The latest revision date of the AVEHAP Nontechnical Summary is July 2023. This nontechnical summary was not revised as part of the November 2023 COP submittal; therefore, the date on the cover sheet remains as July 2023.

APPENDIX Z

Analysis of Visual Effects to Historic and Architectural Properties Nontechnical Summary

Prepared for

equinor

TETRA TECH

JULY 2023

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
APE	Area Of Potential Effect
AVEHAP	Analysis of Visual Effects to Historic and Architectural Properties
BOEM	Bureau of Ocean Energy Management
COP	Construction and Operations Plan
Empire	Empire Offshore Wind LLC
EW 1	Empire Wind 1
EW 2	Empire Wind 2
km	kilometer
Lease Area	Renewable Energy Lease Area OCS-A 0512
mi	mile
MSL	mean sea level
NJ HPO	New Jersey Historic Preservation Office
nm	nautical mile
NRHP	National Register of Historic Places
NY SHPO	New York State Historic Preservation Office
O&M	Operations and Maintenance
PAPE	Preliminary Area of Potential Effect
Project	The Empire Offshore Wind Project (EW 1 and EW 2)
Study Area	a 40-mi (64-km) AVEHAP Offshore Study Area around the Lease Area
Tetra Tech	Tetra Tech, Inc.

1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) was contracted by Empire Offshore Wind LLC (Empire)[1] to prepare an Analysis of Visual Effects to Historic and Architectural Properties (AVEHAP), also known as a Historic Resources Visual Effects Assessment, in support of the development of the Empire Offshore Wind: Empire Wind Project (EW 1 and EW 2) Project Construction and Operations Plan (COP). The Project consists of an offshore wind farm to be located in the designated U.S. Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area OCS-A 0512 (Lease Area), as well as submarine export cables and onshore ancillary facilities required to convey power produced by the wind farm to the regional electric transmission system. The Lease Area is approximately 14 statute miles (mi) (12 nautical miles [nm], 23 kilometers [km])[2] south of Long Island, New York and 19.5 mi (16.9 nm, 31.4 km) east of Long Branch, New Jersey (**Figure 1**). The purpose of the AVEHAP is to assess the potential visual effects of the construction and operations of the Project from above-ground historic properties (e.g., cultural properties, districts, buildings, structures, or objects that are 50 years old or older and are listed in or eligible to the National Register of Historic Places [NRHP]) that will have views or partial views of Project components. The Area of Potential Effect (APE) will be defined by BOEM through the Section 106 process; therefore, the AVEHAP describes the preliminary APE (PAPE), as identified by Tetra Tech.

The Project includes the construction of up to 147 wind turbines (the total number across both EW 1 and EW 2) at up to 174 locations, two offshore substations, and foundations for the wind turbines and offshore substations within the Lease Area. The wind turbines will be connected via interarray cables to the offshore substations. The offshore substations will collect the power generated by the wind turbines and transport it to the Project's onshore substations via submarine export cables. The onshore substations will transmit the energy generated for connection to the Points of Interconnection in New York.[2] Most of the resources affected by the Project relate to views of the offshore Project components.

2.0 OFFSHORE VISUAL EFFECTS ASSESSMENT

Coastal New York and New Jersey are areas with extensive historical value and a tradition of historical commemoration resulting in numerous cultural resources that are listed in and determined to be eligible for the NRHP (i.e., historic properties), some within the recommended Offshore and Onshore PAPEs. As defined by 36 Code of Federal Regulations § 800.16(d), the APE 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." Under Section 106, BOEM will determine the extent of and define the Offshore and Onshore APEs for this Project. This AVEHAP focuses on historic properties and architectural properties within the Offshore and Onshore PAPEs that may be affected by the construction and operations of the Project. The PAPE is defined as the area in which there will be potential visibility of the Project, based on computer modeling. Historic properties are defined as properties listed on the NRHP or determined NRHP eligible.

[1] Empire is a direct, wholly owned subsidiary of Empire Offshore Wind Holdings LLC ("Empire HoldCo"). Empire HoldCo is jointly owned by (1) an indirect, wholly owned subsidiary of Equinor ASA (collectively, "Equinor"); and (2) an indirect, wholly owned subsidiary of BP Wind Energy North America In. ("BP"). BP acquired ownership interest in Empire HoldCo in a transaction that closed on January 29, 2021.

[2] The Project Design Envelope proposes the construction and installation of two onshore substations to support the Project. The onshore substations will be used to connect the export cables to the POIs in New York.

[3] While the O&M Base will serve both EW 1 and EW 2, the base will be located at the South Brooklyn Marine Terminal, 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.

Architectural property is the term used here to denote an above-ground building, structure or object, 50 years old or older, that has not been evaluated for NRHP eligibility.

2.1 Viewshed Analysis

An initial 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, entire rotor swept area, hub, and maximum blade tip). The wind turbines installed for the Project will be three-bladed, horizontal-axis machines. The rotor will be attached to a nacelle containing the electrical generator and other equipment. The nacelle will sit on top of a tubular support tower. Wind energy causes the blades on a wind turbine to rotate, which turns a generator to transform the kinetic energy of the air into electricity.

The initial topographic viewshed assumed "bare earth" conditions and was developed from 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. **Figure 2** is a scaled graphic, showing the wind turbines at varying distances based on a photograph from a coastal beach location. A 40-mi (64 km) AVEHAP Offshore Study Area around the Lease Area was used as a conservative estimate of minimal visibility as a starting point for identifying the Offshore AVEHAP PAPE. The location and extent of the AVEHAP Offshore Study Area is illustrated in **Figure 3**.

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 viewshed model accounting for building heights and vegetation was derived using a similar process as the initial topographic viewshed described above. However, for this viewshed model, building footprints for New York City, Suffolk County, and Nassau County in New York and Monmouth County in New Jersey were incorporated into the digital elevation model to represent surface elevations.

2.2 Identification of Above-Ground Historic Properties

The AVEHAP focuses on historic properties and architectural properties within the Offshore and Onshore PAPEs that may be affected by the construction and operations of the Project. Overall, the offshore PAPE includes: 1) the littoral zone of the Atlantic Ocean shoreline, the Lower New York Bay shoreline, and the barrier islands on the south shore of Long Island from the Rockaway peninsula eastward to Fire Island; 2) generally level terrain that extends approximately 0.5 to 3 mi (0.8 to 4.8 km) landward from the shorelines; 3) elevated terrain including the Atlantic Highlands in Monmouth County, New Jersey, the Ronkonkoma and Harbor Hill terminal moraines in Kings, Nassau, and Suffolk counties, New York, and the bedrock-cored uplands in northern Manhattan and adjacent parts of the Bronx; and, 4) elevated buildings clustered in lower and midtown Manhattan and occurring in lower density across the PAPE. Research in the New York State Historic Preservation Office's (NY SHPO's) Cultural Resources Information System, the New Jersey Historic Preservation Office's (NJ HPO's) LUCY database, and the National Park Service's National Register Information System identified 2,830 historic and architectural properties within the PAPE. **Table 1** presents a breakdown of these properties by state and NRHP status.

A supplemental dataset of buildings with build-dates of 1972 and older was acquired from the Monmouth County (New Jersey) tax parcel database. 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. Please note that the New Jersey results presented in this section and in

Table 1 represent the initial desktop analysis only, and have been supplemented by the results of the New Jersey intensive level survey, which are presented in Section 4.0 below.

Table 1 Identified Historic and Architectural Properties within Offshore AVEHAP PAPE Based on Desktop Analysis

NRHP Status	New York	New Jersey	TOTAL
National Historic Landmark	7	5	**12**
National Register Listed	325	45	**370**
National Register Eligible	117	77	**194**
Historic Districts	68	13	**81**
Contributing Resources	208	1,352	**1,560**
Unevaluated	100	513	**613**
TOTAL	**825**	**2,005**	**2,830**

2.3 Effects Assessment

The viewshed model represents a best management practices approach to delineating the PAPE. The computer-generated viewshed is a close approximation of zones of Project visibility and is considered to conservatively define the PAPE (**Figure 4**). However, the viewshed model inherently displays some misrepresentation of actual Project views due to an imperfect rendering of existing conditions on the ground. To better understand this gap between modeled views and actual views, and to delineate areas of the PAPE that would be most likely to contain historic properties vulnerable to visual adverse effects, the AVEHAP team conducted additional analysis. This additional analysis consisted of desktop Google Earth Street View examination of Project-facing views along regularly spaced transects. These transects followed streets, in New Jersey moving westward from the shoreline and in New York, generally moving northward from the shoreline. NRHP-listed, eligible and unevaluated properties were used as station points along each transect, with the objective of determining the most inland point along a transect that would have an ocean view, and thus a possible Project view.

The historic and architectural properties that have views of the Project within the Study Area include those situated at or near sea level in proximity to the shoreline, as well as some located at a distance from the ocean shoreline and consisting of tall buildings or structures situated on elevated terrain. The Study Area contains elevated terrain in several locales, including the Atlantic (Navesink) Highlands in Monmouth County, New Jersey, the Ronkonkoma and Harbor Hill moraines that form the east-west ridge of hills on Long Island, and bedrock formations in northern Manhattan. Historic and architectural properties with tall elevations or located on elevated terrain would possess somewhat attenuated Project views where integrity of the foreground historic viewshed is already substantially altered such that addition of wind turbines in the background viewshed represents a small, incremental change relative to existing conditions. In contrast, properties proximal to the ocean would likely have views of the Project that are direct and unmediated by foreground or middleground vistas of the built-environment, vegetation, or topography. Properties proximal to the ocean, which may have unmediated views and maritime settings, would be most susceptible to adverse effects caused by Project construction and therefore, such properties received the focus of attention in this assessment of effects. Those properties located in Manhattan, and elsewhere, with elevated views, were assessed for their potential impacts through a separate Phased Identification Plan (as discussed in Section 4.0 below).

3.0 ONSHORE VISUAL EFFECTS ASSESSMENT

The methodology for defining the onshore AVEHAP PAPE was largely the same as for the offshore PAPE.

3.1 EW 1 Onshore AVEHAP PAPE

The area encompassed by a computer-generated viewshed indicated that the EW 1 onshore substation and Operations and Maintenance (O&M) Base would have a maximum theoretical visibility up to 4 mi (6.4 km) away, including portions of Brooklyn, Manhattan, Staten Island, and New Jersey. This 4-mi (6.4-km) radius was designated as the EW 1 AVEHAP Onshore Study Area (see **Figure 5**).

The EW 1 AVEHAP Onshore Study Area contains 384 historic properties (NRHP listed and eligible), largely located in Brooklyn and Manhattan, with a small number in Staten Island and Jersey City. Each of the 384 historic properties in the EW 1 AVEHAP Onshore Study Area was subjected to a bare-earth viewshed analysis, resulting in 82 properties with potential views of the EW 1 onshore substation and/or O&M Base. Street-level and in-field analyses were performed to establish the presence of actual Project views, starting with properties in proximity to the onshore substation and proceeding outward with greater distance. In this manner, 30 historic properties were assessed at distances up to 2 mi (3.2 km) from the EW 1 onshore substation and O&M Base, allowing an onshore PAPE to be defined. The analyses indicated that Project visibility became attenuated beyond the blocks immediately surrounding the onshore substation and O&M Base.

The EW 1 Onshore AVHEP PAPE was defined as the zone within the EW 1 AVEHAP Onshore Study Area that was likely to contain views of the onshore substation and O&M Base, based on the analysis of the screening by building elevations, desktop street-level analysis, and a field visit on February 4, 2021. The EW 1 Onshore AVEHAP PAPE is an approximately 2-mi (3.2-km) radius around the EW 1 onshore substation and/or O&M Base. The EW 1 Onshore AVEHAP PAPE encompasses the elevated terrain of the Harbor Hill glacial moraine, the highest point in Brooklyn. Descriptions of the historic properties in the EW 1 Onshore AVEHAP PAPE are provided in COP Appendix Z. The EW 1 Onshore AVEHAP PAPE is shown in **Figure 5**.

3.2 EW 2 Onshore AVEHAP PAPE

The area encompassed by a computer-generated viewshed indicated that the EW 2 onshore substations would have a maximum theoretical visibility up to 4 mi (6.4 km) away, including portions of Long Beach Island, Barnum Island, and the Town of Hempstead, all within Nassau County, New York. The 4-mi (6.4-km) radius from each substation was designated as its preliminary EW 2 AVEHAP Onshore Study Area (see **Figure 6**).

Based on the near-sea level elevation of the onshore substation locations, a refined Study Area of a 2-mi (3.2-km) radius was evaluated, which captures the realistic line-of-sight in the area adjacent to the onshore substations. This refined Study Area for EW 2 Onshore Substation A contains three historic properties and 565 unevaluated architectural properties. For the EW 2 Onshore Substation C, a 2-mi Study Area contains 128 historic properties (7 NRHP listed, 121 NRHP eligible) and 837 unevaluated architectural properties.

The EW 2 Onshore Substation A AVEHAP PAPE was defined as the zone within the EW 2 AVEHAP Onshore Study Area for EW2 Onshore Substation A that may contain views of the proposed onshore substation. Tetra Tech conducted a field visit in May 2021 to ground-truth zones of visibility within the EW 2 Onshore Substation A AVEHAP PAPE. The field team utilized the E.F. Barrett Power Station main building profile to replicate the proposed onshore substations. The E.F. Barrett Power Station main building is approximately 125 ft (38 m) in height and is located 0.4 mi (0.6 km) southeast of the EW 2 Onshore Substation A.

The cable bridge crossing is contained within the EW 2 Onshore Substation A PAPE and was separately evaluated for its potential to be viewed by historic and architectural properties. Two locations are under consideration for the cable bridge. At the location adjacent to the Long Island Rail Road railway bridge, the cable bridge, with a maximum height of approximately 30 ft (9 m) NAVD 88, is screened by the local built environment at distances ranging from approximately 280 ft (85 m) to 660 ft (200 m). To the north the view is screened by the Costco Wholesale building at 3705 Hampton Road, Oceanside, New York; to the east and northeast the view is screened by the E.F. Barrett Power Station and its substation; and, to the southwest, fuel storage tanks obstruct views of the proposed cable bridge. A narrow corridor of visibility to the west takes in undeveloped salt marsh. The other potential location is adjacent to the Long Beach Road bridge. Anticipated to have a maximum height of 30 ft (9 m) NAVD 88, the cable bridge is screened to the east by the Oceanside Landfill, which rises to approximately 160 ft (50 m) above MSL. Views of the cable bridge are attenuated northward and westward by distance and will not be apparent at Daly Boulevard or the E.F. Barrett Power Station, respectively. To the south, views of the bridge crossing may extend to the intersection of Long Beach Road and Austin Boulevard, a distance of approximately 500 ft (150 m), but are not expected to be significantly different from existing views of the built environment, which includes commercial, industrial, and infrastructural views.

The EW 2 Onshore Substation C AVEHAP PAPE was defined as the zone within the EW 2 AVEHAP Onshore Study Area for EW 2 Onshore Substation C that has theoretical views of the proposed substation (**Figure 6**). Viewshed analyses were conducted on all 130 NRHP-eligible and 8 NRHP-listed historic properties occurring on Long Beach Island, resulting in 85 properties with potential views of the onshore substation. 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 onshore substation, 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 acres (51 hectares). 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.

3.3 Onshore Visual Effects Investigations

Onshore, three historic properties within the EW 1 Onshore AVEHAP PAPE (**Figure 5**), associated with the EW 1 onshore substation and O&M Base, may have a view of an onshore Project component; these properties were assessed as not adversely affected (**Table 2**). One historic property within the EW 2 Onshore AVEHAP PAPE (**Figure 6**) associated with the EW 2 Onshore Substation C may have a view of the substation; this property was assessed as not adversely affected (**Table 3**). No historic property within the EW 2 Onshore AVEHAP PAPE will have a view of the EW 2 Onshore Substation A. The submarine export cables and interarray cables, and the onshore export and interconnection cables will be either entirely submerged under water or buried underground except for a cable bridge crossing Barnums Channel; therefore, the export cable and interarray cable components as well as the underground onshore export and interconnection cables were not addressed further in this analysis. The cable bridge crossing is located within the EW 2 Onshore AVEHAP PAPE associated with the EW 2 Onshore Substation A.

Short-term visual effects to historic properties would occur during construction of the EW 1 and EW 2 onshore substations, the O&M Base, and cable bridge, resulting from construction activities and the presence of construction equipment and work crews. Construction activities associated with the construction and

installation of the onshore substations and O&M Base will include surveying, clearing, and grubbing the construction site, stockpiling topsoil, grading, forming and construction of substation equipment foundations, placement and erection of buildings and electrical equipment, placement of perimeter security fencing, and restoration and landscaping installation (if required). Construction activities associated with installation of the cable bridge will include surveying, clearing, and grubbing the construction site if needed, installation of piled foundation supports, placement of a prefabricated steel truss system assembled offsite, and restoration and landscaping installation (if required).

The historic properties with a view of the offshore Project components are greater in number and comprise the majority of the AVEHAP.

Table 2 Assessment of Effects on Historic Properties within the EW 1 Onshore AVEHAP PAPE

Resources	NRIS No./ CRIS No.	Status	NR Criteria	Tetra Tech Assessment of Effect
Bush Terminal Historic District	047010.19392	NR Eligible	A, C	No Adverse Effect
Storehouse #2, US Navy Fleet Supply Base	13000026	NR Listed	A, C	No Adverse Effect
Green-Wood Cemetery	97000228	NHL	C	No Adverse Effect

Table 3 Assessment of Effects on Historic Properties within the EW 2 Onshore Substation C AVEHAP PAPE

Resources	NRIS No./ CRIS No.	Status	NR Criteria	Tetra Tech Assessment of Effect
Cobble Villa	14001214	NR listed	A, C	No Adverse Effect

4.0 PHASED IDENTIFICATION PLAN SURVEYS AND IMPLEMENTATION

4.1 Scope of Phased Identification Plan

Tetra Tech was contracted to complete an AVEHAP in order to assess the potential visual effects of the construction and operation of the Project from aboveground historic properties that will have views or partial views of the Project components. Phased identification is implemented for projects where alternatives under consideration consists of corridors, large land areas, or where access to properties is restricted, and serves as a process document detailing the steps Empire will take to complete the required cultural resources surveys following issuance of the Draft Environmental Impact Statement by BOEM. The phased identification includes establishing the PAPE, identification of historic properties within the PAPE, and conducting a viewshed analysis and historic property assessment.

A viewshed analysis and historic property assessment has been completed for the PAPE including Manhattan, the Statue of Liberty, and portions of Middlesex, Monmouth, and Ocean Counties, New Jersey. Under this Phased Identification Plan, the survey included a historic resources survey and additional visual impact assessment in coordination with NJ HPO and NY SHPO. The recommendations of adverse effects gathered from the prior desktop analysis in New York State and the intensive level architectural survey in New Jersey are combined and presented in **Table 4** below.

4.2 Architectural Survey Field Results Manhattan

In the Borough of Manhattan, New York City, the modeled viewshed indicated that 147 listed or eligible historic properties will have a view of the Project. Street-level views of the Atlantic Ocean from Manhattan are completely screened by the intervening landmarks in Brooklyn. However, Manhattan's spatial dimension is also vertical, and Project views were anticipated and were modeled to be present from elevated perspectives among the many tall building clustered in lower and midtown Manhattan, and in Morningside Heights in northern Manhattan. Project visibility across the modeled viewshed is often mediated by the degree of foreground views, distance, vegetation, and existing infrastructure between a resource and the Project. In addition to the viewshed modelling, a Google Earth 3D desktop analysis and field survey identified historic properties within the PAPE with views of the Project. The Supplemental Visual Impact Assessment in Manhattan included the 147 listed or eligible buildings identified within the PAPE, and included field visits, photographs, and documentation of exterior conditions, integrity, material fabric, setting and other considerations of physical appearance and cultural associations. In addition, five buildings in Manhattan were visited to document the viewshed from the roofs or publicly accessible observation decks, including The Empire State Building, 30 Rockefeller Plaza, The Statue of Liberty, The Master Building, and The Church of Notre Dame. In Manhattan, the character-defining features of the buildings or structures are not tied to an area of significance, such as seaside recreation or maritime history, that would be altered or diminished by the introduction of the Project in their historic viewsheds. Properties were assessed for potential adverse effects due to the introduction of the Project into its viewshed. None of the historic properties with potential Project views possess an unobstructed view of the Atlantic Ocean as character-defining features of their historic significance. The Statue of Liberty also received an individual assessment of effects, including visual simulation, demonstrating that the foreground completely obscures any view of the Project. Therefore, Tetra Tech recommended no adverse effects to historic properties in Manhattan and New York Bay.

4.3 Intensive-Level Architectural Survey Results New Jersey

The PAPE in Middlesex, Monmouth, and Ocean Counties, New Jersey, defined through viewshed modeling within a 40-mile radius of the Project Area, and then refined via field reconnaissance, identified and documented 3,788 parcels and 14 historic districts within the PAPE with potential Project views. Parcel information for historic properties was acquired from tax assessors' databases and was overlaid onto the New Jersey Department of Environmental Protection historic property dataset (LUCY). In order to determine the precise number of properties in New Jersey requiring assessment, an initial field investigation took place to delineate portions of the PAPE that exhibit potential for the presence of significant historic properties. A field reconnaissance in January 2023 determined that there would be no actual views to the Project from Middlesex County, and therefore, Middlesex County parcels were eliminated from the intensive level survey and documentation.

Tetra Tech undertook the intensive level survey in February and March 2023, to document 3,788 historic properties in the PAPE within Monmouth and Ocean Counties. The intensive level surveys of historic and architectural properties associated with maritime settings within the PAPE (within 0.5 mi of shore), included field visiting, photographing, and documenting exterior conditions for integrity, materials, fabric, setting, and other conditions of physical appearance and cultural associations and additional visual impact assessments, in coordination with the NJ HPO.

The survey recommended 69 individual properties as NRHP eligible, 63 in Monmouth County and 6 in Ocean County, plus 11 historic districts as NRHP eligible, with eight in Monmouth County and three in Ocean County. Tetra Tech conducted an assessment of effects and recommended 29 individual properties as adversely affected

(25 in Monmouth County and four in Ocean County), plus ten adversely affected historic districts (seven in Monmouth County and three in Ocean County).

Table 4 Recommendations of Adverse Effects from Desktop Analysis in New York State and Intensive Level Architectural Survey in New Jersey Offshore AVEHAP PAPE

Resources	NRIS No. SHPO No.	Status	NR Criterion	Distance (mi)
New York				
West Bank Light Station	06001230	NR Listed	A, C (engineering)	27.8 (44.7 km)
Breezy Point Surf Club Historic District	08101.011499	NR-Eligible	A, C	22.0 (35.4 km)
Silver Gull Beach Club Historic District	08101.012423	NR Eligible	A, C	22.0 (35.4 km)
Jacob Riis Park Historic District	81000081	NR Listed	C	20.7 (33.2 km)
Jones Beach State Park, Parkway and Causeway System	05000358	NR Listed	A, C	12.8 (20.6 km)
Gilgo State Park	10301.000084	Recommended NR-Eligible	A	21.6 (34.8 km)
Robert Moses State Park	10305.001592	NR Eligible	A, C	20.6 (33.1 km)
Fire Island Lighthouse	81000082	NR Listed	A, C	21.7 (35.0 km)
Fire Island Lighthouse Historic District	09001288	NR Listed	A, C, D	21.7 (35.0 km)
Carrington House	13001057	NR-Listed	A, C	24.9 (40.1)
Point O'Woods Historic District	10302.003470	NR Eligible	A, C	24.0 (38.6 km)
New Jersey				
Romer Shoal Light Station	06001304	NR Listed	A, C	25.7 (41.3 km)
Sandy Hook Light	66000468	NHL	A	24.0 (38.6 km)
Fort Hancock and Sandy Hook Proving Ground Historic District	80002505	NHL	A	22.4 (36.0 km)

Resources	NRIS No. SHPO No.	Status	NR Criterion	Distance (mi)
Fort Hancock U.S. Life Saving Station	81000080	NR Listed	A, C	22.6 (36.3 km)
Water Witch (Monmouth Hills) Historic District	04000147	NR Listed	A, B, C	22.8 (36.6 km)
Navesink Light Station (Twin Lights)	70000389	NHL	C	22.4 (36.1 km)
Navesink Military Reservation Historic District	15000011	NR Listed	A, C	22.2 (34.4 km)
Monmouth Beach Bath & Tennis Club	Not assigned	NR Eligible	A, C	19.0 (30.6 km)
U.S. Life Saving Station #4	257	Unevaluated	A, C	19.0 (30.6 km)
78 Ocean Ave., Monmouth Beach	Not assigned	Unevaluated	C	19.0 (30.6 km)
San Alfonso Retreat	Not assigned	Unevaluated	C	20.0 (32.2 km)
Navaho Lodge	Not assigned	Unevaluated	A, C	19.2 (30.9 km)
39 Ocean Ave., Deal	Not assigned	Unevaluated	C	20.6 (33.2 km)
53 Ocean Ave., Deal	Not assigned	Unevaluated	C	20.6 (33.2 km)
191 Ocean Ave., Deal	Not assigned	Unevaluated	C	20.9 (33.6 km)
Deal Esplanade Historic District	Not assigned	Unevaluated	A, C	21.0 (33.8 km)
Allenhurst Residential Historic District	10000353	NR Listed	C	24.3 (39.1 km)
Waterfront Resort Historic District	Not assigned	Unevaluated	A, C	21.6 (34.8 km)
Berkeley-Carteret Hotel	3673	NR Eligible	A	24.9 (40.1 km)
Asbury Park Convention Hall	79001512	NR Listed	C	24.9 (40.1 km)
Howard Johnson's Pavilion	4129	NR Eligible	C	24.9 (40.1 km)

Resources	NRIS No. SHPO No.	Status	NR Criterion	Distance (mi)
Asbury Park Casino & Carousel	1951	NR Eligible	A, C	24.9 (40.1 km)
Asbury Park Boardwalk	Not assigned	Unevaluated	A, C	21.4 (34.5 km)
Ocean Grove Camp Meeting Association District	76001170	NR Listed	A, C	25.4 (40.9 km)
705 Ocean Ave., Bradley Beach	Not assigned	Unevaluated	C	22.5 (36.2 km)
709 Ocean Ave., Bradley Beach	Not assigned	Unevaluated	C	22.5 (36.2 km)
309 Ocean Ave., Bradley Beach	Not assigned	Unevaluated	C	22.6 (36.4 km)
Belmar Fishing Club	Not assigned	Unevaluated	C	23.0 (37.0 km)
Belmar Boardwalk	Not assigned	Unevaluated	C	23.5 37.8 km)
1711 Ocean Ave., Spring Lake	Not assigned	Unevaluated	C	24.3 (39.1 km)
Essex & Sussex Hotel	Not assigned	Unevaluated	A, C	24.8 (39.9 km)
Squan Beach Life Saving Station #9	08000135	NR Listed	A, C	26.2 (42.2 km)
Manasquan Inlet USCG Station	100006508	NR Listed	A, C	26.7 (43.0 km)
Bay Head Historic District	3402	NR Listed	A, C	27.8 (44.8 km)
Mantoloking Historic District	3417	NR Eligible	A, C	28.7 (46.2 km)
Ocean Beach Historic District	5023	NR-Eligible	A, C	37.0(59.6 km)
Stevens House	Not assigned	Unevaluated	C	21.4 (34.5 km)
Casino Pier	Not assigned	Unevaluated	C	34.2 (55.1 km)
Seaside Heights Boardwalk	Not assigned	Unevaluated	A, C	34.1 (54.9 km)

5.0 CONCLUSION

Tetra Tech has researched the effects of the Project on historic and architectural resources in Manhattan and New Jersey. In Manhattan, the Supplemental Visual Impact Assessment determined that an unobstructed view

of the open Atlantic Ocean is not an important part of the historic significance for any of the 71 properties and historic districts surveyed. Tetra Tech recommended that there will be no adverse effects to any of the NHL or NRHP-listed properties or districts in Manhattan attributable to the Project. Consequently, no treatment plan is recommended to mitigate impacts to built environment resources in Manhattan.

In New Jersey, Tetra Tech recommended 63 historic properties in Monmouth County and 6 historic properties in Ocean County as eligible for listing in the NRHP, including two National Historic Landmarks and 11 NRHP-listed properties. Tetra Tech also recommended retention of eligibility for 11 of the historic districts and the Romer Shoal Light Station in New Jersey.

An assessment of Project effects identified 25 individual historic properties and seven historic districts in Monmouth County, and four individual historic properties and three historic districts in Ocean County that will be subject to adverse effects by Project construction and operation.

Tetra Tech recommends considering means that will avoid adverse effects to the historic properties. If avoidance is not feasible, exploration of means to minimize these potential effects should take place. To offset visual impacts resulting from construction and operations of the Project, Empire will implement mitigation options, which are currently being developed through engagement with BOEM, NY SHPO, and NJ HPO, and 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.

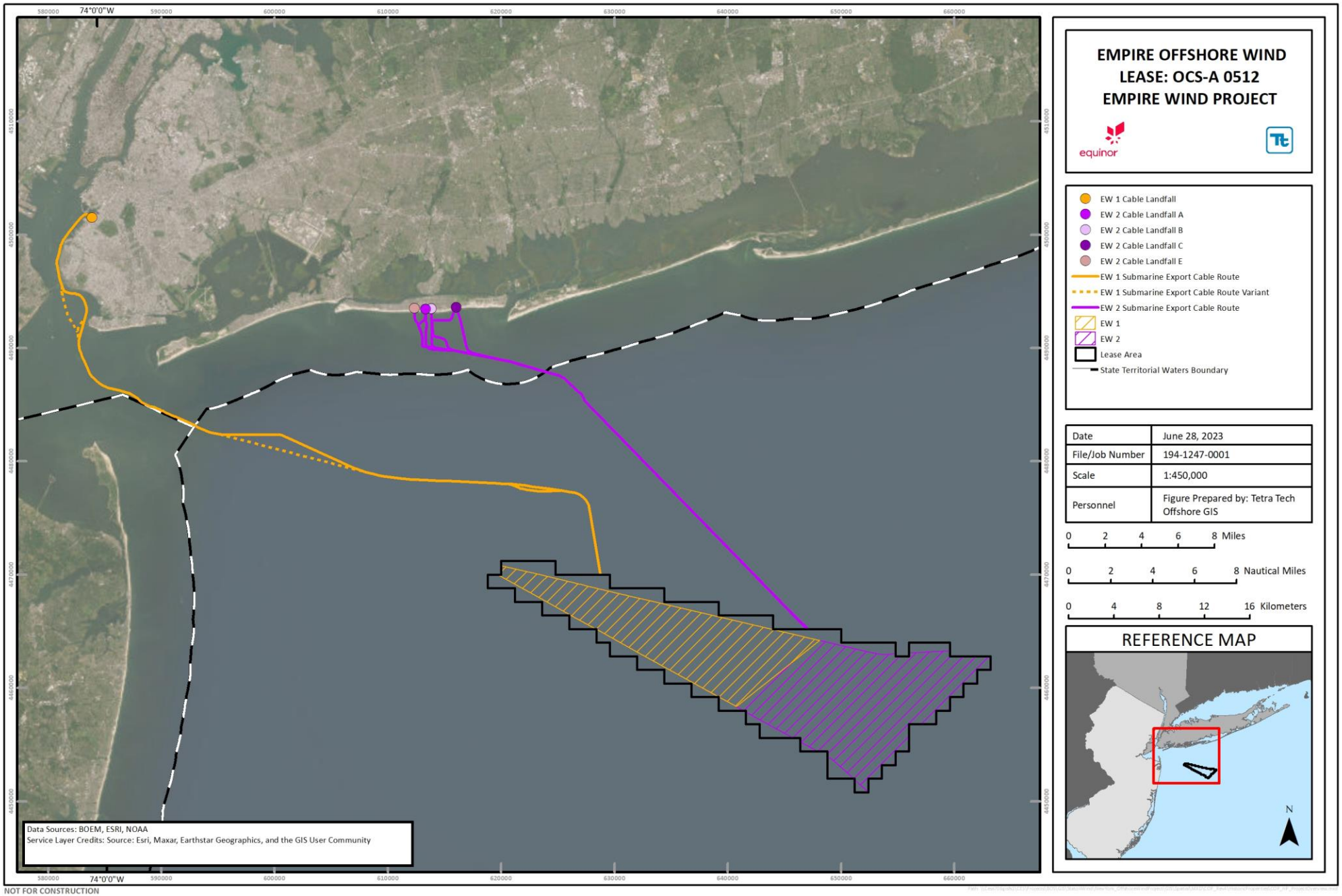

Figure 1 Project Area

Figure 2 Perspective Simulation

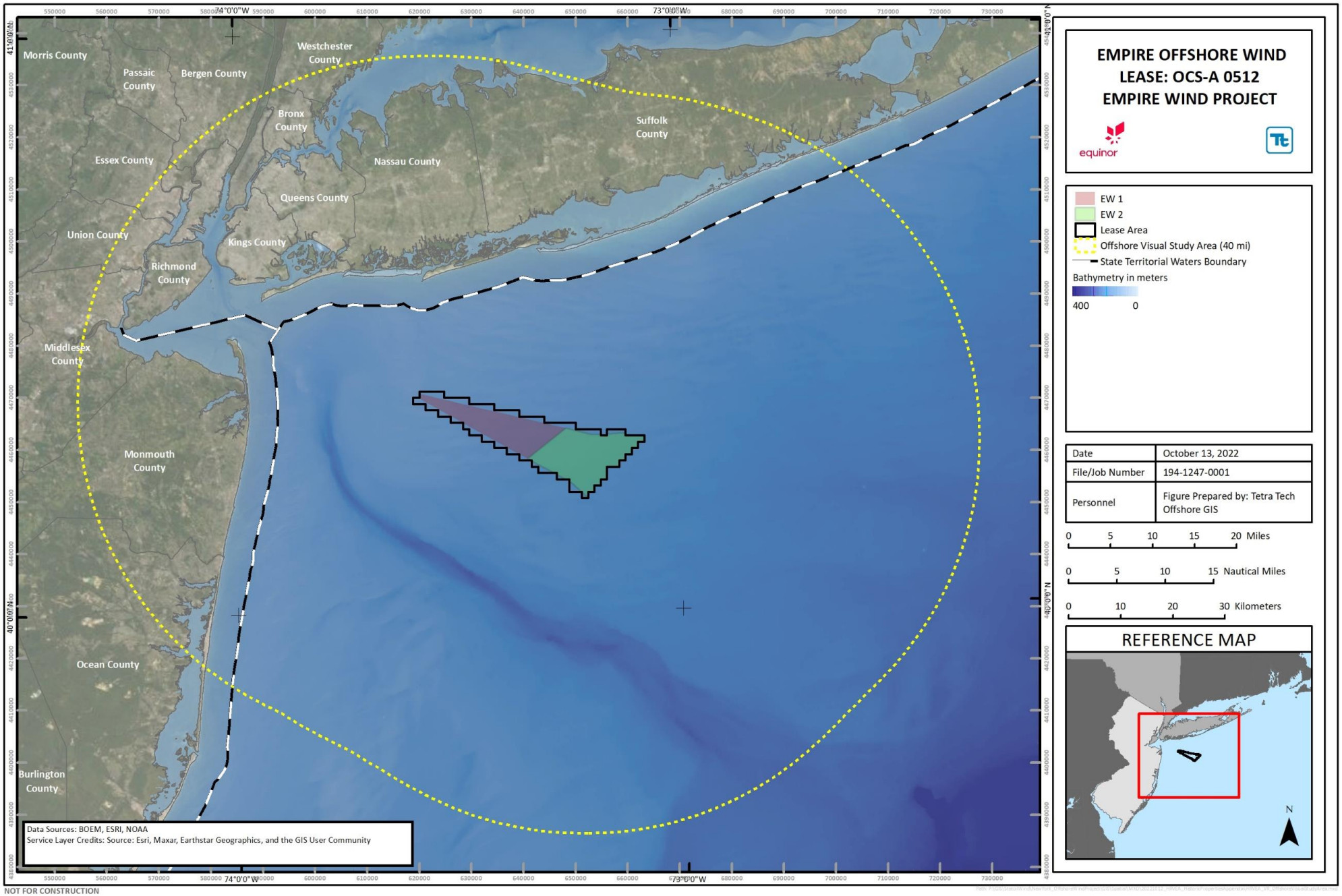

Figure 3 AVEHAP Offshore Study Area

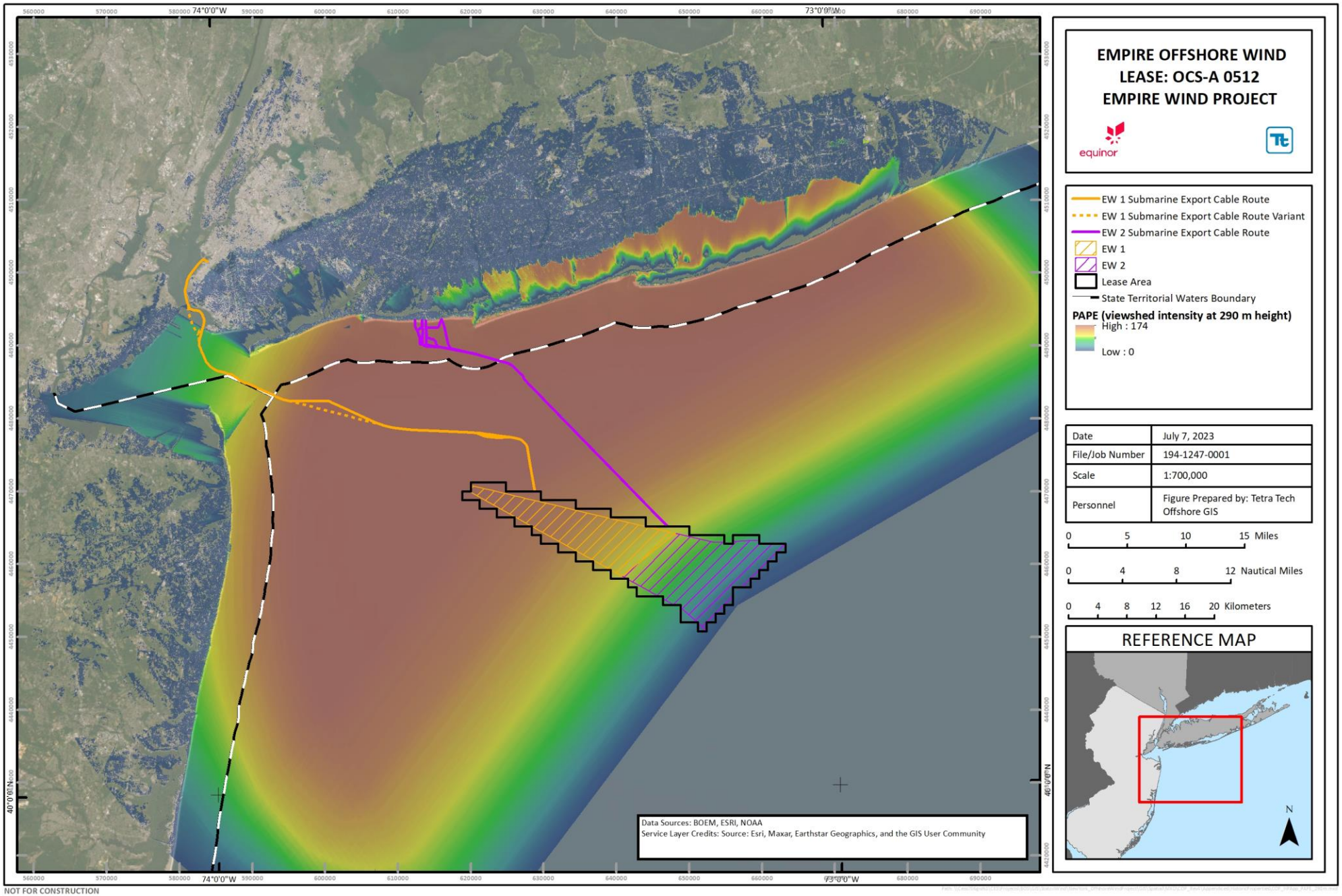

Figure 4 **Geographic Definition of the Offshore AVEHAP PAPE Shown as Viewshed Intensity (# of Turbines Visible) Based on a 290 m Height (Blade Tip Height)**

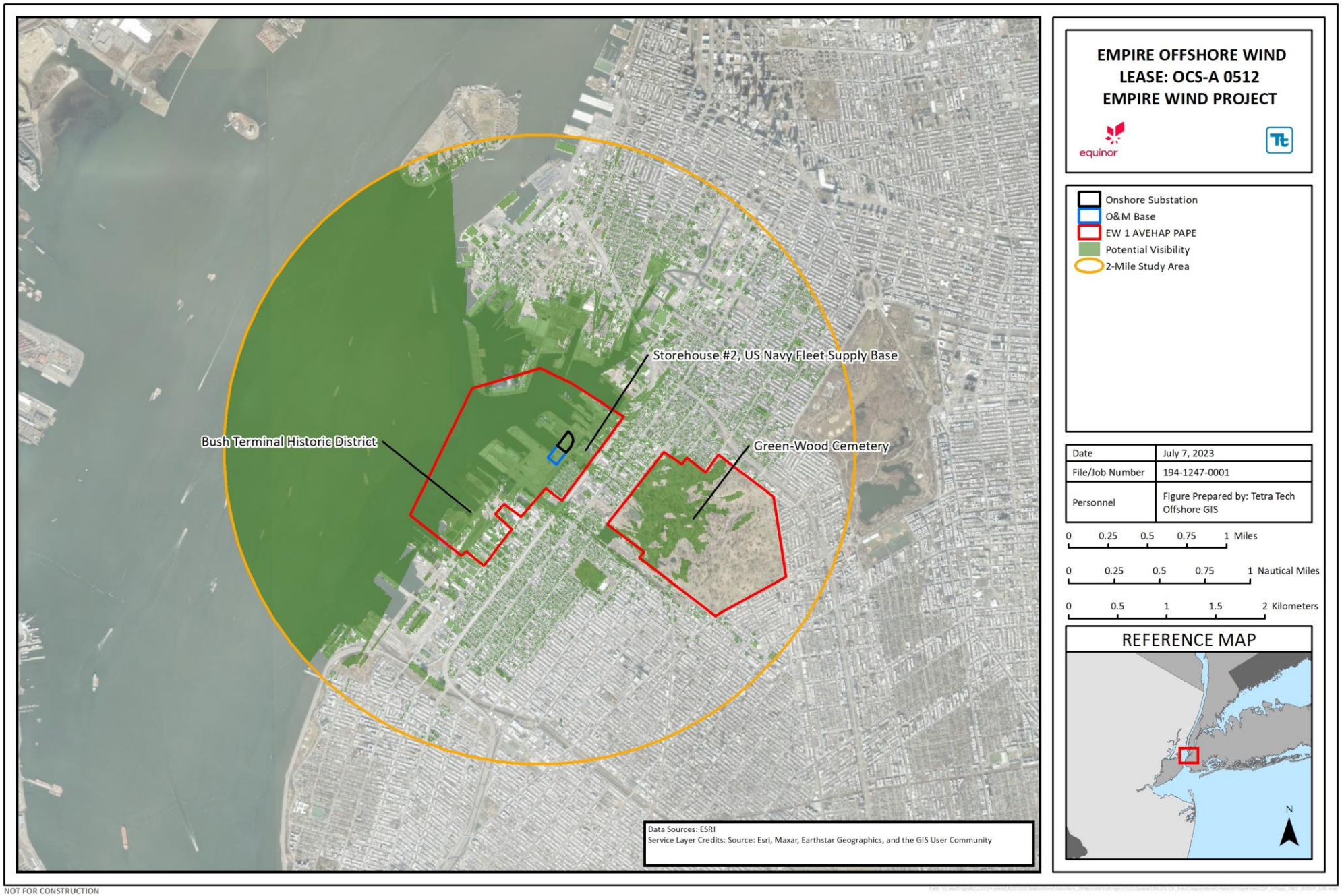

Figure 5 EW 1 Onshore AVEHAP PAPE

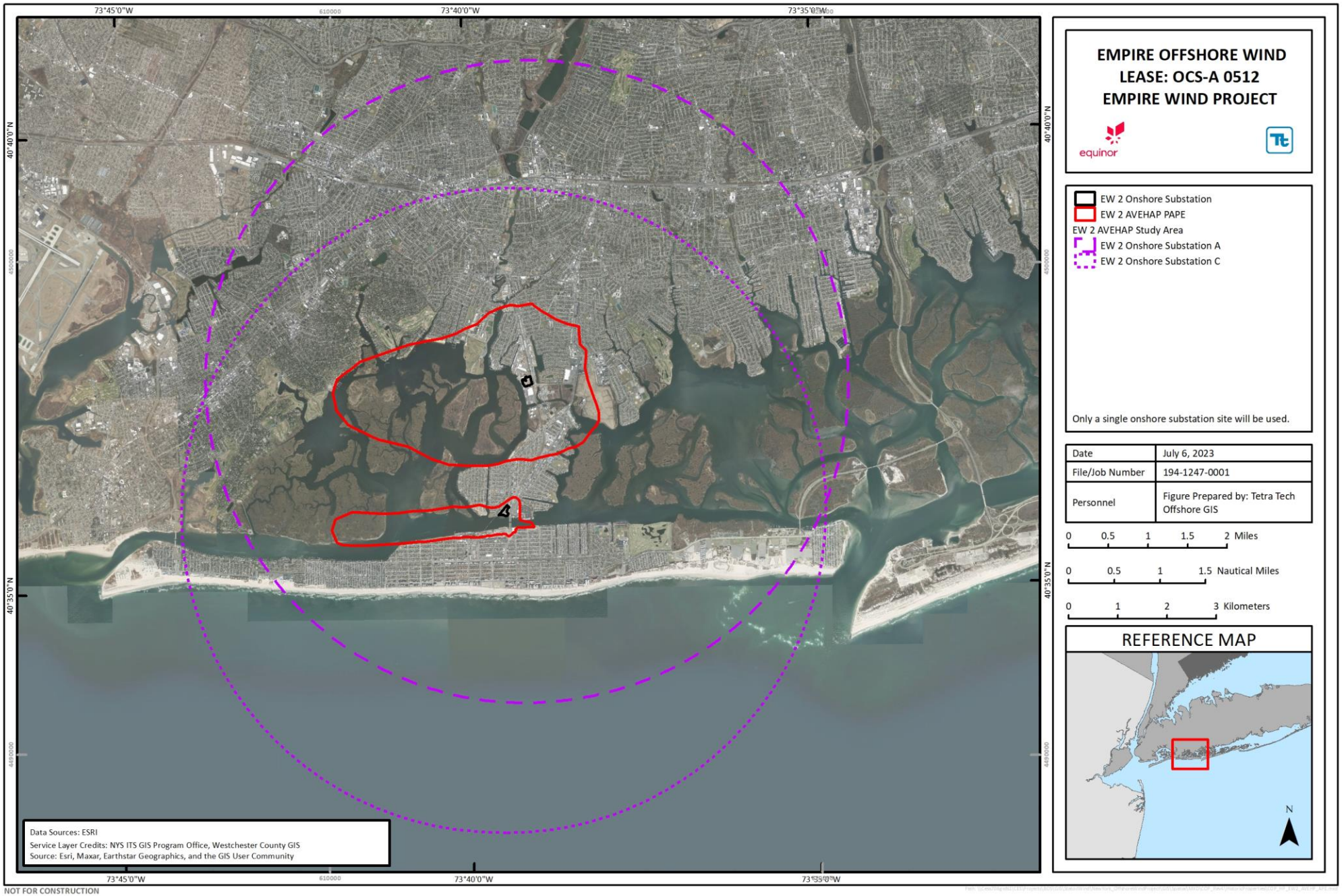

Figure 6 EW 2 Onshore AVEHAP PAPEs