**Empire Offshore Wind LLC** 

**Empire Wind 2 Project** 

Appendix D

Wetland and Terrestrial Vegetation Report

June 2022

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# **ATTACHMENTS**

Attachment D-1 Photographic Log

# ACRONYMS AND ABBREVIATIONS

ac	acre
CWA	Clean Water Act
Empire	Empire Wind LLC
EW 2	Empire Wind 2 Project
ft	foot
ha	hectare
HUC	Hydrologic Unit Code
m	meter
NWI	National Wetlands Inventory
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
POI	Point of interconnection at an expansion of the Barrett 138-kV Substation
Study Area	Four potential landfall locations in the City of Long Beach and the Town of Hempstead, New York; the onshore export cable corridors under consideration from the potential landfall locations to the onshore substation; and the interconnection cable corridors under consideration from the onshore substation to the POI in Oceanside, New York
Tetra Tech	Tetra Tech, Inc.
USACE	U.S. Army Corps of Engineers

# D.1 Introduction

Tetra Tech, Inc. (Tetra Tech) was contracted by Empire Offshore Wind LLC<sup>1</sup> (Empire) to prepare a Wetland and Terrestrial Vegetation Report in support of the development of the Empire Wind 2 (EW 2) Project. Empire proposes to construct and operate the EW 2 Project as one of two separate offshore wind projects to be located within the Bureau of Ocean Energy Management-designated Renewable Energy Lease Area OCS-A 0512.

Tetra Tech conducted a field survey of wetlands and terrestrial vegetation for the proposed onshore export and interconnection cable routes for the EW 2 Project, as well as the Study Area for route alternatives under consideration. The field survey included wetland delineations of the onshore substation, for which access for survey was authorized, and a reconnaissance of wetland and surface waterbodies from publicly-accessible areas for the remaining portions of the Study Area, for which access was not authorized at the time of survey. The Study Area included four potential landfall locations in the City of Long Beach and the Town of Hempstead, New York; the onshore export cable corridors under consideration from the potential landfall locations to the onshore substation; and the interconnection cable corridors under consideration from the onshore substation to the point of interconnection (POI) in Oceanside, New York, which collectively comprise the Study Area and totals approximately 86.9 acres (ac, 35.2 hectares [ha]) (Study Area) (**Figure D-1**). Terrestrial vegetation was characterized concurrently during the wetland delineation and wetland verification effort.

This report provides a description of the wetlands, surface waterbodies, and terrestrial vegetation within the Study Area. Included are a regulatory framework, Study Area description, methods used to delineate wetlands and characterize terrestrial vegetation, summary of the documents reviewed, field survey results, and a literature cited section. Select site photographs are provided as an Attachment to this report.

Formal wetland delineations and terrestrial vegetation surveys for the remaining portions of the EW 2 Project will be conducted as survey access is negotiated. The results of these surveys will be provided as an update to this report.

#### D.2 Regulatory Framework

#### D.2.1 Wetlands and Waterbodies

Wetlands and waterbodies in New York may be protected under federal law, New York State law, or both. The U.S. Army Corps of Engineers (USACE) is responsible for assessing permit applications for activities otherwise prohibited by Section 404 of the Clean Water Act (CWA) and Section 10 of the 1899 Rivers and Harbors Act. Under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, the USACE has regulatory jurisdiction over navigable waters and waters of the United States, including wetlands. Additionally, under Section 401 of the CWA, applicants for a federal license or permit must obtain certification from the state indicating that the permitted activity will not violate the state's water quality standards.

<sup>&</sup>lt;sup>1</sup> Empire is a direct, wholly owned subsidiary of Empire Offshore Wind Holdings LLC (Empire HoldCo). Empire HoldCo is jointly owned by (1) an indirect, wholly owned subsidiary of Equinor ASA (collectively, Equinor); and (2) an indirect, wholly owned subsidiary of BP Wind Energy North America Inc. BP Wind Energy North America Inc. acquired ownership interest in Empire HoldCo in a transaction that closed on January 29, 2021.





Figure D-1 Study Area Location

Under Article 24 of the Environmental Conservation Law, commonly referred to as the Freshwater Wetlands Act, New York regulates freshwater wetlands greater than 12.4 ac (5.0 ha) or freshwater wetlands of any size that are of "unusual local importance" (such as those with a documented presence of a threatened or endangered species). New York also regulates the freshwater wetlands adjacent area, defined as the area of land or water that is outside of a wetland and within 100 feet (ft, 30 meters [m]) of the wetland boundary. The New York Department of Environmental Conservation (NYSDEC) is the agency responsible for regulating activities within freshwater wetlands and adjacent areas. NYSDEC assigns freshwater wetlands under its jurisdiction a classification value from 1 (highest) to 4 (lowest), based on characteristics that provide ecological, hydrological, pollution control, and/or other special benefits.

Stream banks are defined by NYSDEC as the land area immediately adjacent to, and which slopes toward, the bed of a watercourse, and which is necessary to maintain the integrity of the watercourse. A bank will not be considered to extend more than 50 ft (15 m) horizontally from the mean high-water line, except where a generally uniform slope of 45 degrees (100 percent) or greater adjoins the bed of a watercourse. The bank is then extended to the crest of the slope or the first definable break in slope, either a natural or constructed (road, or railroad grade) feature lying generally parallel to the watercourse.

Tidal wetlands in New York State are protected under Article 25 of the Environmental Conservation Law, known as the Tidal Wetlands Act. Under this Act, New York regulates all tidal wetlands displayed on an inventory map, as defined in 6 New York Codes, Rules and Regulations (NYCRR) § 661.4(o), and the associated tidal wetlands adjacent areas. There are multiple types of tidal wetlands based on 6 NYCRR § 661.4(hh), including:

- Coastal Fresh Marsh: The tidal wetland zone, designated FM on an inventory map, found primarily in the upper tidal limits of riverine systems where significant freshwater inflow dominates the tidal zone. Species normally associated with this zone include narrow leaved cattail (*Typha angustifolia*), the tall brackish water cordgrasses (*Spartina pectinata* and/or *S. cynosuroides*), and the more typically emergent fresh water species such as arrow arum, (*Peltandra virginica*), pickerel weed (*Pontederia cordata*), and rice cutgrass (*Leersia oryzoides*).
- *Intertidal Marsh*: The vegetated tidal wetland zone, designated IM on an inventory map, lying generally between average high and low tidal elevation. The predominant vegetation in this zone is smooth cordgrass (*Spartina alterniflora*).
- *Coastal Shoals, Bars and Flats*: The tidal wetland zone, designated SM on an inventory map, that satisfies each of the following, except as otherwise determined in specific cases where such lands do not function biologically as tidal wetlands due to such factors as pollution, sedimentation, or other physical disturbances:
  - (1) at high tide is covered by water,
  - (2) at low tide is exposed or is covered by water to a maximum depth of approximately one foot, and
  - (3) is not vegetated by smooth cordgrass.
- Littoral Zone: The tidal wetlands zone, designated LZ on an inventory map, that includes all lands under tidal waters which are not included in any other category, except as otherwise determined in specific cases where such lands do not function biologically as tidal wetlands due to such factors as pollution,

sedimentation or other physical disturbances. The Littoral Zone does not extend under waters deeper than six feet at mean low water.

- High Marsh or Salt Meadow: The normal uppermost tidal wetland zone, designated HM on an inventory
  map, usually dominated by saltmeadow cordgrass (Spartina patens) and spike-grass (Distichlis spicata).
  This zone is periodically flooded by spring and storm tides and is often vegetated by low vigor (dwarf
  form) smooth cordgrass and Seaside lavender (Limonium carolinianum). Upper limits of this zone often
  include black grass (Juncus Gerardi), chairmaker's rush (Scirpus pungens), marsh elder (Iva frutescens), and
  groundsel bush (Baccharis halimifolia).
- Formerly Connected Tidal Wetlands: The tidal wetlands zone, designated FC on an inventory map, in which normal tidal flow is restricted by man-made causes. Typical tidal wetland plant species may exist in such areas although they may be infiltrated with common reed (*Phragmites australis*).

NYSDEC also regulates activities in tidal wetlands adjacent areas. The tidal wetlands adjacent area is defined as the land adjacent to the wetland boundary to a maximum landward distance of 150 ft (46 m) for tidal wetlands within the New York City limits and 300 ft (91 m) for tidal wetlands elsewhere in the State. The maximum landward distance (150 ft [46 m] or 300 ft [91 m] from the tidal wetland boundary) is reduced in the presence of a lawfully and presently existing (i.e., as of August 20, 1977) functional structure greater than 100 ft (30 m) in length (including, but not limited to, paved streets and highways, railroads, bulkheads and sea walls, and riprap walls) or where an elevation reaches 10 ft (3 m) above mean sea level (6 NYCRR § 661.4(b)(1)).

Under Article 15 of the Environmental Conservation Law, New York classifies surface water resources by their best uses (fishing, source of drinking water, etc.; 6 NYCRR Part 701) or as Wild, Scenic and Recreation Rivers (6 NYCRR Part 666). Saline surface waters fall into five categories based on the best uses assigned by NYSDEC:

- Classification SA: assigned to waters used for shell fishing for market purposes along with primary and secondary contact recreation and fishing.
- Classification SB: assigned to waters used for primary and secondary contact recreation and fishing.
- Classification SC: assigned to waters used for fishing and primary and secondary contact recreation, although other factors may limit the use for these purposes.
- Class I: assigned to waters used for secondary contact recreation and fishing. Class I waters may be suitable for primary contact recreation, other factors may limit the use for this purpose.
- Class SD: assigned to waters used for fishing. All of the defined water quality classifications are suitable for fish, shellfish, and wildlife propagation and survival; however, Class SD waters cannot meet the requirements for fish propagation due to natural or man-made conditions.

# **D.2.2** Terrestrial Vegetation

Terrestrial vegetation is not universally protected under federal or state law. However, impacts to terrestrial vegetation may be regulated at the federal and/or State level by restricting tree removal or other alterations to the vegetation community due to the presence, or potential presence, of threatened or endangered species. Additionally, NYSDEC regulates invasive plant species through Title 6, Department of Environmental Conservation, Chapter V, Resource Management Services, Subchapter C, Invasive Species, Part 575, Prohibited and Regulated Invasive Species of the New York Codes, Rules and Regulations. The Part 575 list includes 69 prohibited and six regulated plant species ("Part 575 Listed Species"). Prohibited species are those that cannot be sold, imported, purchased, transported, introduced or propagated in New York. Regulated species can be possessed, sold, purchased, propagated and transported, but cannot be introduced into a free-living state (i.e., unconfined and outside the control of a person).

# D.3 Project Setting / Information Review

## D.3.1 Mapped Wetlands

The submarine export cables make landfall from the marine environment of the Atlantic Ocean in the Long-Island-Atlantic Ocean watershed (10-digit Hydrologic Unit Code [HUC 10]: 0203020209). The Study Area includes four alternative landfall sites: Landfall A, Landfall B, Landfall C, and Landfall E. The potential onshore export cable routes north of the cable landfall sites enter the South Oyster Bay-Jones Inlet watershed (HUC 10: 0203020202) and traverse developed areas of the Town of Hempstead and the City of Long Beach. Each onshore export cable route is located primarily within existing road rights-of-way. Based on United States Fish and Wildlife Service's National Wetland Inventory (NWI) and NYSDEC mapping, the onshore export cable corridors between the cable landfall and Reynolds Channel do not cross any tidal wetlands. There are no NYSDEC-mapped freshwater wetlands in the vicinity of the Study Area. NYSDEC-mapped tidal wetlands are adjacent to and within 300 ft (91 m) of the onshore export cable corridor where the corridor follows Park Street and also at the southern bank of Reynolds Channel.

The onshore export cable route crosses Reynolds Channel (also identified as Wreck Lead Channel on some mapping) to the onshore substation in the Village of Island Park. Reynolds Channel is classified by NWI as a subtidal estuarine feature with an unconsolidated bottom (E1UBL), and by the NYSDEC tidal wetland database as a Littoral Zone. NYSDEC also maps portion of the southern bank of Reynolds Channel as Coastal Shoak, Bars and Flats. The onshore substation site is located on the northern bank of Reynolds Channel on developed lands comprising commercial properties. NWI and NYSDEC mapping indicates that Reynolds Channel extends into the onshore substation site by a maximum of approximately 40 ft (12 m).

From the onshore substation, the interconnection cable routes under consideration traverse the Village of Island Park north to the POI, located primarily within existing railroad or road rights-of-way. Tidal wetlands mapped by NWI and NYSDEC are located within the Study Area just south of the POI (adjacent to Barnums Channel). NWI classifies these wetlands as subtidal estuarine with an unconsolidated bottom (E1UBL) with intertidal estuarine wetlands (E2US2N) along select banks. The NWI mapped wetlands at these locations are approximately consistent with NYSDEC tidal wetlands mapping, which depicts Littoral Zone with Coastal Shoals, Bars and Flats as well as Intertidal Marsh in this area. The NWI also maps a freshwater wetland complex east of the existing Barrett 138-kilovolt Substation, southwest of the intersection of Long Beach Road and Daly Boulevard. This wetland is classified as a temporarily-flooded palustrine emergent and scrub-shrub wetland (PEM1/SS1S). NYSDEC-mapped tidal wetlands are adjacent to and within 300 feet of the interconnection cable corridor where the corridor follows Austin Boulevard as well as in the vicinity of the POI in the northerm portion of the Study Area.

Mapped wetlands within and proximal to the Study Area are presented on Figure D-2.





Figure D-2 Mapped Wetlands and Waterbodies

# D.3.2 Mapped Surface Waterbodies

NYSDEC mapping identifies Reynolds Channel and Barnums Channel as surface waterbodies crossed by the EW 2 Project. Barnums Channel corresponds to the NWI and NYSDEC-mapped tidal wetland that the interconnection cable route crosses approaching the POI. Reynolds Channel is classified as a Class SB waterbody, for primary and secondary contact recreation and fishing. NYSDEC classifies Barnums Channel as a Class SC waterbody, used for primary and secondary contact recreation and fishing, although other factors may limit the use for these purposes.

Mapped surface waterbodies within and proximal to the Study Area are presented on Figure D-2.

# **D.3.3** Terrestrial Vegetation

The Study Area is located within the Barrier Islands/Coastal Marshes Level III U.S. Environmental Protection Agency ecoregion. This ecoregion consists of flat to gently sloping plains, coastal bays and inlets, islands, bluffs, dunes, beaches, tidal flats, and marshes. Natural vegetation comprises coastal forests of scarlet oak (*Quercus coccinea*), black oak (*Quercus velutina*), post oak (*Quercus stellata*), beech (*Fagus grandifolia*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*), pitch pine (*Pinus rigida*), and American holly (*Ilex opaca*). Coastal forests may have a dense shrub layer and vines including sassafras (*Sassafras albidum*), greenbrier (*Smilax spp.*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), beach plum (*Prunus maritima*), lowbush blueberry (*Vaccinium angustifolium*), or grape (*Vitis spp.*). Beach communities comprise sea-rocket (*Cakile spp.*), dune grasses (*Ammophila breviligulata*), beach pea (*Lathyrus japonicus*), and seabeach orache (*Atriplex glabriuscula*). Salt marshes are dominated by saltmeadow cordgrass (*Spartina patens*), smooth cordgrass (*Spartina alterniflora*), spikegrass (*Distichlis spicata*), and saltmarsh rush (*Juncus gerardii*) (Bryce et al. 2010).

The Study Area is broadly located within urbanized landscapes of the City of Long Beach, the Village of Island Park, and Town of Hempstead, New York. Based on aerial imagery review, the vegetation typical of this ecoregion, as described above, is limited within the Study Area. Aerial imagery review indicates that vegetated areas are primarily limited to areas surrounding the onshore substation site, and the northern portion of the Study Area, east of the existing Barrett 138-kilovolt Substation. The onshore export cable corridor and the interconnection cable corridor are located primarily within existing road or railroad rights-of-way, which contain sparse trees and shrubs and limited maintained grass.

#### D.4 Methods

#### D.4.1 Wetland Delineation

A wetland delineation was conducted on November 4, 2021 following methods described in the USACE Wetlands Delineation Manual (USACE 1987) and the New York State Freshwater Wetlands Delineation Manual (Browne et al. 1995). Areas at the onshore substation site (a subset of the Study Area) located within Block 14, Lots 1, 4, 5, 7, 72, 76, 78, 111, 174, 180, 186, and 194 in the Village of Island Park, New York. NYSDEC-mapped tidal wetland boundaries were assessed, field-delineated, and categorized into the appropriate wetland type based on 6 NYCRR § 661.4(hh), as detailed in Section D.2.1.

The presence of unmapped freshwater wetlands was verified using the Routine Onsite Determination Method, as described in USACE 1987, together with methods and guidelines provided in the Northcentral and Northeast Region Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (USACE 2012). In addition, the Routine Delineation Procedure, as described in Browne et al. 1995 was also considered. These methods incorporate a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands. The presence of a wetland was

field verified by analyzing dominant vegetation, soil classification, and hydrology at paired sample stations within the investigated area. Under the New York State method, the presence of hydrophytic vegetation characteristics (i.e., greater than 50 percent facultative wet or wetter species, 10 percent or greater areal cover of obligate perennial species, morphological adaptions, or expanses of peat mosses over persistently saturated soils) typically indicates a wetland and an area that exhibits these indicators can generally be considered a wetland without detailed examination of hydrology and/or soils.

Wetland boundary points were recorded in a geodatabase (i.e. field geodatabase) using an Eos Arrow 100<sup>©</sup> handheld Global Positioning System and an Apple iPad<sup>©</sup>. The Eos Arrow 100<sup>©</sup> provides sub-meter accuracy. Each delineated feature was photo-documented.

# D.4.2 Wetland Verification

A field reconnaissance was conducted on November 4, 2021 within those portions of the Study Area not delineated as described in Section D.4.1 to (1) verify the presence of any mapped wetland and waterbody resources identified during the desktop analysis, and (2) assess the potential presence of unmapped wetland and waterbody resources. The field reconnaissance was conducted from publicly-accessible areas only. NYSDEC-mapped tidal wetlands that approached to within 300 ft (91 m) of the Study Area were also field verified, where access allowed, to assess the associated regulated wetland adjacent areas that may potentially extend into the Study Area.

The potential presence of unmapped wetlands within the Study Area was evaluated based on the occurrence of hydrophytic vegetation within topography conducive to wetland hydrology.

Each field-verified wetland was photo-documented.

# D.4.3 Terrestrial Vegetation Survey

A terrestrial vegetation survey was conducted concurrently with the wetland delineation (Section D.4.1) and the wetland verification (Section D.4.2) efforts on November 4, 2021. This survey included both a characterization of the vegetation communities within the Study Area, as well as a documentation of invasive species observed, as described below. The terrestrial vegetation survey was conducted from publicly accessible areas, with the exception of the onshore substation site, where full access was authorized.

#### D.4.3.1 Vegetation Communities

Vegetation within the Study Area was classified into ecological communities as described in *Ecological Communities of New York State, Second Edition* (Edinger et al. 2014). Distinct communities were recorded in the field geodatabase as either polygons in non-linear areas (e.g., landfall sites and the onshore substation) or using start/stop points in linear areas (e.g., cable corridors). Representative photographs of each community type were recorded.

#### D.4.3.2 Invasive Species

Part 575 Listed Species were recorded in the field geodatabase by tallying all invasive species observed within each tax parcel that was able to be accessed, in the case of the onshore substation, or viewed from publicly-accessible vantage points for the remaining portions of the Study Area where access was not authorized. Invasive species were compiled into a comprehensive list to quantify species richness. The extent of each distinct invasive species stands was not delineated as part of this survey considering that survey access was limited, and the survey was conducted outside of the flowering period for most of the Part 575 Listed Species,

potentially influencing detectability at time of survey. Representative photographs of observed invasive species were recorded.

#### D.5 Results

The wetland delineation, wetland verification, and terrestrial vegetation survey were conducted on November 4, 2021 by Stephen Ryan, Professional Wetland Scientist, and Jessica Atutubo, Biologist, both of Tetra Tech.

#### **D.5.1 Wetland Delineation**

One tidal wetland (TW1) was partially delineated within the Study Area, which corresponds to Reynolds Channel, mapped as a tidal wetland by NWI and NYSDEC (Section D.3.1) and a surface waterbody by NYSDEC (Section D.3.2). Due public and private land where access permission had not yet been obtained at the time of survey, only the northern boundary of Reynolds Channel was field-delineated, while the southern boundary of Reynolds Channel was field-verified from adjacent publicly-accessible areas (see Section D.5.2).

The northern boundary of wetland TW1 comprises Littoral Zone that transitions immediately to uplands currently used for commercial purposes, specifically a restaurant, a marina with floating docks, and supporting ancillary buildings and parking lots. A total of 0.04 ac (0.02 ha) of wetland TW1 extends into the onshore substation portion of the Study Area. A total of 760.6 ft (231.8 m) of the delineated boundary comprises wooden bulkheading, with the remaining 47.02 ft (14.3 m) comprising natural shoreline within the Study Area, including 11.54 ft (3.5 m) of natural shoreline at the extreme eastern edge of the onshore substation and 35.48 ft (10.8 m) at the western edge of the onshore substation (**Figure D-3**).

A total of 0.60 ac (0.24 ha) of tidal wetland adjacent area associated with the delineated boundary of wetland TW1 extends into the Study Area, measured perpendicularly a distance of 300 feet from the general flow of the delineated natural shoreline of Reynolds Channel. Based on section 661.4 of Title 6 of the New York State regulations, the tidal wetland adjacent area is truncated along the 760.6 ft (231.8 m) of the delineated wetland boundary that is wooden bulkheading (**Figure D-3**).

The southern boundary of wetland TW1 will be delineated during a subsequent field effort(s) as access is negotiated. The total area of wetland TW1 within the Study Area, and the extent of the tidal wetland adjacent area associated with the southern boundary of the wetland, will be calculated when the wetland is fully delineated.

No unmapped freshwater wetlands, tidal wetlands, or surface waterbodies were identified within the onshore substation site during the wetland delineation effort. Photographs supporting the wetland delineation are provided in **Attachment D-1**.



Figure D-3 Wetland Delineation and Verification

#### **D.5.2** Wetland Verification

A total of six NYSDEC-mapped tidal wetlands were field-verified within the Study Area. These include:

- Four tidal wetlands adjacent to the north of the onshore export cable route alternative that follows Park Avenue. These wetlands are fully bulkheaded within a heavily-populated residential area and the tidal wetland adjacent area is truncated at the bulkhead and does not extend to the onshore export cable corridor.
- The southern bank of Reynolds Channel. This tidal wetland was partially field delineated as wetland TW1 (see Section D.5.1). This southern wetland boundary exists approximately as mapped by NYSDEC with no bulkheading or rip-rap along the shoreline. A large amount of concrete and asphalt debris is deposited in and above the intertidal zone. Based on field observations, it is anticipated that tidal wetland adjacent area associated with the southern bank of Reynolds Channel will extend landward 300 feet or be truncated at the first qualifying structure, whichever is greater, as detailed in Section D.2.1.
- The tidal wetland adjacent to the east of the interconnection cable route alternative that follows Austin Boulevard. Similar to above, this wetland is fully bulkheaded within a heavily-populated residential area; therefore, the tidal wetland adjacent area is truncated at the bulkhead and does not extend to the interconnection cable corridor.

No unmapped tidal wetlands, freshwater wetlands, or surface waterbodies were identified within the Study Area during the field verification. Photographs supporting the wetland verification field reconnaissance are provided in **Attachment D-1**.

Due to access limitations, a field verification of wetlands or waterbodies could not be conducted for approximately 37.10 ac (15.02 ha) of the 86.91-ac (35.17-ha) Study Area. This includes the cable landfall alternatives, areas along the Long Island Rail Road corridor, and the northern portions of the Study Area where the interconnection cable route corridor deviates from public roads (**Figure D-4**). This report will be updated once additional access permissions have been obtained within the Study Area.

#### **D.5.3** Terrestrial Vegetation Survey

#### D.5.3.1 Vegetation Communities

A total of 11 Edinger communities categorized under two larger systems (Estuarine and Terrestrial) were identified within the Study Area. **Table D-1** provides the total acreage and the percentage of the Study Area occupied by each of these communities. A total of 26.72 ac (10.81 ha) of the Study Area was not assessed for terrestrial vegetation due to access restrictions and lack of publicly-accessible vantage points (**Figure D-4**).



Figure D-4 Terrestrial Vegetation

Sub System	Edinger Community Type		Total Acres (ha)	Percent of Study Area
Terrestrial Cultural	Paved Road / Path		45.29 (18.33)	52.11%
Terrestrial Cultural	Urban Structure Exterior / Urban Vacant	t Lot	8.14 (3.30)	9.37%
Terrestrial Cultural	Unpaved Road / Path		1.97 (0.80)	2.27%
Terrestrial Cultural	Urban Vacant Lot		1.72 (0.70)	1.98%
Terrestrial Cultural	Mowed Roadside / Pathway		1.10 (0.44)	1.26%
Estuarine Subtidal	Tidal River		0.63 (0.25)	0.72%
Terrestrial Cultural	Dredge Spoils		0.93 (0.38)	1.07%
Terrestrial Cultural	Mowed Lawn		0.35 (0.14)	0.40%
Terrestrial Cultural	Railroad		0.05 (0.02)	0.06%
Estuarine Intertidal	Brackish Intertidal Shore		0.00 (0.0)	0.0%
Estuarine Cultural	Estuarine Riprap / Artificial Shore		<0.01 (<0.01)	<0.01%
	Suk	btotal	60.19 (24.36)	69.25%
	Unassessed		26.72 (10.81)	30.75%
	Suk	btotal	26.72 (10.81)	30.75%
	٦	Total	86.91 (35.17)	100.0%

#### Table D-1 Edinger Community Types Identified within the Study Area

#### D.5.3.2 Invasive Species

A total of 11 Part 575 Listed Species were identified during the terrestrial vegetation survey, including:

- *Ampelopsis brevipedunculata* (porcelain berry)
- Artemisia vulgaris (mugwort)
- Celastrus orbiculatus (Oriental bittersweet)
- Lonicera japonica (Japanese honeysuckle)
- Phragmites australis (common reed grass)
- Robinia pseudoacacia (black locust)
- Rosa multiflora (multiflora rose)
- *Clematis virginiana* (virgin's bower)
- Reynoutria japonica (Japanese knotweed)
- Berberis thunbergia (Japanese barberry)
- *Miscanthus sinensis* (Chinese silvergrass)

Invasive species observations were concentrated within the onshore substation area, where 9 of the 11 above species were documented; however, this is more a function of survey access than actual invasive species distribution within the Study Area. In addition to the onshore substation site, three Part 575 Listed Species (mugwort, Oriental bittersweet, and common reed grass) were observed near the southern bank of Reynolds Channel and two Part 575 Listed Species (mugwort and common reed grass) were observed on the southern shoulder of Daly Boulevard. Additionally, although not recorded in the field geodatabase, expansive stands of common reed grass were observed in the northern portion of the Study Area southwest of intersection of Daly Boulevard and Long Beach Road. This common reed grass corresponds with the NWI-mapped freshwater

wetland complex discussed in Section D.3.1. This entire area was obscured by a privacy fence, so the extent of the common reed, and the presence of additional Part 575 Listed Species, could not be determined.

Considering that the terrestrial vegetation survey was conducted outside of the peak flowering season and that survey access was partially restricted, this list may not be comprehensive for the entire Study Area, and will be supplemented upon further field surveys.

#### D.6 Summary and Conclusion

Tetra Tech conducted a field effort of the 86.91-ac (35.17-ha) Study Area on November 4, 2021, which included a formal wetland delineation of the proposed onshore substation and a verification of wetland and surface waterbodies from publicly accessible areas for the remaining portions of the Study Area. Terrestrial vegetation was characterized concurrently during the wetland delineation and verification effort.

One wetland, wetland TW1, was partially delineated within the Study Area, which is identified as Reynolds Channel. A total of 0.04 ac (0.02 ha) of wetland TW1 extends into the onshore substation. A total of 760.6 ft (231.8 m) of the delineated boundary comprises wooden bulkheading, with the remaining 47.02 ft (14.3 m) comprising natural shoreline, including 11.54 ft (3.5 m) of natural shoreline at the extreme eastern edge of the onshore substation and 35.48 ft (10.8 m) at the western edge of the onshore substation. A total of 0.60 ac (0.24 ha) of tidal wetland adjacent area associated with the delineated boundary of wetland TW1 extends into the Site. The southern boundary of wetland TW1 will be delineated during a subsequent field effort as access is negotiated.

A total of six NYSDEC-mapped tidal wetlands were field-verified within the Study Area along the onshore export and interconnection cable routes. These include four NYSDEC-mapped tidal wetlands adjacent to within 300 ft (91 m) of the onshore export cable route and one NYSDEC-mapped tidal wetland adjacent to within 300 ft (91 m) of the interconnection cable route. Each of these wetlands were identified as fully bulkheaded; therefore, the tidal wetland adjacent area is truncated at the bulkhead and does not extend to the Study Area. The final field-verified wetland is the southern boundary of Reynolds Channel, while the northern boundary was field-delineated as wetland TW1 (see above). This southern wetland boundary exists approximately as mapped by NYSDEC with no bulkheading or rip-rap along the shoreline. A large amount of concrete and asphalt debris is deposited in and above the intertidal zone. Based on field observations, it is anticipated that tidal wetland adjacent area associated with the southern bank of Reynolds Channel will extend landward 300 feet or truncated at the first qualifying structure, whichever is greater. The total area of wetland TW1 within the Study Area, and the extent of the tidal wetland adjacent area associated with the southern boundary of the wetland, will be calculated when the wetland is fully delineated.

Due to access limitations, a field verification of wetlands or waterbodies could not be conducted for approximately 37.10 ac (15.02 ha) of the 86.91-ac (35.17-ha) Study Area. No unmapped freshwater wetlands, tidal wetlands, or surface waterbodies were identified within the assessed areas of the Study Area during the wetland delineation and verification effort.

A total of 11 Edinger ecological communities categorized under two larger systems (Estuarine and Terrestrial) were identified within the Study Area as part of the terrestrial vegetation survey. The most prevalent ecological communities were Paved Road / Path [45.29 ac (18.33 ha), or 52.1 percent of Study Area], Urban Structure Exterior / Urban Vacant Lot [8.14 ac (3.3 ha), or 9.4 percent of Study Area], and Unpaved Road / Path [1.97 ac (0.8 ha), or 2.3 percent of Study Area]. This is consistent with the developed nature of the Study Area. A total of 26.72 ac (10.81 ha) of the 86.91-ac (35.17-ha) Study Area was not assessed for terrestrial vegetation due to access restrictions and lack of publicly-accessible vantage points.

A total of 11 Part 575 Listed Species were identified during the terrestrial vegetation survey. Invasive species observations were concentrated within the onshore substation, where 9 of the 11 above species were documented; however, this is more a function of survey access than actual invasive species distribution within the Study Area and the actual total number of invasive species may be larger.

It is recommended that an additional wetland delineation be conducted for the 37.10 ac (15.02 ha of the 86.91ac (35.17-ha) Study Area that were not accessible during the wetland delineation and verification effort. Similarly, it is recommended that a terrestrial vegetation survey be conducted to characterize the remaining ecological communities within 26.72 ac (10.81 ha) of the Study Area that was not assessed. Considering that the terrestrial vegetation survey was conducted outside of the peak flowering season and that survey access was partially restricted, the list of invasive species documented in this report is not comprehensive for the entire Study Area. If it is determined that a formal invasive species survey is required, additional and comprehensive efforts will be needed.

# D.7 References

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Attachment D-1 Photographic Log



Photograph 01 Northern bank of wetland TW1 (Reynolds Channel) showing bulkhead. Facing west from floating dock (November 4, 2021).



Photograph 02 Northern bank of wetland TW1 (Reynolds Channel) showing bulkhead. Facing west northwest (November 4, 2021).



Photograph 03 Northern bank of wetland TW1 (Reynolds Channel) showing natural shoreline at western edge of onshore substation site. Facing northeast (November 4, 2021).



Photograph 04

Northern bank of wetland TW1 (Reynolds Channel) showing natural shoreline at western edge of onshore substation site. Facing northeast (November 4, 2021).



## Photograph 05

Southeast portion of onshore substation site. Taken from Railroad Place facing south toward parking lot with Reynolds Channel in background (November 4, 2021).



Photograph 06 Southwest portion of onshore substation site. Facing north northeast showing active marina with LIRR right-of-way to the left (out of view) (November 4, 2021).



Photograph 07 Northern portion of onshore substation site. Taken from Railroad Place facing north toward large stockpile area (November 4, 2021).



Photograph 08 Northern portion of onshore substation site. Taken from top of large stockpile mound. Facing northeast showing dense invasive species, including black locust (*Robinia pseudoacacia*), mugwort (*Artemisia vulgaris*), and Japanese knotweed (*Reynoutria japonica*) (November 4, 2021).



Photograph 09 Proposed Cable Landfall (Alternative A). Taken from Riverside Boulevard facing northwest toward fenced gravel lot (November 4, 2021).



Photograph 10 Proposed Cable Landfall (Alternative A). Facing east along Broadway (November 4, 2021).



# Photograph 11 Onshore export cable route corridor west of Cable Landfall Alternative C. Facing east at Broadway and Mitchel Avenue showing ornamental plantings in median (November 4, 2021).



#### Photograph 12 NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing west near intersection of Chester Street and Doyle Street showing bulkheaded bank on all sides. Chester Street left of image (out of view) (November 4, 2021).



#### Photograph 13 NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing west near intersection of Chester Street and Heron Street showing bulkheaded bank on all sides. Chester Street in left of image (November 4, 2021).



#### Photograph 14

NYSDEC-mapped tidal wetland north of onshore export cable route corridor. Facing southwest near intersection of Chester Street and Clark Street showing bulkheaded bank on all sides. Chester Street in background (November 4, 2021).



Photograph 15 Southern bank of Reynolds Channel at end of Riverside Boulevard. Facing northeast with onshore substation site in distance (November 4, 2021).



Photograph 16 Southern bank of Reynolds Channel at end of Riverside Boulevard. Facing west (November 4, 2021).



Photograph 17 NYSDEC-mapped tidal wetland east of interconnection cable route corridor. Facing southwest from California Place North showing rip-rap bank (November 4, 2021).