SUNRISE WIND LLC

SUNRISE WIND NEW YORK CABLE PROJECT

EXHIBIT 3

ALTERNATIVES

PREPARED PURSUANT TO 16 NYCRR § 86.4

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Acronyms and Abbreviations

AC	alternating current
Applicant	Sunrise Wind LLC
BOEM	Bureau of Ocean Energy Management
CES	Clean Energy Standard
CFR	Code of Federal Regulations
CLCPA	Climate Leadership and Community Protection Act
DC	direct current
ft	feet
GEIS	Generic Environmental Impact Statement
ha	hectare(s)
HDD	horizontal directional drilling
ICW	intracoastal waterway
km	kilometer(s)
LIE	Long Island Expressway
LIPA	Long Island Power Authority
LIRR	Long Island Rail Road
mi	mile(s)
MW	megawatt(s)
NOAA	National Oceanic Atmospheric Administration
NRHP	National Register of Historic Places
NRW	National Wildlife Refuge
NYCRR	New York Codes, Rules and Regulations
NYS	New York State
NYSERDA	New York State Energy Research Development Authority
NYSPSC	New York State Public Service Commission
OCS	Outer Continental Shelf

OCS-DC	Offshore Converter Station
OnCS-DC	Onshore Converter Station–Direct Current
OnSS-AC	Onshore Converter Station–Alternating Current
OREC	Offshore Renewable Energy Credit
OSS-AC	Offshore Substation–Alternating Current
Project	Sunrise Wind New York Cable Project
PSL	New York Public Service Law
REV	Reforming the Energy Vision
ROW	right-of-way
SEP	State Energy Plan
SRHP	State Register of Historic Places
SRWEC	Sunrise Wind Export Cable
SRWEC-NYS	Sunrise Wind Export Cable–New York State
SRWEC-OCS	Sunrise Wind Export Cable–Outer Continental Shelf
SRWF	Sunrise Wind Farm
TJB	transition joint bay
USGS	United States Geological Survey
WTG	wind turbine generator

EXHIBIT 3: ALTERNATIVES

In accordance with New York Public Service Law (PSL) § 122 and 16 New York Codes, Rules and Regulations (NYCRR) § 86.4, this exhibit outlines the various alternatives that the Applicant considered concerning the Project, including for: (1) any alternative route; (2) the expansion of any existing right of-way (ROW) of the Applicant or of another; and, (3) any alternate method that would fulfill the energy requirements with comparable costs.

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 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.

3.2 PURPOSE AND NEED

The SRWF and this Project will provide clean, reliable offshore wind energy that will increase the amount and availability of renewable energy to NYS while creating the opportunity to displace electricity generated by fossil fuel-powered plants and offering substantial economic and environmental benefits. NYS has adopted substantial renewable portfolio standards and clean energy targets to address issues associated with climate change highlighting the current and future demand for the SRWF and this Project.

In 2014, NYS launched Reforming the Energy Vision (REV), a comprehensive energy strategy that strives to make energy more affordable, build a more resilient energy system, improve existing initiatives and infrastructure, create jobs and business opportunities and protect the environment. Further, REV is focused on building an integrated energy network able to harness the combined benefits of the central grid with clean, locally-generated power.

In 2015, NYS adopted the 2015 NYS Energy Plan (SEP) serving as a roadmap to advance the REV agenda. Among other clean energy goals, the SEP set forth the NYS's long-term goal to provide 50 percent of its electricity from renewable resources by 2030 (the "50 by 30" goal).[1] The SEP included an offshore wind

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[1] New York State Energy Planning Board. 2015. "New York State Energy Plan. Volume 1: The Energy to Lead." Accessed June 25, 2020. Available at: https://energyplan.ny.gov/Plans/2015.

initiative to encourage long-term and strategic regulatory coordination for large-scale offshore wind projects, resulting in the New York State Public Service Commission's (NYSPSC) issuance of an order to implement the Clean Energy Standards (CES or CES Order).[2] The CES Order requested NYSERDA to lead a research, analysis and outreach program to evaluate the potential for offshore wind energy in the State resulting in the Offshore Wind Master Plan,[3] and a report titled "Offshore Wind Policy Options" paper (the Options Paper), which served as a roadmap for meeting the NYS's goal—announced in 2017—of 2,400 MW of offshore energy generation by 2030. In 2018, as a result of the Options Paper and completion of a Generic Environmental Impact Statement (GEIS)[4] the NYSPSC issued an Order Adopting the Offshore Wind Standard[5] setting the stage for the first phase of procurements for offshore wind.

In response to the expressed need and demand and following its selection in a competitive request for proposals in which four developers responded with submitted proposals, the Applicant was one of two developers selected and executed a contract with NYSERDA for a 25-year OREC Agreement in October 2019. Under the OREC Agreement, NYSERDA will purchase ORECs generated by the operational SRWF and make them available for purchase by NYS load-serving entities. The SRWF and this Project are being developed to fulfill its obligations to NYS in accordance with its OREC Agreement. As specified in the OREC Agreement, the Project will transmit electricity from the SRWF located in a lease area for delivery to the LIPA Holbrook Substation. As such, the SRWF and this Project will help NYS achieve the aggressive clean energy goals set forth in REV, the CES and more recently, the Climate Leadership and Community Protection Act (CLCPA), which was effective in July 2019 and codifies the most ambitious and comprehensive climate and clean energy legislation in the country. Among other things, the CLCPA establishes NYS's goals of achieving 100 percent carbon-free electricity by 2040 and 70 percent of electricity from renewable sources by 2030, including a target of reaching 9,000 megawatts (MW) of offshore wind by 2035.

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[2] See Case 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard*, Order Adopting a Clean Energy Standard (issued August 1, 2016).
[3] Additional information on the Offshore Wind Master Plan is available at: https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/About-Offshore-Wind/Master-Plan.
[4] See Case 18-E-0071, *In the Matter of Offshore Wind Energy*, Generic Environmental Impact Statement (issued June 14, 2018).
[5] See Case 18-E-0071, *In the Matter of Offshore Wind Energy*, Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement (issued July 12, 2018).

3.3 SUMMARY OF ALTERNATIVES ANALYSIS

The Applicant considered multiple alternatives to achieve the Project's purpose, which includes delivery of up to 880 MW from Lease OCS-A-0487 (Lease Area)[6] to LIPA via a point of interconnection at the Holbrook Substation in the Town of Brookhaven, New York. The evaluation of alternatives was completed in the context of creating a project design envelope to allow for reasonable flexibility in certain elements while supporting review and approval processes by NYSPSC, Bureau of Ocean Energy Management (BOEM), as well as other federal and NYS regulations. The process involved siting, design, and construction alternatives for the Project, including:

- Siting Alternatives
  - Location of Onshore Facilities, including sites for the OnCS–DC, sites for landfall, and routes for the Onshore Transmission Cable; and
  - Location of offshore transmission facilities.
- Design Alternatives
  - Transmission cable technology.
- Construction Alternatives
  - Submarine cable installation methods; and
  - Onshore Transmission Cable and Onshore Interconnection Cable installation methods.

General criteria for the evaluation of alternatives included:

- meeting the Project purpose;
- consideration of environmental resources;
- consideration of human/social resources;
- consideration of design characteristics;
- consideration of construction methodologies and feasibility;
- consideration of future operations and maintenance requirements;

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[6] A portion of Lease Area OCS-A 0500 (Bay State Wind LLC) and the entirety of Lease Area OCS-A 0487 (formerly Deepwater Wind New England LLC) were assigned to Sunrise Wind LLC on September 3, 2020, and the two areas will be merged and a revised Lease OCS-A 0487 will be issued. Thus, when using the term "Lease Area" it refers to the Applicant's merged Lease Area OCS-A 0487.

- implications to the Project schedule; and
- consideration of capital and maintenance costs.

Transmission and interconnection facilities are necessary to transmit electricity generated by the SRWF to the NYS electrical grid. This specifically requires conveying (or delivering) electricity from the SRWF to existing onshore electrical transmission facilities associated with the Project (*i.e.*, the Holbrook Substation). The Project includes multiple transmission and interconnection components: the OnCS-DC, Onshore Interconnection Cable, Onshore Transmission Cable, and SRWEC-NYS. Once the point of interconnection was determined in the OREC Agreement, the Applicant reviewed alternative landfall sites for the SRWEC-NYS and considered potential routes for the Onshore Transmission Cable. The following subsections describe the alternatives considered for these Project components and provide the rationale for their inclusion or exclusion from the proposed Project.

3.4 ONSHORE CONVERTER STATION SITE ALTERNATIVES

An OnCS-DC will be constructed to support interconnection to the existing Holbrook Substation, located near Union Avenue at the intersection of Long Island Expressway (LIE) and Route 97 in the Town of Brookhaven.

The Applicant evaluated siting alternatives for the OnCS-DC using the following criteria:

- Proximity to the contractual grid point of interconnection and parcel availability;
- A parcel of adequate size (approximately 6 to 10 acres [2.4 to 4.0 hectares (ha)]), suitable shape and ground conditions (*e.g.*, no severe slopes or shallow groundwater);
- Appropriate zoning/land-use compatibility (*e.g.*, avoidance of residential areas and/or other sensitive receptors [schools, hospitals, day care centers, open space and recreational areas]) for construction and operation of the OnCS-DC; and
- Avoidance or minimization of disturbance to sensitive natural resources (*e.g.*, wetlands, waterbodies, forested areas, other protected and/or ecologically sensitive areas) and/or cultural resources (*e.g.*, areas of potential archaeological sensitivity, avoidance of State or National Register of Historic Places [S/NRHP] structures/sites on the S/NRHP or tribal lands).

The Applicant identified multiple sites in the general vicinity of the existing Holbrook Substation that are potentially available and undeveloped. This evaluation generally considered the following four sites, as depicted in Figure 3.4-1:

- *Union Avenue North Site* - Located north of Union Avenue in the Town of Brookhaven, this approximately 8-acre (3.2-ha) site is located on one parcel. The site is approximately 0.8 mi (1.3 km) from the existing Holbrook Substation. This site is currently undeveloped and contains both forested areas and open land;
- *Union Avenue South Site* - Located south of Union Avenue in the Town of Brookhaven, this approximately 8-acre (3.2-ha) area includes three parcels. This site is approximately 1.0 mi (1.6 km) from the existing Holbrook Substation. This site is currently cleared and contains gravel and paved locations, multiple buildings, and equipment storage areas associated with various commercial developments;
- *North Ocean Avenue Site* - A 16-acre (6.5-ha) site with two parcels, located near the intersection of North Ocean Avenue and the LIE in the Town of Brookhaven, approximately 3.1 mi (5.0 km) from the existing Holbrook Substation. This site is currently undeveloped and contains primarily forested areas; and
- *Long Island Avenue Site* - A 15-acre (6.0-ha) site with two parcels located near intersection of Horseblock Road, Long Island Avenue and the LIE, approximately 5.0 mi (8.0 km) from the existing Holbrook Substation in the Town of Brookhaven. The site contains both undeveloped and gravel areas.

Sites for the OnCS-DC are depicted in Figure 3.4-1 and Table 3.4-1 summarizes the constraints that were identified for each site.

Table 3.4-1. Summary of Sites Evaluated for OnCS-DC

OnCS-DC Sites		Constraints Identified
1	Union Avenue North Site	Site advantageous based on proximity to existing substation and other industrial development. Union Avenue North is currently undeveloped and contains both forested areas and open land.
2	Union Avenue South Site	Site advantageous based on proximity to existing substations and other industrial development. Union Avenue South is currently cleared, contains existing industrial buildings and other infrastructure.
3	North Ocean Site	Site excluded from further consideration due to distance from existing Holbrook Substation.
4	Long Island Avenue Site	Site excluded from further consideration due to distance from existing Holbrook Substation.

As reflected in Table 3.4-1, the North Ocean and Long Island Avenue Sites were removed from consideration as the longer distances from the point of interconnection at the Holbrook Substation would be less advantageous. A factor in site selection for the OnCS is proximity to the point of interconnection via the existing transmission grid and locating a suitable site for the OnCS as close as practical to the point of interconnection is important in reducing project costs and impacts. Both the Union Avenue North Site and Union Avenue South Site are closer to the Holbrook Substation and are within existing industrial development.

Design of the OnCS–DC is ongoing; a variety of design options are being considered based on Project needs and site constraints. For the purpose of the environmental assessment presented in this Application, two sites for the OnCS-DC are under consideration, the Union Avenue North Site and Union Avenue South Site, which are referenced throughout this Application as the "Union Avenue Site."[7]

3.5 LANDFALL SITE ALTERNATIVES

Identification of a suitable landfall site must take into account a variety of factors including:

- Proximity to interconnection point to the onshore transmission grid and proximity to the coastline to minimize the onshore transmission routes;
- Proximity to the Lease Area;
- Technical feasibility, including sufficient available area for cable landfall installation activities, site slope and other site conditions; and
- Minimal conflicts with existing environmental and anthropogenic constraints and uses, both onshore and offshore.

First, the Applicant completed a desktop evaluation between the Lease Area and Long Island, New York to identify constraints of potential cable routes based on publicly-available information on oceanography, geology, potential hazards, archaeological and environmental resources and existing/sensitive infrastructure. This evaluation generally considered two corridors, the Long Island Sound Approach, routed through Atlantic Ocean and Long Island Sound, and the Atlantic Shore Approach, routed through Atlantic Ocean, south of Long Island. Several constraints were identified with the Long Island Sound Approach, including increased offshore distance of cable route; presence of natural rock reefs between Montauk, Block Island and Orient Point-Fishers Island; presence of numerous significant habitat designations; and higher-concentration of shipwrecks in portions of Long Island Sound Approach than along the Atlantic Shore Approach. As a result, the Atlantic Shore Approach was selected.

[7] The Project is in discussion with the owner of each site regarding acquisition or lease of the property for the Project.

Based on this evaluation, the Applicant investigated potential landfall sites on the south shore of Long Island associated with the Atlantic Shore Approach and conducted a desktop evaluation to identify potential constraints, based on publicly-available information on biological resources, geology, potential for contamination, cultural resources, existing and sensitive infrastructure, fisheries and existing coastal infrastructure projects. Landfall sites evaluated are depicted in Figure 3.5-1 and Table 3.5-1 summarizes the constraints that were identified for each landfall site.

Table 3.5-1. Summary of Landfall Sites Evaluated

<table>
<tr><th colspan="2">Landfall Site</th><th>Constraints Identified</th></tr>
<tr><td>1</td><td>Smith Point County Park, Town of Brookhaven, NY</td><td>Site advantageous because of anticipated suitable offshore geology and onshore workspace; distance from existing sand borrow areas, mapped shipwrecks or obstructions and recreational boating activity; minimal impacts on natural resources.</td></tr>
<tr><td>2</td><td>Village of Quogue Beach, Town of Southampton, NY</td><td>Site excluded from further consideration based on limited areas available for temporary work areas; floodplains, significant coastal fish and wildlife habitat; and extended length of onshore transmission cable.</td></tr>
<tr><td>3</td><td>Coopers Beach, Town of Southampton, NY</td><td>Site excluded from further consideration based on potential conflicts with existing sand borrow areas and recreational boating activity; proximity to cultural and historic resources; and extended length of onshore transmission cable.</td></tr>
<tr><td>4</td><td>Rogers Beach, Town of Westhampton, NY</td><td>Site excluded from further consideration based on close proximity to residential areas; limited area available for temporary work areas; and potential conflicts with existing sand borrow areas and recreational boating activity.</td></tr>
<tr><td>5</td><td>Bellport Bay, Town of Brookhaven, NY</td><td rowspan="2">Sites excluded from further consideration based on adjacent land uses; proximity to federally designated wilderness area and federal navigation channels; and potential conflicts with commercial and recreational fishing activities.</td></tr>
<tr><td>6</td><td>Bluepoint Marina/Corey Beach, Town of Brookhaven, NY</td></tr>
</table>

The Village of Quogue Beach, Coopers Beach, and Rogers Beach landfall sites were excluded from further consideration as additional evaluation determined that these routes would result in greater seabed and/or terrestrial disturbance due to increased length of transmission route and/or conflicts with existing anthropogenic constraints and uses. The Bellport Bay and Bluepoint Marina/Corey Beach landfall sites were excluded from further consideration based on concerns about proximity to a federally designated wilderness area and potential impacts to recreational and commercial fishing activities within Great South Bay. The selection of Smith Point County Park as the landfall location was based on numerous technical and environmental benefits summarized in Table 3.5-1 in addition to stakeholder input, and was a fundamental component of the Project in its original bid proposal to NYSERDA and subsequent award.

Based on this analysis, the Atlantic Shore Approach with a landfall at Smith Point County Park (the Landfall) was selected as the preferred corridor and landfall site for the SRWEC-NYS. This site provides sufficient area to accommodate onshore horizontal directional drilling (HDD) operations within developed areas, with minimal disruption to adjacent land uses, and minimizes direct disturbance to natural or cultural resources in the nearshore, coastal, and intracoastal areas.

The SRWEC-NYS corridor is based on the landfall siting as described above and the corridor for the submarine segment of the export cable within federal waters (SRWEC-OCS). Following the selection of the Atlantic Shore Approach with a landfall at Smith Point County Park, the Applicant identified corridors for the SWREC-NYS that connect the Lease Area and the Landfall site. A desktop analysis was performed on the SRWEC-NYS corridor to review mapped geology, shipwrecks, artificial reefs, sand borrow pits, existing cables and other mapped resources. Where necessary, the SRWEC-NYS corridor was modified to avoid constraints identified during the desktop assessment.

3.6 ONSHORE TRANSMISSION CABLE ROUTE ALTERNATIVES

Potential routes for the Onshore Transmission Cable were considered once the preferred OnCS-DC site and Landfall site were selected. Identification of a suitable route for the Onshore Transmission Cable must consider a variety of factors including:

- Maximum use of existing linear corridors and existing ROW while also minimizing the length of the transmission line and constructability and engineering conflicts;
- Minimal effects to sensitive environmental resources; and
- Minimal conflicts with other land uses and human/social factors.

Based on selection of the Union Avenue Site for the OnCS-DC and Smith Point County Park for the Landfall site, the Applicant conducted multiple rounds of review to identify potential routes that would be suitable for the Onshore Transmission Cable. Initially, the Applicant completed preliminary review of potential corridors within existing roadway and utility ROW (*e.g.*, William Floyd Parkway, existing transmission line ROW, Long Island Rail Road [LIRR], Sunrise Highway). This initial review identified characteristics and potential constraints of the potential routes, based on publicly available information and local stakeholder engagement. Factors considered during the evaluation included route length, constructability (*e.g.*, route length, number of roadway and railroad crossings, width of corridor), adjacent land uses (*e.g.*, developed parcels, number of residences, public lands) and proximity to environmental and cultural resources (*e.g.*, streams, wetlands, floodplains, unique habitats, cultural and historic properties). This review was used to reduce the potential number of routes and for further discussions to solicit stakeholder feedback to identify a preferred route for the Onshore Transmission Cable.

The Applicant's evaluation generally considered four routes, as depicted in Figure 3.6-1 and described below. Some sections of these routes are located within the same ROW. The routes were studied using a corridor approach, rather than along a specific centerline. The corridors generally consisted of the extents of public road ROW and are described below.

- *LIE Service Road Route* – From the Landfall work area (the Landfall Work Area), the LIE Service Road Route runs parallel to Fire Island Beach Road within the paved Smith Point County Park parking lot, crossing under the William Floyd Parkway to a recreational area located to the west of William Floyd Parkway. The LIE Service Road Route is routed across the intracoastal waterway (ICW) and turns north along East Concourse, north along William Floyd Parkway, west along Mastic Boulevard, north along Ashley Place, and then west along Montauk Highway. The LIE Service Road Route crosses Carmans River, continues west along Montauk Highway, crosses Yaphank Creek and turns north along Yaphank Avenue. The LIE Service Road Route crosses Sunrise Highway at Yaphank Avenue and turns northwest on Horseblock Road. The LIE Service Road Route crosses the LIRR at Manor Road to Long Island Avenue, turns west along the LIE South Service Road, continues to Waverly Avenue, and turns south on Waverly Avenue to Long Island Avenue. The LIE Service Road Route turns west to Long Island Avenue and continues west to Union Avenue to reach the OnCS–DC.
- *Peconic Avenue Route* – The Peconic Avenue Route initially follows the same route as the LIE Service Road Route, but diverts off Horseblock Road at Peconic Avenue and continues west along Peconic Avenue to North Ocean Avenue. The Peconic Avenue Route turns north along North Ocean Avenue, west to Long Island Avenue, and continues west along Long Island Avenue to Union Avenue to reach the OnCS–DC.
- *East Woodside Avenue Route* – The East Woodside Route initially follows the same route as the LIE Service Road Route, but diverts off Horseblock Road at East Woodside Avenue. The East Woodside Avenue route continues west on East Woodside Avenue, turns north along North Ocean Avenue, west along Long Island Avenue to Union Avenue to reach the OnCS–DC.
- *Smith Road Route* – The Smith Road Route initially follows the same route as the LIE Service Road Route, but diverts off the William Floyd Parkway at Ranch Drive and continues west along Ranch Drive to Smith Road. The route follows Smith Road north to Montauk Highway. The Smith

Road Route turns west on Montauk Highway and proceeds along the same route as the LIE Service Road Route.

Table 3.6-1 summarizes the constraints that were identified for each route.

Table 3.6-1. Summary of Routes Evaluated for Onshore Transmission Cable

Onshore Transmission Cable Route		Constraints Identified
1	LIE Service Road Route	Route advantageous because of location primarily within existing ROW; minimal presence of sensitive natural resources; limited presence of potential cultural resources; and limited residential impacts.
2	Peconic Avenue Route	Route advantageous because of location primarily within existing ROW; minimal presence of sensitive natural resources; and limited presence of potential cultural resources.
3	Woodside Avenue Route	Route excluded from further consideration based on constructability constraints and length of route; proximity to stream and wetlands; and proximity and quantity of residences in some areas.
4	Smith Road Route	Route excluded from further consideration based on proximity to residences; narrow road ROW and required clearing within Wertheim Natural Wildlife Refuge (NWR); potential utility conflicts; ownership of underlying land under federal and private control; and proximity to natural resources and historic and cultural resources.

As shown in Figure 3.6-1 and Table 3.6-1, all of these routes are predominantly along currently-paved roads or previously-disturbed areas. However, the Applicant identified several technical, commercial, stakeholder, and environmental constraints with the Woodside Avenue Route and Smith Road Route. The Woodside Avenue Route was longer than the other alternatives and had a high number of residences within 200 ft (61 km) of the road and was excluded from further consideration. Where the Smith Road Route diverted from the LIE Service Road Route, it followed Smith Road, a narrow road that had many residences close to the edge of the road. Partial closure of the road would not be possible during construction due to the narrow width, and full road closures would be required during some portions of construction. Additionally, the crossing of the LIRR would require construction setups that would be located off the maintained roadway due to the residences and existing overhead utilities present on the east side of the road; while, the west side of Smith Road has mature trees and vegetation that would need to be trimmed and/or cleared to allow for construction vehicle operations. There are also areas of the road within the NYSDEC-regulated 100 ft (30.5 m) freshwater wetland adjacent area. Based on this analysis, the Applicant excluded the Smith Road Route from further consideration.

The Peconic Avenue Route was considered a viable alternative as it was primarily located within existing ROW and contains limited sensitive environmental resources. However, given the proximity to residences and that certain portions of the roadway are narrow which would potentially require complete road blockage and/or private property acquisition, to minimize residential and traffic impacts the Peconic Avenue Route was not selected as the preferred route. The Applicant ultimately selected the LIE Service Road Route as the preferred route due to its location primarily within existing ROW and the limited sensitive resources, including residences.

In addition to these alternative routes, alternative variations to the Onshore Transmission Cable route were also evaluated:

- William Floyd Parkway to Montauk Highway, which is approximately 0.5 mi (0.8 km) long. Under this alternative variation, the corridor continues north along William Floyd Parkway to the intersection with Montauk Highway and turns west along Montauk Highway.
- Nicolls Avenue Variation, which is approximately 0.9 mi (1.4 km) long. Under this alternative variation, the corridor continues west along the LIE South Service Road to Nicolls Road, and then turns south on Nicolls Road to Union Avenue.

These alternative variations were not selected to avoid certain intersections located along the route, due to permitting and/or traffic impacts, specifically the William Floyd Parkway and Montauk Highway intersection and the LIE South Service Road entry and exit ramps along Nicolls Road.

3.7 ALTERNATIVE METHODS TO FULFILL ENERGY REQUIREMENTS

3.7.1 Alternative Transmission Line Technologies

This section details the considerations the Applicant gave to alternative transmission line technologies, including use of AC, and alternative construction methods.

Alternating Current

The Applicant had been considering both an AC and DC option for the Project's transmission system and has finalized its selection of the DC option. The Applicant has performed analysis on both options and has worked closely with several suppliers and determined the DC option is not only viable, but preferable. Due to the length of the Project's transmission system, a DC option provides a more efficient electrical design that will reduce losses – providing a more effective transmission system for the Project. The DC system is also expected to result in greater overall grid stability when compared to an AC system due to the way a DC system is able to decouple any electrical disturbances present from the onshore grid to the wind turbine generators (WTGs) and vice versa. As an added benefit, the DC system will also reduce the number of Project components, and will reduce the environmental impacts from the Project compared to an AC solution.

An AC transmission system would include an offshore substation (OSS-AC), or two OSS-AC connected by an inter-link cable, to collect the power generated by the WTGs, transform it to a higher voltage for transmission, and transfer the electricity to the onshore electrical infrastructure via two export cables and a booster station. Due to the distance from the OSS-AC to an Onshore Substation (OnSS-AC), the AC transmission system would also require reactive compensation to stabilize the voltage and minimize electrical losses along the export cables. Thus, a booster station would be required, located approximately midway between the OnSS-AC and the OSS-AC. The booster station would be of similar size as the OSS-AC. The offshore DC transmission system only includes one Offshore Converter Station (OCS-DC), one distinct cable bundle, and does not require a booster station to reach the OnCS-DC.

Because two distinct buried subsea export cables are required for the AC transmission system, whereas the DC transmission system only requires a single cable bundle, the impacts resulting from the construction and operation of two AC export cables would be greater than those resulting from the single DC export cable bundle. The total length of an AC export cable corridor would also be greater than the DC export cable corridor if two OSS-AC were to be utilized, and an OSS-Link cable would be required to connect the two OSS-AC.

The booster station required for an AC transmission also creates additional impacts that are avoided by the DC transmission system. Although the Applicant conducted a thorough assessment to identify a suitable location for a booster station, the structure would result in impacts that are avoided by the use of a DC transmission system.

Onshore, the AC transmission system would include transmission cables (two circuits of three cables each within a duct bank of roughly 4 ft [1.2 m] width), an OnSS-AC, and interconnection cables connecting the OnSS-AC to the transmission grid (two circuits of six cables each). The DC transmission system would consist of two cables within a single duct bank of roughly 3 ft (0.9 m) in width, an OnCS-DC, and interconnection cables of similar size as the AC system. The AC system would require a pair of cable splice vaults approximately every 2,000 ft (609.6 m), whereas the DC system would require only one splice vault at that same distance. The OnCS-DC has a similar fenced footprint size as an OnSS-AC, but a taller enclosure height than an OnSS-AC.

Based on the above technical and environmental considerations, the Applicant has determined that a DC transmission system is most appropriate for the Project to meets its purpose and need.

3.7.2 Construction Alternatives

The Applicant considered various alternative methods for installation of the SRWEC-NYS and the Onshore Transmission Cable. Construction alternatives related to installation of these Project components are discussed below.

SRWEC–NYS Installation Methods

Various options for installation of submarine cables were considered, 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, the Applicant 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) and minimizing the potential for interference with other marine uses. Burying the cable also minimizes the need for maintenance and associated potential for seabed disturbance. The burial depths are selected to balance the following design criteria: 1) physical conditions; 2) avoidance of physical damage from anchors, vessels, or other equipment that might penetrate the seabed; 3) avoidance and minimization of interference with other marine uses; and 4) to allow heat to flow away from the cable so that the temperature does not exceed the design basis of the cable.

Various installation methods for the SRWEC–NYS were also considered, including hydraulic plow (*i.e.*, jet-plow and controlled flow excavation), mechanical plow, and mechanical dredging (*i.e.*, mechanical cutter and trailing suction hopper dredger). Due to the variability of surface and subsurface seabed conditions, the Applicant may use a combination of cable installation methods to install the cable at the target burial depth. Due to the acentric nature of the DC cable bundle (see Exhibit 5: Design Drawings), methods typically used for simultaneous lay and bury methodology (*e.g.*, mechanical plowing) have been unsuccessful for bundled DC cables, as they result in uneven forces on the cable, resulting in damage. Thus, a simultaneous lay and bury methodology cannot be used for the SRWEC—NYS.

The Applicant also considered multiple installation methods for the SRWEC–NYS at the Landfall site, including open cut trench and HDD methods. Installation via open cut trench would include jet plowing (*i.e.*, trenching via high pressure seawater) and could be used to bury the cable in the nearshore zone up to the MHWL on the beach. In this scenario, either an open trench or a short-length HDD (likely with a cofferdam on the beach) would be used to install the cable from the MHWL to a transition vault located at an onshore location. This method is not considered preferable based on impacts to intertidal, beach and dune habitats during construction, as well as impacts to the Fire Island National Seashore. As such, only a longer-length HDD is under consideration which will bore under the beach and nearshore area, exiting in deeper water past the MHWL.

Onshore Transmission Cable and Onshore Interconnection Cable Installation Methods

The Applicant considered various options for installation of the Onshore Transmission Cable and Onshore Interconnection Cable, including use of aboveground structures and underground duct banks. Although aboveground installation would minimize construction time and cost, identifying and developing a transmission ROW in this area was not considered practical due to potential siting and permitting requirements and difficulty in finding and securing a ROW of sufficient size from landfall to the interconnection point. In addition, a buried cable reduces visual impacts and operational requirements and provides a more reliable electric system that is less prone to storm events as an overhead system. Therefore, the Applicant plans to bury the Onshore Transmission Cable and Onshore Interconnection Cable within existing roadway and utility ROWs, where possible.

3.8 NO ACTION ALTERNATIVE

Under the "no action" alternative, the Project would not be built.

As stated in Section 3.2, the Applicant was selected by NYSERDA to construct the SRWF and has executed the OREC Agreement. Under the OREC Agreement, NYSERDA will purchase ORECs generated by the operational SRWF and make them available for purchase by New York load-serving entities. The Project is being developed to fulfill obligations to NYS in accordance with its OREC Agreement. As specified in the OREC Agreement, the SRWF will generate renewable electricity from an offshore wind farm located in the Lease Areas for transmission and delivery to the Holbrook Substation. In the absence of the Project, the generated electricity would not reach Long Island and the load-serving entities would be forced to implement alternatives to meet the area's energy supply needs and demand. Therefore, the "no action" alternative is not considered a viable option to the Project as it will not support the NYS renewable energy goals and CLCPA requirements.

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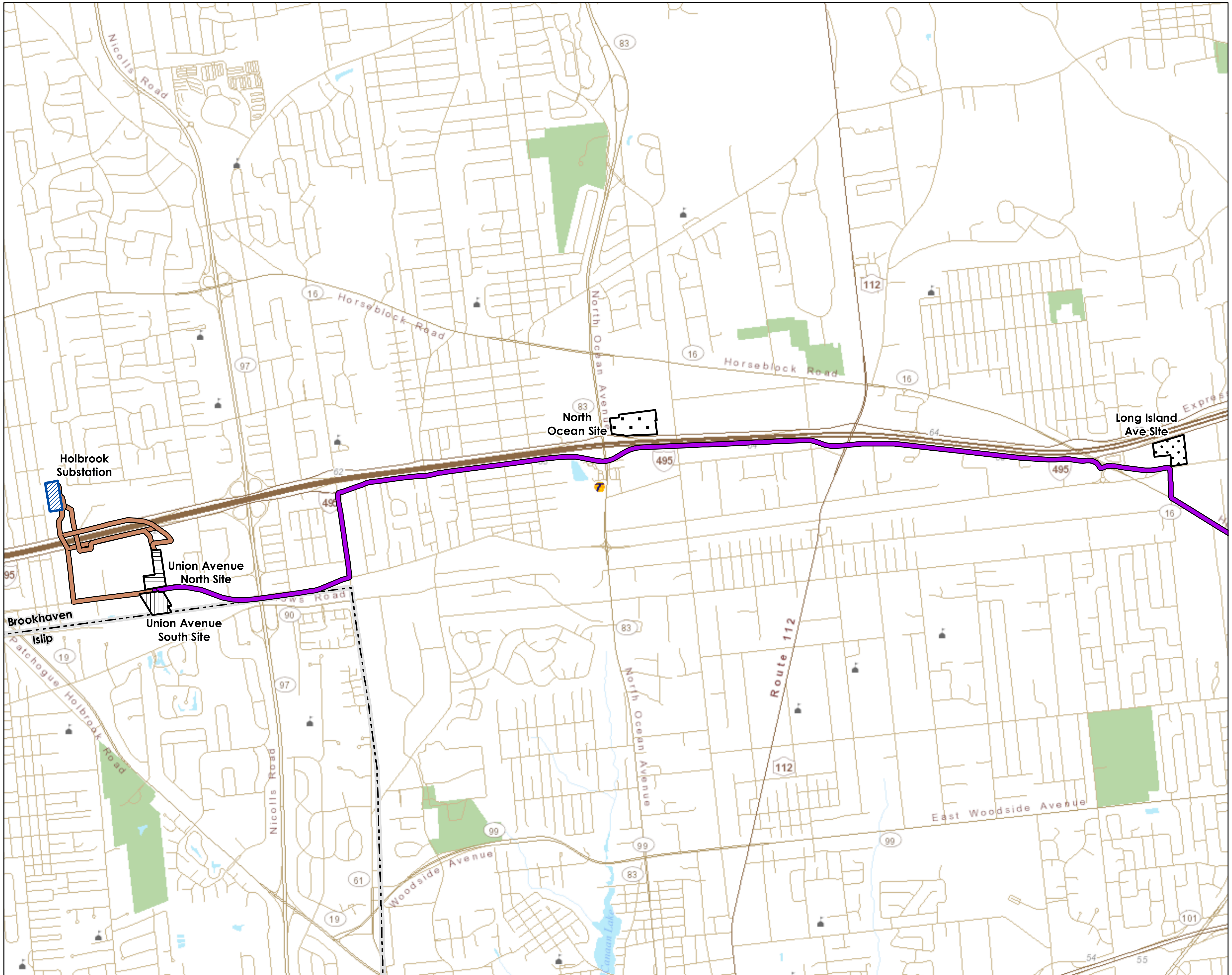


Figure 3.4-1
Onshore Substation Site Alternatives

Sunrise Wind | Powered by Ørsted & Eversource

Legend

- Onshore Transmission Cable LIE Service Road Route
- Onshore Interconnection Cable Route
- Union Avenue North Site
- Union Avenue South Site
- Long Island Ave Site
- North Ocean Site
- Holbrook Substation

Sources
NYS Office of IT Services GPO, NYS Boundaries, 2018
Base Map: NYSDOT Base Map
Note
The cable route centerline and trenchless crossing work areas are indicative and subject to final engineering design.

Date	11/23/2020
Project Number	2028113199
Prepared By	GC
Reviewed By	SBG

0 2,500 feet
0 700 meters
N

Scale at 11x17: 1:32,000
NAD 1983 2011 UTM Zone 18N

REFERENCE MAP

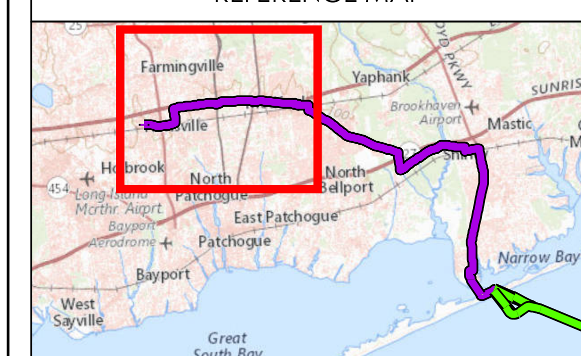


Figure 3.5-1
Landfall Site Alternatives

Sunrise Wind | Powered by Ørsted & Eversource

Legend
- Potential Landfall Site
- Onshore Converter Station (OnCS–DC)
- Holbrook Substation
- 3-Nautical Mile State Water Boundary

Sources
1. Base map: NYSDOT Base Map

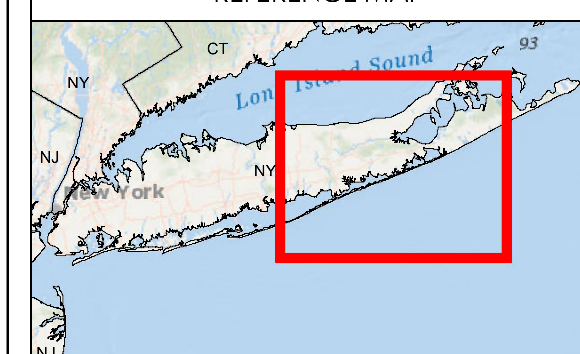
Date	11/23/2020
Project Number	2028113199
Prepared By	GC
Reviewed By	LJ

0 4 miles
0 4 nm
0 6 km

N

Scale at 11x17: 1:253,440
NAD 1983 2011 UTM Zone 18N

REFERENCE MAP



Revised: 2020-11-23 By: gcarpentier

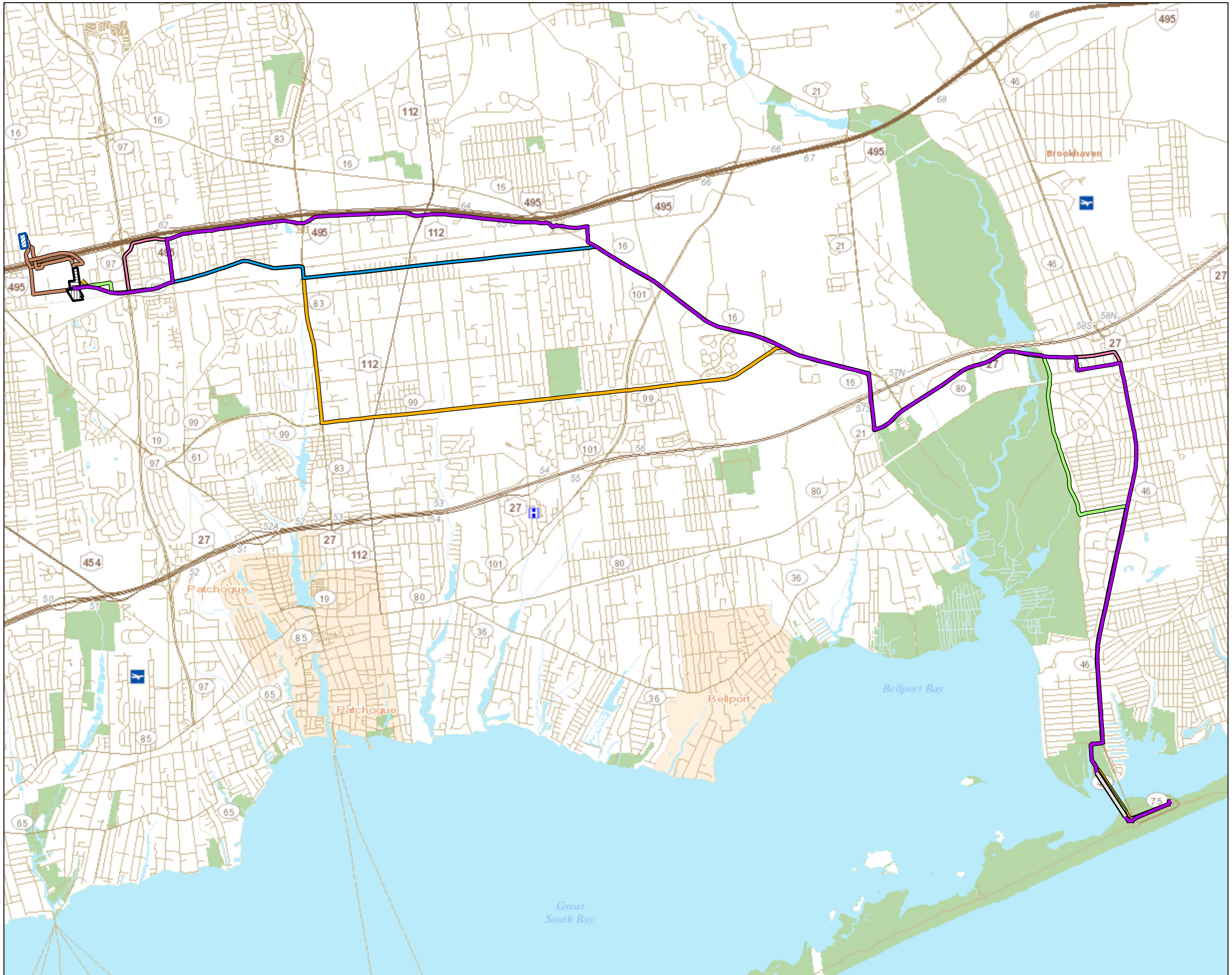


Figure 3.6-1
Onshore Transmission Cable Route Alternatives

Sunrise Wind | Powered by Ørsted & Eversource

Legend

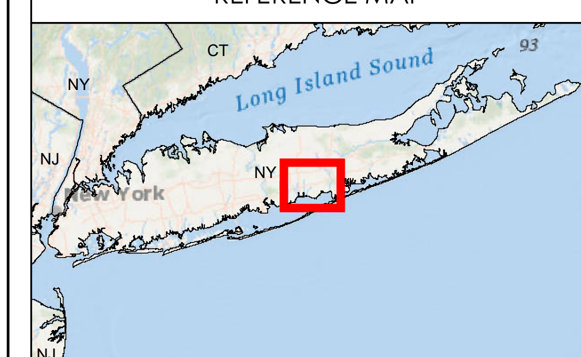
- Onshore Transmission Cable LIE Service Road Route
- Onshore Transmission Cable Peconic Avenue Route
- Onshore Transmission Cable East Woodside Route
- Onshore Transmission Cable Smith Road Route
- Onshore Transmission Cable Alternative Segment
- Intracoastal Waterway Horizontal Directional Drilling (ICW HDD)
- Union Avenue North Site
- Union Avenue South Site
- Onshore Interconnection Cable Route
- Holbrook Substation

Sources
Base map: NYSDOT Base Map
Note
The cable route centerline and trenchless crossing work areas are indicative and subject to final engineering design.

Date	11/23/2020
Project Number	2028113199
Prepared By	GC
Reviewed By	LJ

0 1 mile
0 1 nm
0 1.5 km
N
Scale at 11x17: 1:63,360
NAD 1983 2011 UTM Zone 18N

REFERENCE MAP



V:\1956\active_Task Owner and other Non-BC1956 Jobs\2028113199\03_data\gis_cad\gis\MXDs\ArticleVII\2028113199_3.6-1_OnshoreAlternatives.mxd Revised: 2020-11-23 By: gcarpenter