

EMPIRE OFFSHORE WIND:
EMPIRE WIND PROJECT (EW 1 and EW 2)
**CONSTRUCTION AND
OPERATIONS PLAN**

VOLUME 2c: CULTURAL RESOURCES

Prepared for

equinor



Submitted to

**Bureau of Ocean
Energy Management**

Prepared by



TETRA TECH

NOVEMBER 2023

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6. CULTURAL RESOURCES

Cultural resources include archaeological sites, historic standing structures, objects, districts, and traditional cultural properties that illustrate or represent important aspects of prehistory (before circa Anno Domini [AD] 1600) or history (after circa AD 1600) or that have important and long-standing cultural associations with established communities or social groups. Significant archaeological and architectural properties are generally defined by the eligibility criteria for listing on the National Register of Historic Places (NRHP). Section 106 of the National Historic Preservation Act (NHPA) (54 U.S.C. § 306108) is triggered when projects require federal permits, receive federal funding, or occur on federal lands. Such federal undertakings require consultation by federal agencies with the state historic preservation office (SHPO) and interested Native American Tribes. In 2016, BOEM executed a Programmatic Agreement with the State Historic Preservation Officers of New Jersey and New York, the Shinnecock Indian Nation, and the Advisory Council on Historic Preservation (ACHP) to formalize agency jurisdiction and coordination for the review of offshore renewable energy development regarding cultural resources. The Programmatic Agreement recognized that issuing renewable energy leases in the OCS constituted an undertaking subject to Section 106 of the NHPA. BOEM, as lead federal agency in this process, has the authority to initiate consultations with the New York and New Jersey SHPOs, and to consult with interested Native American Tribes (BOEM 2016). These consultations identify the area of potential effect (APE) and potential impact-producing factors to historic properties, as defined in 36 CFR 800.16(l), that are listed on, or are potentially eligible for listing on, the NRHP. The APE will be defined by BOEM through the Section 106 process, therefore, this COP describes the preliminary APE (PAPE), as identified by Tetra Tech.

This COP includes three subsets of historic properties, each discussed in separate sections and Appendices:

- Marine Archaeological Resources (Section 6.1 and Appendix X);
- Terrestrial Archaeological Resources (Section 6.2 and Appendix Y); and
- Visual Effects to Historic and Architectural Properties (Section 6.3 and Appendix Z).

In addition, other resources and assessments detailed within this COP that are related to historic properties include:

- Visual Resources (Section 7 and Appendix AA).

To better inform understanding of potential effects and appropriate mitigation measures as it relates to historic properties, Empire has engaged with Tribes and cultural resources stakeholders. This engagement is documented in **Appendix B Summary of Agency Engagement**. However, engagement is continuing and Empire will provide updates to BOEM, as appropriate.

6.1 Marine Archaeological Resources

This section discusses marine archaeological resources within and surrounding the offshore portions of the Project Area. Potential impacts resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Empire are also described, which are intended to avoid, minimize, and/or mitigate potential impacts to marine archaeological resources.

Other resources and assessments detailed within this COP that are related to marine archaeological resources include:

- Marine Archaeological Resources Assessment (Appendix X).

Data Relied Upon and Studies Completed

For the purposes of this section, the Marine Archeological Resources PAPE includes the surveyed area within which offshore Project components may be sited (see **Figure 6.1-1**). The Marine Archeological PAPE consists of a total of 102,666 ac (41,547 ha), which covers the Wind Farm Development Area, the submarine export cable siting and anchor corridors for EW 1 and EW 2 (shown on **Figure 6.1-2** and in **Table 6.1-1**), as well as additional adjacent areas surveyed for siting flexibility.

Table 6.1-1 Summary of the Marine Archeological PAPE a/

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect b/
Wind Farm Development Area	65,908 ac (26,672 ha)	197 ft (60 m)
EW 1 Submarine Export Cable Siting Corridor (Total length of 40 nm (74 km))	500 ft (152 m)	20 ft (6.1 m) c/
EW 1 Anchor Corridor (Total length of 16 nm [30 km]) d/	1,250 ft (381 m)	49 ft (15 m)
EW 2 Submarine Export Cable Siting Corridor (Total length of 26 nm (48 km))	900 ft (274 m)	20 ft (6.1 m) c/
EW 2 Anchor Corridor (Total length of 16 nm [30 km]) d/	1,250 ft (381 m)	49 ft (15 m)

Notes:

a/ The Marine Archeological PAPE includes the entire surveyed area within which Project components may be sited. This table details the specific Project areas within the Marine Archeological PAPE associated with construction activities. Project O&M activities will occur within this maximum horizontal and vertical effects, as detailed above.

b/ Below seabed elevation

c/ Maximum vertical effect to be based on CBRA and/or site-specific conditions but will not exceed 20 ft (6.1 m).

d/ The area in which a submarine export cable installation vessel may anchor in support of installation activities; distance measured from the edge of the siting corridor. Corridor width may increase or decrease where site constraints exist.

This section was prepared in accordance with 30 CFR § 585.626(a)(5) and 30 CFR § 585.627(a)(6) to support BOEM's NEPA and NHPA review of the COP. To assess potential impacts, a phased approach was used to identify documented marine archaeological resources and to evaluate the PAPE for its potential to contain undocumented archaeological resources that might be eligible for listing on the NRHP. The phased approach included:

- Literature review and background research of the New York Bight to provide environmental, pre-contact, and historical context for assessing archaeological sensitivity of the PAPE; and
- A full marine archaeological analysis, including review of geophysical and geotechnical survey methods and data analysis.

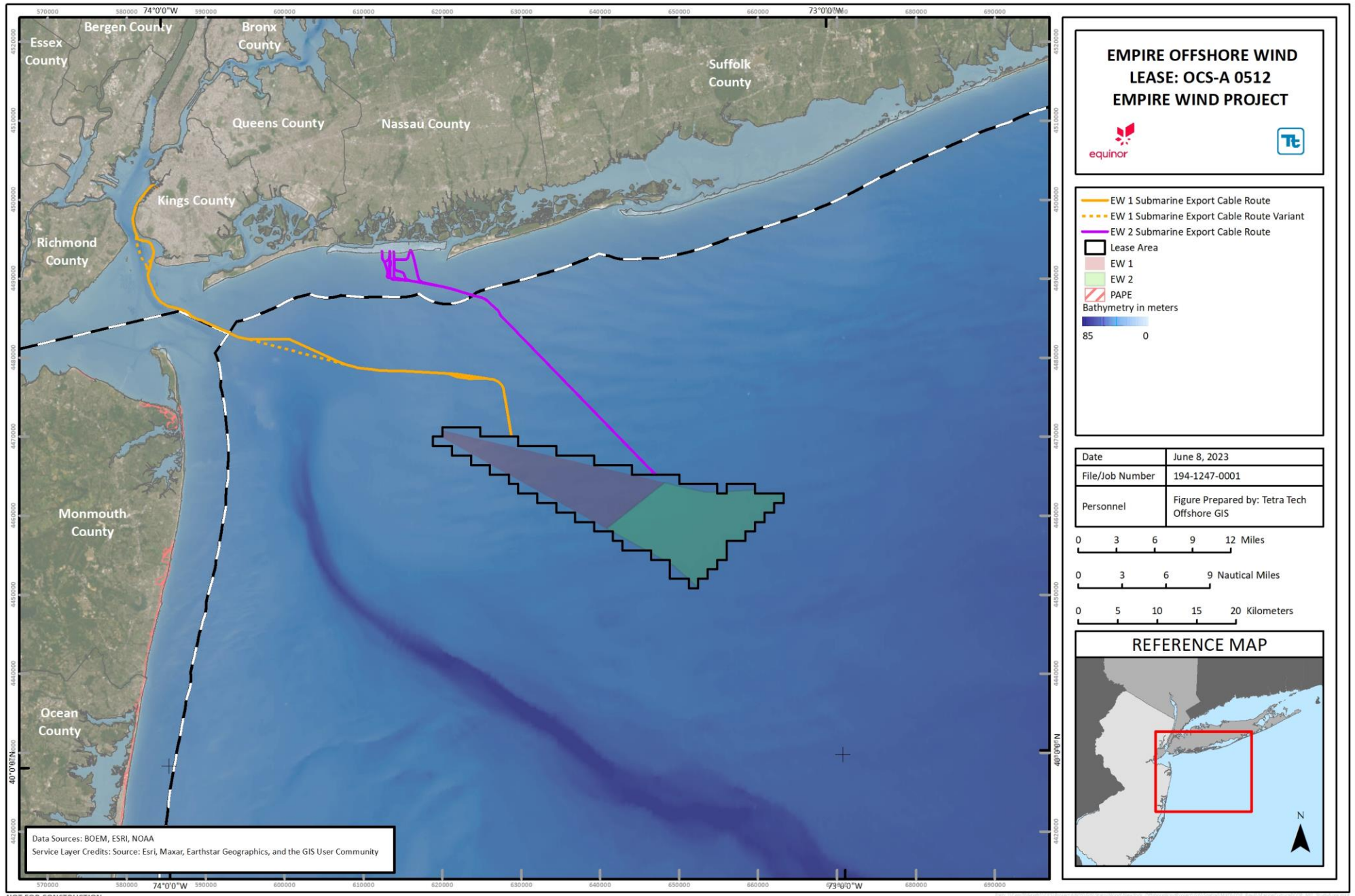


Figure 6.1-1 Marine Archaeological Resources PAPE

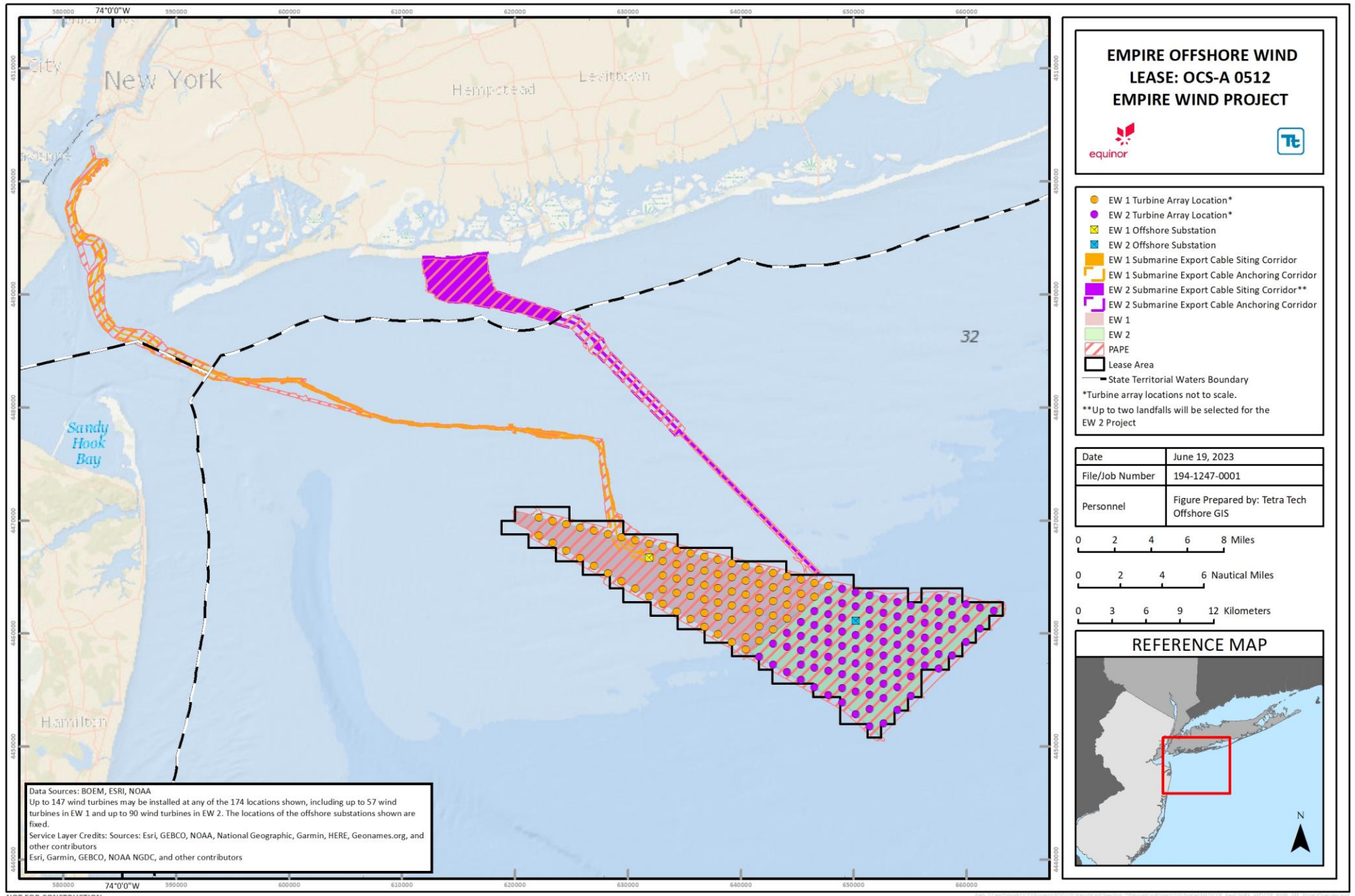


Figure 6.1-2 Activities Proposed within the Marine Archaeological Resources PAPE

Marine archaeological analysis included a full assessment of gradiometer data, side-scan sonar imagery, sub-bottom profiler data, and select geotechnical investigations. In accordance with Lease stipulation 2.1.2, the geophysical and geotechnical survey plans were developed with the assistance of a Qualified Marine Archaeologist (QMA) who participated in pre-survey meetings, as required. An evaluation of all data was used to identify potential submerged cultural resources. The archaeological information derived from site-specific surveys was used to identify archaeological areas of interest (targets) and geological features with pre-contact period archaeological potential. For historic resources, evaluation relied heavily on magnetometer data and side-scan sonar imagery, while pre-contact resources are commonly identified using sub-bottom profiler imagery and geotechnical investigations. Additionally, the geological ground model was a valuable resource for identifying large-scale geological trends throughout the PAPE, which can be helpful in detecting landforms with pre-contact period archaeological potential.

6.1.1 Affected Environment

The affected environment is defined as the offshore areas where marine archaeological resources may be and/or are known to or have the potential to occur and to be directly affected by the construction, operations, and decommissioning of the Project. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Empire expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Empire will comply with in using the facilities.

When discussing archaeological resources, the affected environment is referred to as the APE. The APE, as defined by 36 CFR § 800.16(d), is “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist”. The APE will be defined by BOEM through the Section 106 process, therefore, this COP describes the PAPE, as identified by Tetra Tech. For the purposes of this section, the PAPE will be referred to as the Marine Archaeological PAPE, and is defined in **Table 6.1-1** and **Table 6.1-2**, illustrated in **Figure 6.1-1**, and further detailed in **Appendix X Marine Archaeological Resources Assessment**. The Marine Archaeological Resources PAPE was designated based on constraints specified for offshore wind and defined by BOEM (2017).

Table 6.1-2 Summary of Activities Proposed within the Marine Archaeological PAPE a/

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect b/
Wind Farm Development Area		
Monopile foundation	36 ft (11 m) c/	180 ft (55 m)
Monopile scour protection (including foundation)	207 ft (63 m) c/	0 ft (0 m)
Offshore substation foundation	197 ft x 197 ft (60 m x 60 m)	197 ft (60 m)
Offshore substation scour protection (including foundation)	93,560 ft ² (8,692 m ²)	0 ft (0 m)
Project-vessel area of disturbance	1,312 ft (400 m) c/	82 ft (25 m)
Interarray cables (total length of 260 nm [481 km])	33 ft (10 m)	8 ft (2.4 m)
Cable Protection d/	16 ft x 3 ft (5 m x 1 m)	0 ft (0 m)
Meteorological Buoy	151.8 ft ² (14.1 m ²)	2 ft (0.6 m)

Table 6.1-2 Summary of Activities Proposed within the Marine Archaeological PAPE a/ (continued)

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect b/
EW 1 Submarine Export Cable Siting Corridor		
Submarine Export Cable Burial e/	33 ft (10 m)	<20 ft (<6.1 m)
Pre-Sweeping f/	164 ft x 5,577 ft (50 m x 1,700 m)	<20 ft (<6.1 m) g/
Dredging (cable and pipeline crossing) f/	33 ft x 52.5 ft (10 m x 16 m)	8 ft (2.4 m)
Dredging (EW 1 landfall)	36,127 yd ² (30,207 m ²)	20 ft (6.1 m)
Cable Protection d/	36 ft (11 m)	0 ft (0 m)
Cable and pipeline crossing h/	53 ft x 6.6 ft (16 m x 2 m)	<20 ft (<6.1 m) g/
HDD Cofferdam	100 ft x 100 ft (30 m x 30 m)	<20 ft (<6.1 m) g/
EW 1 Anchor Corridor		
Anchor Drop i/	269 ft ² (25 m ²)	49 ft (15 m)
EW 2 Submarine Export Cable Siting Corridor		
Submarine Export Cable Burial e/	33 ft (10 m)	<20 ft (<6.1 m)
Pre-Sweeping f/	164 ft x 5,577 ft (50 m x 1,700 m)	<20 ft (<6.1 m) g/
Cable Protection d/	36 ft (11 m)	0 ft (0 m)
Cable and pipeline crossing h/	53 ft x 6.6 ft (16 m x 2 m)	<20 ft (<6.1 m) g/
HDD Cofferdam	100 ft x 100 ft (30 m x 30 m)	<20 ft (<6.1 m) g/
EW 2 Anchor Corridor		
Anchor Drop i/	269 ft ² (25 m ²)	49 ft (15 m)

Notes:

a/ This table details the Project activities associated with construction; Project O&M activities will occur within the maximum horizontal and vertical effects, as detailed in this table.

b/ Below seabed elevation

c/ Distance provided is the diameter of the Project component.

d/ It is estimated that up to 10 percent of the length of the submarine export cables and up to 10 percent of the length of the interarray cables will require remedial surface cable protection.

e/ Burial depth will be 8 ft (2.4 m) in most locations and 18 ft (5.5 m) in locations where the submarine export cable will cross federally maintained areas in accordance with engagement with USACE and other stakeholders. This depth will be determined based upon the current or future authorized depth or the existing water depths, whichever is greater; therefore, minimum burial could be greater. Burial depth will not exceed 20 ft (6.1 m).

f/ Dredging and pre-sweeping activities will be located in select locations along the submarine export cable routes and vary in the maximum horizontal and maximum vertical extent; see **Section 3** for additional information.

g/ The maximum vertical effect will be less than the maximum vertical effect analyzed within the Marine Archaeological PAPE.

h/ Along the EW 1 submarine export cable route, it is anticipated that there will be seven crossings of active or planned cables and nine crossings of active, planned, or out-of-service pipelines. Along the EW 2 submarine export cable route, it is anticipated that there will be four crossed active or planned cables; one active pipeline may be crossed if EW 2 Landfall A or EW 2 Landfall E is selected.

i/ The area in which a submarine export cable installation vessel may anchor in support of installation activities; distance measured from the edge of the siting corridor. Corridor width may increase or decrease where site constraints exist. Impacts from Project-related vessel anchoring are expected to be in up to 1,400 locations.

Marine archaeological resources identified in the Marine Archaeological Resources PAPE are described in **Appendix X**. Geologic interpretation completed during the marine archaeological assessment also identified the existence of two epochs with the potential to contain evidence of human habitation, the Late Pleistocene

and Holocene Epochs. These two epochs were identified in both the Wind Farm Development Area and the submarine export cable siting and anchoring corridors.

6.1.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (for a complete description of the construction, operations, and decommissioning activities that Empire anticipates will be needed for the Project, see **Section 3 Project Description**). For marine archaeological resources, the maximum design scenario is the greatest amount of ground disturbing activities, including foundation installation and submarine export and interarray cable burial, as described in **Table 6.1-3**. The parameters provided in **Table 6.1-3** represent the maximum potential impact from full build-out of EW 1 and EW 2 and incorporates a total of up to 149 foundations at any of 176 locations within the Lease Area (made up of up to 147 wind turbines and 2 offshore substations) with two submarine export cable routes, one to EW 1 and one to EW 2.

Table 6.1-3 Summary of Maximum Design Scenario Parameters for Marine Archaeological Resources

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore structures	Based on full build-out of EW 1 and EW 2 (147 wind turbines and 2 offshore substations). EW 1: 57 wind turbines and 1 offshore substation. EW 2: 90 wind turbines and 1 offshore substation.	Representative of the maximum number of structures, which would result in the greatest seabed disturbance.
Submarine export cables	Based on full build-out of EW 1 and EW 2. Total: 66 nm (122 km). EW 1: 40 nm (74 km). EW 2: 26 nm (48 nm).	Representative of the maximum length of new submarine export cables to be installed, which would result in the greatest seabed disturbance.
Interarray cables	Based on full build-out of EW 1 and EW 2, with the maximum number of structures (147 wind turbines and 2 offshore substations) to connect. Total: 260 nm (481 nm). EW 1: 116 nm (214 km). EW 2: 144 nm (267 nm).	Representative of the maximum length of interarray cables to be installed, which would result in the greatest seabed disturbance.
Foundation horizontal disturbance	Based on the maximum amount of scour protection for monopile foundations to support wind turbine generators: 207 ft (63 m) radius. Based on the maximum amount of scour protection for piled jacket foundations to support offshore substations: 93,560 ft ² (8,692 m ²) radius.	Representative of the maximum horizontal area of seabed disturbance during installation.

Table 6.1-3 Summary of Maximum Design Scenario Parameters for Marine Archaeological Resources (continued)

Parameter	Maximum Design Scenario	Rationale
Foundation vertical disturbance	Based on the maximum depth of monopile installation to support wind turbine generators: 180 ft (55 m). Based on the maximum depth of piled jacket installation to support offshore substations: 197 ft (60 m).	Representative of the maximum vertical area of seabed disturbance during installation.
Project-related vessels	Based on full build-out of EW 1 and EW 2, which corresponds to the maximum number of structures (147 wind turbines and 2 offshore substations), submarine export and interarray cables, and maximum associated vessels.	Representative of the maximum number of Project-related vessels, which will result in the maximum construction and installation footprint to the seabed.
Operations and Maintenance		
Project-related vessels	Based on full build-out of EW 1 and EW 2, which corresponds to the maximum number of structures (147 wind turbines and 2 offshore substations), submarine export and interarray cables, and maximum associated vessels.	Representative of the maximum number of Project-related vessels, which will result in the maximum operations and maintenance disturbance footprint to the seabed.

6.1.2.1 Construction

During construction, the potential impact-producing factors to marine archaeological resources may include:

- Construction of offshore components, including foundations, wind turbines, offshore substations, and submarine export cables, and interarray cables, and the associated anchoring of working vessels and Project infrastructure.

The following impacts may occur as a consequence of factors identified above:

- Disturbance to known and/or unknown submerged marine archaeological resource.

Disturbance to any known and/or unknown submerged marine archaeological resource. During construction, the installation of the foundations, wind turbines, offshore substations, submarine export cables, and interarray cables, as well as vessel and infrastructure anchoring will result in the temporary disturbance of the seafloor and the potential for permanent disturbance of marine archaeological resources. Based on the results of the survey activities and marine archaeological analysis completed to date, potential sources of marine archaeological resources have been identified within the Project Area. In order to avoid, minimize, and mitigate impacts, a horizontal buffer of at least 98 to 164 ft (30 to 50 m) from the extent of the magnetic anomalies or acoustic contacts will be applied around contacts, as described in **Appendix X**, unless further investigation and/or consultation with the appropriate authorities determines that a smaller buffer may be appropriate and/or unnecessary. Accordingly, a Phase IB target investigation occurred in late 2022 for six previously identified potential submerged cultural resources (**Appendix X**) whose buffers could not be fully avoided. During this process, remotely operated vehicle and diver investigations were conducted. Only Target 17 was identified as potentially eligible for inclusion in the NRHP. Target 17 will be avoided by a minimum distance

of 65.5 ft (20 m) from the extent of the buried material that was identified by manual probing during the diving investigation.

Additionally, 22 ancient submerged landform features (ASLFs) were identified in the PAPE. Due to the potential for the occurrence and preservation of culturally significant sites to be located on the flanks of paleochannels, additional evaluation of these features and the potential appropriate buffers to be applied was undertaken (**Appendix X**). The ASLFs represent areas possessing preservation potential of margins surrounding the Holocene and Pleistocene paleo-drainage systems that traverse across the PAPE. The areas recommended for avoidance represent the margins of these paleochannels where they extend into the vertical PAPE (**Appendix X**).

6.1.2.2 Operations and Maintenance

During operations and maintenance, activities that disturb the seabed (i.e., repairing of the submarine export and/or interarray cables or the utilization of a jack-up vessel) have the potential to disturb submerged marine archaeological resources. These activities will be limited to areas previously assessed for potential resources. Therefore, no additional impacts are anticipated. In order to avoid, minimize, and mitigate any potential impacts, buffers will be implemented around identified potential submerged contacts, to the extent practicable.

6.1.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in Section 6.1.2.1. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Empire anticipates will be needed for the Project, please see **Section 3**.

6.1.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in Section 6.1.2, Empire is proposing to implement the following avoidance, minimization, and mitigation measures. Additional measures are being discussed as part of Empire's ongoing engagement with Tribes and cultural resources stakeholders. Updates will be provided to BOEM as appropriate.

6.1.3.1 Construction

During construction, Empire will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in Section 6.1.2.1:

- Avoidance of culturally sensitive marine archaeological resources by siting Project components to avoid and minimize impacts to potential marine archaeological sites, including shipwrecks and ASLFs, to the extent practicable, with continued oversight by a Qualified Marine Archaeologist;
- Implementation of a horizontal buffer of at least 98 to 164 ft (30 to 50 m) for identified potential submerged archaeological resources, with the minimum recommended size and configuration of these areas individually based on characterization of the site and delineation of the site's horizontal and vertical boundaries, unless further investigation and/or consultation with the appropriate authorities deems this unnecessary;
- Avoidance of Target 17 by a minimum distance of 65.5 ft (20 m) from the extent of the buried material that was identified by manual probing during the diving investigation;
- Avoidance of ASLF Targets 32, 34, 37, 38, 40, 43, 44, 46, and 50;

- Native American Tribes will continue to be provided opportunities for involvement in marine survey protocol design, execution of the surveys, and interpretation of the results;
- Empire will ensure Tribes have further opportunities to participate in the development of detailed property specific mitigation planning and execution related to submerged historic properties that may be affected by the Project and the interpretation of data collected through mitigation efforts;
- A plan for vessels will be developed prior to construction to identify no-anchorage areas to avoid documented sensitive resources and will be implemented by construction and operation phase vessels; and
- Additional evaluation of appropriate measures regarding ASLFs will be addressed with regulatory authorities, and informed by engagement with Tribes and cultural resource stakeholders.

6.1.3.2 Operations and Maintenance

During operations, Empire will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described Section 6.1.2.2:

- Implementation of a horizontal buffer of at least 164 ft (50 m) for identified potential submerged archaeological resources, unless further investigation and/or consultation with the appropriate authorities deems this unnecessary; and
- Additional evaluation of appropriate measures regarding ASLFs to be addressed with regulatory authorities, and informed by engagement with Tribes and cultural resource stakeholders.

6.1.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in Section 6.1.3.1 and Section 6.1.3.2. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

6.1.4 References

Table 6.1-4 Data Sources

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
NOAA NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coastal/crm.html	N/A

- BOEM (Bureau of Ocean Energy Management). 2016. Programmatic Agreement Among The U.S. Department of the Interior, Bureau of Ocean Energy Management, The State Historic Preservation Officers of New Jersey and New York, The Shinnecock Indian Nation, and The Advisory Council on Historic Preservation Regarding Review of Outer Continental Shelf Renewable Energy Activities Offshore New Jersey and New York Under Section 106 of the National Historic Preservation Act. Available online at: <https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/HP/NY-NJ-Programmatic-Agreement-Executed.pdf>.
- BOEM. 2017. *Guidelines for Providing Archaeological and Historical Property Information Pursuant to 30 CFR Part 585*. United States Department of the Interior, Office of Renewable Energy Programs.

6.2 Terrestrial Archaeological Resources

This section discusses terrestrial archaeological resources within and surrounding the onshore portions of the Project Area. Potential impacts resulting from construction, operations, and decommissioning of the Project are discussed. Proposed Project-specific measures adopted by Empire are also described, which are intended to avoid, minimize, and/or mitigate potential impacts on terrestrial archaeological resources.

Other resources and assessments detailed within this COP that are related to terrestrial archaeological resources include:

- Terrestrial Archaeological Resources Assessment (**Appendix Y**).

Data Relied Upon and Studies Completed

For the purposes of this section, the Terrestrial Archaeological Resources Study Area includes an 0.5-mi (0.8-km) buffer around the EW 1 and EW 2 onshore export and interconnection cable routes, the onshore substation parcels, and the O&M Base¹ (see **Figure 6.2-1** and **Figure 6.2-2**). The Terrestrial Archaeological PAPE includes all areas where ground disturbing activities may occur for EW 1 and EW 2 and includes the onshore export and interconnection cable construction corridors, the onshore substation parcels, and the O&M Base (see **Figure 6.2-3**, **Figure 6.2-4**, and **Table 6.2-1**). The EW 2 Terrestrial Archaeological PAPE is composed of a 952.93 acre area in Long Island and a 446.21 acre area in Island Park encompassing all proposed onshore cable routes, landfall sites, and substation sites under consideration (see **Figure 6.2-4**). Empire has characterized the full onshore Project Area for EW 1 and EW 2, which includes a 0.5-mi (0.8-km) buffer around the EW 1 and EW 2 export cable landfall sites, onshore export and interconnection cable routes, onshore substation parcels, and O&M Base, to allow for micro-siting of Project facilities.

Table 6.2-1 Summary of Activities Proposed within the Terrestrial Archaeological PAPE

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect
EW 1		
Export Cable Landfall	200 ft x 200 ft (61 m x 61 m)	10 ft (3 m)
Interconnection Cables (Total length of 0.2 mi [0.4 km])	50 ft (15 m)	10 ft (3 m)
Onshore Substations	10.8 ac (4.4 ha)	15 ft (4.5 m)
O&M Base	6.5 ac (2.6 ha)	15 ft (4.5 m)
EW 2		
Export Cable Landfall	260 ft x 680 ft (79 m x 207 m)	80 ft (24 m)
Onshore Export and Interconnection Cables (Total length of 5.6 mi [9.1 km])	150 ft (46 m)	15 ft (4.5 m)
Onshore Substations	6.4 ac (2.6 ha)	15 ft (4.5 m)
Onshore HDD Crossing	246 ft x 246 ft (75 m x 75 m)	10 ft (3 m)

¹ While the O&M Base will serve both EW 1 and EW 2, the facility will be located at SBMT, adjacent to the EW 1 onshore substation, and will therefore be included within the EW 1 Onshore Study Area for the purposes of this analysis.

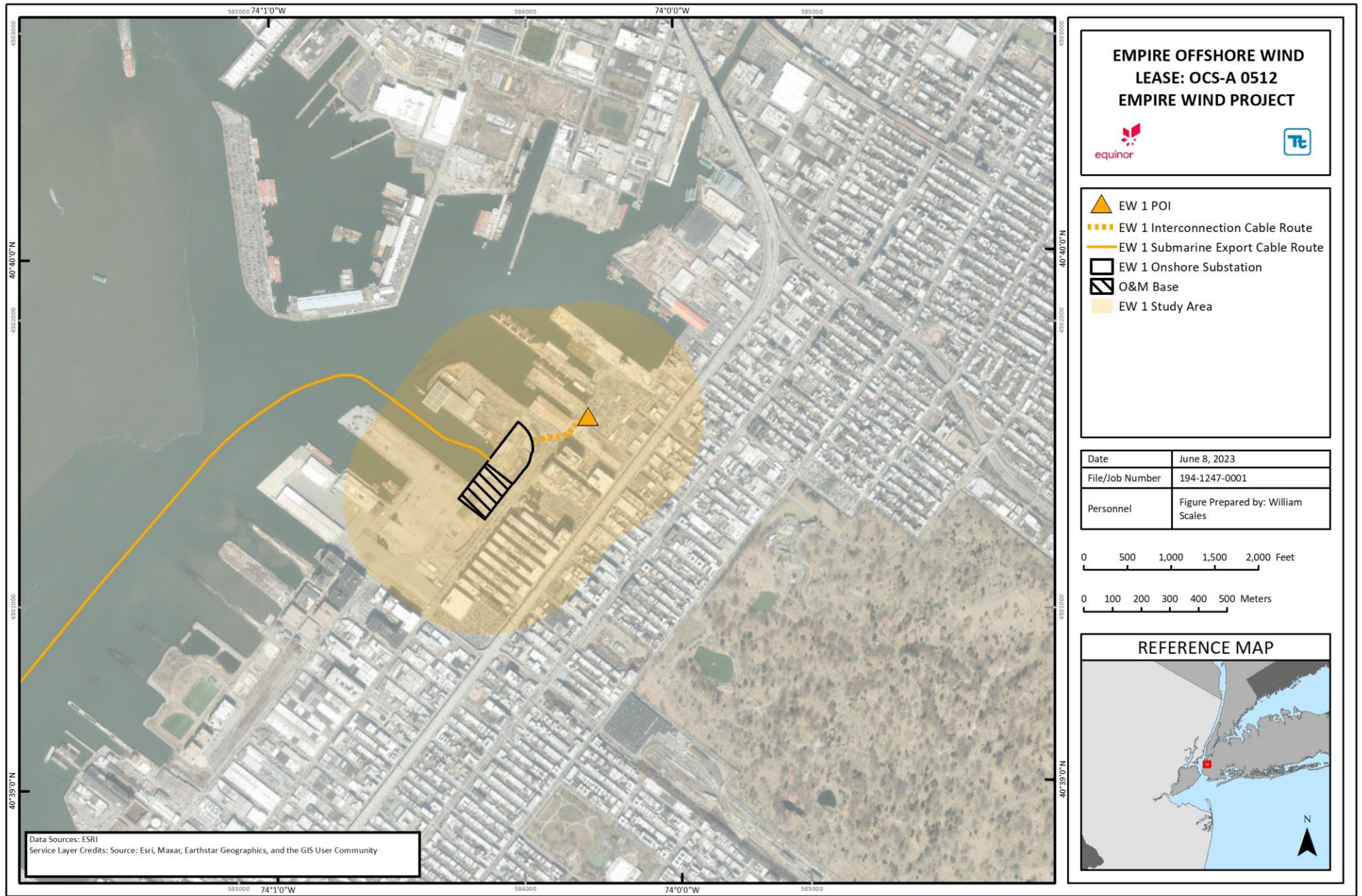


Figure 6.2-1 EW 1 Terrestrial Archaeological Study Area

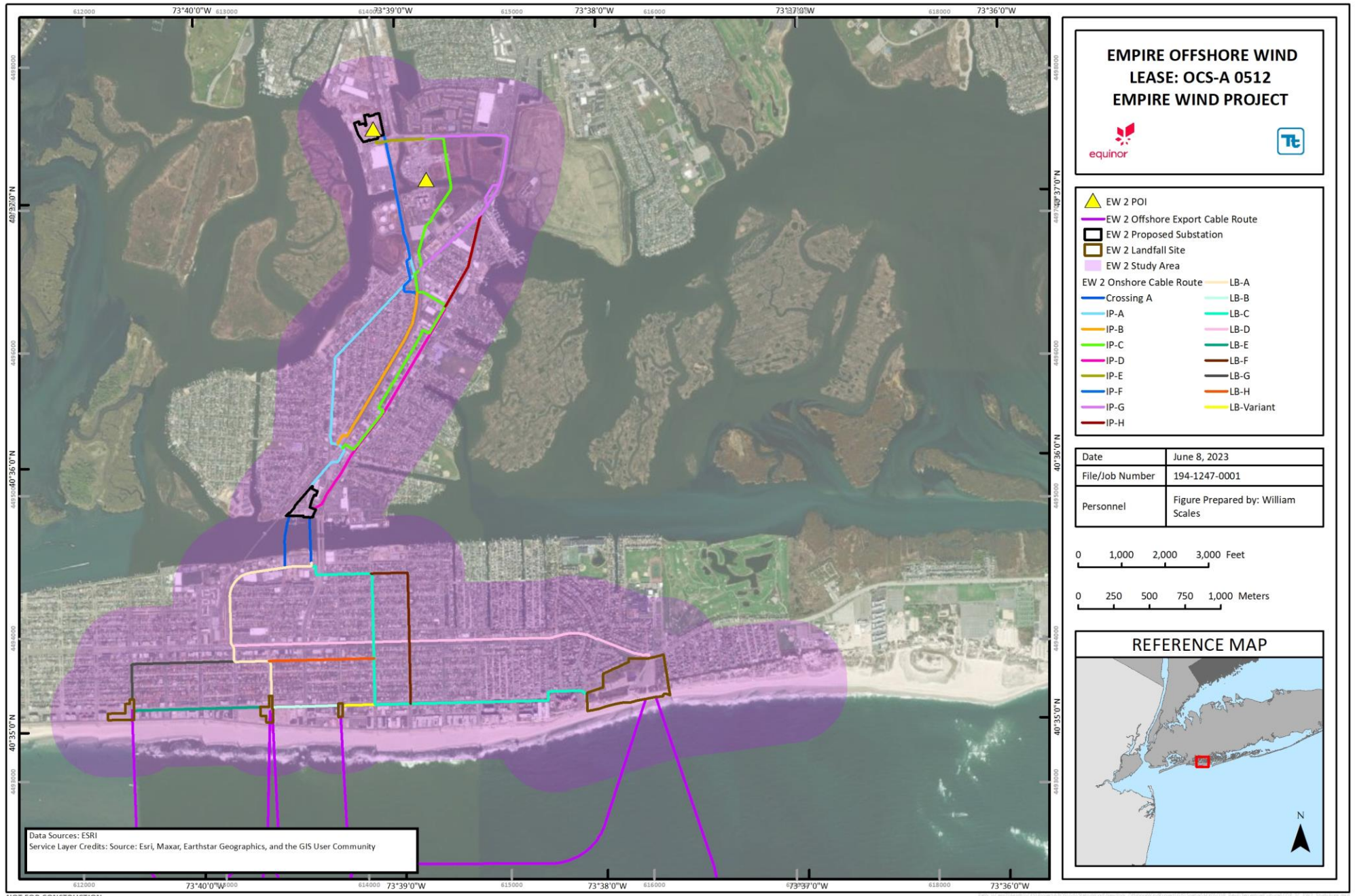


Figure 6.2-2 EW 2 Terrestrial Archaeological Study Area

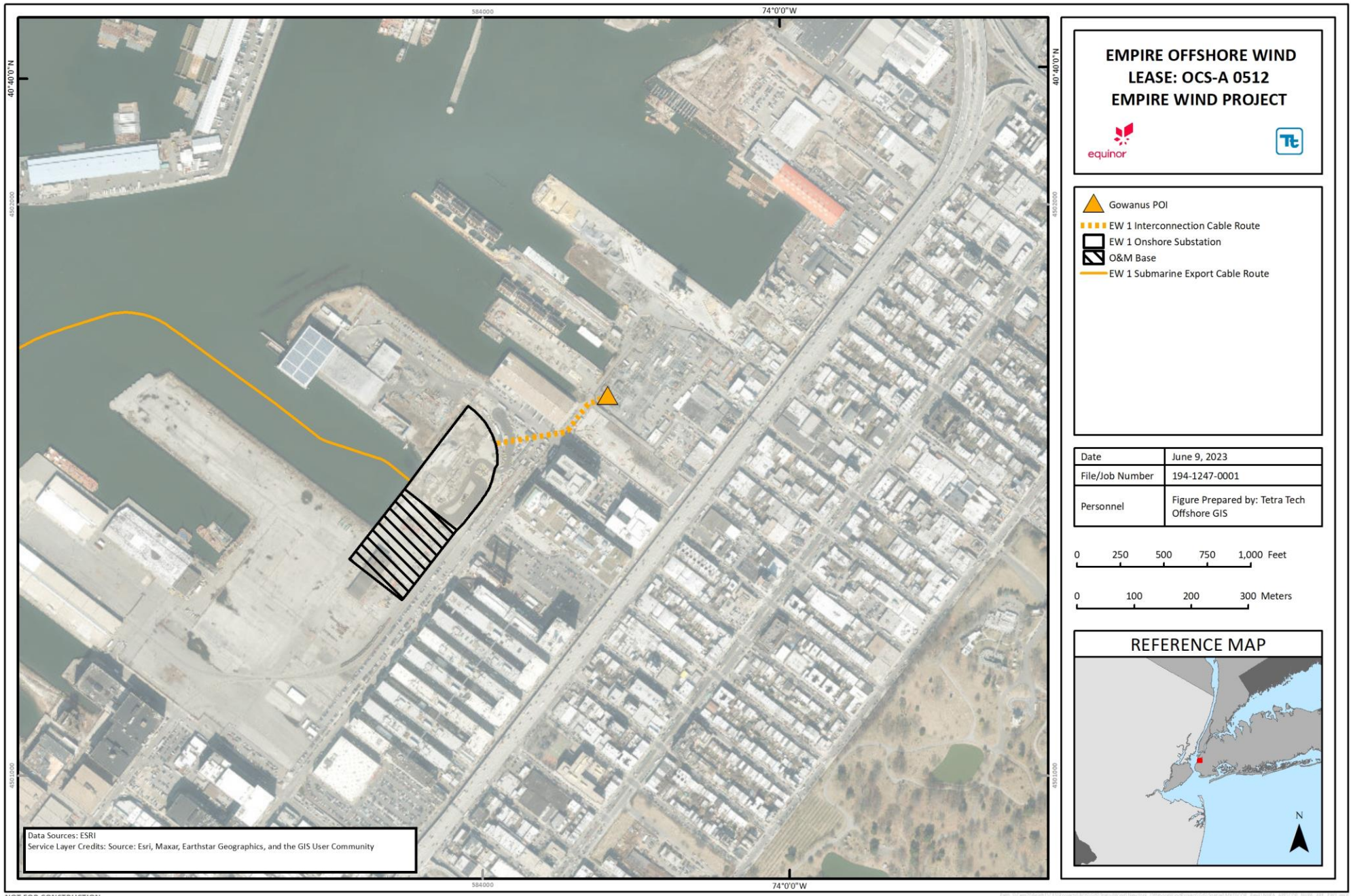
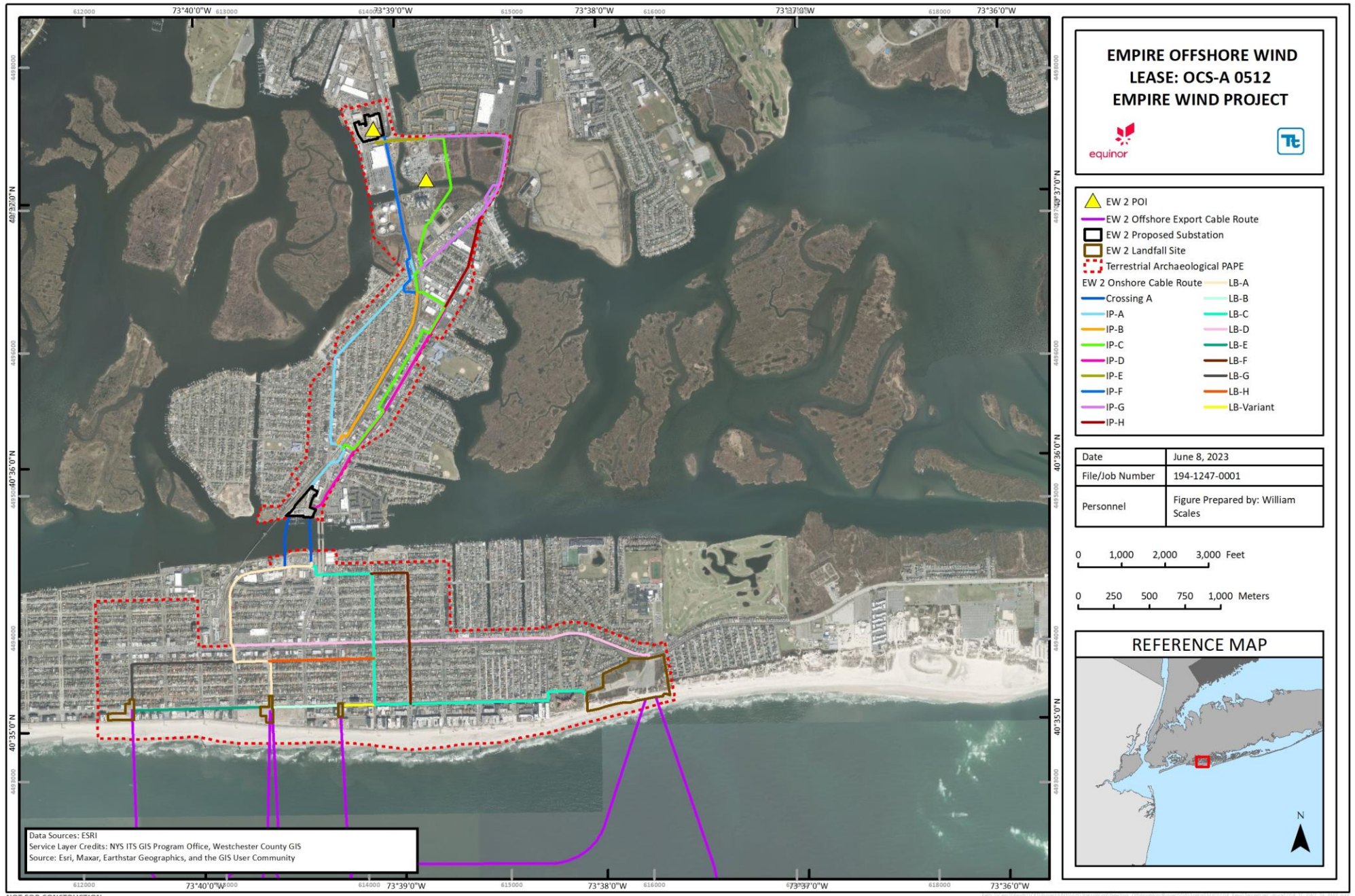


Figure 6.2-3 EW 1 Terrestrial Archaeological PAPE



In December 2018, Empire provided the New York State Historic Preservation Office (NY SHPO) and the New Jersey Historic Preservation Office (NJ HPO) an introductory letter that detailed the proposed methodology for the terrestrial archaeological work, including the proposed Terrestrial Archaeological PAPE and file review search radius (Study Area). In August 2019, Empire provided a Project update letter to the NY SHPO, introducing the EW 2 Phase and providing an update on the EW 1 Phase; NY SHPO confirmed receipt of the update and had no comments at the time. As detailed in these letters, the Study Area radius extends approximately 1 mi (1.6 km) around areas where ground-disturbing activity will take place, including onshore export and interconnection cable corridors and all associated appurtenances such as export cable landfalls, HDD entry and exit locations, workspaces, equipment laydown areas, and access roads. In December 2018 and August 2019, the NY SHPO provided confirmation that the proposed methodology was found to be acceptable and noted that the agency would accept a reduction to a 0.25 mi (0.4 km) buffer on each side of the proposed onshore export and interconnection cable routes, for a 0.5-mi (0.8-km) buffer total. This reduction in the Study Area along the onshore export and interconnection cable routes was implemented into the next steps of the assessment for the EW 1 and EW 2 onshore export cable routes.

This section was prepared in accordance with 30 CFR § 585.627(a)(6) to support BOEM's NEPA and NHPA review of the COP. To assess potential impacts, a phased approach was used to identify documented terrestrial archaeological resources and to evaluate the Study Area for its potential to contain undocumented archaeological resources that might be eligible for listing on the NRHP. The Phase IA survey approach included:

- Literature review and background research of the Study Area, to provide environmental and historical context for assessing archaeological sensitivity of the PAPE;
- A review of site files and survey reports within the Study Area held by the NY SHPO; and
- A pedestrian reconnaissance of the proposed onshore export and interconnection cable route corridors at EW 1 and EW 2.

After completing the literature review, site files review, and pedestrian surveys, the NY SHPO filed a communication via the New York State Cultural Resource Information System (CRIS) dated August 30, 2019, concurring with Tetra Tech's recommendation that Phase IB archaeological surveys were not necessary for the EW 1 and EW 2 onshore export and interconnection cable route corridors, including the associated onshore substation parcels. Throughout 2021, and up to May 10, 2022, Tetra Tech updated the site file review, including further reviews of CRIS data, historical cartography, and historic aerial imagery, to capture any resources that may have been added to the database since the original file review in November 2018. Empire provided a Project-update letter to the NY SHPO, introducing the additional EW 2 onshore export and interconnection cable routes and EW 2 Onshore Substation A site in April 2021. NY SHPO confirmed receipt of the update and had no comments at the time. In August 2021, Empire provided NY SHPO a Project-update letter presenting proposed locations of geotechnical borings. Tetra Tech recommended that no further archaeological investigation was warranted on the basis of nil archaeological sensitivity at these locations, and on August 17, 2021, NY SHPO concurred without further comment. On May 10, 2022, Empire provided a supplemental Project-update letter introducing an additional landfall site (EW 2 Landfall E), EW 2 Onshore Substation C, additional EW 2 onshore export and interconnection cable route segments, and the O&M Base. If any substantial modifications are made to the Project design, including the identification of temporary work spaces and laydown areas, Empire will review archaeological site and standing structure files maintained by NY SHPO, historical cartography and aerial imagery, and prehistoric and historical development in the vicinity of the spaces and will consult with NY SHPO as appropriate, and may conduct additional archaeological surveys. See **Section 6.2.1** and **Appendix Y Terrestrial Archaeological Resources Assessment** for additional information.

6.2.1 Affected Environment

The affected environment is defined as the onshore areas where terrestrial archaeological resources may be and/or are known to or have the potential to occur and to be directly or indirectly affected by the construction, operations, and decommissioning of the Project. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Empire expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Empire will comply with in using the facilities. When discussing archaeological resources, the affected environment is referred to as the APE. The APE, as defined by 36 CFR § 800.16(d), is “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” The APE will be defined by BOEM through the Section 106 process, therefore, this COP describes the PAPE, as identified by Tetra Tech. For the purposes of this section, the PAPE will be referred to as the Terrestrial Archaeological PAPE.

The Terrestrial Archaeological PAPE has the potential to be directly and/or indirectly affected by Project-related construction activities. For known and potential archaeological resources, the direct effects Terrestrial Archaeological PAPE is the area of ground disturbance associated with the Project’s construction, operations and maintenance, and decommissioning (see **Table 6.2-3** for additional detail on the horizontal and vertical extent of the PAPE). Additional direct effects to archaeological resources may include visual or auditory impacts that would adversely affect the character and setting of a significant archaeological site. The site files review undertaken for this COP established that there are no NRHP-listed or NRHP-eligible sites within the Study Area, precluding any direct effects to significant archaeological resources caused by Project activities; therefore, direct effects such as auditory or visual effects will not be discussed further in this section. The potential auditory and/or visual effects associated with the Project on NRHP-listed and other aboveground historic properties are discussed further in **Section 6.3 Visual Effects to Historic and Architectural Properties**.

Following concurrence of the methodology from NY SHPO, site files reviews were undertaken via CRIS, an online database maintained by the NY SHPO (NYS OPRHP 2019). The reviews identified recorded archaeological resources within the Study Areas. As the Project design evolved, further reviews of CRIS data and mapping were conducted to encompass all landfalls, onshore export cable routes, and substation locations. The most recent review was conducted May 11, 2022. In addition, information regarding previously conducted archaeological surveys within the Study Areas was gathered at these repositories and via the New York City Landmarks Preservation Commission online archives (LPC 2019). Following the review of recorded archaeological resources within the Study Areas, 36 CFR Part 61–qualified and professionally registered archaeologists conducted pedestrian and windshield reconnaissance of the three onshore export and interconnection cable route corridors (EW 1 and EW 2) in 2019 and 2021, including all routes then under consideration (see **Appendix Y** for additional information). The goal of the reconnaissance was to identify specific areas within the PAPE where significant ground disturbance was observed, or that possessed archaeological sensitivity based on observations of fine-grained terrain characteristics not depicted on standard aerial imagery or topographic maps. Findings of this sort are considered critical for making recommendations for Phase IB archaeological survey. A summary of archaeological sensitivity findings and recommendations for each onshore phase is described further in this section.

6.2.1.1 EW 1

Landfall at EW 1 would occur within SBMT, where the onshore substation will also be located, and proceed northeastward to the Gowanus POI. The O&M Base will be located on an approximately 4.5 ac (1.8 ha) portion of SBMT, directly to the south of the EW 1 onshore substation. A review of nineteenth century maps of the Brooklyn shoreline indicates that the Terrestrial Archaeological PAPE occurs in its entirety on landfill

constructed into Gowanus Bay in the late nineteenth and early twentieth centuries (NYPL 2019). In addition, archaeological surveys previously conducted in the Study Area concluded that Gowanus Bay waterfront lots possessed low archaeological sensitivity. Pedestrian reconnaissance was conducted by registered professional archaeologists on October 30, 2018, to assess the archaeological sensitivity of the PAPE. Based on the site files review and pedestrian reconnaissance, it is recommended that no further archaeological investigations are warranted for the EW 1 landfall, onshore substation, interconnection cable route, and the O&M Base. In a response dated August 30, 2019, NY SHPO concurred with this recommendation. **Table 6.2-2** provides additional information on the previously conducted archaeological surveys.

Table 6.2-2 Previous Cultural Resource Surveys within EW 1 Study Area

NY SHPO Survey			
Report No.	Report Title	Results/ Recommendations	Author/Date
85SR61925	Survey Level Study, 31st Street Pier, Brooklyn, NY	Recommended NRHP-not eligible/ No further work	Michael Raber 1985
08SR58199	South Pier Improvement Project, Phase IA Cultural Resource Survey, Brooklyn, NY	No adverse effects/ No further work	Douglas McVarish, Patrick Heaton, and Joel Klein (John Milner) 2008
18SR56622	Made in New York (MiNY)-North Campus Project, Phase IA Archaeological Documentary Study	Low to no pre-contact sensitivity; portions of Pier 6 and bulkhead possess moderate historic sensitivity	Zachary Davis (Dewberry) 2019

6.2.1.2 EW 2

To provide as much flexibility as possible in its early project design, Tetra Tech focused investigations on the landfalls, onshore export and interconnection cable routes, and onshore substation locations plus a 0.25-mi (0.4-km) radius buffer (0.5 mi [0.8 km] total) around them.

The EW 2 export cable makes landfall on Long Beach Island, Nassau County, New York, in up to two of four sites: EW 2 Landfall A, EW 2 Landfall B, EW 2 Landfall C, and/or EW 2 Landfall E. EW 2 Landfall A would occur at the intersection of Riverside Boulevard and East Broadway. EW 2 Landfall B would occur approximately 1,600 ft (490 m) to the east, at the intersection of Monroe Boulevard and Shore Road. EW 2 Landfall C would occur within Lido Beach West Town Park. EW 2 Landfall E would occur at the intersection of Laurelton Boulevard and West Broadway. The proposed onshore export cable route segments, EW 2 Long Beach (LB) A through H, the EW 2 LB Variant, and EW 2 Island Park (IP) A through H, traverse a variety of surface and water route options from export cable landfall to onshore substation. There are two HDD sites for crossing Reynolds Channel, which separates Long Beach Island and Barnum Island (Island Park), connecting the EW 2 LB onshore export cable route segments to the EW 2 IP onshore export cable route segments. Two onshore substation parcels are under consideration: EW 2 Onshore Substation A in the unincorporated hamlet of Oceanside, Town of Hempstead and EW 2 Onshore Substation C in the incorporated village of Island Park, Town of Hempstead. In the case that EW 2 Onshore Substation C is adopted, the Island Park onshore export cable route segments would instead be traversed by the interconnection cables between EW 2 Onshore Substation C and the POI.

The EW 2 onshore export cable route segments follow existing, paved roadways and ROWs northward to the Oceanside POI in the Town of Hempstead, Nassau County, New York. The EW 2 Onshore Substation A site is located northwest of the existing Barrett Substation location of the Oceanside POI.² The EW 2 Onshore Substation C site is located adjacent to Reynolds Channel on land that is currently developed with a restaurant and storage unit buildings. The site also includes some vegetation consisting of primarily grasses, shrubs, and patches of trees.

Long Beach Island is a barrier island with no sources of surface fresh water and did not support full-time inhabitants until the growth of seaside resorts along Long Island's south shore in the late nineteenth century. Residential development of the island began in earnest in the early twentieth century, and at present the town of Long Beach has approached full build-out. Barnum Island and the land south of the village of East Rockaway, including the onshore substation parcels, were salt marsh with only limited fastland (non-wetlands) projecting above the high tide line (USGS 1898). Large scale land-making was undertaken in the 1920s, followed by commercial and residential development. The northern edge of Barnum Island and the eastern shoreline of Hog Island Channel, north of Barnum Island at the EW 2 Onshore Substation A location, were filled in the early 1950s for the site of the E.F. Barrett Power Station and a tank farm. By 1966, the *Spartina* marsh in the Oceanside POI parcel had been filled as made-land. The location of the proposed EW 2 Onshore Substation C is on the north shore of Reynolds Channel, situated between the Long Island Railroad to the west and the Long Beach Bridge to the east. The shoreline at the proposed substation is bulkheaded. Late nineteenth century USGS geodetic and topographic sheets depicted this location as marshland (see **Appendix Y** for additional detail).

The site files review identified no recorded SHPO terrestrial archaeological sites and one recorded New York State Museum (NYSM) Area (No. 7774) within the Study Area. CRIS includes no information regarding the temporal period or description of the NYSM Area. Unlike recorded SHPO or NYSM sites which represent locations of recovered artifacts or cultural features, "NYSM Areas" were intended to mark locales of potential resources. A Phase IA archaeological assessment survey was undertaken in 2020 for the Long Beach Water Pollution Control Consolidation Project, located tangentially within the Study Area on Long Beach Island. The investigators concluded that there was a low potential for the recovery of in situ, significant, precontact or historic period archaeological resources within the project area. A pedestrian reconnaissance was conducted by Tetra Tech's 36 CFR Part 61-qualified and professionally registered archaeologists in July 2019 and May 2021. Archaeological sensitivity is judged to be low across the full extent of the EW 2 onshore export and interconnection cable route, with the exception of seven sections along the EW 2 onshore export cable segments:

- An approximately 1,000-ft (300-m) section of EW 2 Route IP-A from the intersection of Williams Lane and Long Beach Road to the intersection of Long Beach Road and the Long Island Railroad in the incorporated village of Island Park and the unincorporated hamlet of Barnum Island, Town of Hempstead, Nassau County, New York.
- An approximately 330-ft (100-m) section of EW 2 Route IP-B at the southern terminus of Parente Lane North northward to the intersection of IP-B with IP-C, in the unincorporated hamlet of Barnum Island, Town of Hempstead, Nassau County, New York;
- An approximately 650-ft (200-m) section of EW 2 Route IP-C from the intersection of Saratoga Boulevard and Sherman Road under the Long Island Railroad, to the intersection of IP-C with IP-A

² This parcel may be used for EW 2 Onshore Substation A, a new Hampton Road Substation that is not part of the Project, or possibly for both if that is later determined to be feasible.

at Long Beach Road, then northeastward to the intersection of the Route with Long Beach Road in the unincorporated hamlet of Barnum Island, Town of Hempstead, Nassau County, New York;

- An approximately 370-ft (112-m) section of EW 2 Route IP-F along Parente Lane North, from the cul-de-sac to the intersection of Kildare Road in the unincorporated village of Barnum Island, Town of Hempstead, Nassau County, New York.;
- An approximately 110-ft (35-m) section of EW 2 Route IP-F along Kildare Road from the intersection of Parente Lane North northward to the intersection of Long Beach Road in the unincorporated village of Barnum Island, Town of Hempstead, Nassau County, New York.;
- An approximately 475-ft (145-m) section of EW 2 Route IP-F along Long Beach Road from the intersection of Kildare Road northeastward to the intersection of North Nassau Lane with Waterford Road in the unincorporated hamlet of Barnum Island, Town of Hempstead, Nassau County, New York; and
- An approximately 800-ft (245 m) section of EW 2 Route IP-G along Long Beach Road from the intersection of Sherman Road northeastward to the intersection of Long Beach Road and McCarthy Road in the unincorporated village of Barnum Island, Town of Hempstead, Nassau County, New York. Tetra Tech recommends monitoring undertaken from the intersection of Long Beach Road and the Long Island Railroad (latitude 40.612078°N, longitude -73.648416°W) to the intersection of Long Beach Road and McCarthy Road (latitude 40.613648°N, longitude -73.646087°W).

Based on analysis of nineteenth century maps, these route segments will cross a relict upland that possesses sensitivity for pre-contact and historic period archaeological resources. Following completion of the site files review, cartographic analysis, and pedestrian reconnaissance, it is recommended that no further archaeological investigations are warranted for the EW 2 onshore export cable and interconnection route and onshore substation(s). NY SHPO concurred with this recommendation in communications dated August 30, 2019 and April 22, 2021. Based on discussions with BOEM, Empire will ensure that a Secretary of the Interior-qualified professional archaeologist will be present where the Project's ground disturbing activities intersect the "Archaeological Monitoring Area" depicted on **Appendix Y, Attachment Y-2, Figure Y-2-12**.

6.2.1.3 Summary of Findings

The findings of the site files reviews, background research, and pedestrian surveys indicate that major portions of the onshore export and interconnection cable route corridors, onshore substation parcels (EW 1 and EW 2), and O&M Base have been subject to various episodes of significant ground disturbances or land-making that has resulted in low expectations of recovering significant and undocumented archaeological resources within the proposed Terrestrial Archaeological direct effects PAPE.

6.2.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (for a complete description of the construction, operations, and decommissioning activities that Empire anticipates will be needed for the Project, see **Section 3**). For the terrestrial archaeological resources, the maximum design scenario is the greatest amount of ground-disturbing activities, as described in **Table 6.2-3**. This design concept incorporates the full build-out of onshore structures, including two onshore substations, with an interconnection cable route to EW 1, up to two onshore export cable and interconnection cable routes to EW 2, and the O&M Base.

Table 6.2-3 Summary of Maximum Design Scenario Parameters for Terrestrial Archaeological Resources

Parameter	Maximum Scenario	Rationale
Construction		
Export cable landfall	Based on EW 1 and EW 2. EW 1: HDD in a 200-ft by 200-ft (61-m by 61-m) area. EW 2: HDD or Direct Pipe installation in a 260-ft by 680-ft (79-m by 207-m) area. Maximum vertical disturbance of 80 ft (24 m).	Representative of the maximum area to be utilized to facilitate the export cable landfall, which would result in the maximum area of ground disturbance.
Onshore export and interconnection cables	Based on EW 1 and EW 2. EW 1: 0.2 mi (0.4 km). EW 2: 5.6 mi (9.1 km). Maximum vertical disturbance of 15 ft (4.5 m); maximum horizontal disturbance of 40 ft (12 m) for EW 1 and 150 ft (46 m) for EW 2.	Representative of the maximum length of onshore export and interconnection cables to be installed, which would result in the maximum area of ground disturbance.
Onshore substations	Based on EW 1 and EW 2. EW 1: 10.8-ac (4.4-ha) area. EW 2: 6.4-ac (2.6-ha) area. Maximum vertical disturbance 15 ft (4.5 m).	Representative of the maximum area to be utilized to facilitate the construction of the onshore substation(s), which would result in the maximum area of ground disturbance.
O&M Base	6.5-ac (2.6-ha) area.	Representative of the maximum area to be utilized to facilitate the construction of the O&M Base, which would result in the maximum area of ground disturbance.
Staging and construction areas, including port facilities, work compounds and lay-down areas	Based on EW 1 and EW 2. Maximum number of work compounds and lay-down areas required. Ground disturbing activities are not anticipated. Independent activities to upgrade or modify staging, construction areas, and ports prior to Project use will be the responsibility of the facility owner.	Representative of the maximum area required to facilitate the onshore construction activities.
Operations		
Onshore O&M activities	Based on EW 1 and EW 2. Longest operational duration, with the maximum amount of Project-related activities expected per year.	Representative of the maximum amount of activities from the Project during the O&M phase, which would have the potential to result in ground disturbance.

6.2.2.1 Construction

During construction, the potential impact-producing factors to terrestrial archaeological resources may include:

- Construction of the onshore export and interconnection cable, including splice bays (installation techniques include open cut trenching, HDD, or Direct Pipe);
- Staging activities and assembly of Project components at applicable facilities or areas; and
- Construction of new onshore substations and O&M Base.

The following impacts may occur as a consequence of factors identified above:

- Ground disturbance of the Project Area for the construction and installation of underground features (e.g., joint vaults, onshore export and interconnection cable, site grading), the onshore substations, and the O&M Base.

Ground disturbance of the Project Area for the construction and installation of underground features (e.g., joint vaults, onshore export and interconnection cable, site grading), the onshore substations, and the O&M Base. Ground-disturbing activities within the onshore export cable routes, onshore substations, interconnection cable routes, POIs, and O&M Base are anticipated during construction. Temporary construction work compounds and set down areas have not yet been finalized, however, and will be evaluated for terrestrial archaeological sensitivity prior to the start of construction. These ground-disturbing activities include the excavation of an area for the trenchless installation of the export cable landfall, the installation of all underground features, and the installation of a new onshore substation. These activities have the potential to uncover and impact buried terrestrial archaeological resources. Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities, and Empire will comply with applicable permitting standards and best practices to limit environmental impacts from Project-related activities. Empire proposes to implement the following measures to avoid, minimize, and mitigate impacts:

- Avoidance of culturally sensitive terrestrial archaeological resources by siting Project components in existing ROW and previously disturbed areas, to the extent practicable;
- An archaeological monitor will be present to monitor during ground-disturbing activities associated with onshore export cable trench excavations at archaeologically sensitive areas of EW 2; and
- The development and implementation of an Unanticipated Discoveries Plan, developed in consultation with federal and state agencies and the Tribes. The Unanticipated Discoveries Plan will be in accordance with state laws and will outline the procedures to follow if archaeological materials or human remains are discovered during construction activities, including contact information and reporting protocols if unanticipated discoveries are identified.

6.2.2.2 Operations and Maintenance

During operations, no impacts to terrestrial archaeological resources are anticipated, as additional ground-disturbing activities are not proposed. Other direct impacts to terrestrial archaeological resources in the form of operational noise, emissions, or visibility are not anticipated, based on the absence of recorded sites within the Study Area that are NRHP-listed, -eligible, or potentially eligible (see **Section 6.3** for additional information).

6.2.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in Section 6.2.2.1. It is important to note that advances in decommissioning methods/technologies

are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Empire anticipates will be needed for the Project, please see **Section 3**.

6.2.3 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in Section 6.2.2, Empire is proposing to implement the following avoidance, minimization, and mitigation measures.

6.2.3.1 Construction

During construction, Empire will commit to avoidance, minimization, and mitigation measures to mitigate the impacts described in Section 6.2.2.1:

- Avoidance of culturally sensitive terrestrial archaeological resources by siting Project components in existing ROWs and previously disturbed areas, to the extent practicable;
- An archaeological monitor will be present to monitor during ground-disturbing activities associated with onshore export cable trench excavations at archaeologically sensitive areas of EW 2; and
- The development and implementation of an Unanticipated Discoveries Plan, which will be developed in coordination with federal and state agencies and the Tribes. The Unanticipated Discoveries Plan will be in accordance with state laws and will outline the procedures to follow if archaeological materials or human remains are discovered during construction activities, including contact information and reporting protocols if unanticipated discoveries are identified.

6.2.3.2 Operations and Maintenance

As additional ground-disturbing activities are not anticipated during operations and maintenance, avoidance, minimization and mitigation measures are not expected to be necessary. Should additional ground-disturbing activities occur, measures proposed to be implemented are expected to be similar to those experienced during construction.

6.2.3.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in Section 6.2.3.1 and Section 6.2.3.2. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

6.2.4 References

LPC (New York City Landmarks Preservation Commission). 2019. Archaeology Reports. Available online at: <https://www1.nyc.gov/site/lpc/about/archaeology-reports.page>. Accessed November 5, 2018 and May 20, 2019.

NYPL (New York Public Library). 2019. Digital Collections-Maps. Available online at <https://digitalcollections.nypl.org/search/index?utf8=%E2%9C%93&keywords=maps>. Accessed January 5, 2019.

NYS OPRHP (New York State Office of Parks, Recreation and Historic Preservation). 2019. Cultural Resource Information System (CRIS). Available online at <https://cris.parks.ny.gov/Login.aspx>. Accessed October 25, 2018, May 27, 2019, and February 26, 2021.

USGS (United States Geological Survey). 1898. *Hempstead, NY*. 15-minute quadrangle. Washington, D.C.

6.3 Visual Effects to Historic and Architectural Properties

This section discusses visual effects to historic and architectural properties within and surrounding the Project Area. Historic properties are defined as districts, buildings, structures, objects, or sites that are listed in, or determined eligible for, inclusion in the NRHP. Architectural properties are defined as districts, buildings, structures, or objects that are 50 years old or older and unevaluated for NRHP significance. Potential impacts resulting from construction, operations, and decommissioning of the Project are discussed. Proposed project specific measures adopted by Empire are also described, which are intended to avoid, minimize, and/or mitigate potential impacts on historic architectural resources.

Other resources and assessments detailed within this COP that are related to historic properties and architectural properties include:

- Marine Archaeological Resources (Section 6.1);
- Terrestrial Archaeological Resources (Section 6.2);
- Visual Resources (Section 7);
- Marine Archaeological Resources Assessment (Appendix X);
- Terrestrial Archaeological Resources Assessment (Appendix Y);
- Analysis of Visual Effects to Historic and Architectural Properties (Appendix Z); and
- Visual Impact Assessment (Appendix AA).

Assessments of effects on historic architectural resources are required to support BOEM's NEPA review process and consultations under Section 106 of the NHPA. BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 285* (BOEM 2017) provide recommended approaches for assessing historic and architectural resources during the permitting phase of offshore wind projects. BOEM directs that an Analysis of Visual Effects to Historic and Architectural Properties (AVEHAP) should be conducted in a manner acceptable to the relevant SHPO for the state within the areas that will have a view of the Project (see **Appendix Z Analysis of Visual Effects to Historic and Architectural Properties** for a full copy of the report).

Data Relied Upon and Studies Completed

For the purposes of this section, the AVEHAP Study Areas include a 40-mi (64-km) buffer around the Lease Area (AVEHAP Offshore Study Area; see **Figure 6.3-1**) and a 4 mi (6.4 km) buffer around each of the onshore substations and O&M Base³ (AVEHAP Onshore Study Areas; see **Figure 6.3-2** and **Figure 6.3-3**). The APE will be defined by BOEM through the Section 106 process, therefore, this COP describes the PAPE, as identified by Tetra Tech. The AVEHAP PAPE includes both the Offshore AVEHAP PAPE and the Onshore AVEHAP PAPEs. The Offshore AVEHAP PAPE includes all areas in which the offshore Project components (i.e., wind turbines and offshore substations) are visible. The Onshore AVEHAP PAPEs include all areas in which the onshore Project components (i.e., onshore substations and O&M Base) are visible. As the other components of the Project will be installed underground and their visual impacts to historic properties and architectural properties will be temporary during the construction phase, they were excluded from the analysis.

³ While the O&M Base will serve both EW 1 and EW 2, the facility will be located at SBMT, adjacent to the EW 1 onshore substation, and will therefore be included within the EW 1 Onshore Study Area for the purposes of this analysis.

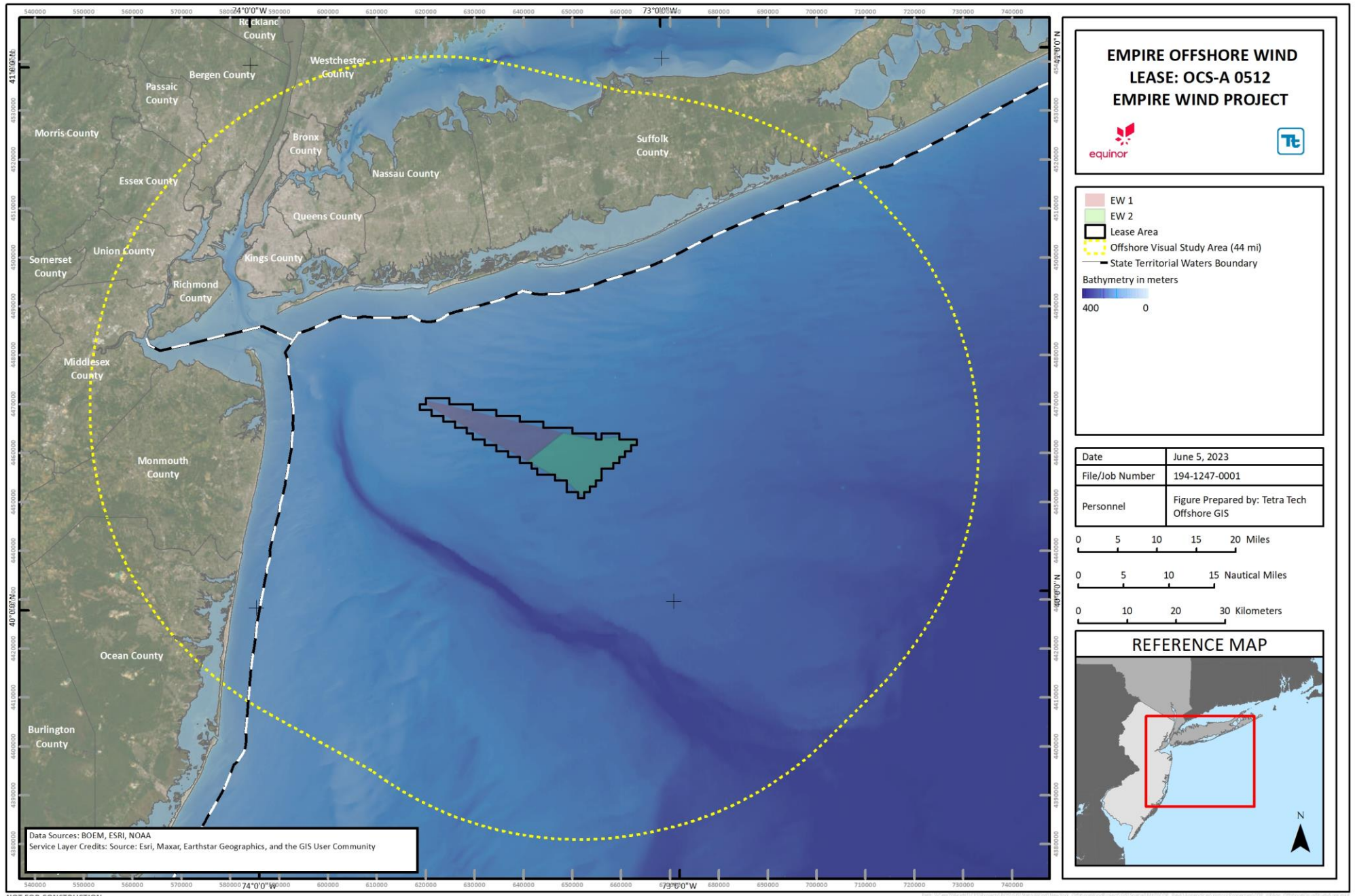
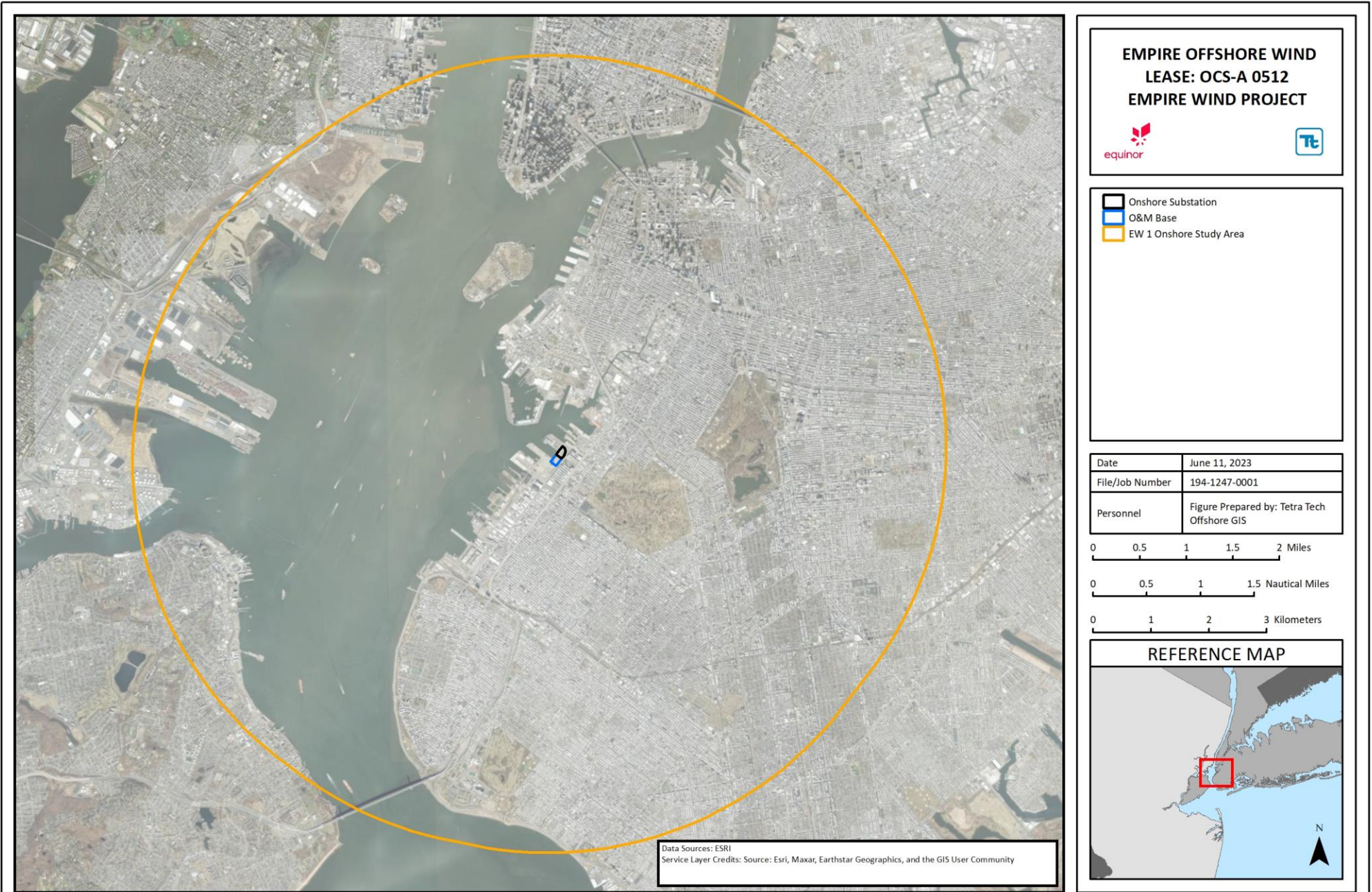


Figure 6.3-1 AVEHAP Offshore Study Area



NOT FOR CONSTRUCTION

Figure 6.3-2 EW 1 AVEHAP Onshore Study Area

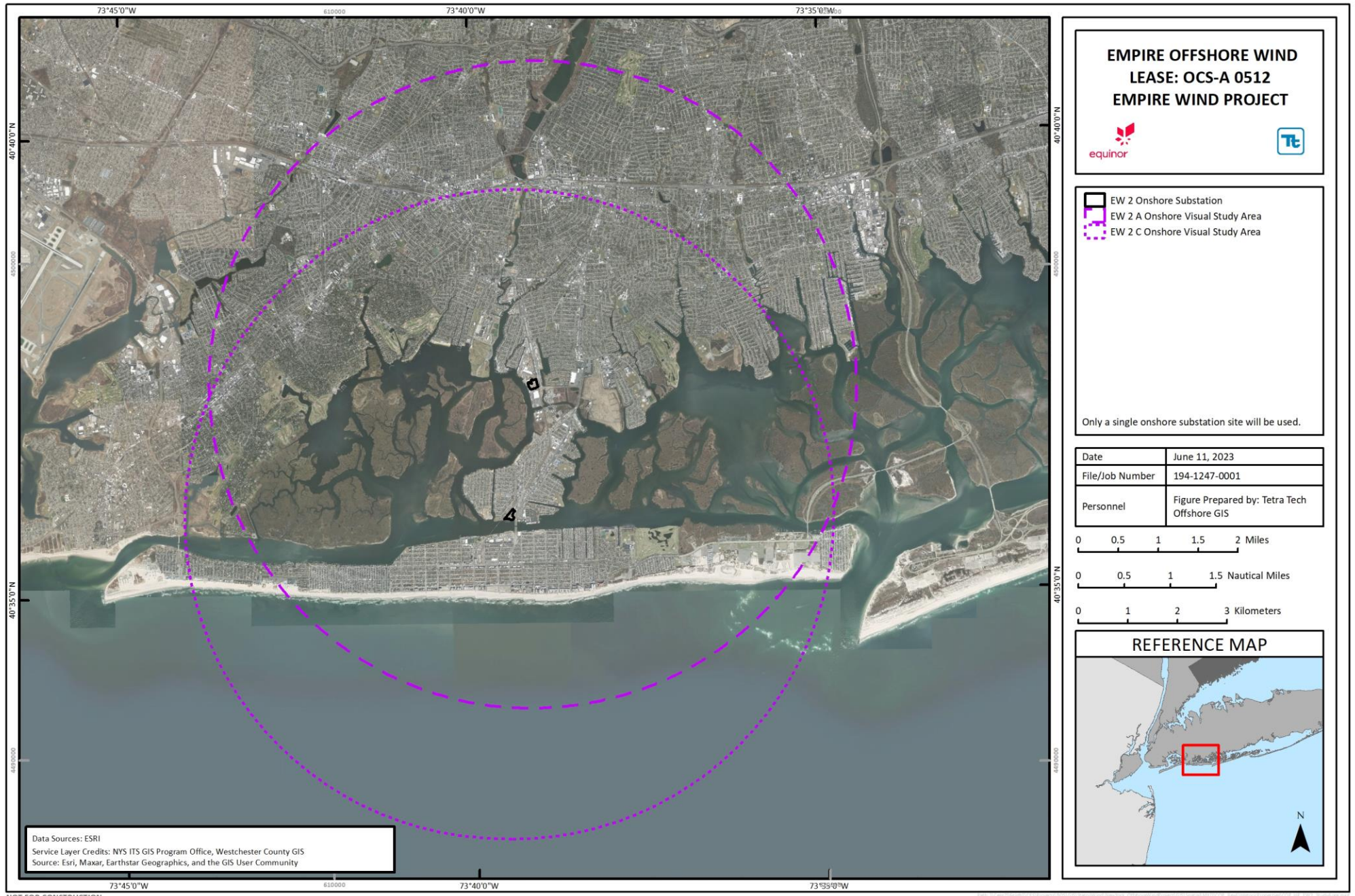


Figure 6.3-3 EW 2 AVEHAP Onshore Study Areas

The scope and approach to this analysis were supported through engagement with federal and state agencies. Empire met with BOEM and the National Park Service (NPS) on August 29, 2018, to discuss approaches to the historic architectural survey and visual impact analysis. In December 2018, Empire provided the NY SHPO and the NJ HPO introductory letters that detailed the proposed methodology for the historic properties work, including the proposed AVEHAP Study Areas. In August 2019, Empire provided a Project-update letter to the NY SHPO, introducing the proposed EW 2 Project and providing an update on the EW 1 Project⁴. NY SHPO confirmed receipt of the update and had no comments at the time. As detailed in these letters, the AVEHAP Offshore Study Area initially extended approximately 35 mi (56 km) around the Lease Area; Empire has since expanded the AVEHAP Offshore Study Area to approximately 40 mi (64 km) around the Lease Area at the request of BOEM. In December 2018 and August 2019, the NY SHPO provided confirmation that the proposed methodology was found to be acceptable. In January 2019, the NJ HPO provided confirmation of its concurrence with the proposed methodology. Empire provided a Project-update letter to the NY SHPO, introducing the additional EW 2 onshore export and interconnection cable routes and EW 2 Onshore Substation A site in April 2021. NY SHPO confirmed receipt of the update and had no comments at the time. Empire has also submitted a Project-update letter to NY SHPO in May 2022. Empire continues to engage with stakeholders with regards to potential impacts to architectural properties.

This section was prepared in accordance with 30 CFR § 585.627(a)(6) to support BOEM's NEPA and NHPA review of the COP. Identification of historic architectural resources was based on standard practices within the discipline and engagement through meetings and correspondences with federal and state agencies (see **Appendix B Summary of Agency Engagement**). Based upon this analysis and outreach with regulatory agencies, the following approach was undertaken to define the Project's AVEHAP Offshore and Onshore Study Areas and Offshore and Onshore Preliminary APEs (PAPes; as defined in Section 6.3.1), and to identify and evaluate historic architectural resources.

An initial AVEHAP Offshore Study Area was determined based on the maximum extent of theoretical limit of visibility based on the maximum height of the Project elements, their locations, the curvature of the earth, and the topography of the area (see **Section 7 Visual Resources** and **Appendix Z** for additional information). Based on the potential size of the offshore Project components included in the PDE (i.e., wind turbines), an initial AVEHAP Offshore Study Area of 40 mi (64 km) was established around the Lease Area (**Figure 6.3-1**). At 40 mi (64 km), it is anticipated that most turbines will be unnoticeable from this distance.

An initial viewshed analysis was conducted using ESRI ArcGIS Pro 2.2.0 software with the Spatial Analyst extension to process 10-meter Digital Elevation Models based on the National Elevation Dataset and height zones of visible components of the wind turbines (foundation, rotor swept area, hub and above, and maximum height of blade tip). The initial topographic viewshed assumed "bare earth" conditions and was developed from the wind turbine locations looking out to determine areas with potential visibility. The initial viewshed accounted for both curvature of the earth and refraction, using the default values identified in the software.

Preliminary fieldwork and desktop research allowed for ground-truthing and further refinement of the AVEHAP Offshore Study Area based on local topography and landscape features (intervening vegetation, visual screening by existing buildings, the alignment of view corridors along streets, and other factors). An initial field visit to the AVEHAP Study Areas was conducted between November 4 and November 13, 2018. Additional field visits were conducted between June 3 and June 6, 2019, and on February 2, 2021.

⁴ This update letter did not include the O&M Base. However, the O&M Base is located directly adjacent to the EW 1 onshore substation and was included within AVEHAP Study Area using consistent approaches outlined in the consultation letter.

To supplement the initial topographic viewshed analysis, a viewshed accounting for building heights and vegetation was also developed to identify areas where potential screening may be provided by buildings and vegetation. This viewshed model helped to focus inventory and field visit efforts based on existing conditions within the landscape. The resulting viewshed model accounting for building heights was taken to approximate the Offshore AVEHAP PAPE (**Figure 6.3-4**). See **Appendix Z** for additional information. Data from publicly available databases were acquired to compile a list of historic properties and architectural properties within the Offshore AVEHAP PAPE. These databases included: the NPS-National Register of Historic Places, New York SHPO's Cultural Resources Information System, and New Jersey HPO's LUCY database. These online databases were accessed in September 2022.

Within the Study Area, 16,515 historic and architectural properties were identified in New Jersey and 2,353 historic and architectural properties in New York. All 18,868 properties were subjected to viewshed analysis. In New Jersey, 2,005 NRHP-listed, eligible, contributing resources, and unevaluated properties were identified, and 825 historic properties were identified in New York within the Offshore AVEHAP PAPE. In general, historic districts were enumerated as an individual historic property without including individual contributing properties. Each historic property identified was subjected to viewshed analysis. From this dataset, a sample of 157 historic and architectural properties was selected for more intensive assessment. This assessment took the form of street-level analyses via Google Earth street views and selected field visits to identify properties within the PAPE that had actual views of the Project. The subset of 157 properties included six National Historic Landmarks (NHL), 26 NRHP-listed and 31 NRHP-eligible historic properties, and 94 unevaluated architectural properties. Of the 157 properties assessed in this manner, 104 are located in New Jersey and 53 in New York (**Appendix Z, Attachment Z-1**).

On September 22, 2022, BOEM directed Empire to develop a Phased Identification Plan that would detail the steps to be taken to implement field surveys of potentially eligible historic and architectural properties within the Offshore AVEHAP PAPE in the Borough of Manhattan, New York City. On behalf of Empire, Tetra Tech conducted a Supplemental Visual Impact Assessment of NRHP-listed historic properties within the Offshore PAPE in Manhattan from January to February 2023. A discussion of methods, findings, and recommendations from this survey is summarized in Section 6.3.4. Further details can be found in **Appendix Z** and the respective Section 106 report (Tetra Tech 2023).

6.3.1 Affected Environment

The affected environment is defined as the onshore areas where historic and architectural properties have the potential to be directly or indirectly affected by visual effects from the construction, operations, and decommissioning of the Project. Permits necessary for the improvement of port and construction/staging facilities will be the responsibility of the owners of these facilities. Empire expects such improvements will broadly support the offshore wind industry and will be governed by applicable environmental standards, which Empire will comply with in using the facilities. When discussing historic resources, the affected environment is referred to as the APE. The APE, as defined by 36 CFR § 800.16(d), is “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist”. The APE will be defined by BOEM through the Section 106 process, therefore, this COP describes the PAPE as identified by Tetra Tech. For the purposes of this section, the PAPE will be referred to as the Offshore AVEHAP PAPE and/or the Onshore AVEHAP PAPE(s).

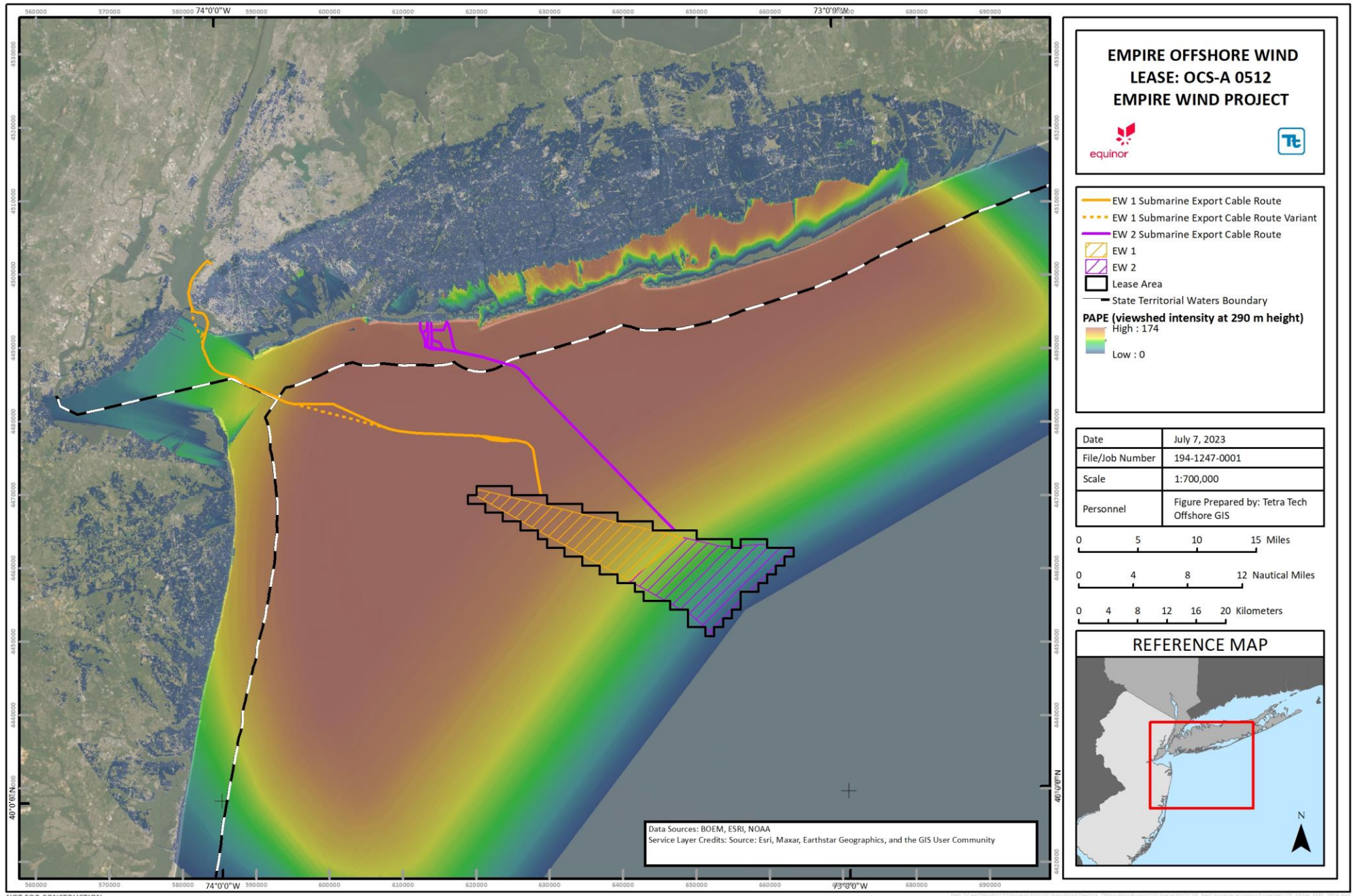


Figure 6.3-4 Geographic Definition of the Offshore AVEHAP PAPE Shown as Viewshed Intensity (# of Turbines Visible) Based on a 290 m Height (Blade Tip Height)

As discussed in Data Relied Upon and Studies Completed, the Offshore AVEHAP PAPE is defined as those areas within 40 mi (64 km) of the Project Area where the Project is likely to be visible. This was found to generally extend onshore mostly within 0.3 mi (0.5 km) to 0.5 mi (0.8 km) of, but in some locations up to 0.7 mi (1.1 km) from, the shoreline within the AVEHAP Offshore Study Area. The AVEHAP Onshore Study Area is an approximately 2-mi (3.2-km) radius around each of the proposed onshore substations and the O&M Base (see **Figure 6.3-3**). The Onshore AVEHAP PAPE is the area, on land or sea, where views of the Project's onshore components will be visible. The process of defining the Onshore AVEHAP PAPE involved establishing a Study Area and models of preliminary viewsheds. The AVEHAP Onshore Study Area, in turn, was refined to resolve Project visibility to a more fine-grained and realistic degree, resulting in a more accurate computer-generated viewshed model through observation of real conditions in the field (i.e., ground truthing). This refinement resulted in development of the Onshore AVEHAP PAPE (see **Figure 6.3-5**). Under Section 106, BOEM then determines the extent of and defines the Onshore AVEHAP APE for this Project. The Onshore AVEHAP PAPE was defined as the zone within the AVEHAP Onshore Study Area that was likely to contain views of any of the onshore substation areas or O&M Base, based on analysis of screening by building elevations, desktop street-level analysis, and field visits on February 4, 2021 at EW 1, and on May 13 and 14, 2021 at EW 2. The remainder of Sections 6.3.1 and 6.3.2 focus on these desktop assessments; in contrast, supplemental field survey work conducted in Manhattan in 2023 is discussed in Section 6.3.3. Further details can be found in **Appendix Z** and the respective Section 106 report (Tetra Tech 2023).

The Onshore AVEHAP PAPE was defined by observations of potential visibility at locations within the onshore Study Area during field visits and by analysis of Google Earth streetviews. Locations were chosen from the set of NRHP-listed and eligible historic properties identified within the onshore Study Areas, which allowed for evaluations of visibility and, if visible, for an assessment of effects to that historic property by the Project (**Appendix Z, Attachments Z-5 and Z-6**). At EW 1, 30 historic property locations were analyzed with respect to Project visibility. The analysis at EW 2 consisted of 31 historic property locations with an additional 15 locations selected from adjacent road intersections and shoreline locales. In this manner, a zone of positive visibility was mapped for the onshore Project at EW 1 and EW 2.

The E.F. Barrett Power Station main building, in Island Park, is an estimated 175 ft (53 m) in height, or approximately three times the height of the proposed EW 2 Onshore Substation A. The top of the power station's main floor, housing the generators, reaches around 75 ft (23 m) above the ground and thus serves as a good proxy for judging the proposed height of the substation. It was against this reference point that initial observations of potential Project visibility, defining the PAPE, were made from locations within the Study Area. The computer-generated viewshed was recalculated in June 2023 to account for the possibility of a maximum height of 75 feet at the EW 2 Onshore Substation A. The EW 2 Onshore Substation A 2-mi Study Area remains unchanged.

The City of Long Beach elevated water tower (USN 05946.001723) located between Water Street and Park Place reaches a height of approximately 160 ft (49 m), or more than twice the height of the proposed substation. Its position on the south shore of Reynolds Channel, opposite the site of the proposed EW 2 Onshore Substation C, makes the tower a useful visual reference point vis-à-vis historic properties across the PAPE. An assessment of street-level views toward the tower's midpoint resulted in an onshore zone of visual impact extending not beyond approximately 0.25 mi (0.40 km) from the tower, encompassing an area around 125 ac (51 ha). Beyond approximately 0.25 mi (0.40 km), ground-level views of the tower are obscured by the built environment of the surrounding neighborhoods. EW 2 Onshore Substation C's location on the north shore of Reynolds Channel allows potential views largely limited to the channel shorelines.



Figure 6.3-5 NRHP listed or eligible resources within each Onshore AVEHAP PAPE (EW 1 [left] and EW 2 [right])

The NRHP Criteria are used for determining the eligibility of a resource to the NRHP (36 CFR § 60.4 and NPS 2002). To be historically significant, a resource must meet one of the following basic criteria:

- A. The resource must be associated with events that have made a significant contribution to the broad patterns of our history;
- B. The resource must be associated with the lives of persons significant in our past;
- C. The property must embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; and
- D. The property must show, or may be likely to yield, information important to history or prehistory (NPS 2002).

Desktop analysis and field visits identified 2,830 historic and architectural properties (825 in New York [Figure 6.3-6] and 2,005 in New Jersey [Figure 6.3-7]), located within the Offshore AVEHAP PAPE, three historic properties within the EW 1 Onshore AVEHAP PAPE, and one historic property within the EW 2 Onshore Substation C AVEHAP PAPE; the EW 2 Onshore Substation A AVEHAP PAPE contains no NRHP-listed resources and one eligible resource (Figure 6.3-2). Of the properties within the Offshore AVEHAP PAPE, 657 are either NRHP listed, determined NRHP eligible or recommended NRHP eligible (see Appendix Z for additional information).

Table 6.3-1 lists NHLs, NRHP-listed, and previously recorded NRHP-eligible and recommended eligible properties within one-third mile of the Atlantic Ocean shoreline. Two additional properties (Navesink Light Station and Water Witch Historic District) located 0.5 mi (0.8 km) and 0.7 mi (1.1 km) from the shoreline, respectively, join the list because of their elevated positions on the Atlantic Highlands in Monmouth County, New Jersey, the highest elevation on the eastern seaboard south of Maine. The table includes each property's NRHP numbers, the NRHP Criteria under which they are listed, and summarizes the reasons for their listing. Table 6.3-2 lists the properties within the Project's Onshore AVEHAP PAPEs, their NRHP numbers, the NRHP Criteria under which they are listed, and summarizes the reasons for their listing.

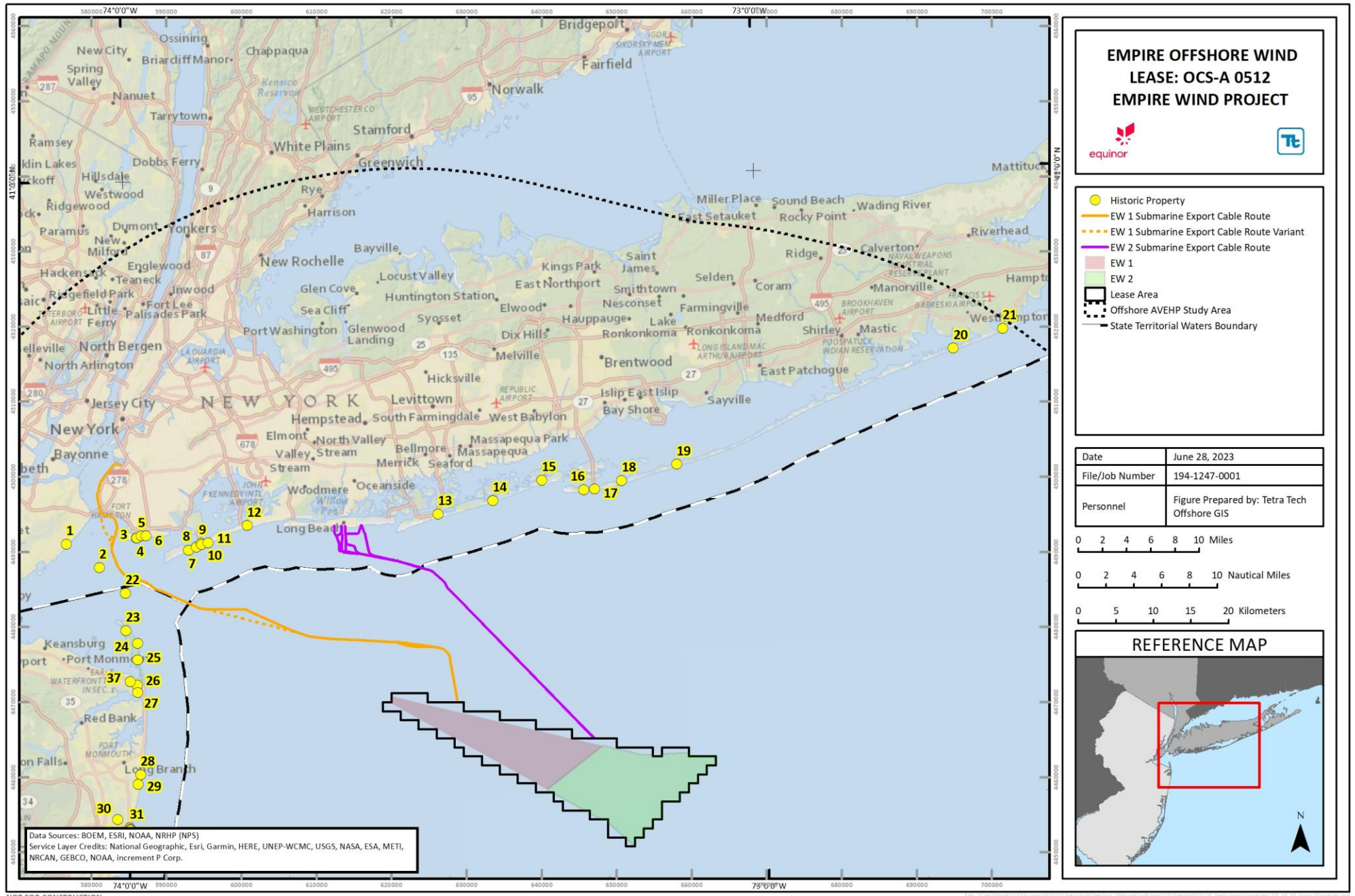


Figure 6.3-6 Identified Historic and Architectural Properties within the Offshore AVEHAP PAPE in New York

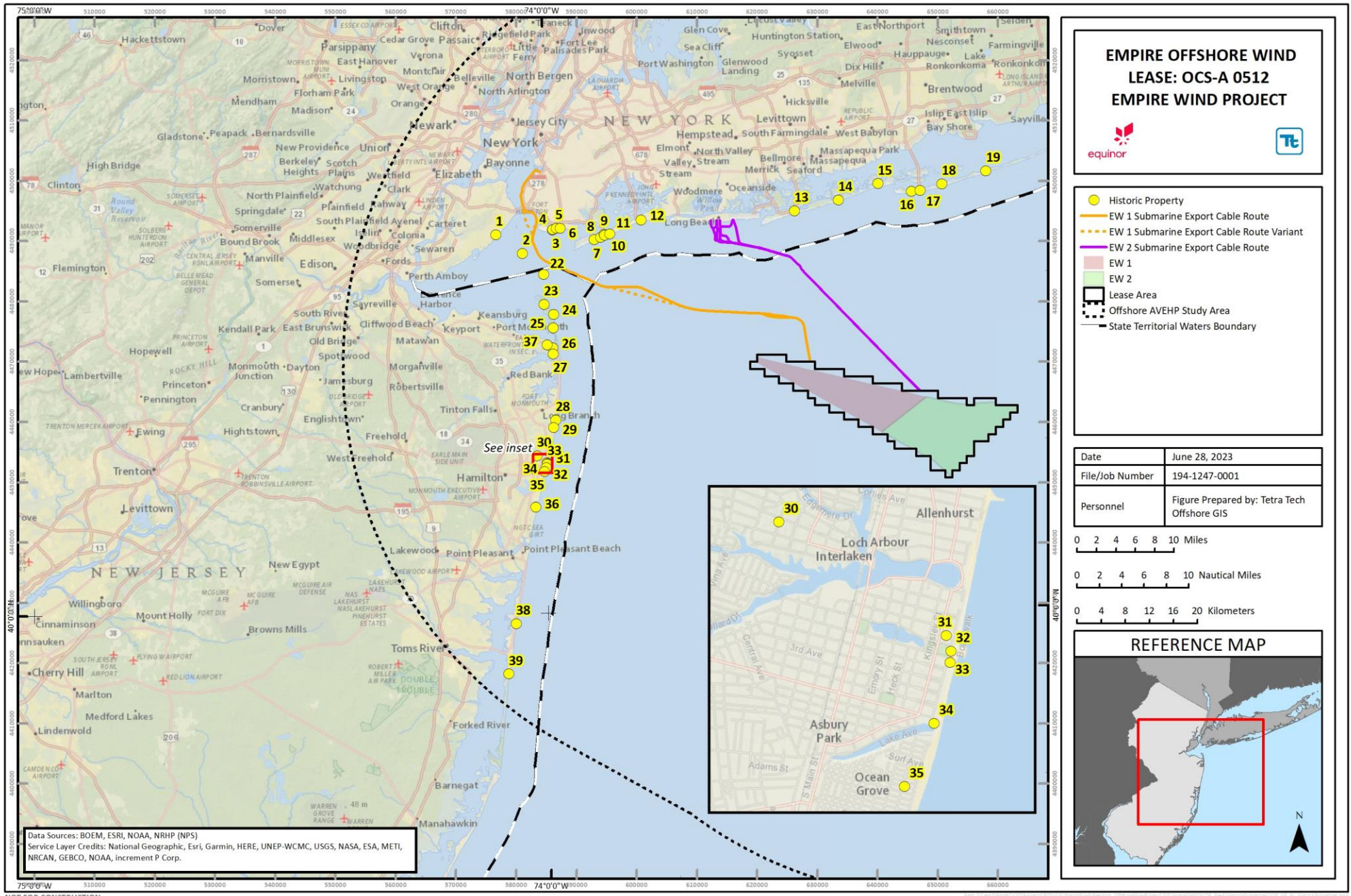


Figure 6.3-7 Identified Historic and Architectural Properties within the Offshore AVEHAP PAPE in New Jersey

Table 6.3-1 Selected Historic Property and Architectural Property Data within the Offshore AVEHAP PAPE

Resources (Figure#/HP#)	Location	NRIS/SHPO No.	NR Status	NR Criteria	Reason for Listing in the NRHP
New York					
Miller Army Air Field Historic District (Figure 6.3-7/#1)	Staten Island, NY	80000362	NR Listed	A	The property is listed for its “direct association with early aviation history, the history of air coast defenses of New York, and the lighthouse service.”
Fort Wadsworth Historic District	Staten Island, NY	99000430	NR Listed	A, C	The property is listed for its association with military history and as a key example of a fortified military landscape.
West Bank Light Station (Figure 6.3-6/#2)	Lower New York Bay	6001230	NR Listed	A, C (engine ering)	The property is listed as part of the Light Stations of the United States MPS.
Parachute Jump (Figure 6.3-6/#3)	Coney Island, NY	80002645	NR Listed	A, C	The property is listed as an extant example of the amusement attractions at Coney Island.
B&B Carousell (Figure 6.3-6/#4)	Coney Island, NY	16000035	NR Listed	A, C	The property is listed as an “excellent example of an early twentieth century carousel form that incorporates the artistry of several masters of Coney Island carousel design, including the two master carvers who pioneered the flamboyant and dynamic Coney Island style of carousel carving” and for its association with the amusement park industry.
Cyclone Roller Coaster (Figure 6.3-6/#5)	Coney Island, NY	91000907	NR Listed	A	The property is listed as an extant example of the amusement attractions at Coney Island.
Breezy Point Surf Club Historic District	Far Rockaway, NY	08101.01149 9	NR Eligible	A, C	The property is listed for its association with the development of seaside recreation in New York City and as an intact example of beach bungalow architecture.
Floyd Bennett Field Historic District	Brooklyn, NY	80000363	NR Listed	A, C	This property is listed for its association with the development of aviation and airport design.
St. Margaret Mary Roman Catholic Church (Figure 6.3-6/#6)	Coney Island, NY	04701.02373 6	NR Eligible	C	The property is eligible as an example of Arts & Crafts and Tudor styling in a small suburban church.

Table 6.3-1 Historic Property and Architectural Property Data within the Offshore AVEHAP PAPE (continued)

Resources (Figure#/HP#)	Location	NRIS/SHPO No.	NR Status	NR Criteria	Reason for Listing in the NRHP
Silver Gull Beach Club Historic District (Figure 6.3-6/#7)	Far Rockaway, NY	08101.01234 23	NR Eligible	A, C	The property is eligible as an example of a post-Second World War seaside resort for an urban population.
Fort Tilden Historic District (Figure 6.3-6/#8)	Far Rockaway, NY	84002917	NR Listed	A	The property is listed for its role as a late 19 th and early 20 th century coastal defense installation.
Administration Bldg, Fort Tilden (Figure 6.3-6/#9)	Far Rockaway, NY	08101.01228 0	NR Eligible	A	The property is eligible for its role as a late 19 th century and early 20 th century coastal defense installation.
CO Quarters, Fort Tilden (Figure 6.3-6/#10)	Far Rockaway, NY	08101.01228 1	NR Eligible	A	The property is eligible for its role as a late 19 th and early 20 th century coastal defense installation.
Jacob Riis Park Historic District (Figure 6.3-6/#11)	Rockaway Point, NY	81000081	NR Listed	C	The property is listed as an “excellent examples of recreational architecture of the early 1930s” and for its association with the Works Progress Administration.
Jones Beach State Park/Jones Beach State Park, Causeway and Parkway System (Figure 6.3-6/#13)	Jones Beach Island, NY	05000358	NR Listed	A, C	The property is listed as a historic district and is notable for its implementation of Beaux Arts design and Art Deco motifs incorporated into the development of a large-scale oceanside recreation area created specifically for public use.
Ocean Parkway (Figure 6.3-6/#14)	Fire Island	10301.00006 2	NR Eligible	A	The property is eligible for its association with the development of the state park system and beach facilities.
Gilgo State Park (Figure 6.3-6/#15)	Jones Beach Island	10301.00008 4	Recommend ed NR Eligible	A	The property is recommended eligible for its association with the development of Long Island as a recreational destination.
Field #2 Bath House (Figure 6.3-6/#16)	Fire Island	10301.00074 6	NR Eligible	C	The property is eligible for its distinctive facility architecture.

Table 6.3-1 Historic Property and Architectural Property Data within the Offshore AVEHAP PAPE (continued)

Resources (Figure#/HP#)	Location	NRIS/SHPO No.	NR Status	NR Criteria	Reason for Listing in the NRHP
Robert Moses State Park (Figure 6.3-6/#17)	Fire Island	10305.00159 2	NR Eligible	A, C	The property is eligible for its association with the development of Long Island as a recreational destination and for its facility architecture.
Fire Island Lighthouse (Figure 6.3-6/#18)	Bay Shore, NY	81000082	NR Listed	A, C	The property is listed for its association with federal maritime navigational aids along the east coast, and for its distinctive architectural and engineering design.
Fire Island Lighthouse Historic District (Figure 6.3-6/#18)	Bay Shore, NY	09001288	NR Listed	A, C, D	The property is listed for its association with federal maritime navigational aids along the east coast, for its distinctive architectural and engineering design, and for its potential to contain precontact archaeological resources.
Carrington House	Fire Island	13001057	NR Listed	A, C	The property is listed for its association with the development of seaside vacation community on Fire Island and its association with the encouragement and growth of gay culture on Fire Island. It is also listed as an intact example of beach bungalow architecture.
Point O'Woods Historic District (Figure 6.3-6/#19)	Fire Island	10302.00347 0	NR Eligible	A, C	The property is eligible for its association with the development of Long Island as a recreational destination and for its community architecture.
Geller-Pearlroth House (Figure 6.3-6/#20)	Westhampton Beach, NY	10375.00001 3	NR-Eligible	C	The property is NRHP-eligible as an excellent example of mid-century modern beach house architecture.
New Jersey					
Romer Shoal Light Station (Figure 6.3-7/#22)	Lower New York Bay	06001304	NR Listed	A, C	The property is listed "for its association with the Federal government's efforts to provide an integrated system of navigational aids throughout the United States, and to promote maritime safety in the vicinity of New York harbor" and because it embodies the distinctive characteristics and methods of construction employed for offshore lighthouses during the late nineteenth century."

Table 6.3-1 Historic Property and Architectural Property Data within the Offshore AVEHAP PAPE (continued)

Resources (Figure#/HP#)	Location	NRIS/SHPO No.	NR Status	NR Criteria	Reason for Listing in the NRHP
Sandy Hook Light (Figure 6.3-7/#23)	Sandy Hook, NJ	66000468	NHL	A	The property is listed as “the oldest standing light tower in the United States.”
Fort Hancock and Sandy Hook Proving Ground Historic District (Figure 6.3-7/#24)	Sandy Hook, NJ	80002505	NHL	A, C	The property is listed both as “the key fortification guarding the approaches to America’s most important harbor and its largest metropolis,” and having a “key role in the development of the weapons employed by the U.S. Coast Artillery and U.S. Field Artillery during the vital years that the Nation emerged as a world power,” for its role in the development of radar, and as the location of the individually listed Sandy Hook Light.
Fort Hancock, U.S. Life Saving Station (Figure 6.3-7/#25)	Highlands, NJ	8100080	NR Listed	A, C	The property is listed for its association with the “earliest Federally sponsored efforts to save life and property from coastal shipwrecks,” and as an example of “late-19 th century New Jersey coastal utilitarian architecture.”
Water Witch (Monmouth Hills) Historic District (Figure 6.3-7/#37)	Middletown, NJ	04000147	NR Listed	A, B, C	The property is listed for its association with late-19 th century town planning, for its association with noted designer-builder Frederck P. Hill, and for its landscaping and architectural details.
Navesink Light Station (Figure 6.3-7/#26)	Highlands, NJ	70000389	NHL	C	The property is listed for its unusual twin light design and association with federal maritime navigational aids in the 19 th century.
Navesink Military Reservation Historic District (Figure 6.3-7/#27)	Middletown Twp., NJ	15000011	NR Listed	A, C	The property is listed for its role as “the primary fortification in the Harbor Defense of New York,” and for “the design and construction of its five tactical military structures that exemplify the culmination of more than 200 years of American coastal fortifications.”
468 Ocean Ave (Figure 6.3-7/#28)	Long Branch, NJ	2009	NR Eligible	C	The property is eligible as an excellent example of the Craftsman style.
St. Michael’s Roman Catholic Church (Figure 6.3-7/#29)	Long Branch, NJ	4647	NR Eligible	C	The property is eligible as a fine example of Gothic Revival style among religious buildings.

Table 6.3-1 Historic Property and Architectural Property Data within the Offshore AVEHAP PAPE (continued)

Resources (Figure#/HP#)	Location	NRIS/SHPO No.	NR Status	NR Criteria	Reason for Listing in the NRHP
Allenhurst Residential Historic District (Figure 6.3-7/#30)	Allenhurst, NJ	10000353	NR Listed	C	The district is listed for its variety of high-style, turn-of-the-century dwellings and the high degree of integrity displayed in most of the district’s dwellings.
Berkeley Carteret Hotel (Figure 6.3-7/#31)	Asbury Park, NJ	3673	NR Eligible	A	The property is eligible for its association with Asbury Park’s period in the early 20 th century as a premier beach destination.
Asbury Park Convention Hall (Figure 6.3-7/#32)	Asbury Park, NJ	79001512	NR Listed	C	The property is listed for its design by architects Warren and Wetmore, and for its role in the city’s economy and as an entertainment center.
Howard Johnson Pavilion (Figure 6.3-7/#33)	Asbury Park, NJ	4129	NR Eligible	C	The property is eligible for its distinctive space-age style architecture.
Asbury Park Casino (Figure 6.3-7/#34)	Asbury Park, NJ	1951	NR Eligible	A, C	The property is eligible for its association with the development of Asbury Park as a recreation destination and for its distinctive architecture.
Ocean Grove Camp Meeting Association District (Figure 6.3-7/#35)	Ocean Grove, NJ	76001170	NR Listed	A, C	The property is listed as a planned community, for its vernacular architecture, and for the nineteenth century acoustical science and ventilation system demonstrated by the Great Auditorium.
Audenried Cottage (Figure 6.3-7/#36)	Spring Lake, NJ	91000117	NR Listed	C	The property is listed for its innovative mix of Queen Anne, Italianate, and Shingle styles into a well-integrated whole.
Ocean Beach Historic District (Figure 6.3-7/#38)	Lavallette, NJ	5023	NR-Eligible	A, C	The historic district has been determined NRHP-eligible for its association with the development of the Jersey Shore post-Second World War as a second-home ocean recreation area and as an example of architecturally simple, inexpensive houses on the ocean-front. The period of significance is 1946 to 1955.

Table 6.3-2 Historic Property Data within the EW 1 Onshore AVEHAP PAPE

Resources	Location	NRIS No.	Status	NR Criteria	Reason for Listing in the NRHP
New York					
Bush Terminal Historic District (Figure 6.3-7)	Brooklyn, NY	USN 04701019392	NR Eligible	A, C	The property is noted as “the first American example of the complete integration of the commercial and industrial functions of manufacturing and warehousing with both rail and water transportation in one terminal under a unified management.”
Storehouse #2, US Navy Fleet Supply Base (Figure 6.3-7)	Brooklyn, NY	13000026	NR Listed	A, C	The property is listed both for its role in supplying the military and for its Classical Revival style design.
Green-Wood Cemetery (Figure 6.3-7)	Brooklyn, NY	97000228	NHL	C	The property is listed for the outstanding merits of the landscape design of David Bates Douglass, the cemetery architecture of Richard Upjohn & Sons, and the sculptural quality of the monuments.

Table 6.3-3 Historic Property Data within the EW 2 Onshore Substation C AVEHAP PAPE

Resources	Location	NRIS No.	Status	NR Criteria	Reason for Listing in the NRHP
New York					
Cobble Villa	Long Beach, NY	USN 04001214	NR Listed	A, C	The property is listed for its association with town planning and the development of Long Beach as a resort community during the early twentieth century, and for its Mediterranean Revival style. The “cobble” in its name refers to the use of cobble stone as a decorative element on the front façade.

6.3.2 Impacts Analysis for Construction, Operations, and Decommissioning

The potential impacts resulting from the construction, operations, and decommissioning of the Project are based on the maximum design scenario from the PDE (for a complete description of the construction, operations, and decommissioning activities that Empire anticipates will be needed for the Project, see **Section 3**). For visual effects to the historic and architectural properties, the maximum design scenario is the presence of new fixed structures offshore (i.e., wind turbines and offshore substations) and onshore (i.e., onshore substations), as described in **Table 6.3-4**. This design concept incorporates the full build-out of EW 1 and EW 2 and associated onshore structures, including the onshore export and interconnection cable routes, the onshore substation, and the O&M Base.

Table 6.3-4 Summary of Maximum Design Scenario Parameters for Historic Resources

Parameter	Maximum Design Scenario	Rationale
Construction		
Offshore construction duration	Based on full build-out of EW 1 and EW 2. EW 1: 57 wind turbines and 1 offshore substation. EW 2: 90 wind turbines and 1 offshore substation.	Representative of the maximum period required to install the offshore components, which has the potential to visually impact historic resources in the Project Area.
Onshore construction duration	Based on EW 1 and EW 2. Construction and installation of the export cables landfalls, onshore export and interconnection cables, onshore substations, and O&M Base.	Representative of the maximum period required to install the onshore components, which has the potential to visually impact historic resources in the Project Area.
Operations		
Wind turbines	Based on full build-out of EW 1 and EW 2 (147 wind turbines). EW 1: 57 wind turbines. EW 2: 90 wind turbines.	Representative of the presence of new fixed structures in an area that previously had none.
Onshore substations	Based on EW 1 and EW 2. EW 1: 4.8-ac (1.9-ha) area. EW 2: 6.4-ac (2.6-ha) area.	Representative of the presence of a new structure in an area where there was previously none.
O&M Base	4.5-ac (1.8-ha) area.	Representative of the presence of a new structure in an area where there was previously none.

6.3.2.1 Construction

During construction, the potential impact-producing factors to historic resources may include:

- Construction of the offshore components, including the foundations, submarine export cables, and interarray cables;
- Staging activities and assembly of Project components at applicable facilities or areas; and
- Construction of the onshore components, including the export cable landfall, the onshore export and interconnection cables, the onshore substations, and the O&M Base.

The following impacts may occur as a consequence of factors identified above:

- Short-term visual impacts during offshore construction activities; and
- Short-term visual impacts during onshore construction activities.

Direct effects to historic resources during the construction of the EW 1 and EW 2 onshore components are not expected and will not be discussed further.

Short-term visual effects during offshore construction activities. During construction, Project-related vessels will be present within and transiting to/from the Lease Area and along the submarine export cable routes. As vessel traffic is common along the Atlantic Coast, it is anticipated that the vessels required to transport Project components from shore to the Lease Area will not substantially increase traffic around New York Harbor and along the southern and eastern coast of New York and New Jersey, respectively. The majority of the vessels that will be used for Project construction will be similar in size and form to existing commercial vessels. Therefore, weak contrast will be introduced for viewers within the Offshore AVEHAP PAPE who will see vessels in the foreground to middle ground distance zone (0 to 5 mi [8 km]) traveling from ports on the mainland to the Project Area.

Larger vessels used for Project construction, such as barges or jack-up vessels, may be more noticeable to viewers on shore given the size of barges or jack-up vessels relative to existing vessels, however, these visual effects will be short-term, limited to the time it takes for the vessels to travel from port to the Project Area. Viewers along the southern coast of Long Island and the northern coast of New Jersey will also have views of vessels used for construction in the seldom seen distance zone, beyond 15 mi (24 km). However, these visual effects will be short-term because construction vessels and equipment will only be present during construction and will not be present once construction is complete.

Installation of the submarine export cables in nearshore waters will introduce Project-related vessels relatively close to shore in the areas near export cable landfall. While these vessels will be easily visible from shore, they will not remain in any area for more than several weeks. Because of the relatively short duration that they will be in any single location, they are not anticipated to adversely affect onshore historic resources.

Nighttime construction activities are also proposed to occur within the Project Area. Navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction activities may be visible from coastal vantage points. However, visual effects resulting from nighttime construction activities will be limited to select locations within the Project Area. These visual effects will also be short-term, as the large vessels and lights necessary to perform construction activities will not be present overnight once construction is complete.

Short-term visual effects during onshore construction activities. During construction of the onshore substations and O&M Base, potential short-term views of the Project would result from construction activities and the presence of construction equipment and work crews. Construction activities associated with the construction and installation of the EW 1 and EW 2 onshore facilities would include surveying; clearing and grubbing the construction site; stockpiling top soil; grading, forming, and construction of substation equipment foundations; placement and erection of substation equipment; placement of perimeter fencing; and restoration and landscaping installation (if required).

It is anticipated that contrast would be introduced during Project construction of the onshore substations and O&M Base would be primarily for viewers associated with residential areas in close proximity to the proposed onshore substations and O&M Base, where the presence of construction equipment, materials, and crews

would be dominant in the foreground. However, some of the visual effects would be short-term because construction equipment and crews would be removed once construction is complete. Views of Project construction from areas not immediately adjacent to the onshore substation site would be mostly screened by vegetation and/or topography. Visual impacts to these viewers would be mostly limited to construction traffic on local roads.

Other Project onshore components; namely export cable trenches, HDD pads, and laydown yards; will occur at-grade, and will offer temporary views of construction equipment only to areas immediately adjacent to the construction. Activities at staging and construction facilities will be consistent with the established and permitted uses of these facilities, and Empire will comply with applicable permitting standards to limit environmental impacts from Project-related activities.

6.3.2.2 Operations and Maintenance

During operations and maintenance, the potential impact-producing factors to historic resources may include:

- The presence of new fixed structures offshore (e.g., wind turbines and offshore substations); and
- The presence of new fixed structures onshore (e.g., onshore substations and O&M Base).

The following impacts may occur as a consequence of factors identified above:

- Long-term visual impacts resulting from the presence of new fixed structures offshore (e.g., wind turbines and offshore substations); and
- Long-term visual impacts resulting from the presence of new fixed structures onshore (e.g., onshore substations and O&M Base).

Long-term visual impacts resulting from the presence of new fixed structures offshore. Historic and architectural resources have the potential to be directly affected during Project operations, primarily in the form of visual impacts. The presence of new fixed structures offshore (e.g., wind turbines and offshore substations) within view from NRHP-listed or -eligible resources may change the views from these places. In some cases, these changes may adversely affect a resource by diminishing the characteristics that led to its being listed in the NRHP. These effects are more fully described in the AVEHAP (**Appendix Z**) and the Visual Impact Assessment (**Section 7** and **Appendix AA**).

The properties likely to be affected by the Project are those where the traditional maritime setting is an important part of the property's significance. One key tenet of assessment of effect is that an adverse effect occurs when an undertaking affects the "characteristics of a historic architectural resource that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR Part 800). The assessment of effect on historic properties for this Project focused on the significance of the setting of a property, as this is the aspect of the resource that is most likely to be affected by a direct visual impact; on a property's association with maritime activities, as this connection is the most likely to be affected by a change in the visible seascape.

The remainder of Section 6.3.2 focuses on properties identified through desktop assessments completed in 2020 through 2022; in contrast, supplemental field survey work conducted in Manhattan in 2023 is discussed in Section 6.3.3. Further details can be found in **Appendix Z** and the respective Section 106 report (Tetra Tech 2023). Analysis of the viewshed identified 41 historic properties that were assessed in detail because of their proximity to the shoreline or associations with maritime/ocean themes, activities, and locales. These properties are a mix of residential historic districts, parks/beaches, lighthouses/stations, coastal military installations,

seaside attractions, churches, and a residence and a lifesaving station. An assessment of effects for each of these properties identified 23 properties that are likely to be susceptible to adverse effects resulting from Project construction and operations, and for which a character-defining element is the oceanside setting and the feeling associated with an expansive and unobstructed vista of open water to the horizon. The lighthouses/light stations (Romer Shoal Light Station, West Bank Light Station, Fire Island Lighthouse, Navesink Light Station, and Sandy Hook Light) are located on the shoreline or in the lower harbor, and were intended to be seen from the open waters of New York Harbor and the Atlantic Ocean. An expansive view of the ocean was intrinsic to the character of the Fort Hancock U.S. Life-Saving Station on Sandy Hook, New Jersey and the Fort Tilden Historic District on Long Island, New York. The Jones Beach State Park/Jones Beach State Park Causeway and Parkway System, Robert Moses State Park, Gilgo State Park, and Jacob Riis Park were created to provide access for the public to enjoy oceanside recreation. Private access to the oceanfront was provided by the Silver Gull Beach Club Historic District, Breezy Point Surf Club Historic District, and Point O'Woods Historic District. Individual beach homes built on the barrier islands off the southshore of Long Island include the Carrington House on Fire Island. Allenhurst Residential Historic District is a residential community and the Ocean Grove Camp Meeting Association is a residential/religious community, both built along the New Jersey shore in the nineteenth and early twentieth centuries to take advantage of the oceanfront's natural scenery. The Water Witch (Monmouth Hills) Historic District was built as a residential community to take advantage of the ocean vistas offered by its elevated location on the Navesink Highlands in New Jersey.

Each of the 23 historic properties would be subject to a significant alteration to the character for which they were listed or determined eligible to the NRHP. In **Appendix Z**, Tetra Tech concludes that the Project will have adverse effects to these 23 historic properties.

As summarized in **Table 6.3-5**, 23 historic properties are likely to be adversely affected by the operations of the Project (and the subsequent changes to their setting); 18 are likely to have no adverse effect from the Project.

To minimize effects to these identified historic resources, Empire has taken steps to reduce the visibility of the Project to the extent practicable. All wind turbines and the offshore substations will be a white or light grey color in order to minimize their contrast with the sky in most atmospheric conditions, and the wind turbine design and appearance will be in line with mitigation measures recommended by BOEM (2007). Furthermore, navigational lighting that minimizes the visibility of the wind turbines and offshore substations, without compromising safety, will also be employed. This strategy may include limiting the amount of lighting and time duration to the minimum allowable by the FAA and USCG, such as the implementation of an ADLS system (see **Section 3.5.3** for additional information).

Table 6.3-5 Selected Historic Property Effects within the Offshore AVEHAP PAPE

Resources	NRIS No. SHPO No.	Status	NR Criterion	Modeled View	Distance (mi)	Tetra Tech Assessment of Effect
Miller Army Air Field Historic District	80000362	NR Listed	A	Hub up Visible	31.0 (49.9 km)	No adverse effect
Fort Wadsworth Historic District	99000430	NR Listed	A, C	Hub up Visible	29.6 (47.7 km)	No adverse effect
West Bank Light Station	06001230	NR Listed	A, C (engineering)	Hub up Visible	27.8 (44.7 km)	Adverse effect
Parachute Jump	80002645	NR Listed	A, C	Hub up Visible	26.2 (42.1 km)	No adverse effect
B&B Carousell	16000035	NR Listed	A, C	Hub up Visible	26.1 (42.0 km)	No adverse effect
Cyclone Roller Coaster	91000907	NR Listed	A	Max tip Visible	26.0 (41.8 km)	No adverse effect
Breezy Point Surf Club Historic District	08101.011499	NR Eligible	A, C	Hub-up Visible	22.0 (35.4 km)	Adverse effect
Floyd Bennett Field Historic District	80000363	NR Listed	A, C	Hub up Visible	21.5 (34.6)	No adverse effect
St. Margaret Mary Roman Catholic Church, Coney Island, Brooklyn	04701.023736	NR Eligible	C	Max tip Visible	24.7 (39.7 km)	No adverse effect
Silver Gull Beach Club Historic District	08101.012423	NR Eligible	A, C	Hub up Visible	22.0 (35.4 km)	Adverse effect
Fort Tilden Historic District	84002917	NR Listed	A	Bottom Rotor Visible	20.9 (33.6 km)	Adverse effect
Administration Bldg, Fort Tilden	08101.012280	NR Eligible	A	Rotor Visible	20.9 (33.6 km)	No adverse effect
CO Quarters, Fort Tilden	08101.012281	NR Eligible	A	Hub up Visible	20.8 (33.5 km)	No adverse effect
Jacob Riis Park Historic District	81000081	NR Listed	C	Bottom Rotor Visible	20.7 (33.2 km)	Adverse effect
Jones Beach State Park, Parkway and Causeway System	05000358	NR Listed	A, C	Bottom Rotor Visible	12.8 (20.6 km)	Adverse effect
Ocean Parkway, Suffolk County	10301.000062	NR Eligible	A	Max tip Visible	18.6 (30.0 km)	No adverse effect
Gilgo State Park	10301.000084	Recommend ed NRHP Eligible	A	Max tip visible	21.6 (34.8 km)	Adverse effect

Table 6.3-5 Selected Historic Property Effects within the Offshore AVEHAP PAPE (continued)

Resources	NRIS No. SHPO No.	Status	NR Criterion	Modeled View	Distance (mi)	Tetra Tech Assessment of Effect
Field #2 Bath House, Fire Island	10301.000746	NR Eligible	C	Hub up Visible	20.3 (32.6 km)	No adverse effect
Robert Moses State Park	10305.001592	NR Eligible	A, C	Hub up Visible	20.6 (33.1 km)	Adverse effect
Fire Island Lighthouse	81000082	NR Listed	A, C	Hub up Visible	21.7 (35.0 km)	Adverse effect
Fire Island Lighthouse Historic District	09001288	NR Listed	A, C, D	Hub up Visible	21.7 (35.0 km)	Adverse effect
Carrington House	13001057	NR Listed	A, C	Hub up Visible	24.9 (40.1)	Adverse effect
Point O'Woods Historic District	10302.003470	NR Eligible	A, C	Hub up Visible	24.0 (38.6 km)	Adverse effect
Geller-Pearlroth House	10375.000013	NR Eligible	C	Max tip Visible	39.7 (64 km)	No adverse effect
Romer Shoal Light Station	06001304	NR Listed	A, C	Hub up Visible	25.7 (41.3 km)	Adverse effect
Sandy Hook Light	66000468	NHL	A	Not Visible from base; Hub up Visible at Lantern	24.0 (38.6 km)	Adverse effect
Fort Hancock and Sandy Hook Proving Ground Historic District	80002505	NHL	A	Hub up Visible	22.4 (36.0 km)	Adverse effect
Fort Hancock U.S. Life Saving Station	81000080	NR Listed	A, C	Hub up Visible	22.6 (36.3 km)	Adverse effect
Navesink Light Station (Twin Lights)	70000389	NHL	C	Not Visible	22.4 (36.1 km)	Adverse effect
Navesink Military Reservation Historic District	15000011	NR Listed	A, C	Entire Turbine Visible	22.2 (34.4 km)	No adverse effect
468 Ocean Ave., Long Branch	2009	NR Eligible	C	Hub up Visible	22.1 (35.5 km)	No adverse effect
St. Michael's Roman Catholic Church, Long Branch	4647	NR Eligible	A, C	Hub up Visible	23.1 (37.2 km)	No adverse effect
Allenhurst Residential Historic District	10000353	NR Listed	C	Hub up Visible	24.3 (39.1 km)	Adverse effect
Berkeley Carteret Hotel	3673	NR Eligible	A	Hub up Visible	24.9 (40.1 km)	Adverse effect
Asbury Park Convention Hall	79001512	NR Listed	C	Hub up Visible	24.9 (40.1 km)	Adverse effect

Table 6.3-5 Selected Historic Property Effects within the Offshore AVEHAP PAPE (continued)

Resources	NRIS No. SHPO No.	Status	NR Criterion	Modeled View	Distance (mi)	Tetra Tech Assessment of Effect
Howard Johnson Pavilion	4129	NR Eligible	C	Hub up Visible	24.9 (40.1 km)	No adverse effect
Asbury Park Casino	1951	NR Eligible	A, C	Max Tip Visible	24.9 (40.1 km)	Adverse effect
Ocean Grove Camp Meeting Association District	76001170	NR Listed	A, C	Hub up Visible	25.4 (40.9 km)	Adverse effect
Audenried Cottage	91000117	NR Listed	A, C	Hub up Visible	28.0 (45.1 km)	No adverse effect
Water Witch (Monmouth Hills) Historic District	04000147	NR Listed	A, B, C	Entire turbine	22.8 (36.6 km)	Adverse effect
Ocean Beach Historic District	5023	NR Eligible	A, C	Max tip Visible	37.0 (59.6 km)	No adverse effect

Long-term visual impacts resulting from the presence of new fixed structures onshore. Direct visual effects resulting from the EW 2 Onshore Substation A are not anticipated as there are no NRHP-listed properties within the EW 2 Onshore Substation A AVEHAP PAPE and the only NRHP-eligible property within the EW 2 Onshore Substation A AVEHAP PAPE does not have a potential view of the proposed substation. The street-level analysis identified one historic resource with a potential view of the proposed EW 2 Onshore Substation C, the Cobble Villa house (NR No. 14001214, **Table 6.3-6**). However, the industrial character of the Reynolds Channel shorelines and its environs are consistent with the massing and appearance of the proposed onshore substation. Furthermore, Cobble Villa's significance and NRHP listing is not associated with unobstructed vistas or pristine natural settings. Cobble Villa is listed in the NRHP under Criterion A for its association with the development of an early 20th century residential neighborhood and under Criterion C for its architectural significance. The introduction of the substation will not alter or diminish the characteristics for which Cobble Villa is listed on the NRHP. Tetra Tech's assessment is that the Project will have no adverse effect on the significance of Cobble Villa.

Table 6.3-6 Historic Property Effects within the EW 2 Onshore Substation C AVEHAP PAPE

Resources (Table#/HP#)	NRIS/CRIS No.	NR Status	NR Criterion	Assessment of Effect
Cobble Villa (Table 6.3-3/#1)	14001214	NR-listed	A, C	No Adverse Effect

Assessment of several unevaluated architectural properties within the EW 2 Onshore AVEHAP PAPEs indicate that none of the properties possess the qualities that would make them eligible for NRHP-listing (see **Appendix Z** for additional information).

There are two NRHP-listed individual properties and one NRHP-eligible district within the EW 1 Onshore AVEHAP PAPE (**Table 6.3-7**). The Bush Terminal Historic District (NRHP eligible) and Storehouse #2 (NRHP listed) are both located near the proposed EW 1 onshore substation and O&M Base. Preliminary Project designs depict the onshore substation and O&M Base to be industrial-style buildings with a roof peak of 49 ft (15 m)⁵. At EW 1, this building type and roof elevation will be commensurate with the existing local built environment. Because the Bush Terminal Historic District and Storehouse #2 are listed under Criterion A for their association with the development of Brooklyn's waterfront and are already located in an active, modern waterfront, the introduction of an additional modern component to this setting will not adversely affect either resource, as their significance does not derive from their historic maritime setting being preserved.

Table 6.3-7 Historic Property Effects within the EW 1 Onshore AVEHAP PAPE

Resources (Table#/HP#)	NRIS/CRIS No.	NR Status	NR Criterion	Assessment of Effect
Bush Terminal Historic District (Table 6.3-2/#1)	USN 04701019392	NR-Eligible	A, C	No adverse effect
Storehouse #2, US Navy Fleet Supply Base (Table 6.3-2/#2)	13000026	NR-Listed	A, C	No adverse effect
Green-Wood Cemetery (Table 6.3-2/#3)	97000228	NHL	C	No adverse effect

⁵ Subsequent to initial efforts, Empire continues to refine the design of the onshore substation. This is informed by analysis, including visual simulations, acoustic modeling, and other field surveys, as well as engagement with municipalities and other stakeholders.

Green-Wood Cemetery is approximately 0.5 mi (0.8 km) east-southeast of the proposed EW 1 onshore substation and O&M Base. The property is listed for the outstanding merits of the landscape design of David Bates Douglass, the cemetery architecture of Richard Upjohn & Sons, and the sculptural quality of the monuments. Observations made by Tetra Tech in 2019 indicate that Green-Wood Cemetery currently retains its significance and integrity. The proposed EW 1 onshore substation and O&M Base would be partially visible from one of the highest topographic points of the cemetery, but would be a minor middleground element in the built environment of the Gowanus Bay shoreline (**Appendix Z, Attachment Z-4**). Tetra Tech's assessment is that the introduction of the EW 1 onshore substation and O&M Base will have no adverse effect on Green-Wood Cemetery.

Mitigation of possible adverse effects may be requested by BOEM as the lead federal agency and by the NY SHPO and NJ HPO, respectively. Mitigation options may be developed by Empire in consultation with BOEM, NY SHPO, and NJ HPO, and possibly with additional interested parties. In support of identifying appropriate mitigation options, Empire is engaging with stakeholders that may be involved in this process. This includes meetings completed with and/or planned with municipalities, organizations, and/or regulatory agencies that are involved in the management of the affected properties. Empire is committed to working with stakeholders in determining appropriate and suitable mitigation. Additional detail has been provided to BOEM under confidential cover based partly on Empire's engagement with stakeholders (see **Appendix Z** for additional details).

6.3.2.3 Decommissioning

Impacts during decommissioning are expected to be similar or less than those experienced during construction, as described in Section 6.3.2.1. It is important to note that advances in decommissioning methods/technologies are expected to occur throughout the operations phase of the Project. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and potential impacts will be re-evaluated at that time. For additional information on the decommissioning activities that Empire anticipates will be needed for the Project, please see **Section 3**.

6.3.3 Phased Identification Plan

A Phased Identification Plan was implemented through fieldwork in the Borough of Manhattan, New York City to document potential Project effects to NRHP-listed properties and NHLs in January and February 2023. The methodology, results, and recommendations of this Supplemental Visual Impact Assessment is addressed below.

6.3.3.1 Manhattan

A review of the NPS and CRIS databases identified 148 NRHP-listed and NHL properties within the modeled viewshed in Manhattan, including the Statue of Liberty NHL in New York Bay. Of the 148 historic properties evaluated, it was found that three of these properties are non-extant. The remaining 145 properties were analyzed through Google Earth 3D imagery to assess viewshed screening from adjacent and neighboring buildings. Based on this desktop analysis, 99 additional properties were eliminated from further field assessment due to the height of the property being less than surrounding buildings, thus screened from any Project views. All buildings and districts with potential views based on desktop analysis were subject to field survey. Selected buildings that appeared to have no potential Project view via desktop analysis were field visited to ground-truth the accuracy of the desktop assessment.

The remaining 46 historic resources were field documented via digital photography from multiple perspectives, had locational data recorded by a GPS unit, and were architecturally described in field notes. Historic districts

were documented as an integral unit using a combination of building-targeted and streetscape photography. Significant buildings or those with a potential view of the Project had at least one elevation photographed. Streetscape photography was used to document the character and current conditions of historic districts which can encompass large areas and many buildings.

Lower Manhattan contains eight buildings or structures within the Offshore PAPE that were determined to have potential Project visibility. These include: 19 Rector Street, Equitable Building, Manhattan Bridge, Manhattan Company Building, Park Row Building, U.S. Court House at Foley Square, U.S. Post Office-Church Street Station, and Woolworth Building. In addition, there are six NRHP-listed historic districts with potential Project views, and include: The Bowery, Chinatown and Little Italy, Fulton-Nassau, Lower East Side, Wall Street, and South Street Seaport Historic Districts.

Midtown Manhattan contains 11 individual NRHP-listed buildings and structures within the Offshore PAPE, and include: American Radiator Building, Chanin Building, Chrysler Building, Empire State Building, Flatiron Building, Fred F. French Building, General Electric Building, Germania Life Insurance Company Building, McGraw-Hill Building, Metropolitan Life Insurance Company Tower, New York Life Building, Public School 35, and the Queensboro Bridge. Four historic districts in Midtown Manhattan with Project views include: Garment Center Historic District, Metropolitan Life Insurance Company Complex, Rockefeller Center Complex, and Tudor City Historic District.

Uptown Manhattan contains five individually listed historic properties and two listed historic districts that will have Project views, including: Barbizon Hotel for Women, Paul Robeson Home, Master Building, Church of Notre Dame and the Rectory, and Riverside Church, plus Central Park West Historic District and Upper East Side Historic District.

None of these historic properties with Project views relies on an unobstructed ocean view as a character-defining feature that contributes in whole or part to a property's historic significance. Therefore, Tetra Tech recommends that there will be no adverse impacts to any of the NHL or NRHP-listed properties or districts in Manhattan attributable to the Project.

6.3.3.2 Summary of Phased Identification Surveys

The Supplemental Visual Impact Assessment of NRHP-listed properties in Manhattan identified 148 historic properties within the Offshore PAPE. Refinement of the PAPE through desktop review of Google Earth 3D imagery narrowed the set of historic properties within the Offshore PAPE to 24 individually listed buildings and structures and 12 historic districts. Tetra Tech recommended that none of these historic properties would be subject to Project adverse effects.

6.3.4 Summary of Avoidance, Minimization, and Mitigation Measures

In order to mitigate the potential impact-producing factors described in Section 6.3.2, Empire is proposing to implement the following avoidance, minimization, and mitigation measures.

6.3.4.1 Construction

During construction, Empire will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in Section 6.3.2.1:

- Continued outreach and engagement with relevant agencies, interested Tribes, and other stakeholders throughout the construction process to identify appropriate mitigation and monitoring measures during ground-disturbing activities, if deemed necessary.

In addition, during construction, Empire will consider the following avoidance, minimization, and mitigation measures to mitigate the impacts described in Section 6.3.2.1:

- Avoidance of sensitive historic resources by siting onshore Project components in highly developed and previously disturbed areas to the extent practicable.

6.3.4.2 Operations and Maintenance

During operations, Empire will commit to the following avoidance, minimization, and mitigation measures to mitigate the impacts described in Section 6.3.2.2:

- Marking and lighting of above water offshore Project components will be consistent with regulatory requirements and guidance (see **Section 3** for additional details on the proposed marking and lighting measures); and
- Wind turbine design and appearance will be in line with mitigation measures recommended by BOEM (2007).

Empire also proposes to include an ADLS (or a similar system) to turn the aviation obstruction lights on and off in response to detection of nearby aircraft, as a base case, pending commercial availability, technical feasibility, safety/reliability, and agency review and approval. Mitigation of possible adverse effects may be requested by BOEM as the lead federal agency and by the NY SHPO and NJ HPO respectively. Mitigation options may be developed by Empire in consultation with BOEM, NY SHPO, and NJ HPO, and possibly with additional interested parties. In support of identifying appropriate mitigation options, Empire is engaging with stakeholders that may be involved in this process. This includes meetings completed with and/or planned with municipalities, organizations, and/or regulatory agencies that are involved in the management of the affected properties. Empire is committed to working with stakeholders in determining appropriate and suitable mitigation. Additional detail has been provided to BOEM under confidential cover based partly on Empire's engagement with stakeholders (see **Appendix Z** for additional details).

6.3.4.3 Decommissioning

Avoidance, minimization, and mitigation measures proposed to be implemented during decommissioning are expected to be similar to those implemented during construction and operations, as described in Section 6.3.4.1 and Section 6.3.4.2. A full decommissioning plan will be approved by BOEM prior to any decommissioning activities, and avoidance, minimization, and mitigation measures for decommissioning activities will be proposed at that time.

6.3.5 References

Table 6.3-8 Data Sources

Source	Includes	Available at	Metadata Link
BOEM	Lease Area	https://www.boem.gov/BOEM-Renewable-Energy-Geodatabase.zip	N/A
BOEM	State Territorial Waters Boundary	https://www.boem.gov/Oil-and-Gas-Energy-Program/Mapping-and-Data/ATL_SLA(3).aspx	http://metadata.boem.gov/geospatial/OCS_SubmergedLandsActBoundary_Atlantic_NAD83.xml
NOAA NCEI	Bathymetry	https://www.ngdc.noaa.gov/mgg/coastal/crm.html	N/A
NRHP	NRHP Listed/Eligible District/Historic Property	https://www.nps.gov/subjects/nationalregister/data-downloads.htm	N/A
CRIS	NRHP Listed/Eligible/Unevaluated District/Property	https://cris.parks.ny.gov/Login.aspx?ReturnUrl=%2f	N/A
LUCY	NRHP Listed/Eligible/Unevaluated District/Property	https://www.arcgis.com/apps/webappviewer/index.html	N/A
Monmouth County (NJ)	Tax parcels	https://gis-monmouthnj.opendata.arcgis.com/	N/A

BOEM (Bureau of Ocean Energy Management). 2007. *Programmatic Environmental Impact Statement for Alternative Energy Development and Production and Alternative Use of Facilities on the Outer Continental Shelf – Final Environmental Impact Statement, Section 5 Potential Impacts of Alternative Energy Development*. Available online at: https://www.boem.gov/Renewable-Energy-Program/Regulatory-Information/Alt_Energy_FPEIS_VolIIIFrontMatter.aspx. Accessed on June 27, 2018.

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