Empire Offshore Wind LLC

Empire Wind 1 Project

Article VII Application

Appendix G

Phase I Terrestrial Archeological Survey

June 2021

Empire Wind 1 Project

Phase I Terrestrial Archaeological Survey

Brooklyn, Kings County, New York

Prepared for
Empire Offshore Wind LLC

Prepared by
Tetra Tech, Inc.

6 Century Drive, Suite 300
Parsippany, NJ 07054

June 2021

Management Summary

Tetra Tech, Inc. (Tetra Tech) conducted a Phase I terrestrial archaeological survey of the proposed Empire Wind 1 (EW 1) Project onshore export and interconnection cable corridor and onshore substation for Empire Offshore Wind LLC (Empire) in Kings County, New York in 2019. The survey was undertaken in support of the development and operation of the Project to comply with the Bureau of Ocean Energy Management guidelines regarding the development of offshore wind generated power facilities and to satisfy the requirements of federal permitting under Section 106 of the National Historic Preservation Act of 1966, as amended. This assessment is being submitted to the New York State Public Service Commission (NYSPSC or Commission) for the portions of the EW 1 Project transmission system located within the State of New York (collectively the Project) pursuant to Article VII of the New York Public Service Law (PSL).

Onshore components of the Project located at the EW 1 landfall area (for the purposes of this report, will be referred to as the "EW 1 facilities" or "facilities") include: (1) an export cable landfall in Brooklyn, New York; (2) onshore high voltage alternating current interconnection cable installed in subsurface trenches within public road and private property rights-of-way; and (3) an onshore substation.

To assess the potential of the construction, operations, and decommissioning of these Project facilities to affect archaeological resources, Tetra Tech conducted background research including a review of archaeological site and standing structure files maintained by the New York State Office of Parks, Recreation and Historic Preservation, which functions as the state historic preservation office in New York (NY SHPO); and a literature review of pertinent information regarding local geology and soils, topography and hydrology, historical cartography and aerial imagery, and prehistoric and historical development in the vicinity of the facilities.

Tetra Tech concludes that no National Register of Historic Places (NRHP) listed, eligible or potentially eligible archeological resources are known within the Area of Potential Effects evaluated during this Phase I Terrestrial Archeological Survey. Tetra Tech also concludes that, overall, the onshore portions of the Project possess low sensitivity to contain intact archaeological resources that might be eligible for listing on the NRHP. This assessment of low sensitivity is due to prior large-scale ground disturbing activities including: (1) creation of made-land along Gowanus Bay; and, (2) previous installation of urban infrastructure within the public road and private parcels rights-of-way.

Tetra Tech therefore recommends that construction and operation of the Project be permitted within the areas surveyed. If any substantial modifications are made to the Project design, consultation with NY SHPO and possibly additional archaeological survey may be necessary.

MANAGEMENT SUMMARY (cont.)

NY SHPO Project Review Number:	18PR07274
Involved State and Federal Agencies:	NY SHPO (Section 14.09 of the New York State Parks, Recreation and Historic Preservation Law) Bureau of Ocean Energy Management (Section 106 of the National Historic Preservation Act)
Phase of Survey:	Phase IA Terrestrial Archaeological Survey
Location Information:	Borough of Brooklyn, Kings County, New York
Survey Area:	
Project Description:	Offshore Wind Energy Project with associated Onshore Infrastructure
Onshore Project Area:	Cable Route of 0.2 miles; Substation of 4.8 acres
U.S. Geological Survey 7.5-Minute Quadrangle Map:	Jersey City, NJ
Archaeological Resources Overview:	No terrestrial archaeological resources have been previously recorded within 0.25 mile (0.4 kilometer) (0.5 mile [0.8 kilometer total) of the Project.
Report Author:	Robert M. Jacoby (M.A., RPA) and Christopher L. Borstel (Ph.D., RPA)
Date of Report:	June 2021

TABLE OF CONTENTS

TABLES

FIGURES

PHOTOGRAPHS

ACRONYMS AND ABBREVIATIONS

ac	Acre
AD	anno Domini
APE	Area of Potential Effects
BC	before Christ
BOEM	Bureau of Ocean Energy Management
BP	before present
CFR	Code of Federal Regulations
ConEdison	Consolidated Edison Company of New York, Inc.
COP	Construction and Operations Plan
CRIS	Cultural Resource Information System
Empire , the Applicant	Empire Offshore Wind LLC
Empire HoldCo	Empire Offshore Wind Holdings LLC
Equinor	Equinor ASA
EW 1	Empire Wind 1
ft	feet
Dha	hectare
HVAC	high-voltage alternating current
km	kilometer
kV	kilovolt
Lease Area	Designated Renewable Energy Lease Area OCS-A 0512
m	meter
mi	mile
nm	nautical mile
NHPA	National Historic Preservation Act
NRCS	National Resources Conservation
NRHP	National Register of Historic Places
NYSPSC or Commission	New York State Public Service Commission
NY SHPO	New York State Historic Preservation Office or SHPO
NYAC	New York Archaeological
NYCDCP	New York City Department of City Planning
NYISO	New York Independent System Operator, Inc.
NYSL	New York State Library
OCS	Outer Continental Shelf
OPRHP	New York State Office of Parks, Recreation and Historic Preservation
POI	Point of Interconnection at the Gowanus 345-kV Substation
Project Area	The submarine export cable corridor, onshore cable corridor and onshore substation facilities within New York State jurisdiction
PSL	New York Public Service Law

SBMT	South Brooklyn Marine Terminal
Tetra Tech	Tetra Tech, Inc.
the Project	EW 1 Project transmission facilities in New York

G.1 Introduction

Tetra Tech, Inc. (Tetra Tech) was contracted by Empire Offshore Wind LLC[1] (Empire, the Applicant) to prepare this Terrestrial Archaeological Survey Report in support of the development of the Empire Wind 1 (EW 1) Project. Empire proposes to construct and operate the EW 1 Project (**Figure G-1**) as one of two separate offshore wind projects to be located within the Bureau of Ocean Energy Management (BOEM) designated Renewable Energy Lease Area OCS-A 0512 (Lease Area). This assessment is being submitted to the New York State Public Service Commission (NYSPSC or Commission) for the portions of the EW 1 Project transmission system located within the State of New York (collectively the Project) pursuant to Article VII of the New York Public Service Law (PSL).

The Project will interconnect to the New York State Transmission System operated by the New York Independent System Operator, Inc. (NYISO) at the Gowanus 345-kilovolt (kV) Substation (the point of interconnection, or POI). The Gowanus 345-kV Substation is owned by the Consolidated Edison Company of New York, Inc. (ConEdison). The Project's onshore facilities, including the onshore cable route, onshore substation, and the POI, are located entirely within Brooklyn, Kings County, New York.

The Article VII components of the EW 1 Project include:

- Two three-core 230-kV high-voltage alternating-current (HVAC) submarine export cables located within an approximately 15.1-nautical mile (nm, 27.9-kilometer [km])-long, submarine export cable corridor from the boundary of New York State waters 3 nm (5.6 km) offshore to the cable landfall in Brooklyn, New York;
- A 0.2-mile (mi, 0.3-km)-long onshore cable route and substation including:
    - Two three-core 230-kV HVAC EW 1 onshore export cables buried underground from the cable landfall either directly to the cable terminations or to a vault within the onshore substation;
    - An onshore substation located at the South Brooklyn Marine Terminal (SBMT), which will increase the voltage to 345 kV for the onshore interconnection cables; and
    - Two 345-kV cable circuits, each with three single-core HVAC onshore interconnection cables, buried underground from the onshore substation to the POI.

A Construction and Operations Plan (COP) was submitted to the BOEM in January 2020, with subsequent revisions in response to agency comments in September 2020 and April 2021 as required by 30 Code of Federal Regulations (CFR) Part 585. BOEM's approval of the COP, allowing for construction and operation of the Project, is contingent, in part, on the completion of archaeological investigations to identify potentially significant archaeological resources that may be subject to disturbances due to Project activities within the Area of Potential Effects (APE) (30 CFR § 585.626(a)(5)). This report discusses the Phase I terrestrial archaeological survey of the EW 1 onshore export and interconnection cable route and onshore substation (onshore Project Area) located in Brooklyn, Kings County, New York (**Figure G-2**).

[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 Wind Energy North America In. acquired ownership interest in Empire HoldCo in a transaction that closed on January 29, 2021.

G.1.1 Project Description

The submarine export cable route comes ashore from the lower reaches of Upper New York Bay in southwestern Brooklyn, making landfall at the SBMT. The route then exits SBMT at the northeast corner, at the intersection of 2nd Ave and 29th St. The route then traverses north along 2nd Ave until entering the Gowanus POI on 28th St (**Figure G-2** and **Figure G-3**).

G.1.2 Regulatory Authority

This assessment is submitted to the Commission for the portions of the EW 1 Project transmission system located within the State of New York (collectively the Project) pursuant to Article VII of the PSL and the New York State Historic Preservation Act of 1980, Section 14.09 (New York's counterpart to the National Historic Preservation Act [NHPA]). The EW 1 Project is also subject to regulation by BOEM under provisions of the Outer Continental Shelf (OCS) Renewable Energy Program authorized by the Energy Policy Act of 2005 (42 United States Code § 13201 *et seq.*) and Section 106 of NHPA. 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 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 of 1966, as amended. BOEM, as lead federal agency in this process, has authority to initiate consultations with state historic preservation offices, and to consult with interested Native American Tribes.

G.1.3 State Historic Preservation Office Coordination

Empire and its consultants coordinated with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) in its role as New York State Historic Preservation Office (NY SHPO) prior to initiation of cultural resource surveys. Tetra Tech provided NY SHPO with a work plan, dated December 13, 2018, that included a project description, a direct effects APE defined as "all areas where ground-disturbing activity will take place including export cable corridors and all associated appurtenances such as landfalls, horizontal direct drill entry and exit locations, workspaces, equipment laydown areas, and access roads," and methodological approaches to conducting cultural resource surveys of terrestrial archaeology (including a 1-mi [1.6-km] Study Area buffer around the onshore cable route), marine archaeology, and historic architecture (**Appendix A Agency Outreach and Correspondence**). In a letter dated December 19, 2018, NY SHPO approved Tetra Tech's work plan and noted that the agency would accept a reduction to a 0.25 mi (0.4 km) on each side of the proposed EW 1 onshore export and interconnection cable routes, for a 0.5-mi (0.8-km) buffer total. Tetra Tech provided NY SHPO with a revised work plan and updated project description, dated August 22, 2019. NY SHPO, in a response dated August 30, 2019, accepted this work plan and expressed no further comments or questions (**Appendix A**).

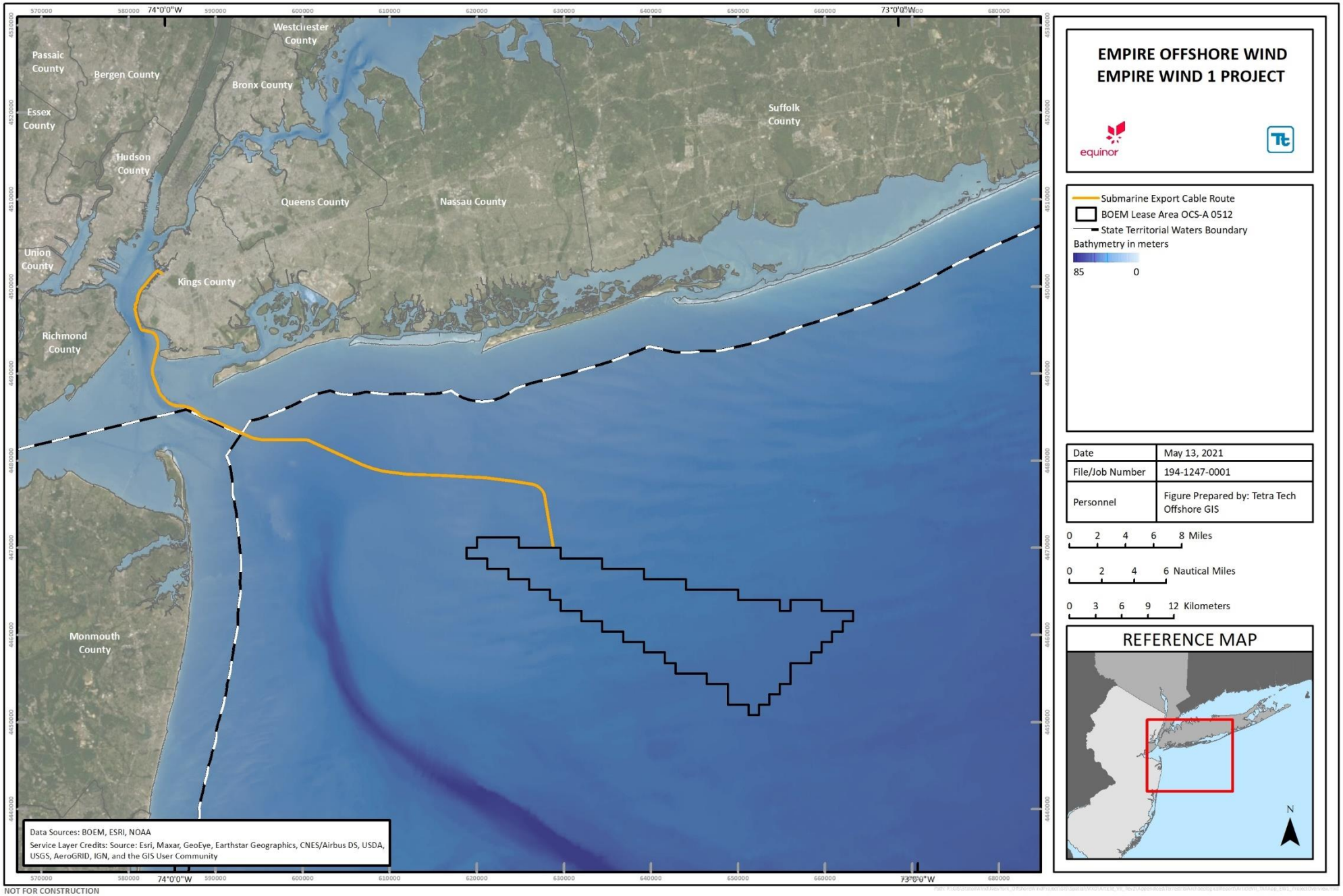

Figure G-1 Project Overview

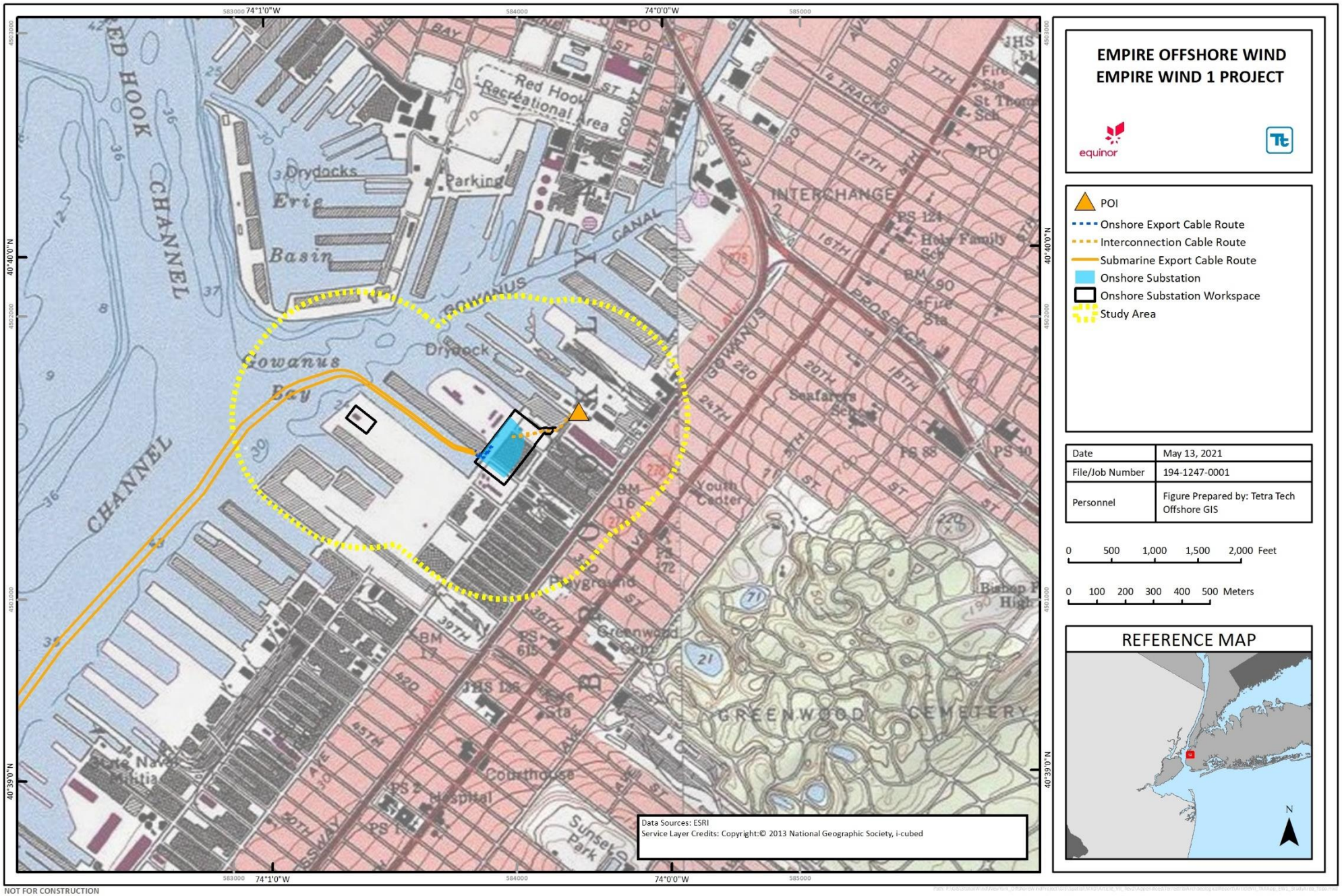

Figure G-2 Onshore Project Area Overview and Study Area, Topographic Background

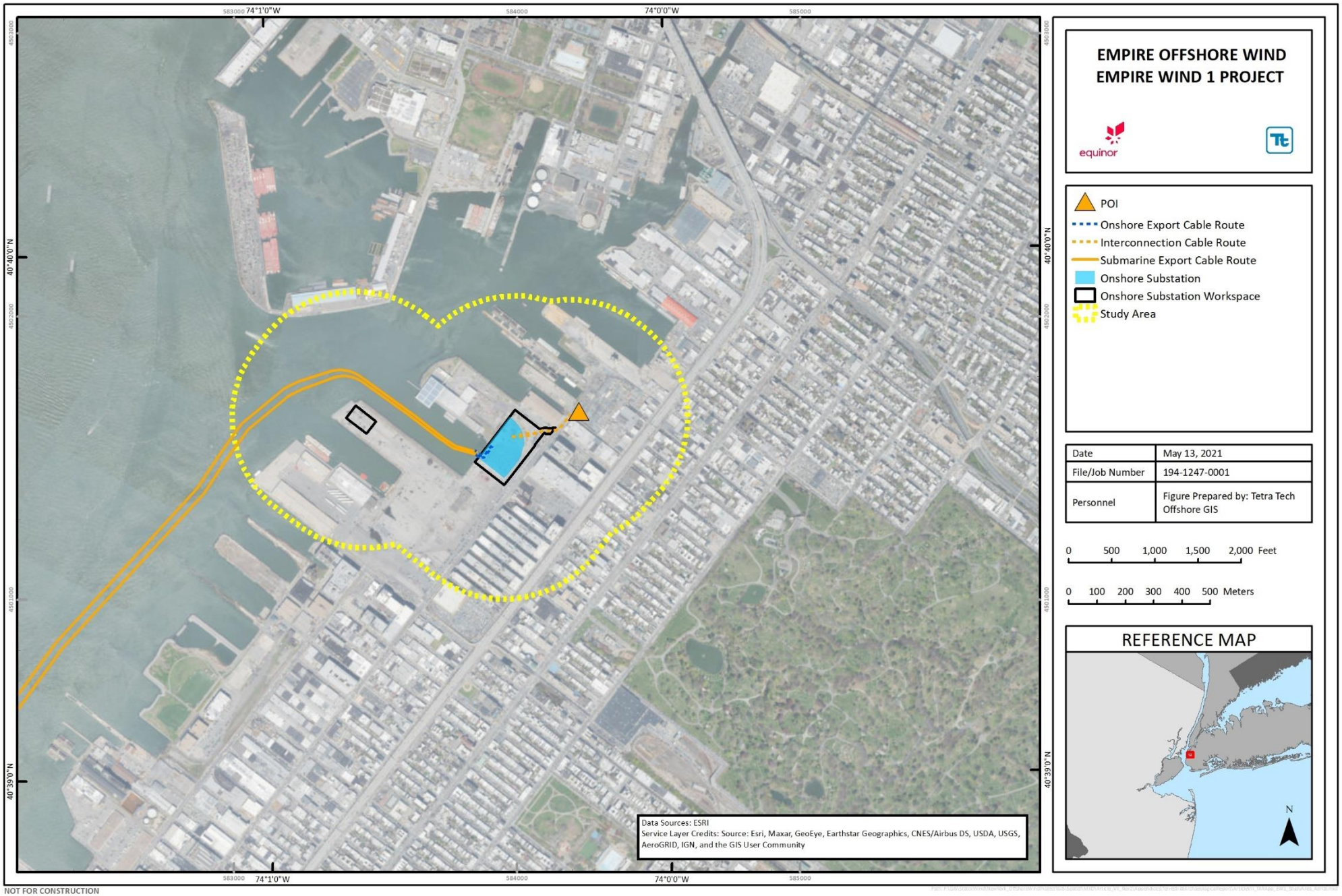

Figure G-3 Onshore Project Area Overview and Study Area, Aerial Background

G.2 Research Design

This section describes the objectives and methods of the Phase I survey.

G.2.1 Survey Objectives

The purpose of the terrestrial archaeological survey was to satisfy regulatory compliance with NYSPSC's review under Article VII and BOEM's Section 106 review of Empire's COP. The survey objectives were to:

- Investigate the direct and indirect effects APE (areas that will undergo ground disturbance as a result of the Project) and identify archaeological resources that are present therein;
- Evaluate the significance of each identified resource and determine if it may be potentially eligible for listing on the National Register of Historic Places (NRHP);
- Make recommendations to avoid, minimize Project effects on, or mitigate effects to significant archaeological resources if Project avoidance is not achievable; and
- Register new archaeological sites with NY SHPO and update state site forms for previously documented sites that have been re-located during the survey.

G.2.2 Research Methods

Tetra Tech developed research methods for the Phase I survey that are in accordance with New York Archaeological Council standards for archaeological investigations (NYAC 1994).

G.2.2.1 Study Area

To provide as much flexibility as possible in its early project design, Tetra Tech focused investigations on the onshore cable route plus a 0.25 miles (0.4 km) (0.5 mi [0.8 km] total) buffer around it (the Study Area, **Figure G-2**).

G.2.2.2 Area of Potential Effects

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" (36 CFR § 800.16(d)), also adopted by the NYSHPO in its New York State Historic Preservation Office (SHPO) Phase I Archaeological Report Format Requirements in 2005. Regarding known and potential archaeological resources, this area typically refers to the direct effects APE, which is the area of ground disturbance associated with the project's construction, operation, maintenance, and decommissioning. Indirect effects to archaeological resources are less common but might include visual or auditory impacts that would adversely affect the character and setting of a significant archaeological site.

The APE for archaeology consists of areas directly or indirectly affected by ground disturbing activities associated with construction, operations and maintenance, including but not limited to trench excavating, bore and drill pads, substation construction, laydown yards, and workspaces. The site files review undertaken established that there are no NRHP-listed or NRHP-eligible sites within the Study Area, precluding any indirect effects to significant archaeological resources caused by Project activities; therefore, indirect effects will not be discussed further in this report.

The APE includes a 9.0-acre (ac) (3.6-hectare [ha]) portion of SBMT for cable landfall, the onshore substation and EW 1 onshore export cables, and the temporary construction staging area and laydown area required for onshore construction of the facility. Approximately 4.8 ac (1.9 ha) of this area will be occupied by the onshore substation and associated infrastructure during the operation of the Project.

For the 0.2 mi (0.3 km) of onshore cables, a trench will be excavated along the onshore cable route. Typically, the trench will be 10-ft- (3-m-) deep and 10-ft- (3-m-) wide, within a 50-ft- (15-m-) wide construction corridor, including duct banks for both circuits. A trenchless crossing via jack and bore installation typically requires an extra work area of approximately 50 ft by 50 ft (15 m by 15 m) alongside the onshore cable corridor. Within the cable corridor, the crossing requires a 60-ft by 20-ft (18-m by 6-m) bore pit to be excavated on one side and a 30-ft by 20-ft (9-m by 6-m) receiving pit on the other side. In the case of the railroad crossing at SBMT, these work areas will be located within the onshore substation construction workspace limits at SBMT.

G.2.2.3 Background Research

Tetra Tech conducted background research and literature review on topics pertinent to an understanding of the environmental setting and historical development of the Study Area. These topics included bedrock geology, hydrology, soils, Native American land use, Euro-American settlement history, and socio-economic transformations. Tetra Tech reviewed historic maps and aerial imagery to identify documented structures, historic roads, and other landscape features present within the Study Area and the APE.

G.2.2.4 Site File Review

A research objective to identify local patterns in the archaeological record was achieved via a review of NY SHPO's Cultural Resource Information System (CRIS), an online archive of site files and survey reports that is viewable to qualified professionals. The review encompassed a Study Area extending 0.25 miles (0.4 km) (0.5 mi [0.8 km] total) from the proposed EW 1 onshore facilities. Tetra Tech reviewed CRIS for information relating to site location and type, temporal period, and NRHP-status, in addition to information regarding prior archaeological surveys conducted within the Study Area. Tetra Tech conducted an updated CRIS review in January 2021.

G.2.2.5 Pedestrian Reconnaissance

On October 30, 2018, Tetra Tech archaeologists conducted a pedestrian reconnaissance of the onshore cable route corridor and proposed onshore substation parcel. This reconnaissance was undertaken to evaluate the extent of prior ground disturbance within the APE, and to identify locales within the APE that might have the potential to contain undocumented archaeological resources.

G.3 Environmental and Cultural Setting

G.3.1 Environmental Setting

Geologically, the Study Area sits near the boundary between the Atlantic Coastal Plain, comprised of Cretaceous clays, silts, sands, and gravels, to the southeast, and the Manhattan Prong of the New England Upland, comprised of metamorphic and intrusive igneous rocks of Precambrian through mid-Paleozoic age, to the northwest. Published sources are unclear about the bedrock directly underlying this section of southwestern Brooklyn, but it may be Neoproterozoic (~560 million years) metamorphic "Bronx Zoo-type" Hartland formation gneiss, schist, and amphibolite, or Manhattan Schist (Brock and Brock 2001; Fisher et al. 1970; Merguerian 2003; Shah et al. 2006).

Directly overlying bedrock and/or lying atop Cretaceous sediments is a blanket of Pleistocene drift consisting of interbedded till, outwash, and glaciolacustrine sediments, possibly extending as far back in age as the mid-Pleistocene. Near-surface glacial sediments represent the late Wisconsinan glacial advance that reached New York City ca. 21,000 years ago. The maximum late Wisconsinan glacial extent is represented by the Harbor Hill moraine, a southwest-trending ridge of interbedded till and outwash that is situated slightly southeast of the Study Area and continues west of the New York Narrows on Staten Island. During the early stages of

deglaciation, the Harbor Hill moraine formed a dam that retained meltwater in the early stages of Glacial Lake Albany. As deglaciation and isostatic uplift continued, the height of Lake Albany behind the moraine varied. These changes in the height and volume of Lake Albany culminated around 13,350 calendar years ago with the breaching of the Harbor Hill moraine at the Narrows. This event is associated with catastrophic drainage of glacial lakes upstream of the moraine and resulted in the discharge of an estimated 3,200 cubic km of water through the Narrows, which scoured a deep channel from there to the Hudson Canyon, today situated some 120 mi (200 km) to the southeast (Merguerian 2003; Moss and Merguerian 2007; Stanford 2010; Thieler et al. 2007).

Although the Study Area was subject to subaerial weathering and environmental change over a period of approximately 13,000 years, no native soils remain today due to over a century of urban land use, with an emphasis on commerce and industry in the area, since the late nineteenth century. The National Resources Conservation Service maps all soils along the preferred alignment and in its vicinity as one of three types of urban land (NRCS 2019). The term "urban land" indicates in general that a significant portion of the mapped area contains a significant percentage of artificial impervious surfaces, such as buildings and pavement. The three map units are differentiated by substratum:

- Urban land, reclaimed substratum, 0 to 3 percent slopes (UrA)–49 percent of the preferred alignment and 100 percent of the alternate alignment;
- Urban land, sandy substratum, 0 to 3 percent slopes (UsA)–40 percent of the preferred alignment; and
- Urban land, till substratum, 0 to 3 percent slopes (UtA)–11 percent of the preferred alignment.

Each of these units is a consociation, or map unit that is dominated by a single type of soil, with other types as minor components. All three units are characterized as having, by overall area, 92 percent urban land (NRCS 2019). Comparison of the mapped polygons of the three soil units with the historical development of the local landscape indicates that UrA soils (Urban land, reclaimed substratum) represent filled tidelands and formerly open water, while UsA and UtA soils (Urban land with sandy or till substratum, respectively) are predominantly fast land (i.e., historically terrestrial areas), but also contain some areas of reclaimed land.

Early colonial descriptions of Long Island's native flora are rare and tend to be brief. Of his voyage into New York Harbor, Henry Hudson described the landscape as "full of great tall oaks…with grass and flowers and goodly trees…" (Munsell 1882:20). Writing in the 1670s, Daniel Denton described Long Island as "very full of timber, as oaks white and red, walnut trees, chestnut trees…also red maples, cedars, sassafras, beech, holly, hazel with many more…" (quoted in Svenson 1936:208-209).

Presently, the landward section of the Project is situated in a densely developed port district of New York City. The area is maritime and industrial-commercial in character. The shoreline is occupied by piers and the sites of former piers now decayed and demolished. The landside-built environment consists of brick and masonry warehouses, manufacturing facilities, and a diverse variety of small to medium-size commercial enterprises (**Photograph 1**). The streets are paved with macadam, which covers an older layer of cobblestones in many areas. Along portions of First and Second Avenues, sections of railroad and trolley tracks, which once served the piers and warehouses of the area, remain embedded in the pavement (**Photograph 2**). The area is slowly undergoing redevelopment after a long period of economic decline that began around 1970. There are empty lots where early twentieth-century buildings once stood, that are today typically used as parking lots and paved aprons for vehicle traffic. Despite a shift away from portside handling of cargo, the area has streets crowded with streams of vehicles passing through and loading and unloading throughout the day.

Photograph 1. Second Avenue and 29th Street, Brooklyn, NY. View to northeast.

Photograph 2. First Avenue and 50th Street, Brooklyn, NY. View to southwest.

G.3.2 Pre-Contact Context

Archaeologists have divided the 13,000-year record of human habitation in coastal New York prior to European colonization into three general periods: Paleoindian (11,000 to 8000 before Christ [BC]); Archaic (8000 to 1000 BC); and, Woodland (1000 BC to anno Domini [AD] 1500). These periods represent broad patterns of Native American cultural adaptation to changing climatic conditions since the arrival of humans in the Study Area around 13,000 years ago. The subsequent Contact period (AD 1500 to 1700) represents the period of interaction between Native Americans and European-Americans, from initial contact with European trappers and traders to the expulsion of most Native Americans in lower New York State by the beginning of the eighteenth century.

The earliest peopling of the region occurred within a few thousand years after final retreat of the Laurentide ice sheet, although precise timing of initial human settlement is uncertain. Varve counts from Lake Hackensack deposits indicate that northern New Jersey was ice-free circa 16,000 BC with the Hudson River valley near present-day Albany ice-free some four thousand years later (Stanford 2010:56-59). The earliest securely dated Paleoindian site in the region, the Shawnee-Minisink site on the upper Delaware River, was occupied around 10,900 BC (10,937±15 ^{14}C BP; Gingerich 2013:238-240). Elsewhere near the Study Area, Paleoindian sites have been reported on Staten Island, including the Port Mobil site which contained several fluted points manufactured from non-local material and small scrapers made from locally sourced glacial cobbles (Kraft 1986:43).

Early Archaic (8000 to 6000 BC) sites are rare along the present New York coastal region. During this period shorelines were still dozens of miles seaward of their modern locations, and any evidence of Early Archaic period utilization of coastal settings is now inundated. The Middle Archaic period (6000 to 3500 BC) roughly corresponds with an extended warm and dry interval during the mid-Holocene. Fishing and shellfishing are seen in the archaeological record toward the latter part of the Middle Archaic, as sea level rise slowed, and estuaries and riverine habitats stabilized. In the lower Hudson River, early shell middens have radiocarbon dates of circa 5170 to 4900 BC, coeval with Neville point horizon (Schaper 1989:16; Claasen 1996:104). The Dogan Point site on the lower Hudson River in Westchester County, New York, contained a basal Middle Archaic deposit of Neville points, dating roughly to 5000 BC (Claasen 1995:131).

During the Late Archaic period (3500 to 1000 BC), shell harvesting in the lower Hudson River was intensively practiced from around 3500 to 2000 BC. Claasen (1996:105) speculated that large shell middens, like those found along the lower Hudson Valley, may have fostered colonization by native plants that were of economic interest to local groups, including sumpweed, goosefoot, and gourd/squashes, encouraging scheduled visits to these locales.

The Early Woodland period (1000 BC to AD 250) marks the inception of widespread ceramic vessel use amidst a general decline in site numbers and population density across the Eastern Woodlands. Population decline may have been in response to climatic cooling that adversely affected game numbers and flora availability, or to epidemic disease (Fiedel 2001). Native, starchy seeds, including goosefoot (*Chenopodium berlandieri*), maygrass (*Phalaris caroliana*), knotweed (*Polygonum erectum*), sumpweed (*Iva annua*), and sunflower (*Helianthus annuus*), began to appear in site assemblages across eastern North America in the Late Archaic and Early Woodland periods, and with some frequency by AD 100 (Fritz 1990). Rossville points and Vinette I ceramics have been found in association on Long Island at the Bowman Brook site. The Middle Woodland period (AD 250 to 900) marks the appearance of the first truly large shellfish middens in southern coastal New England and Long Island (Bernstein 1993). Cross noted that shellfishing along the New Jersey coast had become a major economic enterprise during this period (1956:194).

Maize agriculture was adopted by many Eastern Woodlands groups as their principal subsistence strategy between AD 900 to 1100, but its adaptation was not uniform especially in the Middle Atlantic and New England regions (Fritz 1990). Abundant fish and shellfish resources along coastal and estuarine environments may have lessened the need and desire to shift to an unpredictable labor-intensive subsistence strategy based on maize cultivation. Although some evidence of maize production dating to circa AD 990 was identified in the mid-Hudson Valley and from AD 1250 on the Housatonic River in Connecticut (Cassedy and Webb 1999), most researchers suggest that maize was not cultivated in coastal New York until as late as AD 1500, or even after initial European contact (Ceci 1990; Lavin 1988). The study area likely supported minimal maize horticulture during the Late Woodland period (AD 900 to 1600).

G.3.3 Historic Period Context

G.3.3.1 The Contact Period (AD 1500 to 1700)

Inhabitants of New Jersey, eastern Pennsylvania, and southeastern New York were members of the Lenape, an Algonquian language group, divided between Munsee dialect-speakers north of the Raritan River, and Unami-speakers to the south (Kraft 1986). Native American bands living on the south shore of Long Island within the Study Area included the Rockaway and Massapequa. In sharp contrast to neighboring groups that were hierarchically organized into tribes (Iroquois to the north and Susquehannocks to the west) or chiefdoms (the Powhatan in Tidewater Virginia), the Lenape were loosely organized into autonomous villages of several related families. The Lenape are often described as an egalitarian band-level social organization and refrained from fusing into higher-order associations typically headed by a powerful individual. Alliances between autonomous bands, when they existed, tended to be short-term coalitions (Grumet 1979:26-28).

European mariners visited the East Coast of North America during the sixteenth century lured by furs, fish and other trade items. While employed by the Dutch East India Company to search for a northwest passage to Asia, the English mariner Henry Hudson sailed along New York shores in 1609 and made the first reported contact with Native Americans in New York.

In 1624, the Dutch West India Company built Fort Orange at Albany and landed settlers on Manhattan Island, marking the first permanent European settlements in New York. The Dutch established settlements on western Long Island at Breukelen (Brooklyn) in 1636, followed by Flatbush in 1651, New Utrecht in 1657, and Bushwick in 1660 (Munsell 1882:23). Although the Dutch claimed sovereignty over all Long Island, they were slow to establish communities east of Flatbush and were unable to halt English settlement in central and eastern Long Island. English settlers established towns at Newtown in 1642, Flushing in 1643, and Hempstead in 1644, all located in what would become Queens County (Burrows and Wallace 1999:40). Most English settlements were established by New England Puritans who brought with them the idea of representative government. In contrast, the governing principle of New Netherland was summed up by Governor Peter Stuyvesant's comment that "I shall govern you as a father his children" (quoted in Aliano 1995:112).

Seventeenth century settlements in Kings County outside the established towns tended to be small, isolated farmsteads or hamlets situated on the drainage headlands, or necks, that extend into the marshes and bays. Early farming on Long Island was primarily subsistence based, with grains serving as the principal crops. Among the first grains cultivated on seventeenth century farms were corn, rye, and wheat. Later, oats, flax barley, buckwheat, and, in some places, potatoes and tobacco were grown (Moss 1993:6). In addition to crops, livestock raising was important to the livelihood of many settlers. Salt hay was used as fodder for herds of cattle, sheep, and pigs. Fishing and shellfishing were important supplements to income and diet for farming families. The Dutch transported the first enslaved Africans to New Amsterdam shortly after its establishment in the 1620s, using them to clear land, build roads and structures, and work farms. By 1664, an estimated 25 percent

of New Amsterdam's 1,500 residents were slaves. The English continued and greatly expanded the institution of slavery after their takeover of the colony, and by 1698, Long Island (the counties of Kings, Queens, and Suffolk) contained 1,053 enslaved Africans, or 12 percent of the population. A 1712 slave revolt in New York was violently suppressed, and rumors of a slave revolt in 1741 led to the execution of dozens of enslaved people (Singer 2007:165-167). Though these events were restricted to the city proper, their effect on Long Island communities was to harden opinions and behavior toward and by the enslaved population.

As the number of Africans into New York increased through the seventeenth and eighteenth centuries, Native American communities were in decline. Harassed and exploited by European settlers, the Lenape found themselves exposed to foreign diseases, hemmed in by loss of traditional hunting lands, and overwhelmed by more powerful tribes to the north and west. After a brief period of intense fighting with Europeans in 1655 during the so-called Peach War, the Lenape's hold on western Long Island was broken and by the early 1670s the Lenape were largely dispersed from the region (Burrows and Wallace 1999:68-69).

G.3.3.2 American Independence and Expansion (1776-1860)

On the eve of the American Revolution, western Long Island contained around 14,000 inhabitants in a largely rural setting of dispersed farms, hamlets, and a few small towns (**Table G-1**). As New York City grew from around 7,250 people in 1723 to almost 22,000 in 1771 (O'Callaghan 1849a:693, 697), agricultural production in the agrarian periphery expanded to meet the food demands of urban dwellers and the province's increasing trade with the British West Indies. In addition to food staples, agricultural products of economic importance in the region were flax, wool, timber, and beeswax (O'Callaghan 1849a:729, 761).

Table G-1 Population Data for Kings County, New York

Year	Population	Density (pop/sq. miles)	% Change/Annum	Percent Enslaved
1698	2,010	28	-	14.6
1738	3,013	42	1.2	17.1
1790	4,495	63	0.9	31.9
1800	5,740	81	1.4	25.8
1810	8,303	117	4.5	NA
1825	14,679	207	5.1	10.3
1835	32,057	452	11.8	-
1845	78,691	1,108	14.6	-
1855	216,355	3,047	17.5	-
1865	311,090	4,382	4.4	-
1875	509,154	7,171	6.4	-
1892	991,569	13,965	5.6	-
1900	1,166,582	16,480	2.2	-
1910	1,634,351	23,019	4.0	-
1925	2,203,991	31,042	2.3	-
1970	2,602,012	36,648	0.4	-
2010	2,504,700	35,277	-0.1	-

Sources: O'Callaghan 1849a, 1849b, 1850; NYS Library 2019; U.S. Census Bureau 1908, 1910, 1973, 2012; NYC DCP 2019.

At the outbreak of the American Revolution, loyalist sympathies ran high on Long Island, especially after British forces defeated the Americans at the Battle of Long Island in late August 1776. This action, fought on the strategic heights in Brooklyn, included skirmishes within 1 mi (1.6 km) of the Study Area. It appears that a majority in Kings and Queens counties backed the loyalist cause with as many as 2,000 men joining royal militias (McNamara 1995:184). Promised freedom for their allegiance and aid to the British, thousands of slaves from the metropolitan area ran away from their masters and sought protection under the crown (Burrows and Wallace 1999:248).

Before and after the Revolutionary War slaveholding was commonplace in the economic life of New Yorkers and was, in large measure, a reflection of Dutch attitudes toward slavery. In the old Dutch strongholds of the Hudson Valley and western Long Island, more than one in three families owned slaves in 1790, proportionally more than in most of the South, though numbers were far fewer in these northern contexts (White 1995). In Kings County enslaved Africans accounted for 31.9 percent of a total population of 4,495 in 1790 (U.S. Census Bureau 1908). The New York legislature acted to limit slavery in 1799 and abolished the practice in 1827. Still, the 1825 state census counted as enslaved persons 10.3 percent of Kings County population.

Through the early nineteenth century Kings County remained primarily a rural district. The Town of Brooklyn, representing the original Dutch settlement of Breukelen along the East River, had a population of around 10,800 in 1825, but the other towns in Kings County (New Utrecht, Flatlands, Flatbush, Gravesend, and Bushwick) were modest in size, ranging from about 400 to 1,000 persons, and many of those inhabitants lived on dispersed farmsteads. Kings County experienced a population boom during the 1830s and 1840s, with annual increases from around 12 percent to 17 percent (**Table G-1**). Nearly 1,000 men were employed in house construction in Kings County as enumerated in the 1840 census (U.S. Census Bureau 1842:141).

Key agricultural products for the region were cattle, wheat, rye, corn, oats, and butter (**Table G-2**). Grain processing facilities were some of the earliest and most important manufacturing sites in the region. In Kings County this took the form of liquor distilling, with nine distilleries producing more than 3.3 million gallons of liquor in 1840. In contrast, grain processing in Queens County involved 41 grist mills in 1840; there were no recorded grist mills in Kings County (U.S. Census Bureau 1842:138, 140). Neither the liquor nor flour produced in Kings and Queens counties was intended for local consumption alone; county populations simply were not large enough for the amounts produced. Canal and railroad construction from the 1820s to the 1850s connected new farming districts with urban and overseas markets. Long Island farmers, increasingly, were not able to compete with midwestern grain prices, and instead turned to supplying New York City with market garden produce, including potatoes, beans, peas, and other vegetables (Burrows and Wallace 1999:431). In 1840 Kings County trailed only Queens County in the value of market gardens in New York State and was third in 1850. In 1855, 575 acres of market gardens were cultivated in New Utrecht, accounting for more than 14 percent of improved land in the town (NYSL 2019). **Table G-2** presents key agricultural data for Kings County 1840-1900.

Table G-2 Selected Agricultural Data for Kings County 1840-1900

Agricultural Products and Acreage	Year			
	1840	1860	1880	1900
Wheat (bushels)	24,964	21,927	3,240	-
Oats (bushels)	72,450	9,835	3,158	310
Rye (bushels)	8,537	4,493	2,052	-
Corn (bushels)	81,824	84,782	52,090	6,020
Potatoes (bushels)	95,805	607,182	772,246	197,216
Market garden produce ($)	84,000	319,134	842,017	260,930
Cattle	5,978	1,510	1,424	2,418
Sheep	48	34	11	-
Swine	8,360	1,880	744	88
Improved land (acres)	NA	16,006	9,967	5,980

Sources: U.S. Census Bureau, Agricultural Schedules (1842, 1864, 1882, 1902).

G.3.3.3 Urban Expansion and Rural Decline (1860-1960)

The status of Kings County as a leader in market gardening continued well into the nineteenth century. Between 1860 and 1880, Kings County market gardens had increased in value by 164 percent to almost $850,000 (U.S. Census Bureau 1864:102, 1882:299). Farming districts in Kings County included New Utrecht, Flatbush, and Flatlands, areas located south of the Harbor Hill moraine and, as the names imply, level terrain.

Even as local agriculture continued to play a role in the region's economy, Brooklyn's waterfront became the epicenter for goods moving from upstate New York and the Midwest to New York and overseas markets, especially grain shipments. Beginning with the Atlantic Dock in the 1840s and followed by Erie Basin in the 1850s, developers erected docks and warehouses around deep-water basins in Red Hook, Brooklyn to aggregate bulk shipments arriving down the Erie Canal and from other Eastern ports. The Erie Basin included a 500-foot (152-meter) drydock and grain elevators enclosing a 100-acre anchorage on the north edge of Gowanus Bay (Ostrander 1894:134). Dredging of Gowanus Creek, a tidal stream supporting extensive salt marshes, began in the 1850s, and by the early 1870s the mile-long Gowanus Canal and a series of basins and docks had been constructed. The canal became a focus for industrial and residential development, one of several nodes of growth in Brooklyn that by 1900 had reduced agricultural land, and farm families, by nearly two-thirds from 1860 levels (U.S. Census Bureau 1902).

In 1895, Irving Bush began development of the Gowanus Bay waterfront, constructing deep-water piers, warehouses and industrial buildings that by 1915 had become a 200-acre (81-ha) complex known as Bush Terminal (Flagg and Raber 1986:5). The terminal maintained a railroad to move cargo from piers and buildings, connecting with major trunk lines out of the city. The terminal tracks ran along First and Second Avenues and each of the side streets. Passenger trolleys also used these tracks until the mid-1950s (**Photograph 3**). The vertical integration of transshipment by rail and water with commercial and industrial facilities managed by a single organization was the first of its kind in the United States, and the largest such enterprise until the mid-twentieth century. The operation of Bush Terminal transformed industrial production in Brooklyn and created thousands of jobs, spurring development of Sunset Park as a residential and commercial neighborhood. A deep economic decline in the Gowanus waterfront began in the 1970s leading to the abandonment of many piers and former warehouses (**Figure G-4**).

Photograph 3. First Avenue and 39th Street, Brooklyn, NY, circa 1950. View to north

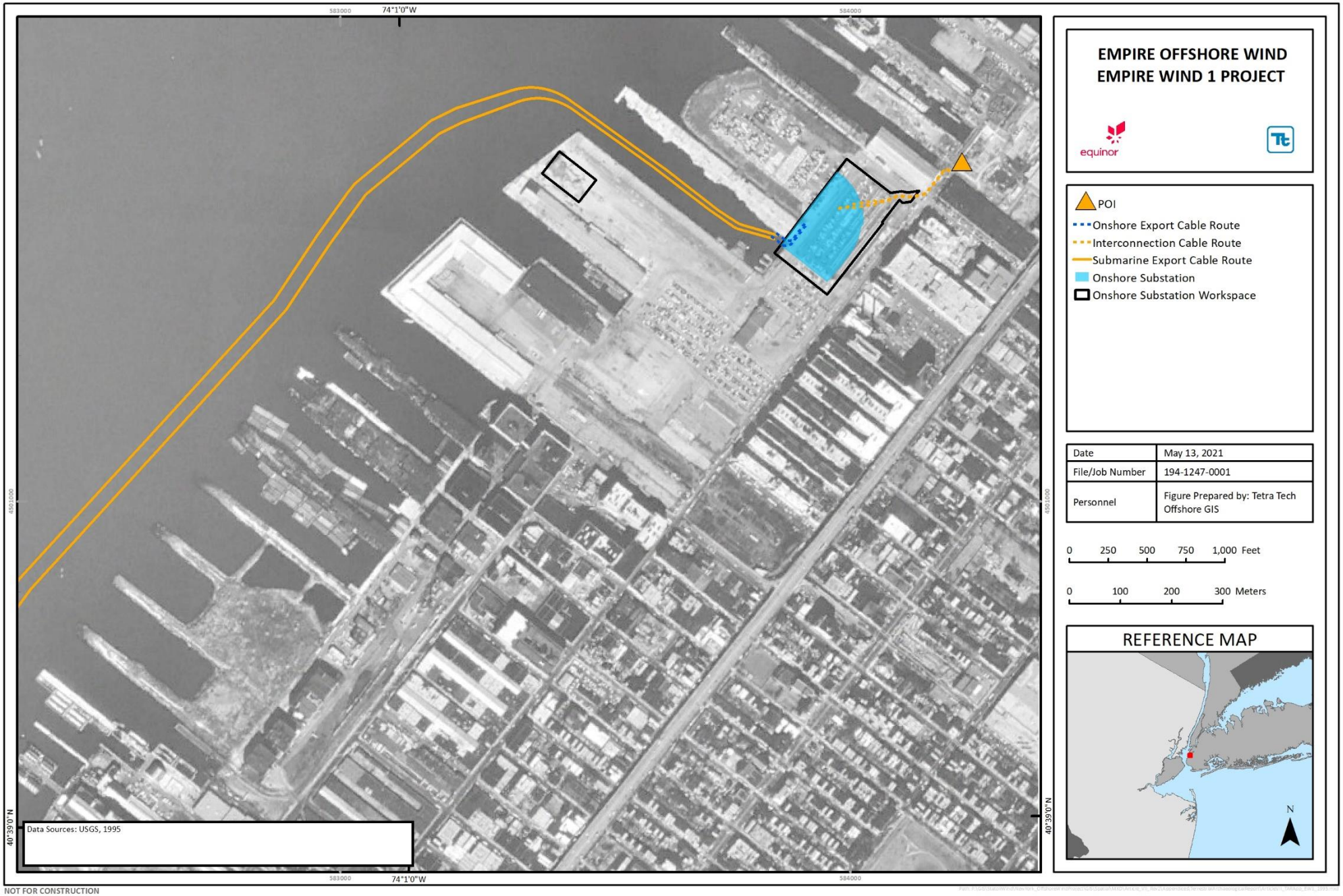

Figure G-4. Aerial image of Project Area, 1995

G.3.4 The Archaeological Record in the Study Area

A review of CRIS identified no recorded terrestrial archaeological sites or previously conducted archaeological surveys within 0.25 mi (0.4 km) (0.5 mi [0.8 km] total) of the Project. One site has been recorded within 1 mi (1.6 km) of the Project (04701.020238) representing historic rear yard deposits that NY SHPO has determined are not NRHP-eligible. The nearest pre-contact archaeological site to the Project is an undated Native American burial (04701.017322) in Boerum Hill, Brooklyn, about 1.9 mi (3 km) northeast of the Project. The NRHP status of this site is undetermined. The nearest NRHP-eligible pre-contact resources are two Woodland-period sites on Governor's Island, the Fort Jay Prehistoric Site (06101.009523) and the Nolan Park Prehistoric Site (06101.009524), both yielding pottery fragments. Tetra Tech updated the CRIS site review in January 2021 and identified no further additions to the archaeological record.

Previous archaeological surveys recorded in CRIS and the Landmarks Preservation Commission online report archives indicate that three surveys have been conducted within 0.25 mi (0.4 km) of the Project (**Table G-3**). Each of the three surveys evaluated properties along the Gowanus Bay waterfront. Raber (1985) and McVarish et al. (2008) concluded that no historic properties would be adversely affected by proposed projects and recommended no further archaeological studies. Davis (2019) concluded that the North Campus Project, which overlaps the onshore cable corridor, possessed low to no sensitivity for pre-contact archaeological resources. Davis also concluded that Pier 6 and a portion of the waterfront bulkhead, which do not fall within Empire's Project APE, possessed moderate sensitivity for historic archaeological resources. An updated review of CRIS and LPC databases in January 2021 identified no additional archaeological surveys.

Table G-3 Previous Archaeological Surveys Undertaken in the 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

G.3.5 Archaeological Sensitivity within the APE

As discussed in Section G.3.1, the Project APE is situated in an urban setting that includes maritime and land-based transportation facilities, and industrial and commercial buildings. As indicated on the 1845 Coast and Geodetic Survey, the Gowanus Bay shoreline prior to urbanization was a low-cut bank fronted by mudflats and a narrow beach. The Coast Survey[2], charged with charting the nation's important coastal waterways, has created a pictorial record of shoreline change in Gowanus Bay from the early nineteenth century onward. Because these nautical charts were intended to ensure maritime safety, they are among the most accurate early maps of New York Harbor and are useful in gauging the position of the shoreline relative to the Project APE. In the 1845

[2] Office of Coast Survey, a branch of National Oceanic and Atmospheric Administration.

chart (**Figure G-5**), the shoreline was mapped inland of the Project APE from around 39th Street northward indicating that the entire Project route is sited on made-land.

Development of Brooklyn's waterfront moved southward from the Atlantic Docks and Erie Basin complexes and resulted in extensive land filling of the Gowanus Bay shoreline for Bush Terminal and other piers (**Figure G-6** and **Figure G-7**). Comparing coast charts from 1882 and 1906 reveals an infilling of shoreline and the construction of deep-water piers and warehouses immediately south of Gowanus Creek (**Figure G-6** and **Figure G-8**). A bird's-eye-view print of Brooklyn from 1897 depicts an early phase of the Bush Terminal complex with undeveloped shoreline extending to the south (**Figure G-7**). A review of 1898 and 1916 insurance maps show broad continuation of construction and shoreline filling (**Figure G-9** through **Figure G-11**). First Avenue had become lined with warehouse or factory structures (**Figure G-8**; **Photograph 4**). Shoreline filling and development of lots along the Project APE was essentially complete by 1920 (**Figure G-9** and **Figure G-11**; **Photograph 5**). Reconfiguration of piers, terminal buildings, and roads, including the removal of much former trackage from the streets, has occurred from the 1960s to the present (**Figure G-12** and **Figure G-13**).

Photograph 4. Bush Terminal circa 1905

Photograph 5. Bush Terminal, 1917. View to east

Figure G-14 presents a synthesis of the mapped nineteenth century shoreline relative to the present built environment and the Project APE. The figure illustrates that the onshore cable route will be located entirely within made-land.

Review of the available historic sources plus results of the pedestrian reconnaissance reveals that there is low to no archaeological sensitivity within the Project APE.

G.4 Summary and Recommendations

Tetra Tech conducted a Phase I terrestrial archaeological survey of the proposed EW 1 onshore export and interconnection cable corridor and onshore substation in Brooklyn, Kings County, New York in 2019, in support of the Empire Lease Area OCS-A 0512 Offshore Wind Project. The survey was undertaken to comply with BOEM guidelines regarding the development of offshore wind generated power facilities, New York State guidelines, and to satisfy the requirements of federal permitting under Section 106 of the National Historic Preservation Act of 1966 and requirements of PSL Article VII.

Onshore facilities of the Project include: (1) an export cable landfall along the Gowanus Bay waterfront; (2) onshore high voltage alternating current interconnection cable installed in subsurface trenches within public rights-of-way and private easements on surface roads, sidewalks, parking areas; and, (3) an onshore substation. To assess the potential of these Project facilities to contain previously unrecorded archaeological resources, Tetra Tech conducted background research including a review of the online CRIS database maintained by NY SHPO and the online report archives of the Landmarks Preservation Commission; and a literature review of pertinent information regarding local geology and soils, topography and hydrology, historical cartography and aerial imagery, and prehistoric and historic development in the Project vicinity.

Tetra Tech finds that no NRHP-listed, eligible or potentially eligible archeological resources are known within the Study Area evaluated during this Phase I Terrestrial Archaeological Survey. Because of the absence of recorded archaeological resources within the Study Area, project actions are not anticipated to result in adverse indirect impacts. Tetra Tech concludes that the overall sensitivity of the direct effects APE evaluated in this Phase I is negligible due to (1) late-nineteenth and early-twentieth century landfill operations; and (2) extensive maritime harbor, industrial, and commercial construction and re-construction from circa 1895 to the present.

Based on these conclusions, Tetra Tech recommends that construction and operation of the Project be permitted within the areas surveyed. If any substantial modifications are made to the Project design, consultation with NY SHPO and possibly additional archaeological survey may be necessary.

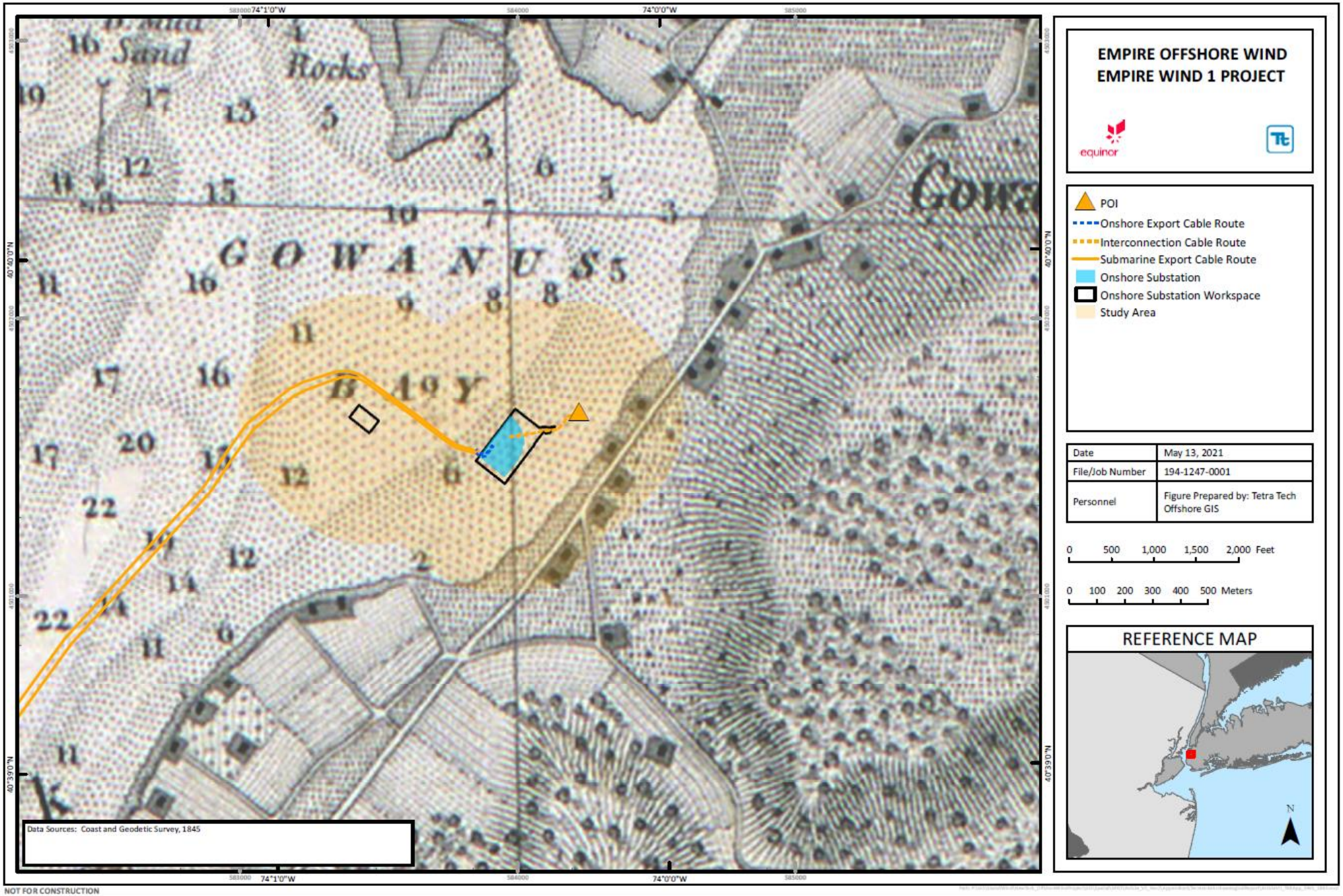

Figure G-5 Coast Survey Chart (1845) showing the onshore Project Area

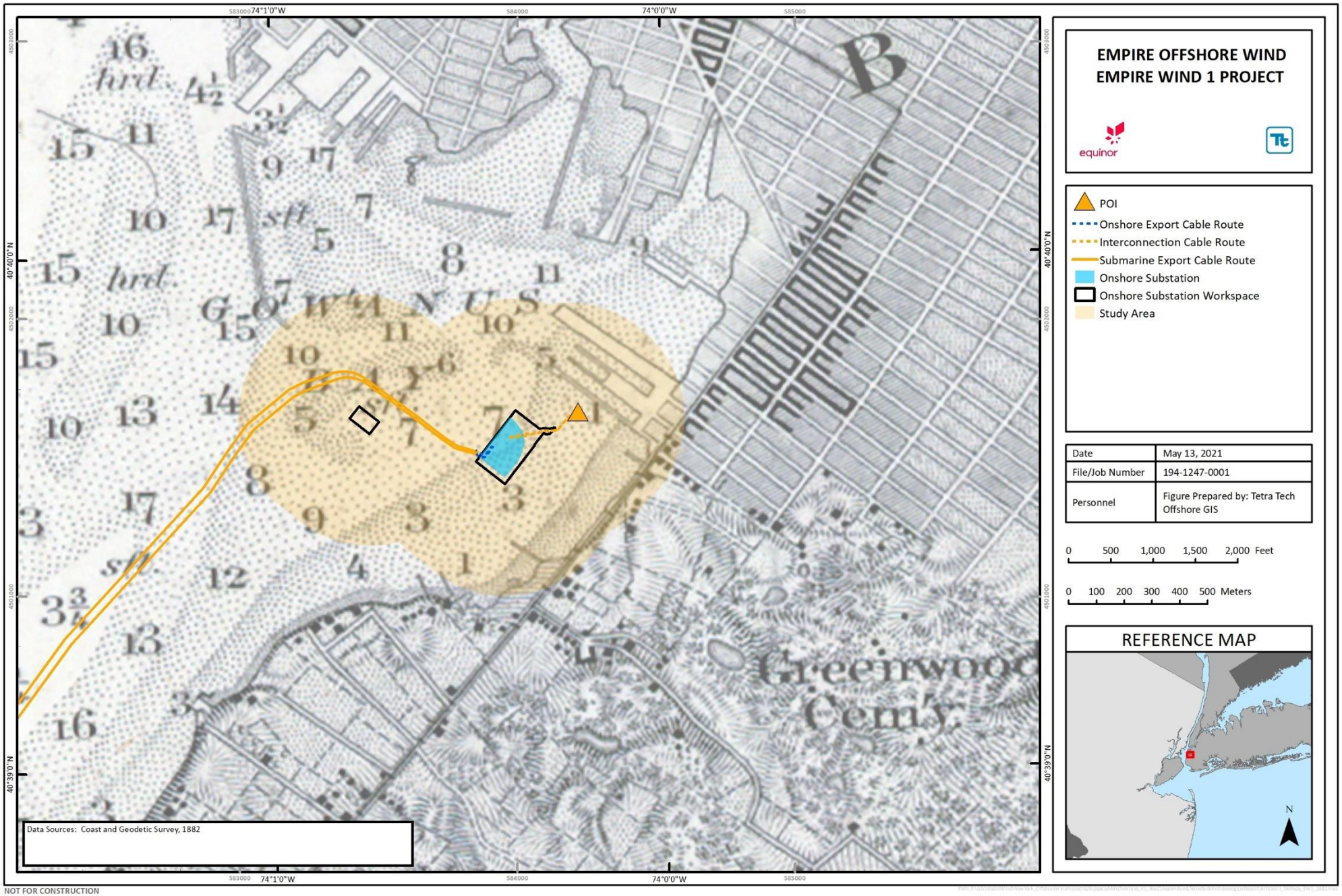

Figure G-6 Coast Survey Chart (1882) Showing the onshore Project Area

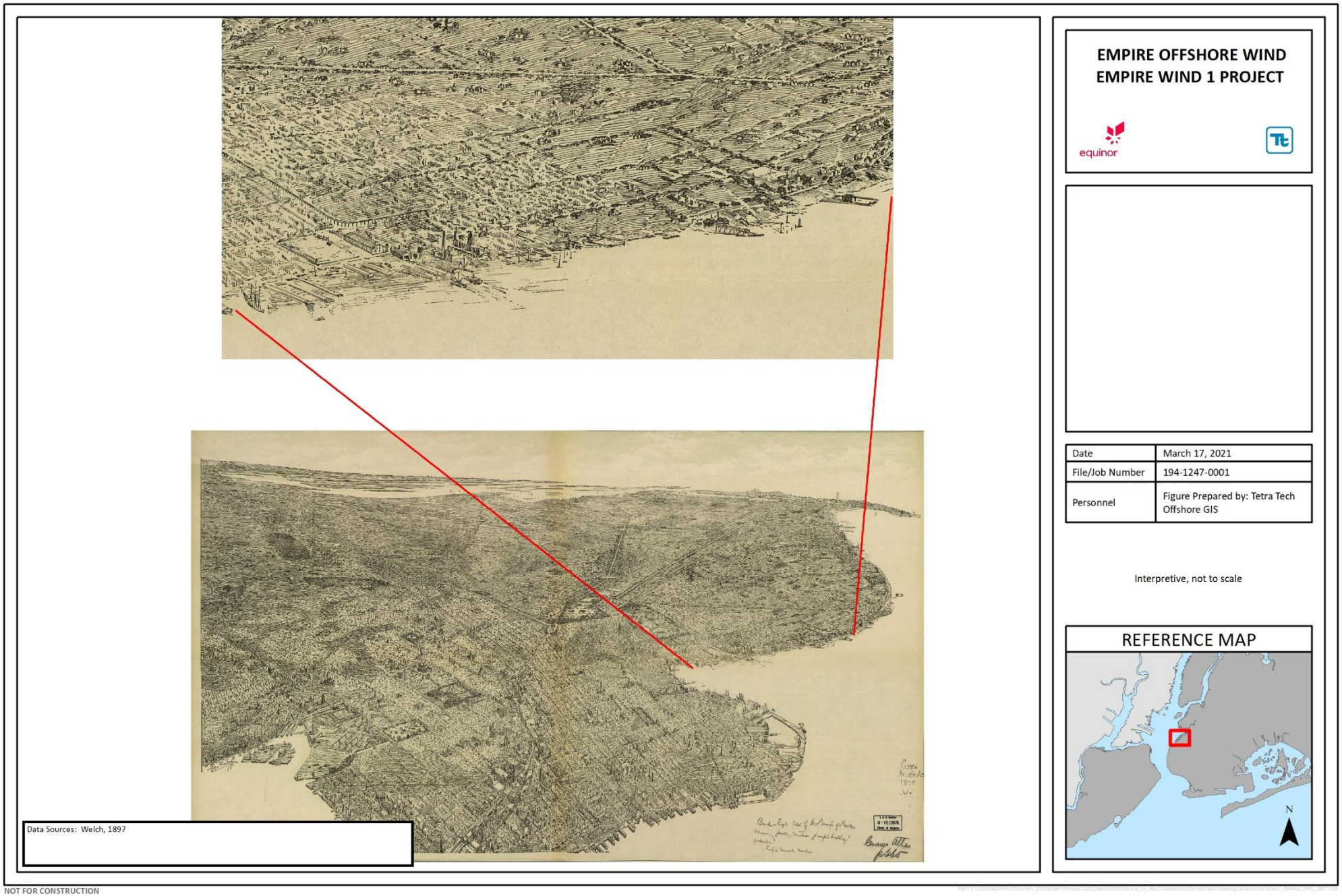

Figure G-7 Bird's-Eye-View of Brooklyn (1897)

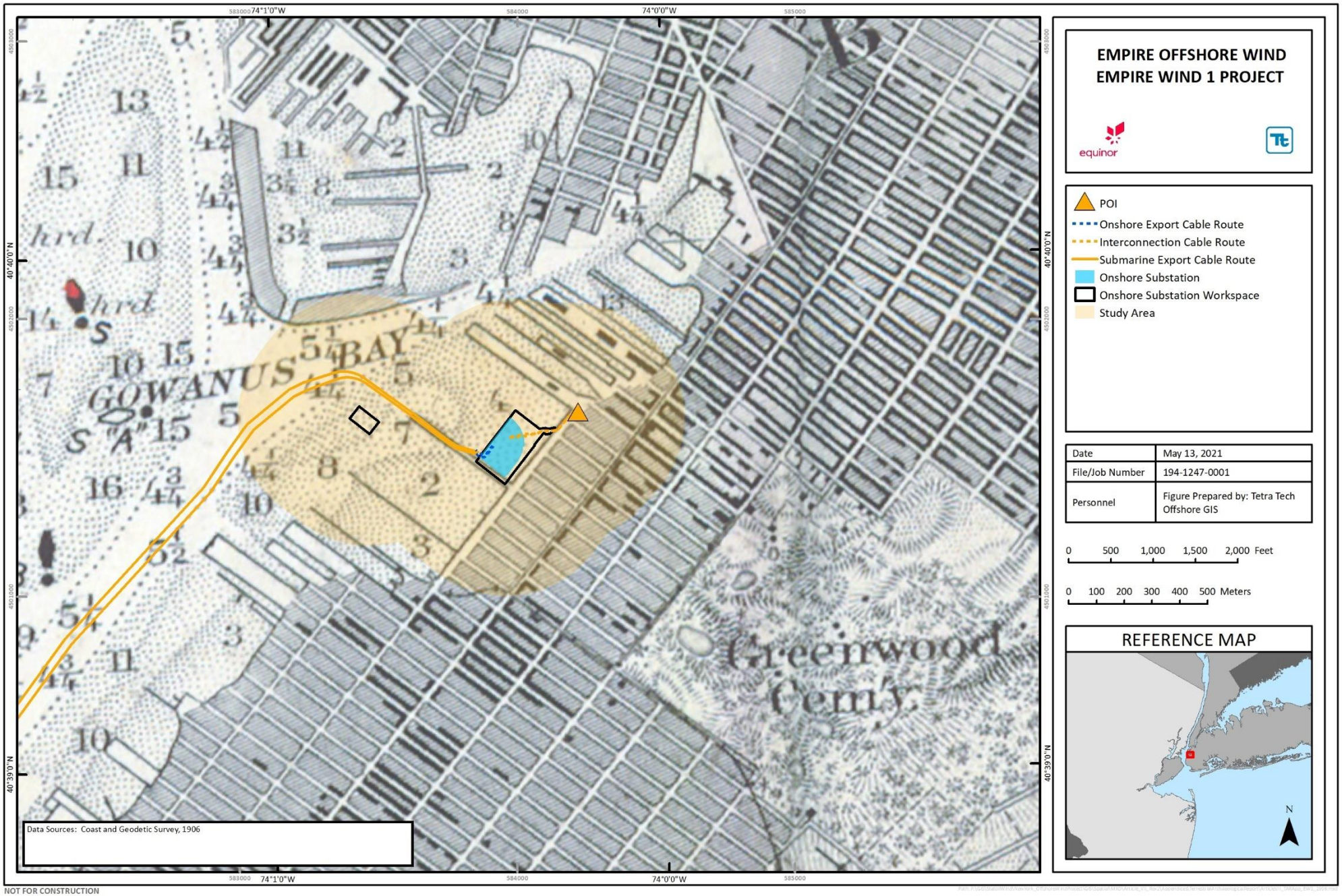

Figure G-8 Coast Survey Chart (1906) Showing the onshore Project Area

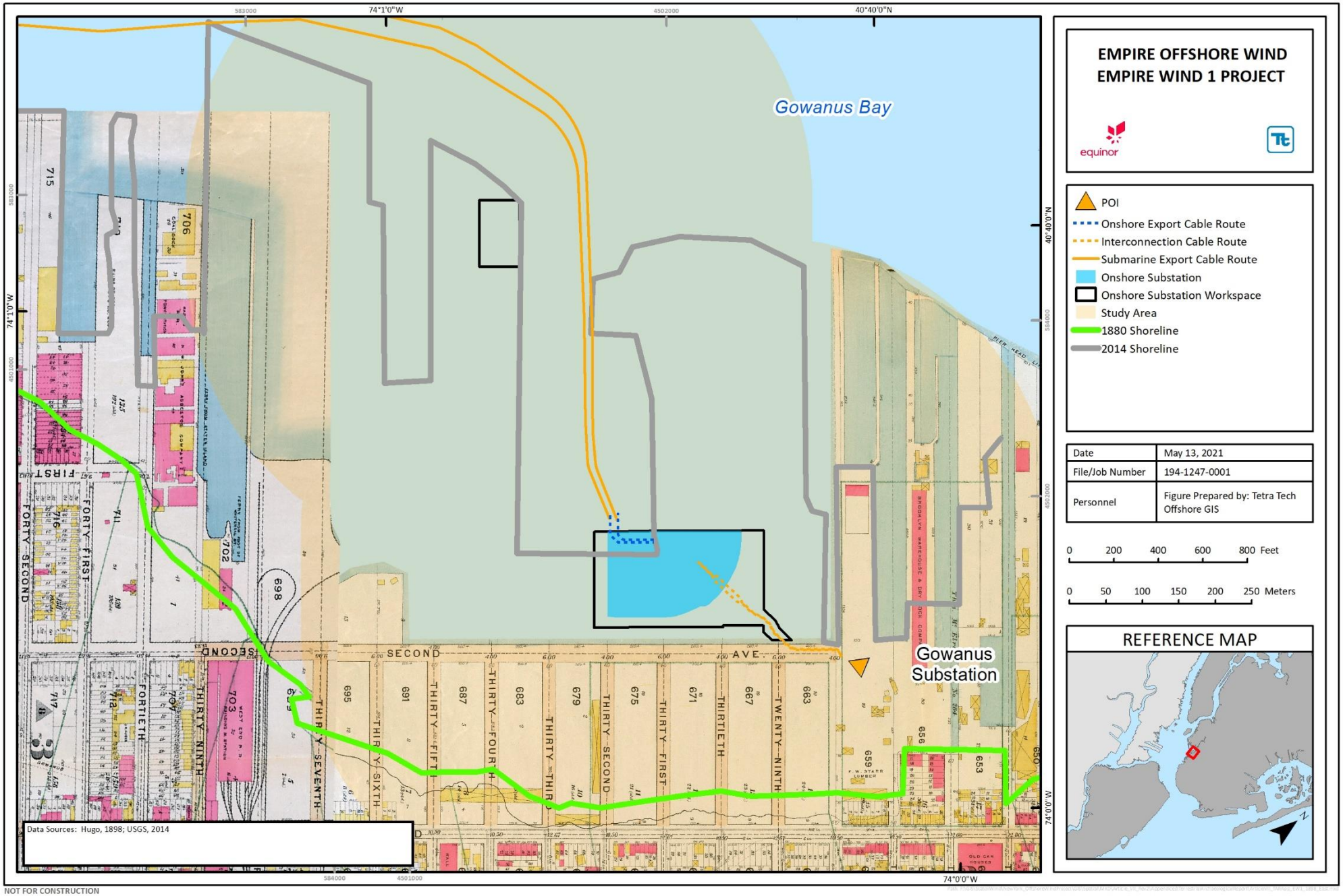

Figure G-9 New York City Fire Insurance Map (1898) Showing the Onshore Project Area

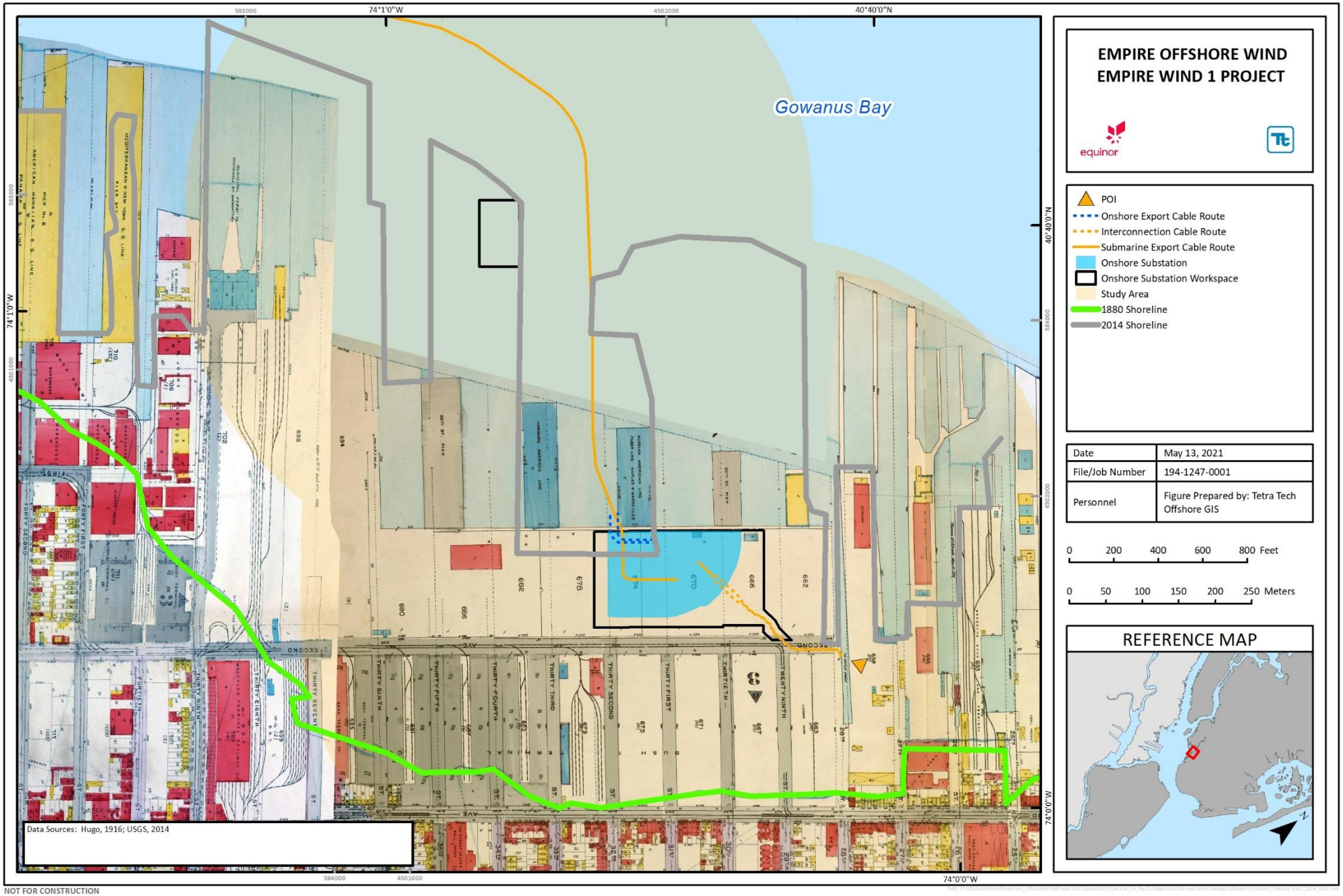

Figure G-10 New York City Fire Insurance Map (1916) Showing the Onshore Project Area

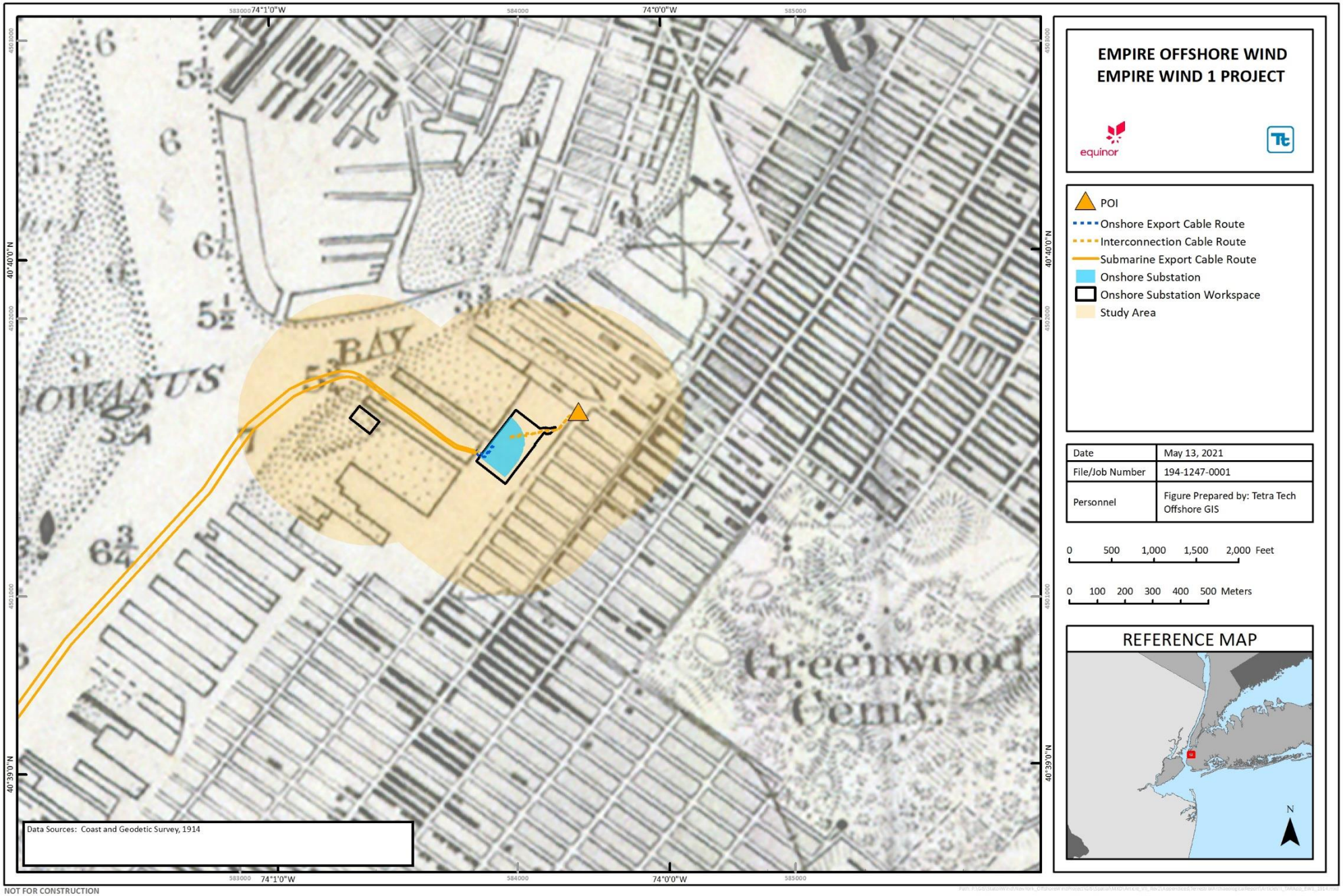

Figure G-11 Coast Survey Chart (1914) Showing the Onshore Project Area

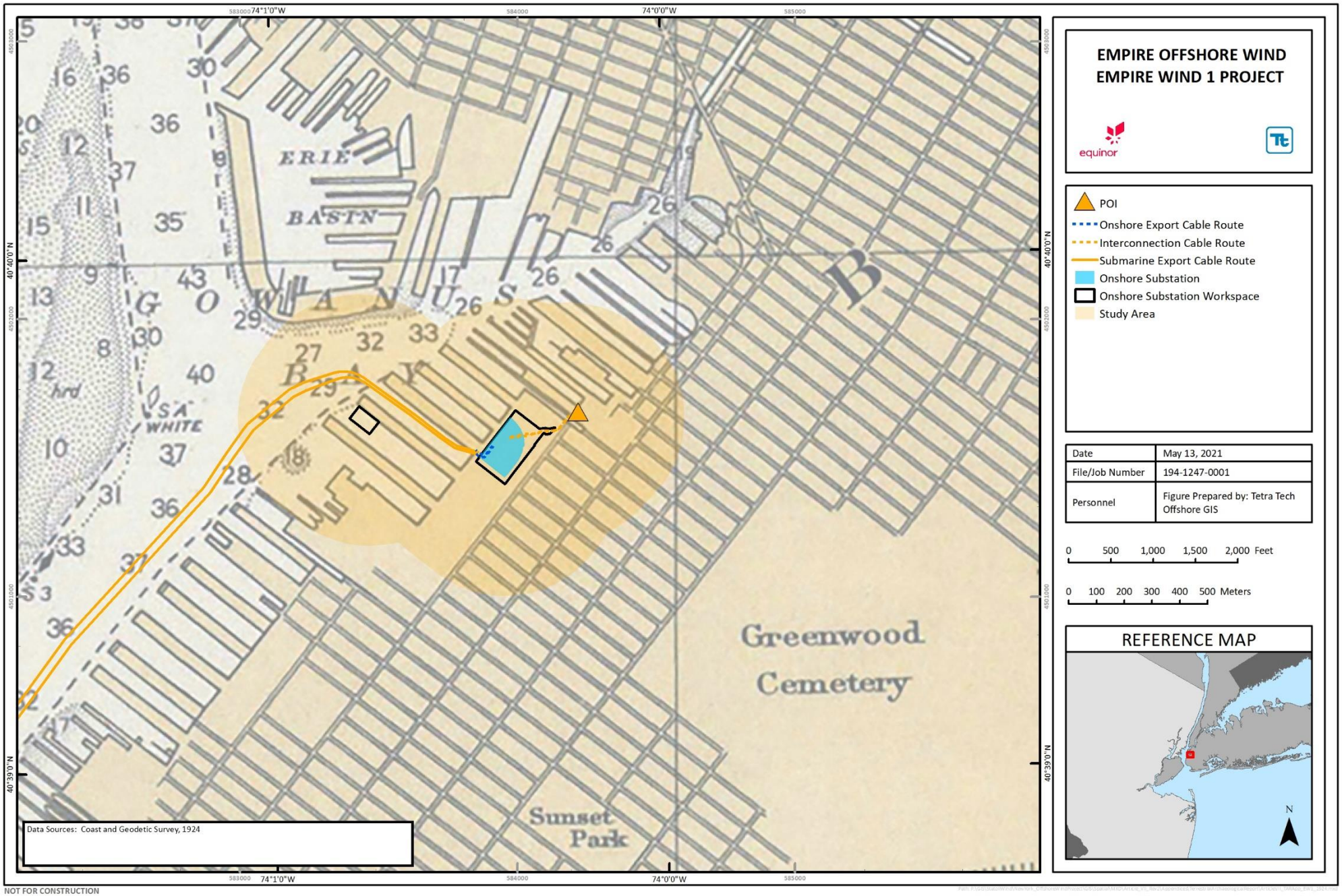

Figure G-12 Coast Survey Chart (1924) Showing the Onshore Project Area

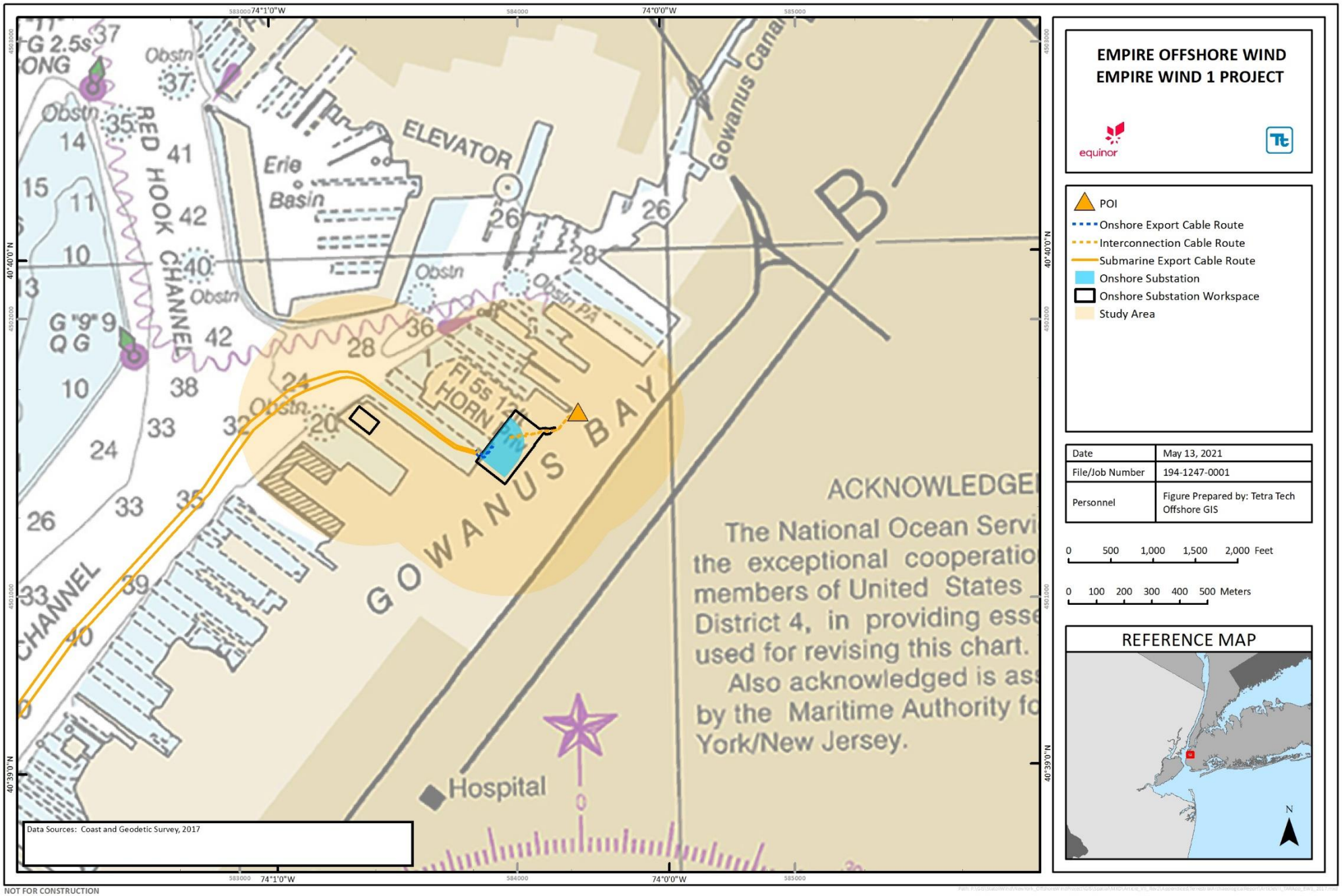

Figure G-13 Coast Survey Chart (2017) Showing the Onshore Project Area

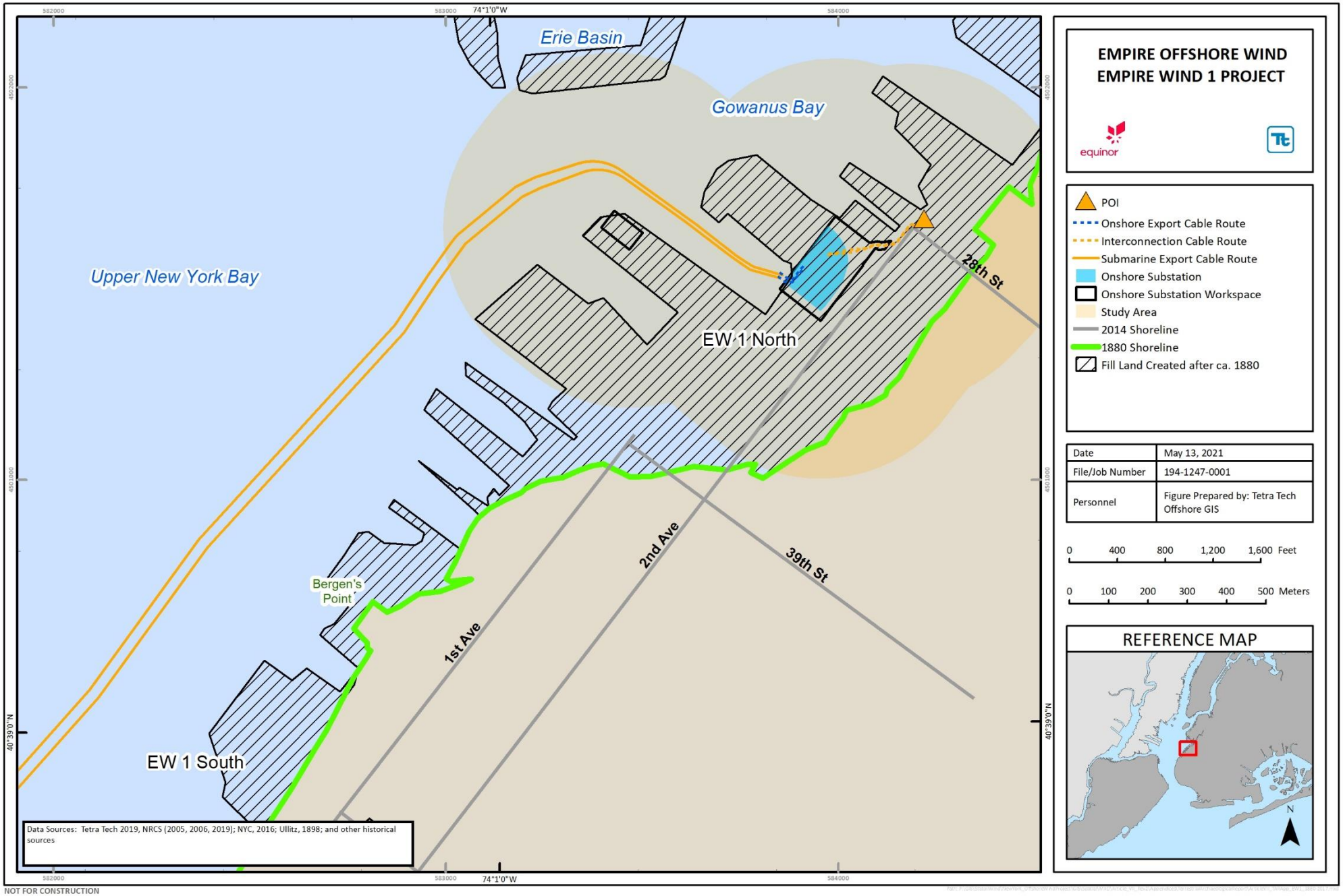

Figure G-14 Gowanus Bay Shoreline Change, 1880-2017

G.5 References

Aliano, David. 1995. Long Island's Struggle for Civil Liberty under the Dutch Regime. *Long Island Historical Journal*, 8:111-118.

Bernstein, David J.
1993 *Prehistoric Subsistence on the Southern New England Coast: The Record from Narragansett Bay*. Academic Press, San Diego, CA.

Brock, Pamela Chase and P.W.G. Brock
2001 Bedrock Geology of New York City: More Than 600 M.Y. of Geologic History -- Field Guide for the Long Island Geologists Field Trip, October 27, 2001. Electronic document, https://pbisotopes.ess.sunysb.edu/reports/ny-city/, accessed September 26, 2019.

Burrows, Edwin G. and M. Wallace
1999 *Gotham: A History of New York City to 1898*. Oxford University Press, New York.

Cassedy, Daniel and P. Webb
1999 New Data on the Chronology of Maize Horticulture in Eastern New York and Southern New England. In *Current Northeastern Paleobotany*, edited by John Hart, pp. 85-99. New York State Museum, Albany.

Ceci, Lynn
1990 Maize Cultivation in Coastal New York: The Archaeological, Agronomical, and Documentary Evidence. *North American Archaeologist*, 11:147-176.

Claasen, Cheryl
1995 Dogan Point and its Social Context. In *Dogan Point: a Shell Matrix Site in the Lower Hudson Valley*, edited by Cheryl Claasen, pp. 129-142. Archaeological Services, Bethlehem, CT.

1996 The Shell Matrix at Dogan Point. In *A Golden Chronograph for Robert E. Funk*, edited by Chris Lindner and Edward V. Curtin, pp. 99-107. Occasional Publications in Northeastern Anthropology, No. 15.

Cross, Dorothy
1956 *Archaeology of New Jersey, Vol. II: The Abbott Farm Site*. Archaeological Society of New Jersey, Trenton, NJ.

Davis, Zachary
2019 Made in New York (MiNY) – North Campus Project, Phase IA Archaeological Documentary Study. Prepared for the New York City Economic Development Corp and New York City Department of Small Business Services. Prepared by Dewberry Engineering, Parsippany, NJ.

Fiedel, Stuart J.
2001 What Happened in the Early Woodland? *Archaeology of Eastern North America*, 29:101-142.

Fisher, Donald W., Y.W. Isachsen and L.V. Rickard
1970 *Geologic Map of New York: Lower Hudson Sheet*. Map and Chart Series 15. New York State Museum and Science Service, Albany.

Flagg, Thomas R. and M.S. Raber
1986 Documentation for Determination of Eligibility for Bush Terminal, Brooklyn, Kings County, New York. Prepared for U.S. Army Corps of Engineers – New York District. On file with NY SHPO, CRIS.

Fritz, Gayle J.
1990 Multiple Pathways to Farming in Precontact Eastern North America. *Journal of World Prehistory*, 4:387-435.

Gingerich, Joseph A.M.
2013 Revisiting Shawnee Minisink. In *In the Eastern Fluted Point Tradition*, edited by Joseph A.M. Gingerich, pp. 218-258. University of Utah Press, Salt Lake City.

Grumet, Robert S.
1979 *"We Are Not So Great Fools:" Changes in Upper Delawaran Socio-Political Life 1630-1758*. PhD Dissertation, Department of Anthropology, Rutgers University, New Brunswick, New Jersey.

Kraft, Herbert C.
1986 *The Lenape: Archaeology, History, and Ethnography*. New Jersey Historical Society, Newark.

Lavin, Lucianne
1988 Coastal Adaptation in Southern New England and Southern New York. *Archaeology of Eastern North America*, 16:101-120.

McNamara, Patrick J.
1995 "By the Rude Storms of Faction Blown": Thomas Jones, a Long Island Loyalist. *Long Island Historical Journal*, 7:178-190.

McVarish, Douglas C., P.J. Heaton and J.I. Klein
2008 South Pier Improvement Project: Phase 1A Cultural Resources Survey, Brooklyn, New York. Prepared for ESS Group, Inc., East Providence, RI. Prepared by John Milner & Assoc., Croton-on-Hudson, NY.

Merguerian, Charles
2003 The Narrows Flood – Post-Woodfordian Brach of the Narrows Channel, NYC. In *Program for the Tenth Annual Conference on Geology of Long Island and Metropolitan New York*. Electronic document, https://www.geo.sunysb.edu/lig/Conferences/abstracts-03/merguerian-03.pdf, accessed January 25, 2019.

Moss, Cheryl J., and C. Merguerian
2007 Different and Distinct—Implications of Unusual Glacial Strata in Brooklyn. In Program for the Fourteenth Annual Conference on Geology of Long Island and Metropolitan New York. Electronic document, https://dspace.sunyconnect.suny.edu/bitstream/handle/1951/47855/moss-07.pdf?sequence=1, accessed January 25, 2019.

Moss, Richard Shannon
1993 *Slavery on Long Island: A Study in Local Institutional and Early African-American Communal Life*. Garland Publishing, Inc., New York.

Munsell, W.W. (publisher)
1882 *History of Queens County, New York*. W.W. Munsell & Co., New York.

New York Archaeological Council (NYAC)
1994 Standards for Cultural Resource Investigations and the Curation of Archaeological Materials in New York State. Available online at https://nysarchaeology.org/wp-content/uploads/2013/12/NYACStandards.pdf, accessed December 4, 2018.

New York City Department of City Planning
2019 NYC Population: 2010 Census. Electronic document, https://www1.nyc.gov/site/planning/data-maps/nyc-population/census-2010.page, accessed January 16, 2019.

New York State Library (NYSL)
2019 Census – New York State. Electronic document, http://www.nysl.nysed.gov/scandocs/nyscensus.htm, January 14, 2019.

Natural Resources Conservation Service (NRCS)
2019 Web Soil Survey. Electronic document, https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed September 26, 2019.

O'Callaghan, E.B.
1849a *The Documentary History of the State of New-York*. Vol. I. Weed, Parsons & Co., Albany, NY.

1849b *The Documentary History of the State of New-York*. Vol. II. Weed, Parsons & Co., Albany, NY.

1850 *The Documentary History of the State of New-York*. Vol. III. Weed, Parsons & Co., Albany, NY.

Office of Coast Survey (Coast Survey)
1845 Map of New York Bay and Harbor and Environs. Coast Chart 120. NOAA.

1882 New York Bay and Harbor, New York. Coast Chart 120. NOAA.

1906 New York Bay and Harbor, New York. Coast Chart 120. NOAA.

1914 New York Bay and Harbor, New York. Coast Chart 120. NOAA.

1924 New York Harbor, New York. Coast Chart 369. NOAA.

2017 New York Harbor, New York. Coast Chart 12327. NOAA

Ostrander, Stephen
1894 *A History of the City of Brooklyn and Kings County*, Vol. II. Self-published.

Raber, Michael
1985 Survey Level Study for Determination of Significance and Management Recommendations: 31st Street Pier, Brooklyn, New York, Brooklyn Reach 2, New York Harbor Collection and Removal of Drift Project. Prepared for U.S. Army Corps of Engineer – New York District.

Schaper, Hans F.
1989 Shell Middens in the Lower Hudson Valley. *The Bulletin: Journal of the New York State Archaeological Association*, 98:13-24.

SEARCH
2018 Archaeological Resource Assessment of Two Buoy Deployment Areas within the New York Lease Area (OCS-A-0512), New York Bight. Final Report. Prepared for Equinor Wind US LLC, Stamford, CT.

2019 Marine Archaeological Resources Assessment for the Equinor Wind Offshore Wind Project, Construction and Operations Plan. Revised Preliminary Draft Report. Prepared for Equinor Wind US LLC, Stamford, CT.

Shah, Ajitkumar, S. Chakraborty and K. Kim
2006 The Geological Setting of New York City and the Geotechnical Challenges in Urban Construction. Conference Paper 646. 10th International Congress of the International Association for Engineering Geology and the Environment, Nottingham, England. Electronic document, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.518.2421&rep=rep1&type=pdf, accessed January 25, 2019.

Singer, Alan
2007 Slavery in Colonial and Revolutionary New York: Complicity and Resistance. *Long Island Historical Journal*, 20:163-173.

Stanford, Scott D.
2010 Glacial Geology and Geomorphology of the Passaic, Hackensack, and Lower Hudson Valleys, New Jersey and New York, In *Field Trip Guidebook*, edited by Alan I. Benimoff, pp. 47-83. Prepared for the New York State Geological Association 82nd Annual Meeting, Staten Island, New York. Electronic document, http://www.nysga-online.net/download/2010s-nysga-guidebooks/, accessed November 21, 2018.

Svenson, Henry K.
1936 The Early Vegetation of Long Island. *Brooklyn Botanic Garden Record*, 25:207-227. Electronic document, https://www.biodiversitylibrary.org/item/41119#page/248/mode/1up, accessed November 15, 2018.

2019b Phase I Terrestrial Archaeological Survey, Equinor Wind Lease Area OCS-A 0512, Offshore Wind Project, Boardwalk Wind 1 Onshore Export and Interconnection Cable Corridor and Onshore Substation, Asbury Park and Neptune Township, Monmouth County, New Jersey. Draft Report. Prepared for Equinor Wind US LLC, Stamford, CT.

Thieler, E. Robert, B. Butman, W.C. Schwab, M.A. Allison, N.W. Driscoll, J.P. Donnelly, and E. Uchupi
2007 A Catastrophic Meltwater Flood Even and the Formation of the Hudson Shelf Valley. *Paleogeography, Paleoclimatology, Paleoecology* 246:120-136. Electronic document, https://darchive.mblwhoilibrary.org/bitstream/handle/1912/1630/Thieler?sequence=1, accessed January 25, 2019.

U.S. Census Bureau
1842 Sixth Census of the United States - Compendium of the Enumeration of the Inhabitants and Statistics of the United States. Electronic document, http://usda.mannlib.cornell.edu/usda/AgCensusImages/1840/1840.pdf, accessed January 19, 2019.

1864 Agriculture of the United States in 1860; compiled of the original returns of the 8th Census. Electronic document, http://usda.mannlib.cornell.edu/usda/AgCensusImages/1860/1860b-06.pdf, accessed January 19, 2019.

1882 Report on the Productions of Agriculture – Tenth Census of the United States. Electronic document, http://usda.mannlib.cornell.edu/usda/AgCensusImages/1880/1880a_v3-01.pdf, accessed January 20, 2019.

1902 Twelfth Census of the United States. Agriculture, Part II: Crops and Irrigation. Electronic document, http://usda.mannlib.cornell.edu/usda/AgCensusImages/1900/06/02/1836/33398096v6p2.pdf, accessed January 20, 2019.

1908 First Census of the United States, 1790 – New York: Heads of Families. U.S. Census Bureau, Washington, D.C. Electronic document, https://www2.census.gov/library/publications/decennial/1790/heads_of_families/new_york/1790g-02.pdf?#, accessed January 4, 2019.

1910 Thirteenth Census of the United States. Bulletins. Population: New York City. Number of Inhabitants, by Enumeration Districts. Electronic document, ftp://ftp.census.gov/library/publications/decennial/1910/bulletins/demographics/374-population-new-york-city-number-of-inhabitants-by-enumeration-districts.pdf, accessed January 15, 2019.

1973 1970 Census of Population. Vol. 1: Characteristics of the Population. Part 34: New York.

2012 New York: 2010. Summary Population and Housing Characteristics. 2010 Census of Population and Housing. Electronic document, ftp://ftp2.census.gov/library/publications/2012/dec/cph-1-34.pdf, accessed January 16, 2019.

White, Shane
1995 Slavery in New York State in the Early Republic. *Australasian Journal of American Studies*, 14:1-29.