of 5.2 feet (1.6 m) placed on each side of the trench, and that this equipment will be used for 23.8 miles (38.3 km, 20.7 nm), which does not include 2.2 miles (3.5 km, 1.9 nm) adjacent to foundations where cable protection will be placed.

The inter-array cable will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m) in the seabed. Where the inter-array cable emerges from the trench and is attached to the foundation, cable protection (e.g., engineered concrete mattresses, concrete bags) will be placed on the seabed near the WTG foundation.

In addition, it is anticipated that a maximum of 10 percent of the inter-array cable (2.6 miles [4.2 km, 2.3 nm]) may not achieve the target burial depth if hard substrate or other unforeseen obstacles are encountered. Cable protection also will be placed in those areas.

Appendix G includes a typical cross-section of the inter-array cable, a conceptual drawing of the typical burial depth for the cable, a conceptual drawing of concrete mattresses to be used near the foundation, and where burial depth cannot be achieved.

3.1.2.4 Offshore Substation

The OSS will collect electric energy generated by the WTGs through the inter-array cables for transmission through the SFEC to the SFEC - Interconnection Facility. While the equipment on the OSS will serve several purposes, its primary purpose is to transform and step up voltage from the inter-array cable to the SFEC. A rendering of the conceptual design for the OSS is provided in Figure 3.1-6.

The OSS will also house the Supervisory Control and Data Acquisition (SCADA) system that serves as the means for wind farm monitoring and control between the WTGs, substation, and onshore remote operation center(s). Power metering and protection relays will be in the OSS, which will be coordinated with similar relays located in the SFEC - Interconnection Facility so that the inter-array cable and the SFEC operate within design boundaries and can be disconnected from all power sources, if necessary.

The OSS will consist of high voltage power transformer, reactor, and switchgears together with secondary medium voltage transformers, switchgears, and utility equipment, including heating, ventilation, and air conditioning systems. The substation may also include a small permanent diesel generator, which will have a maximum power up to 400 hp and up to a 500-gallon diesel tank with secondary containment.

The OSS will be above the water located either on a platform supported by a foundation similar to those used for the WTGs, or co-located on a foundation with a WTG. If the OSS is located on its own foundation, the total height of the substation will be 150 to 200 feet (45.7 to 61 m), measured from MSL to the top of the substation. If the substation is co-located with a WTG on a single foundation, the substation will be placed on the foundation such that the total maximum height of the WTG does not exceed the total height of other WTGs (as depicted in Figure 3.1-5).

Appendix G includes a conceptual design of the OSS, for both standalone and co-located foundation. Although this design depicts an OSS on a jacket foundation, the foundation will be a similar type as selected for the WTG.

Figure 3.1-6. Offshore Substation

Conceptual three-dimensional rendering of the proposed offshore substation, note wind turbine generators in picture are conceptual, not scaled for height or spacing, and are pictured on monopile foundations.

3.1.2.5 South Fork Wind Farm Operations and Maintenance Facility

The only ancillary facility that will be built as an operational component of the SFWF is the onshore SFWF O&M facility. The SFWF O&M facility will be in a port in Montauk in East Hampton, New York or at Quonset Point in North Kingstown, Rhode Island. The SFWF O&M facility will include a building and a berth for the crew transfer vessel (CTV) at a nearby dock so that SFWF O&M staff can prepare and mobilize from this location for offshore maintenance activities. The SFWF O&M facility will also include office space where staff can monitor the wind farm. It also will have storage space for spare parts and other equipment to support maintenance activities.

3.1.3 Construction

This section describes the construction process of the SFWF based on typical methods, vessels, and equipment.

Before construction begins, DWSF will finalize contracts with vendors and fabrication and installation contractors. DWSF will also finalize mobilization plans and arrangements at port facilities to support Project activities, including logistic support for fabrication, as needed.

It is assumed that certain Project components will be pre-fabricated prior to arrival at regional ports (e.g., blades and nacelles). Some fabrication and pre-assembly activities, particularly for the foundations, may occur at regional ports. Foundations and WTGs components may be staged and loaded at regional ports and transported to the SFWF. Onshore fabrication and manufacturing of the offshore components will take place in the years before and during offshore construction.

The general process for installation of the SFWF involves the installation of the foundations to the sea floor and preparation of the structures for the WTGs. Work vessels then supply and assemble all the WTG components and install them on the foundations. Depending on the foundation selected, pile driving may be used to install the foundations. All installation activities will occur within the MWA (Figures 3.1-1 and 3.1-2).

Although each foundation type requires a unique installation approach, offshore construction for the SFWF is anticipated to be completed in the following general sequence, which is further described in subsequent sections:

- Mobilization of vessels
- Transportation of the foundations to the WTG installation site
- Installation of the foundations
- Installation of the OSS
- Installation of the inter-array cable
- Installation of the WTGs

The WTG commissioning phase begins when the first WTG is installed offshore.

3.1.3.1 Ports, Vessels and Vehicles, and Material Transportation

Port Facilities

Several port facilities located in New York, Rhode Island, Massachusetts, and Connecticut will be considered for offshore construction, staging and fabrication, as well as for crew transfer and logistics support. During the FDR phase, DWSF will finalize which specific ports will be utilized to support construction. In general, DWSF expects that a number of upgrades at several ports throughout the northeast will occur in the future to support the offshore wind industry. Figure 3.1-7 and Table 3.1-5 provide additional information about the potential Project activities that may occur at selected ports.

Ports that may support fabrication, assembly, staging, deployment, and decommissioning may need specific upgrades which DWSF anticipates will likely be completed by SFWF vendors or implemented by the individual port. These upgrades may include erection of buildings (up to 350,000 ft^2 [32,516 m^2]), reinforcement of terrestrial bearing capacity (up to 1,300,000 ft^2 [120,774 m^2]) and changes to surface materials, reinforcement and/or rehabilitation of quayside(s) (up to 500 feet [152 m]), and installation of supporting infrastructure such as lighting, electricity, water, fencing, and/or security booth. The majority of ports that may support crew transfer, cargo logistics, and storage are not anticipated to require upgrades.

Table 3.1-5. Potential Project Port Facilities

Anticipated ports that may be utilized during construction, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

State	Port	Town	Summary of Potential Project Activities		Potential Port Upgrades/ Modifications
			Fabrication, Assembly, Deployment, Decommissioning	Crew Transfer, Cargo Logistics and Storage	
New York	South Brooklyn Marine Terminal	Brooklyn	❍		May be required
	Howland Hook Marine Terminal	Staten Island	❍		None anticipated
	Coeymans Industrial Park	Albany	❍		None anticipated
	Port of Montauk	Montauk		❍	May be required
	Shinnecock Fish Dock	Hampton Bays		❍	None anticipated
	Greenport Harbor	Greenport		❍	None anticipated
Rhode Island	Port of Providence (ProvPort)	Providence	❍		May be required
	Port of Davisville and Quonset Point, Quonset Development Corporation	North Kingstown	❍	❍	May be required
	Old Harbor and New Harbor	New Shoreham		❍	None anticipated
	Port of Galilee	Point Judith		❍	None anticipated

Table 3.1-5. Potential Project Port Facilities
Anticipated ports that may be utilized during construction, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

State	Port	Town	Summary of Potential Project Activities		Potential Port Upgrades/ Modifications
			Fabrication, Assembly, Deployment, Decommissioning	Crew Transfer, Cargo Logistics and Storage	
Massachusetts	New Bedford Marine Commerce Terminal	New Bedford	❍	❍	None anticipated
Connecticut [a]	Port of New London	New London	❍	❍	May be required

Note:
[a] DWSF is considering the Port of New London as a potential backup location to support SFWF and SFEC activities.

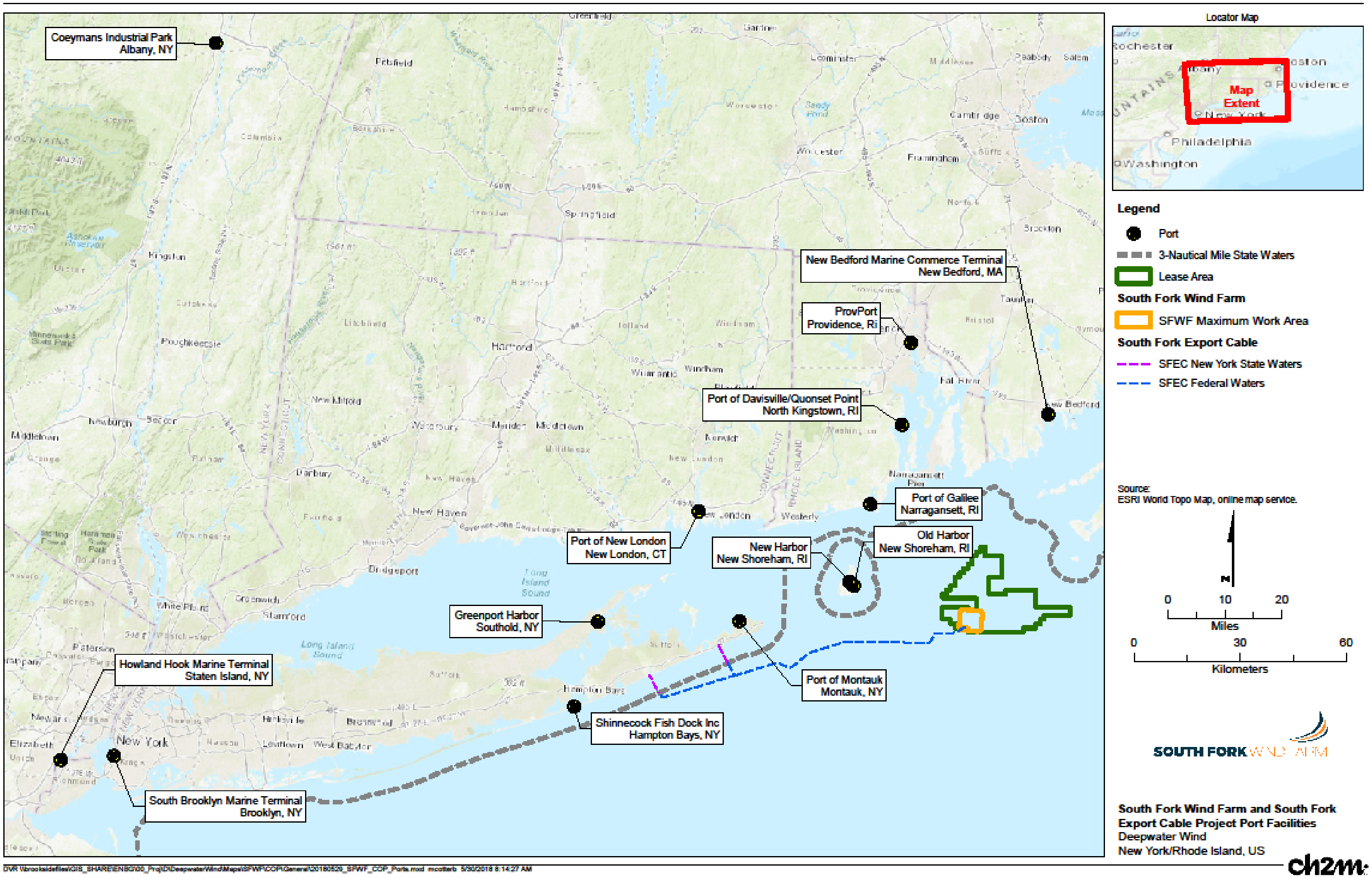


Figure 3.1-7. Locations of Project Port Facilities

Anticipated ports that may be utilized during construction, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

Vessels and Vehicles

All vessels associated with the Project (foreign and domestic) will comply with United States Coast Guard requirements. Some of these vessels may originate from the Gulf of Mexico, Atlantic Coast, Europe, or other worldwide ports, depending on charter agreements and vessel availability. The vessel types that are anticipated to support installation of the SFWF, as well as types of onshore vehicles that will be used at ports, are described in Table 3.1-6.

The large vessels anticipated to support most offshore installation activities will have accommodation units that provide board and lodging for crew, construction managers, inspectors, and other personnel (e.g., CVA). Occasional crew changes will be provided by crew transport vessels or when vessels return to port for provisioning or material transport.

Project vessels could employ a variety of anchoring systems, which include a range of size, weight, mooring systems, and penetration depth. Table 3.1-7 provides additional details about the maximum seabed disturbance for these systems.

Material Transportation

The WTGs and other components will be transported to the onshore staging facilities (as described in Table 3.1-5) prior to installation. During installation, transportation barges and material barges will transport components and equipment to the Lease Area. Vessels not transporting material from local ports may travel with components and equipment directly to the Lease Area from locations such as the Gulf of Mexico, Atlantic Coast, Europe, or other worldwide ports. Before arriving at the SFWF, a local port call for inspections, crew transfers and bunkering can occur.

Table 3.1-6. Project Vessels and Vehicles

Vessels, vehicles, and associated activities planned for use during installation, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Vessel/Vehicle Activity (Average Speed Range of Vessel)	SFWF						SFEC			
		Installation and Decommissioning				Operations		Installation and Decommissioning		Operations	
		Foundations, WTG, Substation			Inter-Array Cable	Foundations, WTG, Substation	Inter-Array Cable	SFEC – Offshore	SFEC – Onshore	SFEC - Offshore	SFEC-Onshore
		Jacket	Monopile	GBS							
OFFSHORE VESSELS											
Heavy Lift Crane Vessel	Vessel for installation of foundations and substation (0 to 5 knots)	❍	❍			□					
Derrick Barge Crane Vessel	Vessel for installation of foundations and substation (0 to 5 knots)	❍	❍			□					
Jack-up Installation Vessel	Vessel for installation of foundations, WTG, and substation (0 to 10 knots)	❍	❍			□					
Jack-up Material Feeder Barge[a]	Vessel to transport materials to installation vessels (0 to 4 knots)	❍	❍	❍	❍	□	□	❍		□	
Floating Material Barge	Barge transport materials to installation vessels (0 to 4 knots)	❍	❍	❍	❍	□	□	❍		□	
Jack-up Crane Work Vessel	Vessel to complete misc. work (e.g., cable mattressing) (0 to 4 knots)	❍	❍	❍	❍	□		❍		□	
Floating Crane Work Vessel	Flat-topped materials transportation barge (0 to 4 knots)	❍	❍	❍	❍	□		❍		□	

Table 3.1-6. Project Vessels and Vehicles

Vessels, vehicles, and associated activities planned for use during installation, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Vessel/Vehicle Activity (Average Speed Range of Vessel)	SFWF						SFEC			
		Installation and Decommissioning				Operations		Installation and Decommissioning		Operations	
		Foundations, WTG, Substation			Inter-Array Cable	Foundations, WTG, Substation	Inter-Array Cable	SFEC – Offshore	SFEC – Onshore	SFEC - Offshore	SFEC-Onshore
		Jacket	Monopile	GBS							
Towing Tug	Towing tug for transportation barge (0 to 11 knots)	○	○	○	○	□	□	○	○	□	
Anchor Handling Tug	Towing tug for positioning anchors (0 to 11 knots)	○	○	○	○	□	□	○	○	□	
Dredge Vessel[b]	Vessel used to dredge/transport ballast material for GBS (0 to 12 knots)			○							
Rock Dumping/Fallpipe Vessel (FPV)[c]	Vessel used to place rock on seabed in vicinity of foundations (0 to 6.5 knots)	○	○	○							
Fuel Bunkering Vessel	Bunker vessel for refueling vessels offshore during installation (11 knots)	○	○	○	○	□	□	○	○	□	
Cable Laying Vessel	Vessel used for transporting and installing cable (12.4 knots, 1 to 2 miles per day)				○		□	○		□	
Crew Transport Vessel	For transport of crew and/or supplies to/from worksite (23 knots)	○	○	○	○	■	■	○		■	

Table 3.1-6. Project Vessels and Vehicles
Vessels, vehicles, and associated activities planned for use during installation, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Vessel/Vehicle Activity (Average Speed Range of Vessel)	SFWF						SFEC			
		Installation and Decommissioning				Operations		Installation and Decommissioning		Operations	
		Foundations, WTG, Substation			Inter-Array Cable	Foundations, WTG, Substation	Inter-Array Cable	SFEC – Offshore	SFEC – Onshore	SFEC - Offshore	SFEC-Onshore
		Jacket	Monopile	GBS							
Support Vessel/Inflatable Boat	For transport of environmental observers (23 knots)	❍	❍	❍	❍	■	■	❍		■	
Cable Installation Equipment	Self-propelled equipment for installing cable on seafloor (1-2 miles per day)				❍		□	❍		□	

Table 3.1-6. Project Vessels and Vehicles

Vessels, vehicles, and associated activities planned for use during installation, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Vessel/Vehicle Activity	SFWF						SFEC			
		Installation and Decommissioning				Operations		Installation and Decommissioning		Operations	
		Foundations, WTG, Substation			Inter-Array Cable	Foundations, WTG, Substation	Inter-Array Cable	SFEC - Offshore	SFEC-Onshore	SFEC - Offshore	SFEC-Onshore
		Jacket	Monopile	GBS							
ONSHORE VEHICLES											
Crane	For staging activities at ports and for installation and decommissioning of SFEC - Onshore	○	○	○	○	■		○	○	□	□
Front-end Loader		○	○	○	○	■		○	○	□	□
Heavy-duty Truck		○	○	○	○	□		○	○	□	□
Pickup Truck		○	○	○		■			○		□
Self-propelled modular transportation		○	○	○		□			○		□
Bulldozer		○	○	○					○		□
Excavator		○	○	○					○		□
Trencher		○	○	○					○		□
Dump Truck		○	○	○					○		□
Bucket Truck									○		
Telescoping Forklift									○		

Table 3.1-6. Project Vessels and Vehicles

Vessels, vehicles, and associated activities planned for use during installation, operations, and decommissioning of South Fork Wind Farm and South Fork Export Cable.

		SFWF						SFEC			
		Installation and Decommissioning				Operations		Installation and Decommissioning		Operations	
		Foundations, WTG, Substation			Inter-Array Cable	Foundations, WTG, Substation	Inter-Array Cable	SFEC - Offshore	SFEC-Onshore	SFEC - Offshore	SFEC-Onshore
Vessel/Vehicle	**Vessel/Vehicle Activity**	Jacket	Monopile	GBS							
HDD Boring Machine	For installation of sea-to-shore transition								❍		■
Helicopter	For emergency transport	❍	❍	❍	❍	□	□	❍	❍	□	□

Key

❍	Installation
■	Operations - Planned Maintenance
□	Operations - Unplanned Maintenance

Notes:

[a] A jack-up crane barge would be used for transportation of WTGs, but not for foundations or the OSS.

[b] A dredge vessel would be used for installation of GBS foundations, but not for installation of WTGs or the OSS.

[c] A rock dumping or FPV would be used for installation of GBS foundations, and for placement of scour protection for monopile foundations, but not for installation of WTGs or the OSS.

Table 3.1-7. Seabed Disturbance from Vessels

Maximum seabed disturbance from activities during installation of the South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Maximum Area of Seabed Disturbance (total acres/ ha per foundation)	Maximum Area of Seabed Disturbance (ft^2/ m^2 per activity)	Description of Bottom-Disturbing Activity and Maximum Seabed Disturbance	Maximum Depth of Penetration (feet [m])
Bottom-disturbing activity during Typical Installation of Foundations				
Derrick Barge Crane Vessel (anchor)	9.02 (3.7)	392,698 (36,482)	8-point 12-ton delta flipper anchor spread, used 2 times at each foundation, with disturbance of 196,349 ft^2	15 (4.6)
Jack-up Installation Vessel (spud can)	0.62 (0.25)	27,000 (2,508)	Spud cans, up to 4 per vessel, used 4 times at each foundation, with disturbance of 6,750 ft^2	9 (2.7)
Jack-up Material Feeder Barge (spud can)[a]	0.93 (0.38)	40,500 (3,763)	Spud cans, up to 4 per vessel, used 6 times at each foundation, with disturbance of 6,750 ft^2	9 (2.7)
Floating Material Barge (anchor)	27.05 (11)	1,178,094 (109,449)	8-point 12-ton delta flipper anchor spread, used 6 times at each foundation, with disturbance of 196,349 ft^2	15 (4.6)
Jack-up Crane Work Vessel (spud can)	0.15 (0.06)	6,750 (627)	Spud cans, up to 4 per vessel, used 1 time at each foundation, with disturbance of 6,750 ft^2	9 (2.7)
Floating Crane Work Vessel (anchor)	13.52 (5.47)	589,047 (54,724)	Anchor only used if issue with dynamic positioning (DP) system; 8-point 12-ton delta flipper anchor spread, used 3 times at each foundation, with disturbance of 196,349 ft^2	15 (4.6)
Bottom-disturbing activity only in emergency use or if issue with DP system				
Towing Tug			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with disturbance of 196,349 ft^2	15 (4.6)
Anchor Handling Tug			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with disturbance of 196,349 ft^2	15 (4.6)

Table 3.1-7. Seabed Disturbance from Vessels
Maximum seabed disturbance from activities during installation of the South Fork Wind Farm and South Fork Export Cable.

Vessel/Vehicle	Maximum Area of Seabed Disturbance (total acres/ ha per foundation)	Maximum Area of Seabed Disturbance (ft^2/ m^2 per activity)	Description of Bottom-Disturbing Activity and Maximum Seabed Disturbance	Maximum Depth of Penetration (feet [m])
Dredge Vessel[b]			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with maximum seabed disturbance of 196,349 ft^2	15 (4.6)
Rock Dumping/Fallpipe Vessel[c]			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with disturbance of 196,349 ft^2	15 (4.6)
Fuel Bunkering Vessel			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with disturbance of 196,349 ft^2	15 (4.6)
Cable Laying Vessel			Anchor only used if issue with DP system, would be one 12-ton delta flipper, with disturbance of 196,349 ft^2	15 (4.6)
Heavy Lift Crane Vessel (DP)			2-point anchor for emergency use only if issue with DP system	15 (4.6)
Crew Transport Vessel			1-point anchor for stationing on site, one 5-ton delta flipper	5 (1.5)
Support Vessel/Inflatable Boat			1-point anchor for stationing on site, one 5-ton delta flipper	5 (1.5)

3.1.3.2 Foundation Installation

The general installation sequence for all foundation types includes the following steps:

1. Prepare sea floor, if necessary.
2. Install foundation, based on the selected type.
3. Commission platform which includes installation of marking and lighting for Private Aid to Navigation required by the USCG.
4. Complete quality control checks and inspection in accordance with the FIR.

The installation process for each foundation type is described in further detail below. Table 3.1-8 summarizes various installation parameters for the pile driving associated with each foundation type and Appendix G includes conceptual drawings that depict the installation sequence for each foundation type.

Table 3.1-8. South Fork Wind Farm Parameters: Foundation Installation
Anticipated parameters for installation of foundations.

Foundation Installation Parameter	Design Specification by Foundation Type		
	Jacket	Monopile	GBS
Pile hammer size (kilojoules)	1,400	4,000	N/A
Power pack capacity for pile hammer (kilowatts [kW])	2,000	6,000	
Maximum penetration depth into seabed (feet [m])	197 (60)	164 (50)	10 (3)
Duration of pile driving (hours/foundation)	12	24-48	N/A
Duration of installation (days/foundation)	Post-piled 5 days Pre-piled 3-4 days	4-5 days	4-5 days

Jacket Foundation Installation

Each jacket foundation consists of a steel lattice structure and four piles that are placed vertically into the seabed. Piles will not be raked or driven in at an angle. Tables 3.1-2 and 3.1-8 provide the relevant dimensional parameters of the jacket foundations.

The foundations will be installed from a jack-up lift barge or derrick barge moored to the seabed or kept in position by the vessel's DP system. The hydraulic pile driving hammer and crane used for lifting foundations and piles will be located on the installation barge. Jack-up vessels use metal legs with spud cans attached to the bottom to lift the work vessel out of the water. Once the vessel has completed its task, the vessel lowers back down to the water and lifts the spud cans off the sea floor and moves to the next work location. If a derrick barge is used as the installation vessel, it will be anchored at the location of the foundation. Once the vessel has completed its task, the vessel pulls its anchors and moves to the next work location. Alternatively, the derrick barge could use a DP system to maintain position instead of anchors. Material barges will be used to transport the pile driving template, piles, and jacket structures to the installation site.

Prior to commencing installation activities of the jacket foundation, the seabed will be checked for debris and levelness within a 100-foot (30.5-m) radius of the jacket installation location. As necessary, significant debris, such as large boulders, will be moved outside this area.

Jacket foundations will be installed either by (a) driving the piles in after the steel lattice jacket structure is set on the seabed (post-driven pile installation), or by (b) driving piles in through a template set on the seabed, removing the template, and lowering the jacket structure onto the already installed piles (pre-driven pile installation). Appendix G includes illustrations of a typical construction sequence for a post-driven pile installation and a pre-driven pile installation of the jacket foundation using a moored derrick barge.

> *Post-Driven Pile Installation.* Each jacket will be lifted from the material barge, placed onto the seabed, leveled, and prepared for piling. A skirt pile jacket design will be selected for post-driven pile installation. This includes circular braces called skirt sleeves that are mounted at the corners of the jacket foundation. The piles will then be inserted into each corner of the jacket skirts and driven to their final penetration design depth or until refusal, whichever occurs first, using a hydraulic hammer. Pile driving will start with the hammer hitting the pile above sea level, and as the pile penetrates the seabed, hammering will transition from above-water to underwater.

> *Pre-Driven Pile Installation.* The pile driving template will be lifted from the material barge and lowered onto the seabed, where it is leveled and positioned. The piles are then inserted into each corner of the template and driven to their final penetration design depth or until refusal, whichever occurs first, using a hydraulic hammer. Pile driving will start with the hammer hitting the pile above sea level, and as the pile penetrates the seabed, hammering will transition from above-water to underwater. After driving is completed, the template is lifted off the piles and onto the material barge and it moves to the next jacket location. The tops of the piles are checked for significant amounts of sediment or mud plugs and cleared if necessary. A pin pile jacket design will be selected for pre-driven pile installation. The jacket structure is lowered over the pre-driven piles that have been placed on the seabed, and the jacket tubes fit over the pin piles. The structure is then checked for levelness.

In the event that refusal occurs during pile driving, a drill rig may be kept on standby to drill out the pile to remove any obstruction or buildup of sediment to complete installation. Refusal during pile driving is typically due to extra hard or dense soils encountered. Removed soil from the pile would be sidecast near the location. After the pile is cleared pile driving can be completed.

Grouting will be used to secure the foundation to the piles for both jacket foundation installation options. Cement, or grout, is pumped at the waterline into the annulus, or space in between the pile and the foundation tube. Grout flows down inside filling this space in the submerged part of the foundation and hardens. Grouting will take up to 2 days per foundation.

Assuming a 24-hour work window and no delays due to weather, sea conditions, or other circumstances, each jacket will require approximately 5 days for post-piled installation or 3 to 4 days for pre-piled installation. Duration of pile driving is anticipated to be approximately 3 hours per pile, with a total cumulative time of 12 hours of pile driving per jacket.

Although scour protection is not anticipated for either installation method because of the relatively small diameter of the jacket pile, the SFWF Project Envelope includes the possibility that scour protection may be placed around the base of each jacket foundation. Scour protection will consist of engineered rock that will be placed around the base of each pile using an FPV. This involves delivering the rock down from the vessel through a guided, flexible pipe assembly to the seabed in an area around the base of each jacket. Alternatively, sandbags or groutbags may be placed around each pile using the installation vessel or a small work vessel. The specific parameters for the diameter, volume, and area of the scour protection rings are depicted in Table 3.1-2. A scour analysis will be completed as part of the FDR to refine these assumptions.

Monopile Foundation Installation

If the monopole foundation option is selected (Figure 3.1-5), the monopiles will be installed using similar vessels to those described for jacket foundation installation. Appendix G depicts a typical installation sequence, using a jack-up lift barge, and Tables 3.1-2 and 3.1-8 include relevant dimensional parameters for the monopile foundation.

Prior to commencing installation activities, the seabed will be checked for debris and levelness within a 200-foot (61-m) diameter circle from the location where the monopile will be installed. As necessary, significant debris, such as large boulders, will be moved outside this area. Each monopile will be lifted from the material barge, placed onto the seabed, leveled, and made ready for pile driving. Each monopile will then be driven to its final penetration design depth using a hydraulic hammer. Once the driving is complete, a transition section will be bolted to the top of the monopile to complete the installation.

Assuming a 24-hour work window and no delays due to weather, sea conditions, or other circumstances, each monopile will require approximately 2 to 4 days for installation. Duration of pile driving is anticipated to be approximately 2 to 4 hours per pile.

Monopiles will likely require scour protection because of the wider diameter of a monopile as compared to a jacket foundation. Scour protection will consist of engineered rock that will be placed around the base of each monopile using either a FPV or a stone dumping vessel. Alternatively, the scour protection can be installed before the installation of the monopile. The specific parameters for the diameter, volume, and area of scour protection are depicted in Table 3.1-2. A scour analysis will be completed as part of the FDR to refine these assumptions.

Gravity Base Structure Foundation Installation

The GBS consists of a pre-cast concrete dome and floor with a steel column on top of the dome (Figure 3.1-4). If required, a steel skirt may be connected to the base of the GBS and would penetrate to a shallow depth into the seabed. The total weight during transport and installation will be around 4,000 short tons (8 million pounds). Appendix G depicts a typical construction sequence and Tables 3.1-2 and 3.1-8 includes other relevant dimensional parameters for the GBS foundation.

Prior to commencing installation activities, the seabed will be checked for debris and levelness within a 600-foot (183-m) diameter circle from the location where the GBS will be placed, and, as necessary, significant debris, such as large boulders, will be moved outside this area. Before placement of the GBS, a filter layer of engineered rock will be placed on the seabed by a FPV or rock-dumping vessel in an area of approximately 200 feet (61 m) to ensure levelness.

The GBS is self-floating and will be towed by up to three tugs to its location. Using seawater ballasting, the GBS will be lowered on top of the stone filter layer while the skirt (if needed) may penetrate the filter layer and seabed. Further ballasting will be achieved by inserting sand or similar material inside the GBS dome. This ballast material will be dredged offshore from a site near the wind farm or elsewhere on the OCS. The total dry weight of the sand will be around 6,000 short tons (12 million pounds) per GBS. During installation and ballasting, the tugs will keep the GBS in position by making use of propulsion, DPS or anchoring. If suitable sands are not available from offshore locations, sourcing will be considered from onshore locations. Once the GBS is placed, a transition section will be bolted to the top of the GBS to complete the installation.

Scour protection will likely be required for GBS. Scour protection will consist of engineered rock that will be placed around the base of the GBS using a FPV or a stone dumping vessel. All remaining exposed stone filter layer will be covered by scour protection. The specific parameters for the diameter, volume, and area of scour protection are depicted in Table 3.1-2. A scour analysis will be completed as part of the FDR to refine these assumptions.

3.1.3.3 Inter-Array Cable Installation

The most effective method of protecting a submarine cable from damage caused by external forces is to bury the cable under the seabed. The inter-array cable will be installed using a simultaneous trench and lay process in which a self-propelled mechanical/hydro-jet plow creates a trench along the seabed and the cable is simultaneously laid and buried in a single pass (Figure 3.1-8). The target burial depth of the cable is 4 to 6 feet (1.2 to 1.8 m). The exact cable lay advance speed depends on final cable type and seabed conditions but is expected to be approximately between 1 mile (1.6 km, 0.86 nm) and 2 miles (3.2 km, 1.73 nm) per day.

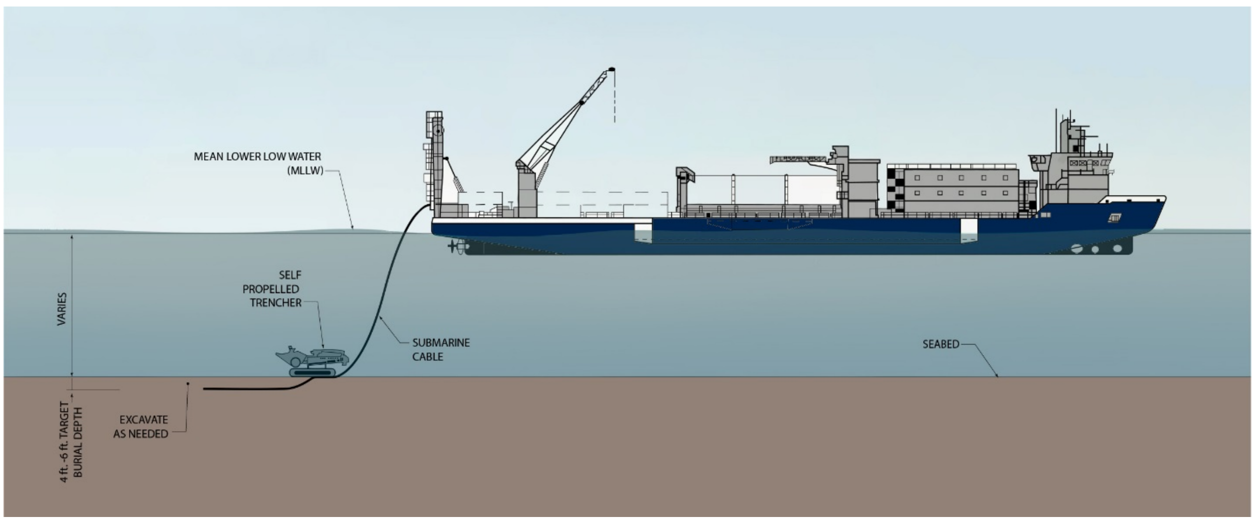


Figure 3.1-8. Cable Installation
Illustration of cable installation of both South Fork Wind Farm inter-array cable and South Fork Export Cable - Offshore.

The self-propelled equipment uses a mechanical plow as well as a hydro-jet plow to install the cable in the seabed. The hydro-jet plow pumps sea water through a series of jets onto the seabed. The self-propelled equipment is expected to have a nominal power of 1,600 kW and would circulate 1674 cubic yards (yd^3; 1,400 cubic meters [m^3]) of seawater per hour. The plow has a maximum width of 24 feet (7.3 m), length of 40 feet (12.2 m), and each track is 5.2 feet (1.6 m) wide.

Prior to initiation of cable installation, a pre-lay grapnel run (PLGR) will be conducted. The purpose of the PLGR run is to remove possible obstructions and debris, such as abandoned fishing nets, wires and hawsers, from along the cable route. Additionally, a debris plow may be used to move rocks away from the trench centerline.

Cable lay and burial will be carried out until it reaches a distance of approximately 300 feet (91 m) from each foundation, where the cable will be laid out, cut, and a pulling head will be put on the cable end to allow the cable to be pulled into a J-tube attached to the foundation. Once the inter-array cable has been installed, scour protection will be installed, as described for each foundation type.

The burial method is dependent on suitable seabed conditions and sediments along the inter-array cable route. Therefore, in areas where seabed conditions might not allow cable burial, other methods of cable protection may be employed, such as articulated concrete mattresses or rock placement.

Appendix G includes a conceptual drawing of the installation process for the cable, the J-tube, and the cable protection near the foundation where burial depth cannot be achieved.

3.1.3.4 Wind Turbine Generator Installation

The WTG installation process is the same for each foundation type (Appendix G). After installation of the foundation and the pull-in of the inter-array cable (i.e., feeding the cable into the J-tube of each foundation), the WTGs will either be transported from the onshore staging facility by barge to the offshore installation site adjacent to the installation jack-up lift barge, or some WTG components may be transported to the SFWF aboard the installation vessel. In some locations, vessels may use moorings in temporary staging areas adjacent to the installation site. If a U.S.-flagged jack-up lift vessel is available, the WTG components may be loaded directly onto this vessel at the staging port for offshore installation.

After transportation to the SFWF, the WTGs will be installed in accordance with the following general sequence (Figure 3.1-9).

1. The jack-up vessel will be located next to each foundation and will individually lift each WTG component in accordance with the final installation strategy that will be described in the FIR. The towers for the WTGs will be installed in sections with the lower tower section lifted first followed by the other tower sections. Alternatively, the complete tower could be installed in one piece.
2. The nacelle will be lifted and connected to the tower, followed by installation of each blade to the hub. Pending final engineering and vessel availability, some tower sections (potentially including the full tower), and the full rotor (potentially including the hub and three blades) might be pre-assembled onshore.
3. Once the components are installed, workers will finalize securing each WTG component.

Installation of each WTG will require up to 3 days to complete, assuming a 24-hour work window and no delays due to weather, sea conditions, or other circumstances.

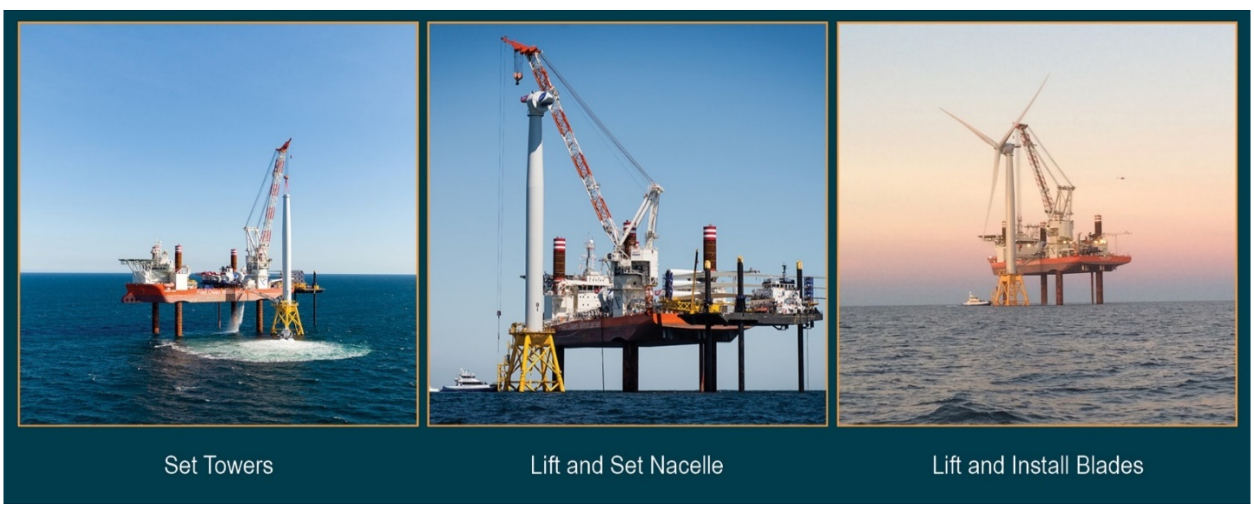


Figure 3.1-9. South Fork Wind Farm Wind Turbine Generator Installation
Photographs depicting the wind turbine generator installation sequence.

3.1.3.5 Offshore Substation Installation

The general installation process for the OSS will be very similar to the WTG installation process. The substation will be placed on of the same foundation as a WTG or a similar foundation as the WTGs. The substation will be brought to the foundation on a transportation barge and lifted into place by a jack-up lift barge or a derrick barge.

3.1.4 Commissioning

During commissioning, a variety of electrical and mechanical work and quality testing will occur. Commissioning requires technicians to frequently travel to each WTG and the OSS. Technicians will be transported to and from the SFWF by a CTV.

A typical commissioning process includes the following steps:

- Onshore at the port: tower electrical and mechanical tests, checks, and quality controls to validate functionality of components installed in the tower and in the nacelle, and of the interface between components in tower and nacelle
- Offshore cold commissioning: electrical and mechanical tests, checks, and quality controls to validate mechanical and electrical integrity of the complete WTG prior to energizing
- Offshore hot commissioning: final electrical tests, checks, and quality controls to validate systems interactions, while the WTG is energized but not generating
- Reliability testing: operational test of each WTG in normal conditions, including electrical and mechanical tests, checks, and quality controls to validate reliability and systems interaction

3.1.5 Operations and Maintenance

DWSF will be responsible for the O&M of the SFWF. The SFWF will operate in accordance with the approved COP, and other applicable approvals and permits. The SFWF will operate at maximum capacity while complying with all electric grid requirements from LIPA and New York Independent System Operator (NYISO). The SFWF will be monitored 24 hours a day, 365 days a year from a remote facility. Any issues that cannot be fixed remotely will be addressed locally by trained technicians.

The SFWF O&M Facility, which will be staffed by project technicians, will include storage for an appropriate number of spare parts.

3.1.5.1 Vessel and Vehicle Mobilization and Material Transportation

During operations, vessels for SFWF maintenance activities will typically be mobilized from one of the identified ports, as described in Table 3.1-5. The anticipated vessels and support vehicles that will be used during operations are described in Section 3.1.3.1 and Table 3.1-6.

In the case of unplanned maintenance, vessels may travel directly to the SFWF from locations that will be determined based on the type of maintenance that is required and vessel availability. These vessels may originate from the Gulf of Mexico, Atlantic Coast, Europe, or other worldwide ports.

3.1.5.2 Foundations

During operations, the primary activity related to foundations will be inspections and any resulting maintenance.

A foundation inspection program will be developed during the FDR phase so that nodes/critical components of the foundations are inspected within a 5-year timeframe. Underwater inspection will include visuals and eddy currents tests conducted by divers or remotely operated vehicles. Any observed damage or cracks would be analyzed further and repaired if required.

3.1.5.3 Wind Turbine Generators

Personnel conducting O&M activities will access the SFWF on an as-needed basis with no personnel living offshore. The WTGs are remotely monitored and controlled by the SCADA system. The SCADA system connects the WTGs to the OSS and the OSS to the SFEC - Interconnection Facility with fiber optic cables that will be embedded in the inter-array and export cables. Each WTG will have a wind speed and wind direction measuring device, such as a mechanical anemometer and windvane or other devices able to make such measurements. The SCADA system will provide a live feed of the measured wind speeds within the SFWF, as well as mechanical and electrical status of each WTG. The WTG activation/de-activation and output setpoints will normally be implemented through the fiber optic network that will be housed, in part, within the OSS and the SFEC - Interconnection Facility. This system will store real-time and historical data on performance and environmental conditions and provide a link to appropriate entities to monitor and control the SFWF.

The WTGs are equipped with safety devices to ensure safe operation during their lifetime. These safety devices may vary depending on the WTG selected and will be reviewed by the CVA during the FDR and the FIR phases. They may include, but are not limited to, vibration protection, over-speed protection, and aerodynamic and mechanical braking systems, as well as electrical protection devices.

The WTGs will be maintained in accordance with a dedicated service and maintenance plan, developed by the WTG vendor before the start of operations. It is anticipated that each WTG will require approximately 1 week of planned maintenance and approximately 1 week of unplanned maintenance per year. Planned maintenance will be scheduled during low-wind periods of the year. For the SFWF, this is expected to be during the summer. Unplanned maintenance will occur to address issues that cannot be resolved remotely.

For planned maintenance activities, personnel access will be provided using CTVs (Figure 3.1-10). Unscheduled maintenance, including major repairs, may require the use of jack-up or crane barges if repairs to equipment such as power transformers, reactors, or switchgear are necessary. Temporary diesel generators, with secondary containment, may be used during repairs.

Figure 3.1-10. Crew Transfer Vessel
Photograph depicting an example CTV from the Block Island Wind Farm.

3.1.5.4 Inter-Array Cable

The inter-array cable has no maintenance needs unless a fault or failure occurs. Cable failures are only anticipated from damage because of outside influences, such as boat anchors. The armoring of the inter-array cable at the J-tubes and the burial of the inter-array cable to target depth will minimize the risk of damage to the cable system. An O&M phase cable inspection program will be developed by DWSF as part of the FDR and reviewed by the CVA.

3.1.5.5 Offshore Substation

The OSS will be monitored and controlled remotely through the SCADA system. The OSS is equipped with devices to ensure safe operation. These safety devices may vary depending on the substation selected and will be reviewed by the CVA as part of the FDR and FIR. They may include, but are not limited to, smoke detection, arc flash and safety signage, and fire suppression. During emergency events in which the power connection may be lost, a utility generator will operate to keep essential systems functional. Unplanned maintenance, which can include major repairs to heavy components like the main transformer, may require the use of jack-up or crane barges.

3.1.6 Conceptual Decommissioning

DWSF will decommission the SFWF in accordance with 30 CFR § 585.902 and 30 CFR §§ 585.905 through 585.912. The first step will be submission of a decommissioning application in accordance with 30 CFR § 585.905. Unless otherwise approved in the decommissioning plan, removal of facilities will be completed in accordance with the approved decommissioning plan and will follow the same relative sequence as construction but in reverse.

The WTG components and OSS will be disconnected and likely be removed using a jack-up lift vessel or a derrick barge. A material barge will then likely transport the components to a recycling yard where the components will be disassembled and prepared for re-use and/or recycling for scrap metal and other materials. If steel foundations (jacket or monopile) are used, they will be cut by an internal abrasive water jet cutting tool at 15 feet (4.6 m) below the seabed in accordance with 30 CFR § 585.910 and returned to shore for recycling in the same manner described for the WTG components and OSS. If GBS foundations are used, each will be de-ballasted to allow it to float and be towed to a port or other onshore location identified in the decommissioning plan. The inter-array cables will be decommissioned in accordance with the approved decommissioning plan. The decommissioning application will include a plan to clear the area after the SFWF facilities have been decommissioned to ensure that no unauthorized debris remains on the seabed.

3.2 South Fork Export Cable

3.2.1 Project Location

The SFEC will be located offshore, in both federal waters and New York State territorial waters, and onshore in East Hampton, New York. As shown in Figure 1.1-2, the SFEC - Offshore extends westward through federal waters from the OSS, passes south of Block Island, and crosses into New York State territorial waters 3 nautical miles (5.6 km, 3.5 m) offshore. DWSF is considering two landing sites for the SFEC in East Hampton - Beach Lane and Hither Hills. As shown in Figure 1.1-3, the SFEC - Onshore extends from the landing site to the SFEC - Interconnection Facility in East Hampton.

Water depths, in the areas where the SFEC is proposed, range from 0 feet (0 m) in New York State waters to approximately 158 feet (48.2 m) in federal waters. The SFEC will be installed to a target burial depth of 4 to 6 feet (1.2 to 1.8 m).

Construction staging for the SFEC - Offshore will be as described for the SFWF, using ports in New York, Rhode Island, Massachusetts, or Connecticut. Construction staging for the SFEC - Onshore will be located in East Hampton, New York.

3.2.2 South Fork Export Cable Facilities

The SFEC will be an AC electric cable that will connect the SFWF to the existing mainland electric grid on Long Island. The SFEC will be 138 kV or 230 kV; the final cable size will be determined based on the final wind turbine selected.

Table 3.2-1 summarizes the distances for the following segments of the SFEC:

- **SFEC - Offshore**: A submarine export cable (138 kV or 230 kV), buried beneath the seabed, including the SFEC - OCS and the SFEC - NYS:
  - **SFEC - OCS:** the submarine segment of the export cable, buried beneath the seabed, within federal waters on the OCS from the OSS to the boundary of New York State territorial waters.
  - **SFEC - NYS:** the submarine segment of the export cable, buried beneath the seabed, within state territorial waters, from the boundary of the OCS to a sea-to-shore transition vault located in the Town of East Hampton on Long Island, Suffolk County, New York. The SFEC - NYS includes the sea-to-shore transition.

- **SFEC - Onshore**: the terrestrial underground segment of the export cable (138 kV or 230 kV), buried beneath public roads and along the Long Island Railroad (LIRR) ROW, from the sea-to-shore transition to a new interconnection facility (SFEC - Interconnection Facility) where the SFEC will interconnect with the LIPA electric transmission and distribution system at the existing East Hampton substation in the town of East Hampton on Long Island, Suffolk County, New York.

Table 3.2-1. Summary of South Fork Export Cable Segments
Distances for each segment of South Fork Export Cable.

SFEC Section	Beach Lane	Hither Hills
SFEC - Offshore	61.4 miles (98.8 km, 53.4 nm)	49.6 miles (79.8 km, 43.1 nm)
SFEC - OCS	57.9 miles (93.2 km, 50.3 nm)	46 miles (74.0 km, 40.0 nm)
SFEC - NYS[a]	3.5 miles (5.6 km, 3.1 nm)	3.5 miles (5.6 km, 3.1 nm)
SFEC - Onshore	4.1 miles (6.6 km)	11.5 miles (18.5 km)
TOTAL	65.5 miles (105.4 km)	61.1 miles (98.3 km)

Note:

[a] The SFEC - NYS includes the sea-to-shore transition, which includes approximately 500 feet (0.1 nm) on land.

Each of the SFEC segments are described in the following sections, and where consistent, references are incorporated for information previously presented for the SFWF inter-array cable. The major characteristics that may vary within the Project Envelope are listed in Table 3.0-1. The temporary and permanent footprints for each component are summarized in Table 3.2-2. The tables in the following sections further describe parameters that may vary.

Table 3.2-2. Footprint of South Fork Export Cable Segments
Maximum temporary and permanent seabed footprint for components of South Fork Export Cable.

Project Component/Activity	Temporary	Permanent
SFEC - OCS submarine cable[a]	73.0 acres (29.5 ha)	21.1 acres (8.5 ha)
SFEC - OCS cable protection[b]	N/A	3.4 acres (1.4 ha)
SFEC - NYS submarine cable[a]	4.4 acres (1.8 ha)	1.3 acres (0.5 ha)
SFEC - NYS cable protection[b]	N/A	0.2 acres (0.08 ha)
SFEC - NYS sediment excavation for an offshore cofferdam for sea-to-shore transition [c]	850 yd^3 (650 m^3)	N/A

Notes:

[a] Conservatively assumes the SFEC has a total permanent width of 3 feet (0.9 m), with an additional temporary width of 10.4 feet (3.2 m) for temporary seabed disturbance during installation.

[b] Conservatively assumes additional cable protection, consisting of rock or concrete matting (8 feet long by 20 feet wide [2.4 m long by 6.1 m wide]), for up to 2 percent of the SFEC, where burial depth may be less than 4 feet (1.2 m), and for seven locations where the SFEC - OCS will cross utility crossings, each of which may need up to 180 linear feet (54.9 m) of concrete matting.

[c] Cofferdam will enclose an area that is 75 feet long by 25 feet wide to a depth of up to 12 feet (22.9 m long by 7.6 m wide to a depth of up to 3.7 m).

3.2.2.1 South Fork Export Cable - Offshore (SFEC - OCS and SFEC - NYS)

The SFEC - Offshore will be a buried submarine power cable, comprised of one segment of single three-core conductor and fiber optic cable for communication and control (Figure 3.2-1). The cable is the same in federal waters and New York State territorial waters. The SFEC will carry 3-phase HVAC power, either 138 kV or 230 kV, and will operate as a bi-directional conduit for power flow. The final voltage of the export cable will be based upon the final engineering design specifications for the SFWF and reviewed by the CVA in connection with the preparation of the FDR.

Figure 3.2-1. South Fork Export Cable Cross Section
Three-dimensional rendering of the typical design of the submarine cable.

The SFEC will be approximately 8 to 12 inches (20 to 30 cm) in diameter, including a continuous three-conductor and fiber optic bundle that will be encased in a water sealed jacket, which is wrapped in either a single or double-steel armor wire. The bundle will be wrapped in a polyester yarn which will likely exhibit bright black and yellow striping for identification and handling. The power conductors will be made of either copper or aluminum alloys with a cross sectional area of less than 1,000 (copper) or 1,500 (aluminum) square millimeters (1.55 [copper] or 2.32 [aluminum] square inches) and insulated with cross-linked polyethylene (XLPE). The export cable does not contain lubricants, liquids, or oils.

The SFEC - Offshore will be buried to a target depth of 4 to 6 feet (1.2 to 1.8 m) beneath the seabed between the SFWF - OSS and the start of the sea-to-shore transition at a location at least 1,750 feet (533 m) offshore from the MHWL. It is anticipated that a maximum of 2 percent of the SFEC - Offshore (up to 1.2 linear miles [1.9 km, 1.7 nm] of the SFEC - OCS, and up to 0.07 mile [0.11 km, 0.06 nm] of the SFEC - NYS) may not achieve the target burial depth if hard substrate is encountered. In those areas, the export cable will require extra protection or armoring (e.g., rock or engineered concrete mattresses), as described for the inter-array cable (see Section 3.1.2.3). The 2 percent estimate does not include (i) the protection needed at seven identified cable crossings or (ii) other areas where burial is not permitted due to potential culturally or archeologically sensitive areas.

Appendix G includes a typical cross-section of the export cable, a cross-section of the trench and burial depth for the cable, a typical installation sequence for the cable, and a conceptual drawing of cable protection where burial depth may not be achieved.

The Project Envelope includes maximum parameters for the offshore segments of the export cable (Table 3.2-3).

Table 3.2-3. South Fork Export Cable Parameters: Outer Continental Shelf and New York State Export Cable
Anticipated parameters for the export cable.

Parameter	OCS	New York State
Cable diameter	8-12 inches (20 - 30.5 cm)	
Anticipated burial depth[a]	4 - 6 feet (1.2 - 1.8 m)	
Maximum trench depth	10 feet (3 m)	
Maximum permanent footprint for export cable[b]	21.1 acres (8.5 ha)	1.3 (0.53 ha)
Maximum length of export cable	57.9 miles (93.2 km, 50.3 nm)	3.5 miles (5.6 km, 3.0 nm)
Trench width	3 feet (0.9 m)	
Maximum permanent footprint for export cable protection[c]	3.4 acres (1.4 ha)	0.2 acres (0.08 ha)
Cable protection for each cable crossing[d]	3,600 ft^2 (334.5 m^2)	N/A
Additional cable protection[e]	122,285 ft^2 (11,361 m^2)	7,392 ft^2 (686.7 m^2)
Maximum temporary seabed disturbance[f]	73.0 acres (29.5 ha)	4.4 acres (1.78 ha)

Notes:

[a] Burial depth is measured from the seabed to the top of the cable.

[b] Conservatively assumes the SFEC - OCS has a length of 57.9 miles (93.2 km, 50.3 nm) and the SFEC - NYS has a length of 3.5 miles (5.6 km, 3.0 nm), both of which have a total width of 3 feet (0.9 m).

[c] Conservatively assumes cable protection will be needed for up to seven cable crossings and for up to 2 percent of the export cable where burial depth may be less than 4 feet (1.2 m).

[d] Conservatively assumes additional cable protection, consisting of rock or concrete matting (8 feet long by 20 feet wide [2.4 m long by 6.1 m wide]), for up to seven existing cable systems, each of which may need up to 180 linear feet (54.9 m) of matting.

e Conservatively assumes additional cable protection, consisting of rock or concrete matting (8 feet long by 20 feet wide [2.4 m long by 6.1 m wide]), for up to 2 percent of the SFEC, where burial depth may be less than 4 feet (1.2 m).

[f] Conservatively assumes that cable is installed by equipment with 2 tracks, each of which has a maximum width of 5.2 feet placed on each side of the trench, and that this equipment will be used for up to 57.9 miles (93.2 km, 50.3 nm) for the SFEC - OCS and up to 3.5 miles (5.6 km, 3.0 nm) for the SFEC - NYS.

3.2.2.2 South Fork Export Cable - Sea to Shore Transition

The sea-to-shore transition connects the SFEC - NYS to the SFEC - Onshore. The offshore and onshore cables will be spliced together so the cable can be routed to the SFEC - Interconnection

Facility by an underground electrical duct bank. The sea-to-shore transition will include a new onshore transition vault, cable installed using HDD under the beach and intertidal water, and may also include a temporary cofferdam located offshore beyond the intertidal zone. If conditions require a cofferdam, it will be installed using either sheet pile or gravity cell (as described in Section 3.2.3.4). Figure 3.2-2 provides a conceptual illustration of the sea-to-shore transition; while the illustration is based on a landing site at Beach Lane, the concept would be similar for a landing site at Hither Hills. Figure 3.2-3 shows the aerial view of each landing site.

Beach Lane

The cable will be installed at least 30 feet (9.1 m) below the current profile of the beach.

A new underground transition vault will be placed within the roadway approximately 800 feet (243 m) onshore from the MHWL. The vault will be positioned along the northern side of Beach Lane with a manhole cover at the surface. Pedestrian and vehicle access will be maintained throughout installation.

A temporary cofferdam may be located offshore, approximately 1,750 feet (533 m) from the MHWL. The cofferdam will be sited at a location with approximately 25 to 40 feet (7.6 to 12.2 m) of water depth.

Hither Hills

The cable will be installed at least 30 feet (9.1 m) below the current profile of the beach.

A new underground transition vault will be placed within the pavement approximately 650 feet (198 m) onshore from the MHWL. The vault will be positioned within the northern parking lot adjacent to State Highway 27. Pedestrian and vehicle access will be maintained throughout installation.

A temporary cofferdam may be located approximately offshore, 1,900 feet (579 m) from the transition vault location in the Hither Hills parking lot. The cofferdam will be sited at a location with approximately 40 to 60 feet (12.2 to 18.3 m) of water depth.

Appendix G includes conceptual plan and profile drawings for the HDD installation work area, for the cofferdam installed by gravity cell or by sheet pile, and for the transition vault.

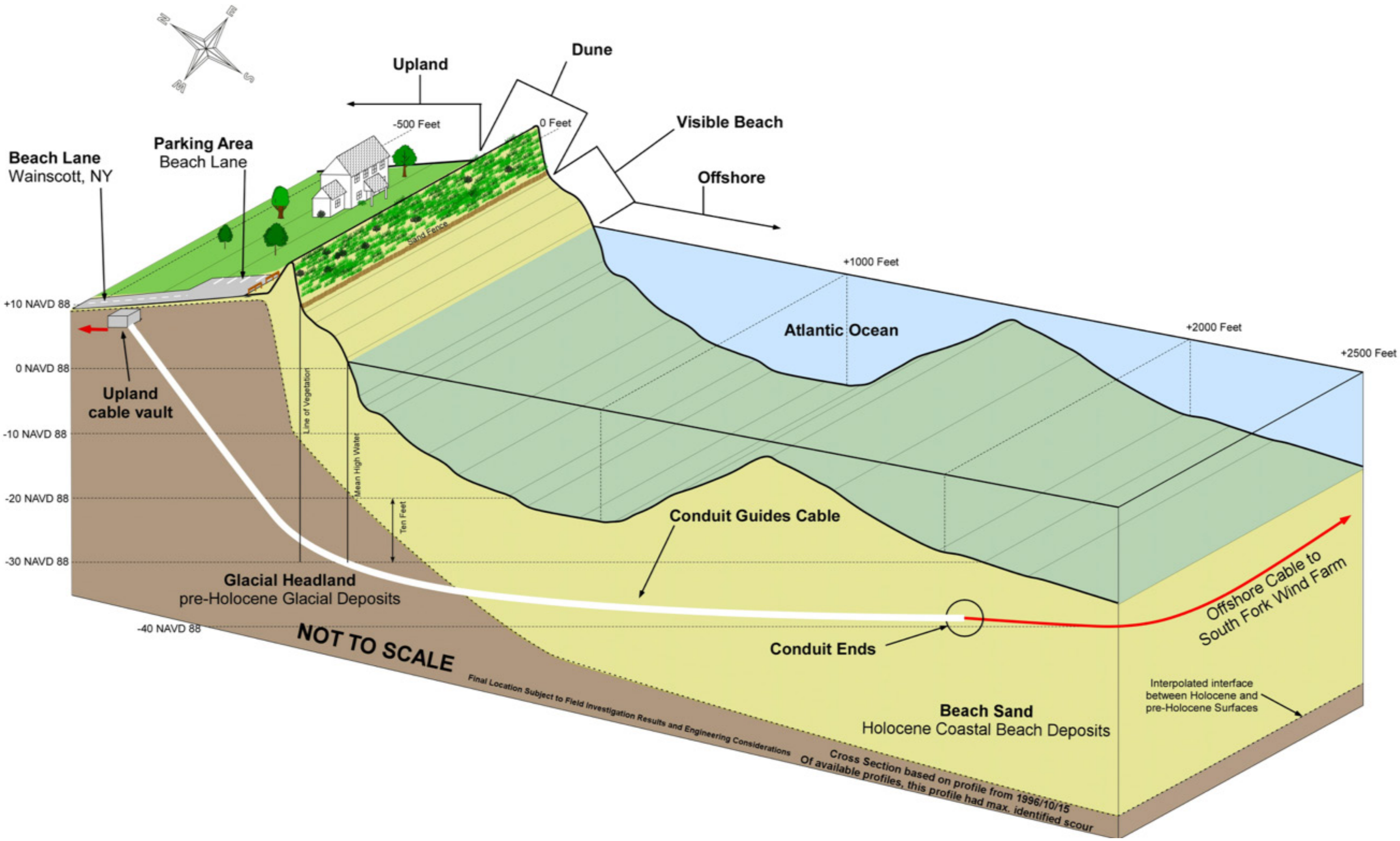


Figure 3.2-2. SFEC - Sea-to-Shore Transition Illustration

Illustration of sea-to-shore transition at the Beach Lane landing site.

Source: Aerial image © 2018 Google. Annotation © 2018 CH2M HILL, Inc.

Figure 3.2-3. South Fork Export Cable - Landing Sites

Aerial views of the two landing site options at Beach Lane, East Hampton and Hither Hills, Montauk.

3.2.2.3 South Fork Export Cable - Onshore

The SFEC - Onshore begins at the transition vault located onshore at the sea-to-shore transition and ends at the SFEC - Interconnection Facility (Figure 3.2-4). The SFEC - Onshore will be installed within a new underground duct bank. The SFEC - Onshore will be an underground power cable, comprised of three single core cables with a conductor of either copper or aluminum and two separate fiber optic cables, which will provide communication and control. Duct banks will be designed to accommodate up to two circuits. The SFEC-Onshore will carry 3-phase HVAC power, either 138 kV or 230 kV, and will operate as a bi-directional conduit for power flow. The final voltage of the export cable will be determined in the FDR based upon the finalized engineering design specifications for the SFWF.

Each conductor will be approximately 2 to 4 inches (3 to 10 cm) in diameter, including a single-core cable, with compact round, uncoated copper wires. The cable will be insulated with XLPE. The conductors will be sheathed by a semi-conductive insulation screen and wrapped in a high-density polyethylene (HDPE) jacket.

The duct bank will be located underground within public ROWs and alongside the tracks within the LIRR ROW. The SFEC - Onshore will not include any overhead lines. Most of the SFEC - Onshore that is located on public roads will be located within the existing paved section of the ROW. The specific configuration of the duct bank could vary along the route; the maximum width would be 36 inches (91 cm) and the maximum depth would be 40 inches (101 cm).

Appendix G includes a typical cross-section of the underground export cable, as well as typical cross-sections of the cable trench, duct bank, and manhole cable splice vaults.

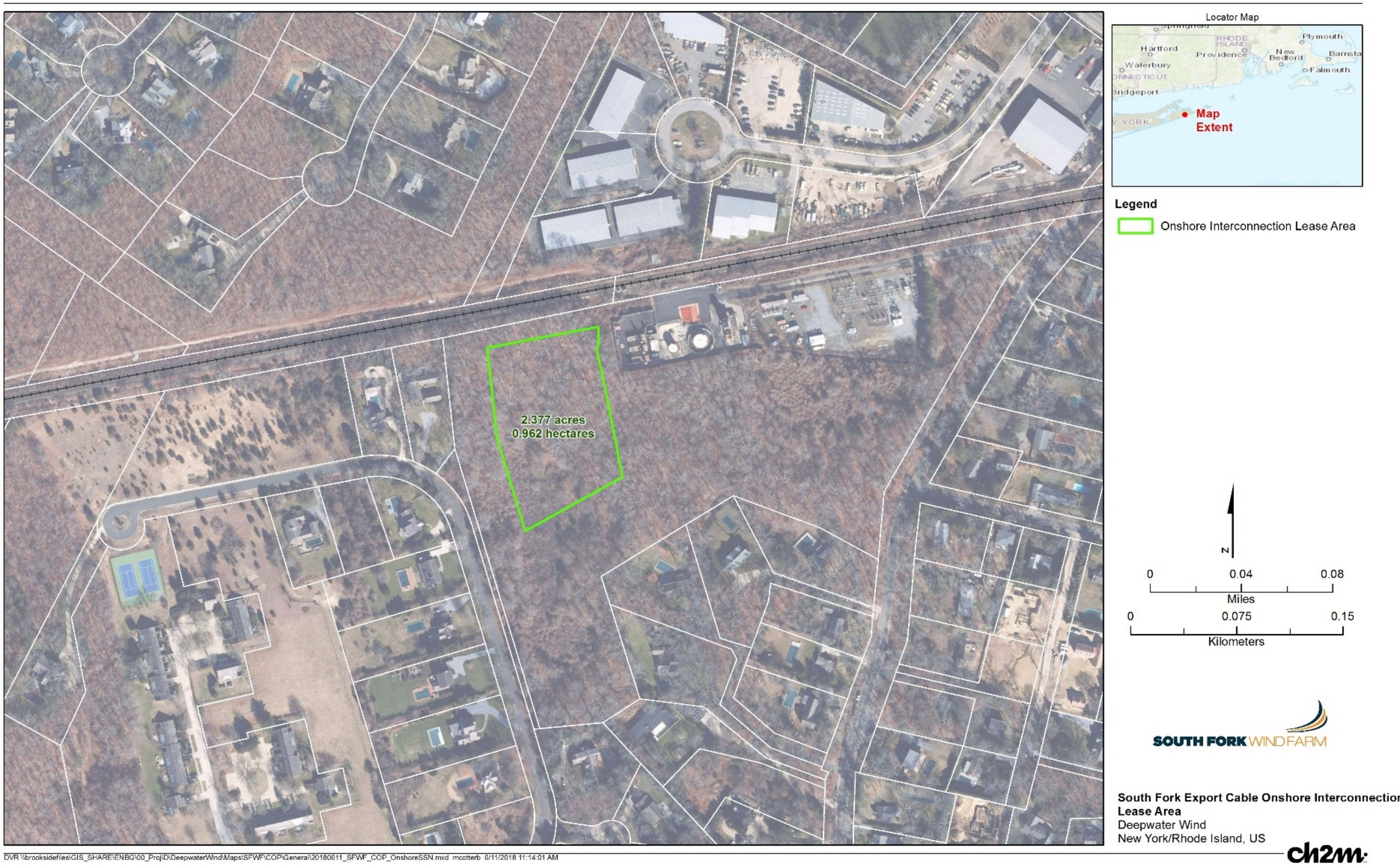
3.2.2.4 South Fork Export Cable - Interconnection Facility

The SFEC - Interconnection Facility will be newly constructed to connect the SFEC with the existing 69 kV LIPA substation, located off Cove Hollow Road in the town of East Hampton, New York. The SFEC - Interconnection Facility will be located adjacent to the existing LIPA substation (Figure 3.2-2), on the same parcel in the town of East Hampton’s Commercial Industrial zoning district.

The footprint of the SFEC - Interconnection Facility will be up to 228 by 313 feet (69.5 by 95.4 m), including the exterior wall, with a maximum equipment height of approximately 43 feet (13.1 m).

The configuration of the SFEC - Interconnection Facility and the interconnection to the East Hampton substation will be developed as part of the NYISO interconnection process and will include all the equipment necessary to safely connect the SFEC with the NYISO transmission system.

Appendix G includes conceptual plan and profile drawings for the interconnection facility.



Source: Aerial image © 2018 Google. Annotation © 2018 CH2M HILL, Inc.

Figure 3.2-4. South Fork Export Cable - Interconnection Facility Lease Area
Location of South Fork Export Cable - Interconnection Facility adjacent to existing East Hampton Substation.

3.2.3 Construction

This section describes the construction process of the SFEC based on typical methods, vessels, and equipment.

Before construction begins, DWSF will finalize contracts with vendors (including fabrication and installation contractors), develop mobilization plans, and make arrangements at the port facilities to support Project activities, including fabrication, as needed.

3.2.3.1 Ports, Vessels and Vehicles, and Material Transportation

As described for the SFWF, multiple port locations may be utilized (Table 3.1-5, Figure 3.1-8).

The anticipated vessels and vehicles that will be used for construction of the SFEC are described in Table 3.1-5. Vessels that will not be transporting material from local ports may travel directly to the work sites from locations that will be determined prior to construction. Some of these vessels may originate from the Gulf of Mexico, Atlantic Coast, Europe, or other worldwide ports, depending on charter agreements and vessel availability. A cable lay vessel, similar to what will be used to install the SFEC- Offshore is shown in Figure 3.2-5.

Figure 3.2-5. Cable Lay Vessel
Photograph depicting an example cable lay vessel.

3.2.3.2 South Fork Export Cable - Outer Continental Shelf Waters

The installation of the SFEC-OCS will follow similar methods as those described in Section 3.1.3.3 for the inter-array cable of the SFWF.

The installation of the SFEC begins with the sea-to-shore transition described in the next section. Installation of the submarine cable then continues from the sea-to-shore transition through New York State territorial waters into federal waters and out to OSS located within the SFWF.

Cable lay and burial, as described for the inter-array cable of the SFWF, will be carried out along the entire route until approximately 300 feet (92 m) of the OSS. At that point, cable will be attached to the OSS, in the same process as described for connecting the inter-array cable to WTG in Section 3.1.3.3. Scour protection at the foundation for the OSS will then be installed once the cables are connected.

The burial method is dependent on suitable seabed conditions and sediments along the SFEC route. Therefore, in areas where seabed conditions might not allow for cable burial, other methods of cable protection may be employed, such as articulated concrete mattresses or rock placement.

SFEC - OCS will cross seven existing telecommunications cable systems, some of which are active and others that are inactive, on the seabed. DWSF is consulting with these cable owners to implement a mutually agreeable crossing process (Appendix F). This process will be consistent with industry practice and will typically use articulated concrete mattresses. Where appropriate, inactive cable systems will be cut and cleared from the burial route for a short distance on each side. Any cut and cleared cables will typically have the exposed ends weighted with clump anchors so that the cable cannot be snagged by other seabed users, such as fishermen.

A cable inspection program will be developed, and reviewed by the CVA, to confirm the cable burial depth along the route.

3.2.3.3 South Fork Export Cable - New York State Territorial Waters

Installation of the SFEC - NYS will follow the same methods described above for the SFEC - OCS.

No other cable systems along the proposed cable route have been identified within New York State waters.

3.2.3.4 South Fork Export Cable - Sea-to-Shore Transition

Installation of the SFEC - Offshore will start with HDD within the sea-to-shore transition. The installation process will be the same at Beach Lane or Hither Hills, although the specific locations of the transition vault and cofferdam will be different at each site.

The workspace for the HDD and drill entry point will be located at least 650 feet (198 m) onshore from the MHWL at both Beach Lane and Hither Hills. The HDD (as well as the conduit and the cable) will end at least 1,750 feet (533 m) offshore from the MHWL at both Beach Lane and Hither Hills and will be installed under the beach and intertidal zone.

Before HDD begins, a temporary cofferdam may be installed at the endpoint of the HDD, where the conduit exits from the seabed. Alternatively, the HDD might be installed without a cofferdam. The cofferdam, up to 75 feet by 25 feet (22.9 by 7.6 m), serves as containment for the drilling returns during the HDD installation and keeps the excavation free of debris and from silting back in. The cofferdam, if required, may be installed as either a sheet piled structure into the sea floor or a gravity cell structure placed on the sea floor using ballast weight. Installation of the cofferdam and drilling support will be conducted from an offshore work barge anchored near the cofferdam. A 5-point anchor barge may be employed at the cofferdam site to incorporate a second HDD drill spread in a push-pull drilling operation, which would facilitate removal of drill cuttings, insertion of HDPE conduit, and grouting. The location will be clearly marked to indicate to vessels that the cofferdam is present below the water surface, and DWSF will coordinate navigational marking and publication of its location with United States Coast Guard.

Sheet Pile Installation. If the cofferdam is installed using sheet pile, a vibratory hammer will be used to drive the sidewalls and endwalls into the seabed. Installation of a sheet pile cofferdam may take approximately up to 3 days. The sidewalls and endwalls will be driven to a depth of approximately 6 feet (1.8 m); sections of the shoreside endwall will be driven to a depth of up to 30 feet to facilitate the HDD entering underneath the endwall. After the sheet piles are installed, the inside of the cofferdam will be excavated to approximately 12 feet (3.7 m). This depth allows access to the HDD pilot hole for installation of the HDPE conduit. Up to 850 yd^3 (650 m^3) of material will be excavated from the pilot hole and sidecast during installation to naturally disperse. The cofferdam walls will be cut off at a depth of 4 feet (1.2 m) above the sea floor after HDD operations and conduit are installed. Metal sheeting will be removed, placed on the work barge, and hauled back to shore.

Gravity Cell Installation. If the cofferdam is installed using gravity cell, the cell will be lowered onto the seafloor by a crane that is on a work barge. The sidewalls and seaside wall and end wall will be multi skinned to accommodate a rock ballast fill that will stabilize the cofferdam on the seabed. The cofferdam may be of a multi-sectional design to allow transportation and assembly at the site. Assembled interior dimensions of the cofferdam will be similar to a sheet pile cofferdam with similar volumes of excavated material which is sidecast, allowing access to the HDD conduit by the cable trencher. Once the HDD is complete and the conduit installed, the ballast is lifted out of the cofferdam and the un-ballasted cofferdam lifted off the seabed, placed on the work barge, and hauled to back to shore.

For the construction of the HDD a drilling fluid of bentonite-water-based mud or another non-toxic drilling fluid will be used to cool the drill bit, maintain bore hole stability, and control fluid loss during operations. Drilling mud will be injected into the drill pipe onshore using pumps that are located within the HDD workspace. The mud will be jetted through a rotating drill bit attached at the end of the drill pipe. Jetting of the mud will cool the drill bit and suspend drill cuttings within the mud solution. Mud and cuttings will flow back to the surface in the gap between the drill pipe and bore hole, which will stabilize the bore hole. Once the mud flows back to the bore hole entry, it will be collected and reused.

The drill bit will enter the cofferdam under the cofferdam shoreside end wall; sufficient clearance will be allowed in the design to facilitate the pilot hole, drill head, and HDPE conduit. Once the pilot hole has exited in the cofferdam, the hole will be opened to a diameter of approximately 32 inches (81 cm) to install the conduit. When no cofferdam is used, a small construction vessel will monitor the completion of the HDD drilling. This vessel will ensure that no drilling mud will be released.

The conduit, consisting of a thick-walled HDPE pipe with a maximum diameter of 24 inches (61 cm), will be inserted through the entire length of the bore hole through which the submarine cable will be installed. The conduit may be assembled adjacent to the HDD workspace and, after completion of drilling, will be capped, moved across the surface of the beach, and floated to the endpoint of the HDD. The HDD equipment will be used to pull the HDPE pipe through the drill hole to create a stable conduit for bringing the cable ashore.

After installation of the HDPE conduit, a transition vault will be installed onshore around the drill pit. A pull line will be placed inside the finished conduit to facilitate pulling the SFEC through the conduit. After the SFEC is pulled through the conduit, the submarine and fiber optic cables will be spliced to the SFEC - Onshore cable within the transition vault. The transition vault will be sealed, covered, and repaved with manhole covers at the surface.

The temporary cofferdam will be removed after installation of the SFEC - NYS has started. The remaining cofferdam walls will be removed, either by vibratory hammer (for sheet pile cofferdam) or by lifting (for gravity cell cofferdam). The excavated sediments placed in the immediate vicinity of the cofferdam will be allowed to disperse naturally.

The onshore work areas have been sized to accommodate an HDD rig, mud pumps, generators, a slurry plant, de-silter, backhoe, boom truck, crane, pickup truck, as well as areas for parking and other equipment and facilities necessary to support installation.

Depending on site-specific conditions and other external factors, the HDD installation activities are expected to take 10 to 12 weeks, including equipment mobilization and breakdown. In residential areas, HDD activities will be limited to a typical 12-hour working window, with exceptions for extenuating circumstances and for two specific activities (conduit installation and cable pull-in) that require 24-hour operation for a short period of time. HDD activities will be completed outside the summer season, with active drilling expected to be completed before March 31.

3.2.3.5 South Fork Export Cable - Onshore

The construction for the SFEC - Onshore includes the following activities:

- Site preparation, including minimal vegetation clearing as needed
- Excavation for underground duct bank
- Duct bank installation
- SFEC - Onshore installation and splicing
- HDD, where appropriate, for crossing of infrastructure

The SFEC - Onshore will be installed in an underground duct bank consisting of concrete encased conduits, with cable vaults for installation and maintenance access.

The SFEC - Onshore will be installed within the ROW of the existing roadways or the ROW of the LIRR. Existing pavement, gravel, or dirt will be removed and a trench of up to 4 feet (1.2 m) wide and 8 feet (2.4 m) deep will be excavated. Once each portion of the trench is excavated, the conduit will be assembled and lowered into the trench and the area around the conduit will be filled with concrete. Once the conduit is installed, the trench will be backfilled with compacted soil. Initially, temporary pavement will be applied followed by full pavement of the affected lane or the road as appropriate.

The SFEC - Onshore will be installed following the installation of the duct bank and cable vaults. The SFEC - Onshore will be installed by pulling the cable from manhole to manhole. The SFEC - Onshore will be spliced in each manhole.

3.2.3.6 South Fork Export Cable - Interconnection Facility

The construction for the SFEC - Interconnection Facility includes the following activities:

- Site preparation, excavation, and grading
- Construction of foundations for the control building, transformer, reactors, and switchgear
- Construction of electrical grounding, duct banks, and underground conduits

- Installation of appropriate drainage systems and station service including electrical and water
- Installation of all aboveground structures including transformer, reactors, switchgear, cable systems, and lightning protection.

Any temporary staging areas required during construction, such as laydown areas, temporary equipment storage, and work offices will be located within or adjacent to the location identified in Figure 3.1-10.

3.2.4 Commissioning

Once the SFEC has been installed, DWSF will commence commissioning to meet standards for grid interconnection reliability and provide a baseline of the cable characteristics including a baseline time domain reflectometer, and high potential test.

During these steps, commissioning testing will include:

- Visual and function tests of bonding and grounding system
- Continuity tests of conductor and armoring
- Resistance and capacitance tests for insulation and conductors
- Grounding measurements
- Time domain reflectometer for both optical (fiber) and electrical (power) to establish reference baseline performance metrics

3.2.5 Operations and Maintenance

DWSF will be responsible for the operation of the SFEC. As described for the SFWF, the SFEC will be monitored 24 hours a day, 365 days a year from a remote facility. The SFEC is not expected to require planned maintenance; however, inspections and tests will be conducted regularly based on manufacturer-recommended schedules; regular monitoring and any repairs will be based on manufacturer-suggested methods. DWSF will maintain at least 500 feet (152.4 m) of spare cable and underwater splices to facilitate mechanical cable repair that could become necessary through a fault or mechanical damage event.

Monitoring will include a periodic review of anomalies in cable charging current and power factor, as well as review of protection device operation records.

3.2.5.1 Vessel and Vehicle Mobilization and Material Transportation

As described for the SFWF, during operations, vessels for the SFEC - Offshore maintenance activities will typically be mobilized from one of the identified ports, as described in Table 3.1-5. Onshore personnel vehicles for the SFEC-Onshore maintenance activities will be mobilized from the O&M facility. The vessels and vehicles anticipated to be used during operations are described in Table 3.1-6.

In the case of unplanned maintenance, vessels may travel directly to the work sites from locations to be determined prior to operations. Some of these vessels may originate from the Gulf of Mexico, Atlantic Coast, Europe, or other worldwide ports, depending on charter agreements and vessel availability.

3.2.5.2 South Fork Export Cable - Offshore (OCS and NYS)

The SFEC - Offshore has no maintenance needs unless a fault or failure occurs. Cable failures are only anticipated because of damage from outside influences, such as boat anchors. Burial of the cable to the target burial depth will minimize the risk of damage to the cable system. An O&M-phase cable inspection program will be developed by DWSF, included in the FDR, and reviewed by the CVA.

Mechanical inspections will include a cable burial assessment and debris field investigation of the SFEC. The mechanical inspection is planned to occur on a 5-year basis or following a storm event that may necessitate an unplanned inspection.

If mechanical damage to the SFEC - Offshore should occur, the cable will fault immediately. DWSF will identify the location of the fault, and mobilize a repair barge, which would be equipped with water pumps, jetting devices, hoisting equipment, and other tools typically used in repairs of submarine cables. The cable would be exposed with hand-operated jet tools and cut in the middle of the damaged area. The cable would be raised to the repair barge where the damaged portion of the cable would be cut so that cable splicing can occur. The repaired cable would then be reburied to the appropriate depth by hand-operated jet tools.

3.2.5.3 South Fork Export Cable - Onshore

The SFEC - Onshore has no maintenance needs unless a fault or failure occurs. Cable failures are only anticipated because of damage from outside influences, such as unexpected digs from other parties. If repair is needed, spare cable and splice kits would be used to replace the affected area.

3.2.5.4 South Fork Export Cable - Interconnection Facility

The SFEC - Interconnection Facility will be monitored and controlled remotely through the SCADA system that is linked with fiber optic cables to the SFWF O&M facility. During emergencies in which the power connection may be lost, a utility generator will operate to keep essential systems functional.

Inspections and tests will be conducted regularly based on manufacturer-recommended schedules and repairs will be based on manufacturer-suggested methods.

3.2.6 Conceptual Decommissioning

DWSF will decommission the SFEC in accordance with 30 CFR § 585.902 and 30 CFR §§ 585.905 through 585.912. The first step will be submission of a decommissioning application in accordance with 30 CFR § 585.905. Unless otherwise approved in the decommissioning plan, removal of facilities will be completed in accordance with the approved decommissioning plan and will follow the same relative sequence as construction but in reverse.

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