# SUNRISE WIND LLC

# SUNRISE WIND NEW YORK CABLE PROJECT

# REVISED EXHIBIT E-3

# UNDERGROUND CONSTRUCTION

# PREPARED PURSUANT TO 16 NYCRR § 88.3

*This page intentionally left blank.*

# Table of Contents



**LIST OF TABLES**

**LIST OF FIGURES**

## Acronyms and Abbreviations

| | |
|---|---|
| AC | alternating current |
| ALARP | as low as reasonably practicable |
| Applicant | Sunrise Wind LLC |
| BMP | best management practice |
| CFE | controlled flow excavation |
| CFR | Code of Federal Regulations |
| DC | direct current |
| DP | dynamic positioning |
| EM&CP | Environmental Management and Construction Plan |
| ft | feet |
| G&G | geophysical and geotechnical |
| ha | hectare(s) |
| HDD | horizontal directional drill |
| ICW | intracoastal waterway |
| IEEE | Institute of Electrical and Electronics Engineers |
| km | kilometer(s) |
| kV | kilovolt(s) |
| LIE | Long Island Expressway |
| LIPA | Long Island Power Authority |
| LIRR | Long Island Rail Road |
| m | meter(s) |
| MBES | multibeam echo sounding |
| MEC/UXO | munitions and explosives of concern/unexploded ordinance |
| MHWL | mean high water line |
| mi | mile(s) |

| | |
|---|---|
| NAD 83 | North American Datum of 1983 |
| NASCA | North American Submarine Cable Association |
| NAVD88 | North American Vertical Datum of 1988 |
| NESC | National Electric Safety Code |
| NOAA | National Oceanic Atmospheric Administration |
| NPS | National Park Service |
| NYCRR | New York Codes, Rules and Regulations |
| NYS | New York State |
| NYSERDA | New York State Energy Research and Development Authority |
| OCS | Outer Continental Shelf |
| OnCS-DC | Onshore Converter Station-Direct Current |
| OREC | Offshore Wind Renewable Energy Certificate |
| PLGR | pre-lay grapnel run |
| Project | Sunrise Wind New York Cable Project |
| PSL | New York Public Service Law |
| RARMS | Risk Assessment with Risk Mitigation Strategy |
| ROW | right-of-way |
| SRWEC | Sunrise Wind Export Cable |
| SRWEC–NYS | Sunrise Wind Export Cable–New York State |
| SRWF | Sunrise Wind Farm |
| SSS | side-scan sonar |
| TJB | transition joint bay |
| US | United States |
| USACE | United States Army Corps of Engineers |

# EXHIBIT E-3: UNDERGROUND CONSTRUCTION

In accordance with New York Public Service Law (PSL) § 122 and 16 New York Codes, Rules and Regulations (NYCRR) § 88.3, this exhibit provides a description of the proposed underground transmission line including: (a) the type of cable system to be used; (b) the design standards for that system; (c) the number and size of conductors to be used; and (d) a profile on the line indicating: (1) the depth of the cable; and (2) the location of oil pumping stations and manholes, where applicable.

## E-3.1 INTRODUCTION

Sunrise Wind LLC (Sunrise Wind or the Applicant), a 50/50 joint venture between Orsted North America Inc. (Orsted NA) and Eversource Investment LLC (Eversource), proposes to construct, operate, and maintain the Sunrise Wind New York Cable Project (the Project). Sunrise Wind executed a 25-year Offshore Wind Renewable Energy Certificate (OREC) contract related to the Sunrise Wind Farm (SRWF) and the Project with the New York State Energy Research and Development Authority (NYSERDA) in October 2019. The Project will deliver power from the SRWF, located in federal waters on the Outer Continental Shelf (OCS), to the existing electrical grid in New York (NYS). The Project includes offshore and onshore components within NYS that are subject to PSL Article VII review and will interconnect at the existing Holbrook Substation, which is owned and operated by the Long Island Power Authority (LIPA).

Specifically, power from the SRWF will be delivered to the existing mainland electric grid via distinct Project segments: the submarine segment of the export cable (SRWEC), which will be located in both federal and NYS waters (the NYS portion of the cable referred to as the SRWEC–NYS); the terrestrial underground segment of the transmission cable (Onshore Transmission Cable); the new Onshore Converter Station (OnCS–DC); and the underground segment of the interconnection cable (Onshore Interconnection Cable). The Onshore Transmission Cable, the OnCS–DC, and Onshore Interconnection Cable (collectively, the Onshore Facilities) are all located in the Town of Brookhaven, Suffolk County, New York.

The Project's components are generally defined into two categories:

- SRWEC–NYS
    - One direct current (DC) submarine export cable bundle (320 kilovolt [kV]) up to 6.2 miles (mi) (10 kilometers [km]) in length in NYS waters and up to 1,575 feet (ft) (480 meters [m]) located onshore (*i.e.*, above the Mean High Water Line [MHWL], as defined by the United States [US] Army Corps of Engineers [USACE] [33 Code of Federal Regulations (CFR) 329]) and underground, up to the transition joint bays (TJBs).

- Onshore Facilities
  - One DC underground transmission circuit (320 kV) (referred to as the Onshore Transmission Cable) up to 17.5 mi (28.2 km) in length within existing roadway right-of-way (ROW), TJBs, and concrete and/or direct buried joint bays and associated components;
  - One OnCS–DC that will transform the Project voltage to 138 kV alternating current (AC);
  - Two AC underground circuits (138 kV) (referred to as the Onshore Interconnection Cable) up to 1 mi (1.6 km) in length, which will connect the new OnCS–DC to the existing Holbrook Substation; and
  - Fiber optic cables co-located with both the Onshore Transmission Cable and Onshore Interconnection Cable.

## E-3.2 CABLE SYSTEM DESIGN

Power from the SRWF will be delivered to the electric grid via distinct transmission cable segments: the SRWEC and Onshore Transmission Cable will carry the power to the OnCS–DC, and the Onshore Interconnection Cable will inject the power to the existing grid at the point of interconnection.

The SRWEC–NYS will be up to 6.2 mi (10 km) long and will be installed within the corridor as described in Revised Exhibit 2: Location of Facilities. The SRWEC–NYS will consist of one cable bundle comprised of two cables traversing through NYS waters. Each cable within the single bundle will consist of one copper or aluminum conductor core surrounded by layers of cross-linked polyethylene insulation and various protective armoring and sheathing to protect the cable from external damage and keep it watertight. A fiber optic cable will be bundled together with the two main conductors.

The SRWEC–NYS will be spliced to the Onshore Transmission Cable at co-located TJBs and link boxes located at Smith Point County Park on Fire Island in the Town of Brookhaven, New York.

The Onshore Transmission Cable will be up to 17.5 mi (28.2 km) long and will be installed within the corridor as described in Revised Exhibit 2: Location of Facilities. At the TJB, the two monopole cables will be spliced into two Onshore Transmission Cables (each comprising a single phase cable) and two fiber optic cables. Each cable will consist of one copper or aluminum conductor core surrounded by layers of cross-linked polyethylene insulation and sheathing to protect the cable from external damage and keep it watertight.

The Onshore Interconnection Cable will be up to 1.0 mi (1.6 km) long and will be installed within the corridor as described in Revised Exhibit 2: Location of Facilities.

Design details of the SRWEC–NYS and Onshore Transmission Cable are included within Revised Exhibit 5: Design Drawings and Revised Exhibit E-1: Description of Proposed Line. The preliminary plans of the SRWEC–NYS from the NYS line to the TJB is provided in Figure 5.3-2, including preliminary target burial depths. The preliminary plans of the Onshore Transmission Cable from the TJB to the OnCS–DC is provided in Figure 5.3-4, including the indicative location of splice boxes (*e.g.*, manholes).

### E-3.2-1 Design Standards

The Project will be designed to meet National Electric Safety Code (NESC), and all applicable Institute of Electrical and Electronics Engineers (IEEE) standards.

## E-3.3 UNDERGROUND CONSTRUCTION

The Onshore Transmission Cable and Onshore Interconnection Cable and have different construction parameters than the SRWEC–NYS; therefore, these transmission components are described separately. The construction methodology described below follows the anticipated order of construction. As such, the construction methodology of the Onshore Transmission Cable and Onshore Interconnection Cable are described in Section E-3.3.1. The construction methodology of the SRWEC–NYS is described in Section E-3.3.2.

### E-3.3.1 Onshore Transmission Cable and Onshore Interconnection Cable Construction

Construction of the Onshore Transmission Cable and Onshore Interconnection Cable will involve site preparation, trench excavation, duct bank and vault installation, cable installation, cable jointing (splicing), final testing, and restoration, with additional steps associated with horizontal directional drilling (HDD) and other trenchless crossing methods. The typical underground transmission cable construction sequence is provided in Table E-3.3-1.

Temporary laydown yards will be required to support the staging of necessary equipment and materials for the installation of the Onshore Transmission Cable and Onshore Interconnection Cable. Locations selected for the use of temporary laydown yards will be approved by the applicable permitting agencies prior to utilization. These areas will be generally confined to locations containing open land or previously disturbed commercial/industrial sites with existing roadway access, such that no or minimal site improvements are required. Following the completion of the Project, locations used for temporary laydown yards will be restored to pre-existing conditions and/or accordance with landowner requests and permit requirements.

**Table E-3.3-1. Typical Underground Transmission/Interconnection Cable Construction Sequence**

| Activity/Action | Construction Details |
|---|---|
| Surveys and Protection of Sensitive Areas | Work along the cable route will begin with the survey, staking, and protection of any sensitive areas/services. Access to the work area will then be established and the required safety measures will be implemented. |

| Activity/Action | Construction Details |
|---|---|
| Site Preparation | Site preparation involves the surveying and staking the proposed cable alignments, implementation of the specified traffic control measures required to perform the work, and soil erosion control methods to prevent runoff into the existing infrastructure and sensitive areas. This stage of the construction will also include identification of any existing underground utilities (DigSafe or test pits) along the proposed alignment. |
| Clearing and Grading | The work area for the cable route will be cleared of vegetation (where required), and temporary environmental erosion controls such as swales and erosion control socks will be installed in accordance with best management practices (BMPs). These controls will be maintained until the site is restored and stabilized. Portions of the work area may also require grading. |
| Duct Bank and Vault Installation | Splice vaults will be spaced approximately every 1,800 to 2,200 ft (549 to 671 m) along the route to facilitate the pulling and splicing of cable. These will typically be precast concrete pieces (top and bottom) set within an excavation pit, and then backfilled. The cable duct bank will connect the vaults along the route and consists of conduits installed within an approved concrete or thermal equivalent material. The duct bank will be installed via open trench excavation for the majority of the Project. Once excavated, the conduit will be arranged within the open trench per the design drawings and held in place using conduit spacers to allow the concrete to be poured and set around the ducts. Once the concrete has been poured, it will be allowed to set up to a specific strength before the trench is backfilled. The backfill must meet certain heat transfer requirements and may consist of a fluidized thermal backfill (*i.e.*, weak mix concrete) or a compacted sand or approved gravel mixture. This operation will be repeated until all conduit and concrete has been installed to the specified jointing locations (*i.e.*, manholes, termination structures, etc.). At the completion of the installation, all conduits will be proofed and mandreled to verify continuity of the raceway for cable installation. |
| Trenchless Installation | The Project will utilize trenchless crossing installation to avoid sensitive environmental resources or other physical obstructions (*i.e.*, railroads) at certain crossing locations. Most of the onshore trenchless installation(s) will utilize the “pipe-jacking” method, which consists of excavating a pit on each side of the crossing to facilitate forcing, or jacking, a pipe under a crossing (*i.e.*, railroad). Alternatively, the use of an HDD may be required, which will consist of boring a pilot hole to provide the correct alignment. Once the pilot hole has been completed, the hole will be reamed out to the specific diameter for the ducts within which the cable will be installed to be pulled into the borehole. The installed ducts will facilitate the installation of the power cable and fiber optic cable.<br>To minimize the potential risks associated with an inadvertent drilling fluid return/release, an Inadvertent Return Plan for the inadvertent release of drilling fluids will be developed prior to construction and will implement appropriate BMPs. |
| Cable Installation | Upon completion of the proofing and mandreling of the conduits, cable-pulling operations can begin. The cable will be pulled through the duct bank conduits from vault to vault, and is cut leaving a sufficient amount of cable to perform the jointing operations. Once pulling has been completed, and appropriate testing of the cable performed to ensure no damage has occurred during installation (*i.e.*, cable jacket integrity test). The cables will then be sealed to prevent moisture ingress until jointing operations can be performed. |
| Cable Jointing | Cable jointing refers to the splicing and/or terminating of the cables. Splicing and terminating is performed once all the cables for a specific section have been successfully pulled into the vault, jointing bay, or termination structure. Once splicing and terminating is complete, the cables and accessories will be secured to the associated racking systems with the use of cable clamps. This mitigates lateral movements experienced by the cable during operation. |
| Final Restoration Activities | Once the duct bank and splice vaults have been installed, permanent restoration as required by the governing authority will be completed. For roadway installations, this will include the surface repaving, including installment of the road subbase and base layers followed by the surface layer (*i.e.*, concrete or asphalt). For installations outside of roadways, such as greenbelt areas, final restoration typically involves backfilling to the original grade elevation and hydroseeding to prevent soil erosion. |

Installation of the Onshore Transmission Cable will generally require excavation of a trench within a temporary disturbance corridor. The Onshore Transmission Cable will be installed within a concrete or thermal equivalent duct bank buried to a depth consistent with local utility standards. From the OnCS–DC, the Onshore Interconnection Cable will also be installed underground within a duct bank to the Holbrook Substation. A typical configuration of an underground onshore transmission circuit is shown in Figure E-3.3-1. A typical configuration of the installation setup for installation of an underground Onshore Transmission Cable is shown in Figure E-3.3-2. A typical configuration of an underground onshore interconnection circuit is shown in Figure E-3.3-3.

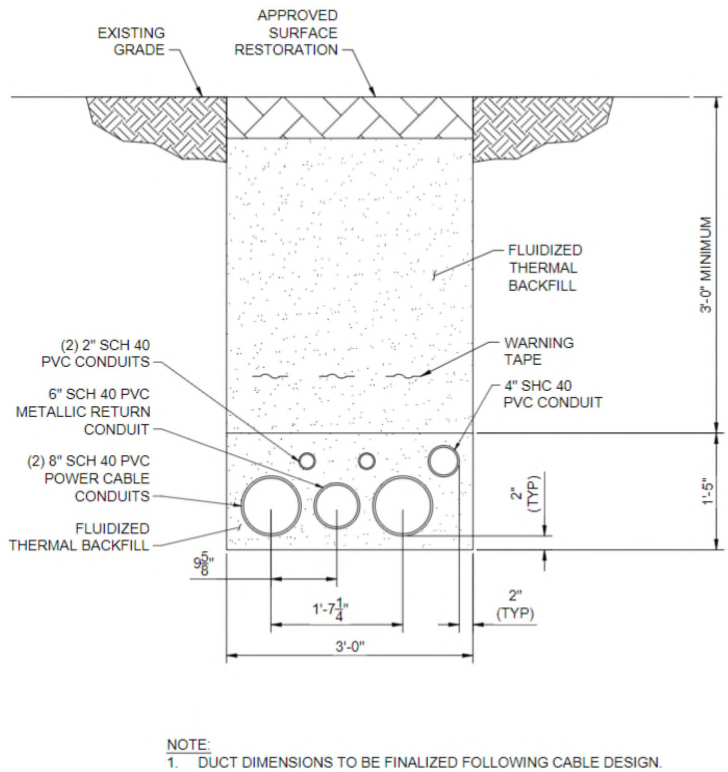


**Figure E-3.3-1 Typical Installation Configuration of Underground Onshore Transmission Circuit**

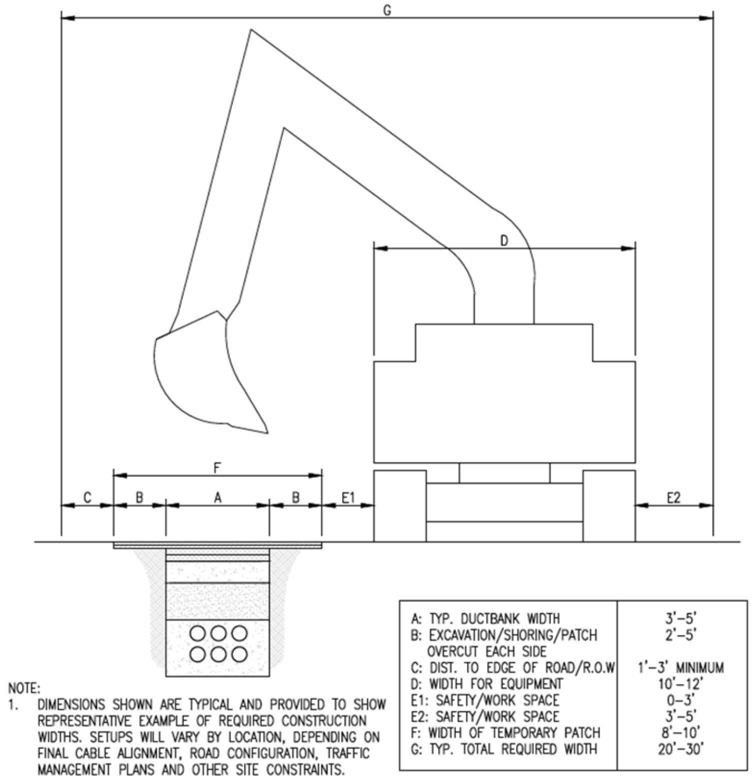


**Figure E-3.3-2 Typical Underground Onshore Transmission Circuit Installation within a Road ROW**

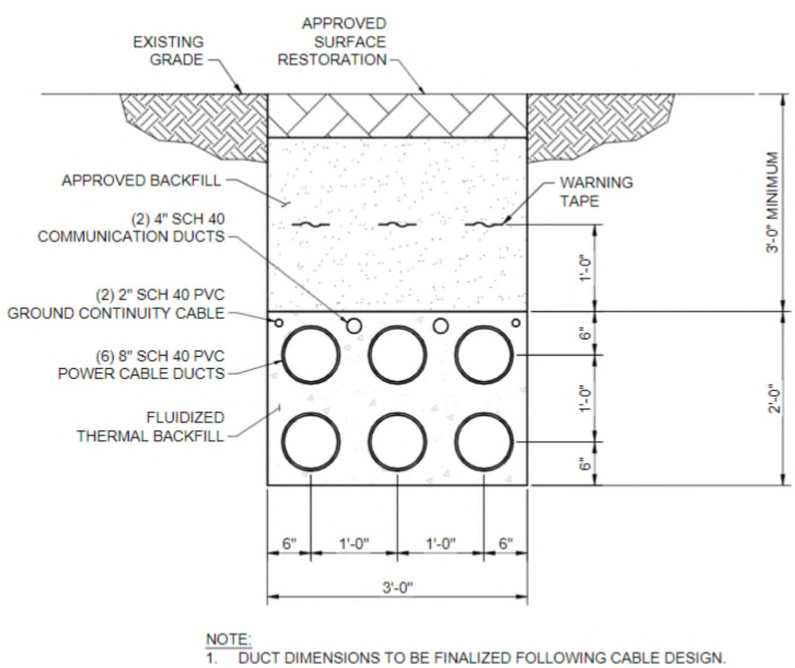


**Figure E-3.3-3 Typical Installation Configuration of Underground Onshore Interconnection Circuit**

Due to the length of Onshore Transmission Cable, sections of cable will need to be spliced together with joints for each circuit. Splicing will occur along the entirety of the route approximately every 1,800 to 2,200 ft (549 to 671 m). At each splice location, a splice vault/pit will be required. Once a detailed below grade utility survey is completed, more refined distances between splice vaults/pits can be determined based upon site specifics. In these locations, the temporary disturbance area required will be larger than for the duct bank installation. The splice vaults will be buried to a depth consistent with local utility standards. The entire temporary disturbance corridor will be restored to pre-construction conditions following installation of the Onshore Transmission Cable.

The maximum design scenario for the construction of the Onshore Transmission Cable and Onshore Interconnection Cable is provided in Table E-3.3-2.

**Table E-3.3-2. Onshore Transmission/Interconnection Cable Construction Maximum Design Scenario**

| Onshore Transmission/ Interconnection Cable Feature | Maximum Design Scenario |
|---|---|
| Temporary Disturbance Width a/ | 30 ft (9.1 m) |
| Trench Width | 8 ft (2.4 m) |
| Duct Bank Target Burial Depth (to top of concrete) b/ | 3 to 6 ft (0.9 to 1.8 m) |
| Splice Vault Construction Disturbance Area | 50 ft x 40 ft (15 m x 12 m) |
| Splice Vault Burial Depth (from surface to bottom of the vault) | Up to 15 ft (4.6 m) |

NOTES:
a/ Maximum temporary disturbance width excludes disturbance area for crossing locations and splice vaults.
b/ Duct bank target burial depth with vary based on site-specific conditions and may be deeper in areas of HDD or trenchless crossings.

Installation of the Onshore Transmission Cable and Onshore Interconnection Cable will result in the crossing of multiple waterways, major roadways, and/or railroads, which will require additional temporary disturbance areas to support the setup of equipment necessary to perform each crossing. The maximum design scenario, identifying the associated crossing method, overall crossing distance, approximate area of temporary and/or permanent impact, along with a description of the workspace locations that will be impacted to facilitate the various major crossings are provided in Revised Table E-3.3-3. For the intracoastal waterway (ICW) HDD crossing (ICW HDD) the Applicant will install up to two HDDs, including one for the transmission circuit, as well as one additional to be used as a spare in the event of a drilling failure.

**Revised Table E-3.3-3. Onshore Transmission/Interconnection Cable Crossing Locations Maximum Design Scenario**

| Crossing Name | Crossing Method | Approximate Crossing Length | Approximate Area of Temporary Disturbance | Description of Location and Potential Impacts |
|---|---|---|---|---|
| **Onshore Transmission Cable** | | | | |
| Intracoastal Waterway (ICW) | HDD | 2,660 ft (811 m) | 80,000 sq ft<br>(7,432 $m^2$) | Parking lot at Smith Point Marina located off East Concourse/Duneview Drive on the north side of Narrow Bay<br>Recreational area at Smith Point County Park, west of William Floyd Parkway on the south side of Narrow Bay |
| Long Island Rail Road (LIRR) Crossing at Church Road | Pipe Jacking | 93 ft (28 m) | 5,300 sq ft<br>(493 $m^2$) | Green space to the north of LIRR along paper road<br>Green space to the south of LIRR along paper road |
| Sunrise Highway (State Route [SR] 27 at Revilo Avenue | Trenchless Crossing | 877 ft (267 m) | 38,700 sq ft<br>(3,596 $m^2$) | Green space within NYSDOT owned retention basin to the south of Sunrise Highway east of Revilo Avenue<br>Green space to the north of Sunrise Highway<br>Paved roadway of Revilo Avenue to the north of Sunrise Highway |
| Carmans River Crossing | HDD | 1,990 ft (607 m) | 75,000 sq ft<br>(6,968 $m^2$) | Green space to the north of Victory Avenue within Southaven County Park to the west of Carmans River<br>Southern edge of ROW and paved shoulder of Victory Avenue to the east of Carmans River<br>Southern edge of ROW and paved shoulder of Victory Avenue to the west of Carmans River |
| Manor Road Crossing of LIRR | Pipe Jacking | 99 ft (30 m) | 5,000 sq ft<br>(465 $m^2$) | Green space to the north of LIRR on Manor Road<br>Paved portions of Manor Road and green space to the south of LIRR |
| **Onshore Interconnection Cable Route** | | | | |
| Long Island Expressway (LIE) (I-495) Trenchless Crossing - LIPA ROW | Pipe Jacking | 400 ft (122 m) | 5,800 sq ft<br>(539 $m^2$) | Green space on North Service Road, LIPA overhead transmission ROW<br>Green Space to the south of South Service Road, LIPA overhead transmission ROW |

### E-3.3.2 SRWEC–NYS

**SWREC–NYS Landfall Construction**

The Applicant will land the SRWEC–NYS at the landfall location via HDD methodology. Up to three HDDs will be installed to support the landfall of the SRWEC–NYS (the Landfall HDD), including one for each of the transmission cables of the bundle, as well as one additional third borehole to be used if it is technically or physically infeasible for the fiber optic cable to be included with the transmission cables. Up to two ducts will be installed in each drilled hole, one for the transmission cable, and one for the fiber optic cable.

The HDD methodology selected is expected to have a minimum impact on coastal resources at Smith Point County Park (the Landfall Work Area). The HDD methodology will require temporary use of the Landfall Work Area located onshore within which the TJBs will be installed and HDD construction activities will occur, including cable pull in activities. HDD cable duct stringing activities are not included in the Landfall Work Area. Three approaches are being explored for the HDD path for the SRWEC–NYS to reach the Landfall Work Area due to the presence of an existing telecommunications cable in proximity to the landfall location:

- Landfall HDD A would require no crossing of the existing telecommunications cable with the SRWEC–NYS. If Landfall HDD A were utilized, the existing telecommunications cable would be crossed onshore with the Onshore Transmission Cable.
- Landfall HDD B would require crossing of the existing telecommunications cable with the HDD itself, and the SRWEC–NYS would cross beneath the existing telecommunications cable via HDD.
- Landfall HDD C would involve crossing the existing telecommunication cable further offshore.

Each approach falls within the SRWEC–NYS corridor (as described in Revised Exhibit 2: Location of Facilities) and is being studied and selection of an approach will be dependent on review of the final geotechnical and geophysical (G&G) survey data and continued coordination with the telecommunication cable owner, Suffolk County Parks Department, and National Park Service (NPS).

The HDD methodology will involve drilling a horizontal bore underneath the seafloor surface and the intertidal area using a drilling rig located onshore within the Landfall Work Area. The process uses drilling heads and reaming tools of various sizes controlled from the rig to create a passage that is wide enough to accommodate the cable duct. Drilling fluid, comprised of bentonite, drilling additives, and water is pumped to the drilling head during the drilling process to stabilize the hole preventing collapse, and to return the cuttings to the rig site where the cuttings will be separated from the drilling fluids and the fluid recycled for re-use. The Applicant will use a casing pipe, if the geology and site is suitable, to support drilling operations. The casing pipe will contain and collect drilling fluid within the casing to minimize dispersal into the marine environment. The casing pipe solution will likely require a steel casing and supporting sheet piles to be installed temporarily at the HDD exit pit locations during HDD installation and provide a closed system for the drilling fluids. Additional details will be provided in the Project Environmental Management and Construction Plan (EM&CP).

A temporary sheetpile anchor wall may be installed onshore in front of the HDD rig to anchor the rig into position and provide stability while conducting drilling activities. Due to the forces exerted during the HDD installation process, particularly while the HDD rig is used to pull the duct through the borehole from offshore to onshore, additional stability provided by the sheet piles are required for the onshore rig. Additional details will be provided in the Project EM&CP.

In addition to the anchor wall, the workspace may also require the installation of other temporary sheetpiles to aid in anchoring of the rig and/or to provide soil stabilization of the excavated area. The location of the Landfall Work Area is depicted in Figure 4.7-1 in Revised Exhibit 4: Environmental Impact and Revised Exhibit 5: Design Drawings. A simplified HDD installation schematic is provided in Figure E-3.3-4.

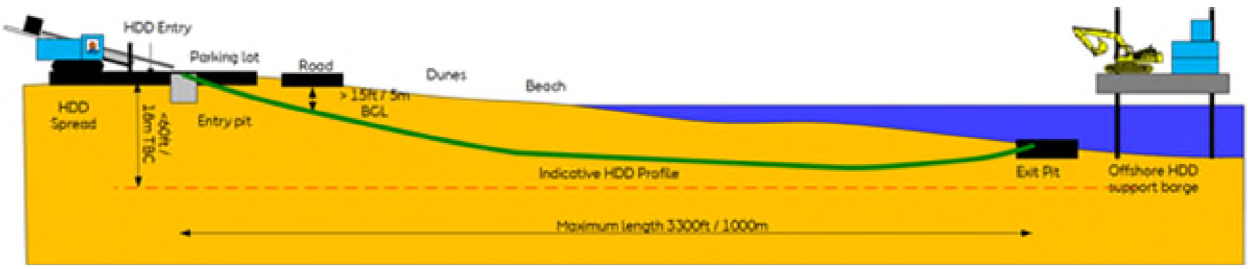


**Figure E-3.3-4 Simplified Landfall HDD Schematic**

Once the bore has been sufficiently enlarged and cleansed, the duct is connected to the drill string either on the barge or with the assistance of divers and the marine support spread and pulled into the prepared hole by the onshore HDD rig from offshore towards the drilling rig located at the Landfall Work Area. The duct will be assembled offsite and floated to the site by tugs, or it will be assembled on the beach at Smith Point County Park and maneuvered offshore for installation. If assembled on the beach, this action would require welding and short-term placement (*i.e.*, 2–3 weeks per duct) of assembled HDD conduit sections laid out on approximately 3,500 ft (1,067 m) of beach. HDD conduit stringing is anticipated to occur between October and March.

Up to two ducts will be installed in each drilled hole, one for the transmission cable, and one for the fiber optic cable, pending engineering design. Once the duct(s) are installed in the first drilled hole, the drilling rig will be repositioned, and the process will be repeated for drilling and installing the next duct(s). The offshore duct end will be laid down and secured using a suitable form of ballast such as concrete mattress and/or rock bags awaiting the subsequent installation of the export cable. When the export cable installation begins, a pull winch attached to either a piled anchor or a gravity anchor (*e.g.*, a large bulldozer) will then be used to pull the cable through the conduit. The Applicant will drill up to three HDDs to support the landfall of the SRWEC–NYS. Depending on the geology and engineering design, the fiber optic cable will either be installed in one of the boreholes that contains one of the transmission cables or the fiber optic cable will be installed separately in the third HDD borehole. Following installation, the HDD exit pits would be predominantly backfilled.

To support HDD installation, HDD exit pits will be excavated offshore within the surveyed corridor and outside of the Fire Island National Seashore boundary. HDD exit pits (one per HDD) will be excavated where the drill will reach the seafloor surface and to support subsequent burial of the HDD duct beneath the seabed. Upon completion of the excavation of the offshore exit pit(s), it is anticipated that temporary rock bags may be lowered into the excavation from the marine support vessel. The rock bags will prevent the natural backfill of the excavation during the drilling process and therefore prevent a need to re-excavate later. Once the drilling has been completed, the rock bags will be removed to enable the lowering of the duct end and awaiting subsequent cable installation and final backfill of the excavation. The depth and actual length of the HDD will depend on the soil conditions and final cable specifications. A barge or jack-up vessel may be used at this location to assist the drilling process, excavate the exit pit, and handle the duct for pull in. To minimize the potential risks associated with an inadvertent drilling fluid return/release, the Applicant will develop an Inadvertent Return Plan as part of the Project EM&CP for the inadvertent release of drilling fluids.

The maximum design scenario for the Landfall HDD is provided in Table E-3.3-4.

**Table E-3.3-4. Landfall HDD Maximum Design Scenario**

| HDD Feature | Maximum Design Scenario |
|---|---|
| Number of HDDs a/ | 3 |
| Number of HDD Cable Ducts b/ | 6 |
| Diameter of Ducts | 3.0 ft (0.9 m) |
| Maximum Length of Ducts | 0.9 mi (1.5 km) |
| HDD Target Burial Depth c/ | 5–75 ft (1.5–25 m) |
| HDD Exit Pit dimensions (Length x Width x Depth) | 164 ft x 49 ft x 16 ft (50 m x 15 m x 5 m) |
| Onshore HDD Temporary Anchor Wall Dimensions | 33 ft (10 m) wide, driven to a depth of 26 ft (8 m) |

NOTES:
a/ Assumes up to three HDDs at the cable landfall location (one for each transmission cable of the bundle).
b/ Assumes 6 ducts (2 ducts per HDD)
c/ The depth of drilling will be defined during the engineering process.

Once the Landfall HDD is installed and cable pull in has occurred, the SRWEC–NYS will be installed via excavation of a trench from the Landfall HDD onshore entry point to the TJB where the jointing of the SRWEC–NYS and Onshore Transmission Cable will occur. The trenching will be completed via open cut and possibly extending the ducts installed for the Landfall HDD to the TJBs. The trenching between the Landfall HDD onshore entry point and the TJB will occur within the Landfall Work Area. The maximum disturbance areas for construction and operation of the SRWEC– NYS Landfall are provided in Table E-3.3-5.

**Table E-3.3-5. Maximum Disturbance Areas for SRWEC–NYS Landfall**

| Parameter | Maximum Area of Disturbance |
|---|---|
| **Onshore** | |
| Landfall Work Area a/ b/ | 6.5 acres (2.6 hectares [ha]) |

| Parameter | Maximum Area of Disturbance |
|---|---|
| **Onshore** | |
| TJB Area (per TJB) c/ | 0.03 acres (0.0125 ha) |
| **Offshore** | |
| Area of Seafloor Disturbance for HDD Exit Pits a/ d/ | 61.8 acres (25 ha) |

NOTES:

a/ Post construction, all work areas would be graded and/or backfilled and returned to pre-construction conditions.

b/ The Landfall Work Area defines the area within which the indicative work space and ancillary equipment will be sited. The anticipated area used will be a minimum of 328 ft x 328 ft (100 m x 100 m) within the Landfall Work Area. The work area is inclusive of all Landfall HDD installation activities, including onshore trenching between end of HDD ducts and TJB is included, as well as construction of TJBs and link boxes. Trenching of the Onshore Transmission Cable from the TJB to the ICW Work Area and HDD cable duct stringing activities are not included in this area. Area assumes 328 ft x 328 ft (100 m x 100 m).

c/ 82 ft x 16 ft (25 m x 5 m), not including link boxes or fiber optic cable boxes.

d/ HDD exit pits will be approximately 164 ft x 49 ft x 16 ft (50 m x 15 m x 5 m) in dimension; a maximum of three exit pits will be required for the Project. Area of Disturbance is inclusive of the HDD exit pit and perimeter bund, anchoring area (approximately 1,640 ft x 1,640 ft [500 m x 500 m]) and separation of the HDD exit pits at the seafloor (HDD exit pits will be approximately 328 ft [100 m] apart).

### Offshore SWREC–NYS Cable Installation

Installation of the SRWEC–NYS consists of a sequence of events, including pre-lay cable surveys, seafloor preparation, cable installation, beginning with cable pull in to the landfall, joint construction, cable installation surveys, and cable protection as summarized in Revised Table E-3.3-6. The following subsections describe seafloor preparation, cable installation methodologies, and cable protection strategies further.

**Revised Table E-3.3-6. Typical Offshore Export Cable Installation Sequence**

| Activity/Action | Construction Summary |
|---|---|
| Pre-lay Cable Surveys | Prior to installation, geophysical surveys will be performed to check for debris and obstructions that may affect cable installation. |
| Seafloor Preparation | Seafloor preparation will include required sand wave leveling, boulder clearance, and removal of any out of service cables. Boulder clearance trials may be performed prior to wide-scale seafloor preparation activities to evaluate efficacy of boulder clearing techniques. |
| Pre-Lay Grapnel Runs (PLGR) | PLGR runs will be undertaken to remove any seafloor debris along the export cable route. A specialized vessel will tow a grapnel rig along the centerline of each cable to recover any debris to the deck for appropriate licensed disposal ashore. |
| Cable Installation | Following cable pull in at the landfall through the Landfall HDD cable pipe, the HDD duct will be filled with thermal grout. From the landfall location towards the SRWF, the offshore cable laying vessel will move along the pre-determined route within the established corridor. Cable lay and burial trials within the 98-ft (30-m)-wide disturbance corridor may be performed prior to main cable installation activities to test equipment. The cable bundle will be laid on the seafloor and then trenched post-lay. Alternatively, a trench may be pre-cut prior to cable installation. Multiple passes may be required to reach the target burial depth. |
| Cable Installation Surveys | Cable installation surveys will be required, including pre- and post-installation surveys, to determine the cable lay-down position and the cable burial depth. Depending on the instruments selected, type of survey, length of cable, etc., the survey will be completed by vessel mounted equipment. |

| Activity/Action | Construction Summary |
|---|---|
| Cable Protection | After multiple passes are made to reach the target burial depth are made, minimal use of cable protection in the form of rock placement, rock/grout bags and/or mattresses may be installed in areas where the target burial depths have not been achieved depending on factors such as the as-built burial depths, cable burial risk and suitability to perform remedial works. Cable protection will be installed from an anchored or dynamic position (DP) support vessel that will place the protection material over the designated area(s). |

*MEC/UXO Risk Mitigation*

While during Project construction the likelihood of munitions and explosives of concern/unexploded ordnance (MEC/UXO) encounter is very low, prior to seafloor preparation, cable routing, and micro siting of all assets, the Project will implement a MEC/UXO Risk Assessment with Risk Mitigation Strategy (RARMS) designed to evaluate and reduce risk in accordance with the As Low As Reasonably Practicable (ALARP) risk mitigation principle. The RARMS consists of a phased process beginning with a Desktop Study and Risk Assessment that identifies potential sources of MEC/UXO hazard based on charted MEC/UXO locations and historical activities, assesses the baseline (pre-mitigation) risk that MEC/UXO pose to the Project, and recommends a strategy to mitigate that risk to ALARP.

If encountered, the Applicant will work with applicable agencies to identify appropriate response actions, which may include developing an emergency response plan, conducting MEC/UXO-specific safety briefings, retaining an on-call MEC/UXO consultant, or other measures to evaluate and reduce MEC/UXO risk in accordance with the ALARP risk mitigation principle.

*Boulder Removal*

Boulder removal may be required in targeted locations to clear boulders along the SRWEC–NYS prior to installation. Boulder removal can be performed using a combination of methods to optimize clearance of boulder debris of varying size and frequency. Removal is based on pre-surveys to identify location, size, and density of boulders. Where required, the Applicant has assumed the route would be cleared of boulders up to 98 ft (30 m) in width along the final SRWEC–NYS centerline of each cable. Boulder removal would occur prior to installation and would be completed by a support vessel based on pre-construction surveys. The following two techniques may be used to complete boulder removal prior to installation of the SRWEC–NYS:

- **Boulder Grab:** Boulder grabs are most likely deployed from a DP offshore support vessel and are completed prior to cable installation works. Removal is based on pre-construction surveys to identify both location and size of boulders. This method is typically used to remove large boulders and is most suited to low density boulder areas. A drawing of a typical boulder grab configuration is provided in Figure E-3.3-5.

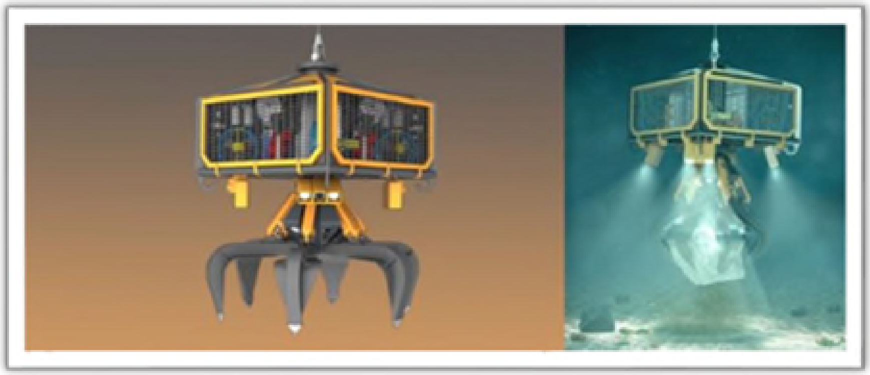

**Figure E-3.3-5 Typical Boulder Grab Configuration**

The typical boulder grab methodology includes the following steps:

1. A grab is lowered to the seafloor over the target boulder.
2. Once grabbed, the boulder is either relocated away from the lay corridor or recovered to deck.

- **Boulder Plow**: Boulder removal is completed by a high-bollard pull vessel prior to cable installation works. A towed plow is configured for boulder clearance, generally forming an extended V-configuration, splaying from the rear of the main chassis. A drawing of a typical boulder plow configuration is provided in Figure E-3.3-6.

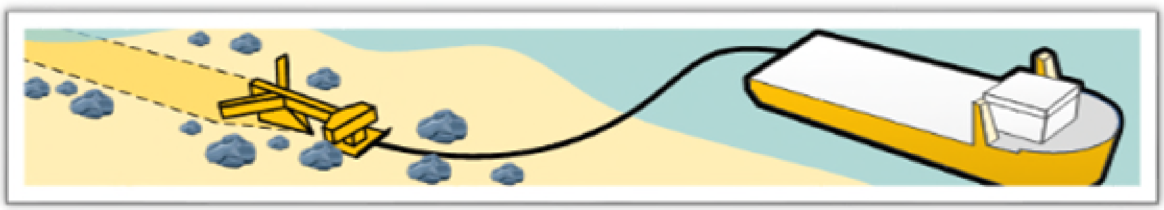

**Figure E-3.3-6 Typical Boulder Plow Configuration**

The typical boulder plow methodology includes the following steps:

1. The vessel is positioned on the cable route and the plow is launched and lowered to seafloor.
2. The vessel moves along the route dragging the plow along the seafloor.
3. The “V” shaped configuration forces boulders to the plow’s extremities, thus establishing a clear corridor for cable installation.
4. Multiple passes of the boulder plow along the cable route may be required to gain the required width.

5. Boulder grab campaign could be required afterwards to remove any remaining boulders.
6. On completion of the operation, a post clearance survey is carried out, using either Multibeam Echo Sounding (MBES) or a Side-Scan Sonar (SSS) to confirm that boulder removal has been achieved.

*Sand Wave Leveling*

Sand wave leveling may also be required during seafloor preparation activities prior to installation of the SRWEC–NYS. Sand waves have been identified along the SRWEC–NYS corridor. The Applicant has assumed a maximum of 40 percent of the SRWEC–NYS corridor will require sand wave leveling before the cable can be installed. This is a conservative estimate as it assumes that all seafloor features along the route are mobile; the actual number will be refined following the results of the ongoing geophysical surveys and additional sediment mobility studies (see Section 4.5 and 4.11 of Revised Exhibit 4: Environmental Impact). Where required, the Applicant has assumed the 98-ft (30-m) construction corridor per cable would be cleared of sand waves. Sand wave removal is typically completed for the following reasons:

- Many of the cable installation tools proposed require a relatively-flat seafloor surface so that the operational criteria (pitch and roll) of the tools is not exceeded. The seafloor slope angles may be leveled to ensure burial tool maneuverability. The maximum acceptable slope angle will depend on the burial tool selected; and
- Export cables must be buried beneath the stable seafloor elevation to avoid cable exposure during the lifetime of the Project. A portion of the dynamic seafloor layer may be removed if the stable seafloor elevation if out of the burial tool's reach.

Available methodologies for sand wave leveling include dredging and controlled flow excavation (CFE), which can be used as stand-alone or in combination. CFE methodology is described below in the export cable installation methodology section. The dredging technique is used to recover and relocate material from one location to another by means of suction hopper dredger, as described below.

- **Suction Hopper Dredger**: This system consists of one or more suction downpipes equipped with a seafloor drag head. The drag head is towed over the sand wave by the vessel, while a pump system "sucks" fluidized sand into the vessel's storage hopper. Any sediment removed would be relocated within the local sand wave field along the SRWEC–NYS corridor. Once full, the vessel can relocate to a designated storage or disposal area, and either offload material through a hatch in the vessel's hull, or more carefully position material subsea via means of a downpipe.

*Pre-Lay Grapnel Run*

Seafloor preparation activities including PLGR may be required prior to installation of the SRWEC–NYS during seafloor preparation activities. A PLGR campaign is carried-out to remove debris such as wires, ropes, fishing nets, and out of service cable removal from the seafloor. The goal of this process is to remove any risk of entanglements with submarine cables and installation tools.

Once deployed on the seafloor, the PLGR equipment is towed once along the planned submarine cables route within an accuracy of approximately +/- 32 ft (10 m) and a penetration depth of up to 1.6 ft (0.5 m) (subject to soil conditions). Best practice recommends a PLGR campaign to take place no more than two weeks prior to the start of the submarine cable installation campaign.

*Offshore Export Cable Installation Methodology*

Selection of cable installation methodologies is dependent on sediment conditions. As sediment conditions range along the SRWEC–NYS corridor, several different cable installation methodologies may be required during installation. The Applicant has completed preliminary geophysical surveys of the SRWEC–NYS corridor to inform preliminary cable routing and selection of the most appropriate tools for installation of the SRWEC–NYS to the target burial depths. The cable bundle will be laid on the seafloor and then trenched post-lay. Alternatively, a trench may be pre-cut prior to cable installation. Based on current understanding of site-specific conditions along the corridor, the Applicant is considering the following techniques to support cable installation, as described below.

- **Jet-Plowing:** This technique involves the use of water jets to fluidize the soil, temporarily opening a channel to enable the cable to be lowered under its own weight or be pushed to the bottom of the trench via a cable depressor. The cable is typically installed after the cable has been laid on the seafloor (post-lay burial). A drawing of a typical jet plow (post-lay burial) configuration is provided in Figure E-3.3-7.

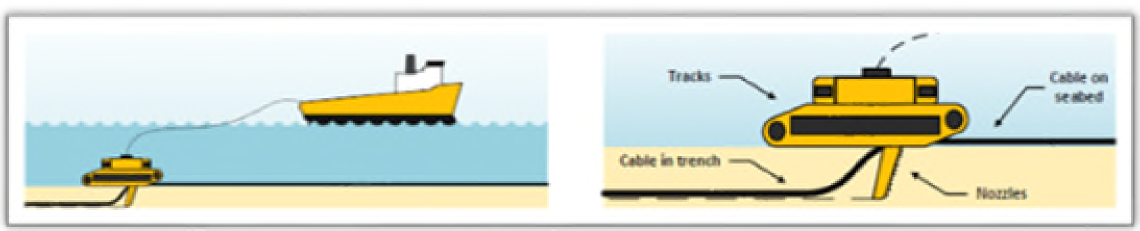


**Figure E-3.3-7 Typical Configuration of a Jet Plow (Post-lay Burial)**

The typical jet plow installation methodology includes the following steps:

1. The cable is laid on the seafloor and as-laid/found data is supplied to the burial vessel.
2. The tool is launched and landed on the seafloor. The tool is typically lowered to the seafloor with a safe distance from any existing subsea cables or pipelines.

3. Once deployed on the seafloor, the tool will drive over the surface laid cable. It may be necessary to land the tool over the cable.
4. The tool is then positioned so that the cable is centralized between the tracks (as applicable).
5. Once in position, the jetting swords are powered and lowered, fluidizing the local seafloor.
6. The tool moves forward, and the cable is deployed within the trench under gravity or by depressor.
7. Multiple passes may be required to reach the target burial depth.
8. On completion of post lay cutting operations, a post burial survey is carried out using a combination of MBES or SSS to confirm the mean seafloor and a cable detection system to confirm the target cable burial depth.

- **Mechanical Cutting:** This technique employs either a cutting wheel or an excavation chain to cut a narrow trench into the seafloor allowing the cable to sink under its own weight or be pushed to the bottom of the trench via a cable depressor. This installation methodology is typically used for post lay burial operations. Although not frequently used as an option, cutting can also be used as a pre-lay solution, the only difference being that the tool is not required to handle the cable while cutting. The cutting tool is unsuitable for areas of cobbles and boulders. It may often incorporate systems for jetting, either simultaneously or independently.

  The typical mechanical cutting installation methodology includes the following steps:

  1. The cable is laid on the seafloor and as-laid/found data is provided to the burial vessel.
  2. The tool is launched from support vessel offset from the cable.
  3. Once stable, the tool is positioned with the cable centralized between its tracks.
  4. Once in position, mechanical arms lift the cable from the seafloor, clear of the cutting tool.
  5. The cutting tool is lowered to seafloor and commences trench cutting while traversing forward.
  6. At the rear of the cutting tool, the cable is lowered into the trench.
  7. On completion of post-lay cutting operations, a post-burial survey is carried out using a combination of MBES or SSS for confirming the mean seafloor and a cable detection system to confirm the target cable burial depth.

During cable installation, there may be scenarios where installation to the target burial depth is not achievable using the primary installation methodologies due to mechanical problems with the trencher, adverse weather conditions, and/or unforeseen soil conditions. Therefore, the following alternative installation methodologies would be utilized.

- **CFE:** This is a non-contact dredging tool, providing a method of clearing lose sediment below submarine cables, enabling burial. The method utilizes thrust to direct waterflow into sediment, creating liquefaction and subsequent dispersal. The CFE tool draws in seawater from the sides and then jets this water out from a vertical down pipe at a specified pressure and volume. The down pipe is positioned over the cable alignment, enabling the stream of water to fluidize the sands around the cable, which allows the cable to settle into the trench under its own weight.
- **Pre-cut mechanical plowing:** This involves pre-cutting a trench to the target burial depth in advance of the cable lay operations. Following cable lay, the trench is backfilled via an additional pass using the displaced material to provide sufficient cover on the cable. This method is typically suited for harder soil types, which allows the trench to stay open until cable lay. In softer soils, the trench walls may collapse. The pre-cut plow may also be used for surface boulder clearance, as described previously. A drawing of a typical configuration of a typical pre-cut mechanical plow is provided in Figure E-3.3-8.

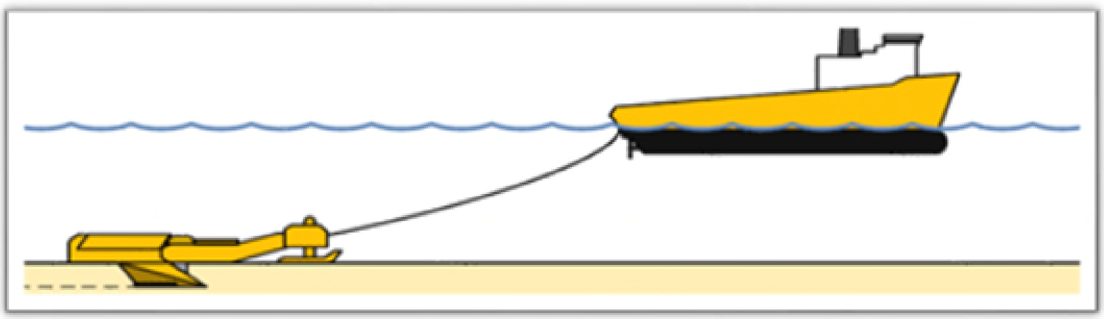

**Figure E-3.3-8 Typical Configuration of a Pre-cut Mechanical Plow**

The typical pre-cut mechanical plow installation methodology includes the following steps:

1. Prior to cable installation, a plow is pulled along the cable lay route, creating a "V" or "box" shaped trench into which the cable can be laid. Note that once deployed on the seafloor, the plow is towed behind the vessel with a lay tolerance of +/- 32 ft (10 m) either side of the designed cable route.
2. Multiple passes may be required in order to reach the target trench depth.

3. After the trenching operation, a post trenching survey is carried out, using a MBES or SSS to confirm the target trench depth.

4. For long interim periods, pre-sweeping via a jetting or CFE pass may be required to remove debris/natural backfilling from the trench, prior to cable lay.

- **Pre-Cut Dredging:** This technique is an alternative to pre-cut plowing. A drag head offers another option to pre-form a trench into which the cable can be laid. The drag head is a steel structure that is connected to the dredge vessel via a suction pipe. This technique can utilize one of two methods for managing spoil. Material removed from the trench can be either side-cast as berms on either side of the tool path for subsequent backfill, or material can be recovered to the vessel for subsequent relocation and storage at a pre-designated site. Additional information regarding the use of suction hopper dredging systems is provided below.

  The typical pre-cut dredging installation methodology includes the following steps:

  1. The drag head and suction pipe are deployed to the seafloor by a crane/gantry and hydraulic winches.
  2. The drag head incorporates teeth and water jet nozzles to form the trench shape.
  3. Dredged material is placed within the vessel and then disposed of either on-site, or at an appropriate dredge disposal site. Alternatively, the spoil can be placed beside the trench and used after cable lay for backfilling.
  4. Multiple passes may be required to reach the target trench depth.
  5. After the trenching operation, a post trenching survey is carried out using a MBES or SSS to confirm the target trench depth.
  6. For long interim periods, pre-sweeping via a jetting or CFE pass may be required to remove debris/natural backfilling from the trench, prior to cable lay.

Based on the identified range of installation methods and requirements, the Applicant has established a design envelope for installation of the SRWEC–NYS that reflects the maximum seafloor disturbance associated with construction (see Revised Table E-3.3-7). Temporary seafloor disturbance during installation includes the construction disturbance corridor where seafloor preparation would occur prior to cable installation, as well as the installation of the cable. Vessel anchoring occurring within the surveyed corridor during cable installation would also result in temporary seafloor disturbance. Permanent seafloor disturbance includes areas where additional cable protection may be required post-installation.

**Revised Table E-3.3-7. Maximum Construction Disturbance Areas for SRWEC–NYS**

| Parameter | Maximum Area of Disturbance a/ |
|---|---|
| **SRWEC–NYS (Corridor is 6.2 mi [10 km])** | |
| Construction Disturbance Corridor b/ | 74 acres (30 ha) |
| Boulder Clearance b/ | 22.2 acres (9 ha) |
| Sand wave Leveling d/ | 29.6 acres (12 ha) |
| Secondary Cable Protection e/ | 1.4 acres (0.6 ha) |
| Cable Crossing Protection of Existing Cables f/ | 7.4 acres (2.99 ha) |

NOTES:

a/ Disturbance area includes installation of one distinct DC cable bundle.

b/ SRWEC–NYS corridor length x 98 ft (30 m)-wide disturbance corridor. Boulder clearance, sand wave leveling, and cable protection will not extend beyond this corridor.

c/ Assumes up to 30 percent of SRWEC–NYS may be cleared by using a boulder plow or grab within the 98 ft (30 m) wide corridor.

d/ Assumes up to 40 percent of SRWEC–NYS may be cleared of sand waves within a 98-ft (30-m) width corridor (SRWEC–NYS corridor length x 0.40 x 30 m).

e/ Assumes up to 5 percent of the SRWEC–NYS would require secondary cable protection. Secondary protection will be up to 39 ft (12 m) wide (SRWEC–NYS corridor length x 0.05 x 39 ft [12 m]). Includes areas where additional cable protection may be required post-installation.

f/ Assumes up to three known crossing and two unknowns of the SRWEC–NYS in NYS waters, requiring additional cable protection and a maximum 1.48 acres (0.6 ha) of seafloor disturbance per cable crossing.

Upon receipt of the final G&G survey data, the Project will complete final cable route engineering. The purpose of the final cable routing process is to avoid, where practicable, features along the route which that have the potential to impact cable installation. In addition to cable routing, the Project will complete a Cable Burial Risk Assessment, which will support the definition of burial depths for the cable. Furthermore, the installation contractor will perform a burial assessment study in which the site conditions will be described in detail, identifying features such as boulder distribution and dimensions, sand wave height (where applicable), soil strength and classification, seafloor obstructions, and MEC/UXO. This information will inform installation technique(s) and burial requirements, both of which will be included in the Project EM&CP.

*Cable Protection*

Secondary cable protection may be applied where burial cannot occur, sufficient burial depth cannot be achieved due to seafloor conditions, or to avoid risk of interaction with external hazards. The need for secondary cable protection in specific locations will be based on factors such as the as-built burial depths, cable burial risk, and suitability to perform remedial works. The Applicant assumes 10 percent of the corridor for each cable comprising the SRWEC–NYS will require secondary cable protection. The area of impact for secondary cable protection is accounted for in the Table E-3.3-7 above. It is assumed that secondary cable protection will measure up to 39 ft (12 m) wide.

One or more of the following cable protection solutions may be used for secondary cable protection. Cable protection solutions implemented will be of the type that minimizes the potential for gear snags, as feasible.

- **Rock placement:** Rock placement involves dumping or placing rock overtop of a cable to cover and protect it from external aggression. Rocks are normally placed on the seafloor via a fall pipe vessel.
- **Mattressing:** Standard mattresses are composed of concrete blocks linked together by ropes to form a flexible, articulated mat, which can be placed on the seafloor over a cable. Alternatively, Frond Mattresses incorporate aerated polyethylene fronds, which essentially mimic natural seaweed. The purpose of this arrangement is to trap sediment and mitigate scour erosion around the vicinity of the mattress. A standard mattress size is 9.8 ft x 19.6 ft x 0.9 ft (3 m x 6 m x 0.3 m).
- **Rock filter bags:** Rock filter bags consist of a mesh fabric, in which rocks can be deployed subsea. Rock filter bags are suitable for low density coverage and allow more precise placement of material and limit rock migration relative to dumped rock.
- **Grout bags:** Grout bags are suitable for low density coverage.

The location of the SRWEC–NYS and associated cable protection will be provided to National Oceanic and Atmospheric Administration's (NOAA) Office of Coast Survey after installation is completed so that they may be marked on nautical charts.

*Cable Crossing*

Depending on the landing approach selected, the SRWEC–NYS may cross one known existing telecommunications cable as detailed in Table E-3.3-8 below (see Figure E-5.2-1 in Revised Exhibit E-5: Effect on Communication).

**Table E-3.3-8. Existing Cable Potential Crossing Locations by the SRWEC–NYS**

| Name of Existing Cable a/ | Facility Owner | Status | Location | Project Component Crossing | Crossing X Latitude b/ | Crossing Y Latitude b/ |
|---|---|---|---|---|---|---|
| Apollo North | Apollo | In service | NYS | SRWEC–NYS c/ | 40.7357 | -72.8579 |
| | | | | SRWEC–NYS d/ | 40.7271 | -72.8438 |

NOTES:
a/ The existing utilities are indicatively based on a combination of survey data and information provided by utility owners, NOAA, and North American Submarine Cable Association (NASCA) and potential crossing locations are indicative. Other utilities may be present.
b/ The Spatial Reference for the Longitude and Latitude coordinates are: North American Datum of 1983 (NAD 83) (2011) – EPSG 6318.
c/ Potential crossing location for Landfall HDD B.
d/ Potential crossing location for Landfall HDD C.

Cable protection at the crossing will be applied for in service asset that cannot be safely removed and pose a risk to the SRWEC–NYS. 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 weights or short-section chain so that the cable cannot be snagged by other seafloor users, such as fishermen.

Rock berm or concrete mattress separation layers will be installed prior to cable installation, while the rock berm or concrete mattress cover layers will be installed after cable installation. Any rock berm separation and cover layers will be installed using suitably approved rock material. The rock berm separation and cover layers are defined by minimum geometry and vertical and horizontal tolerances. The amount of cable protection will be as required for suitable coverage and technical agreements with respective asset owners. It is assumed up to 1.48 acres (0.6 ha) of cable protection will be required per crossing. The cable protection required for cable crossings is in addition to the secondary cable protection requirements previously described above.

The Applicant has engaged with the identified telecommunication owners during the G&G and to discuss crossing and proximity agreements. Final crossing designs will be completed in coordination with each of the asset owners and formalized in crossing and proximity agreements, in line with International Cable Protection Committee recommendations.

### E-3.3.3 Fiber Optic Cable

Continuous monitoring of the SRWEC–NYS and Onshore Transmission Cables will be provided by fiber optic cables, which assist in cable fault detection, control and monitoring, and communication. One fiber optic cable will be bundled together with the two main conductors of the SRWEC–NYS while two fiber optic cables will be co-located with the Onshore Transmission Cable circuits. These fiber optic cables are 1 in (2.5 cm) in diameter and is coupled with the SRWEC–NYS and Onshore Transmission Cables. The fiber optic cables from the SRWEC–NYS and Onshore Transmission Cable will be joined inside the fiber optic joint box. Because the cables are coupled together, installation of the fiber optic cables will be completed with the installation of the SRWEC–NYS and Onshore Transmission Cable installation described above.

***