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# Empire Offshore Wind Final Environmental Impact Statement Volume 5

September 2023

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Bureau of Ocean Energy  
Management



# **Empire Offshore Wind, Empire Wind Projects (EW 1 and EW 2) Final Environmental Impact Statement**

**Volume 5**

**September 2023**

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Office of Renewable Energy Programs

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**Appendix O. Alternatives Analysis for U.S. Army Corps of  
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## **Empire Wind 1**

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**U.S. Army Corps of Engineers  
Joint Permit Application  
Section 10/404 Individual Permit Application**

**Empire Wind 1 Project  
Lease Area OCS-A 0512**

**Alternatives Analysis**

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## ACRONYMS AND ABBREVIATIONS

AIS	automatic identification system
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CLCPA	Climate Leadership and Community Project Act
CO <sub>2</sub>	carbon dioxide
COP	Construction and Operations Plan
CSD	cutter suction dredge
Empire	Empire Offshore Wind LLC
EW 1	Empire Wind 1
ft	foot
GBS	gravity base structure
HDD	horizontal directional drilling
HRG	high-resolution geophysical
HVAC	high-voltage alternating-current
HVDC	high-voltage direct-current
km	kilometer
kV	kilovolt
Lease Area	The geographic area defined in Lease OCS-A 0512
LNYBL	Lower New York Bay Lateral
m	meter
mi	mile
MLLW	mean lower low water
MTBM	microtunnel boring machine
MW	megawatt
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NYCDEP	New York City Department of Environmental Protection
NYCDPR	New York City Department of Parks and Recreation
NYCEDC	New York City Economic Development Corporation
NYISO	New York Independent System Operator
NYSERDA	New York State Energy Research & Development Authority
O&M	Operations and Maintenance
PANYNJ	Port Authority of New York and New Jersey
POI	Point of Interconnection
Project	Empire Wind 1 Project
PSA	Purchase and Sale Agreement
ROW	right-of-way
SBMT	South Brooklyn Marine Terminal
SSBMT	Sustainable South Brooklyn Marine Terminal
TSHD	trailing suction hopper dredging
TSS	traffic separation scheme
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
UXO	unexploded ordnance
Wall-LI	Wall, New Jersey to Long Island telecommunications cable system

WTG

wind turbine generator

## 1. INTRODUCTION

Empire Offshore Wind LLC (Empire) proposes to construct and operate an offshore wind farm located in the designated Renewable Energy Lease Area OCS-A 0512 (Lease Area). Empire proposes to develop the Lease Area in two individual projects, to be known as the Empire Wind 1 (EW 1) and Empire Wind 2 projects. These individual projects will connect to separate offshore substations and onshore Points of Interconnection (POIs) by way of separate export cable routes and onshore substations. Empire is submitting this Alternatives Assessment as part of the Application to the U.S. Army Corps of Engineers (USACE) for an Individual Permit for jurisdictional activities pursuant to Section 404 of the Clean Water Act (Section 404) and Section 10 of the Rivers and Harbors Act (Section 10) for EW 1 (referred to hereafter as the Project).

As part of the design development of the EW 1 Project (Project), Empire conducted a detailed analysis of potential POIs to the existing grid and Project alternatives to connect the offshore Lease Area to the POI. Empire evaluated siting alternatives for the submarine export cable route from federal waters, onshore substation location, export cable landfall, and onshore cable route to interconnect with the POI relative to constructability, reliability, environmental resources, and stakeholder impact criteria. Although each component was assessed separately, the siting process was completed holistically relative to submarine and terrestrial constraints to identify the most feasible and reasonable overall solution to deliver energy from the Lease Area to the electric grid, with the fewest negative impacts. The evaluation is informed by several factors, including desktop assessments, site-specific surveys, supply chain capacity, commercial availability, and engagement with regulators and stakeholders. Additional discussion of the selection of the POI for the Project is provided in **Attachment D** (Project Narrative).

An initial high-level assessment of offshore constraints was conducted based on geographic information system data to identify the most feasible potential submarine export cable routes between the Lease Area and the area of Gowanus Bay, New York. A siting comparison of the potential submarine export cable routes was then conducted. Section 2.1 summarizes the constraints analysis and results for the identified submarine export cable alternatives within federal waters. Empire conducted more detailed site assessment, including geophysical and geotechnical surveys, along the proposed route (see **Attachment D** [Project Narrative]).

Once the submarine export cables make landfall, they either extend directly to the onshore substation or they transition to onshore export cables to transport power from the cable landfall to the onshore substation<sup>1</sup> (in the case of most evaluated alternatives). Interconnection cables leave the onshore substation underground to deliver power to the POI. The onshore cable route refers to the complete route traversed by the onshore export and interconnection cables between the submarine cable landfall and the POI.

In addition to evaluating Project siting alternatives, Empire also considered the use of alternative technologies. This analysis considered alternative submarine export cable current type, cable landfall installation, submarine asset crossing methodologies, and pre-sweeping and dredging methodologies, as discussed in Section 3.4. These alternative technologies were assessed relative to feasibility of existing technology and logistics, cost, and environmental impact, where applicable, in light of the overall project purpose.

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<sup>1</sup> The final configuration is still under evaluation, but Empire anticipates that the design for cable landfall and onshore transition will be consistent with the methods and environmental impacts described herein.

## 2. PROJECT DESIGN DEVELOPMENT

This section provides an overview of the design development of the Project, including portions of the Project in federal waters. **Section 3** provides the detailed Alternatives Analysis<sup>2</sup> in accordance with the Clean Water Act's 404(b)(1) Guidelines, 40 Code of Federal Regulations (CFR) Part 230, for the discharge of dredge or fill material associated with the submarine export cable alternatives, cable landfall alternatives and onshore cable route alternatives, and alternative technologies.

### 2.1 Submarine Export Cable Route Alternatives – Federal Waters

Based on the location of the POI, an analysis of offshore routing constraints was the first step in submarine export cable route assessment to identify potential submarine export cable routes between the Lease Area and the POI, to assess feasibility, and to understand potentially significant challenges along each route. In considering submarine export cable routes between the Lease Area and the area of Brooklyn, New York, the most direct submarine export cable route served as the starting point in developing the export cable route. This was also driven by technical constraints and costs, including cable costs, installation time, and limits associated with efficient high-voltage alternating-current (HVAC) transmission. Detail on the offshore routing constraints considered in the offshore routing constraints analysis is provided in Volume 1, Section 2 of the Construction and Operations Plan (COP, provided in **Appendix D-1** of **Attachment D** [Project Narrative]).

Three submarine cable route alternatives were considered for the submarine export cable route in federal waters, which are presented in **Figure 1** and **Figure 2**.

Both regional bathymetry datasets (NOAA 2015) and project-specific high-resolution geophysical (HRG) survey data were collected to analyze general seabed conditions and specific seabed-related risks along the potential submarine export cable routes. These data have allowed for routing to minimize traversing steeper seabed slopes and areas of complex seabed due to scour, mobile seabed, potential hardgrounds, or anthropogenic dredged channels. Steep slopes and abrupt changes in depth can pose a risk to cable installation and burial, as seabed cable burial tools are susceptible to stability issues and decreased burial potential as slopes increase. Areas of very shallow water also pose a challenge to the installation because a cable vessel suitable to install this type of cable requires an adequate draft to safely maneuver.

Existing utilities and other assets pose several challenges and risks with respect to the submarine export cables and may limit the methods and depth of burial available for cable installation at the crossing. This may add cost and complexity to the installation, as well as residual risks to the installed cable from reduced burial in the area, the installation of external protection, and/or from maintenance activities for the existing asset. As such, cable crossings and close parallels are avoided to the extent feasible by the routing.

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<sup>2</sup> Alternatives for the development of the Lease Area and associated facilities are also considered as part of the Empire COP filed in January 2020 and subsequent revisions in response to agency comments. The COP became publicly available following the Bureau of Ocean Energy Management issuance of a Notice of Intent to prepare an Environmental Impact Statement in June 2021. Additional information on the Project design development is provided in Section 2 of the COP (**Attachment D, Appendix D-1**).

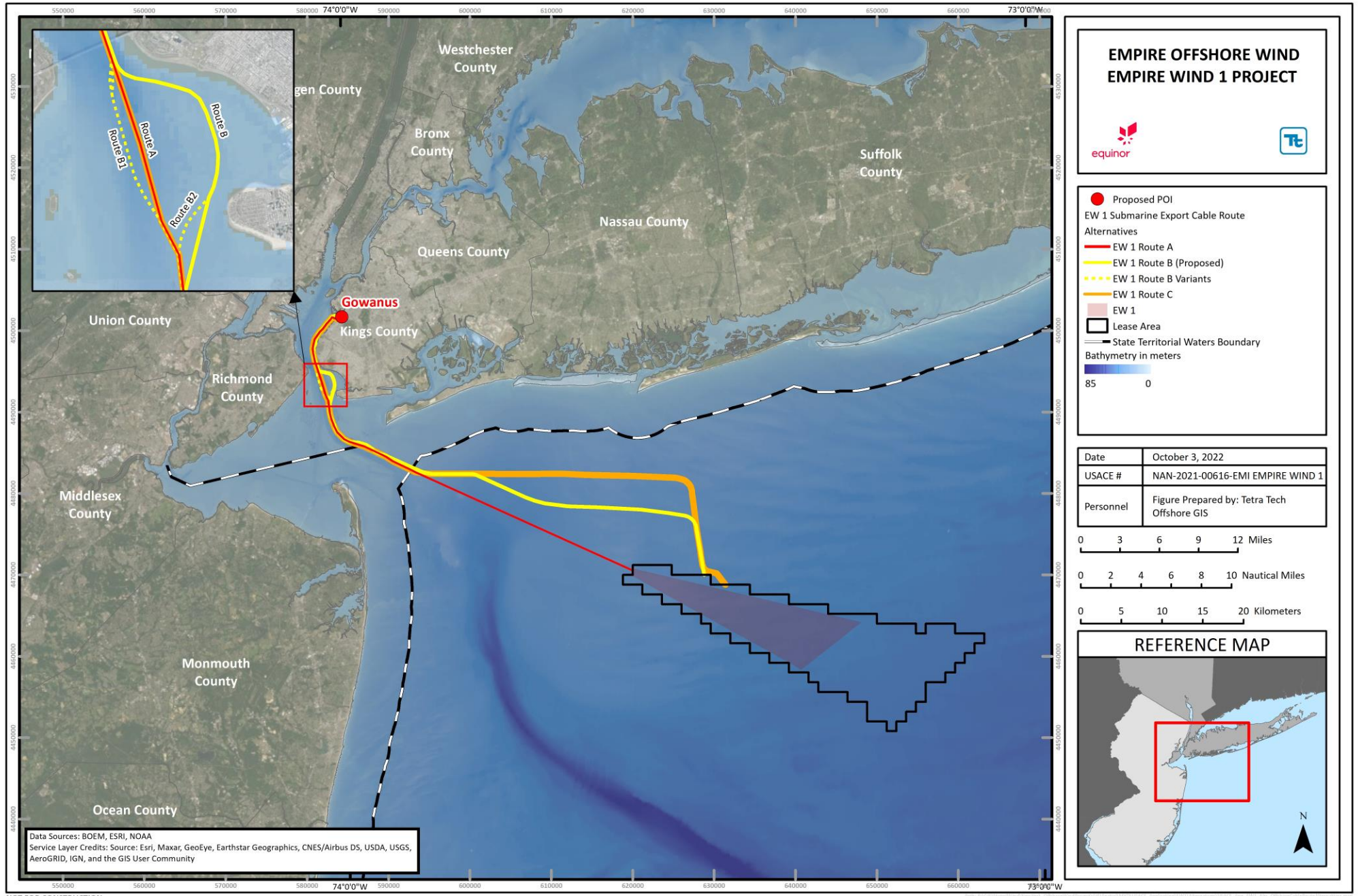


Figure 1 Submarine Export Cable Route Alternatives – Federal Waters



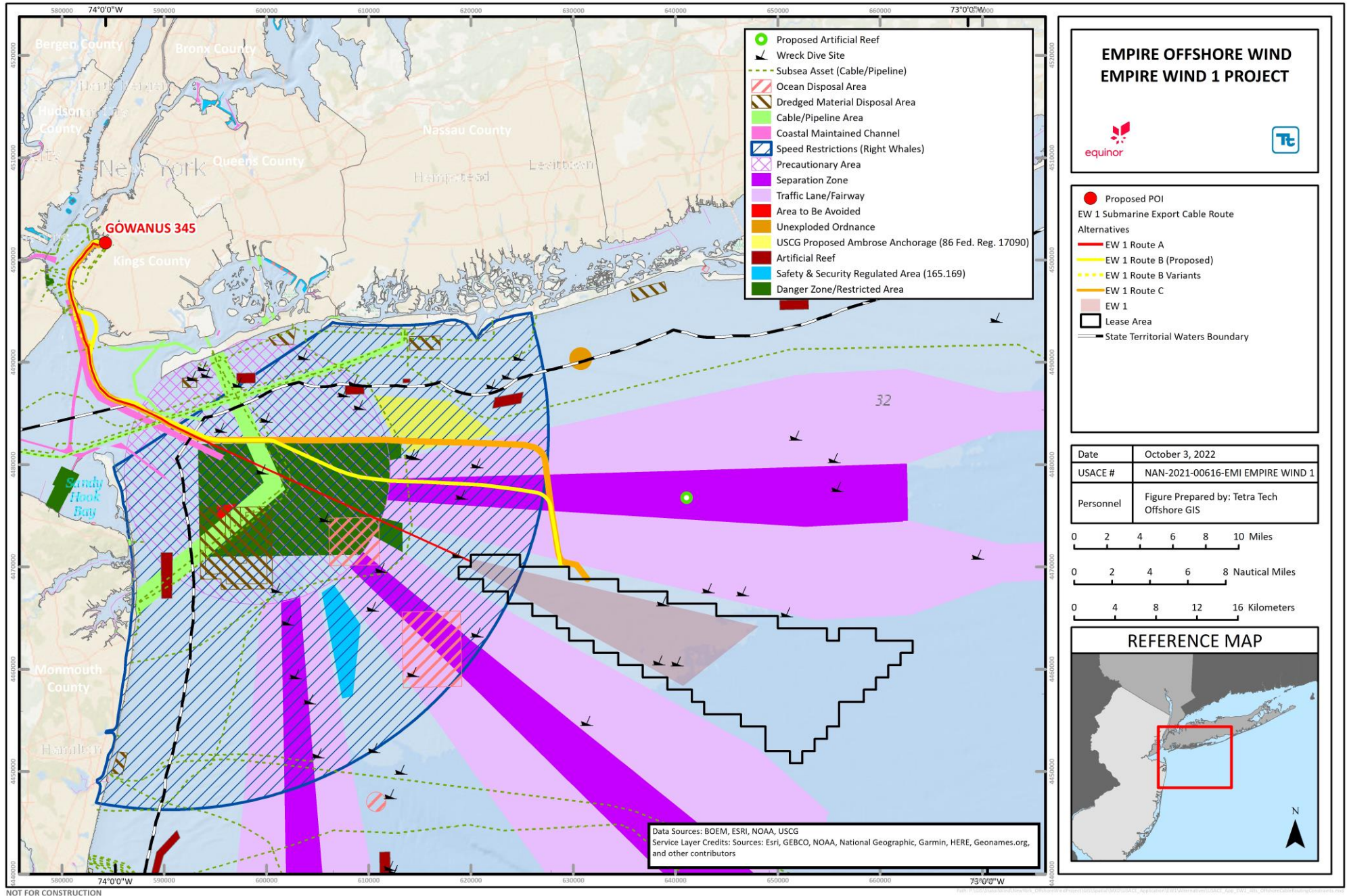


Figure 2 Submarine Export Cable Route Offshore Constraints – Federal Waters

Dredged and maintained channels are under the purview of the USACE. The location and depths of navigation channels are authorized by the federal government, and the USACE periodically performs condition surveys to identify when maintenance dredging may be needed to keep the channels available at the authorized depth. Should a cable route cross a maintained channel, the cable must be buried deep enough below the authorized depth to ensure that the channel can be safely maintained and to ensure that there is no risk to the cable; therefore, installation within dredged and maintained channels is minimized to the extent practicable.

Traffic separation schemes (TSS) are commonly used to identify and constrain inbound and outbound traffic lanes, typically with a separation zone between these lanes to minimize the likelihood of vessel collisions. Two of the evaluated submarine export cable routes must cross the TSS located to the north of the Lease Area.

Charted danger zones, restricted areas, and warning areas exist for a variety of reasons and serve to advise mariners and other users of the risks of navigating an area or conducting some type of bottom contacting activity, such as fishing or cable laying. For these reasons, traversing charted danger zones is avoided to the extent practicable. Similarly, charted disposal areas warn mariners and other users of the risks associated with traversing an area of disturbed seabed. While some areas may contain relatively harmless material, such as dredged spoils from maintained channels, others may contain acid wastes (an industrial byproduct), municipal waste (a sewage treatment product), or munitions.

Shipwrecks and other obstructions are cataloged in the National Oceanic and Atmospheric Administration (NOAA) Nautical Charts and within the NOAA Automated Wreck and Obstruction Information System database. These features may represent physical hazards to installation and may be historically or culturally significant. These features are avoided to the extent practicable by the submarine export cable routing. Where such features must be closely approached, the HRG survey provides insight into the location and nature of the feature through acoustic and magnetic datasets. Known and suspected shipwrecks and obstructions were avoided to the extent practicable during pre-survey routing and the routing was further refined following the acquisition of HRG survey data. Identified features and recommended buffer distances is in the process of being defined through review of the HRG survey and diver data by a qualified marine archaeologist.

All route alternatives also cross a seasonal management area for Right Whales, where vessel speed restrictions are in place. Project-related vessels will comply with NOAA National Marine Fisheries Service speed restrictions in this area.

### **2.1.1 EW 1 Route A**

The EW 1 Route A Alternative represents approximately the shortest and most direct route from the offshore Lease Area to export cable landfall alternatives near the POI (36 nautical miles [nm, 42 miles {mi}, 67 kilometers {km}]). Minimizing route length was a primary driver in route selection, as it directly impacts project costs, electrical transmission, and environmental and stakeholder impacts of cable installation. EW 1 Route A, the first alternative considered, traversed northwest from the westernmost portion the Lease Area. This route then crossed a bathymetric high exhibiting increased seabed complexity and higher backscatter in regional seabed studies. Known as Cholera Bank, this feature has an increased potential as valuable seabed habitat and is targeted by fishing efforts. EW 1 Route A avoids interactions with the TSS lanes (**Figure 2**) but crosses a dump site with a usage status of “discontinued” and previously used for “municipal sewage sludge.” EW 1 Route A enters the Precautionary Area associated with the entrance to Ambrose Channel. Prior to reaching the Precautionary Area, the route enters a charted danger area. EW 1 Route A then follows the same alignment as Route B to landfall.

### 2.1.2 EW 1 Route B (Proposed Project Alternative)

EW 1 Route B Alternative (40 nm [46 mi, 74 km]) from the Lease Area to the export cable landfall is a route designed to mitigate the impacts to Cholera Bank. EW 1 Route B departs the Lease Area along its northern boundary and continues north-northwest across the outbound lane of the Ambrose to Nantucket TSS (**Figure 2**) and then enters the separation zone between the traffic lanes before turning to the west. The route continues through the traffic separation zone towards New York Harbor reaching the Precautionary Area at the end of the traffic lanes. Prior to reaching the Precautionary Area, the route enters a charted danger area. Risks of encountering UXO in this area have been and will continue to be studied to evaluate what mitigation measures may be necessary. This routing avoids the shallower and more complex seabed areas associated with Cholera Bank while minimizing impacts to the TSS lanes.

To minimize the traverse of the charted danger area, the route turns to the northwest and crosses the planned path of the Wall, New Jersey to Long Island (Wall-LI) telecommunications cable system (personal communications). The route passes approximately 2.0 nm (2.3 mi, 3.8 km) north of the Ambrose Channel Pilots Buoy, where it resumes a westerly direction after exiting the danger area.

North of the Red “4” Ambrose Channel buoy, the route turns to the northwest to stay north of the Ambrose Channel, a dredged and maintained shipping channel under the authority of the USACE. Ambrose Channel is authorized to a depth of 53 feet (ft, 16.2 meters [m]), with a width of 2,000 ft (610 m).<sup>3</sup> The route maintains an approximately 1,250 to 1,300-ft (380 to 400-m) offset from the designated channel boundary and is over 980 ft (300 m) outside of the boundaries of the areas dredged to maintain the channel.

Empire is proposing EW 1 Route B due to its minimization or avoidance of interaction with key constraints including Cholera Bank, TSS lanes, and a charted danger area.

### 2.1.3 EW 1 Route C

EW 1 Route C Alternative (41.8 nm [77.4 km]) from the Lease Area to the export cable landfall was designed to minimize potential risks from UXO by avoiding the charted danger area (**Figure 2**). EW 1 Route C follows Route B out of the Lease Area and then continues across both the inbound and outbound traffic lanes of the TSS before turning west to stay north of the danger area. This route increases the distance within the inbound TSS traffic lane and also traverses a large but not formally defined de facto anchorage just north of the danger area. As anchoring here is less regulated and more dispersed, protection via deeper cable burial would need to occur over a larger area, increasing costs and impacts. As such, EW 1 Route B has been evaluated as the best approach. West of this area, EW 1 Route C follows the same alignment as EW 1 Route B.

## 3. ALTERNATIVES ANALYSIS

Except in certain cases, 40 CFR Part 230 prohibits discharge of dredge or fill material where a practicable alternative exists to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is considered practicable if it is available and could be implemented considering cost, existing technology and logistics in light of the overall project purpose. The overall project purpose is the construction and operation of a commercial scale offshore wind energy project for renewable energy generation and distribution to New York State’s energy grid in support of New York’s renewable energy mandates. This alternatives assessment is

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<sup>3</sup> Additional correspondence with the USACE dated August 20, 2020 indicates that that the USACE has received approvals to evaluate and report on the feasibility of improving Ambrose Channel from 53 ft (16 m) to 58 ft+ (18 m) mean lower low water (MLLW).



provided in accordance with the 404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged or Fill Material.

Under the 404(b)(1) Guidelines, if a proposed activity is to be located in a special aquatic site but is not water dependent, practicable alternatives not involving special aquatic sites are presumed to be available unless the applicant demonstrates otherwise. Offshore wind farms are generally considered not to require access or proximity to or siting within a special aquatic site to fulfill their basic project purpose (wind energy generation), and therefore are not water dependent. Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs and riffle and pool complexes. The proposed Project does not cross any identified special aquatic sites, and Empire has not identified any special aquatic sites that would be affected by the proposed Project. As a result, the presumption does not apply to EW 1.

### **3.1 Purpose and Need**

The purpose and need for the Project is to develop a commercial-scale offshore wind energy facility in Lease Area OCS-A 0512 with wind turbine generators, an offshore substation, and electric transmission cables making landfall in Brooklyn, New York to support the achievement of New York's renewable energy mandates.

In August 2016, the Commission adopted the Clean Energy Standard.<sup>4</sup> Under this standard, 50 percent of New York State's electricity must come from renewable sources of energy by 2030. In 2017, New York set a goal of having 2.4 gigawatts of energy generated by offshore wind by 2030, which the Commission adopted as a supplementary goal for its Clean Energy Standard by order dated July 12, 2018.<sup>5</sup> On November 8, 2018, the New York State Energy Research and Development Authority (NYSERDA) issued its first competitive solicitation for 800 megawatts (MW) or more of new offshore wind projects. On July 18, 2019, Empire and the 816-MW EW 1 Project was announced as a winner of that first state solicitation. On the same day, the Climate Leadership and Community Protection Act (CLCPA) was signed into law. The CLCPA requires that the State obtain 70 percent of its electricity from renewable sources by 2030 and 100 percent by 2040, and that New York has 9,000 MW of offshore wind capacity by 2035. Equinor Wind US LLC and NYSERDA entered into the Offshore Wind Renewable Energy Certificate Purchase and Sale Agreement (PSA) on October 23, 2019. Equinor Wind US LLC subsequently entered a 50-50 partnership with bp plc in 2021 and assigned Lease OCS-A 0512 to Empire Offshore Wind LLC. The PSA requires Empire to design, obtain permitting/approvals for, build and operate the Project and to sell the Offshore Renewable Energy Certificates generated to NYSERDA.

The Project is needed to meet the Empire's obligation to NYSERDA to generate approximately 816 MW of clean, renewable electricity from an offshore wind farm located in the Lease Area for delivery into the New York State power grid via ConEdison's existing Gowanus 345-kilovolt (kV) Substation. The Project is an essential element in addressing the need identified by the State for renewable energy and will help the State achieve its CLCPA mandate and other renewable energy goals.

### **3.2 No Action Alternative**

Under the No Action Alternative, the Project would not be built, the PSA contract between Empire and NYSERDA would not be fulfilled, and the Project's purpose to generate and deliver to New York renewable energy from the offshore wind farm in the Lease Area in furtherance of New York's renewable energy mandates and goals would not be met. The No Action Alternative does not meet the criteria to generate renewable energy

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<sup>4</sup> Case 15-E-0302, *Large-Scale Renewable Program and Clean Energy Standard*, Order Adopting a Clean Energy Standard (Issued and Effective August 1, 2016).

<sup>5</sup> Case 18-E-0071, *In the Matter of Offshore Wind Energy*, Order Establishing Offshore Wind Standard and Framework For Phase 1 Procurement (Issued and Effective July 12, 2018).

through a commercial-scale offshore wind energy facility within the area defined by Lease OCS-A 0512 to meet the PSA to provide approximately 800 MW of energy to the New York State energy grid.

The No Action Alternative would result in no construction and operation of a commercial scale wind energy project, and therefore does not meet the Project's overall purpose. Because it does not meet the Project's purpose, the No Action Alternative is not a practicable alternative and is eliminated from further consideration.

### 3.3 Cable Landfall Alternatives

To identify the preferred cable landfall site, Empire conducted coastal and waterfront engineering analyses of the risks and benefits of potential cable landfall locations at multiple sites in New York. Depending on the distance to the onshore substation, the submarine export cables may transition to onshore export cables between the cable landfall and the onshore substation, or in the case of the EW 1 Cable Landfall Alternative at the South Brooklyn Marine Terminal (SBMT), the submarine export cables may be pulled directly into the onshore substation (hereafter, EW 1 onshore export cables). Interconnection cables leave the onshore substation to deliver power to the POI. The onshore cable route refers to the complete route traversed by the onshore export and interconnection cables between the submarine cable landfall and the POI. The locations of potential cable landfalls were also informed based on the submarine export cable routing analysis (Section 3.3.3), and the onshore substation site selection (see Section 2.1.3.2 of the COP in **Appendix D-1 of Attachment D**).

Based on the location of the POI, the study area for a potential submarine export cable landfall includes the Brooklyn shoreline between Coney Island to the south, and the Sunset Park and Red Hook neighborhoods to the north. For much of this highly developed area, which borders the upper part of the Lower Bay of New York Harbor, Gravesend Bay, and Upper Bay, the shoreline typically consists of bulkheads, steel sheet piles, seawalls, wood piles, riprap, concrete and other debris, or a combination thereof. In some areas, relic structures and marine debris remain from former shoreline developments. Cable and other asset crossings are present across the navigation channels. Potential shoreline locations of adequate size for the submarine export cables to make landfall are limited, due to the highly developed nature of the area.

Cable landfalls to the north of SBMT and ConEdison's Gowanus 345-kV Substation were eliminated. Potential landfall sites further north would lengthen the overall transmission system from the offshore substation to the POI (thereby increasing cost, time and potential environmental impacts) and would need to represent substantial benefit to offset these undesirable attributes. Furthermore, routes making landfall north of the Gowanus 345-kV Substation add significant complexity due to challenges of constructing within or across the Gowanus Canal, currently a U.S. Environmental Protection Agency Superfund site. Therefore, the concept of landfall north of the Gowanus 345-kV Substation was not explored further. The concept of a direct landfall to the Gowanus 345-kV Substation was also eliminated, due to the potential complexities associated with an existing cable landfall (Bayonne Transmission) at that location. It was also recognized that the need to construct an onshore substation on a separate parcel would negate potential benefits of direct landfall to the Gowanus 345-kV Substation, because a land route would still be required to connect to the proposed onshore substation site.

In response to feedback from USACE and other stakeholders, Empire evaluated cable landfall alternatives as far south as Coney Island and within Gravesend Bay and associated onshore routes to the POI. The remaining conceptual landfall alternatives selected for detailed evaluation were located along the Brooklyn waterfront to the north of the Verrazzano-Narrows Bridge.

From each cable landfall alternative, the goal of the onshore cable routing was to develop a constructible route that is largely sited within public rights-of-way (ROWs) and minimizes impacts to the environment and the public. Siting the onshore cable routes to use public ROWs, where possible, is advantageous because the area is congested and highly developed, and is generally made up of small, privately owned lots with insufficient space for constructing the Project. Public ROWs limit the number of stakeholders directly impacted and the number of new landowner easements that must be acquired for the onshore cable route. However, minimizing in-street work reduces impacts on traffic, enhances safety during construction, and typically shortens the duration of installation. Roadways also typically contain gas, sewer, water, telecommunications, and electric utilities, which add routing and workspace constraints, construction logistics and complexity.

During conceptual routing, the route alternatives that had some construction flexibility for siting refinement were preferred. For example, roadway corridors with available shoulders or space on both sides of the roadway were preferred. Wide corridors are needed to allow for adequate construction workspace and access for installation of the Project and to minimize the potential need for road closures. By routing the Project along wider ROW corridors, constraints during the route assessment and development process can more easily be avoided with minor modification of the route alignment and/or construction workspace.

### 3.3.1 Cable Landfall Evaluation Criteria

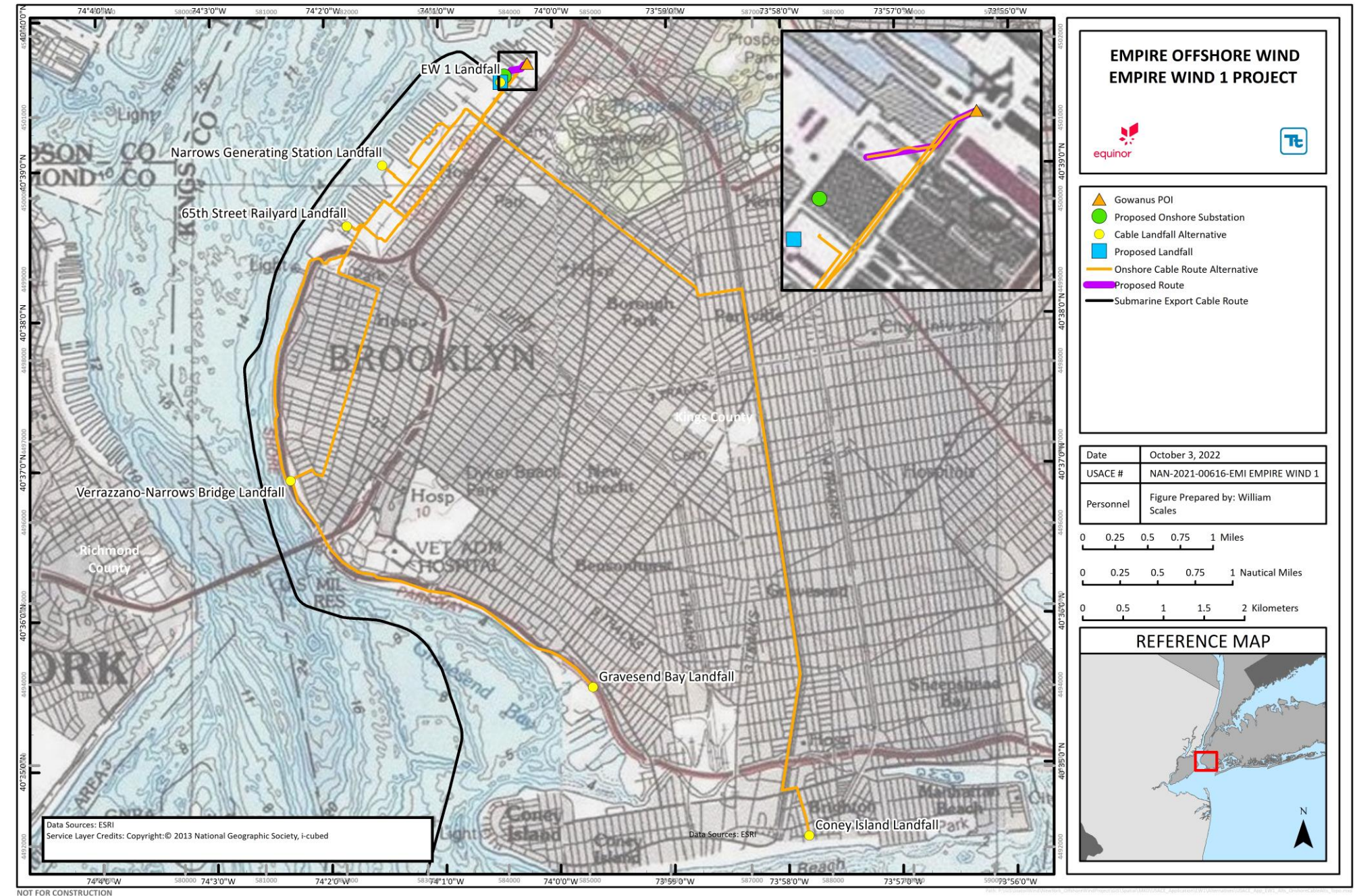
The evaluation of cable landfall, submarine and onshore cable route alternatives was conducted as an iterative process that involved multiple steps of evaluation of the offshore and onshore cables routes, constraints on potential landfall locations, and the feasibility of landfall installation methodologies at potentially suitable landfall sites. Each of these Project components, although described as separate evaluations, were considered in concert for the selection of the overall proposed solution for the Project.

Cable landfall alternatives that were evaluated in detail are shown in **Figure 3**. Each landfall was evaluated relative to the following existing technology, cost, logistical, environmental, and stakeholder considerations:

- Proximity to the preferred POI (e.g., onshore route length);
- Prior subsea cable landfall success in nearby areas;
- Staging area size/options (e.g., preferably land without permanent structures, with a minimum size to allow for adequate staging);
- Hydrodynamics and sediment dynamics (e.g., erosion);
- Artificial interferences (e.g., fish trap area, pipelines, dredging);
- Environmental, wildlife habitat, and cultural considerations (e.g., eelgrass, dunes, wetlands, buried and/or submerged cultural resources);
- Technological and logistical constructability complexities (e.g., utility congestion); and
- Land use (consistency of existing uses, minimizing impacts to public lands).

Cable landfalls were evaluated relative to the use of horizontal directional drilling (HDD) installation methodology, as well as open cut methodology. These methods are briefly described below and evaluated for the proposed cable landfall in Section 3.4.5.





**Figure 3 Cable Landfall and Onshore Cable Route Alternatives**

### 3.3.1.1 HDD Installation

Horizontal directional drilling is a trenchless installation method often used to install cables in ducts under sensitive coastal and nearshore habitats, such as dunes, beaches, waterways, and submerged aquatic vegetation. HDD can also be used to cross under major infrastructure, including railroads and highways. Typically, HDD operations for an export cable landfall originate from an onshore landfall location and exit a certain distance offshore, determined by the water depth contour and total HDD length considerations. To support this installation, both onshore and offshore work areas are required.

The onshore work areas are typically located within the cable landfall parcel, supporting a drilling rig containment pit for drilling mud, a drill control cab, and staging of the drill stem and drilling mud production/recycling. Once the onshore work area is set up, the HDD activities commence using a rig that drills a borehole underground. The drill begins with a pilot bore that consists of advancing a steerable, rotary drill bit along the design alignment from the drill rig entry location to the exit location. Once the pilot bore is completed, the drilling assembly is removed and replaced with a reaming assembly. Reaming involves enlarging the pilot bore to a larger diameter to accommodate the conduits. Depending upon the required diameter, multiple passes with reamers of increasing diameter may be required to incrementally enlarge the pilot bore to its final diameter.

Upon completion of the reaming pass(es), the condition of the HDD bore is assessed by completing a swab pass through the bore. This pass consists of pushing or pulling a slightly smaller diameter barrel or ball reamer through the fully reamed bore from start to finish. When the reaming operation is completed, the conduit (steel or high-density polyethylene) in which the submarine cable will be installed, is pulled back onshore within the drilled borehole from the offshore exit side.

The offshore exit location requires some seafloor preparation in order to collect any drilling fluids that localize during HDD completion. Depending on the seabed conditions, a temporary steel casing may be installed on the exit side from a jack-up barge to below the mudline. This jack-up barge would also house a drill rig. Seabed preparation may also be completed with the installation of a cofferdam for each HDD and excavation to remove material from the cofferdam. A pit would be excavated or material within the cofferdam would be dredged prior to installation of the conductor casing. The offshore work area for HDD installation requires approximately 10,000 square feet (930 square meters), and siting consideration is needed to avoid impact to marine traffic.

Onshore, the entry side of the HDD installation requires an approximate workspace of 246 by 246 ft (75 by 75 m). The entry side staging area is required to locate equipment necessary for the installation, which includes the drill rig, stacks of drill pipe, operator control cabin, tooling trailers, crane or excavator, separation plant, mud tanks, mud pumps, water storage tanks, office trailer, and support trailers.

In addition to the entry and exit staging areas, a conduit staging area is also required for fabricating each conduit (or pipe) string. Each conduit string is fully fabricated into a single string with a length equivalent to the approximate length of the HDD installation (additional length may be necessary to account for geometry). This results in a conduit staging area requirement for a single conduit string that is typically 20 to 25 ft (6.1 to 8.2 m) wide by the length of the conduit string (approximately 2,460 ft [750 m]). The conduit string is floated out to the offshore HDD exit location, where it is installed using the drill string to pull it back through the drill hole.

HDD installations also require the overlying soils to possess sufficient strength to resist the required drilling fluid pressures during the installation and to allow the fluids to flow through the bore path created by the drilling equipment and back to the drill rig location. Sands, silts, and clays, when in a very soft or very loose



state, may not provide sufficient strength to resist the required fluid pressures necessary to complete an HDD installation. It is important to note that longer installations typically require greater depths of cover to allow for sufficient overlying strength to resist the drilling fluid pressures.

Inadvertent returns occur when drilling fluid pressures exceed the strength of the overlying geotechnical material, and pressure causes the drilling fluids to follow a path that flows upwards and outwards until the pressure is relieved. Drilling fluids reaching the sediment surface may pond on the ground surface in uplands or be released on the seabed as inadvertent returns. All HDD installations carry some risk of an inadvertent drilling fluid return, especially during the exit curve and exit tangent, as the drill bit is steered upwards toward the ground surface or seabed. Inadvertent return risks can be reduced along the majority of an HDD alignment by selecting an appropriate depth of cover that provides sufficient overlying strength to resist the required fluid pressures; however, near the entry and exit points an HDD will need to cross shallow sediments.

Geotechnical conditions, HDD geometry, and bending radii dictate HDD installation depth, which may be driven by a combination of factors, including sediment characteristics, the required HDD entry angle, avoidance of existing shoreline infrastructure, limitations on the length of the drill, and potential impacts on maritime traffic at the location of the HDD exit point.

### 3.3.1.2 Open Cut Installation

Open cut alternatives and other non-trenchless installation methods would use standard submarine cable installation methods to facilitate installation at target burial for approach to landside. Open cut methods may include open cut trenching/dredging or jetting to bury the cables up to the landfall conduits. Jetting involves the use of pressurized water jets into the seabed, creating a trench. As the trench is created, the submarine export cable is able to sink into the seabed. The displaced sediment then resettles, naturally backfilling the trench.

Dredging is used to excavate, remove, and/or relocate sediment from the seabed/waterway in order to allow for the cable to make landfall at the target installation depth. Dredging can be completed through clamshell dredging, suction hopper dredging, and/or hydraulic dredging. During dredging activities, the material is collected in an appropriate manner for either re-use or disposal (depending on the nature of the material) and in accordance with applicable regulations.

A typical open cut method would involve installation of a sheet pile cofferdam to isolate the area of the shoreline at the landfall, dewatering within the area of the cofferdam, and excavating a trench for each cable within the dry cofferdam(s). Cable conduits would then be installed within the trench and the trench would be backfilled. Following installation of the conduits across the shoreline, the cables would be pulled through the conduits for final installation.

Additional non-trenchless installation methodologies are also considered at the interface of a developed shoreline for landfall (e.g., rip rap, bulkhead or sheet pile) and include installation “through the bulkhead” or “over the bulkhead,” which would involve trenching/dredging or jet plowing the submarine export cables to the target burial depth along the approach to landside (see Section 3.4.5). These methods use conduits to install the cables over or through the developed shoreline feature, rather than trenching across such features.

### 3.3.2 Cable Landfall Alternatives

The cable landfall analysis is described in this section. Empire considered potential landfall alternatives in Coney Island and along Gravesend Bay, as well as four sites to the north of the Verrazzano-Narrows Bridge. Three of these northern landfall alternatives are immediately adjacent to the onshore substation alternatives (see Section

2.1.3.2 in the COP **Appendix D-1 of Attachment D**). Cable landfall and onshore cable route alternatives were evaluated relative to the criteria listed in Section 3.3.1. The cable landfall and associated onshore cable route alternatives are considered together, since they are interdependent (i.e., a viable onshore cable route alternative needs a viable cable landfall alternative and vice versa).

### 3.3.2.1 Coney Island Alternative

#### **Coney Island Cable Landfall**

Empire evaluated a large public parking area on the north side of Brighton Beach as a potential Coney Island Cable Landfall Alternative. The Brighton Beach public parking area is located immediately to the south of Brightwater Circuit, opposite Brighton 3<sup>rd</sup> Street. The parking area covers approximately 2 acres (ac, 0.8 hectares [ha]), and it is bounded by the Rieglemann Boardwalk to the south and Brighton Beach Playground to the west. Otherwise, the surrounding area consists largely of high-rise buildings with mixed residential and commercial developments.

This parking lot represents one of relatively few large parcels without structures directly adjacent to the beach, with a relatively unobstructed approach for cable landfall. Other open parcels along the south side of Coney Island are generally more obstructed and/or consist of public parkland in recreational use, with the exception of similar large parking areas associated with Steeplechase Park and the Abe Stark Sports Center to the west, or Manhattan Beach parking towards the eastern end of Coney Island. In general, the waters to the south of Coney Island are shallow, and geophysical and geotechnical characteristics (i.e., non-cohesive soils) adjacent to other potential cable landfall parcels on the south side of Coney Island are expected to be similar.

Water depths in the vicinity of a south shore Coney Island cable landfall alternative are expected to present a significant challenge for construction of an HDD cable landfall. Nearshore waters are predominantly less than 16 ft (5 m) deep at 3,000 ft (914 m) from the shoreline, which is the approximate practicable limit of HDD installation and subsea cable pulling for EW 1. This does not achieve the 33 ft (10 m) depth that is required for the typical submarine export cable installation vessel. The result is that an HDD cable landfall to the southern shore of Coney Island would result in a long, risky, and significantly costly HDD, due to the additional cost and complexity of using specialized vessels and techniques required for a cable landfall installation in shallower water. The relatively shallow water depth at the HDD exit offshore would also mean potential concern for seabed mobility, since there would be increased risk of the cable becoming unburied or requiring burial mitigation in these shallow water areas during operations of the cable system.

Because Coney Island was formed during the last period of glaciation, its soils are expected to be underlain by glacial tills (unconsolidated material from boulders sand pebbles to sand and clays) and outwash deposits, which would present a significant challenge to HDD installation and result in a high likelihood of inadvertent returns (unintended discharges of drilling fluids). Empire could not find any record of successful HDD installation or operations in the vicinity of the south shore of Coney Island.

While an HDD cable landfall is likely to prove challenging, it is also unlikely that an open cut would be feasible or permitted, because Coney Island's shoreline is regulated as a Coastal Erosion Hazard Area. It is also a potential area of significant erosion risk in New York City (NYC Emergency Management 2019), due to the area's exposure to wave action from the Atlantic Ocean, which would require the cable landfall to be installed deep enough to avoid impacts from coastal processes. Empire met with the New York City Department of Parks and Recreation (NYCDPR) on November 20, 2020; NYCDPR indicated that a longstanding relationship exists between New York City, New York State Department of Conservation and the USACE regarding the nourishment of Coney Island's shoreline, as it is an area that provides important shoreline protection.

NYCDPR indicated that this obligation and function as shoreline protection, and the known erosion risk, would need to be considered for any installation activities.

Unlike the other cable landfall alternatives considered, a cable landfall at Brighton Beach with either HDD or open cut would cross sandy beach and intertidal habitat. Although surface impacts would be avoided by an HDD, if feasible, noise and disturbance adjacent to the beach could impact the use of the area by wildlife such as shorebirds, as well as public users of the beach, which is heavily used for recreation. Based on the U.S. Fish and Wildlife Service's Information for Planning and Consultation tool (USFWS 2021), Coney Island beaches may serve as potential habitat for federally listed species, specifically Red Knot, Piping Plover, Roseate Tern and Seabeach Amaranth.

Per NYCDPR, an easement across Brighton Beach would require pursuit of New York State parkland alienation legislation, which would also add regulatory challenges and schedule risk. Because Brighton Beach has also received federal grant money through the Land and Water Conservation Fund (e.g., Project # 36-00618 [1978]), any easement across such lands may trigger a separate parkland conversion review process; that process requires additional time to complete and is governed by the National Park Service (NYSOPRHP 2012). National Park Service rules require consideration of practicable alternatives to the conversion, which is likely to be a significant hurdle to overcome given the existence of identified practicable alternatives for the EW 1 Project (e.g., the proposed alternative).

### **Coney Island Onshore Cable Route**

From the cable landfall alternative on the south shore of Coney Island, the onshore export cable route alternative maximizes use of Ocean Parkway, which is the widest north-south roadway corridor, to reduce space-related constraints for construction and utility congestion along the narrower north-south corridors in the vicinity. Ocean Parkway is a divided 6-lane road, edged by trees, and with additional carriage lanes on either side. From the cable landfall at the Brighton Beach public parking area, this route alternative proceeds north up Brighton 3<sup>rd</sup> Street to Neptune Avenue, and then north along Ocean Parkway. After entering the Kensington neighborhood, the route turns west along Ditmas Avenue, briefly north along Dahill Road and then continues northwest along 39<sup>th</sup> Street to the south of the Green-Wood Cemetery until it reaches 2<sup>nd</sup> Avenue at the southeast corner of the SBMT. This route is approximately 7.4 mi (11.9 km) long.

The Coney Island Onshore Cable Route Alternative was the longest onshore cable route considered and was determined to be unreasonably challenging, disruptive, and expensive in light of existing utilities, traffic diversions, development density, and space constraints. The route would involve extensive in-street work within densely developed areas of Brooklyn where street corridors already have significant existing utility congestion.

On December 11, 2020, Empire met with the New York City Department of Environmental Protection (NYCDEP) to better understand the potential in-street constraints and the presence of existing infrastructure. According to information provided, at minimum, the Coney Island Onshore Cable Route Alternative would encounter a water main and sewer main on every block, with additional considerations needed for storm sewers as well. Water mains typically are located at 4 ft (1.2 m) depth, which means special crossing methods would need to be employed on each block. Additionally, a NYCDEP interceptor main runs east-west along the length of Coney Island, along with the New York Metropolitan Transit Authority subway lines. Given the busy, developed nature of the area, it would be necessary to maintain traffic flow during cable installation, which would increase the number of trenchless crossings required along the route and the associated installation complexity.



This existing utility and infrastructure congestion limits the available space for routing duct banks for the cables, and the number of infrastructure crossings along the roadway corridor adds significant cost. The construction duration associated with the need for additional geotechnical work; cable splice and transition vaults; HDD, jack-and-bore and other trenchless infrastructure crossings; utility relocations; and soil and water management, decontamination, and disposal is a significant factor. Extended in-street construction and multiple trenchless crossings will exacerbate the potential for noise impacts to local residents during construction, as well as traffic and transportation impacts.

In addition to these considerations, Ocean Parkway, which was selected as the widest potential north-south corridor, affording the most potential space and flexibility to deal with the infrastructure-related challenges along the route, is designated as New York City Scenic Landmark. Disruptions from construction noise, traffic, and recreational use along a parkway with this status are likely to preclude the use of this route.

### **Coney Island Summary**

The Coney Island Cable Landfall Alternative is not a practicable alternative for the Project. The cable landfall on Coney Island would reduce the length of the submarine export cable route (and associated disturbance to the marine environment for installation) by approximately 9.6 mi (15.4 km) relative to the proposed alternative, and it would avoid submarine pipeline and cable asset crossings in the vicinity of the Narrows. However, the technical and regulatory challenges associated with the cable landfall and the onshore cable routing render it impracticable relative to cost, existing technology and logistics. The cable landfall and associated onshore cable route have significant logistical constraints that include vehicular traffic, pedestrian foot traffic, residential and commercial development density, noise impacts, business impacts, constructability, workspace constraints due to existing infrastructure, a designated landmark and regulatory challenges.

#### **3.3.2.2 Gravesend Bay Alternative**

##### **Gravesend Bay Cable Landfall**

Empire considered a route that would make cable landfall to the north of Coney Island, within the southern portion of Gravesend Bay. Similar to Coney Island, there are a number of constraints for selecting potential cable landfalls within Gravesend Bay. There are very few parcels of sufficient-sized, open land areas that are not already dedicated as public parklands. For the Gravesend Bay Cable Landfall Alternative, Empire evaluated a private car lot located to the north of the New York City Sanitation Department BK11 garage along 25<sup>th</sup> Avenue, adjacent to Shore Parkway. The lot occupies approximately 3 ac (1.2 ha).

To the south of this location, cable landfalls are constrained by shallow waters, public open space and/or piers and other obstructions. Another similar parking lot space, and a park/open space area exist immediately to the north. These are not described separately in detail because considerations for the cable landfall and associated onshore cable route would be highly similar to those discussed for the evaluated Gravesend Bay Cable Landfall Alternative. Due to the Shore Parkway and adjacent high-rise development, no potential sites for cable landfall exist farther north until the area near the area of Fort Hamilton, at the northern end of Gravesend Bay.

Similar to the Coney Island Cable Landfall Alternative, water depths in the vicinity of the Gravesend Bay Cable Landfall Alternative are expected to present a significant challenge for an HDD cable landfall construction. Nearshore waters are mostly shallow, with depths of 13.1 ft (4 m) or less in much of the area out to 3,000 ft (914 m), which is the approximate technical limit of HDD installation. However, bathymetry shows a deeper channel at 26 ft (8 m) depth that runs near the Gravesend Bay shoreline from the north, presumably providing pier access. This does not achieve the 33-ft (10-m) depth that is typically required, but it could provide enough water depth for operation and staging of HDD cable landfall equipment.

The cable landfall approach and shoreline show evidence of old piers and shallow riprap along the shoreline, and a seawall to the north and west of the cable landfall would need to be avoided by an HDD cable landfall. Assessment of a potential HDD also indicated a potential high risk for inadvertent returns of drilling fluid. Based on the fact that Coney Island and Long Island were formed during the last period of glaciation, the soils throughout the area are likely to be underlain by glacial tills. The sediment in the area is therefore expected to be loose, unconsolidated material from boulders and pebbles to sands and clays. These highly variable soil conditions are not conducive to HDD operations, as stated above, because they make it difficult to maintain the borehole, and if large grain content (i.e., gravel, cobbles, till) is present, this may limit the technical feasibility of HDD operations and increase risks of inadvertent returns.

Because of the greater area and duration of construction within shallow waters associated with this cable landfall alternative, it is also expected to result in somewhat greater impact to habitats for species such as winter flounder and horseshoe crab than other cable landfall alternatives considered. Beaches in this area are considered locally important for horseshoe crab spawning (including Calvert Vaux and Dyker Beach Parks, NYC 2021a), and impacts to horseshoe crab spawning have been raised as a concern by environmental stakeholders for other area projects such as the New York City Economic Development Corporation (NYCEDC) ferry terminal project at Coney Island Creek (USACE 2021). Since the cable landfall would be installed underground to a paved parking area, however, these impacts for Empire's Project would be limited to temporary impacts during construction.

#### **Gravesend Bay Onshore Cable Route**

Empire evaluated a route from the Gravesend Bay Cable Landfall Alternative that follows 25<sup>th</sup> Avenue to Shore Parkway, and then turns northwest, following along a relatively narrow vegetated margin on the west side of Shore Parkway, crossing Bensonhurst Park and continuing along the narrow shoreline to Dyker Beach Park. At that point, the route crosses Shore Parkway and continues along the northeast side of Shore Parkway adjacent to Fort Hamilton, due to the very limited space between the Shore Parkway and the seawall along the shoreline. Crossing under the Verrazzano-Narrows Bridge, this onshore cable route alternative continues along the north side of Shore Parkway to Shore Road Park. From there, this route can either continue along Shore Road Park or follow an inland along the 3<sup>rd</sup> Avenue Onshore Cable Route Alternative, as described in Section 3.3.2.3 for the Verrazzano-Narrows Bridge Onshore Cable Route Alternatives. Routes from the Gravesend Bay Cable Landfall Alternative are approximately 7.3 mi (11.7 km) long.

This Gravesend Bay Onshore Cable Route Alternative follows approximately along the shoreline of Gravesend Bay to the Verrazzano-Narrows Bridge crossing several municipal parklands, including Bensonhurst Park, Dyker Beach Park, Shore Road Park, and Owl's Head Park. Empire met with the NYCDPR on November 20, 2020, to discuss considerations for onshore route alternatives crossing parklands. These crossings are likely to require easements, which would include certain development restrictions. Based on information provided, easements across these parks are expected to require parkland alienation legislation. Although it may be possible for Empire to obtain the parkland alienation required, the process would add significant time, complexity and risk to the Project; the existence of alternatives for the Project that reduce or eliminate impacts to parkland (e.g., the proposed alternative) may be challenging to overcome within the process (NYSOPRHP 2012), and the process may face stakeholder opposition, particularly given the length and number of parks that would need to be crossed.

In addition to municipal parkland, the Gravesend Bay Onshore Cable Route Alternative would also need to cross federal land associated with Fort Hamilton, which would require coordination and easement rights obtained through the Department of the Army. Review of mapping provided by NYCDPR indicates that there would not be sufficient space to stay on municipal land through this area. Obtaining easement rights through

federal lands that are under the Department of Defense, if possible, is expected to be challenging and add further risk associated with land acquisition.

Construction along portions of this route is expected to be technically challenging due to space constraints between Shore Parkway and the seawall, access, and existing infrastructure. During a meeting with the NYCDEP, Empire verified the density of outfall infrastructure that would need to be crossed along the Gravesend Bay shoreline. Based on mapping from the NYCDEP (Open Sewer Atlas NYC 2019a, 2019b), it appears more than 100 outfalls are located along the shoreline adjacent to this route.

It is also likely that one or more additional on-land HDD segments would be required to avoid existing roadway infrastructure and potentially deep foundations/piles, such as the on/off ramps in the area of the Verrazzano-Narrows Bridge. The Metropolitan Transit Authority included a deck reconstruction project associated with the Verrazzano-Narrows Bridge as part of its 2020-2024 capital program (MTA 2020). In 2020, MTA completed improvements including an expansion of the Fort Hamilton Parkway exit to two lanes, and the addition of a fourth eastbound lane from the Verrazzano-Narrows Bridge to the Fort Hamilton Parkway exit (MTA 2020).

To the north of the Verrazzano-Narrows Bridge, this route is as described in Section 3.3.2.3 for the Verrazzano-Narrows Bridge Alternatives.

### **Gravesend Bay Summary**

The Gravesend Bay Cable Landfall Alternative would reduce the submarine export cable route length (and associated disturbance to the marine environment) by approximately 6.1 mi (9.9 km) relative to the proposed alternative and would avoid pipeline and cable asset crossings in the vicinity of the Narrows. However, the Gravesend Bay Cable Landfall Alternative is not practicable, due to the logistical considerations of HDD cable landfall constraints, including shallow water, shoreline obstructions, the risk of inadvertent returns during HDD installation and the onshore cable routing. An open cut landfall would not be used at this location due to the existing shoreline bulkheading and additional environmental impacts associated with trenching across the intertidal zone (see Section 3.3.2.1). Significant logistical constraints along the onshore export cable route include disruption of recreational use of Shore Road Park, noise impacts, business impacts, constructability, existing infrastructure density, and workspace constraints. Additionally, the Gravesend Bay Onshore Route Alternative has technical and regulatory challenges associated with federal and municipal lands.

### 3.3.2.3 Verrazzano-Narrows Alternative

#### **Verrazzano-Narrows Bridge Cable Landfall**

The parcel at the Verrazzano-Narrows Bridge Cable Landfall Alternative consists of open park space (Shore Road Park) under the control of NYCDPR adjacent to Shore Road and the Belt Parkway, on the northwest side of the Verrazzano-Narrows Bridge. This site represents one of the few areas of open space available along the waterfront with adequate space for staging cable landfall installation equipment (e.g., HDD rig). Within Shore Road Park, the Verrazzano-Narrows Cable Landfall Alternative is located in an area consisting of playing fields and a baseball diamond, identified as Bobby Bello Field, located immediately south of the Shore Road Field House. The Bay Ridge Promenade runs south to north along New York Harbor on the opposite side of Shore Parkway from this location.

Given the need to cross an existing seawall, the Bay Ridge Promenade, and Shore Parkway/Belt Parkway in order to reach the start of the onshore cable route at this location, the Verrazzano-Narrows Cable Landfall

Alternative would need to be installed via HDD (see Section 3.4.5 for evaluation of cable landfall installation methodologies), since trenching across any of these features is impracticable.

Construction of the submarine export cable landfall by HDD would be complicated by the existing seawall, which is assumed to extend 23 to 26 ft (7 to 8 m) below the mudline, built on a timber crib wall or timber piles, with riprap extending to the shoreline. Water depths adjacent to the cable landfall site are shallow (approximately 4 to 6 ft [1.5 to 2 m]) nearshore and extend to approximately 98+ ft (30+ m) deep in the channel. No UXO are noted, but other unidentified obstructions are present in the area on National Oceanic and Atmospheric Administration (NOAA) charts, including a cable area south of the bridge. Strong currents may be present in the area, but coastal processes do not appear to be a limiting constraint for a cable landfall.

Assessment of potential HDD alignments and water depths at this location determined that the drill exit on the water side, where a cofferdam and conductor casing would likely be required, would be near medium to high levels of vessel traffic on the north side of the Verrazzano-Narrows Bridge. Given the duration of HDD installation (estimated at approximately two months per drill [with one drill per circuit]), this could result in a significant duration of impact to marine users. Impacts to marine traffic through the Narrows from the HDD would require additional coordination with the United States Coast Guard (USCG) to determine whether impact minimization or mitigation would be possible for this alternative.

The entry side of the HDD would be located within the playing fields in Shore Road Park. Since there is no direct access from public roadways adjacent to the site, and there are slopes immediately to the east of the playing fields, temporary construction access would be required within the park for vehicles and equipment. An offsite staging area for fabrication is also expected to be required.

Use of this cable landfall is expected to raise stakeholder concerns, due to potential disruptions affecting open space users, noise from HDD activities, and traffic for local residents. Local road closures are not anticipated, but some tree removal within the park would likely be required for staging and access. Use of the playing fields would result in conflict with recreational use of the area for the duration of cable landfall construction activities. To the north and west of the Verrazzano-Narrows Bridge Cable Landfall Alternative, dense residential development, high-rises and sensitive noise receptors are present on the west side of Shore Road. Given the topography and absence of tree screening along portions of Shore Road to the west of the cable landfall area, temporary noise impacts during construction would occur during HDD activities. Temporary visual impacts during construction due to tree clearing, staging, and construction equipment are also a potential stakeholder concern. Because this site is not already developed for industrial use, temporary impacts to vegetation, land use, and terrestrial habitats would be greater than at other cable landfall alternatives considered.

Cable landfall and onshore routing (discussed below) for the Verrazzano-Narrows Bridge Cable Landfall Alternative is also expected to require parkland alienation legislation. Parkland alienation in New York State applies to dedicated municipal parklands. Although it may be possible to obtain alienation legislation, it represents a significant additional procedural requirement that would be needed to use this cable landfall alternative, requiring additional time and support from both the local and State legislative bodies, which introduces additional risk. As described above, the existence of practicable alternatives for the Project that reduce impacts to parkland (e.g., the proposed alternative) likely would be challenging to overcome within the alienation process.

### **Verrazzano-Narrows Onshore Cable Route**

Empire evaluated two onshore export cable routes from the Verrazzano-Narrows Cable Landfall Alternative:

- The Shore Road Park Onshore Cable Route Alternative: from the Verrazzano-Narrows Bridge Cable Landfall Alternative would run north and slightly west from the cable landfall through Shore Road Park and along the Belt Parkway to Owl's Head Park. From there, the route would require an HDD crossing of the Belt Parkway and the 65<sup>th</sup> Street Railyard. To the north of the 65<sup>th</sup> Street Railyard, this alternative would continue north along the west side of the Brooklyn Army Terminal and then turn east along 58<sup>th</sup> Street. The Shore Road Park Onshore Cable Route Alternative would then turn north along 2<sup>nd</sup> Avenue to SBMT and eventually to the POI, similar to other route alternatives described in this section. This route is approximately 4.4 mi (7.1 km) long.
- The 3<sup>rd</sup> Avenue Onshore Cable Route Alternative: from the Verrazzano-Narrows Bridge Cable Landfall Alternative. From the cable landfall in Shore Road Park, this route goes directly north across Shore Road and follows 96<sup>th</sup> Street to the northeast. The route cuts over to the 3<sup>rd</sup> Avenue corridor with a jog to the south along Marine Avenue and then east on 97<sup>th</sup> Street. After continuing north along 3<sup>rd</sup> Avenue, it turns west along Bay Ridge Avenue to Owl's Head Park, then crosses the Belt Parkway and 65<sup>th</sup> Street Railyard, following a similar alignment to the Shore Road Park Onshore Cable Route Alternative described above. This route is approximately 4.5 mi (7.2 km) long. The 3<sup>rd</sup> Avenue Onshore Cable Route Alternative was selected for the evaluation of a north-south corridor that substantially avoids a significant portion (but not all) of the parkland impacts along the waterfront, but instead it requires extensive in-street work in the densely developed Bay Ridge neighborhood.

In the area of the Shore Road Park Onshore Cable Route Alternative, Shore Road Park varies in width from an approximately 75-ft (23-m)-wide north-south strip, to up to 525 ft (160 m) wide in areas with fields, tennis courts, and other recreational infrastructure. HDDs would both reduce surface disturbance to the parkland and avoid areas of steep side slopes that are present along the route. Trenchless construction would also be needed to cross the Belt Parkway/Shore Parkway on the north side of Owl's Head Park, ramps and railroad tracks associated with the 65<sup>th</sup> Street Railyard. These HDDs would be technically challenging and require additional study for feasibility based on soils data, calculations for the cables, and railroad crossing requirements. Overall, the number of HDDs required along this route adds logistical and construction complexity that would increase installation cost and duration.

The Shore Road Park Onshore Cable Route Alternative would also cross the Narrows Botanical Garden, a volunteer-run garden, along Shore Road Park on the east side of the Belt Parkway. Based on a nominal corridor width of 50 ft (15 m), along with the additional temporary workspace at HDDs, bores, and temporary access roads, tree clearing would be required during construction. While much of the cable corridor could be restored post-construction, some tree clearing directly over the cable corridor may be permanent. Infrastructure may also be present along this route; based on mapping from the NYCDEP (Open Sewer Atlas NYC 2019a, 2019b), it appears more than 30 outfalls are located along the shoreline in the vicinity of this route, although it is unknown how many would cross the onshore cable route.

The 3<sup>rd</sup> Avenue Onshore Cable Route Alternative would avoid much of the routing within Shore Road Park and the Narrows Botanical Garden but is expected to encounter significant utility congestion within the relatively narrow roadway corridors found throughout the densely developed Bay Ridge neighborhood of Brooklyn. Although 3<sup>rd</sup> Avenue is relatively large compared to other north-south corridors in this area, it is only approximately 45 ft (14 m) between sidewalks and flanked largely by multi-story and high-rise apartment buildings, with commercial development at ground level. Considerations and logistical constraints include vehicular traffic, pedestrian foot traffic, residential and commercial development density, noise impacts, business impacts, constructability, and workspace constraints due to existing infrastructure. Significant stakeholder opposition may be present due to construction disruptions along this route.



Many of the considerations for the 3<sup>rd</sup> Avenue Cable Route Alternative are similar to those described in Section 3.3.2.1 for the Coney Island Onshore Cable Route Alternative. Investigation of utilities indicated significant utility congestion along this route, and per NYCDEP, this route would also encounter a water main and sewer main on every block. The need to maintain traffic flow is also expected to drive the number and complexity of trenchless crossing installations along this route. Additionally, there is a mapped NYCDEP interceptor main that runs to the north and south along from the Owl's Head Wastewater Treatment Plant that would need to be crossed by either the Shore Park Road or 3<sup>rd</sup> Avenue Onshore Cable Route Alternatives. Assessment of the space available for the 3<sup>rd</sup> Avenue Onshore Cable Route Alternative indicated that joint bays may be especially difficult to locate in the city street for this route.

Both the 3<sup>rd</sup> Avenue and Shore Park Road Onshore Route Alternatives cross Owl's Head Park to the south of the 65<sup>th</sup> Street Railyard. During a meeting with Empire, the NYCPDR indicated that there is significant local concern about preserving Owl's Head Park, and that there has been opposition to previous plans for construction of improvements in the park. Owl's Head Park is the site of the former estate of Brooklyn politician Henry C. Murphy in the 19<sup>th</sup> Century (NYC 2021b). It was later sold to New York City with the stipulation that it remain parkland, and the estate buildings were eventually demolished. Owl's Head Park therefore has potential historic significance. The vicinity of Owl's Head Park is also mapped as an area of potential cultural significance and is notable compared to much of the surrounding area as being on a natural terminal moraine (NYC 2021b) instead of urban filled soils. The NYCDPR indicated that if a crossing of Owl's Head Park is needed, it would be preferable to route around the outer edge of the park, adjacent to Belt Parkway, however it may not be possible to entirely limit impacts to the park edge due to the need to cross the Belt Parkway and the 65<sup>th</sup> Street Railyard via HDD or trenchless methods.

### **Verrazzano-Narrows Summary**

The Verrazzano-Narrows Cable Landfall Alternative reduces the submarine export cable route length (and associated disturbance to the marine environment) by approximately 4.3 mi (6.9. km) relative to the proposed alternative and avoids pipeline and cable asset crossings in the vicinity of the Narrows. However, the Verrazzano-Narrows Bridge Cable Landfall Alternative is not practicable due to logistical constraints associated with the HDD cable landfall and potential for conflict with marine traffic, disruption of recreational use of Shore Road Park, noise, constructability challenges, and additional potential regulatory challenges compared to the proposed alternative. The Verrazzano-Narrows Onshore Cable Route Alternative is also impracticable due to logistics associated with parkland alienation legislation, added cost and complexity of several HDDs, utility congestion along 3<sup>rd</sup> Avenue and the potential for public stakeholder opposition along both routes. Moreover, the route across Owl's Head Park, an area of cultural sensitivity in the vicinity, has the potential to result in other adverse environmental impacts.

#### **3.3.2.4 65<sup>th</sup> Street Railyard Alternative**

##### **65<sup>th</sup> Street Railyard Cable Landfall**

The parcel at the 65<sup>th</sup> Street Railyard Cable Landfall Alternative consists of rail tracks and open industrial land adjacent to the Owls Head Wastewater Treatment Plant and north of the Belt Parkway. This site is adjacent to the 65<sup>th</sup> Street Railyard substation site that was considered by Empire (see Volume 1, Section 2.1.3.2 in the COP **Appendix D-1 of Attachment D**).

The 65<sup>th</sup> Street Railyard is being developed as a significant transportation hub along the Brooklyn waterfront. In 2014, the Port Authority of New York and New Jersey (PANYNJ) published a draft Tier I Environmental Impact Statement (EIS) for the Cross Harbor Freight Program to study cross harbor transportation options to alleviate truck traffic. A Record of Decision was issued in 2016, which included a rail tunnel alternative crossing

the 65<sup>th</sup> Street Railyard as one of the preferred alternatives advanced for further study. Under all operating scenarios for the rail tunnel, the 65<sup>th</sup> Street Railyard would process carload freight moving to and from Brooklyn, parts of Queens, and southern Long Island (FHWA and PANYNJ 2014). Enhanced waterborne transportation alternatives from the 65<sup>th</sup> Street Railyard were also part of this study. On May 5, 2017, the PANYNJ issued a request for proposals for a Tier II EIS of the preferred alternatives for the Cross Harbor Freight Program. In February, 2022, Governor Hochul announced that the Port Authority of New York and New Jersey is resuming work on the Tier II EIS. A FASTLANE grant from the Federal Highway Administration for 65<sup>th</sup> Street Railyard funds additional improvements beyond those contemplated in the Tier II study (FHWA and PANYNJ 2014).

Empire's discussions with New York City stakeholders indicated that plans for the 65<sup>th</sup> Street Railyard, including improvements associated with the Cross Harbor Freight Program, would not be compatible with siting Project facilities due to the likelihood of conflict with other potential uses, which could make obtaining an easement agreement for the cable landfall difficult.

In addition, this site also presents challenges for either HDD or open cut cable landfall installation, due to shoreline infrastructure and cable burial depth limitations. Interferences and obstruction are present at the shoreline. Although as-builts of the seawall were not available, it is assumed to have deteriorated riprap that likely extends below the mudline. Other unidentified obstructions are also present on NOAA charts with only a narrow unobstructed corridor for a potential cable landfall alignment. Water depths immediately adjacent to the cable landfall are very shallow, however, coastal processes in this location do not appear to be a limiting constraint. Similar to other sites considered, the in-water HDD exit would be in deeper waters, which correspond to areas of higher marine traffic offshore. Also similar to other sites, there is a potential high risk for inadvertent returns of drilling fluid during HDD construction. The required depth of an HDD cable landfall may exceed the maximum allowable depth of the cable installation due to thermal resistivity concerns (see Section 3.4.5). Initial feasibility analysis indicated that an open cut solution may be possible at this location, but additional geotechnical assessment would be required to confirm this; however, this assessment was not done because it was determined this site would be unavailable and therefore not practicable.

### **65<sup>th</sup> Street Railyard Onshore Cable Route**

Two onshore cable route alternatives were assessed from the 65<sup>th</sup> Street Railyard Cable Landfall Alternative. From the 65<sup>th</sup> Street Railyard, one onshore cable route alternative would exit the site to 2<sup>nd</sup> Avenue and travel northeast to 28<sup>th</sup> Street, following it to the entrance of the substation at the Gowanus POI. Empire also evaluated a route from the 65<sup>th</sup> Street Railyard that follows 1<sup>st</sup> Avenue to 39<sup>th</sup> Street, traveling east along 39<sup>th</sup> Street to 2<sup>nd</sup> Avenue, and continuing to the Gowanus POI along routes previously described from there. These routes are approximately 2.2 to 2.3 mi (3.5 to 3.7 km).

Of the two routes, the 2<sup>nd</sup> Avenue corridor was determined to be less risky than the 1<sup>st</sup> Avenue corridor, although neither route is practicable, due to site constraints within the 65<sup>th</sup> Street Railyard cable landfall (see above).

The 1<sup>st</sup> Avenue corridor is a two-lane street with an approximate roadway width of 40 ft (12 m) that runs north to south to 39<sup>th</sup> Street, where it ends at the SBMT. An existing rail line, and large diameter sewer interceptor run along this corridor to the north of the Owl's Head Wastewater Treatment Plant. These features constrain the available space for the onshore cable ducts along this corridor. The 1<sup>st</sup> Avenue alternative also crosses the parcel and parking lot associated with the Brooklyn Army Terminal, an industrial manufacturing and commercial business complex managed by NYCEDC, immediately north of the 65<sup>th</sup> Street Railyard, before entering the southern end of 1st Avenue. The Brooklyn Military Ocean Terminal, located at what is now the

Brooklyn Army Terminal, is a listed Formerly Used Defense Site property that staged chemicals for several decades, housing aboveground storage tanks, cask oil storage, and machine shops.

The 2<sup>nd</sup> Avenue corridor is a two-lane city street that runs north-south between 63<sup>rd</sup> and 28<sup>th</sup> Street, which also has an approximate roadway width of 40 ft (12 m); however, some of the large infrastructure that is present along 1<sup>st</sup> Avenue is absent. The street is mostly commercial/industrial development, while the side streets to the east of 2<sup>nd</sup> Avenue are mostly residential. The 2<sup>nd</sup> Avenue corridor generally runs closer to areas of commercial and residential development than the 1<sup>st</sup> Avenue corridor, which passes predominantly through areas of industrial land use. The 2<sup>nd</sup> Avenue corridor is a main route for transportation through Brooklyn and has several bus routes and stops; this corridor also has higher daily average traffic, with annual average daily traffic counts (8,500) that are nearly twice the volume along 1<sup>st</sup> Avenue (3,400). Utilities along this route are known to include a sanitary sewer transmission line, a water line, a high-pressure natural gas line, and storm drainage inlets. However, the risk caused by utility congestion along 2<sup>nd</sup> Avenue was estimated to be less than the risks associated with 1<sup>st</sup> Avenue.

### **65<sup>th</sup> Street Railyard Summary**

The 65<sup>th</sup> Street Railyard Cable Landfall Alternative has the advantage of reducing the submarine export cable route length (and associated disturbance to the marine environment) by approximately 1.7 mi (2.7 km) relative to the proposed alternative. Due to planned development conflicts associated with the 65<sup>th</sup> Street Railyard, the 65<sup>th</sup> Street Railyard Cable Landfall Alternative is not practicable alternative for the Project due to its expected unavailability. Construction along either the 1<sup>st</sup> or the 2<sup>nd</sup> Avenue corridors would also be associated with additional logistical constraints due to infrastructure density, increased impacts due to construction noise and traffic, and disruption to adjacent residential and commercial neighborhoods compared with an in-water route. Empire has not identified any special aquatic sites that would be avoided with this cable landfall alternative.

#### **3.3.2.5 Narrows Generating Station Alternative**

##### **Narrows Generating Station Cable Landfall**

The Narrows Generating Station Cable Landfall Alternative is located at Astoria Generating Company, LP's Narrows Generating Station parcel, which was also considered by Empire for locating the new onshore substation (see **Attachment D, Appendix D-1** [COP Volume 1, Section 2.1.3.2]). The existing site contains floating platforms for the generation facility extending into the bay. The cable landfall would be located on the pier with a deep bulkhead sheet pile wall, which would require cable burial depths of 30 to 50 ft (10 to 15 m).

The generation float and other upland surface obstructions would have to be removed for the site to be used. Space availability is constrained by the presence of existing structures as well as the presence of existing rights-of-way. The removal of those existing structures in turn is dependent upon the decommissioning and remediation of the facility prior to the start of Project construction. Decommissioning of the Narrows facilities was proposed as part of the Gowanus Repowering Project; on December 15, 2021, Astoria Generating Company, LP, filed a notice discontinuance for the Gowanus Repowering Project with the New York State Department of Public Service (NYS DPS Case # 18-F-0758), stating that it is no longer pursuing a Certificate of Environmental Compatibility and Public Need pursuant to Article 10 of New York Public Service Law. Whether and when decommissioning plans may be proceeding are currently unclear.

Empire considered both HDD and open cut cable landfall alternatives for the Narrows Generating Station Cable Landfall Alternative. Obstructions and interferences are present near the shoreline and include submarine dolphin piles and ruins of a historical pier to the south. The main obstacle at the site is a deep bulkhead that extends to an elevation of -39 ft (-12 m) mean lower low water (MLLW), with tie rods connected to this



bulkhead and sheet pile anchor walls installed on the land side of the bulkhead. Detailed assessment determined that an HDD cable landfall would not be feasible for the Narrows Generating Station Cable Landfall Alternative, for reasons similar to those that eliminated HDD at the preferred site, including the required HDD depth, thermal resistivity limits, the presence of loose sediments, and inadvertent return risk (see Section 3.4.5). Additionally, the available right-of-way width between the two existing buildings onsite is only 42 ft (13 m). Allowing for horizontal tolerances and the necessary setback distance from the edge of the right-of-way, the available horizontal separation distance is only approximately 7.8 ft (2.4 m), not considering existing utilities that may further constrain this corridor. This is significantly less than industry standard separation for an HDD installation and may not allow sufficient separation of the two cables. Furthermore, the HDD at this location requires drilling next to the foundations/piles of an existing large office building, which is strongly not recommended due to the risk of foundation settlement and damage to the building. Additionally, vessel traffic around this site is expected to be heavy, with the potential for marine traffic impacts at the HDD exit location offshore.

### **Narrows Generating Station Onshore Cable Route**

From the Narrows Generating Station Cable Landfall Alternative, two major route alternatives were considered:

1. The Bush Pier Terminal Park Onshore Cable Route Alternative runs northwest from Narrows Generating Station site along 1<sup>st</sup> Avenue from the intersection with 54<sup>th</sup> Street to the intersection of 51<sup>st</sup> Street. The route heads west then north, along a right-of-way adjacent to the Bush Pier Terminal Park, until reaching 43<sup>rd</sup> Street. Here the route runs southeast along 43<sup>rd</sup> Street to 2<sup>nd</sup> Avenue. From there, the route continues along the same path as the route from the EW 1 cable landfall, travelling northeast along 2<sup>nd</sup> Avenue to 28<sup>th</sup> Street where it enters the existing substation at the Gowanus POI. This route is approximately 2.0 mi (3.2 km).
2. The 1<sup>st</sup> Avenue Onshore Cable Route Alternative runs north from the Narrows Generating Station Cable Landfall Alternative at the intersection of 54<sup>th</sup> Street and 1<sup>st</sup> Avenue to the intersection at 43<sup>rd</sup> Street. The route then turns southeast on 43<sup>rd</sup> Street to 2<sup>nd</sup> Avenue. From here, the route continues along the same path as the route from the EW 1 Cable Landfall Alternative (Section 3.7.3.6), travelling northeast along 2<sup>nd</sup> Avenue to 28<sup>th</sup> Street where it enters the existing substation at the Gowanus POI. This route is approximately 1.8 mi (2.9 km).

Of the two onshore cable route alternatives from the Narrows Generating Station, Empire determined the Bush Pier Terminal Park Onshore Cable Route Alternative is not practicable, due to the portion of the routing along Bush Pier Terminal Park. Empire determined that this portion of the route would result in additional potential impacts to recreational resources. Empire also received feedback during a meeting on August 23, 2019 with NYCEDC and NYCDPR, that the location of any facilities within the Bush Terminal Park fence line would be discouraged due to the nature of the site as a former landfill. Landfill facilities, including leachate lines and groundwater monitoring wells, are located subsurface.

Considerations for routing along 1<sup>st</sup> Avenue from the Narrows Generating Station are similar to those described for the 65<sup>th</sup> Street Railyard Alternative along 1<sup>st</sup> Avenue. Two trenchless (jack-and-bore) crossings would be required for active railroad lines. This would result in additional onshore disturbance to commercial and residential neighborhoods in comparison to the proposed, shorter onshore cable route alternative, and would add risks, cost, and construction duration associated with utility congestion along a longer route.

### **Narrows Generating Station Summary**

The Narrows Generating Station Cable Landfall Alternative would reduce the length of the submarine export cable route (and associated disturbance to the marine environment) by approximately 1.3 mi (2.1 km). However,

it is expected that a cable landfall at this location would also require installation with an open cut cable landfall method and would not materially decrease in-water impacts as compared to the proposed alternative. Moreover, the Narrows Generating Station Cable Landfall is not practicable for the Project, due to the existing site constraints, commercial availability, and scheduling risks associated with the uncertainty of the decommissioning of the existing station.

### 3.3.2.6 EW 1 Proposed Project Alternative

#### **EW 1 Proposed Project Cable Landfall**

The proposed EW 1 Cable Landfall Alternative is located at SBMT. The SBMT is a New York City-owned parcel under lease by NYCEDC, which subleases to Sustainable South Brooklyn Marine Terminal (SSBMT). This site is Empire's proposed site for the onshore substation (see **Attachment D, Appendix D-1, COP** [Volume 1, Section 2.1.3.2]).

The EW 1 Cable Landfall Alternative is located immediately adjacent to the proposed onshore substation site at SBMT. For this export cable landfall alternative, Empire assessed both open cut and HDD cable landfall installation and determined that HDD cable landfall would not be feasible (see Section 3.4.5.1). The pier<sup>6</sup> at the EW 1 cable landfall location consists of deep, concrete-filled caisson bulkhead at the pier tip. The north side of the pier appears to be constructed of a steel sheet pile and riprap shoreline. Both in water and under the riprap are buried timber piles, cut off at the mudline. The piles are assumed to extend to 26 ft to 33 ft (8 to 10 m) below the mudline.

Other unidentified obstructions noted on NOAA charts include an obstruction near the seaward entry of the waterway. Based on water and sewer data from the NYCDEP, there is a combined sewer easement in this area that discharges to the harbor and approximately in line with 32<sup>nd</sup> Street. Empire is coordinating with the property owner and NYCDEP regarding the outlet. Depths adjacent to and between the piers at EW 1 vary and may be as shallow as 6.5 ft (2 m) below MLLW, increasing towards the bay.

Empire also assessed installing the submarine export cables through or over the bulkhead at the shoreline at SBMT. This cable landfall installation would require dredging between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers to allow for sufficient depth for access by the cable lay vessel; installation through the bulkhead was determined to be a practicable option for cable installation at this location (see Section 3.4.5.1). The existing bulkhead between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers requires replacement due to its condition.

#### **EW 1 Proposed Project Onshore Cable Route**

The proposed onshore cable route from the EW 1 Proposed Cable Landfall Alternative at SBMT to the Gowanus POI is approximately 0.2 mi (0.3 km) long. This route runs northeast from the proposed EW 1 onshore substation site to a parking lot along the northwestern side of 2<sup>nd</sup> Avenue. It then continues north along 2<sup>nd</sup> Avenue to 28<sup>th</sup> Street and turns east along 28<sup>th</sup> Street where it enters the existing substation at the Gowanus POI.

Because the EW 1 Cable Landfall Alternative is directly adjacent to the onshore substation, the EW 1 Onshore Cable Route Alternative consists only of the interconnection cable route traversing SBMT and 2<sup>nd</sup> Avenue to the POI. This cable route would be required for any project alternative that incorporates the onshore substation at SBMT (i.e., all other cable landfall/onshore cable route combinations under consideration). This onshore cable route eliminates onshore impacts to public open space, and greatly minimizes disturbance within densely

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<sup>6</sup> Note that SBMT includes two areas of bulkheaded landfill that resemble and are referred to as "piers," (herein, the 29<sup>th</sup> Street and 35<sup>th</sup> Street Piers), despite being landfill instead of pile-supported structures over water.

developed areas of Brooklyn associated with the other onshore cable route alternatives, including reducing impacts to vehicular traffic, pedestrian foot traffic, residential and commercial development, business disruption, noise impacts, and traversing potentially contaminated soils. This route also minimizes the onshore cable route constructability risks associated with existing utilities, infrastructure, and in-street work.

### **EW 1 Proposed Project Summary**

Based on the assessment of construction feasibility of an open cut cable landfall methodology, consistency with existing land use and future development, commercial availability, costs, logistical concerns, and minimization of impacts to local stakeholders, Empire has identified EW 1 Cable Landfall Alternative as the proposed alternative for the Project. The EW 1 Cable Landfall Alternative results in a longer submarine export cable route (and associated length of in-water/marine disturbance), and would require dredging, which represents a greater aquatic impact than other alternatives considered. However, other cable landfall alternatives considered are not practicable, for reasons of logistics, costs, and/or constraints of existing technology. Empire has not identified any impacts to special aquatic sites associated with the EW 1 Cable Landfall Alternative. Moreover, since the area around and between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers is expected to need modification associated with SBMT's separate port upgrade activities (e.g., dredging, replacement of deteriorated bulkheads), siting disturbances associated with the cable landfall activities in the same area will help minimize overall environmental impacts relative to the use of another, relatively undisturbed site. Onshore disturbance and other environmental impacts will be minimized with the EW 1 Cable Landfall Alternative and the associated onshore cable routing, due to the location of activities in an area of existing industrial development, and the short length (0.2 mi [0.3 km]) of the onshore cable route.

### **3.3.3 Submarine Export Cable Route Alternatives – State Waters**

The submarine export cable route begins where the route crosses into state waters 3 nm (5.6 km) offshore, approximately 3.9 mi (6.2 km) southeast of Rockaway Point at the southwestern corner of Long Island, and 5.5 mi (8.8 km) east of the tip of Sandy Hook in New Jersey.

For each submarine export cable route alternative, Empire evaluated several alternative methods for cable installation offshore, including cable burial and direct placement on the seafloor. Empire is proposing to bury the submarine export cables using jetting, mechanical plow, trenching/cutting, and dredging. Dredging and mass flow excavation are not proposed for cable burial in general, but may be required in certain locations, such as for pre-sweeping and seabed preparation activities prior to cable lay, at certain asset crossings, and for trench excavation and cable burial along the submarine export cable corridor between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers, approaching the cable landfall. The evaluation of these installation methods is detailed in Section 3.4.3.

Based on results of the offshore constraints analysis, Empire evaluated four submarine cable route alternatives in New York State waters for the Project (**Figure 4, Figure 5**). Each of the routes is described relative to the cable landfall at the proposed EW 1 cable landfall at SBMT. The offshore routing constraints considered in the identification of potential Project submarine export cable route alternatives include:

- Segment length;
- Installation constraints and complexity, including water depth, slopes, and seabed features;
- Ability to adequately bury and protect the cable;
- Avoidance or minimization of anthropogenic hazards to cable installation and operations, and use conflicts (e.g., existing utility crossings, dredged and maintained channels, anchorages and de facto

anchoring areas, vessel TSSs, precautionary areas, safety and security regulated areas, charted danger zones, disposal areas, sand borrow areas);

- Avoidance of biological and cultural resources (e.g., eelgrass, shipwrecks); and
- Avoidance of high-use commercial and recreational fishing grounds.

Fairways and UXO areas were also considered in the offshore constraints analysis, although these are not present as mapped areas along the route alternatives in **Figure 5**.



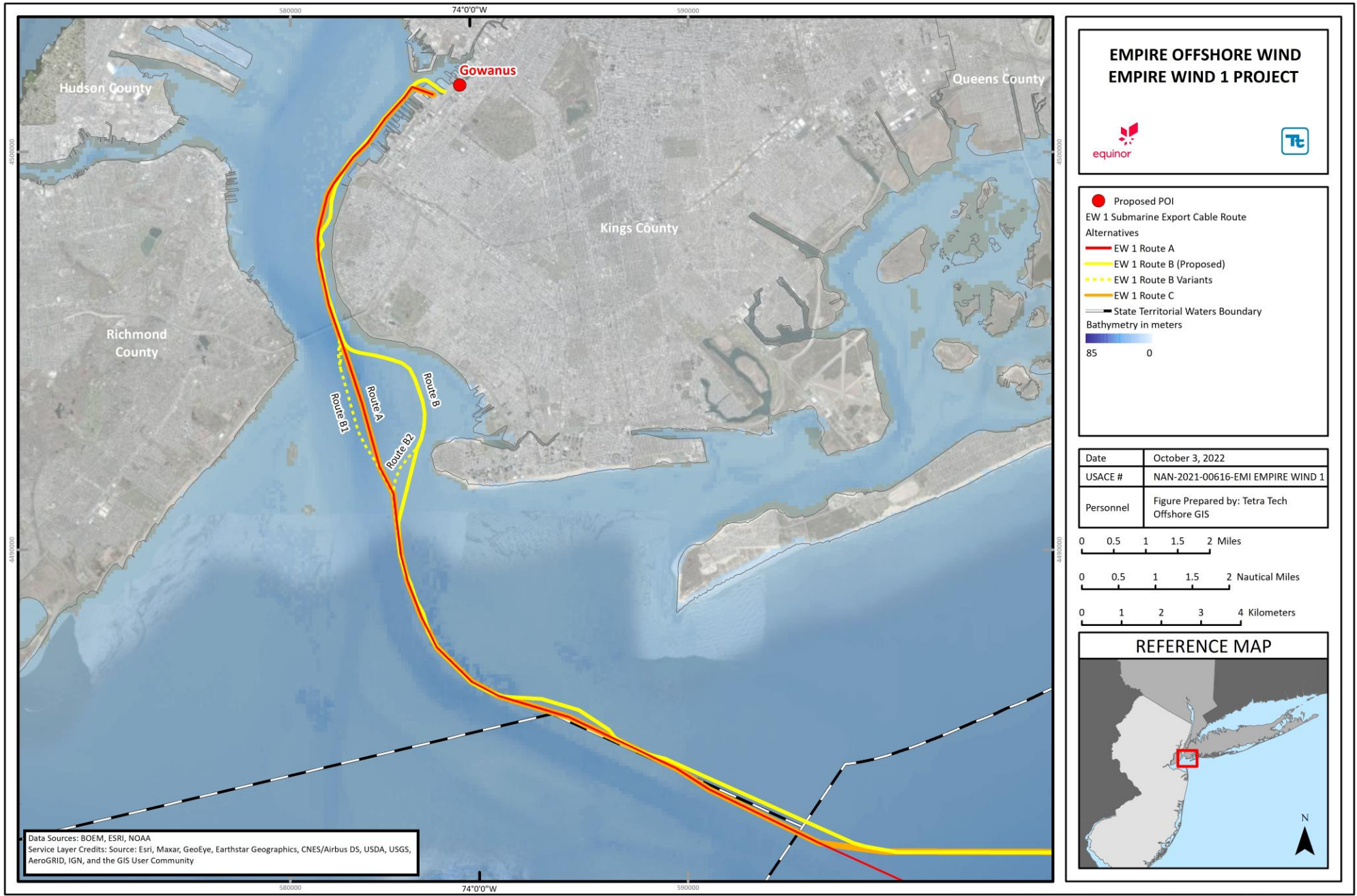


Figure 4 Submarine Export Cable Route Alternatives – State Waters



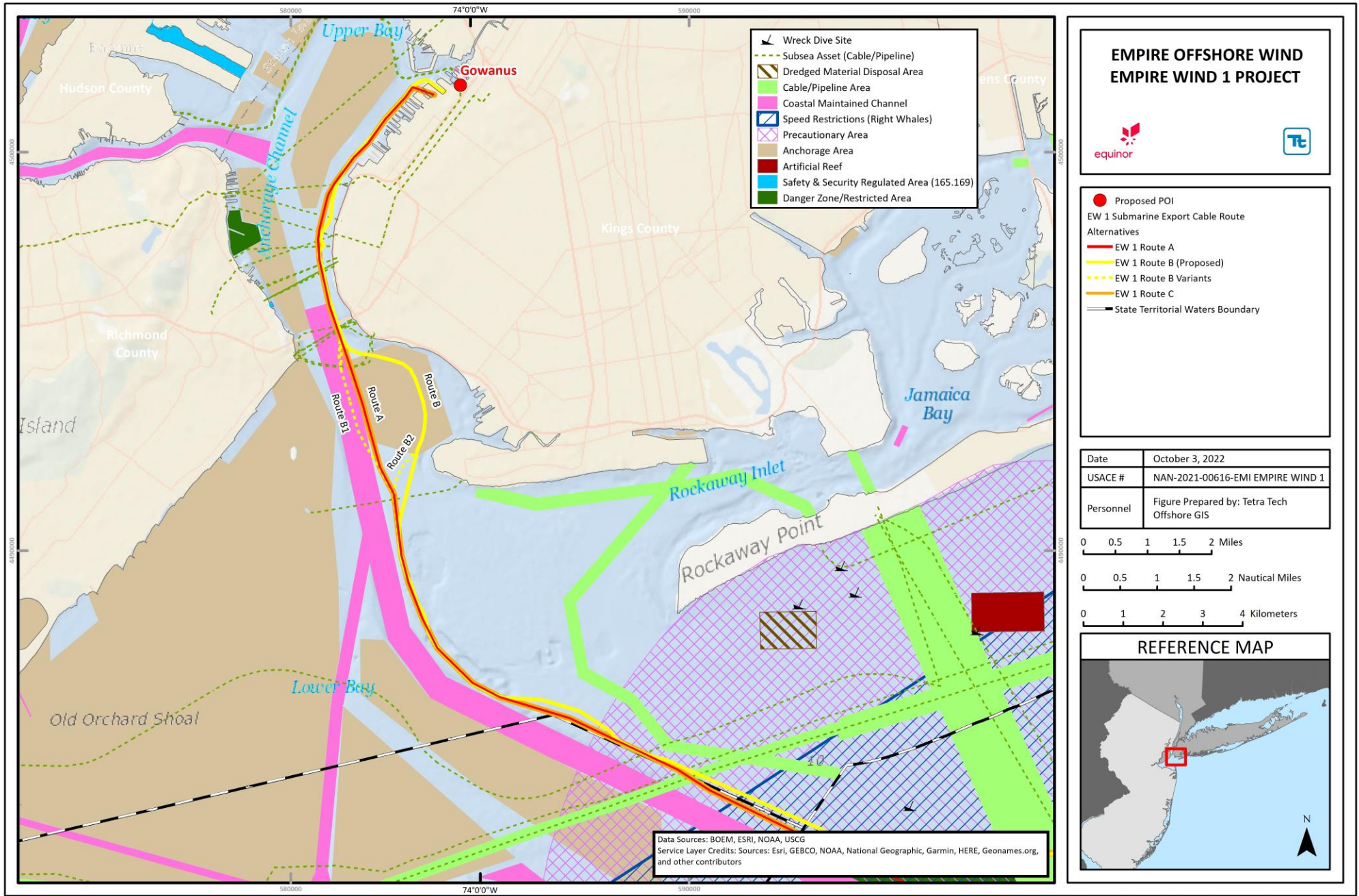


Figure 5 Submarine Export Cable Routing Constraints Analysis – State Waters

### 3.3.3.1 Submarine Export Cable Route Alternative A

From where the submarine export cable route crosses the New York State boundary 3 nm (5.6 km) offshore from federal waters, this route alternative continues parallel to the east of the maintained Ambrose Channel and then crosses the Transco Lower New York Bay Lateral (LNYBL) gas pipeline, which is buried in this area. Approximately 1,060 ft (323 m) northwest of the Transco LNYBL pipeline crossing is the high-voltage direct-current (HVDC) Neptune Regional Transmission System (Neptune cable), which is also indicated as buried in this area. The proposed Poseidon Transmission (Poseidon) cable is documented to closely follow the Neptune cable route and would also be crossed in a similar orientation, if the Poseidon cable is installed before the Project's submarine export cables. Approximately 0.4 nm (0.7 km) to the northwest, the route crosses the location of the planned Transco Raritan Bay Loop natural gas pipeline project. The route will then traverse a retired communications cable running from Coney Island to Swinburne Island.

At Gravesend Bay, Submarine Export Cable Alternative A continues straight along the east side of the Ambrose Channel, crossing the USACE Gravesend Anchorage and USCG Anchorage #25. Immediately north of Gravesend Bay, the route enters a charted cable area. The route encroaches to within approximately 82 ft (25 m) of the designated channel boundary due to the seabed constraints. A Safety Zone is depicted on NOAA Chart 12334 between the bridge footing and shore, which is understood to be related to a UXO area located on the seabed. This area is avoided by the routing. As the route turns to the north, it crosses a charted pipeline area. The route turns to the northeast and enters the Bay Ridge Channel, where it crosses a second charted pipeline area. These assets include additional retired communications cables, water siphons and oil pipelines, which cross from Staten Island to Brooklyn. A third charted pipeline area is crossed by the route and is understood to contain the second of two out of service water siphons. The route turns to the northeast and follows the eastern side of the Bay Ridge Channel to land at the EW 1 cable landfall at SBMT.

Alternative A lies east of and parallel to Ambrose Channel and lies partly within an anchorage planned for deepening and/or widening to allow additional anchorage of large vessels (USACE 2020). It is the shortest route alternative in the Gravesend Bay area, but closest route to the Ambrose Channel besides Alternative B1 (discussed in Section 3.3.3.3) and is close to the northbound movement of large ships (observed in 2019 to include up to approximately 180,000 deadweight tons). This area has exposure from large vessels both intentionally anchoring near the channel and transiting the channel itself. Therefore, Alternative A involves the most potential anchoring from large vessels. Compared to Alternative B1, cable burial along Alternative A would therefore need to mitigate for significantly more frequent and intentional anchoring by large vessels. Input from USACE and maritime stakeholders relative to Alternative A indicated concern over routing through this area.

If the proposed anchorage expansion results in dredging along the cable route prior to the installation of the Project, it could also result in more compacted sediments at the seabed at the time of cable installation, which could in turn make cable installation to the required burial depth more challenging. Alternative A is more sensitive to the ability to achieve target burial depth than the other considered routes, because installation of cable protection measures over the submarine export cables may not be considered acceptable in this area based on the existing and future additional anchorage use. In contrast, the use of cable protection along Alternative B1, if necessary, would be less problematic due to the greater water depths within the channel and lower frequency of anchoring. All of these factors result in increased submarine export cable installation time and complexity for Alternative A, in an area with a high level of maritime use and potential impacts to maritime stakeholders. Based on the complexity of installation, planned anchorage deepening/widening, potential marine stakeholder impacts, and stakeholder feedback received by Empire, Alternative A is not practicable.

### 3.3.3.2 Submarine Export Cable Route Alternative B (Proposed Project Alternative)

Submarine Export Cable Route Alternative B follows the same route as Alternative A. However, after passing around the end of Coney Island, the route traverses northeast closer to the shoreline of Coney Island and then enters into Gravesend Bay. Alternative B converges with Alternative A at the north end of Gravesend Bay and follows the same route to the north of the Verrazzano-Narrows Bridge.

Alternative B traverses the easternmost route in Gravesend Bay and the shallower water approximately 1,150 ft (350 m) eastward of Alternative A. It is designed to avoid the USACE Gravesend Anchorage, the potential anchorage expansion area, and the higher used area (informed by automatic identification system [AIS] data) of USCG Anchorage #25. Based on review of 2019 AIS records for all vessels travelling at less than 0.5 knots and a more general view of prior years, anchoring along Alternative B was infrequent in comparison to other alternatives considered, and such anchoring was mainly by pleasure craft and one USCG vessel. Anchor drag risk associated with transiting vessels would also be reduced along Alternative B, as very few vessels transit through the bay so far to the east.

Although there is some commercial and recreational fishing in the Gravesend Bay area, information from commercial fishing outreach indicates this mostly consists of small vessels using pots/traps for fish and crabs tied to lines laid along the seabed. Small dredges are also employed for crab harvesting in the Lower Bay during certain months. Both of these methods have minimal seabed penetration compared to ship anchors. Input from maritime users (see **Attachment D, Appendix D-1** [Appendix B Summary of Agency Engagement in the COP]) indicated a preference for route Alternative B.

In comparing the alternatives in the Gravesend Bay area, although Alternative B is slightly longer than Alternatives A and B1, there are no significant differences in environmental impacts expected between routes. The marine disturbance associated with the longer submarine export cable route is likely to be offset by the additional disturbance for deeper burial mitigation expected to be required along Alternatives A and B1 due to the anchoring activity. Alternative B does traverse closest to potential winter flounder spawning habitat, which consists of sandy bottom areas in water depths of 20 ft (6 m) or less. However, Empire will minimize potential impacts to winter flounder through implementation of appropriate timing windows during submarine cable installation. Thus, Empire is proposing Alternative B as the practicable alternative that minimizes environmental impacts and reduces potential conflicts with maintained channels, anchorages, and marine navigation.

### 3.3.3.3 Submarine Export Cable Route Alternative B1

Submarine Export Cable Route Alternative B1 also follows the same route as Alternative A; however, instead of turning east into Gravesend Bay like Alternative B, it turns slightly west into the eastern portion of Ambrose Channel. It then exits Ambrose Channel on the north end of Gravesend Bay.

Submarine Export Cable Route Alternative B1 enters the eastern portion of Ambrose Channel in order to avoid areas of anchoring activity in the USACE Gravesend Anchorage and USCG Anchorage #25, as well as future potential expansion of the USACE anchorage included in the New York and New Jersey Harbor Federal Navigation Project (USACE 2020). This routing avoids the anchorages (USACE 2020) and targets installation in deeper water but coincides with the highest level of transiting vessel traffic based on review of available AIS data. Few vessels have reason to intentionally deploy an anchor in the channel; vessel anchoring would typically only be associated with accidental deployment or intentional emergency anchoring. As such, anchoring along Alternative B1 is less frequent than that associated with Alternative A. However, during construction within Ambrose Channel, the channel would be partially to completely blocked for several days for the submarine export cable installation. Because the Alternative B1 route is within the maintained channel, it is also subject to



potential future maintenance dredging during Project operations or deepening of the channel to allow use by larger vessels, which need to be considered for cable installation. However, this portion is naturally deeper than areas currently requiring maintenance, so it is not expected to require dredging in the near future.

Although Empire considers avoidance of installing the cable within Ambrose Channel to be a priority, the avoidance of crossing the anchorage area was determined to be an even greater priority when considering this route compared to Alternative A. Alternative B1 is considered a practicable alternative, but it may result in greater impacts to the marine environment due to the regulatory requirements for deep cable burial expected in this area, and has the potential for a high level of impact to marine navigation during construction.

#### 3.3.3.4 Submarine Export Cable Route Alternative B2

Submarine Export Cable Route Alternative B2 is a variation of Alternative B that stays along Ambrose Channel further to the north before making a sharper turn east into Gravesend Bay, and then converging with the Alternative B route.

Submarine Export Cable Route Alternative B2 is slightly longer than Alternative B and has the same considerations as Alternative A relative to the proximity to the northbound movement of large ships along Ambrose Channel. Submarine export cable route Alternative B is optimized relative to Alternative B2, and therefore Alternative B2 may result in greater environmental impacts and potential conflicts with maintained channels, anchorages, and marine navigation. As such, Alternative B2 is a practicable alternative, but is not the proposed alternative.

### 3.4 Technology Alternatives

In addition to the siting and routing alternatives evaluated above, Empire also assessed technology alternatives, specifically cable landfall installation and foundation alternatives, to fulfill its energy requirements. A summary of the options evaluated is provided in this section.

#### 3.4.1 Foundation Alternatives

Empire evaluated several potential types of foundations for wind turbines and offshore substation: monopile, piled jacket, gravity base structure (GBS), suction bucket jacket, suction bucket monopile, and floating. Over the past several years, Empire has been evaluating the use of a GBS as a potential foundation for wind turbines to be deployed in the Lease Area, recognizing the potential of a GBS to avoid certain impacts to marine life (specifically, acoustic impacts from pile driving) from other foundation alternatives, such as monopiles or piled jacket foundations. Empire's evaluation of the GBS foundation alternative included consultation with experts across a spectrum of specialties, including design and construction engineering, acoustic engineering, marine mammal science, manufacturing process engineering, transportation logistics, procurement, permitting, and commercial contracting. Based on the evaluation, Empire has concluded that the GBS is not a practicable alternative for any WTG foundations for EW 1, as stated in Section 3.4.1.1. Empire is instead proposing monopile foundations for the WTGs, and a piled jacket foundation for the offshore substation.

##### 3.4.1.1 GBS

GBS foundations are strengthened concrete structures with a circular base fixed to a conical exterior and vertical concrete column. The vertical concrete column connects to a steel transition piece that holds secondary features (i.e. access platforms and boat landings) associated with deeper water sites. To support up to a 15-MW WTG, a GBS foundation would be approximately 118 ft (36 m) wide at the base, 210 ft (64 m) tall, and weigh up to 8,500 tons (7,711 metric tons). It would require approximately 10,000 tons (9,071 metric tons) of high-density

aggregate to ballast down a GBS and would likely necessitate a considerable amount of scour protection when compared to a monopile foundation.

Structural integrity of the GBS foundation is dependent on stable and supportive seabed conditions. Weak horizontal seabed layers, which are commonly found in locations of sediment deposition (i.e., historic rivers and deltas), are not suitable for GBS foundations. Empire's geophysical and geotechnical survey campaigns of the Lease Area indicate much of the area contains thin layers of soft sediment and loose marine sand. The evaluation also indicates the Lease Area contains Glauconite, which is a highly friable sediment type that may degrade structural integrity under the cyclic loading (repeated application of a load) of a WTG and, therefore, cannot provide the necessary stability for GBS foundations.

Unsuitable seabed conditions necessitate seabed preparation prior to GBS installation. This process is necessary to ensure the wind turbine is adequately supported and involves a combination of dredging and backfilling with rock, adding an armor and filter layer above the mudline, and placing a gravel pad and scour protection on top of that. The dredging preparation would likely involve removing soft, uneven, or mobile sediments as well as a foundation bed of rock (or aggregate). By contrast, monopile foundations require no further seabed preparation after being piled into the ground and scour protection laid along the perimeter above the mudline. As such, GBS foundation installation involves seabed preparation and scour protection, which will disturb a larger area and result in greater impact to the marine environment and benthic resources when compared to impact from installation of the monopile foundation.

The primary advantage of the GBS foundations alternative is to avoid the pile driving into the sea floor that is required to install monopile foundation, and which generates acoustic energy potentially impactful to aquatic life. GBS foundations are transported and placed at the site without pile driving. However, the potential advantages of GBS foundations are offset by other negative environmental impacts. Empire's evaluation indicated there are higher overall carbon dioxide (CO<sub>2</sub>) emissions associated with use of the GBS foundations (Empire's evaluation estimated approximately 4,500 [4,082 metric tons] tons per foundation for GBS, compared to approximately 2,300 tons [2,086 metric tons] per foundation for monopile foundations). This is mostly due to much higher emissions from installation of the GBS foundation. GBS foundation transportation would also result in more marine traffic impacts (GBS foundations must be transported individually, unlike other foundation types).

Logistical challenges are also a consideration for GBS foundations. Since there are currently no GBS manufacturers in the United States, a fabrication site for the foundations is required. Empire would also need to develop its own supply chain to fabricate, transport, and install the GBS foundations. Empire would be entirely responsible for establishing the supply chain, skilled workforce, and adequate quality control. Empire identified Port of Coeymans (near Albany, New York) as a potential fabrication site, but determined it is impracticable due to associated upgrade costs, transportation and staging requirements, and logistics due to bridge height restrictions along the Hudson River. No other commercially viable options for the fabrication and supply chain for GBS foundations were identified.

After evaluation, Empire determined that the costs, logistical challenges, and commercial risks of GBS foundations render the alternative impracticable and would restrict Empire's ability to meet contractual commitments with New York and achieve the Project purpose (see Section 3.1). Moreover, the GBS foundations would cause greater potential environmental impacts to the seafloor due to a larger footprint, to air emissions from increased CO<sub>2</sub> emissions, and to navigation/marine traffic, which outweigh the benefits of GBS foundations in reducing the potential temporary acoustic impacts to marine wildlife during construction.

### 3.4.1.2 Monopile

Monopile foundations consist of a single vertical, broadly cylindrical steel pile driven into the seabed. A steel transition piece, which contain secondary structural components, cable hang-offs and material handling equipment for the WTG (i.e., boat landings, internal access platforms with cable hang-offs, external work platform equipped with gates for W2W systems and crane for equipment transfer from CTV), will be connected to the monopile by bolting (see **Attachment B** Permit Drawings). The transition piece will also contain the Navaid equipment such as marine lanterns, foghorn and AIS

While a piled solution (monopile or piled jacket) for a wind turbine or offshore substation may not require the same level of ground preparation for installation as GBS, drivability relevant to geotechnical conditions need to be considered. Empire has completed an initial drivability assessment to confirm feasibility and has included contingent locations within the conceptual layout.

Empire's evaluation indicated that CO<sub>2</sub> emissions and seabed impacts are lower with installation of monopile foundations than GBS foundations, as discussed in Section 3.4.1.1. Based on the monopile foundation's previous use in the United States, known technology and existing supply chain, and Empire's obligation to meet contractual commitments with New York to achieve the Project purpose (see Section 3.1), monopile foundations were selected for the EW 1 wind turbine foundations.

### 3.4.1.3 Piled Jacket

A piled jacket is a vertical steel lattice structure consisting of three or four legs to support a wind turbine, or up to eight legs to support an offshore substation, from which piles are inserted and connected through cross-bracing (see **Attachment B** Permit Drawings).

The piled jacket foundation was selected for the offshore substation, since monopile foundations are not designed for and are not practicable to support the larger size/weight of the offshore substation (approximately 5,500 tons [5,000 metric tons]).

### 3.4.1.4 Suction Bucket Jacket

A suction bucket jacket is a vertical steel lattice structure consisting of three or four legs, which contain inverted bucket-like structures at the base, connected through cross-bracing. Suction bucket jackets were removed from additional consideration because the conditions in the Lease Area are not suitable. Suction bucket jackets are more typically appropriate for areas with characteristics that allow the buckets to achieve appropriate penetration and the proper soil-structure interaction for the jacket. Empire's geophysical and geotechnical survey data has demonstrated that the seabed sediment in most locations (0 to 33 ft [0 to 10 m] below surface) consists of loose marine sand, limiting the holding capacity of the buckets. As such, based on the technical constraints of suction bucket jacket foundations, they are not a practicable alternative to meet the Project purpose.

### 3.4.1.5 Suction Bucket Monopile

A suction bucket monopile is a single vertical, broadly cylindrical steel monopile, which contains a single inverted bucket-like structure at the base. Suction bucket monopiles were also deemed not to be technically or commercially feasible for the development timescales associated with this Project and are therefore not a practicable alternative to meet the Project purpose.

#### 3.4.1.6 Floating

This alternative uses a floating structure, typically a spar or semi-submersible, which is tethered to the seafloor through a set of anchoring devices. Floating foundations are used for installations at much deeper water depths than are present in the Lease Area. Floating foundations are not considered practicable for the Project because the water is not deep enough to justify the additional costs and engineering considerations.

#### 3.4.2 Submarine Export Cable Technology Alternative

Empire evaluated different transmission technologies for the submarine export cables against the following criteria:

- Transmission distances,
- Economic considerations, and
- Land required to support onshore electrical facilities.

The submarine export cables are designed to use HVAC rather than HVDC due to the considerably lower costs to interconnect HVAC into the alternating current terrestrial grid at the Gowanus 345-kV Substation. HVDC requires a considerably larger investment with greater complexity, significantly larger onshore space requirements, and higher maintenance needs than HVAC due to the need for converter stations onshore and offshore. HVDC becomes more cost-effective for wind farms with a larger nameplate capacity than is planned for the EW 1 Project, in part because HVDC may allow a reduction in the number of export cables for larger projects. This may also be preferable for long transmission lines carrying very large power capacities where HVDC reduces transmission losses relative to HVAC. The transmission distance and power rating of the EW 1 Project submarine export cables makes it suitable and more cost-effective to employ an HVAC system.

#### 3.4.3 Submarine Export Cable Installation Alternatives

Empire also evaluated several alternative methods for cable installation offshore, including cable burial and direct placement on the seafloor. Empire is proposing to bury the submarine export cables using jetting, mechanical plow, trenching/cutting, and dredging. Dredging or mass flow excavation are not proposed for cable burial in general, but may be required in certain locations, such as for pre-sweeping and seabed preparation activities prior to cable lay, at certain asset crossings, and for trench excavation and cable burial along the submarine export cable corridor between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers, approaching the cable landfall.

Placement of the submarine export cables directly on the seafloor as the primary installation method was determined to be not practicable due to the heightened risk of third-party damage to the cables and increased maintenance requirements from anchor or fishing gear snagging. Although direct seafloor disturbance from jetting or trenching during construction would be avoided with this method, the additional cable protection measures required to minimize third-party damage would result in a much larger footprint alteration of the seabed surface and long-term impact to the benthos. Additional cable protection requirements would also likely offset the installation time savings from placing cables on the seafloor instead of burying them. As such, Empire has retained placement of the cables directly on the seafloor, with cable protection (such as rock berm or matting) only for limited areas where sufficient burial depths cannot be achieved due to seabed conditions.

For cable burial, Empire assessed a variety of methods including jet plow, mechanical plow, trenching/cutting, and dredging. Both jetting and mechanical plowing may create a trench and lay the cable in a single pass. Jetting may be conducted via a towed device that travels along the seafloor surface. Jetting may also be conducted with a vertical injector fixed to the side of a vessel or barge. These methods inject high pressure water into the sediment through a blade that is inserted into the seafloor to create a trench. The water sufficiently liquifies

the sediments such that the cable can then settle down through the suspended sediments to the desired burial depth. Mechanical plowing uses a cable plow that is pulled along the seabed, creating a narrow trench. Simultaneously, the cable is fed from the cable ship down to the plow, with the cable laid into the trench by the plow device. Due to gravity, the displaced sediment returns to the furrow, covering the cable.

Jetting methods (including capjet, jet sled, jet plow and vertical injector equipment) are considered Empire's primary proposed method for cable installation. Jetting is the most efficient method of submarine cable installation that minimizes the extent and duration of bottom disturbance for the significant length and water depths along the submarine export cable route. The majority of suspended sediments from jetting settle back in the trench naturally, reducing sedimentation impacts.

Empire also considered trenching, or cutting, which may be used on seabed containing hard materials not suitable for mechanical plowing or jetting, as the trenching machine is able to mechanically cut through the material using a chain or wheel cutter fitted with picks or teeth. Once the cutter creates a trench, the submarine export cable is laid into it, and typically backfill is mechanically returned to the trench using a backfill plow. This method is less preferred due to lower efficiency, longer installation duration, and greater potential impacts from the additional step of backfilling the trench. However, both mechanical plowing and trenching (cutting) are proposed as potential installation methods to be used in the event that Empire encounters seabed or depth conditions where jet plowing is not practicable or efficient. Pre-sweeping or pre-trenching may be associated with any of the considered cable burial methodologies.

Mechanical dredging was also assessed as a potential method for submarine cable installation. Dredging is used to excavate, remove, and/or relocate sediment from the seabed in order to increase water depth and alter existing conditions; this can be completed through clamshell dredging, suction dredging, and/or hydraulic dredging. Because of the greater duration and extent of sediment disturbance associated with dredging, this method is not practicable for the majority of the cable installation. Dredging, however, is proposed for cable installation along the submarine export cable corridor approaching the landfall at SBMT, between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers. In this area, depths below the existing bathymetry are required because of cable installation vessel draft requirements and for cable landfall activities. Since dredging is proposed along this segment of the route, Empire is also proposing to dredge the submarine export cable trench to the target burial depth and backfill with suitable sand or other quarried material. Backfilling the material along this portion of the submarine export cable route will be required due the thermal resistivity properties of the existing sediments along this segment of the submarine export cable route.

#### **3.4.4 Cable and Pipeline Crossing Alternatives**

The submarine export cable route will cross existing in-service and out-of-service assets including existing transmission cables, natural gas and petroleum pipelines, and water siphons, especially as the route traverses the Narrows. Empire is proposing to install the submarine export cables across third-party assets using concrete or rock-filled mattresses or rock berm protection (see Section 2 of **Attachment D**).

A traditional asset crossing with crushed rock installation or a rock berm will consist of installation of rock at the base, cable lay, followed by another layer of rock protection over the top. Rock installation provides protection for the cable against anchor drags or other external impacts. This method results in approximately 6.5 ft (2 m) of shoaling on the seafloor. For certain crossings, Empire is also evaluating the use of traditional asset crossing measures protected with mattresses filled with either rock or concrete. Potential methods include either laying the cable directly on the seafloor with a protective mattress on top or laying the cable on top of a layer of protective mattress on the seafloor, and then adding a second protective mattress over the top of the cable. These solutions do not cause significant shoaling, resulting in a less than 3 ft (0.9 m) reduction in water



depth. Removal of sediment at crossings of identified assets to facilitate installation may be conducted before the crossing installation to allow for sufficient burial of the submarine export cables and reduce the need for supplemental cable protection material or shoaling on the seabed. This method may not be feasible due to site-specific limitations on dredging in the vicinity of existing assets.

These asset crossing methods have been retained as practicable for use on a case-by-case basis at cable and pipeline crossings along the submarine export cable route. Where the submarine export cable route requires the crossing of assets, specific crossing designs will be developed and engineered. Cable crossing methodologies will be based on a variety of factors, including the type of asset to be crossed (i.e., material), the depth of the existing buried cable or pipeline, and whether the assets are in-service or out-of-service.

In a meeting in June 2020, the USACE requested that Empire evaluate the possibility of using trenchless methods to install the submarine export cables under assets in New York Harbor, to avoid the need for shallower burial and surface protection at these crossings. As such, Empire assessed the potential to use HDD or microtunnel installation methods for several cable and pipeline crossings.

A water-to-water HDD installation would be similar to the method described for the land-to-water HDD in Section 3.4.5.1, except that it would be completed using barge support on both ends of the installations. In other words, these crossings would require a barge-to-barge installation for each crossing. Each barge would need to be a jack-up type to eliminate the impacts of waves and tides. It is expected that the soil conditions below the mudline of the harbor would require installation of a 24-inch (610-millimeter) outer diameter stainless steel conduit. Starter casings would be required on both ends of the HDD alignment to help manage and control drilling fluid loss. Potential HDD alignments assessed were 1,990 to 2,365 ft (606 to 720 m) in length.

The resulting depth of the HDD installation greatly exceeds the depth limitation for the electrical cables. Even if temporary casing pipes were not needed and the vertical curve could be started very close to the mudline, the resulting installation elevation would still exceed the depth limitation. Additionally, based on the available geotechnical information, soils consisting of extremely low to low strength clay and silt are anticipated from the mudline and extending down to depths of at least 22 ft (6.7 m) below mud line. These soils present significant risk of drilling fluid inadvertent return. Even with the casing pipe installation, the risk of a drilling fluid inadvertent return is considered extremely high and containing any drilling fluid inadvertent return would be difficult.

The extremely low to low strength clay and silt present additional challenges associated with steering to maintain the design alignment. To induce a steering deflection, the downhole tooling must be able to push off of the existing soil. Difficulty steering can result in a deeper and/or longer than anticipated installation. Designing the HDD alignment within more favorable soils with sufficient strength where the HDD bore curves are located can decrease this risk.

In addition, barge-to-barge crossings carry a unique set of risks in addition to typical HDD risks. Water levels and storms are significant variables that have effects on scheduling and site productivity. Underwater currents during violent storms can alter the casing pipe, in turn affecting the drill string. This is less likely once the casing has been fully placed into the soil but remains a strong possibility until the casing is set. Site logistics, including incoming and outgoing materials and products, including fluid and spoil removal from the site, can also be more difficult than land crossings due to the more isolated nature of the entry and exit points. Barges and/or ships used for the removal of the fluid returns must be adequately sized so as to not reduce the productivity of downhole operations, meaning larger vessels may be needed in areas of marine traffic. Given the risks and challenges associated with the site soils and the exceedance of the maximum depth of the electrical cables, an HDD construction alternative is not a practicable crossing method.



Microtunneling is a method of constructing a tunnel that involves underground installation of a casing pipe by jacking it into place from a jacking shaft, using hydraulic jacks. Excavation is carried out with a remotely controlled, closed face, fully shielded, steerable, laser-guided or similar articulated Microtunneling Boring Machine (MTBM). The MTBM can exert a continuous, controllable pressure at the tunnel heading, utilizing pressurized slurry to prevent groundwater inflows and soil movement into the heading. The MTBM is propelled by thrust from a continuous string of pipe that is advanced from a jacking shaft to a receiving shaft by hydraulic jacks. As the MTBM advances, the cutter head excavates the encountered material in front of the machine. The excavated material passes through a crushing/mixing chamber, where the spoils mix with the recycled slurry water that is pumped down from a slurry separation plant, which is located at the surface. The jacking pipe used for microtunnel installations can be either reinforced concrete jacking pipe or steel.

For a microtunnel, Empire assessed a 42- to 60-inch (1,067- to 1,524-millimeter) outer diameter reinforced concrete jacking pipe that would need to be installed. Similar to HDD, sands, silts and clays in a very soft to soft or very loose state may not provide sufficient bearing capacity to support the heavy MTBM, which would make maintaining the design alignment difficult. Based on Empire's geotechnical investigations in support of the cable routing, the anticipated sediments in the vicinity of potential crossings in New York Harbor are expected to include extremely low to low strength clay and silt, as explained above. These materials are unlikely to provide sufficient bearing capacity to resist the weight of the MTBM, which would impact steering, and increase the risk of a lost MTBM and the potential for significant ground disturbance. Advancement of the MTBM through the anticipated very soft soils may cause a stress redistribution within the soils leading to increased risk of settlement. Settlement, in turn, also has the potential to introduce risk to the existing assets above the microtunnel.

Microtunnel operations also require dry or watertight shafts. Constructing and sealing each of these shafts presents significant challenges. Given the extent of the very soft/extremely low strength soils, these shafts may require significant depth to provide a stable and watertight seal at the base of the shaft. Given the risks and challenges associated with the site soils, the low anticipated bearing capacity of the site soils, and difficulties laying the export cables through the casing pipe, a microtunnel construction alternative is not a practicable crossing method.

In addition to these trenchless crossing methods, Empire also evaluated artificial reef and pipe-supported bridge crossing methods. An artificial reef concept would use an artificial reef structure as cable protection in lieu of the mattress or rock protection that would be employed for a traditional trenched asset crossing. However, Empire did not find examples of artificial reefs having been previously used for cable protection at asset crossings; therefore, the effectiveness of these structures is unknown. Because of the soft soils present at the locations of the existing cable and pipeline crossings, it was determined that a mattress foundation would likely need to be employed in combination with the artificial reef structures for sufficient support. The reef units also carry the risk of creating anchor snag points. Therefore, Empire determined that the use of an artificial reef in conjunction with asset crossings was not a practicable option for the Project.

A pile-supported bridging crossing would require driving piles to either side of the asset crossing, and significant trench dredging. Seabed impacts, as well as potential underwater noise impacts, would be greater than with the preferred solutions. This method is also more labor-intensive and costly than traditional crossing methods. It was therefore determined that a pile-supported bridge crossing is not a practicable solution for the Project.

Rock-filled mattresses, concrete articulated mats, and rock berm protection were determined to be practicable options for asset crossings, considering factors such as hydraulics, scour, and anchor drag/impact. These methods therefore have been retained for case-by-case use at the cable and pipeline crossings along the submarine export cable route.

### 3.4.5 Cable Landfall Installation Alternatives

Empire considered several cable landfall installation alternatives, including installation of the submarine export cables through conduits in the bulkhead at the shoreline of SBMT, installation over the bulkhead, or HDD from offshore to onshore. Installation through the bulkhead is the proposed alternative, as described in Section 3.4.5.2.

#### 3.4.5.1 HDD Cable Landfall Alternative

Empire considered multiple potential HDD alignments in evaluating potential HDD cable landfall alternatives at SBMT in the vicinity of the 35<sup>th</sup> Street Pier. The shoreline around the 35<sup>th</sup> Street Pier is as follows:

1. The end of the 35<sup>th</sup> Street Pier is understood to have a deep concrete-filled caisson bulkhead with cofferdam to a depth of approximately 50 ft (15 m) below MLLW. This cofferdam has two layers of sheet pile.
2. The southern edge of the pier consists of steel sheet pile bulkhead towards the tip of the pier, to a depth of approximately -14.9 ft (-4.5 m) MLLW, and rip rap armoring towards the base. The riprap was reported to extend approximately 28 ft (8.5 m) offshore to a depth of 10.5 ft (3.2 m). Wood fragments are also found in borings in this area.
3. Along the north side of the 35<sup>th</sup> Street Pier, the shoreline also consists of a combination of rip rap armoring and steel sheet pile. The rip-rap revetment extends from the southeast corner and out to the offshore face of the pier. Prior to the installation of the rip rap revetment, a timber pier was demolished, leaving timber piles cut off approximately 2 ft (0.6 m) below the mudline.

Empire conducted an HDD feasibility assessment of an alignment that makes landfall near the base of the southern side of the 35<sup>th</sup> Street pier. The specific information provided in this section refers to the assessment of that alignment; however, the consideration of other HDD alignments around the 35<sup>th</sup> Street pier indicated that similar constraints exist for other potential alignments. Empire determined that based on available geotechnical data that the geotechnical conditions, HDD geometry, and bending radii would require installing the export cables to depths of greater than 70 ft (21 m). This depth requirement is driven by a combination of factors, including sediment characteristics that are unfavorable to a shallower HDD installation, the required HDD entry angle, avoidance of existing shoreline infrastructure, limitations on the length of the drill, and location of the offshore HDD exit due to maritime traffic.

Based on review of previous geotechnical investigations in the vicinity of the Project, it appears that the deeper installation would be required due to the following conditions:

- In the vicinity of the HDD entry location onshore, the geotechnical materials are anticipated to include fill materials overlying sands, silts, and clays, extending from the ground surface to a depth of 22 to 30 ft (6.7 to 9.1 m) below ground surface. The fill materials are anticipated to include sands, gravel, silt, brick fragments and concrete fragments. The density of the fill materials ranged from medium dense in the upper 10 feet (3.3 meters) of the soil column, loose to medium dense to a depth of between 18.5 and 30 feet (5.6 and 9.1 meters) below ground surface. Below the fill, the soil is anticipated to include medium dense sand and silt with varying amount of gravel.
- Beyond the limits of the pier, the geotechnical materials are anticipated to include layers of very soft to soft silts with gravel and very loose to loose sand overlying medium dense sand and silts and medium stiff silt at depths of 50 to 59 ft (15.2 to 18.0 m) below ground surface; and
- In the vicinity of the HDD exit location offshore, the site soils are anticipated to include various layers of very soft to soft silt and very loose sand to a depth of approximately 45 ft (13.7 m) below

the mudline. These soils pose significant challenges with preventing drilling fluid inadvertent return events during pilot bore, reaming, swabbing, and product pipe installation.

Due to the presence of loose fill materials in the soil column in at the HDD entry, and the elevation difference between the HDD entry and exit location, a conductor casing would be needed to bridge and support the drill path from the point of entry. The entry angle of the HDD would have to allow the installation of the temporary conductor casing through the upper 26 ft (7.9 m) of the fill materials. The HDD alignment would also cross beneath the existing pier known to consist of a steel sheet pile bulkhead with riprap armor stone. Avoidance of these features is factored into the required HDD angle, length, and depth.

Soil thermal resistivity is a critical factor for the cable design and limits the burial depth for the installation. Due to the long cable routing and electrical parameters of this Project, cable landfall is the most critical location for the cable design, where burial depth poses most risk of derating the export cable due to the cable heat limitations. Derating is a reduction in the cable's rated capacity to carry current, to prevent degradation of the cable insulation due to heat. In case of an HDD, the maximum cover will be located on the shore side of the drill alignment. This maximum cover will typically be measured from ground level onshore to the safe distance below any existing structures or existing piles along the shoreline. The required depths of greater than 70 ft (21 m) for a cable landfall HDD on EW 1 would exceed the cable burial limitations and introduce thermal constraints on the submarine export cables resulting in cable derating.

Besides exceeding depths set by thermal resistivity limitations, the necessary HDD alignment would also place an HDD installation beyond the ends of the existing piers at the site and within the active vessel traffic area. Vessel tracking AIS data from December 2017 indicates that the landward boundary of heavy vessel traffic is approximately 164 ft (50 m) seawards of the end of 35<sup>th</sup> Street Pier. AIS data shows that the slips north (Sims Municipal Recycling Facility) and south of SBMT are both active with vessel traffic (including tug and barge traffic).

In addition to design limitations associated with the HDD installation depth in this location, geotechnical conditions indicate a high risk for inadvertent returns of drilling fluid. In the vicinity of a potential HDD cable landfall exit, the thickness of very soft silt and very loose sand is approximately 45 ft (13.7 m). The majority of the exit curves and exit tangents are within these low strength materials; therefore, inadvertent drilling fluid returns would be anticipated regularly and often during pilot bore, reaming, swabbing, and conduit installation. Within these soils at the exit location, a casing strategy to mitigate inadvertent returns cannot be developed without significantly deepening and lengthening the HDD installation.

In conclusion, Empire's assessment indicated that an HDD installation of the cable landfall at SBMT would not be practicable, because the depth required for installation would exceed the depth limitations of the export cables. Additionally, the HDD alignment would have a high risk of inadvertent returns and potential associated environmental impacts, especially near the HDD exit location. Moreover, the constraints and impacts were similar for any HDD alignment in the vicinity of the cable landfall. The use of the HDD method would reduce seafloor disturbance between the HDD entry and exit points; however, in this area the seafloor is already highly disturbed and future dredging activities are planned. The potential benefits of the reduced seafloor disturbance with HDD installation are also offset by the additional impacts from a larger cable landfall workspace and cofferdam required offshore for HDD, HDD noise, navigational impacts, and potential impacts from inadvertent returns.

### 3.4.5.2 Through the Bulkhead Alternative

The proposed installation for the cable landfall involves pulling the cables through conduits in the bulkhead at the shoreline at SBMT, aligned approximately with the end of 32<sup>nd</sup> Street, between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers. Due to the condition of the existing relieving platform and bulkhead, replacement is needed to stabilize the site. A new pile-supported platform and bulkhead structure at the cable landfall will incorporate two straight, 30-inch outer diameter steel pipe conduits angled through the bulkhead for landfall of the submarine export cables.

Following installation of the sheet pile behind the existing bulkhead, a sheet pile wall will be hammered approximately 4 ft in front of the edge of the relieving platform. The sheet pile wall will extend only slightly above the seabed elevation, to support the lower end of the conduits and stabilize the seabed in front of the existing relieving platform. Slots will be cut into the sheet pile to allow for the conduit installation. Preparation will then begin on the land side support for the conduits behind the sheet pile.

Next, a dredge pit will be excavated at the pier face for each cable landfall. The dredge pit base will measure approximately 12 ft by 82 ft (3.7 m by 25 m) and excavated to an elevation of 19.1 ft (5.8 m) below MLLW (-22 ft [-6.7 m] elevation NAVD88). The dredge pit will be backfilled with clean stone/scour protection to create a foundation to support the lower, seaward end of the conduits. The conduits will be installed through the sheet pile mechanically.

Once the conduit is installed, stone fill will be placed around and above the lower, in-water opening for stabilization. Export cable installation will then commence by pulling the end of each cable from the cable-laying vessel through the conduits and temporarily anchoring them on shore. Additional stone/scour protection will be placed over the cables to approximately 100 ft (30 m) out from the edge of the relieving platform.

Prior to installation of the cables approaching the cable landfall, dredging will be conducted between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers. This dredging is necessary to facilitate cable vessel access and install the submarine export cables between the two piers. Although this method of installing the submarine export cables would involve some additional seafloor disturbance associated with the dredging and burial of the cables to the shoreline, as compared to the HDD method alternative, this disturbance would be in an already highly disturbed area. This area between the piers provides a straight alignment at cable landfall.

Empire considered other alignments for this cable landfall method; however, compared to a cable landfall on the end or along the north or south sides of the 35<sup>th</sup> Street Pier, the proposed cable landfall alignment through the bulkhead in the area between the piers has a lower risk of conflict with jack-up vessel berthing. Jack-up vessel footings have the potential to pose a risk for third-party damage to the cables during operations; therefore, minimizing conflict with potential berthing areas is advantageous. The cable is also located within an area of SBMT that already has reduced bearing live load requirements. A cable landfall towards the seaward end of the 35<sup>th</sup> Street pier has potential impacts by creating future limitations on heavy loads at the SBMT site. Installing the submarine export cables into conduits through the bulkhead between the piers results in limited disturbance of the seabed at the exit point, minimal interference with marine traffic, and avoids the risk of inadvertent returns of drilling fluid that would be associated with the HDD installation method. As such, Empire is proposing this method and alignment for installation of the Project.

### 3.4.5.3 Over the Bulkhead Alternative

As an alternative method, Empire considered an installation that routes the export cables through a mildly sloped steel conduit that goes over the edge of the bulkhead down towards the mudline. Under this alternative, the conduit would remain on top of the bulkhead instead of routing through the bulkhead. Similar to the

method of installing conduits through the bulkhead, the conduits may need to be supported by a steel structure between bulkhead and mudline, and a cofferdam may be installed to facilitate installation of the conduit underwater. Impacts for this method would be similar to installing a conduit through the bulkhead.

Empire assessed several alignments for an over the bulkhead cable landfall, including onto the 35<sup>th</sup> Street Pier. Nearshore conditions such as bathymetry, in-water obstructions, seabed conditions, and vessel traffic were investigated. For the alignment between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers, installation over the bulkhead and relieving platform would result in projection of the conduits out beyond the edge of the relieving platform. In designing the cable landfall, minimizing new structures seaward of the existing edge was preferred. Keeping the cables underground/within the bulkhead and/or under the relieving platform provides greater safety and protection to the cables from external damage. Running the cables over the bulkhead also may introduce stress from a steeper approach angle.

Cable landfall directly onto the pier was determined to be challenging due to existing remnant pile structures, potential conflict with future site uses, the potential for jack-up vessels or barges berthing at the pier, cable alignment complexity and greater potential conflicts with high vessel-traffic areas, similar to considerations for alignments onto the pier with the “through the bulkhead” method (see Section 3.4.5.2). Routing the cables along the 35<sup>th</sup> Street Pier was also determined to have greater potential to conflict with future site uses, based on discussions with SSBMT. Based on these factors, a cable landfall over the bulkhead to the 35<sup>th</sup> Street Pier was determined not to be a practicable alternative for the Project.

### **3.4.6 Pre-Sweeping and Dredging Alternatives**

In certain limited areas of the submarine export cable siting corridor, where underwater megaripples and sandwaves are present on the seafloor, pre-sweeping may be necessary prior to cable lay activities. Pre-sweeping involves smoothing the seafloor by removing ridges and edges, where present. For cable installation along the submarine export cable corridor approaching the landfall at SBMT, between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers, Empire is also proposing to conduct localized dredging to install the submarine export cables due to cable installation vessel draft requirements, existing sediment thermal resistivity properties, and to conduct cable landfall operations. Empire evaluated a variety of pre-sweeping and dredging equipment for these activities. Dredging methods evaluated include trailing suction hopper dredging (TSHD), hydraulic dredging/cutter suction dredging, mechanical dredging, and mass flow excavation. Based on its evaluation, Empire is proposing mass flow excavation as the primary method for pre-sweeping, subject to regulatory approvals, and a mechanical clamshell dredge operation for localized dredging at SBMT.

#### **3.4.6.1 Pre-Sweeping and Dredging Equipment Alternatives**

The primary pre-sweeping method will involve using a mass flow excavator from a construction vessel to smooth excess sediment on the seafloor along the footprint of the cable lay. A mass flow excavator uses jets to disturb and displace the material below the excavator. This equipment is deployed from a self-propelled vessel, making excavation continuous and adaptable. This technology may also incorporate dynamic positioning, allowing the operator to set way points and plan sediment disturbance with a high degree of accuracy. This equipment often works in close proximity to existing subsea objects in support of cable burial operations.

A TSHD is a self-propelled vessel that digs, stores, and pumps dredged material. TSHDs are beneficial in long spread out excavation areas since they can freely move with no wires or spuds. This equipment can cover miles of excavation each day, and returning to a dig area for a “clean up” or small touch ups to a profile is relatively easy. There is little to no support equipment needed for the dredge to dig, transport, and pump off/bottom dump material. However, active dig time may be reduced due to accommodate other activities, such as sailing or disposal of materials. A typical mid-sized hopper dredge in the United States would be expected to remove



between 1 and 3 ft (0.3 and 0.9 m) of material vertically, across a width of 6-12 ft (1.8 to 3.7 m). After filling the hopper, which typically will hold between 2,300 to 6,000 cubic yards (1,760 to 4,590 cubic meters) of dredged material, the TSHD will transit to a disposal site and prepare for disposal.

A TSHD can be used for ocean placement of material; for bottom placement, the dredge opens several gates/doors or splits its hull on a central hinge to release all the material over 4 to 12 minutes, usually while moving slowly through the disposal area to clean out the hopper. If pumping a slurry (combined water and sediment) of the dredged material to an upland disposal or beach location, the vessel discharge pipe will be connected to a land-based pipe and the operator will pump the slurry until the hopper is reasonably cleaned out. On a beach, the water runs into the ocean as the sediment settles on the beach. During upland disposal, typically the sediment settles in planned cells and the excess water discharges through weir boxes. If dry aggregate is required, the dredge will overflow any excess water using skimmers in the hopper, and then will usually also require additional time to dry out the material. After it is adequately dried, cranes and/or conveyors can be used to offload the hopper. However, this dry aggregate method results in exceptionally long cycle times, and is often not selected due to cost implications and significant duration. Once the material disposal is completed, the dredge will travel back to the excavation area and continue with the next load.

A hydraulic dredge/cutter suction dredge (CSD) is a vessel with a large rotating cutter head that disturbs material then sucks it up and uses an onboard pump to pump it either through a pipeline directly to a disposal location or to a barge. A CSD can dig sand, clay, and rock in some cases, and can pump this material further than a hopper dredge due to the pump size. However, it is not self-propelled, so anchors and wires or spuds are used for small moves, and tugs are used for large moves or anchor resets. Because of this traveling limitation, CSDs are typically not used for narrow (less than 100 feet) and/or low-face (less than 5 feet) dig areas. They are exceptionally good at removing large amounts and can be expected to disturb and pump 8 ft (2.4 m) or more of vertical material in one swing. If the dredge is close enough to the pump out location, a long pipeline can be run directly from dredge to disposal. The length of this pipeline can be upwards of 6 mi (9.6 km) if additional boosters are brought in; boosters are barges (or land-based stations) with large pumps that are strategically put in line to increase the velocity through the pipe. If the disposal area is too far for a continuous pipeline, the CSD can pump to a spider barge which will fill scows for transport to disposal. A spider barge is an anchored barge connected to the pipeline from which the material is pumped; it has several "arms" that open, close, raise, and lower to load material in scows based on the scow's location. This method of CSD to spider barge allows the continuous pumping of material to scows, which are then sailed to an offshore disposal location pumped to some type of upland disposal, or brought to a facility to be unloaded with a bucket or conveyors if dry aggregate is needed.

A mechanical or bucket dredge consists of a barge with a bucket to move material. The dredge moves itself a few hundred feet using spuds or wires, but ultimately requires several tugs for large moves or anchor resets. Therefore, this equipment is beneficial for protected waters with a wider dig area, to limit the amount of forward movement required. Mechanical dredges also require scows to move the material to a disposal site since there is no pump or material storage onboard. Each bucket of material, typically 12 to 30 cubic yards (9.2 to 22.9 cubic meters), is put in a scow alongside the dredge. When the scow is full, a tug brings that loaded scow to a disposal area and a different tug replaces an empty scow alongside the dredge, pausing digging for 20 to 60 minutes for each scow change. If bottom dumping the material to the ocean, the tug will sail the scow to the disposal area, the scow will open its bottom doors, release all material in 4 to 12 minutes (similar to the TSHD), then close and travel back to the dredge location. If material is to be pumped to an upland disposal or beach, each scow will have to be brought alongside an "unloader." An unloader is a stationary vessel with a piece that sucks from the scow, a large pump, and a connection to which a pipeline can run to a disposal cell or location on land. The unloader pumps slurry from the scow until it is relatively clean, then the scow makes its trip back



to the dredging area. A less common, but available mechanical dredging method uses a high-powered backhoe to break up and load rock.

### 3.4.6.2 Pre-Sweeping and Dredging Equipment Alternatives Analysis

Use of a mass flow excavator for pre-sweeping activities (to smooth sandwaves) and at utility crossings is expected to be much shorter in duration than dredging using TSHD, CSD or mechanical dredging equipment. The shorter duration will result in less physical presence of work vessels in the cable corridor, less interference with other marine activities and navigation, and reduced overall duration of disturbance to the seabed and the marine environment. The reduction in duration will also increase the likelihood of being able to complete submarine export cable installation activities within one construction season, which greatly reduces the duration of construction-related disturbances to the marine environment, including disturbances to marine wildlife and fisheries.

Due to the efficiency of the operation, the mass flow excavator can be used immediately prior to the cable installation, minimizing the potential for sediment build up between the time of the pre-sweeping operation and the cable installation due to seabed sediment mobility. A dredging operation would likely need to be conducted significantly in advance of the cable lay and burial operation, which would necessitate overdredging additional volumes to account for the seabed mobility in the interim, in order to ensure the correct depths and seabed conditions are present at the time of cable installation and burial.

Once the pre-sweeping activity is completed and the mass flow excavator moved to a different location, the disturbed sediment is expected to settle out quickly. Dredging equipment may result in longer durations of suspended sediment, both due to the increased duration of operations at a given location along the submarine export cable route, and because of impacts associated with managing dredged material, such as barge overflow, hopper barge decanting, and/or onshore dewatering activities that may be necessary prior to disposal, as described in Section 3.4.6.1.

Use of mass flow excavation eliminates the dredged material disposal associated with this pre-sweeping methodology. With dredging, Empire would need to excavate, manage and dispose of material dredged from construction, including management of decanting and dewatering activities. Disposal of the volumes of dredged material anticipated for pre-sweeping will involve a significant cost to the Project, and introduce added logistical complexity associated with the management, sampling and transportation of the dredged material. Moreover, for pre-sweeping at utility crossings, dredging equipment is expected to be impracticable and/or prohibited in certain locations due to the potential risk of impact to existing assets. Mass flow excavation can remove material surrounding an existing asset with reduced risk of damage from contact with dredging equipment.

In the case that mass flow excavation cannot be used due to regulatory requirements, Empire would likely use a TSHD to pre-sweep sandwaves. Although not preferred, the TSHD allows more efficient production for pre-sweeping sandwaves than other dredging methods due to the independent mobility of the equipment and disposal options.

Empire is proposing to use mechanical dredging, with a clamshell bucket, for the dredge area and submarine export cable installation between the 35<sup>th</sup> Street and 29<sup>th</sup> Street Piers. In this area, mass flow excavation is not practicable, because the final seabed surface elevation needs to be lowered for vessel transit, excavation of and backfill of the cable trench (not just seabed smoothing) is required, and due to concerns related to existing sediment contamination in this area. As such, the mechanical dredge is the most practicable solution in this confined area to allow proper management, handling, and disposal of the dredged material.

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## **Empire Wind 2**

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# **U.S. Army Corps of Engineers Section 10/404 Individual Permit Application**

## **Empire Wind 2 Project Lease Area OCS-A 0512**

### **Alternatives Analysis**

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## ACRONYMS AND ABBREVIATIONS

ac	acre
AIS	automatic identification system
BOEM	Bureau of Ocean Energy Management
CBRA	cable burial risk assessment
CFR	Code of Federal Regulations
CLCPA	Climate Leadership and Community Project Act
CO <sub>2</sub>	carbon dioxide
COP	Construction and Operations Plan
CSD	cutter suction dredge
CTV	crew transfer vessel
Empire	Empire Offshore Wind LLC
EW 1	Empire Wind 1
EW 2	Empire Wind 2
FLAG	Fiber-optic Link Around the Globe
ft	foot
GBS	gravity base structure
GIS	geographic information system
GW	gigawatt
ha	hectare
HDD	horizontal directional drilling
HRG	high-resolution geophysical
HVAC	high-voltage alternating current
HVDC	high-voltage direct current
km	kilometer
kV	kilovolt
Lease Area	Lease Area OCS-A 0512
LIPA	Long Island Power Authority
LIRR	Long Island Rail Road
LWCF	Land and Water Conservation Fund
m	meter
m <sup>3</sup>	cubic meter
MFE	mass flow excavation
mi	mile
MLLW	mean lower low water
MTBM	microtunnel boring machine
MW	megawatt
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NYISO	New York Independent System Operator
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSERDA	New York State Energy Research & Development Authority

NYOPRHP	New York State Office of Parks, Recreation and Historic Preservation
POI	Point of Interconnection
Project	Empire Wind 2 Project
PSA	Purchase and Sale Agreement
QMA	Qualified Marine Archaeologist
SDU	Subsea Distribution Unit
Transco LNYBL	Transco Lower New York Bay Lateral
TSS	traffic separation scheme
TSHD	trailing suction hopper dredging
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
Wall-LI	Wall, N.J. to Long Island telecommunications cable
WOTUS	Waters of the United States
WTG	wind turbine generator
yd <sup>3</sup>	cubic yard

## 1. INTRODUCTION

Empire Offshore Wind LLC (Empire) proposes to construct and operate an offshore wind farm located in the designated Renewable Energy Lease Area OCS-A 0512 (Lease Area). Empire proposes to develop the Lease Area in two individual projects, to be known as the Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2) projects. These individual projects will connect to separate offshore substations and onshore Points of Interconnection (POIs) by way of separate export cable routes and onshore substations. Empire is submitting this Alternatives Analysis as part of the Application to the U.S. Army Corps of Engineers (USACE) for an Individual Permit for jurisdictional activities pursuant to Section 404 of the Clean Water Act (Section 404) and Section 10 of the Rivers and Harbors Act (Section 10) for EW 2 (referred to hereafter as the Project).

Empire conducted a detailed analysis of Project alternatives to connect the offshore Lease Area to the proposed POI in Oceanside, New York. Empire evaluated siting alternatives for the submarine export cable route from federal waters, export cable landfall, onshore export cable route, onshore substation location, and onshore cable route to interconnect with the POI relative to constructability, reliability, environmental resources, and stakeholder impact criteria. Although each component was assessed separately, the siting process was completed holistically relative to submarine and terrestrial constraints to identify the most feasible overall solution to deliver energy from the Lease Area to the electric grid, with the fewest negative impacts. The evaluation is informed by several factors, including desktop assessments, site-specific surveys, supply chain capacity, commercial availability, and engagement with both regulators and stakeholders. Additional discussion of the selection of the POI for the Project is provided in **Attachment D** (Project Narrative).

An initial high-level assessment of offshore constraints was conducted based on geographic information system (GIS) data to identify the most feasible potential submarine export cable routes between the Lease Area and the southern shore of Long Island in the vicinity of Long Beach, New York. A siting comparison of the potential submarine export cable routes was then conducted. Section 2.1 summarizes the constraints analysis and results for the identified submarine export cable route alternatives within federal waters. Empire conducted a more detailed site assessment, including geophysical and geotechnical surveys, along the proposed route (see **Attachment D** [Project Narrative]).

The submarine export cables exit the Lease Area, enter New York State waters, and continue to the export cable landfall. An overview of the submarine export cable routing in federal waters is provided in Section 2.1. A cable landfall alternatives analysis is discussed in Section 3.3, including cable installation method alternatives and landfall evaluation criteria. Once the submarine export cables make landfall, they transition to onshore export cables to transport power from the cable landfall to the onshore substation<sup>1</sup>. Onshore export cable alternatives are described in Section 3.5.1 and onshore substation alternatives are described in Section 3.4. Interconnection cables leave the onshore substation underground to deliver power to the POI; an alternatives analysis of the interconnection cable route is provided in Section 3.5.3. The onshore cable route refers to the complete route traversed by the onshore export and interconnection cables between the submarine cable landfall and the POI.

In addition to evaluating Project siting alternatives, Empire also considered the use of alternative technologies. This analysis considers wind turbine generator foundation types, alternative submarine export cable current type, cable landfall installation, submarine asset crossing methodologies, and pre-sweeping and dredging methodologies, as discussed in Section 3.6. These alternative technologies were assessed relative to feasibility

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<sup>1</sup> The final configuration is still under evaluation, but Empire anticipates that the design for cable landfall and onshore transition will be consistent with the methods and environmental impacts described herein.



of existing technology and logistics, cost, and environmental impact, where applicable, in light of the overall project purpose.

## 2. PROJECT DESIGN DEVELOPMENT

This section provides an overview of the design development of the Project, including portions of the Project in federal waters. **Section 3** provides the detailed Alternatives Analysis<sup>2</sup> in accordance with the Clean Water Act's 404(b)(1) Guidelines, 40 CFR Part 230, for the discharge of dredge or fill material associated with cable landfall alternatives, submarine export cable alternatives, onshore export and interconnection cable alternatives, onshore substation alternatives, and alternative technologies.

### 2.1 Submarine Export Cable Route Alternatives: Federal Waters

Based on the location of the POI, an analysis of offshore routing constraints was the first step in submarine export cable route assessment to identify potential submarine export cable routes between the Lease Area and the POI, to assess feasibility, and to understand potentially significant challenges along each route. In considering submarine export cable routes between the Lease Area and the vicinity of Long Beach, New York, the most direct submarine export cable route served as the starting point in developing the export cable route. This was also driven by technical constraints and costs, including cable costs, installation time, and limits associated with efficient high-voltage alternating current (HVAC) transmission. Detail on the offshore routing constraints considered in the offshore routing constraints analysis is provided in Volume 1, Section 2 of the Construction and Operations Plan (COP, provided in **Appendix D-1** of **Attachment D** [Project Narrative]).

Three submarine export cable route alternatives were considered for the submarine export cable route in federal waters, which are presented in **Figure 2.1-1** and **Figure 2.1-2**.

Both regional bathymetry datasets (NOAA 2015) and project-specific high-resolution geophysical (HRG) survey data were collected to analyze general seabed conditions and specific seabed-related risks along the potential submarine export cable routes. These have allowed for routing to minimize traversing steeper seabed slopes and areas of complex seabed due to scour, mobile seabed, potential hardgrounds, or anthropogenic dredged channels. Steep slopes and abrupt changes in depth can pose a risk to cable installation and burial, as seabed cable burial tools are susceptible to stability issues and decreased burial potential as slopes increase. Areas of very shallow water also pose a challenge to the installation because a cable vessel suitable to install this type of cable requires an adequate draft to safely maneuver.

Existing utilities and other assets pose several challenges and risks with respect to the submarine export cables and may limit the methods and depth of burial available for cable installation at the crossing. This may add cost and complexity to the installation, as well as residual risks to the installed cable from reduced burial in the area, the installation of external protection, and/or from maintenance activities for the existing asset. As such, cable crossings and close parallels are minimized to the extent feasible by the routing.

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<sup>2</sup> Alternatives for the development of the Lease Area and associated facilities are also considered as part of the Empire COP that was filed in January 2020 with subsequent revisions in response to agency comments. The COP became publicly available following the Bureau of Ocean Energy Management's (BOEM) issuance of a Notice of Intent to prepare an Environmental Impact Statement in June 2021. Additional information on the Project design development is provided in Section 2 of the COP (**Attachment D**, **Appendix D-1**).

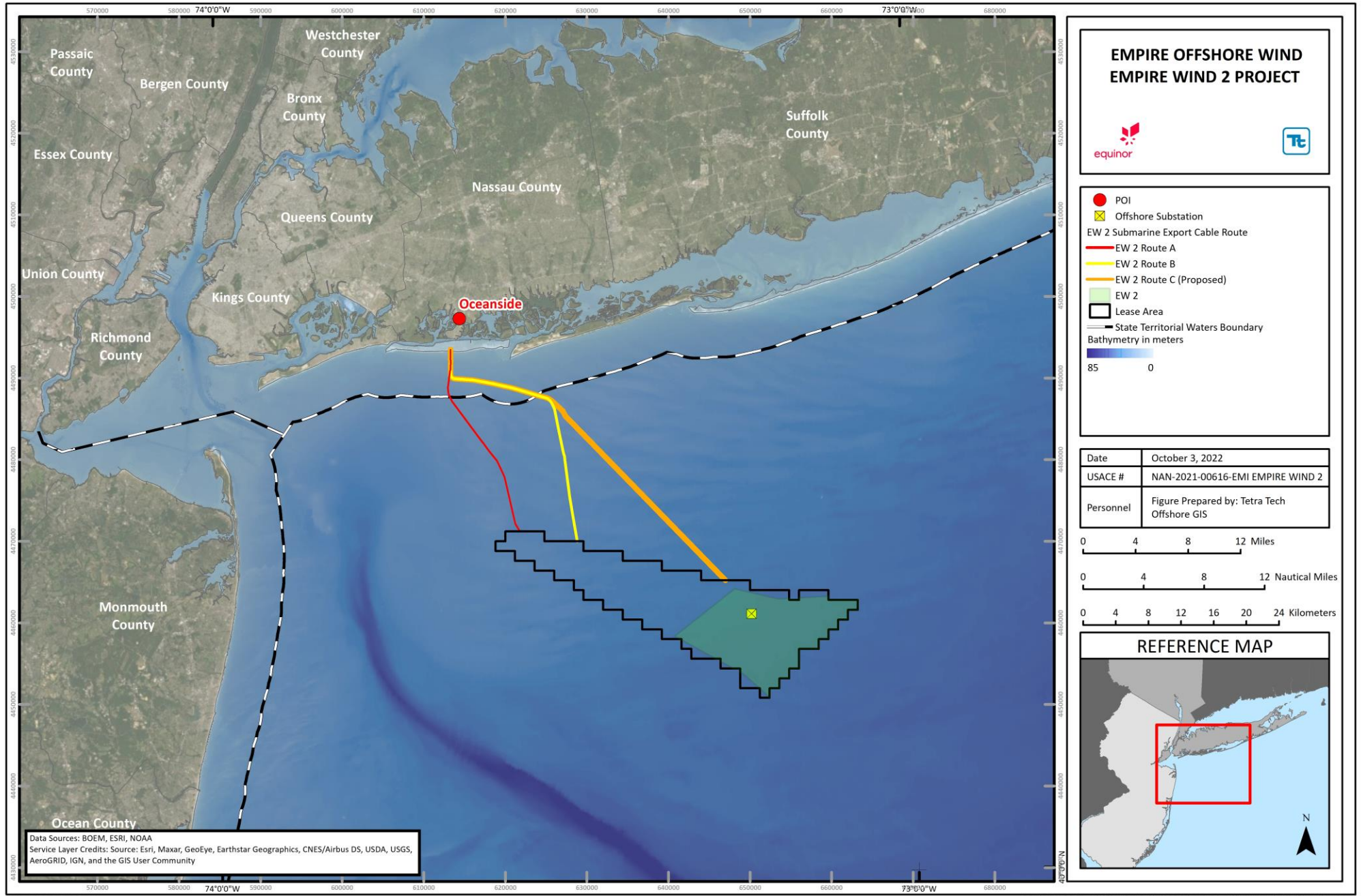


Figure 2.1-1 Submarine Export Cable Route Alternatives: Federal Waters



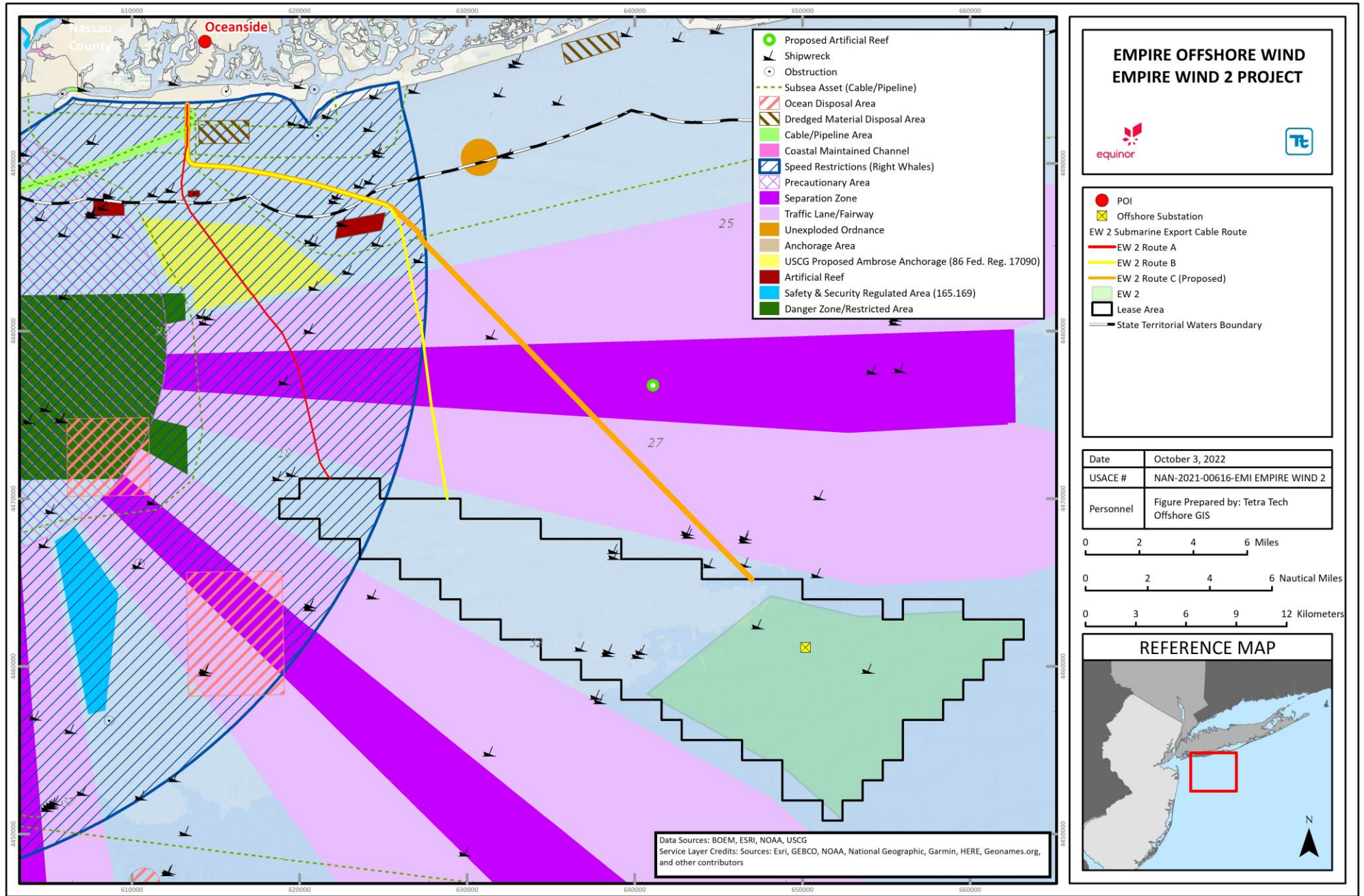


Figure 2.1-2 Submarine Export Cable Route Offshore Constraints: Federal Waters

Dredged and maintained channels are under the purview of the USACE. The location and depths of navigation channels are authorized by the federal government, and the USACE periodically performs condition surveys to identify when maintenance dredging may be needed to keep the channel available at the authorized depth. Should a cable route cross a maintained channel, the cable must be buried deep enough below the authorized depth to ensure that the channel can be safely maintained and to ensure that there is no risk to the cable. The submarine export cable route alternatives for the Project all avoid dredged and maintained channels (with the exception of the cable route associated with the Shell Creek Park (Barnum Island) Landfall Alternative discussed in Section 3.3.5).

Traffic separation schemes (TSS) are commonly used to identify and constrain inbound and outbound traffic lanes, typically with a separation zone between these lanes, to minimize the likelihood of vessel collisions. All routes must cross the TSS located to the north of the Lease Area.

Chartered danger zones, restricted areas, and warning areas exist for a variety of reasons and serve to advise mariners and other users of the risks of navigating an area or conducting some type of bottom contacting activity, such as fishing or cable laying. For these reasons, traversing chartered danger zones is avoided to the extent practicable. Similarly, chartered disposal areas warn mariners and other users of the risks associated with traversing an area of disturbed seabed. While some areas may contain relatively harmless material, such as dredged spoils from maintained channels, others may contain “acid wastes” (an industrial byproduct), “municipal waste” (a sewage treatment product), or munitions.

Shipwrecks and other obstructions are cataloged in the National Oceanic and Atmospheric Administration (NOAA) Nautical Charts and within the NOAA Automated Wreck and Obstruction Information System database. These features may represent physical hazards to installation and may be historically or culturally significant. These features are avoided to the extent practicable by the submarine export cable routing. Where such features must be closely approached, the HRG survey provides insight into the location and nature of the feature through acoustic and magnetic datasets. Known and suspected shipwrecks and obstructions were avoided to the extent practicable during pre-survey routing and the routing was further refined following the acquisition of HRG survey data. Identified features and recommended buffer distances are in the process of being defined through review of the HRG and diver survey data by a Qualified Marine Archaeologist (QMA).

All route alternatives also cross a Seasonal Management Area for Right Whales, where vessel speed restrictions are in place. Project-related vessels will comply with NOAA National Marine Fisheries Service speed restrictions in this area.

### **2.1.1 EW 2 Route A**

Empire evaluated a submarine export cable route alternative from the northwestern corner of the Lease Area to Long Beach to minimize cable length. The total length of EW 2 Route A from the edge of the Lease Area to the cable landfall is approximately 18.6 nautical miles (nm) (34.5 kilometers (km)). The submarine export cable route length within the Lease Area adds another approximately 16.3 nm (30.2 km), while also introducing the difficulty of crossing multiple interarray cables. This route traverses north from the Lease Area to the New York State boundary, across the outbound and inbound traffic lanes of the TSS. EW 2 Route A also traverses closer to the higher grounds of Cholera Bank, potentially increasing the impacts to benthic habitat and areas of increased fishing.

Further north of the inbound traffic lane, the route crosses an area of increased anchoring by large vessels (de facto anchoring area) as identified by automatic identification system (AIS) vessel data. Establishment of an official regulated “Ambrose Anchorage Ground” in this area is being proposed by the US Coast Guard (USCG)

(USCG 2021) (**Figure 2.1-2**). To mitigate the potential risk of impact to the submarine export cables from anchor strike, target burial depth within anchorages is informed by the cable burial risk assessment (CBRA) considering anchor penetration depth. Although Empire can mitigate anchoring risk through the appropriate target burial depth, the increase in depth required in these areas by the CBRA typically results in greater installation complexity, duration, and cost. Anchorage areas may also be subject to potential future maintenance dredging or deepening to allow use by larger vessels. Therefore, crossing either designated anchorages or de facto anchoring areas is avoided to the extent feasible in siting the submarine export cable route. Anchoring within the de facto anchorage is currently less regulated and more dispersed than an official anchorage, so protection via deeper cable burial would need to occur over a larger area, increasing costs and seabed impacts for cable burial.

Empire determined that EW 2 Route A would result in additional challenges associated with crossing the proposed anchorage area and existing de facto anchoring area than the proposed alternative (EW 2 Route C), as well as challenges associated with multiple interarray cable crossings within the Lease Area.

### **2.1.2 EW 2 Route B**

EW 2 Route B was designed to exit the Lease Area from a more centrally located position and stay east of both Cholera Bank and the de facto anchorage area/proposed Ambrose Anchorage Ground described in Section 2.1.1. The route from the Lease Area to the EW 2 landfall runs north-northwest, crossing the inbound and outbound lanes of the Ambrose-Nantucket TSS, to the New York State boundary. This route is a total of approximately 19.6 nm (36.2 km) in length from the edge of the Lease Area to the cable landfall. The submarine export cable route length within the Lease Area adds another 12.9 nm (23.8 km), while also introducing the difficulty of crossing multiple interarray cables.

EW 2 Route B crosses the Fiber-optic Link Around the Globe (FLAG) Atlantic South telecommunications cable about 8.9 nm (16.5 km) offshore from the cable landfall in approximately 59 feet (ft, 18 meters [m]) of water, with the route crossing nearly perpendicularly to the fiber optic cable. The route then proceeds north, keeping over 1,148 ft (350 m) east of a charted artificial reef area containing multiple known wrecks, before turning to the west-northwest.

Empire determined that EW 2 Route B would result in additional challenges associated with multiple interarray cable crossings within the Lease Area compared to the proposed alternative (EW 2 Route C), which is better aligned with the offshore substation location.

### **2.1.3 EW 2 Route C (Proposed)**

EW 2 Route C, the proposed alternative, was designed to better align with the anticipated location of the proposed EW 2 offshore substation and is located further southeast within the Lease Area. This route is a total of approximately 26 nm (48 km) in length from the edge of the Lease Area to the cable landfall. This route offers the shortest cable length within the Lease Area, adding only another approximately 3 nm (5.6 km).

EW 2 Route C exits the Lease Area from the central north edge of the Lease Area and travels in a northwestern direction in a relatively straight line. EW 2 Route C also crosses the FLAG Atlantic South telecommunications cable before turning west and joining the EW 2 Route B alignment seaward of the state water boundary. EW 2 Route C also stays to the east of the charted artificial reef area containing multiple known wrecks, before turning to the west-northwest.

Empire selected EW 2 Route C as the proposed option due to its avoidance of key constraints, such as Cholera Bank, and areas with demonstrated higher frequency anchoring activity. Furthermore, this submarine export



cable route minimizes interarray cable crossings within the Lease Area, which can introduce significant challenges, as noted in Sections 2.1.1 and 2.1.2 above.

### 3. ALTERNATIVES ANALYSIS

Except in certain cases, 40 CFR Part 230 prohibits discharge of dredge or fill material where a practicable alternative exists to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is considered practicable if it is available and could be implemented considering cost, existing technology, and logistics in light of the overall project purpose. This alternatives analysis is provided in accordance with the 404(b)(1) Guidelines for the Specification of Disposal Sites for Dredged or Fill Material.

Under the 404(b)(1) Guidelines, if a proposed activity is to be located in a special aquatic site but is not water dependent, practicable alternatives not involving special aquatic sites are presumed to be available unless the applicant demonstrates otherwise. Offshore wind farms are generally not considered to require access or proximity to, or siting within, a special aquatic site to fulfill their basic project purpose (wind energy generation), and therefore, are not water dependent. Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes.

Based upon wetland delineation efforts performed to date, the proposed Project is not anticipated to significantly affect any special aquatic sites. The Project does not cross any sanctuaries or refuges, vegetated shallows, coral reefs, and riffle and pool complexes. The Project crosses areas of mapped National Wetlands Inventory (NWI) and publicly available NYSDEC tidal wetlands mapping associated with open water areas (Atlantic Ocean, Reynolds Channel, and Barnum Channel). Based on NYSDEC tidal wetlands mapping and aerial photography, areas of mudflat and/or vegetated tidal wetlands may be present along the Project's interconnection cable corridor adjacent to Barnums Channel; however, Empire anticipates that these features, if present, can be avoided with the cable bridge crossing design (see Section 3.5.4).

Empire conducted reconnaissance and wetland delineations for the Project along the onshore export and interconnection cable route on November 4, 2021, June 28, 2022 and August 18, 2022; however, portions of the Project were not assessed due to lack of access permission from property owners. Survey methodologies incorporated the requirements detailed within the Northcentral and Northeast regional supplement to the U.S. Corps of Engineers Wetlands Delineation Manual (USACE 1987). A small palustrine emergent wetland was delineated within the Long Island Railroad (LIRR) corridor. The results of the November 4, 2021, June 28, 2022 and August 18, 2022 survey efforts are provided in the Wetland and Terrestrial Vegetation Report in **Attachment F**.

#### 3.1 Purpose and Need

The overall purpose of the Project is to develop a commercial-scale offshore wind energy facility located in Lease Area OCS-A 0512 (Lease Area) with wind turbine generators, an offshore substation, and electric transmission cables making landfall in the City of Long Beach, New York, to support the achievement of New York's renewable energy mandates.

In August 2016, the State of New York Public Service Commission adopted the Clean Energy Standard.<sup>3</sup> Under this standard, 50 percent of New York State's electricity must come from renewable sources of energy by 2030, with 2.4 gigawatts (GW) of electricity generated by offshore wind. In 2017, New York set a goal of having 2.4

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<sup>3</sup> Case 15-E-0302, *Large-Scale Renewable Program and Clean Energy Standard*, Order Adopting a Clean Energy Standard (Issued and Effective August 1, 2016).

gigawatts of energy generated by offshore wind by 2030, which the New York State Public Service Commission adopted as a supplementary goal for its Clean Energy Standard by order dated July 12, 2018.<sup>4</sup> In July 2019, the Climate Leadership and Community Project Act (CLCPA) was signed into law. The CLCPA adopts a comprehensive climate and clean energy legislation and requires that the State obtain 70 percent of its electricity from renewable sources by 2030 and 100 percent by 2040, and that New York has 9,000 megawatts (MW) of offshore wind capacity by 2035. On July 21, 2020, New York's second offshore wind procurement was announced, under which procurement the New York State Energy Research and Development Authority (NYSERDA) sought up to 2,500 MW of offshore wind. On January 13, 2021, Empire's 1,260-MW EW 2 Project was announced as a winning bidder in the State's competitive solicitation for Offshore Wind Renewable Energy Credits. Governor Hochul announced that Empire Offshore Wind LLC and NYSERDA entered into the Offshore Wind Renewable Energy Certificate Purchase and Sale Agreement (PSA) on January 14, 2022. The PSA requires Empire to design, obtain permits/approvals for, build and operate the Project and to sell the Offshore Renewable Energy Certificates generated to NYSERDA.

The Project is needed to meet Empire's obligation to NYSERDA to generate approximately 1,260 MW of clean, renewable electricity from an offshore wind farm located in the Lease Area for delivery into the New York State power grid via an expansion of Long Island Power Authority's Barrett 138-kilovolt (kV) Substation. The Project is an essential element in addressing the need identified by the State for renewable energy and will help the State achieve its CLCPA mandate and other renewable energy goals.

### **3.2 No Action Alternative**

Under the No Action Alternative, the Project would not be built, the PSA contract between Empire and NYSERDA would not be fulfilled, and the Project's purpose to generate and deliver to New York renewable energy from the offshore wind farm in the Lease Area in furtherance of New York's renewable energy mandates and goals would not be met. The No Action Alternative does not meet the criteria to generate renewable energy through a commercial-scale offshore wind energy facility within the area defined by Lease OCS-A 0512 to meet the PSA to provide approximately 1,260 MW of energy to the New York State energy grid.

The No Action Alternative would result in no construction and operation of a commercial scale wind energy project, and therefore, does not meet the Project's overall purpose. Because it does not meet the Project's purpose, the No Action Alternative is not a practicable alternative and is eliminated from further consideration.

### **3.3 Cable Landfall Alternatives Analysis**

The transition from submarine export cables to the onshore export cables will occur at the export cable landfall location. To identify the proposed cable landfall, Empire conducted coastal and waterfront engineering analyses of the risks and benefits of potential cable landfall locations at multiple sites along the southern shore of Long Island, as well as the submarine export cable routing and associated constraints approaching the cable landfall alternatives. The locations of potential cable landfalls, as discussed in Section 3.3, were also informed by the onshore export cable routing, which is discussed in Section 3.5.

Based on the location of the POI in Oceanside, New York, and the proposed onshore substation in Island Park, New York, the primary study area for a potential submarine export cable landfall included the shoreline of the barrier island of Long Beach, New York. Empire also evaluated a submarine export cable route that would make landfall directly into Barnum Island, as well as a landfall on the adjacent Jones Beach Island.

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<sup>4</sup> Case 18-E-0071, *In the Matter of Offshore Wind Energy*, Order Establishing Offshore Wind Standard and Framework For Phase 1 Procurement (Issued and Effective July 12, 2018).

The shoreline adjacent to the export cable landfall locations along the southern shore of the Long Beach barrier island generally consists of sandy beaches, with a boardwalk along Long Beach, and beach and dune areas along Lido Beach. The boardwalk along Long Beach consists of sheet piling that would require a trenchless method for installation of the submarine export cable. Long Beach recently underwent a USACE renourishment project, which included the placement of new sand material and the repair of rock jetties. To the east, Jones Beach is a State Park, consisting of sand beaches and dunes along the shoreline. By contrast, most of the shoreline along Barnum Island consists of bulkhead or seawall. Due to the limited availability of any other undeveloped space on Barnum Island and/or in the Village of Island Park for the cable landfall, the only evaluated landfall area for the Barnum Island alternative is located within municipal parkland.

The offshore environment generally consists of sandy material with wave and current action typical of the region. Significant offshore constraints on the cable landfall include the presence of existing and proposed pipeline and cable assets along the shoreline, shoals and shallow water areas, the presence of known and potential shipwreck areas, and a sand resource area in the vicinity of the western shoreline of the Long Beach barrier island.

### **3.3.1 Cable Installation Method Alternatives**

Empire is proposing to use the horizontal directional drill (HDD) installation method for the Project cable landfall. Cable landfall installation methods considered were assessed relative to technical feasibility, cost, logistics and minimization of environmental impacts.

Trenchless installation of the cable landfall consists of installation of the cables across the shoreline without direct disturbance of the areas between the entry and exit points, for example, by either HDD or Direct Pipe® installation methodologies. Both methods allow for the installation of conduits or ducts beneath sensitive coastal and nearshore habitats, such as dunes, beaches, waterways, submerged aquatic vegetation, etc. Trenchless installations can also be used to cross under major infrastructure, including railroads and highways. The Project will require three separate trenchless installations to complete the cable landfall, one for each of the submarine export cables.

Typically, trenchless installation operations for an export cable landfall originate from an onshore landfall location and exit a certain distance offshore, determined by the offshore water depth contour and total cable landfall length considerations. To support this installation, both onshore and offshore work areas are required.

Trenchless installation of the cable landfall is proposed due to the more extensive impacts to the marine and shoreline environments associated with installing an open cut cable landfall across the sandy beach (Section 3.3.1.2), which would include dredging and possible temporary suspension of sediment along the offshore portion of the submarine cables, excavation through the intertidal zone, and disturbance to beach and dune habitats on the upland side of the landfall that may include potential foraging and nesting areas for shorebirds. Seabed mobility and coastal shoreline erosion are also significant concerns in the vicinity of the cable landfall, and a trenchless installation will allow deeper installation across the shoreline than an open cut installation could, which will minimize potential for cable exposure during erosion events. Engineering evaluation concluded that the Direct Pipe® installation method is not feasible at Empire's proposed cable landfall (Alternative A) location due to deep foundation and sheet piles supporting the boardwalk and existing structures (Section 3.3.3). Furthermore, Direct Pipe® requires a fabricated steel pipe behind the launch pit that would extend 400 to 500 ft (122 to 152 m) for the duration of the installation, which would result in multiple road closures for several months. Due to the shallow installation angle, an entry pit 15 to 20 ft (4.6 to 6.1 m) is required and would also need to be staged farther north in the roadway than for the HDD installations. Therefore, HDD installation is proposed for the cable landfall installation.

### 3.3.1.1 Horizontal Directional Drill (HDD) (Proposed)

The onshore work area for HDD installations is typically located within the upland cable landfall parcel(s) at the HDD entry point. The evaluated cable landfall alternatives in Section 3.3.3 were sited to avoid vegetation, natural habitats, beach and wetlands, or other waters of the US (WOTUS). Once the onshore work area is set up, casings may be installed at the drill entry points and the HDD activities commence using a rig that drills a borehole underground. The drill begins with a pilot bore that consists of advancing a steerable, rotary drill bit along the design alignment from the drill rig entry location to the exit location. Once the pilot bore is completed, the drilling assembly is removed and replaced with a reaming assembly. Reaming involves enlarging the pilot bore to a larger diameter to accommodate the conduits. Depending upon the required diameter, multiple passes with reamers of increasing diameter may be required to incrementally enlarge the pilot bore to its final diameter.

Upon completion of the reaming pass(es), the condition of the HDD bore is assessed by completing a swab pass through the bore. This pass consists of pushing or pulling a slightly smaller diameter barrel or ball reamer through the fully reamed bore from start to finish. When the reaming operation is completed, the conduit (steel or high-density polyethylene), in which the submarine cable will be installed, is pulled back onshore within the drilled borehole from the offshore exit side. The process of drilling a borehole and conduit pull back will be completed three times for the Project, once for each submarine export cable circuit. The cable installation will be completed when all three submarine export cables are installed through these conduits.

The offshore exit location requires some seafloor preparation to collect any drilling fluids that localize during HDD completion. Preparation will include excavation of pits at each offshore exit location and may also include installation of temporary steel casings from a jack-up barge to below the mudline. Casings may, or may not, be supported by goal posts. The jack-up barge will also house a drill rig. Seabed preparation may also be completed with the installation of a cofferdam for each HDD and excavation to remove material from the cofferdam. The offshore work area for HDD installation requires approximately 22,500 square feet (2,090 square meters) per cable.

Onshore, the entry side of the HDD installation requires an approximate workspace of at least 246 by 246 ft (75 by 75 m) per cable. The entry side workspace area is required to locate equipment necessary for the installation, which includes the drill rig, stacks of drill pipe, operator control cabin, tooling trailers, crane or excavator, separation plant, mud tanks, mud pumps, water storage tanks, office trailer, and support trailers.

In addition to the entry and exit workspace areas, a conduit staging area is also required for fabricating each conduit (or pipe) string. Each conduit string is fully fabricated into a single string with a length equivalent to the approximate length of the HDD installation (additional length may be necessary to account for geometry). This results in a conduit staging area requirement for a single conduit string that is typically 20 to 25 ft (6.1 to 8.2 m) wide by the length of the conduit string (approximately 2,460 ft [750 m]). The conduit string is floated out to the offshore HDD exit location, where it is installed using the drill string to pull it back through the drill hole.

Empire is evaluating potential temporary offsite staging areas for fabricating the HDD conduit strings for the cable landfall. Empire is prioritizing potential temporary fabrication and conduit stringing areas that are existing paved or developed areas (e.g., parking areas or roadways) with existing access to the water. Once fabricated, each conduit string would be rolled across the land toward the water via pipe rollers in an approximately one-day operation (per HDD/conduit). From there, it would be towed by boat to the offshore HDD exit location for installation.

Target depths of the cable landfall HDDs vary by length, down to approximately 100 ft (33 m). Longer HDD installations typically require greater depths of cover to allow for sufficient overlying strength to resist the drilling fluid pressures. Inadvertent drilling fluid returns may occur when drilling fluid pressures exceed the strength of the overlying geotechnical material, and pressure causes the drilling fluids to follow a path that flows upwards and outwards until the pressure is relieved. Drilling fluids reaching the sediment surface may pond on the ground surface in uplands or be released on the seabed as inadvertent returns. All HDD installations carry some risk of an inadvertent drilling fluid return, especially during the exit curve and exit tangent, as the drill bit is steered upwards toward the ground surface or seabed. Inadvertent return risks can be reduced along the majority of an HDD alignment by selecting an appropriate depth of cover that provides sufficient overlying strength to resist the required fluid pressures.

Geotechnical conditions, HDD geometry, and bending radii dictate HDD installation depth, which may be driven by a combination of factors, including sediment characteristics, the required HDD entry angle, avoidance of existing shoreline infrastructure, limitations on the length of the drill, and potential impacts on maritime traffic at the location of the HDD exit point. Another consideration for the export cable landfall alternatives is the need to maintain required spacing (minimum 10 ft) between the submarine export cables, as well as offsets from other existing infrastructure.

### 3.3.1.2 Direct Pipe®

Direct Pipe® is a trenchless method that can be used when HDD methods present challenges for a particular crossing. Similar to HDD, Direct Pipe® operations will originate from an onshore cable landfall location and exit offshore, using both onshore and offshore work areas and requires approximately 260 by 680 ft (79 by 207 m) of onshore workspace per cable. The onshore work area is typically located within the export cable landfall parcel(s). Target depths of landfall paths vary by the length of the Direct Pipe®, up to approximately 80 ft (24 m); however, one advantage of the Direct Pipe® method is that it may allow for a shallower installation than the equivalent length HDD, while still reaching sufficient depths to minimize potential cable exposures from erosion or storm events.

Once the onshore work area is set up and a shallow launch pit has been excavated, Direct Pipe® activities commence. The method involves using a pipe thruster to grip and push a steel pipe with a microtunnel boring machine (MTBM) attached to the leading edge through a seal attached to the pit wall and along the alignment. The MTBM travels along the installation path from onshore to offshore. Once the MTBM exits onto the seafloor and is removed, the duct used to house the electrical cable can be fabricated into a pipe string one joint at a time within the same onshore entry workspace area and pushed into the casing pipe that was previously installed using the Direct Pipe® method. As with the HDD method in Section 3.3.1.1, this process is repeated three times, once for each submarine export cable circuit.

The offshore exit locations will require some seafloor preparation to retrieve the MTBM. Preparation may include completing a shallow excavation (wet) for the MTBM at each exit location. Marine support is needed (e.g., vessels, barges, divers) to excavate the exit pits and support retrieval of the MTBM.

The Direct Pipe® method avoids the need to fabricate a conduit string in a continuous length for each cable, as is required for the HDD installation method. As such, the Direct Pipe® installation does not require an offsite staging and fabrication area. The Direct Pipe® method also avoids the risk of inadvertent returns since drilling fluids are not required to maintain the borehole pressure. However, because the duct is fabricated one joint at a time within the onshore workspace, a larger cable landfall workspace is needed onshore, with greater space constraints for the cable landfall siting. As such, the Direct Pipe® method is only a feasible installation method at certain cable landfall location alternatives, described further in Section 3.3.3. The proposed cable



landfall alternative (Alternative A) does not have sufficient space for installation using the Direct Pipe® method, and Direct Pipe® is not feasible due to existing infrastructure constraints. Moreover, a Direct Pipe® method at this location would result in greater impacts to traffic from road closures. Therefore, Empire is proposing the HDD method for installation of the cable landfall.

### 3.3.1.3 Open Cut

An open cut alternative uses standard submarine cable installation methods to facilitate installation at the target burial depth along the approach to landside. Open cut methods may include open cut trenching/dredging or jetting to bury the cables up to the landfall conduits. Jetting involves the use of pressurized water jets directed into the seabed, creating a trench. As the trench is created, the submarine export cable sinks into the seabed. The displaced sediment then resettles, naturally backfilling the trench.

Dredging is then needed to excavate, remove, and/or relocate sediment across the shoreline and intertidal area to allow the cables to make landfall at the target installation depth. Dredging can be completed through clamshell dredging, suction hopper dredging, and/or hydraulic dredging. During dredging activities, the dredged material is collected in an appropriate manner for either re-use or disposal (depending on the nature of the material) and in accordance with applicable regulations.

A typical open cut method involves installation of one or more sheet pile cofferdams to isolate the area of the shoreline at the cable landfall, dewatering within the area of the cofferdam, and excavating a trench for each cable within the dry cofferdam(s). Cable conduits would then be installed within each trench and the trench would be backfilled. Following installation of the conduits across the shoreline, the cables would be pulled through the conduits for their final installation. A traditional trenched installation then continues across the beach and dune area along the onshore export cable route.

An open cut cable landfall is unlikely to be either feasible or permitted. The shoreline along much of the southern coast of Long Island, including the export cable landfall area, is regulated by New York State as a Coastal Erosion Hazard Area due to the area's exposure to wave action from the Atlantic Ocean, which would require the export cable landfall to be installed deep enough to avoid impacts from coastal processes. Deep installation of the export cables with an open cut cable landfall, if feasible, would require extensive disturbance for dredging, excavation, and stockpiling across the shoreline and beach area. It would also result in direct disturbance to the beach and dune habitat for trench installation of the three export cables, and the associated potential wildlife impacts, including potential impacts to habitat for nesting shorebirds. Finally, direct disturbance and excavation of the shoreline and beach is likely to be viewed unfavorably by the local community and other stakeholders. Empire, therefore, determined that the open cut installation method is not a practicable alternative for the Project and would result in greater environmental impacts than a trenchless installation.

### 3.3.2 Cable Landfall Evaluation Criteria

The evaluation of cable landfall, submarine export, and onshore export cable route alternatives was conducted as an iterative process that involved multiple steps of evaluation of the offshore and onshore cables routes, constraints on potential landfall locations, and the feasibility of landfall installation methodologies at potentially suitable landfall sites. Each of these Project components, although described as separate evaluations, were considered in concert for the selection of the overall preferred solution for the Project. Each landfall was evaluated relative to the following existing technology, logistical, cost, environmental, and stakeholder criteria:

- Proximity to the preferred POI (e.g., route length);
- Prior subsea cable landfall success in nearby areas;

- Temporary staging area size/options (e.g., preferably land without permanent structures, with a minimum size to allow for adequate staging);
- Hydrodynamics and sediment dynamics (e.g., erosion, shoaling);
- Anthropogenic interferences (e.g., fish trap area, pipelines, dredging, sand resources, navigational impacts);
- Environmental, wildlife habitat, and cultural considerations (e.g., eelgrass, dunes, wetlands, sand resources, buried and/or submerged cultural resources);
- Technological and logistical constructability complexities (e.g., long additional water crossings, vessel access, asset crossings); and
- Land use (e.g., consistency of existing uses).

Cable landfalls were evaluated relative to the use of trenchless as well as open cut methodologies (see Section 3.6.5). The trenchless installation methodology was selected due to the avoidance of environmental impacts associated with the open cut methods. As such, the evaluation of cable landfall siting alternatives is based on the use of a trenchless installation. A summary table of the cable landfall alternatives and associated nearshore submarine export cable route alternatives within New York state waters is provided in **Table 3.3-1**.

**Table 3.3-1 Cable Landfall and Submarine Export Cable Route Alternative Comparison**

Assessment Criteria	Cable Landfall Alternative A (Proposed)	Cable Landfall Alternative B	Cable Landfall Alternative C					Cable Landfall Alternative D	Cable Landfall Alternative E	Cable Landfall A + Landfall E Alternative	Barnum Island Cable Landfall	Jones Beach Cable Landfall Alternative
			Alternative C1	Alternative C1 with Deep Burial (no Pre-Dredging)	Alternative C1 with Deep Burial (Pre-Dredging)	Alternative C1 with Trenchless	Alternative C3					
<b>Summary of Route Characteristics</b>												
Total Route Submarine Export Cable Route Length (Lease Area to Cable Landfall) a/	29.1 mi (46.8 km)	28.7 (46.2 km)	27.1 mi (43.6 km)	27.1 mi (43.6 km)	27.1 mi (43.6 km)	27.1 mi (43.6 km)	29.8 mi (48.0 km)	26.8 mi (43.2 km)	29.3 mi (47.2 km)	30.4 mi (48.9 km)	30.0 mi (48.3 km)	23.8 mi (38.4 km)
Submarine Export Cable Route Length (New York boundary to cable landfall)	8.8 mi (14.2 km)	8.4 mi (13.6 km)	6.8 mi (11.0 km)	6.8 mi (11.0 km)	6.8 mi (11.0 km)	6.8 mi (11.0 km)	9.6 mi (15.4 km)	6.5 mi (10.5 km)	9.1 mi (14.6 km)	10.1 mi (16.3 km)	9.7 mi (15.7 km)	3.9 mi (6.2 km)
Approximate Total Onshore Route Length to POI (Onshore Export + Interconnection Cable)	3.3 mi (5.3 km)	3.2 mi (5.1 km)	3.8 mi (6.1 km)	3.8 mi (6.1 km)	3.8 mi (6.1 km)	3.8 mi (6.1 km)	3.8 mi (6.1 km)	5.2 mi (8.4 km)	3.3 mi (5.3 km)	3.9 mi (6.3 km)	2.8 mi (4.5 km)	11 mi (17.7 km)
<b>Environmental Factors</b>												
Submarine Export Cable Length Rank	5	4	3	3	3	3	7	2	6	9 (longest)	8	1 (shortest)
Utility Crossing Potential Sediment Disturbance Volume b/	8,820 cubic yards (yd <sup>3</sup> ) (6,744 cubic meters [m <sup>3</sup> ])	4,410 yd <sup>3</sup> (3,372 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	4,410 yd <sup>3</sup> (3,372 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	8,820 yd <sup>3</sup> (6,744 m <sup>3</sup> )	8,820 yd <sup>3</sup> (6,744 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )	2,205 yd <sup>3</sup> (1,686 m <sup>3</sup> )
<b>Estimated Total Cable Protection Volume c/</b>	<b>177,691 yd<sup>3</sup></b>	<b>172,903 yd<sup>3</sup></b>	<b>161,924 yd<sup>3</sup></b>	<b>161,924 yd<sup>3</sup></b>	<b>161,924 yd<sup>3</sup></b>	<b>161,924 yd<sup>3</sup></b>	<b>179,414 yd<sup>3</sup></b>	<b>160,149 yd<sup>3</sup></b>	<b>180,059 yd<sup>3</sup></b>	<b>180,059 yd<sup>3</sup></b>	<b>179,091 yd<sup>3</sup></b>	<b>142,407 yd<sup>3</sup></b>
Number of dredged/maintained channels crossed d/	0	0	0	0	0	0	0	0	0	0	1	0
Length across Sand Resource Area e/	0	0	4,100 ft (1,250 m)	4,100 ft (1,250 m)	4,100 ft (1,250 m)	4,100 ft (1,250 m)	0	4,100 ft (1,250 m)	0	0	0	0
Centerline distance to Sand Resource Area e/	1,991 ft (607 m)	223 ft (68 m)	0 ft (0 m)	0 ft (0 m)	0 ft (0 m)	0 ft (0 m)	176 ft (54 m)	0 ft (0 m)	3,539 ft (1,079 m)	1,991 ft (607 m)	253 ft (77 m)	4,270 ft (1,300 m)
Wrecks and obstructions within the cable corridor f/	0	0	0	0	0	0	0	0	0	0	2	2
Significant Coastal Fish and Wildlife Habitat	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
<b>Technological and Logistical Factors</b>												
Cable Landfall Area	2.38 ac	0.72 ac	4.9 ac	4.9 ac	4.9 ac	4.9 ac	4.9 ac	57.4 ac	1.56 ac	3.29 ac	11.6 ac	3.5 ac
Maximum Water Depth, ft (m) g/	55.4 ft (16.9 m)	52.2 ft (15.9 m)	53.1 ft (16.2 m)	53.1 ft (16.2 m)	53.1 ft (16.2 m)	53.1 ft (16.2 m)	44 ft (13.4 m)	51.2 ft (15.6 m)	33.8 ft (10.3 m)	51.8 ft (15.8 m)	50.5 ft (15.4 m)	61.7 ft (18.8 m)
Number of existing and planned utility crossings within New York state waters	5	3	2	2	2	2	3	2	5	5	2	2
Hydrodynamics/Sediment dynamics/Coastal Erosion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Assessment Criteria	Cable Landfall Alternative A (Proposed)	Cable Landfall Alternative B	Cable Landfall Alternative C					Cable Landfall Alternative D	Cable Landfall Alternative E	Cable Landfall A + Landfall E Alternative	Barnum Island Cable Landfall	Jones Beach Cable Landfall Alternative
			Alternative C1	Alternative C1 with Deep Burial (no Pre-Dredging)	Alternative C1 with Deep Burial (Pre-Dredging)	Alternative C1 with Trenchless	Alternative C3					
Potential Cable Landfall Installation Methods	HDD	HDD	HDD or Direct Pipe®	HDD or Direct Pipe®	HDD or Direct Pipe®	HDD or Direct Pipe®	HDD or Direct Pipe®	HDD or Direct Pipe®	HDD	HDD	HDD	HDD or Direct Pipe®
Construction Complexity	High	High	Low	High	High	High	Moderate	Low	High	High	High	High
Potential Residential Noise Impact of Cable Landfall	High	High	Moderate	Moderate	Moderate	Moderate	Moderate	Low	High	High	High	Low
Potential Traffic Impact of Cable Landfall h/	High	High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	Low	Low
Availability of Existing Technology	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
<b>Commercial Factors</b>												
Parkland alienation potentially required	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No i/
Parkland conversion potentially required	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Unknown	No
Cable landfall easement/permit risk	Moderate	Moderate	High	High	High	High	High	High	Moderate	High	Unknown	Unknown
<b>Practicable (Technology/Cost/Logistics)</b>	<b>Yes</b>	No	No	No	No	No	Yes	No	Yes	Yes	No	No
<b>Least Environmentally Damaging Practicable Alternative</b>	<b>Yes</b>	No	No	No	No	No	No	No	No	No	No	No

Notes:

a/ as measured from the edge of the Lease Area.

b/ based on up to 735 yd<sup>3</sup> (562 m<sup>3</sup>) at applicable utility crossings.

c/ based on up to remedial cable protection on up to 10% of each of the three submarine export cables, and additional cable protection at utility crossings.

d/ Based on USACE Maintained Channel Quarter Reach (USACE 2007).

e/ Based on BOEM sand and gravel lease areas (BOEM 2020).

f/ Based on NOAA Automated Wrecks and Obstruction Information System (NOAA 2009) mapped locations within a 900-ft (274-m) corridor of the submarine cable route alternative.

g/ Bathymetry is measured for the submarine cable corridor where it enters state waters, from NOAA NCEI's U.S. Coastal Relief Model (CRM).

h/ This assessment is excluding the consideration of the onshore cable routing from the cable landfall to the POI. See Section 3.5 for the alternatives analysis of the onshore export and interconnection cable routes.

i/ Although alienation of municipal parkland is not required, this alternative would need an agreement from New York Office of Parks, Recreation and Historic Preservation for crossing Jones Beach State Park.

### 3.3.3 Long Beach/Lido Beach Landfall Alternatives

Empire identified five export cable landfall options within the City of Long Beach and Town of Hempstead, New York. These include, from west to east: Laurelton Boulevard and West Broadway (Alternative E); Riverside Boulevard and East Broadway (Alternative A); Shore Road and Monroe Boulevard (Alternative B); the Lido Beach West Town Park (Alternative C); and the Lido Beach Town Park (Alternative D). Each is described in more detail below and shown in **Figure 3.3-1**. Submarine constraints associated with the submarine export cable route(s) to each cable landfall alternative are presented in **Figure 3.3-2**. Based on the evaluation of different installation methods (Section 3.3.1), this section primarily considers trenchless installation solutions (HDD or Direct Pipe®) for these export cable landfalls.

In the selection of export cable landfall alternatives, optimizing the combination of the submarine and onshore export cable routes was a key priority due to the potential complexity of cable routing in this area.

#### 3.3.3.1 Alternative A (Proposed)

Cable landfall Alternative A is located in the City of Long Beach and encompasses approximately 2.4 acres (ac, 1.0 hectares [ha]). The cable landfall is located partially within Riverside Boulevard and partially on a mostly bare, privately owned, approximately 4.9-ac (2-ha) vacant parcel located to the west of Riverside Boulevard and to the south of East Broadway. This vacant parcel has been used for parking and equipment storage in the past, and potential future development plans for this parcel are uncertain. The adjacent parcel located to the east of Riverside Boulevard is under redevelopment as part of the Long Beach Superblock Project<sup>5</sup>. Immediately to the north of cable landfall Alternative A, across East Broadway, there are various high-rises. To the south of the cable landfall, the export cable route traverses the end of Riverside Boulevard, in close proximity to or underneath an existing small commercial building, and underneath the raised oceanfront boardwalk adjacent to Long Beach/Ocean Beach Park. The conceptual export cable landfall alignment is designed so that two cables are within Riverside Boulevard, and the third cable is along the easternmost portion of the privately owned parcel to minimize impact to developable space on the privately owned parcel. The onshore export cable route alternatives from cable landfall Alternative A are approximately 1.3 to 1.5 mi (2.0 to 2.4 km) long and offer some of the shortest routes to the proposed onshore substation (Onshore Substation C).

The Riverside Boulevard corridor is narrow and constrained by utility congestion, allowing limited space for siting of the transition joint bays and duct banks within the roadway. Cable landfall Alternative A has sufficient space for a cable landfall of all three export cables and the temporary workspace for cable landfall activities if the vacant parcel is commercially available and the necessary land rights can be obtained. Empire is currently evaluating whether an export cable landfall with three circuits in the right-of-way is practicable in the event that the export cables and cable landfall workspace is limited to the public right-of-way. In the event that the cable landfall can be entirely limited to public right-of-way, it is anticipated that one of the export cable circuits would require drilling under the existing commercial building at the southern end of Riverside Boulevard.

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<sup>5</sup> The Superblock Project is located along Shore Road between Riverside Boulevard and Long Beach Boulevard.



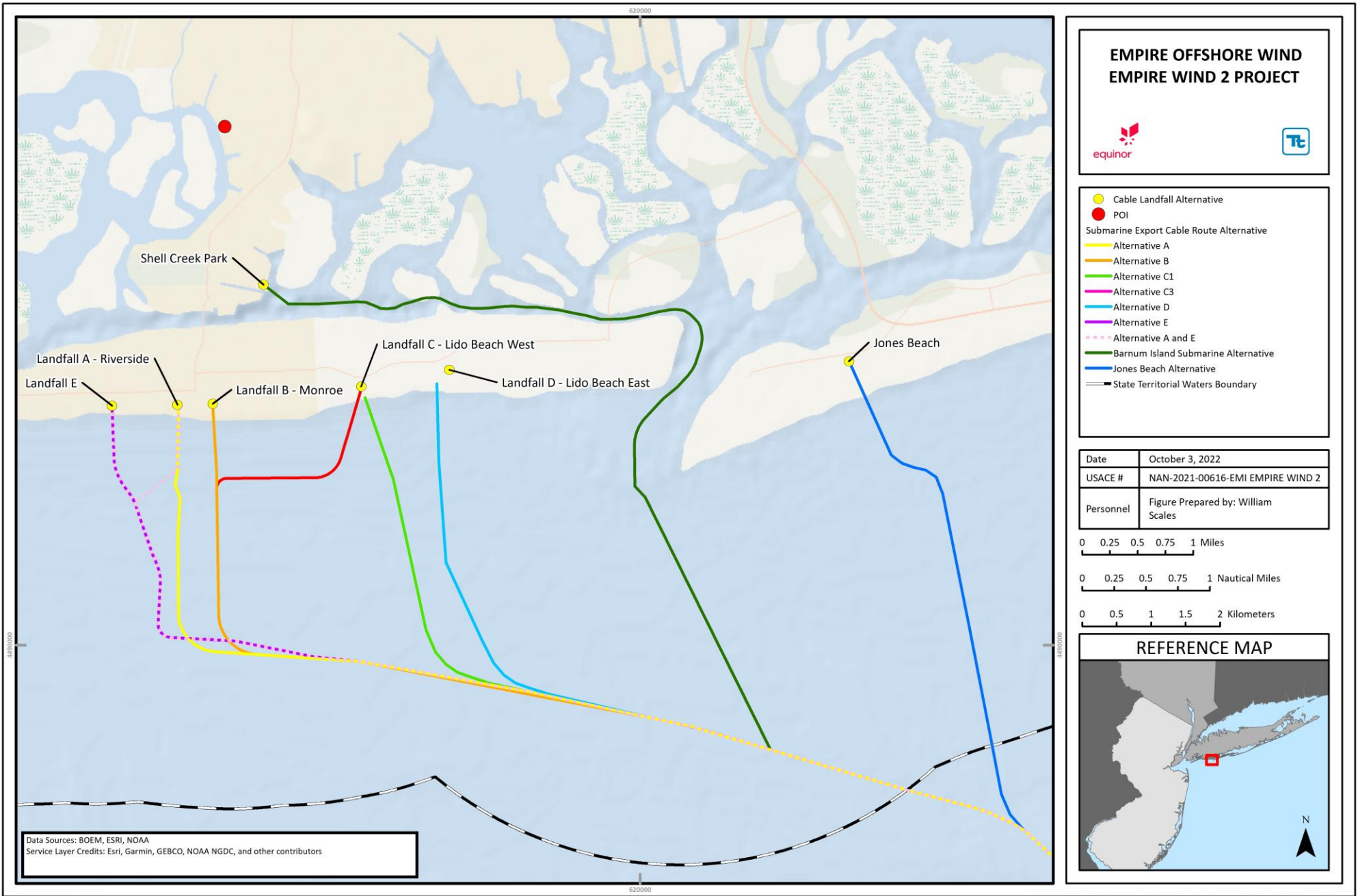
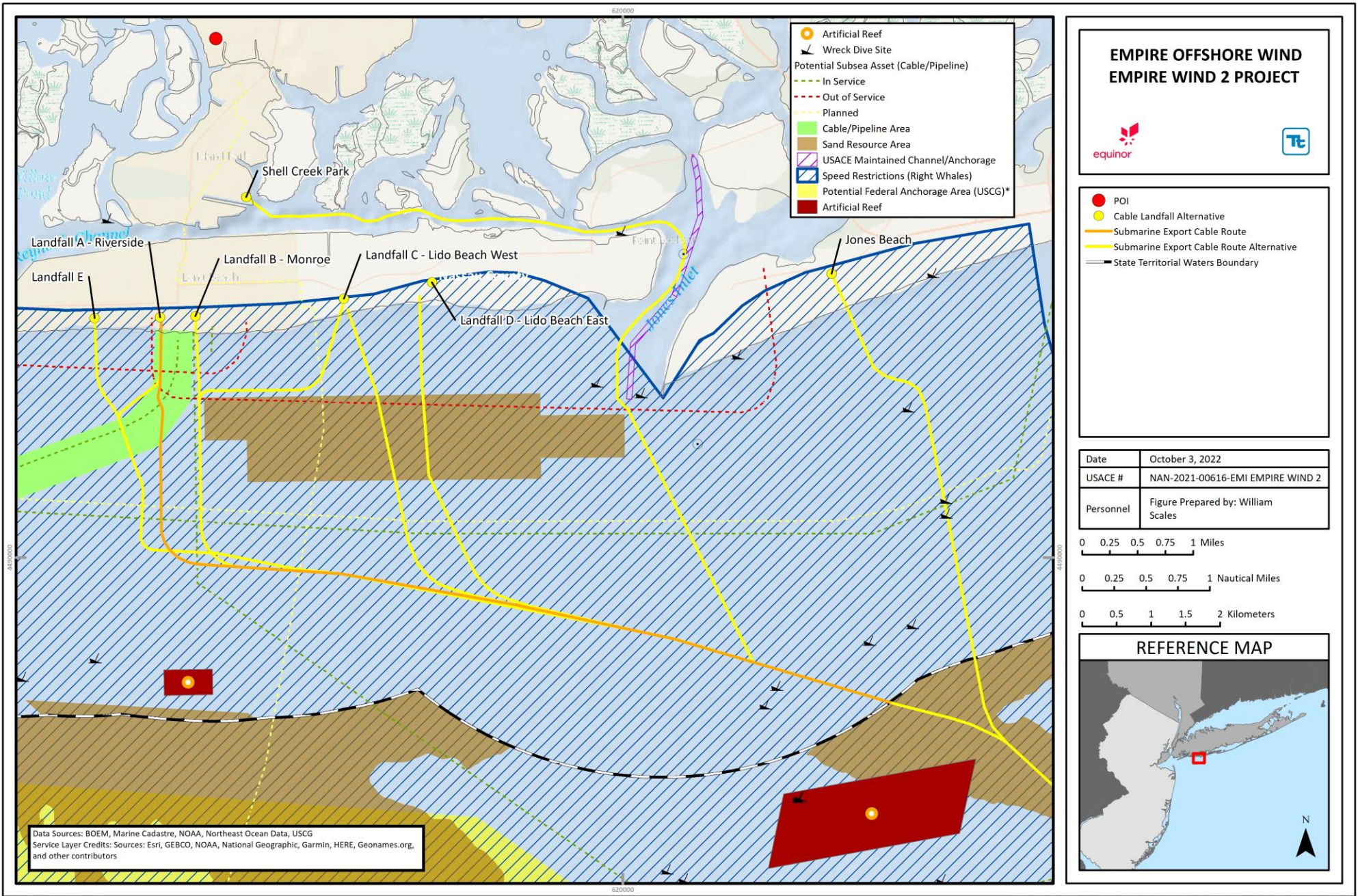


Figure 3.3-1 Cable Landfall and Submarine Export Cable Alternatives





**Figure 3.3-2 Cable Landfall Alternatives and Submarine Export Cable Offshore Constraints**



Due to the limited space availability and the presence of shoreline obstructions, Empire determined that the Direct Pipe® installation method is not feasible for Alternative A. Engineering evaluation concluded that the Direct Pipe® installation method is not feasible at Empire's proposed cable landfall (Alternative A) location due to deep foundation and sheet piles supporting the boardwalk and existing structures (Section 3.3.3). Direct Pipe® installation is not suitable because it requires a fabricated steel pipe behind the launch pit that would extend 400 to 500 ft (122 to 152 m) for the extent of the operations, resulting in multiple road closures for several months. The Direct Pipe® installation also requires the onshore entry pit to be much further north than for the HDD installations, since the angle of installation for Direct Pipe® is less steep. Onshore impacts from Direct Pipe® installation at this location would be significant, requiring more street closures, heavy equipment (side booms) to support the steel pipe behind the entry pit, a larger footprint from additional equipment, and noise impacts for a greater duration. Therefore, the HDD installation method is proposed and Direct Pipe® was not considered further at this location.

In the event that the cable landfall is limited to the public right-of-way, one potential limitation at cable landfall Alternative A is that there may not be sufficient space for contingency in the case of an HDD failure along one or more of the export cable alignments. Typically, if an initial HDD attempt fails, another attempt may be made along a parallel alignment immediately adjacent; however, for cable landfall Alternative A, a separate contingency landfall may be required due to the highly constrained spacing of the three cables.

The submarine export cable route to Alternative A will extend a total length of 7.7 nm (8.8 mi, 14.2 km) from the cable landfall to the New York State boundary. This route requires crossing a total of three existing, two planned, and two out-of-service submarine utilities within New York state waters, including the existing Transco Lower New York Bay Lateral (LNYBL), a 26-inch diameter natural gas pipeline. The LNYBL is located approximately 3,280 ft (1 km) from shore along this route; the submarine export cable route also crosses the high-voltage direct current (HVDC) Neptune Power Transmission Cable and the FLAG Atlantic telecommunications cable. The planned utilities are the Wall, New Jersey to Long Island (Wall-LI) telecommunications cable and the Poseidon transmission cable. These utility crossings are expected to involve the use of hard substrate cable protection measures on the seafloor (e.g., rock berm, concrete mattresses, etc.).

The most challenging aspect of the nearshore routing at this location is the Transco LNYBL crossing in shallow water. Empire evaluated trenched asset crossing solutions for this crossing as well as trenchless HDD crossing solutions. HDD solutions included:

- Extending the export cable landfall HDDs at Alternative A to approximately 5,000 ft (1500 m) and including the Transco LNYBL crossing as part of the landfall; or
- Completing separate, shorter, water-to-water HDDs underneath the Transco LNYBL pipeline, with a shorter (1,650 ft to 3,280 ft [500 m to 1000 m]) trenchless cable landfall segment exiting to the north of the Transco LNYBL crossing.

HDD crossings of the Transco LNYBL pipeline have the additional benefit of reducing the length of jetting impact to the seafloor along the submarine export cable route; however, both of these trenchless options were eliminated from consideration due to the risks associated with drilling underneath an active natural gas pipeline, length of the drill, cable rating and pull-in considerations. The length of the installation to extend the cable landfall past the pipeline crossing would be too great for the technical limitations of an HDD at this location, given geotechnical and ground conditions, environmental risk, cable rating, and other factors. Given the potential for sandy and mobile sediment in the vicinity of the export cable landfall, which increases the risk of inadvertent returns of drilling fluid, undermining of the sediments surrounding the pipeline, and uncertainty of the drill path, the HDD crossing of the Transco LNYBL was deemed impracticable.

A trenched crossing design was also evaluated for the Transco LNYBL crossing location approaching cable landfall Alternative A. The area of the crossing is expected to have medium to high fishing activity and water depths of approximately 31 ft (9.5 m). To reduce potential conflict with fishing activities and ensure sufficient cover and protection over the submarine export cables, rock berm or concrete mattress protection over the cables will be required at the Transco LNYBL crossing location. Evaluation of crossing options indicated that up to approximately 7 ft (2 m) of shoaling will result from each pipeline crossing. Shoaling decreases the water depth above the seafloor, which may result in navigational impacts and reduce the accessibility of the area to deeper-draft vessels. Utilizing the Northeast Ocean Data Portal (2021 dataset) and Automatic Identification System (AIS) data, an initial characterization of vessel traffic within the area of the pipeline crossing, which occurs less than 1 nm offshore landfall Alternative A, identified the presence of pleasure craft, sailing vessels, passenger vessels, tug and tow vessels, and fishing vessels (listed in order of most frequent to lowest occurrence). Average vessel lengths are approximately 72 to 79 ft (22 to 24 m) with an average of approximately 12 ft (3.7m) draft. Traffic frequency crossing the area is one vessel approximately every one to two days. There were no identified cargo vessels or tanker vessels within the area of the crossing.

Pre-installation, localized dredging over the pipeline, either with mass flow excavation (MFE) or diver-assisted dredging operations, could reduce shoaling height to some extent, but the existing depth of the pipeline is uncertain due to seabed dynamics and both methods carry potential safety risks to the pipeline that would require further evaluation to determine feasibility. This method also may not be feasible due to the prohibitions or limitations on dredging by the asset owner. Therefore, available information cannot confirm that it would be technically feasible to install the Transco LNYBL crossing with less than 7 ft (2 m) of shoaling.

During evaluation of potential submarine export cable routes to the landfall alternatives, Empire also considered avoidance of a sand resource area that is located offshore of Lido Beach (**Figure 3.3-2**). The submarine export cable route (centerline) for Alternative A is located approximately 1,991 ft (607 m) west of the sand resource area. Existing infrastructure (the FLAG Atlantic telecoms cable) is located between Alternative A and the sand resource area; therefore, installation of the submarine export cables along this route is not expected to result in any impacts to or new limitations on the use of the sand resource area.

Considering the nearshore environment, the Alternative A cable landfall has a relatively short distance to deeper waters, suitable for setting up the offshore portion of the HDD installations. Water depths at the exit pits offshore are expected to be approximately 30 ft to 33 ft (9 m to 10 m) below mean lower low water (MLLW) for HDD installation lengths of 1,650 ft (500 m) to 3,280 ft (1000 m). HDDs on the shorter end of that range offer more favorable, flexible routing between the offshore exit points of the HDDs and the Transco LNYBL.

The cable landfall HDDs will need to traverse underneath the raised oceanfront boardwalk. The HDDs will need to be installed deep enough to allow adequate spacing between the export cable conduits and the bottom of the sheet pile associated with the boardwalk structure. As part of Empire's conceptual design, casing pipes may be installed on the onshore entry side of each HDD below the existing commercial building and the boardwalk.

The Ocean Beach Park area offers a variety of recreation to visitors in summer, including summer concerts. Since Ocean Beach Park is municipal parkland, parkland alienation by State legislation may be required for the underground crossing of the beach. According to correspondence received from the New York State Office of Parks, Recreation and Historic Preservation (NYOPRHP) dated December 9, 2021, the City of Long Beach received three Land and Water Conservation Fund (LWCF) grants in the 1980s for the development of the Long Beach boardwalk, dunes, and swimming facilities. NYOPRHP indicated that the use of Landfall A could impact LWCF areas, and additional coordination with NYOPRHP and/or National Park Service (NPS) will be required. Crossing underneath a LWCF area may result in additional regulatory challenges if a federal

conversion process is required. A federal conversion process requires the provision of replacement property that is of equal or greater fair market value and of reasonably equivalent usefulness and location as the lands being removed from outdoor recreation use.

The onshore workspace at cable landfall Alternative A is in close proximity to sensitive noise and air quality receptors, including residences adjacent to Riverside Boulevard. The export cable landfall installation would require space at the intersection of East Broadway and Riverside Boulevard, which would likely require road closure, traffic impacts and disruption of access to residential buildings for a prolonged period of time (approximately 6 to 24 months). Due to the space constraints, limited mitigation options may exist for these potential noise and traffic impacts.

As one of the three westernmost export cable landfalls (which include Alternatives E, A, and B) the export cable landfall would cross through the proposed Bayside Development, a potential project listed in the City of Long Beach's comprehensive plan, "Creating Resilience: A Planning Initiative," which was updated in a draft in January 2018 (City of Long Beach 2018).

In summary, Alternative A is a practicable alternative for an export cable landfall of three circuits, in the event that land rights can be obtained for the vacant parcel to the west of Riverside Boulevard, as well as other necessary land rights (i.e., parkland alienation and conversion). Empire is evaluating the feasibility of installation of three circuits in the right-of-way in the event that the cable landfall is limited to the public right-of-way. Challenges for Alternative A include installation of the cable landfall underneath the Long Beach boardwalk, shoaling required for the submarine export cable crossings of the Transco LNYBL, parkland alienation and conversion, and potential noise, traffic and air quality impacts. However, cable landfall Alternative A results in submarine export cable routing that avoids close proximity to the sand resource area and minimizes the submarine export cable route length, cable protection footprint and potential area of pre-sweeping, relative to the other alternatives that are practicable (Alternative E, Alternative C3, and Alternative A+E) on the basis of existing technology, logistics and cost. As such, Alternative A was determined to be the least environmentally damaging practicable alternative and has been selected as the Empire's proposed alternative.

### 3.3.3.2 Alternative B

Alternative B is in the City of Long Beach and consists of only approximately 0.7 ac (0.3 ha) of workspace within Monroe Boulevard. The onshore workspace for the export cable landfall is bounded to the west by apartments and to the east by an apartment building and a parking area. To the north, the cable landfall traverses the intersection of Monroe Boulevard and East Broadway. To the south, the cable landfall is bounded by Shore Road, and the HDD path would traverse the end of Monroe Boulevard and a raised oceanfront boardwalk, adjacent to Ocean Beach Park. Compared to other sites considered, the onshore side of Alternative B is relatively far from the shoreline along the beach, which increases the length of the required trenchless installation segment. Potential onshore export cable routes from Alternative B are approximately 1.4 mi (2.2 km) long and offer some of the shortest routes to the proposed onshore substation (Onshore Substation C).

The submarine export cable route to cable landfall Alternative B extends a total length of 7.3 nm (8.4 mi, 13.6 km) to the New York state waters boundary. This route requires crossing a total of one existing, two planned, and two out-of-service utilities within New York state waters, including crossing the existing HVDC Neptune Power Transmission Cable, which is crossed approximately 9,630 ft (2,940 m) from shore. The planned utilities are the Wall, New Jersey to Long Island (Wall-LI) telecommunications cable and the Poseidon transmission cable. The submarine export cable route and the trenchless landfall installation would also be constrained by the FLAG Atlantic telecoms cable, which is located immediately to the west of this landfall alternative.



During evaluation of potential submarine export cable routes to the landfall alternatives, Empire also considered avoidance of the sand resource area that is located offshore of Lido Beach (**Figure 3.3-2**). The submarine export cable route approaching Alternative B avoids the sand resource area, with the route centerline located approximately 223 ft (68 m) west of the sand resource area. Empire expects that the submarine cable corridor for Alternative B would have a similar offset from the sand resource area as Alternative C3 (see Section 3.3.3.3).

Similar to Alternative E (see Section 3.3.3.5), installation activities would be directly adjacent to noise sensitive areas, including high-rise and residential buildings; however, this cable landfall alternative is surrounded by buildings and residences, and does not have the adjacent vacant parcels that are present at cable landfall Alternatives A and E. The cable landfall installation requires space at the intersection of East Broadway and Monroe Boulevard, which would likely require road closure and traffic impacts for a prolonged period of time. Due to the extremely constrained space availability, limited mitigation options exist for these potential noise and traffic impacts.

This cable landfall also has a relatively short distance to deeper waters suitable for setting up the offshore portion of the trenchless installation. Access from offshore is obstructed, however. The route would need to traverse the raised oceanfront boardwalk and also the narrow corridor at the end of Monroe Drive between two buildings.

Since Ocean Beach Park in the City of Long Beach is municipal parkland, parkland alienation by State legislation may be required for the underground cables to cross the beach. According to correspondence received from the NYOPRHP dated December 9, 2021, the City of Long Beach received three LWCF grants in the 1980s for the development of the Long Beach boardwalk, dunes, and swimming facilities. NYOPRHP indicated that the use of landfall Alternative B could impact these LWCF areas, and additional coordination with NYOPRHP and/or NPS will be required. A crossing of the LWCF area may result in additional regulatory challenges in the case a federal conversion process is required. A federal conversion process requires the provision of replacement property that is of equal or greater fair market value and of reasonably equivalent usefulness and location as the lands being removed from outdoor recreation use.

Alternative B is a not a practicable alternative due to the limited availability of workspace, and adjacency of buildings and residences, combined with the potential regulatory challenges of installing the submarine export cable route in proximity to the sand resource area. Installation of one or two cables to Alternative B in combination with another landfall may alleviate some of the challenges (similar to Alternative A+E, Section 3.3.3.6) but would result in greater environmental impact, due to the need for an additional submarine export cable corridor, which would spread impacts over a greater area rather than aligning the three submarine export cables along a single route. Using multiple landfalls would also increase onshore impacts and the extent of resident disruptions associated with potential noise and traffic impacts.

### 3.3.3.3 Alternative C

Cable landfall Alternative C is located at Lido Beach West Town Park in the Town of Hempstead and consists of an existing large, paved parking lot used for beach access. The overall parcel is approximately 34 ac and includes beach, dune, and adjacent beach shrubs; however, the portion of the parking lot proposed for landfall activities includes approximately 4.9 ac (2.0 ha) of the overall site. The site extends to the north as a parking area, not quite reaching Lido Boulevard. Access to the area is from the west, off of Regent Drive. The park extends further to the west with tennis courts and overflow parking areas. Immediately to the south is the beach access, a protective dune area, and a wide, sandy beach. The beach is open daily with lifeguards in the

summertime. Potential onshore export cable routes from Alternative C to the proposed onshore substation are approximately 2.0 to 2.3 mi (3.3 to 3.6 km) long.

The submarine export cable route Alternative C3 would extend a total length of 8.3 nm (9.6 mi, 15.4 km) from the New York State boundary to cable landfall Alternative C. Any submarine export cable route to Alternative C would require crossing a total of one existing, two planned and one out-of-service submarine utilities within New York state waters, including crossing the existing HVDC Neptune Power Transmission Cable approximately 10,990 ft (3,350 m) from shore. The planned utilities are the Wall, New Jersey to Long Island (Wall-LI) telecommunications cable and the Poseidon transmission cable.

Due to the size of the parcel and the Lido Beach West Town Park, cable landfall Alternative C has abundant available space for the cable landfall for all three export cable circuits and the associated onshore workspace. This parcel has a somewhat longer distance to deeper waters for setting up the offshore portion of the trenchless landfall installation, compared to other alternatives evaluated. However, due to the ample potential onshore workspace for setup and transition to the onshore export cables, either HDD or Direct Pipe® methods may be used for cable landfall installation at this location. Cable landfall Alternative C also has sufficient space for a contingency to attempt to re-drill in an immediately adjacent, parallel alignment, in the case of an initial HDD failure along one or more of the export cable alignments.

According to correspondence received from the NYOPRHP dated December 9, 2021, Lido Beach West Town Park has not received LWCF grants and would not be encumbered by a federal land conversion process and coordination with the National Park Service. Since Lido Beach West Beach is municipal parkland, parkland alienation by State legislation may be required for an agreement to cross the beach and parking area, similar most of the other alternatives considered, with the exception of Jones Beach.

As an existing open space, the parking lot at cable landfall Alternative C is significantly farther from residences and other noise and air quality receptors than Alternatives A, B and E. The nearest residential areas to the cable landfall onshore entry points are approximately 450 ft (137 m) to the east along Allevard Street in Lido Beach. There are also residential areas on the north side of Lido Boulevard (approximately 670 ft [204 m] north) and Eva Drive (660 ft [201 m] northwest). Impacts to adjacent residences, therefore, are expected to be relatively low compared to other cable landfall alternatives.

A variety of protected migratory shorebirds (including federally listed Piping Plovers) are known to nest in the restored dune area along Lido Beach; however, the restored dune habitat is mostly to the west of the Alternative C export cable landfall. Impacts to habitat would be avoided by trenchless installation of the export cable landfall segment across the dunes, and indirect impacts to dune-nesting birds could be mitigated with seasonal timing, as appropriate.

Empire assessed submarine export cable routing options associated with cable landfall Alternative C to avoid or minimize impact to the sand resource area that is located directly offshore opposite Lido Beach (**Figure 3.3-2**). The following submarine export cable route alternatives were assessed:

- Submarine Export Cable Route Alternative C1

The submarine export cable route Alternative C1 approaches landfall Alternative C along the most direct path and crosses the sand resource area approximately perpendicularly. This submarine export cable route from landfall to the New York state boundary has a total length of approximately 5.9 nm (6.8 mi, 11.0 km). With a standard target submarine export cable burial depth of 6 ft, the presence of the cable and its operational requirements would restrict dredging/use of the sand resource area within

an approximately 360 ft (110 m) corridor along the submarine export cable route, bisecting the sand resource area. Based on several stakeholder meetings with the USACE, Empire understands that a submarine export cable route alternative that crosses the sand resource area will pose regulatory challenges. As such, Empire determined this alternative to be impracticable.

- Submarine Export Cable Route Alternative C1 with Deep Burial (no Pre-Dredging)

To avoid or minimize restrictions on dredging and future use of the sand resource area, Empire also investigated installation of the submarine export cables along the submarine export cable Alternative C1 route across the sand resource area, but with deeper burial. Based on feedback from the USACE on the depths that would be required to avoid interference with dredging operations, Empire assessed burial depth of 30 to 40 ft across the sand resource area. Empire determined that with no pre-dredging to remove cover along the submarine export cable route, installation below 30 ft is not technically feasible. Under ideal sediment conditions, the maximum depth of installation with a vertical injector, which provides the deepest installation of industry-standard tools available, would be 29 ft (9 m); however, even achieving this lesser depth consistently under realistic field conditions cannot be assumed. As such, Empire determined that deep burial without pre-dredging cannot achieve the required depths due to technical limitations of the available installation tools and therefore this alternative was deemed impracticable.

- Submarine Export Cable Route Alternative C1 with Deep Burial (with Pre-Dredging)

Given the technical limitations of installing the submarine export cables to a depth of 30 to 40 ft below the existing seabed along the submarine export cable route without pre-dredging, Empire also considered a deeper burial solution that would require dredging along the cable corridor to remove sand and lower the seafloor prior to the installation of the submarine export cables. Empire determined that pre-dredging prior to cable installation would be challenging; due to the seabed mobility of the area, keeping the dredged area from backfilling prior to installation would be difficult. This could be exacerbated if seasonal timing restrictions increase the time between dredging and cable installation, and would require significant over-dredging to counteract, producing large dredge volumes even if the deepest burial tool (vertical injector) is used. It is estimated that dredging a 131 ft (40 m) corridor, an area of 155,479 yd<sup>2</sup> (130,000 m<sup>2</sup>) for the installation across the sand resource area would be extremely costly, generate 1,256,680 yd<sup>3</sup> (960,800 m<sup>3</sup>) of dredged material, and add over a year of work activity to the Project. Moreover, the dredged material would need to be disposed of or temporarily stored unless an immediate use is identified, which would also not be practicable for large volumes of dredge material. Empire determined that the cost of dredging so large an area before cable installation is not viable for the Project. Finally, the depth of cover along the submarine export cable route post-installation would still not allow dredging to occur over the cables, so an approximately 360-ft no-dredge corridor would need to be applied for all three cables, which would be inconsistent with USACE's future use of the area. Empire therefore determined that this alternative is impracticable and would also result in greater aquatic and sediment transport impact within the marine environment, due to the significant additional dredging activity.

- Submarine Export Cable Route Alternative C1 with Trenchless Installation

Another alternative Empire evaluated for a deep crossing of the sand resource area was use of an HDD installation underneath. Two general concepts for an HDD crossing of the sand resource area are 1)

to include the sand resource area within the export cable landfall and start the trenchless installation of the landfall on the south side of the sand resource area, or 2) to install a separate water-to-water HDD across the sand resource area, and then begin the installation of the export cable landfall on the north side of the sand resource area, as proposed. Empire determined that to install the submarine export cables deep enough across the sand resource area, the length of the installation would be too great for the technical limitations of an HDD at this location, given geotechnical and ground conditions, environmental risk, cable rating, and other factors. A length of 3,300 ft (1,000 m) is the approximate limit for standard HDD installation at this location, and this would be exceeded by either option, since the width of the sand resource area is approximately 4,600 ft (1,400 m), and the HDD would need to extend even further to the south to be able to reach the required depths (30 to 40 ft) across the sand resource area. Moreover, the longer an HDD installation, the deeper it needs to be at the bottom depth, which risks derating the submarine export cables due to thermal constraints. Derating reduces the current the cable is able to carry, to prevent degradation of the cable insulation due to heat. Therefore, due to technical limitations on the available technology, Empire determined that installing the submarine export cables across the sand resource area via HDD is not a practicable alternative for the Project.

- Submarine Export Cable Route Alternative C3

This alternative would route around the western side of the sand resource area and has a total length of approximately 8.3 nm (9.6 mi, 15.4 km) from landfall to the New York State boundary. This route would require crossing a total of one existing, two planned, and one out-of-service submarine utilities, including crossing the existing HVDC Neptune Power Transmission Cable. The submarine export cable route and the trenchless landfall installation would also be constrained by the FLAG Atlantic telecoms cable, located immediately to the west of this landfall alternative, but would be appropriately offset. Due to the constraints of routing between the sand resource area and the FLAG Atlantic telecoms cable, the centerline of this route would be located approximately 176 ft (54 m) from the edge of the sand resource area. Considering space requirements for installing all three cables and the FLAG Atlantic telecoms cable, the edge of the submarine export cable corridor required for installation approaches 49 ft (15 m) at its closest point, which could be further optimized to 90 ft (27.4 m). Empire determined this route is a practicable alternative that avoids the shoaling and potential navigational impacts associated with shallow waters at the Transco LNYBL crossing, avoids direct impact to the sand resource area, and minimizes potential onshore impacts to residents associated with the cable landfall, such as noise and traffic. However, submarine export cable route Alternative C3 has additional challenges associated with its proximity to the sand resource area and potential regulatory hurdles, as well as an overall longer submarine export cable route compared to the proposed alternative (Alternative A).

- Jones Inlet Alternative (not shown)

Empire also considered an alternative that would avoid the sand resource area by routing around to the east, curving around past Jones Inlet and continuing west along the north side of the sand resource area to cable landfall Alternative C. Technical challenges for this routing include shallow waters, charted wrecks, and vessel traffic near the mouth of Jones Inlet (described for the Barnum Island Alternative in Section 3.3.5), as well as dredging and maintenance activity that occurs in the vicinity of Jones Inlet itself. For these reasons, a submarine export cable route around the east of the sand resource

area is not practicable and would not reduce environmental impacts relative to the proposed route. Moreover, because of the proximity of the eastern end of the sand resource area to the western tip of Jones Beach and the narrow entrance to Jones Inlet, siting in this area is as constrained as submarine export cable route Alternative C3 and is expected to result in similar proximity to the sand resource area. As such, a Jones Inlet Alternative was determined to be impracticable.

Based on this assessment of space and technical requirements for a trenchless landfall installation of three cables, Empire considers cable landfall Alternative C, with submarine export cable route C3, to be a practicable alternative, but it was not selected as the proposed alternative due to the longer overall submarine export cable route, proximity to the sand resource area and potential regulatory challenges. All other submarine cable route alternatives to cable landfall Alternative C were determined to be impracticable on the basis of available existing technology, cost and/or logistical considerations.

#### 3.3.3.4 Alternative D

Alternative D is located at Lido Beach Town Park in the Town of Hempstead, in an area consisting of a paved parking lot, which is used for beach access and a ball field. The site extends to the north as a parking area, not quite reaching Lido Boulevard. The overall parcel is approximately 57 ac (23 ha) and includes beach, dune, and adjacent beach shrubs. Access to the area is from the north, off Lido Boulevard. Immediately to the south of the parking lot is the beach access, a protective dune area, and a wide, sandy beach. The beach is open daily, with lifeguards in the summertime. Potential onshore cable routes from this export cable landfall to the proposed onshore substation are approximately 3.4 mi (5.5 km) long. Alternative D extends the length of the onshore export cable route by approximately one mile [mi] compared to Alternative C.

The submarine export cable route to landfall Alternative D extends a total length of 5.7 nm (6.5 mi, 10.5 km) from the cable landfall to the New York State boundary. This route requires crossing a total of one existing, one planned submarine and one out-of-service submarine utility, including crossing the existing HVDC Neptune Power Transmission Cable approximately 11,614 ft (3,540 m) from shore. The other utility is identified as the planned Poseidon cable.

The submarine export cable route approaching Alternative D crosses the sand resource area approximately perpendicularly. Installation and operational requirements would restrict future dredging/use of the sand resource area within the submarine export cable corridor. Based on feedback from USACE, Empire understands that a submarine export cable route alternative that crosses the sand resource area will pose regulatory challenges. Routing and installation options to avoid or minimize impact to the sand resource area are similar to those described in Section 3.3.3.3.

Since Lido Beach is municipal parkland, parkland alienation by State legislation may be required for the underground cables to cross the beach and parking area. According to correspondence received from the NYOPRHP dated December 9, 2021, Lido Beach Town Park received two LWCF grants in the 1970s; NYOPRHP indicated that any action that would remove any part of this LWCF-protected park from public outdoor recreation use for longer than 12 months or would entail the permanent conveyance of surface land rights may trigger a conversion process with the National Park Service. This process requires the provision of replacement property that is of equal or greater fair market value and of reasonably equivalent usefulness and location as the lands being removed from outdoor recreation use.

For construction of an HDD, this export cable landfall offers ample potential workspace for trenchless installation, transition joint bays, and separation distance for three export cable circuit. Either HDD or Direct Pipe® methods may be used for cable landfall installation at this location and cable landfall Alternative D also



has sufficient space for a contingency to attempt to re-drill in an immediately adjacent, parallel alignment, in the case of an initial HDD failure along one or more of the export cable alignments. This alternative also provides an opportunity for cable landfall installation that is spatially separated from adjacent residential neighborhoods and potential noise and air quality receptors.

Access to cable landfall Alternative D from offshore is mostly unobstructed. Due to the presence of shallower water nearshore, the distance to deeper offshore contours for the trenchless landfall installation is the farthest of the alternatives evaluated, so this site is expected to require the longest trenchless landfall segment. A variety of protected migratory shorebirds, including federally listed Piping Plovers, are known to nest in the restored dune area along Lido Beach. Considerations for work in proximity to the dune area are similar to those described for cable landfall Alternative C (Section 3.3.3.3).

Cable landfall Alternative D has similar space and constructability advantages as Alternative C and is feasible but requires longer onshore export cable routing, increasing the onshore logistical complexity, installation duration and costs. Alternative D is considered not practicable due to the likelihood of additional regulatory challenges associated with a federal conversion process with the National Park Service in combination with the regulatory challenges of submarine export cable routing that crosses the sand resource area (see similar discussion for Alternative C in Section 3.3.3.3). Alternative D is also in closer proximity to the restored dunes, although impacts to nesting shorebirds could likely be mitigated by implementation of appropriate time-of-year windows, since direct disturbance to the dune habitat will be avoided by the trenchless installation of the landfall segment.

#### 3.3.3.5 Alternative E

Cable landfall Alternative E is located in the City of Long Beach and is the farthest west of the sites evaluated along Long Beach. The onshore workspace for the cable landfall is approximately 1.6 ac (0.6 ha), within Laurelton Boulevard and adjacent privately owned parcels to the west of Laurelton Boulevard on both sides (north and south) of West Broadway. According to the Nassau County Land Records online viewer, there are three parcels to the south of West Broadway totaling approximately 1.7 acres and categorized as ocean waterfront land. The parcel to the north of West Broadway is a 0.2-ac (0.1 ha) privately owned parcel that is categorized as vacant commercial land. The onshore export cable route alternatives from cable landfall Alternative E are approximately 1.8 mi (3.0 km) long and offer some of the shortest routes to the proposed onshore substation.

Alternative E is bounded to the south by the raised oceanfront boardwalk adjacent to the City of Long Beach Ocean Beach Park. There is a high-rise residential complex called Lafayette Terrace along Lafayette Boulevard to the west of the cable landfall. Immediately across Laurelton Boulevard to the east, there is a high-rise assisted living facility at 274 West Broadway. To the north, the cable landfall area is bounded by high-rises and residences along W Broadway and Laurelton Boulevard. The private parcels to the south of West Broadway at the Alternative E cable landfall site have housed construction trailers and been used for parking in the past, but potential future development plans for these parcels are uncertain.

The landfall cable alignment is designed so that two cables are within Laurelton Boulevard, and the third cable is along the easternmost portion of the private parcel to the southwest of West Broadway, to minimize the limitation on potentially developable space. To the south of the cable landfall, along the export cable landfall alignment, the route traverses the end of Laurelton Boulevard and the export cables need to be installed underneath the Long Beach boardwalk. A temporary police trailer sits at the end of Laurelton Boulevard, which will likely need to be relocated for use of Alternative E as an export cable landfall.

The Laurelton Boulevard corridor is narrow and constrained by utility congestion, allowing limited space for siting of the transition joint bays and duct banks within the roadway. Cable landfall Alternative E has sufficient space for a cable landfall of all three export cables and the temporary workspace for cable landfall activities if the vacant parcel is commercially available and the necessary land rights can be obtained. Empire is currently evaluating whether an export cable landfall with three circuits is technically feasible in the event that the export cables and cable landfall workspace is limited to the public right-of-way.

Due to the limited space availability, Empire determined that the Direct Pipe® installation method is not feasible for Alternative E; therefore, the HDD installation method is required. Direct Pipe® installation is not suitable because it requires a fabricated steel pipe behind the launch pit that would extend 400 to 500 ft (122 to 152 m) for the extent of the operations. The Direct Pipe® installation also requires the onshore entry pit to be much further north than for the HDD installations, since the angle of installation for Direct Pipe® is less steep. Onshore impacts from Direct Pipe® installation at this location would be significant, requiring more street closures, heavy equipment (side booms) to support the steel pipe behind the entry pit, a larger footprint from additional equipment, and noise impacts for a greater duration. Therefore, Direct Pipe® was not considered further at this location. In the event that the cable landfall is limited to public right-of-way, one potential limitation at cable landfall Alternative E is that it may not have sufficient space for contingency in the case of an HDD failure along one or more of the export cable alignments. Typically, if an initial HDD attempt fails, another attempt may be made along a parallel alignment immediately adjacent; however, for cable landfall Alternative E, a separate contingency location may be required due to the highly constrained spacing of the three cables.

The submarine export cable route to landfall Alternative E extends a total length of 7.9 nm (9.1 mi, 14.6 km) from the New York State boundary to shore. Similar to the submarine export cable route to Alternative A, this route would require crossing a total of three existing, two planned and one out-of-service submarine utilities, including crossing the existing Transco LNYBL approximately 4,593 ft (1.4 km) from shore, as well as crossing the HVDC Neptune Power Transmission Cable and the FLAG Atlantic telecoms cable. These utility crossings are expected to involve the use of hard substrate cable protection measures on the seafloor (e.g., rock berm, concrete mattresses, etc).

As previously described for landfall Alternative A, challenges exist for crossing the Transco LNYBL along the submarine export cable route approaching Alternative E. However, for Alternative E, the Transco LNYBL crossing is located slightly further offshore due to the alignment of the existing pipeline. As with Alternative A, an HDD crossing of the Transco LNYBL is impracticable (see Section 3.3.3.1). A trenched crossing design could result in up to approximately 7 ft (2 m) of shoaling. Utilizing the Northeast Ocean Data Portal (2021 dataset), an initial characterization of vessel traffic within the area of the pipeline crossing, which occurs less than 1 nm offshore landfall Alternative E, identified the presence of pleasure craft, sailing vessels, passenger vessels, tug and tow vessels, and fishing vessels (listed in order of most frequent to lowest occurrence). There were no identified cargo vessels or tanker vessels within the area of the crossing.

Empire also considered avoidance of a sand resource area that is located offshore of Lido Beach (**Figure 3.3-2**). As the westernmost route, the centerline of the submarine export cable route approaching Alternative E would be approximately 4,270 ft (1,300 m) at its closest to the sand resource area. Existing infrastructure (the FLAG Atlantic telecoms cable) is located between Alternative E and the sand resource area; therefore, installation of the submarine export cables along this route is not expected to result in any impacts to or new limitations on the use of the sand resource area.

Considering the nearshore environment, the Alternative E cable landfall has the shortest distance to deeper water suitable for setting up the offshore portion of the trenchless landfall installation. Water depths at the exit

pit offshore are expected to be approximately 30 ft to 33 ft (9 m to 10 m) below MLLW for trenchless installation lengths of 1,650 ft (500 m) to 3,280 ft (1000 m).

The cable landfall HDDs will need to traverse underneath the raised oceanfront boardwalk. The HDDs will need to be installed deep enough to allow adequate spacing between the export cable conduits and the bottom of the sheet pile associated with the boardwalk structure.

Since Ocean Beach Park is municipal parkland, parkland alienation by State legislation may be required for an underground crossing of the beach. According to correspondence received from the NYOPRHP dated December 9, 2021, the City of Long Beach received three LWCF grants in the 1980s for the development of the Long Beach boardwalk, dunes, and swimming facilities. Additional coordination with NYOPRHP and/or NPS will be required. Crossing a LWCF area may result in additional regulatory challenges in the case a federal conversion process is required. A federal conversion process requires the provision of replacement property that is of equal or greater fair market value and of reasonably equivalent usefulness and location as the lands being removed from outdoor recreation use.

The onshore workspace at cable landfall Alternative E is in close proximity to sensitive noise and air quality receptors, including residences adjacent to Laurelton Boulevard and along W Broadway and an assisted living facility directly adjacent to the site. The cable landfall installation would occupy space at the intersection of these two roadways, which would likely require road closure, traffic impacts and disruption of access to residential buildings for a prolonged period (up to 6 to 24 months). Due to the space constraints, limited mitigation options exist for these potential noise and traffic impacts.

As one of the three westernmost export cable landfalls (which include Alternatives E, A and B) the cable landfall would cross through the proposed Bayside Development, a potential project listed in the City of Long Beach's comprehensive plan, "Creating Resilience: A Planning Initiative," which was updated in a draft in January 2018 (City of Long Beach 2018).

In summary, Alternative E is a practicable alternative for an export cable landfall of three circuits, in the event that land rights can be obtained for the vacant parcel to the west of Riverside Boulevard, as well as other necessary land rights (i.e., parkland alienation and conversion). Empire is evaluating the feasibility of installation of three circuits in the right-of-way event that the cable landfall is limited to the public right-of-way. Challenges for Alternative E include installation of the cable landfall underneath the Long Beach boardwalk, shoaling required for the submarine export cable crossings of the Transco LNYBL, potential parkland alienation and conversion, and potential noise, traffic and air quality impacts. Due to the proximity of cable landfall Alternative E to sensitive noise and air quality receptors, as well as potential onshore traffic impacts, this cable landfall alternative is anticipated to have greater potential onshore environmental and stakeholder impacts compared to the proposed alternative (Alternative A), as well as having a longer submarine export cable route. As such, Alternative E was not selected as the proposed alternative.

#### 3.3.3.6 Alternative A+E

Cable landfall Alternative A+E is a combination that uses the cable landfall areas both at Alternative A (as described in Section 3.3.3.1) and Alternative E (as described in Section 3.3.3.5). Under this cable landfall alternative, two submarine export cables make landfall at the Alternative A location, and one submarine export cable makes landfall at the Alternative E location. Cable landfall Alternative A and Alternative E are located approximately 0.6 mi (1 km) apart. Up to the full available workspace acreage at each location (1.7 ac [0.7 ha] at Alternative A and 1.6 ac [0.6 ha] at Alternative E) are used under this alternative.

The cable landfall Alternative A+E alleviates some of the space constraints associated with a three-circuit cable landfall at either Alternative A or Alternative E. In particular, it would provide space for a contingency in the case of an HDD failure. If an initial HDD attempt fails, another attempt could be made along a parallel alignment immediately adjacent at either cable landfall Alternative A or Alternative E.

For Alternative A+E, the submarine export cable routes are adjusted so that all three submarine export cables cross the Transco NYLBL at one location in parallel, before splitting into separate routes to each of the respective cable landfalls. North of where the route splits to the north of the NYLBL crossing, the submarine export cable corridor to cable landfall Alternative A would be approximately 500 ft (152 m) wide, and the submarine export cable corridor to cable landfall Alternative E would be approximately 300 ft (91 m) wide.

The use of two separate submarine export cable routes/corridors spreads the impacted area within the marine environment over a greater area instead of aligning the three submarine export cables in parallel along a single corridor. Co-locating cables along a single corridor and alignment is generally considered to minimize the extent of environmental impacts, and Alternative A+E will have a slightly longer submarine export cable route than the proposed alternative A+E.

As described above, the City of Long Beach received LWCF grants in the 1980s for the development of the Long Beach boardwalk, dunes, and swimming facilities, and crossing the boardwalk and LCWF area will require additional coordination with NYOPRHP and/or NPS will be required. In the event that a federal conversion process is required, this process could pose additional regulatory challenges for Alternative A+E, since the federal conversion process would be required in disjunct locations. As described above, a federal conversion process requires the provision of replacement property that is of equal or greater fair market value and of reasonably equivalent usefulness and location as the lands being removed from outdoor recreation use. Since both locations may also require parkland alienation by State legislation, Alternative A+E additionally has the potential challenge of obtaining State legislation at both locations.

Additionally, Alternative A+E will require additional onshore export cable routes north of the export cable landfalls at the two locations. The use of two separate cable landfalls for installation will somewhat reduce the duration of potential environmental, traffic, and stakeholder impacts at each location (Alternative A and Alternative E) relative to a three-circuit installation at the same location. However, use of two cable landfalls will also disperse the potential impacts over a broader area. Because the two cable landfall locations are less than 1 mi (1.6 km) apart and both located along the E/W Broadway corridor, construction activities at multiple locations associated with Alternative A+E likely would increase the potential traffic impacts and logistical challenges of road closures.

Alternative A+E is a practicable alternative for an export cable landfall in the event that land rights to use the adjacent private parcels cannot be obtained and construction at cable landfall Alternative A and/or Alternative E is restricted to the public right-of-way and provides a contingency in the case of an HDD failure. However, due to the additional regulatory challenges of potential parkland alienation and conversion processes in two separate locations, as well as the potential for noise, traffic, air quality impacts and marine cable installation impacts over a broader area, Empire selected Alternative A, with all three submarine export cables making landfall in the same location, as the proposed alternative.

### 3.3.4 Jones Beach Landfall Alternative

As an alternative to landfall on the Long Beach barrier island, Empire also considered routing the submarine export cables further to the east and installing the export cable landfall to Jones Beach (Jones Beach Landfall Alternative) (**Figure 3.3-1**). This landfall alternative is located along the open coast at Jones Beach State Park

off of Bay Parkway, near Meadowbrook State Parkway. The Jones Beach Landfall Alternative is sited within an approximately 3.5-ac [1.4-ha] paved parking area located near the west end of Jones Beach. The site is bounded to the south by approximately 1,800 ft of dunes and wide sandy beach, with beach dune habitat to the east and west. Bay Parkway lies immediately to the north of the site.

The submarine export cable route to Jones Beach extends a total length of approximately 3.4 nm (3.9 mi, 6.2 km) from the New York State boundary to shore. A submarine export cable route to the Jones Beach Landfall crosses the existing HVDC Neptune Power Transmission Cable further offshore, similar to Alternatives C and D. As the easternmost route, the Jones Beach Landfall Alternative would avoid the sand resource area that is located offshore of Lido Beach (**Figure 3.3-2**). Since the cable landfall at Jones Beach is far from the shoreline and because of the gradual sloping of the shoreline, it is a longer distance to deep water for HDD installation than at other assessed locations. The minimum HDD length assessed was 2,625 ft (800 m) where water depth is only approximately 20 ft (6 m) below MLLW. Water depths of approximately 33 ft (10 m) depth that are typically required for the submarine export cable installation vessel. To reach 33 ft depth (10 m) a length of approximately 6,890 (2,100 m) would be needed, which is beyond the practicable length for HDD installation.

Jones Beach is a popular State Park for summer recreation and swimming, but open year-round, with programs including concerts and fireworks displays. The Jones Beach Landfall Alternative would require obtaining an agreement with NYOPRHP to cross state park lands.

The most challenging aspect of a Jones Beach landfall is, however, the onshore routing. Two routing options were considered from Jones Beach:

1. After landfall at Jones Beach, completing a second HDD from the Jones Beach parking lot to the Long Beach barrier island in the vicinity of Point Lookout, and routing onshore through Jones Beach and Barnum Island from there; and
2. Routing onshore along Meadowbrook State Parkway towards Freeport and Sunrise Highway, traversing densely developed areas from Freeport west to Oceanside.

An HDD from a Jones Beach landfall to the Long Beach Barrier Island was determined to be infeasible, due to a combination of HDD length, angle, and space availability in the vicinity of Point Lookout. HDD lengths required to reach a suitable staging area at Point Lookout, and avoid houses and other existing structures, would be 6,000 to 8,000 ft, which is beyond the technical limitations for installation. Other options (such as entering the water) would result in greater environmental impacts than the proposed alternatives (also see Section 2.3.4).

Onshore routing from Jones Beach through Freeport would be approximately 11 miles (17.7 km), which is more than double the length of the onshore route from the Long Beach barrier island and is expected to be significantly greater in technical and logistical complexity due to development and infrastructure density. Meadowbrook State Parkway is one of the only two roads that connects the Jones Beach barrier island to mainland Long Island. The road shoulder, which is elevated above adjacent wetlands is flat, but construction along the shoulder would require obtaining approval for accommodation of utilities within state highway right-of-way from the New York State Department of Transportation (NYSDOT). There are three bridges on the Meadowbrook State Parkway between the barrier island and mainland Long Island (traversing from Jones Beach to Jones Island, Petit Marsh and finally the Long Island mainland). These crossings would require HDD or open cut construction across the tidal channels. Estuarine and marine wetlands are adjacent to the length of Meadowbrook State Parkway from the Jones Beach barrier island to Sunrise Highway. For most of the length, there appears to be sufficient space for installation of onshore export cables between the parkway and the wetlands; however, HDD crossings of the tidal channels may require impacts to tidal wetlands for staging and



pullback. Empire also understands there are weight restrictions along the Meadowbrook Parkway bridges, which may pose an additional challenge for construction access.

Additionally, Jones Beach State Park Causeway and Park System is a historic district listed on the National Register of Historic Places (NRHP), which includes the Wantagh, Ocean, Meadowbrook, and Loop State Parkways. Installation along the Meadowbrook State Parkway has the potential to result in direct impacts to an NRHP-listed property.

The Jones Beach landfall is not practicable due to the length and complexity of the onshore routing, potential cultural resource impacts, and expected impacts to tidal wetlands along the route. Construction challenges and logistical constraints for the onshore route also include vehicular traffic, construction vehicle access restrictions, pedestrian foot traffic, residential and commercial development density, noise impacts, business impacts, constructability, and workspace constraints due to existing infrastructure.

### 3.3.5 Shell Creek Park (Barnum Island) Landfall Alternative

A cable landfall alternative on Barnum Island avoids an export cable landfall on the Long Beach barrier island, and instead the submarine export cables continue in-water through Jones Inlet and traverse west along Reynolds Channel on the north side of the barrier island. The evaluated cable landfall is located at Shell Creek Park, an approximately 8-ac municipal park in the unincorporated portion of Barnum Island in the Town of Hempstead. Shell Creek Park consists predominantly of playing fields and ball fields, with a walkway built along the seawall at the shoreline. The park is bounded by water to the south and east, and residential neighborhoods to the west and north.

The submarine export cable route to Barnum Island extends a total length of approximately 8.5 nm (9.7 mi, 15.7 km) from the New York State boundary to shore. Like the other evaluated submarine export cable route alternatives, this route crosses into New York State south of Jones Beach, heading northwest. The Barnum Island submarine export cable route alternative requires crossing a total of one existing, one planned, and one out-of-service submarine utility, including the HVDC Neptune Power Transmission Cable. Empire also considered avoidance of a sand resource area that is located offshore of Lido Beach (**Figure 3.3-2**). Due to the proximity of the eastern end of the sand resource area to the western tip of Jones Beach and the narrow entrance to Jones Inlet, siting in this area is constrained, and the centerline of the submarine export cable route is approximately 300 ft (90 m) to the east of the sand resource area.

Technical challenges for the submarine export cable route include shallow waters, several charted wrecks, and vessel traffic near the mouth of Jones Inlet. Jones Inlet and the north side of the Long Beach barrier island also may have limited barge access due to bridges and narrow clearance. Shallow waters between Jones Inlet and the export cable landfall would require special shallow draft construction vessels for the cable installation, increasing the cost and complexity of installation activities.

Moreover, Jones Inlet and Reynolds Channel are maintained by dredging and maintenance activity for navigation. As such, cable burial would need to take into consideration de-risking future dredging operations, requiring deeper burial and more extensive disturbance along this route. The mouth of Jones Inlet itself is subject to high seabed mobility and erosion, which present logistical challenges for cable burial and protection. Marine traffic data shows that vessel traffic is relatively high through Jones Inlet and along the north side of the Long Beach barrier island, so interference with marine traffic during construction is also of concern.

The Barnum Island Landfall Alternative is associated with greater impacts within the marine environment than other alternative routes evaluated. At Jones Inlet, the submarine export cable route enters mapped Significant Coastal Fish and Wildlife Habitat in Middle Hempstead Bay, considered one of the largest undeveloped coastal

wetland systems in New York State, with a significant nesting habitat for coastal shorebirds and colonial wading birds, as well as being a productive area for marine finfish, shellfish, and other wildlife (NYSDOS 2008a).

The onshore export cable route to the onshore substation from Shell Creek Park is only 1.0 mi (1.6 km) long; however, it requires routing along the relatively constrained Vanderbilt Avenue, through a residential neighborhood. Since Shell Creek Park is a municipal parkland, parkland alienation by the New York State legislature may be required for an underground crossing of the parkland.

Empire's evaluation concluded that a landfall at Barnum Island results in greater impacts to the marine environment, including Significant Coastal Fish and Wildlife Habitat than the proposed alternative and has significantly more logistical challenges associated with construction through Jones Inlet and in an area of high marine traffic. The submarine export cable route to the Shell Creek Park Alternative is also located in proximity to the east side of the sand resource area. Since the submarine export cable route is not practicable, the cable landfall at Shell Creek Park is also not practicable.

### **3.4 Onshore Substation Alternatives**

Empire evaluated three onshore substation site alternatives, which are shown in **Figure 3.4-1**.

#### **3.4.1 Onshore Substation A**

The Onshore Substation A is an approximately 6.4-acre (2.6 ha) site located on a property at the corner of Daly Boulevard and Hampton Road, in Oceanside, New York. The site is bounded by Hampton Road to the west, Daly Boulevard to the south, and the Long Island Rail Road (LIRR) and a residential development to the east. North of the site is predominately used as an industrial area. The site does not contain any existing structures that would need to be removed for the construction of the onshore substation; however, it is expected that existing soil contamination at the site would require remediation before construction.

Onshore Substation A is adjacent to NWI and NYSDEC-mapped tidal waters to the west, but no direct impact to or loss of WOTUS would result in use of the site for the onshore substation.

The onshore export cable route from the proposed cable landfall to Onshore Substation A crosses Barnums Channel along the same route as the interconnection cable route from Onshore Substation C (see further discussion in Section 3.4.3). The combined length of the onshore export and interconnection cables (approximately 3.4 mi [5.5 km]) for the Onshore Substation A alternative is approximately the same as for the proposed Project.

Based on the Empire's ongoing communications with Long Island Power Authority (LIPA), Empire understands that interconnection at the Barrett 138-kV Substation will require an expansion of the existing substation due to available space limitations on LIPA's existing facility. In light of the anticipated LIPA substation expansion onto the Onshore Substation A parcel, there is not also sufficient space available for Empire's onshore substation facility (primarily due to the space required for the installation of the Subsea Distribution Units [SDUs]) on the same site. Logistical complexities of having both Empire and LIPA operating on the same property, such as separate entrances and material handling routes, also increase the space requirements. Based on these space limitations, future plans and remediation requirements, Onshore Substation A is not a practicable alternative for the Project.

#### **3.4.2 Onshore Substation B**

The Onshore Substation B is an approximately 7.4-acre (3.0-ha) site located at 4005 Daly Boulevard, in Oceanside, New York. The site is bordered by Daly Boulevard and a residential development to the north,

Long Beach Road to the east, and an existing power station to the west and south. The parcel is owned by National Grid and currently contains an existing power station. The portion of the parcel evaluated for the proposed onshore substation is undeveloped and contains vegetation. It is immediately adjacent to mapped NWI wetland and is located within NYSDEC-mapped tidal wetland adjacent areas. Empire has not conducted a formal wetland delineation of the site and it is expected that tidal wetland may also extend within the site boundary. Onshore Substation B does not contain any existing structures that need to be removed for the construction of the onshore substation.

The onshore export cable route from the proposed cable landfall to Onshore Substation B is approximately 4.0 mi (6.4 km). The interconnection cable route from Onshore Substation B to the POI is approximately 0.1 mi (0.2 km), for a total onshore cable route length of 4.1 mi (6.6 km). The onshore export cable route to Onshore Substation B crosses Barnums Channel to the east of the proposed route and is expected to require an open cut crossing solution (Section 3.5.3), resulting in a greater net impact to wetland areas than the proposed onshore substation (Onshore Substation C) and its associated interconnection cable route.

Onshore Substation B is not practicable because Empire has determined that it is not commercially available for the Project. Moreover, construction and operation of Onshore Substation B, as well as the onshore export cable route to Onshore Substation B, is expected to result in greater direct and indirect impacts to tidal wetlands than the proposed alternative.

### **3.4.3 Onshore Substation C (Proposed)**

Onshore Substation C is a 5.2-ac (2.1-ha) site located at 15 Railroad Place, in Island Park, New York. The site is bordered by the LIRR to the west, Reynolds Channel to the south, and Long Beach Road to the east. The parcels are privately owned and contain existing commercial uses. Onshore Substation C requires the demolition and removal of existing structures for the construction of the onshore substation. Construction of the onshore substation and associated access will require site grading and elevation, including refurbishment of existing bulkheads and shoreline stabilization (including filling within three existing boat slips).

A small acreage less than 0.1 ac [0.04 ha] of mapped NWI and NYSDEC-mapped tidal wetland is present within the onshore substation site boundary. However, based on Empire's Wetland and Terrestrial Vegetation Report (**Attachment F**), wetlands onsite are associated with open water areas of Reynolds Channel; these mapped wetland areas do not represent vegetated tidal wetlands or mudflats. Impacts will be minimal and predominantly within an area of existing bulkheaded shoreline and existing boat slips. Empire may remove the floating and pile structures associated with the existing marina. Removal of floating and pile structures associated with the existing marina, if conducted, would remove shading impacts and artificial structures within the marine environment.

The onshore export cable route from the proposed cable landfall to Onshore Substation C is approximately 1.5 mi (2.4 km). The interconnection cable route from Onshore Substation C to the POI is approximately 1.8 mi (2.9 km), for a total onshore cable route length of 3.3 mi (5.3 km).

Due to the minimization of impacts to vegetated tidal wetlands along the proposed export and interconnection cable routes (see Section 3.5), minimal impacts to WOTUS associated only with shoreline stabilization (where already bulkheaded), commercial availability and ability to achieve the Project purpose, Onshore Substation C is proposed as the practicable alternative with the least impact to environmental resources.





Figure 3.4-1 Onshore Substation Alternatives

### 3.5 Onshore Export and Interconnection Cable Alternatives

This section provides the evaluation for the route and installation alternatives considered for the onshore export and interconnection cables.

The goal of the onshore export cable and interconnection cable routing alternatives analysis was to develop a constructible route that is largely sited within public rights-of-way and minimizes impacts to the environment and the public. Conceptual routes developed for further analysis incorporate the following objectives, to the extent practicable: maximize use of public rights-of-way; minimize in-street work; avoid existing utilities; allow sufficient space for construction by routing in wider corridors; and maintain construction flexibility.

Public rights-of-way, which include roadways, medians and adjacent areas, railroads, etc., limit the number of stakeholders directly impacted and the number of new landowner easements that must be acquired for the onshore export and interconnection cable routes. Minimizing in-street work within the public right-of-way reduces impacts on traffic, enhances safety during construction, and typically shortens the duration of installation. It is also preferable to avoid siting directly within roadways (where possible) because they typically contain gas, sewer, water, telecommunications, and electric utilities, which add routing and workspace constraints, construction logistics challenges, and project complexity.

The evaluation of onshore export and interconnection cable route alternatives was conducted as an iterative process that involved multiple steps of evaluation of the offshore and onshore cables routes, constraints on potential landfall locations, and the feasibility of landfall installation methodologies at potentially suitable landfall sites. Each of the Project components, although described as separate evaluations, were considered in concert for the selection of the overall proposed solution for the Project.

Onshore export cable route alternatives are limited to routes starting at practicable cable landfall alternatives (Section 3.3) and ending at the proposed onshore substation (Onshore Substation C, Section 3.4). An overview of onshore export and interconnection cable route alternatives considered is provided in **Figure 3.5-1**. To identify the proposed cable route, Empire conducted a comparative analysis to assess the benefits and risks of several route options. The analysis considered the following criteria:

- Route length;
- Land use;
- Constructability;
- Presence of utilities;
- Prioritizing existing rights-of-way;
- Easement acquisition; and
- Environmental aspects such as wetlands and waterbodies, historic and cultural resources, sensitive species habitat, potential for contamination, community impacts, and potential community opposition, among others.

#### 3.5.1 Onshore Export Cable Route Alternatives

Onshore export cable routing from practicable cable landfall alternatives (Alternatives A, C, E and A+E) to the proposed onshore substation are depicted in **Figure 3.5-1** and **Figure 3.5-2** and described in this section. Cable landfall alternative A+E uses the same onshore export cable routes as described individually for cable landfall Alternative A and E.



Minor variations of these routes were also considered (see Volume 1, Section 3 of the COP in Appendix D-1 of **Attachment D**). All of the evaluated onshore export cable routes south of Reynolds Channel (Section 3.5.2) are located along existing roadway corridors and avoid impacts to wetlands and other WOTUS. No other significant environmental impacts have been identified along the onshore export cable segment of the cable routing for any of the alternatives. As such, although Empire has selected the route from cable landfall Alternative A traversing E Broadway and Lincoln Boulevard as the proposed alternative, based on constructability characteristics, all of the routes described are considered practicable alternatives that minimize environmental impacts.

### 3.5.1.1 Onshore Export Cable Route Alternatives from Cable Landfall A

The following three alternatives were evaluated from cable landfall Alternative A to the proposed onshore substation:

- Proposed alternative: from the export cable landfall at Alternative A (Riverside Boulevard/E Broadway) in the City of Long Beach, the proposed onshore export cable route will turn east on E Broadway to Lincoln Boulevard and turn north. This route will continue north across E Park Ave to E Harrison Street and turn west, traversing across Long Beach Boulevard to Long Beach Road. The onshore export cable route then turns north along Long Beach Road to Park Place and a City of Long Beach property, where it continues north across Reynolds Channel to the onshore substation site.
- From the export cable landfall at Alternative A (Riverside Boulevard/E Broadway), the onshore export cables traverse north up Riverside Boulevard and turn east on E Walnut Street. The onshore export cables then turn north on Lincoln Boulevard, continuing north across E Park Ave to E Harrison Street where the route turns west, traversing across Long Beach Boulevard to Long Beach Road. The onshore export cable route then turns north along Long Beach Road to Park Place and a City of Long Beach property, where it continues north across Reynolds Channel to the onshore substation site.
- From the export cable landfall at Alternative A (Riverside Boulevard/E Broadway), the onshore export cables traverse north up Riverside Boulevard to E Walnut Street. The onshore export cables then turn west to Edwards Boulevard, where the cables turn north, cross E Park Ave, and continue onto Reverend JJ Evans Boulevard. Reverend JJ Evans Boulevard turns into Park Place. The onshore export cables turn north onto a City of Long Beach property just before the eastern end of Park Place, and then the route crosses Reynolds Channel.

### 3.5.1.2 Onshore Export Cable Route Alternatives from Cable Landfall C

The following three alternatives were evaluated from cable landfall Alternative C to the onshore substation:

- From the export cable landfall at Alternative C (Lido Beach West Park) in the Town of Hempstead, the onshore export cables traverse west through the park to Richmond Road. The onshore export cables continue west on Richmond Rd until turning south on Maple Boulevard and then immediately west on E Broadway. The onshore export cables then turn north onto Lincoln Boulevard. From Lincoln Boulevard, the onshore export cables will continue north until turning west onto E Harrison Street. The onshore export cables then cross perpendicular to Long Beach Boulevard and turn north onto Long Beach Road, to the crossing at Reynolds Channel.
- From the export cable landfall at Alternative C (Lido Beach West Park), the onshore export cables traverse west through the park to Richmond Road. The onshore export cables continue west on Richmond Rd until turning south on Maple Boulevard and then immediately west on E Broadway.

The onshore export cables then turn north onto Franklin Boulevard. From Franklin Boulevard, the onshore export cables will continue north until turning west onto E Harrison Street. The onshore export cables then cross perpendicular to Long Beach Boulevard and turn north onto Long Beach Road, to the crossing at Reynolds Channel.

- From the export cable landfall at Alternative C (Lido Beach West Park), the onshore export cables connect north into Lido Boulevard and traverse west, as Lido Boulevard turns into E Park Ave. The onshore export cables turn north Lincoln Boulevard, until turning west onto E Harrison Street. The onshore export cables then cross perpendicular to Long Beach Boulevard and turn north onto Long Beach Road, to the crossing at Reynolds Channel.

### 3.5.1.3 Onshore Export Cable Route Alternatives from Cable Landfall E

The following two alternatives were evaluated from cable landfall Alternative E to the onshore substation:

- From the export cable landfall at Alternative E (Laurelton Boulevard) in the City of Long Beach, the proposed onshore export cable route will turn east on W Broadway, continuing on to E Broadway. From E Broadway, the onshore export cable route will continue to Lincoln Boulevard and turn north. This route will continue north across E Park Ave to E Harrison Street and turn west, traversing across Long Beach Boulevard to Long Beach Road. The onshore export cable route then turns north along Long Beach Road to Park Place and a City of Long Beach property, where it continues north across Reynolds Channel to the onshore substation site.
- From the export cable landfall at Alternative E (Laurelton Boulevard) the onshore export cables continue north along Laurelton Boulevard to West Park Avenue and turn east. The onshore export cables continue until Reverend JJ Evans Boulevard, where the cables turn north. The onshore export cables then continue along Reverend JJ Evans Boulevard, which turns into Park Place, until the crossing at Reynolds Channel.



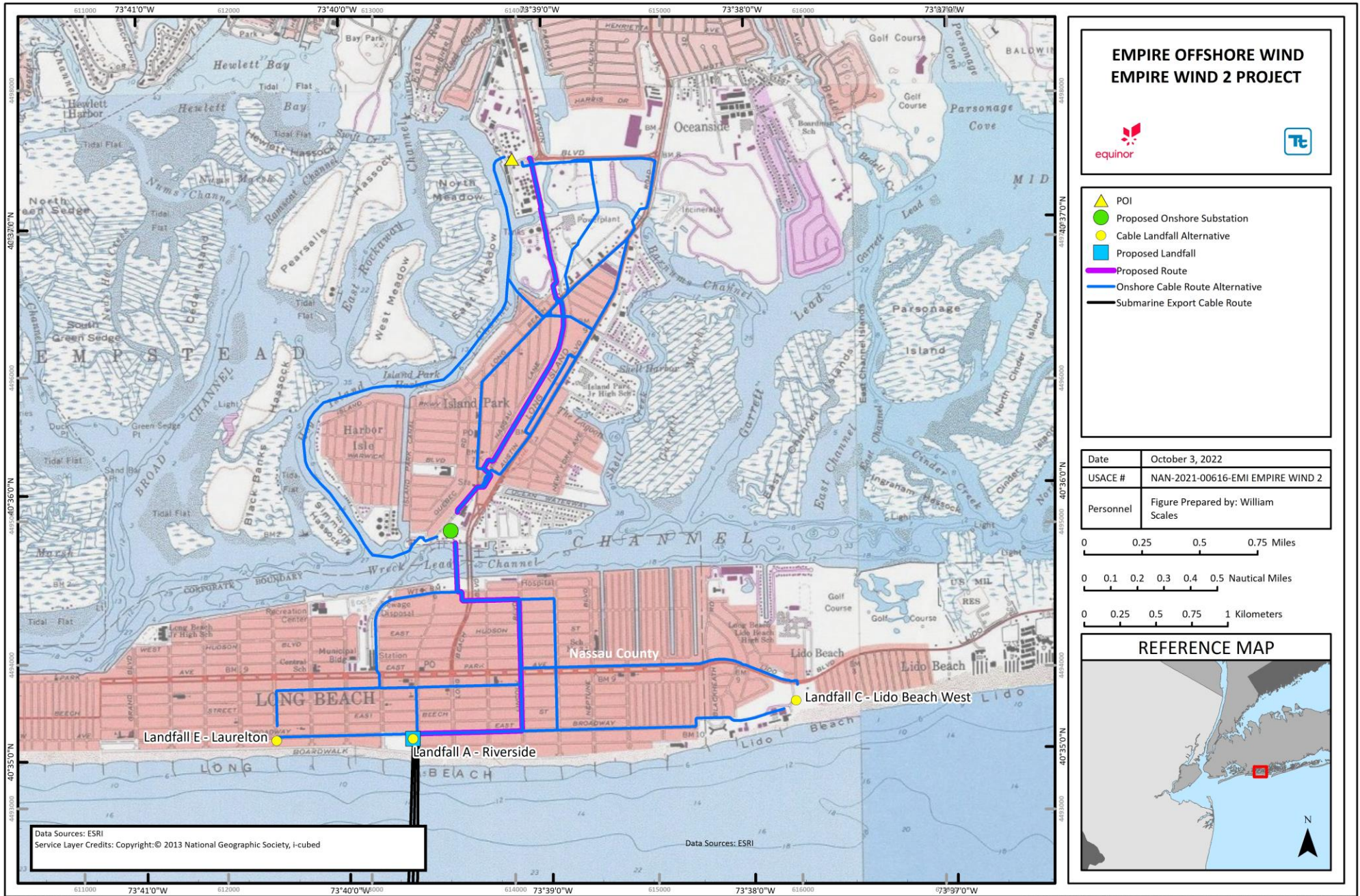
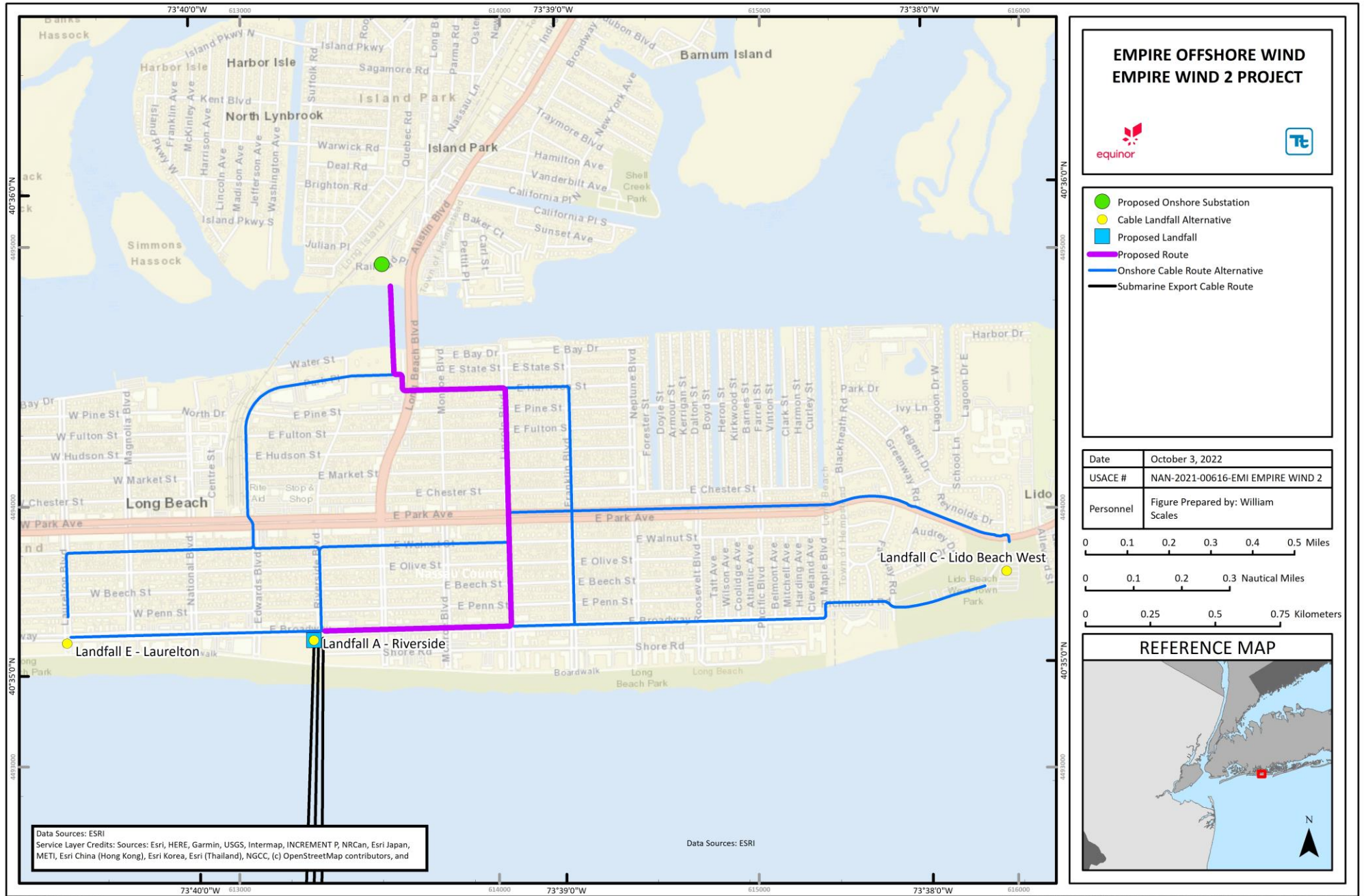


Figure 3.5-1 Onshore Export and Interconnection Cable Route Alternatives





**Figure 3.5-2 Onshore Export Cable Route Alternatives**

### 3.5.2 Reynolds Channel Crossing Alternatives

Empire evaluated crossing methods and alignments for the onshore export cable installation across Reynolds Channel between the Long Beach barrier island and Barnum Island. Alternative methods considered include:

- HDD Alternative; and
- Open Cut Alternative.

The HDD alternative involves the installation of the three land-to-land HDDs, one for each of the onshore export cables, for approximately 1,014 ft (309 m) across Reynolds Channel. HDDs are frequently used to install cables in ducts under sensitive coastal and nearshore habitats, such as dunes, beaches, waterways, and submerged aquatic vegetation. The method for HDD installation on land is similar to that described for the export cable landfall in Section 3.3.1, except that both workspaces are onshore, with the environmental resource crossing in between. Onshore crossings via HDD utilize a rig that drills a borehole underneath the waterway or other environmental resource. Once the rig exits onshore, the ducts in which the cable will be installed are then pulled back within the drilled borehole. Onshore crossings require two onshore work areas (approximately 246 ft by 246 ft [75 m by 75 m] on each side) to support the activities. For the Reynolds Channel crossing, both workspaces are located on previously developed commercial/industrial lands adjacent to the waterbody.

An open cut crossing of Reynolds Channel requires an approximately 72-ft (22-m) wide trench per cable, within an approximately 300 ft (91 m) wide installation corridor and requires excavation of the shoreline on both sides of the crossing. Water depths reach 30 ft (9.1 m) or more in the deepest portions of the Reynolds Channel crossing. In addition to requiring extensive dredging/in-water impact to the tidal channel to install all three cables, Reynolds Channel is used by boats and the installation of the open cut crossing would occur alongside the Long Beach Bridge twin drawbridge that connects the Long Beach barrier island to Barnum Island and the Village of Island Park. Construction of an open cut installation across Reynolds Channel in this location, adjacent to the drawbridge, could result in impacts to marine traffic in this area during construction activities. Immediately upstream and downstream of the crossing area, Reynolds Channel also contains Significant Coastal Fish and Wildlife Habitat designated by the New York Department of State, including potential habitat for winter flounder, a managed species.

Based on Empire's evaluation, an open cut installation is a practicable alternative for constructing the Reynolds Channel crossing, but it would result in greater environmental impacts than the proposed HDD crossings. Although all HDD installations carry some risk of an inadvertent drilling fluid return (see Section 3.3.1), Empire will minimize and mitigate risks by implementing an Inadvertent Return Plan. HDD installation of the three export cables is a practicable solution that minimizes the potential environmental impacts of the Reynolds Channel crossing.

Empire evaluated alternative alignments for the HDDs; however, other HDD crossing alignments in this vicinity require longer distances and/or curved HDD installation, which add time, cost and complexity to the installation. In addition to the proposed HDD alignment, Empire considered an alternative HDD alignment from the intersection of Park Place and Riverside Boulevard on the south side of Reynolds Channel, to the north end of the onshore substation along the LIRR, to be a practicable alternative. However, this alignment can likely support up to two export cable circuits and requires an extra approximately 600 ft (183 m) of installation along Park Place, which is narrow and has existing utility congestion. Therefore, the preferred solution is to install all three export cable circuits along the proposed alignment, to the west of and roughly parallel to the Long Beach Bridge along Long Beach Boulevard.



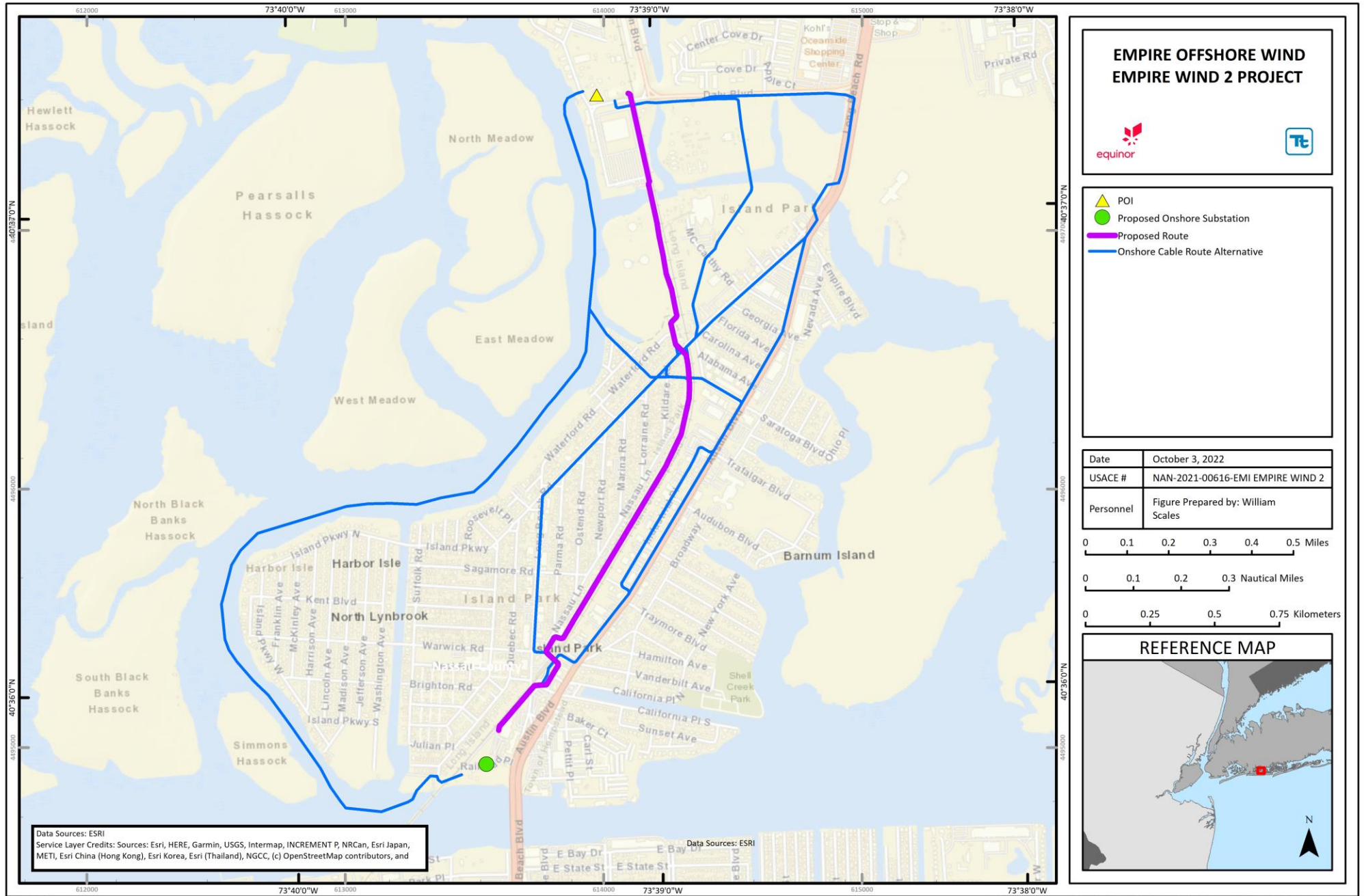
Availability of alternative parcels for HDD workspace is constrained along Reynolds Channel. Since in-water impacts are avoided with the proposed HDD alignment and other alternatives would result in an equal or greater environmental impact, alternative HDD installation alignments are not discussed further.

### 3.5.3 Interconnection Cable Route Alternatives

Empire also considered interconnection cable route alternatives through Barnum Island and/or the Village of Island Park from the proposed onshore substation to the POI at an expansion of LIPA's substation (**Figure 3.5-1** and **Figure 3.5-3**). Onshore interconnection cable route alternatives from the onshore substation follow one of three general north/south corridors: 1) the LIRR corridor, 2) the Long Beach Road corridor or 3) the Austin Boulevard/Industrial Place corridor. These routes follow existing developed road or railroad rights-of-way corridors in upland areas until the northern portion of the route, in the vicinity of Barnums Channel. From there, each of the route corridors can connect to one of three Barnums Channel crossing locations, either along the LIRR, across the E.F. Barrett Generating Station property, or along Long Beach Road.

Crossing Barnums Channel adjacent to the LIRR bridge was determined to provide the best alternative for minimizing impacts to tidal wetlands and within the tidal channel itself. Empire is proposing a cable bridge crossing (see Section 3.5.4), which will require installation of supports/footings within the channel; however, this will occur along a corridor already containing both the railroad bridge, and another utility bridge on the east side of the railroad crossing. Since the north and south sides of the crossing comprise an existing parking lot and a tank farm, respectively, impacts to wetlands and natural habitats on either side of the crossing are avoided. Even in the case of an open cut crossing, the LIRR route alternative would be expected to result in a smaller footprint of disturbance to tidal wetlands than the open cut for other routes evaluated. Thus, Empire's proposed alternative route at Barnum's Channel represents the practicable solution with the least environmental impact.

Empire also considered submarine export cable routes from the onshore substation to the POI, as discussed in Section 3.5.3.4. **Figure 3.5-3** provides a visual comparison of the interconnection cable route alternatives and **Table 3.5-1** summarizes the assessment criteria for interconnection cable route alternatives.



**Figure 3.5-3 Interconnection Cable Route Alternatives**

**Table 3.5-1 Comparison of Interconnection Cable Route Alternatives**

Assessment Criteria	LIRR Corridor Route Alternatives		Long Beach Road Corridor Route Alternatives		Austin Boulevard/Industrial Place Corridor Route Alternatives			Submarine Cable Route Alternatives		
	Full LIRR (Proposed)	LIRR to Parente Lane	Long Beach Road/LIRR	Long Beach Road to Daly Boulevard	Industrial Place to LIRR	Austin Boulevard	Industrial Place to Daly Boulevard	Industrial Place to E.F. Barrett	Submarine Interconnection Cable Route	LIRR to In-Water
<b>Summary of Route Characteristics</b>										
Total Interconnection Cable Route Length	1.7 mi (2.8 km)	1.8 mi (2.9 km)	1.8 mi (2.8 km)	2.5 mi (4.1 km)	2.0 mi (3.2 km)	1.9 mi (3.1 km)	2.5 mi (4.0 mi)	2.2 mi (3.6 km)	2.7 mi (4.4 km)	1.9 mi (3.1 km)
Approximate submarine interconnection cable route length	0	0	0	0	0	0	0	0	2.6 mi (4.1 km)	0.6 mi (1.0 km)
<b>Environmental Factors</b>										
Waterbody Crossing Length (linear)	0.02 mi (0.04 km)	0.02 mi (0.04 km)	0.02 mi (0.04 km)	0.02 mi (0.03 km)	0.02 mi (0.04 km)	0.02 mi (0.04 km)	0.02 mi (0.03 km)	0.02 mi (0.04 km)	2.6 mi (4.1 km)	0.6 mi (1.0 km)
Open Water Crossing Acreage	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	0.3 ac (0.1 ha)	31.1 ac (12.6 ha)	7.3 ac (2.9 ha)
Mapped NYSDEC Tidal Wetlands a/	1.7 (0.7 ha)	1.7 (0.7 ha)	1.7 (0.7 ha)	13.3 ac (5.4 ha)	1.7 (0.7 ha)	1.7 (0.7 ha)	13.3 ac (5.4 ha)	6.4 ac (2.6 ha)	7.0 ac (2.8 ha)	7.0 ac (2.8 ha)
Loss of wetland function	No	No	No	No	No	No	No	No	No	No
Areas of potential cultural sensitivity crossed	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No
<b>Land Use Characteristics b/</b>										
Land Use, Percent Developed Land	98%	98%	98%	93%	98%	98%	94%	88%	8%	69%
Land Use, Percent Emergent Herbaceous Wetlands	0%	0%	0%	3%	0%	0%	2%	4%	1%	1%
Land Use, Percent Open Water	1%	1%	1%	1%	1%	1%	1%	1%	91%	30%
Land Use, Barren Land (Rock/Sand/Clay)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%
Land Use, Percent Developed Open Space	1%	1%	1%	0%	1%	1%	0%	1%	0%	0%
Land Use, Grassland/Herbaceous	0%	0%	0%	2%	0%	0%	2%	3%	0%	0%
Land Use, Woody Wetlands	0%	0%	0%	1%	0%	0%	1%	1%	0%	0%
<b>Technological and Logistical Factors</b>										
Expected onshore infrastructure congestion	Moderate	Moderate	High	High	High	High	High	High	Low	Low
Number of railroad crossings	1	1	1	3	1	1	1	3	1 c/	1
Cable route easement/permit risk	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	High

Assessment Criteria	LIRR Corridor Route Alternatives		Long Beach Road Corridor Route Alternatives		Austin Boulevard/Industrial Place Corridor Route Alternatives			Submarine Cable Route Alternatives			
	Full LIRR (Proposed)	LIRR to Parente Lane	Long Beach Road/LIRR	Long Beach Road to Daly Boulevard	Industrial Place to LIRR	Austin Boulevard	Industrial Place to Daly Boulevard	Industrial Place to E.F. Barrett	Submarine Interconnection Cable Route	LIRR to In-Water	
Number of abutters	Moderate	Moderate	High	High	High	High	High	High	Low	Low	
Expected stakeholder considerations	Moderate	Moderate	High	High	High	High	High	High	Low	Low	
Noise impacts	Moderate	Moderate	High	High	High	High	High	High	Low	Low	
Traffic impacts	Moderate	Moderate	High	High	High	High	High	High	Low	Low	
<b>Commercial Factors</b>											
Easement acquisition risk	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	Low	Moderate
<b>Practicable (Technology/Cost/Logistics)</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
<b>Least Environmentally Damaging Practicable Alternative</b>	Yes	Yes d/	No	No	No	No	No	No	No	No	No

Notes  
 a/ based on a 100 ft corridor for each route alternative. However, the crossing along the proposed route is a cable bridge, which will minimize in-water impacts. NYSDEC acreage does not include mapped Littoral Zone (LZ) or adjacent area (AA).  
 b/ 2016 National Land Cover Dataset (NLCD): Land Cover Conterminous United States (Dewitz 2019).  
 c/ this includes the crossing under the LIRR bridge within Reynolds Channel.  
 d/ this route is practicable and environmental impacts are equivalent to the proposed alternative, but it is not preferred for logistical reasons.

### 3.5.3.1 LIRR Corridor Interconnection Cable Route Alternatives

The LIRR corridor interconnection cable route alternatives (**Figure 3.5-3**) are routed parallel to, alongside or within the LIRR right-of-way for the majority of the length of the interconnection cable route from the onshore substation to the POI, with certain variations. Both of these route alternatives cross Barnums Channel via a proposed cable bridge (Section 3.5.4) immediately to the west of the existing LIRR bridge across the channel.

#### **Full LIRR Alternative (Proposed)**

The full LIRR Alternative for the interconnection cable route is approximately 1.7 mi (2.8 km). This route travels north, crossing the LIRR with horizontal auger bores near Warwick Road and continues along the LIRR corridor. **The route stays parallel to the LIRR corridor as it enters the public right-of-way around the cul-de-sac of Parente Lane North, continuing north to traverse D'Amato Drive. The route crosses Long Beach Road before entering North Nassau Lane and paralleling the LIRR corridor.** Along the LIRR corridor, the proposed interconnection cable route crosses Barnums Channel for approximately 300 ft (91 m) on the west side of the LIRR bridge, and then continues north across Daly Boulevard until it enters the POI.

The considerations for the full LIRR alternative are similar to the LIRR to Parente Lane Alternative below. This route is sited predominantly within or alongside the LIRR right-of-way, which has the advantage of reducing in-street construction and associated disruption to the community from traffic impacts and street closures. The LIRR right-of-way has sufficient space for joint bay siting and reduces cable bends. It also reduces the conflicts with utility congesting along roadway rights-of-way, and potential need for utility relocations, which reduces the duration of construction activities. The LIRR right-of-way is also one of the most direct and shortest routes from the onshore substation to the POI.

Crossing Barnums Channel adjacent to the LIRR bridge provides the best alternative for minimizing impacts to tidal wetlands and within the tidal channel itself (see Section 3.5.4). Since the north and south sides of the crossing comprise an existing parking lot and a tank farm, respectively, impacts to wetlands and natural habitats on either side of the crossing are avoided. Even in the case of an open cut crossing, crossing adjacent to the existing LIRR crossing is expected to result in a smaller footprint of disturbance to tidal wetlands than the open cut for other routes evaluated.

Based on the Empire's assessment, which indicates that this route reduces construction complexity and space constraints and largely avoids the traffic impacts of construction activities and road closures along heavily-trafficked portions of public roadways, the Full LIRR Alternative is practicable and the proposed alternative for the interconnection cable route. Construction along the LIRR corridor will require close coordination with the railroad on requirements within the right-of-way.

#### **LIRR to Parente Lane Alternative**

The LIRR to Parente Lane Alternative for the interconnection cable route is approximately 1.8 mi (2.9 km). From the onshore substation site, the route travels north, crossing the LIRR with horizontal auger bores in the parking lots of LIRR Island Park Station. The route continues in the west side of the LIRR right-of-way until **entering Parente Lane North, bearing west before a slight turn north on Kildare Road.** The route connects to Long Beach Road, heads north onto North Nassau Lane, then parallels the west side of the railroad, adjacent to an existing tank farm. Along the LIRR corridor, the interconnection cable route crosses Barnums Channel for approximately 300 ft (91 m) on the west side of the LIRR bridge. From the north side of Barnums Channel this alternative continues within the LIRR right-of-way north across Daly Boulevard until it enters the POI.

This route is sited predominantly within the LIRR right-of-way, which has the advantage of reducing in-street construction and associated disruption to the community from traffic impacts and street closures. The LIRR



right-of-way has sufficient space for joint bay siting and reduces cable bends. It also reduces the conflicts with utility congesting along roadway rights-of-way, and potential need for utility relocations, which reduces the duration of construction activities. The LIRR right-of-way is also one of the most direct and shortest routes from the onshore substation to the POI. This route avoids a narrow area of the LIRR right-of-way between Parente Lane and the E.F. Barrett Station property, by routing into public rights-of-way along Parente Lane, Kildare Road, and Long Beach Road, as well as private property.

Crossing Barnums Channel adjacent to the LIRR bridge provides the best alternative for minimizing impacts to tidal wetlands and within the tidal channel itself (see Section 3.5.4). Since the north and south sides of the crossing comprise an existing parking lot and a tank farm, respectively, impacts to wetlands and natural habitats on either side of the crossing are avoided. Even in the case of an open cut crossing, crossing adjacent to the existing LIRR crossing is expected to result in a smaller footprint of disturbance to tidal wetlands than the open cut for other routes evaluated.

Based on the Empire's assessment, which indicates that this route reduces construction complexity and space constraints and largely avoids the traffic impacts of construction activities and road closures along heavily-trafficked public roadways, the LIRR to Parente Lane Alternative is a practicable alternative for the interconnection cable route. Due to logistical considerations of routing along Parente Lane, traffic along Long Beach Road, and additional tight cable bends, this route is not proposed.

### 3.5.3.2 Long Beach Road Interconnection Cable Route Alternatives

The two Long Beach Road corridor interconnection cable route alternatives share a section of the cable route, which crosses most of the Village of Island Park along Long Beach Road. These cable route alternatives diverge for the northernmost portion of the route, with different crossing locations for Barnums Channel.

#### **Long Beach Road/LIRR Alternative**

The Long Beach Road/LIRR Alternative for the interconnection cable route is approximately 1.8 mi (2.9 km). The route leaves the onshore substation site heading northeast within the parking lot adjacent to the LIRR tracks then crossing the LIRR with horizontal auger bores in the parking lot of LIRR Island Park Station. The route continues up Long Beach Road to North Nassau Lane, then parallels the west side of the railroad, adjacent to an existing tank farm. Along the LIRR corridor, the interconnection cable route crosses Barnums Channel for approximately 300 ft (91 m) on the west side of the LIRR bridge (similar to the proposed alternative, Section 3.5.3.1), and then continues north across Daly Boulevard until it enters the POI.

The Long Beach Road/LIRR Alternative is relatively narrow (approximately 35 ft [11 m]), which poses logistical challenges for installation of the interconnection cables and joint bay siting, and potentially increases conflicts with existing utility congestion. Installation of the interconnection cables within Long Beach Road is challenging because Long Beach Road represents the only access to Barnum Island from the Long Island mainland and is one of only three routes to the Long Beach barrier island in general. It is the main route serving the central portion of the barrier island, including densely developed areas of the City of Long Beach. In this area, the average annual daily traffic is 45,688. As such, road closures and/or traffic impacts along this corridor for construction of the Project are likely to result in significant impacts. Additionally, existing transmission lines are already present along Long Beach Road, which limits potential space for the installation of the interconnection cables.

The Long Beach Road/LIRR Alternative is a practicable alternative for the interconnection cable route but has additional construction complexity and traffic impacts associated with construction along Long Beach Road in comparison to the proposed alternative.

### **Long Beach Road to Daly Boulevard Alternative**

The Island Park to Daly Boulevard Alternative for the interconnection cable route is approximately 2.5 mi (4.1 km). This interconnection cable route alternative leaves the onshore substation site heading northeast within the parking lot adjacent to the LIRR tracks then crosses the LIRR with horizontal auger bores in the parking lot of the LIRR Island Park Station. The route connects to Long Beach Road and continues on Long Beach Road all the way to the Austin Boulevard intersection. It then continues across Barnums Channel in the vicinity of the bridge along Long Beach Road and turns west onto Daly Boulevard. The route then crosses the LIRR with horizontal auger bores and into the POI.

This route alternative involves several challenging crossings of the LIRR right-of-way: north of Island Park Station, along Long Beach Road between D'Amato Drive and Sherman Road, and along Daly Boulevard approaching the POI. Installation of the interconnection cables within Long Beach Road is challenging because the Long Beach Road bridge represents the only access to Barnum Island from the Long Island mainland and is one of only three routes to the Long Beach barrier island in general. It is the main route serving the central portion of the barrier island, including densely developed areas of the City of Long Beach. In this area, the average annual daily traffic is 45,688. The workspace needed for the LIRR crossing between D'Amato Drive and Sherman Road has the potential to result in temporary impacts to the egress/ingress to Barnums Island and the Village of Island Park for a more extended time. As such, road closures and/or significant traffic impacts along this corridor for construction of the Project are likely to result in unacceptable impacts.

This route alternative also crosses Barnums Channel along Long Beach Road. In this area, Barnums Channel is narrowed by the Long Beach Road bridge abutments to only approximately 100 ft (30 m). The Long Beach Road corridor approaching either side of the bridge is elevated, with tidal wetlands on either side. Cable installation within the existing road bridge may not be technically feasible and results in closure of the main ingress/egress to Barnum Island, which is considered impracticable. Empire therefore assumes that the Barnums Channel crossing along this corridor will need to occur alongside the Long Beach Road bridge. Since NYSDEC-mapped tidal wetlands are present to both the east and west of Long Beach Road in the vicinity of the bridge, any crossing solution (whether open cut, HDD or cable bridge) results in greater impacts to tidal wetlands than the proposed alternative. However, due to existing infrastructure, such as the bridge and bridge abutments, sufficient space for HDD is likely not available. A cable bridge solution in this location is expected to have greater impact to wetlands and visual impact than along the proposed route, since the surroundings along Long Beach Road lack the existing industrial infrastructure that is present along the proposed route. An open cut crossing could avoid impacts of new aboveground infrastructure along this corridor, and is assumed for this route, but will result in greater impacts to tidal wetlands than the proposed alternative.

Long Beach Road is relatively narrow (approximately 35 ft [11 m]), which poses logistical challenges for installation of the interconnection cables and joint bay siting, and potentially increases conflicts with existing utility congestion. There are also several tight bends for the interconnection cables along this route, which add construction cost and complexity. Additionally, Austin Boulevard is currently being redeveloped by Nassau County. In general, impacting recently restored roadways is discouraged by municipal and county agencies.

The Long Beach Road to Daly Boulevard Alternative is a practicable alternative for the interconnection cable route but is not proposed due to logistical complexity and environmental and traffic impacts associated with construction along Long Beach Road and the crossing of Barnums Channel.

#### **3.5.3.3 Austin Boulevard/Industrial Place Interconnection Cable Route Alternatives**

The Austin Boulevard/Industrial Place interconnection cable route alternatives follow the Austin Boulevard and/or Industrial Place corridors north of the onshore substation through unincorporated Barnum Island, east

of the LIRR north-south corridor. From there, these cable route alternatives diverge for the northernmost portion of the route, with different crossing locations for Barnums Channel.

### **Industrial Place to LIRR Alternative**

The Industrial Place to LIRR Alternative for the interconnection cable route is approximately 2.0 mi (3.2 km). The route leaves the onshore substation site heading northeast within the parking lot adjacent to the LIRR tracks. The route crosses Long Beach Road, travelling through the LIRR Island Park Station parking lot. The route enters Austin Boulevard, turns west onto Sagamore Road, then north onto Industrial Place. Industrial Place is taken until the end of the road, and then the route reconnects to Austin Boulevard. The route continues west onto Saratoga Boulevard and horizontal auger bores are required to cross underneath the LIRR tracks to Parente Lane. The route continues up Kildare Road to Long Beach Road to North Nassau Lane. From there, the route heads north crossing Barnums Channel for approximately 300 ft (91 m) on the west side of the LIRR bridge, and then continues north across Daly Boulevard until it enters the POI.

The Industrial Place to LIRR Alternative is routed partially along Austin Boulevard, which has significantly higher traffic volumes (38,078 average annual daily traffic) than Long Beach Road (11,684 average annual daily traffic). Industrial Place is relatively narrow (approximately 35 ft [11 m]), which poses logistical challenges for installation of the interconnection cables and joint bay siting, and potentially increases conflicts with existing utility congestion. There are also several tight bends for the interconnection cables along this route. Additionally, Austin Boulevard is currently being redeveloped by Nassau County. In general, impacting recently restored roadways is discouraged by municipal and county agencies.

Based on Empire's assessment, the Industrial Place to LIRR Alternative is a practicable alternative for the interconnection cable route but results in greater impact to heavily trafficked public roadways and additional construction complexity due to utility congestion and cable bends compared to the proposed route.

### **Austin Boulevard Alternative**

The Austin Boulevard Alternative for the interconnection cable route is approximately 2.0 mi (3.1 km). This route is similar to the Industrial Place to LIRR Alternative, except that it does not deviate along Industrial Place but instead stays along Austin Boulevard until it reaches Saratoga Boulevard. From there, horizontal auger bores are required to cross underneath the LIRR tracks to Parente Lane. The route continues up Kildare Road to Long Beach Road to North Nassau Lane. From there, the route heads north crossing Barnums Channel for approximately 300 ft (91 m) on the west side of the LIRR bridge, and then continues north across Daly Boulevard until it enters the POI.

Routing along Austin Boulevard is challenging due to the high traffic volumes and logistical challenges for installation of the interconnection cables, joint bay siting, and conflicts with existing utility congestion. There are also several tight bends for the interconnection cables along this route. Austin Boulevard is currently being redeveloped by Nassau County, and general, impacting recently restored roadways is discouraged by municipal and county agencies.

The Austin Boulevard Alternative is a practicable alternative for the interconnection cable route but results in greater impact to heavily trafficked public roadways and additional construction complexity due to utility congestion and cable bends compared to the proposed route.

### **Industrial Place to Daly Boulevard Alternative**

The Industrial Place to Daly Boulevard Alternative for the interconnection cable route is approximately 2.5 mi (4.0 km). The Industrial Place to Daly Boulevard Alternative exits the onshore substation routing northeast,

crossing Long Beach Road and travelling through the LIRR parking lot. The route exits onto Austin Boulevard, turns west onto Sagamore Road, then onto Industrial Place. Industrial Place is taken until the end of the road, and then the route reconnects to Austin Boulevard. The route continues north to Long Beach Road and crosses Barnums Channel, turns west onto Daly Boulevard, crosses the LIRR with horizontal auger bores and into the POI.

As described in Section 3.5.3.2 for the Long Beach Road to Daly Boulevard Alternative, this route also crosses Barnums Channel along Long Beach Road. In this area, Barnums Channel is narrowed by the Long Beach Road bridge abutments to only approximately 100 ft (30 m). The Long Beach Road corridor approaching either side of the bridge is elevated, with tidal wetlands on either side. Cable installation within the existing road bridge may not be technically feasible, and results in closure of the main ingress/egress to Barnum Island, which is considered impracticable. Empire therefore assumes that the Barnums Channel crossing along this corridor will need to occur alongside the Long Beach Road bridge. Since NYSDEC-mapped tidal wetlands are present to both the east and west of Long Beach Road in the vicinity of the bridge, any crossing solution (whether open cut, HDD or cable bridge) results in greater impacts to tidal wetlands than the proposed alternative. However, due to existing infrastructure, such as the bridge and bridge abutments, sufficient space for HDD is likely not available. A cable bridge solution in this location is expected to have greater impact to wetlands and visual impact than along the proposed route, since the surroundings along Long Beach Road lack the existing industrial infrastructure that is present along the proposed route. An open cut crossing could avoid impacts of new aboveground infrastructure along this corridor, and is assumed for this route, but will result in greater impacts to tidal wetlands than the proposed alternative.

Long Beach Road and Industrial Place are each relatively narrow (approximately 35 ft [11 m]), which poses logistical challenges for installation of the interconnection cables and joint bay siting, and potentially increases conflicts with existing utility congestion. There are also several tight bends for the interconnection cables along this route, which add construction cost and complexity. This route is also partially located along Austin Boulevard, which has significantly higher traffic volumes than Long Beach Road. Additionally, Austin Boulevard is currently being redeveloped by Nassau County. In general, impacting recently restored roadways is discouraged by municipal and county agencies.

The Industrial Place to Daly Boulevard Alternative is a practicable alternative for the interconnection cable route but is not proposed due to logistical complexity and environmental and traffic impacts associated with construction along Long Beach Road and the crossing of Barnums Channel.

#### **Industrial Place to E.F. Barrett Alternative**

The Industrial Place to E.F. Barrett Alternative for the interconnection cable route is approximately 2.2 mi (3.6 km) long. The route leaves the onshore substation site heading northeast within the parking lot adjacent to the LIRR tracks. The route crosses Long Beach Road, travelling through the LIRR Island Park Station parking lot. The route enters Austin Boulevard, turns west onto Sagamore Road, then north onto Industrial Place. Industrial Place is taken until the end of the road, and then the route reconnects to Austin Boulevard. The route continues west onto Saratoga Boulevard and horizontal auger bores are required to cross underneath the LIRR tracks to Parente Lane. From there, the Industrial Place to EF Barrett goes north along D'Amato Drive to Long Beach Road, and crosses back to the east across the LIRR tracks. The route then immediately turns northwest onto Ladomus Ave, continuing across private property to the east of the E.F. Barrett Power Station. From there, the interconnection cable route crosses Barnums Channel for approximately 300 ft (91 m). Although unmapped, tidal wetlands are expected to be present on both the south and north side of Barnums Channel, approaching Daly Boulevard, before it turns west along Daly Boulevard to the POI. NYSDEC-mapped tidal wetlands are present immediately to the east of the crossing location, south of Daly Boulevard.

This route alternative involves several challenging crossings of the LIRR right-of-way: between Saratoga Boulevard and Parente Lane, along Long Beach Road between D'Amato Drive and Sherman Road, and along Daly Boulevard approaching the POI. Installation of the interconnection cables within Long Beach Road is challenging because the Long Beach Road bridge represents the only access to Barnum Island from the Long Island mainland and is one of only three routes to the Long Beach barrier island in general. It is the main route serving the central portion of the barrier island, including densely developed areas of the City of Long Beach. In this area, the average annual daily traffic is 45,688. The workspace needed for the LIRR crossing between D'Amato Drive and Sherman Road has the potential to result in temporary impacts to the egress/ingress to Barnums Island and the Village of Island Park for a more extended time. As such, road closures and/or significant traffic impacts along this corridor for construction of the Project are likely to result in unacceptable impacts.

Crossing Barnums Channel within the private property to the east of the E.F. Barrett Power Station is expected to result in the greatest impact to tidal wetlands. Tidal wetland may be located adjacent to either side of the crossing in this area. Moreover, construction of an HDD crossing of Barnums Channel is constrained by the presence of the existing power station infrastructure and may not be feasible; if determined possible, such a crossing is expected to require HDD workspace and pull back area within the mapped tidal wetlands south of Daly Boulevard. An open cut crossing is practicable and assumed for this crossing location. Empire also anticipates commercial challenges for obtaining an easement across the property in this area and the potential for routing conflicts with existing infrastructure on the E.F. Barrett property.

Based on the logistical challenges and increased cost and complexity due to the LIRR crossings, the potential challenge of obtaining easements, and impacts along highly-trafficked roadways, Empire determined the Industrial Place to E.F Barrett Alternative is not a practicable alternative for the Project. This route is also expected to result in greater impacts to tidal wetlands than the proposed alternative and associated regulatory challenges.

#### 3.5.3.4 Submarine Interconnection Cable Route Alternatives

Empire also considered submarine export cable routes from the onshore substation to the POI, including:

- A 2.4 nm (2.7 mi, 4.4 km) route that exits the onshore substation to the west in Reynolds Channel, continuing north around Harbor Island and north through Hog Island Channel to the POI; and
- A shorter in-water route that would follow one of the north-south corridors onshore (LIRR, Austin Boulevard or Long Beach Road) to Saratoga Boulevard/Parente Lane/Redfield Road, and then enter the water at the end of Redfield Road, continuing north through Hog Island Channel to the POI.

Either submarine route from the onshore substation to the POI would result in increased impacts within the marine environment compared to other alternatives evaluated. Both of the submarine export cable routes would be at least partially located within the Significant Coastal Fish and Wildlife Habitat designated by the New York Department of State in West Hempstead Bay, considered one of the largest undeveloped coastal wetland systems in New York State, with a significant nesting habitat for coastal shorebirds and colonial wading birds, as well as being a productive area for marine finfish, shellfish, and other wildlife (NYS DOS 2008b). Moreover, similar to routes evaluated in Reynolds Channel (see Section 3.5.2), construction of a submarine export cable route through Hog Island Channel has disadvantages for constructability, associated with shallow waters, special construction techniques required, and existing marine traffic.

#### 3.5.4 Barnums Channel Crossing Alternatives

Empire evaluated three different crossing methods for Barnums Channel, including:



- An HDD installation of the cables belowground;
- And open cut installation of the cables belowground; and
- An aboveground cable bridge.

These alternatives are discussed in this section.

#### 3.5.4.1 HDD

An HDD solution at Barnums Channel would involve three land-to-land HDDs similar to those described for the proposed Reynolds Channel crossing (see Section 3.5.2) but over a shorter crossing distance. Empire determined that use of the HDD installation method is not practicable along the LIRR corridor, due to the lack of sufficient space on the south side of the crossing (at the tank farm) to stage HDDs for all three cables, and the lack of an alignment that would allow a sufficient separation distance between each of the three HDDs. Foundations of unknown depth associated with the tank farm, retaining walls on either side of Barnums Channel, and the bridge footings also pose space and alignment constraints, adding risk to the feasibility and safety of completing the HDDs in this area. Moreover, both sides of the crossing are areas that historically housed fuel oil storage facilities; therefore, there is the potential that HDDs would involve drilling through contaminated soils and/or groundwater on either side of the crossing, as well as a previously remediated area on the north side of the crossing.

#### 3.5.4.2 Open Cut

As described in Section 3.3.1 for the export cable landfall, an open cut requires Empire to excavate, remove, and/or relocate sediment to install the interconnection cables in a trench across the tidal channel at the target burial depth. For a waterway crossing, an open cut is typically constructed using excavators working from both banks and/or within the channel, as necessary. Excavated material is collected in an appropriate manner for either re-use or disposal (depending on the nature of the material) and in accordance with applicable regulations.

An open cut crossing allows the cable to be buried below the waterway, with no aboveground structures or permanent fill within Barnum's Channel. However, installation via an open cut will require more extensive disturbance to the channel for dredging, excavation, and stockpiling, within an approximately 120 ft (37 m) construction corridor across the channel. Sediments within Barnums Channel may have existing contamination, due to the location near industrial properties and known discharges in the vicinity.

An open cut installation would result in greater disturbance to Barnums Channel; therefore, Empire is proposing the aboveground cable bridge solution at this location. In the case that further feasibility evaluation reveals that a cable bridge is not feasible for this crossing, Empire would evaluate installation of the interconnection cables via an open cut with a dry crossing method. A dry crossing method involves isolating the work area from the flow of water (with sandbags, bladderdam, cofferdam, or other measures) prior to trenching, and using a dam-and-pump, flume, or similar design to transport water from one side of the work area to the other. Dry crossings minimize the transport of sediment during an open cut by preventing water from flowing across the disturbance area until the bed and banks have been restored. In the case that a dry crossing is also not feasible, a wet crossing would be used, and Empire would consider the potential efficacy of alternative best management practices to minimize sediment transport (e.g., silt curtains).

#### 3.5.4.3 Cable Bridge

A cable bridge crossing will use up to four support columns (pile caps) located within the waterway to support the truss system which will hold the cables above the water. These supports may be installed by hammer or other installation methods, up to 100 ft (30 m) below the seabed, with final design subject to geotechnical

investigation. These supports will include up to three 1.5-ft (0.5-m)-diameter steel pipe piles per pile cap, for a total of twelve steel pipe piles within the waterway. The cable bridge will be constructed from a prefabricated steel truss system assembled offsite and set in place and the structure will measure up to 25 ft (7.6 m) wide and 8 ft (2.4 m) tall and span a length of approximately 300 ft (91 m). The crossing will be located adjacent to the existing LIRR railway bridge. The structure is anticipated to have a total height of up to 15 ft (4.6 m) above MSL, with a maximum total height of 30 ft (9.1 m). Empire is also further evaluating whether it is practicable to design the cable bridge without footings.

Since the north and south sides of the crossing comprise an existing parking lot and a tank farm, respectively, impacts to wetlands and natural habitats on either side of the crossing are avoided. The above ground cable bridge presents the best solution to span the waterway and avoid trenching or drilling through the existing bulkheads and potentially contaminated soils/groundwater that may exist to the north and south of the crossing. As such, Empire selected the aboveground cable bridge solution as the practicable alternative that minimizes environmental impacts.

### 3.6 Technology Alternatives

#### 3.6.1 Foundation Alternatives

Empire evaluated several potential types of foundations for wind turbines and offshore substation: monopile, piled jacket, gravity base structure (GBS), suction bucket jacket, suction bucket monopile, and floating. Over the past several years, Empire has been evaluating the use of a GBS as a potential foundation for wind turbines to be deployed in the Lease Area, recognizing the potential of a GBS to avoid certain impacts to marine life (specifically, acoustic impacts from pile driving) from other foundation alternatives, such as monopiles or piled jacket foundations. Empire's evaluation of the GBS foundation alternative included consultation with experts across a spectrum of specialties, including design and construction engineering, acoustic engineering, marine mammal science, manufacturing process engineering, transportation logistics, procurement, permitting, and commercial contracting. Based on the evaluation, Empire has concluded that the GBS is not a practicable alternative for any wind turbine generator (WTG) foundations for EW 2, as stated in Section 3.6.1.1. Empire is instead proposing monopile foundations for the WTGs, and a piled jacket foundation for the offshore substation.

##### 3.6.1.1 GBS

GBS foundations are strengthened concrete structures with a circular base fixed to a conical exterior and vertical concrete column. The vertical concrete column connects to a steel transition piece that holds secondary features (i.e. access platforms and boat landings) associated with deeper water sites. To support up to a 15-MW WTG, a GBS foundation would be approximately 118 ft (36 m) wide at the base, 210 ft (64 m) tall, and weigh up to 8,500 tons (7,711 metric tons). It would require approximately 10,000 tons (9,071 metric tons) of high-density aggregate to ballast down a GBS and would likely necessitate a considerable amount of scour protection when compared to a monopile foundation.

Structural integrity of the GBS foundation is dependent on stable and supportive seabed conditions. Weak horizontal seabed layers, which are commonly found in locations of sediment deposition (i.e., historic rivers and deltas), are not suitable for GBS foundations. Empire's geophysical and geotechnical survey campaigns of the Lease Area indicate much of the area contains thin layers of soft sediment and loose marine sand. The evaluation also indicates the Lease Area contains Glauconite, which is a highly friable sediment type that may degrade structural integrity under the cyclic loading (repeated application of a load) of a WTG and, therefore, cannot provide the necessary stability for GBS foundations.

Unsuitable seabed conditions necessitate seabed preparation prior to GBS installation. This process is necessary to ensure the wind turbine is adequately supported and involves a combination of dredging and backfilling with rock, adding an armor and filter layer above the mudline, and placing a gravel pad and scour protection on top of that. The dredging preparation would likely involve removing soft, uneven, or mobile sediments as well as a foundation bed of rock (or aggregate). By contrast, monopile foundations require no further seabed preparation after being piled into the ground and scour protection laid along the perimeter above the mudline. As such, GBS foundation installation involves seabed preparation and scour protection, which will disturb a larger area and result in greater impact to the marine environment and benthic resources when compared to impact from installation of the monopile foundation.

The primary advantage of the GBS foundations alternative is to avoid the pile driving into the sea floor that is required to install monopile foundation, and which generates acoustic energy potentially impactful to aquatic life. GBS foundations are transported and placed at the site without pile driving. However, the potential advantages of GBS foundations are offset by other negative environmental impacts. Empire's evaluation indicated there are higher overall carbon dioxide (CO<sub>2</sub>) emissions associated with use of the GBS foundations

(Empire's evaluation estimated approximately 4,500 [4,082 metric tons] tons per foundation for GBS, compared to approximately 2,300 tons [2,086 metric tons] per foundation for monopile foundations). This is mostly due to much higher emissions from installation of the GBS foundation. GBS foundation transportation would also result in more marine traffic impacts (GBS foundations must be transported individually, unlike other foundation types).

Logistical challenges are also a consideration for GBS foundations. Since there are currently no GBS manufacturers in the United States, a fabrication site for the foundations is required. Empire would also need to develop its own supply chain to fabricate, transport, and install the GBS foundations. Empire would be entirely responsible for establishing the supply chain, skilled workforce, and adequate quality control. Empire identified Port of Coeymans (near Albany, New York) as a potential fabrication site, but determined it is impracticable due to associated upgrade costs, transportation and staging requirements, and logistics due to bridge height restrictions along the Hudson River. No other commercially viable options for the fabrication and supply chain for GBS foundations were identified.

After evaluation, Empire determined that the costs, logistical challenges, and commercial risks of GBS foundations render the alternative impracticable and would restrict Empire's ability to meet contractual commitments with New York and achieve the Project purpose (see Section 3.1). Moreover, the GBS foundations would cause greater potential environmental impacts to the seafloor due to a larger footprint, to air emissions from increased CO<sub>2</sub> emissions, and to navigation/marine traffic, which outweigh the benefits of GBS foundations in reducing the potential temporary acoustic impacts to marine wildlife during construction.

#### 3.6.1.2 Monopile

Monopile foundations consist of a single vertical, broadly cylindrical steel pile driven into the seabed. A steel transition piece, which contains secondary structural components, cable hang-offs and material handling equipment for the WTG (i.e., boat landings, internal access platforms with cable hang-offs, external work platform equipped with gates and crane for equipment transfer from crew transfer vessels (CTVs)), will be connected to the monopile by bolting (see **Attachment B** Permit Drawings). The transition piece will also contain the Navaid equipment such as marine lanterns, foghorn, and AIS.

While a piled solution (monopile or piled jacket) for a wind turbine or offshore substation may not require the same level of ground preparation for installation as GBS, drivability relevant to geotechnical conditions need to be considered. Empire has completed an initial drivability assessment to confirm feasibility and has included contingent locations within the conceptual layout.

Empire's evaluation indicated that CO<sub>2</sub> emissions and seabed impacts are lower with installation of monopile foundations than GBS foundations, as discussed in Section 3.6.1.1 Based on the monopile foundation's previous use in the United States, known technology and existing supply chain, and Empire's ability to meet contractual commitments with New York to achieve the Project purpose (see Section 3.1), monopile foundations were selected for the EW 2 wind turbine foundations.

#### 3.6.1.3 Piled Jacket

A piled jacket is a vertical steel lattice structure consisting of three or four legs to support a wind turbine, or up to eight legs to support an offshore substation, from which piles are inserted and connected through cross-bracing (see **Attachment B** Permit Drawings).

The piled jacket foundation was selected for the offshore substation, since monopile foundations are not designed for and are not practicable to support the larger size/weight of the offshore substation (approximately 5,500 tons [5,000 metric tons]).

#### 3.6.1.4 Suction Bucket Jacket

A suction bucket jacket is a vertical steel lattice structure consisting of three or four legs, which contain inverted bucket-like structures at the base, connected through cross-bracing. Suction bucket jackets were removed from additional consideration because the conditions in the Lease Area are not suitable. Suction bucket jackets are more typically appropriate for areas with characteristics that allow the buckets to achieve appropriate penetration and the proper soil-structure interaction for the jacket. Empire's geophysical and geotechnical survey data has demonstrated that the seabed sediment in most locations (0 to 33 ft [0 to 10 m] below surface) consists of loose marine sand, limiting the holding capacity of the buckets. As such, based on the technical constraints of suction bucket jacket foundations, they are not a practicable alternative to meet the Project purpose.

#### 3.6.1.5 Suction Bucket Monopile

A suction bucket monopile is a single vertical, broadly cylindrical steel monopile, which contains a single inverted bucket-like structure at the base. Suction bucket monopiles were also deemed not to be technically or commercially feasible for the development timescales associated with this Project and are therefore not a practicable alternative to meet the Project purpose.

#### 3.6.1.6 Floating

This alternative uses a floating structure, typically a spar or semi-submersible, which is tethered to the seafloor through a set of anchoring devices. Floating foundations are used for installations at much deeper water depths than are present in the Lease Area. Floating foundations are not considered practicable for the Project because the water is not deep enough to justify the additional costs and engineering considerations.

### 3.6.2 Submarine Export Cable Technology Alternative

Empire evaluated different transmission technologies for the submarine export cables against the following criteria:

- Transmission distances;
- Economic considerations; and
- Land required to support onshore electrical facilities.

The submarine export cables are designed to use HVAC rather than HVDC due to the considerably lower costs to interconnect HVAC into the alternating current terrestrial grid at the Barrett 138-kV Substation. HVDC requires a considerably larger investment with greater complexity, significantly larger offshore and onshore space requirements, and higher maintenance needs than HVAC due to the need for converter stations onshore and offshore. HVDC becomes more cost-effective for wind farms with a larger nameplate capacity than is planned for the EW 2 Project, in part because HVDC may allow a reduction in the number of export cables for larger projects. This may also be preferable for long transmission lines carrying very large power capacities where HVDC reduces transmission losses relative to HVAC. The transmission distance and power rating of the EW 2 Project submarine export cables makes it suitable and more cost-effective to employ an HVAC system.



### 3.6.3 Submarine Export Cable Installation Alternatives

Empire also evaluated several alternative methods for cable installation offshore, including cable burial and direct placement on the seafloor. Empire is proposing to bury the submarine export cables using jetting, mechanical plow and trenching/cutting. Dredging or mass flow excavation are not proposed for cable burial in general, but may be required in certain locations, such as for pre-sweeping and seabed preparation activities prior to cable lay, and at certain asset crossings.

Placement of the submarine export cables directly on the seafloor as the primary installation method was determined to be not practicable due to the heightened risk of third-party damage to the cables and increased maintenance requirements from anchor or fishing gear snagging. Although direct seafloor disturbance from jetting or trenching during construction would be avoided with this method, the additional cable protection measures required to minimize third-party damage would result in a much larger footprint alteration of the seabed surface and long-term impact to the benthos. Additional cable protection requirements would also likely offset the installation time savings from placing cables on the seafloor instead of burying them. As such, Empire has retained placement of the cables directly on the seafloor, with cable protection (such as rock berm or matting) only for limited areas where sufficient burial depths cannot be achieved due to seabed conditions.

For cable burial, Empire assessed a variety of methods including jet plow, mechanical plow, trenching/cutting, and dredging. Both jetting and mechanical plowing may create a temporary trench and lay the cable in a single pass. Jetting may be conducted via a towed device that travels along the seafloor surface. Jetting may also be conducted with a vertical injector fixed to the side of a vessel or barge. These methods inject high pressure water into the sediment through a blade that is inserted into the seafloor to create a trench. The water sufficiently liquifies the sediments such that the cable can then settle down through the suspended sediments to the desired burial depth. Mechanical plowing uses a cable plow that is pulled along the seabed, creating a narrow trench. Simultaneously, the cable is fed from the cable ship down to the plow, with the cable laid into the trench by the plow device. Due to gravity, the displaced sediment returns to the furrow, covering the cable.

Jetting methods (including capjet, jet sled, jet plow, and vertical injector equipment) are considered Empire's primary proposed methods for cable installation. Jetting is the most efficient method of submarine cable installation that minimizes the extent and duration of bottom disturbance for the significant length and water depths along the submarine export cable route. The majority of temporarily suspended sediments from jetting settle back in the trench naturally, reducing sedimentation impacts.

Empire also considered trenching, or cutting, which may be used on seabed containing hard materials not suitable for mechanical plowing or jetting, as the trenching machine is able to mechanically cut through the material using a chain or wheel cutter fitted with picks or teeth. Once the cutter creates a trench, the submarine export cable is laid into it, and typically backfill is mechanically returned to the trench using a backfill plow. This method is less preferred due to lower efficiency, longer installation duration, and greater potential impacts from the additional step of backfilling the trench. However, both mechanical plowing and trenching (cutting) are proposed as potential installation methods to be used in the event that Empire encounters seabed or depth conditions where jet plowing is not practicable or efficient. Pre-sweeping or pre-trenching may be associated with any of the considered cable burial methodologies.

Mechanical dredging was also assessed as a potential method for submarine cable installation. Dredging is used to excavate, remove, and/or relocate sediment from the seabed in order to increase water depth and alter existing conditions; this can be completed through clamshell dredging, suction dredging, and/or hydraulic dredging. Because of the greater duration and extent of sediment disturbance associated with dredging, this method is not practicable for the majority of the cable installation. Dredging, however, may be proposed for

certain locations such as the potential use of a suction dredge or mass flow excavation in limited locations for pre-sweeping, seabed preparation activities and utility asset crossings.

### 3.6.4 Cable and Pipeline Crossing Alternatives

The submarine export cable route will cross existing in-service and out-of-service assets including potentially existing transmission cables and natural gas pipelines. Empire is proposing to install the submarine export cables across third-party assets using concrete or rock-filled mattresses or rock berm protection (see Section 2 of **Attachment D**). As described in Section 3.3.1.1, a water-to-water HDD was determined to be impracticable for crossing the Transco LNYBL. Other asset crossing methods considered are evaluated in this section.

A traditional asset crossing with crushed rock installation or a rock berm will consist of installation of rock at the base, cable lay, followed by another layer of rock protection over the top. Rock installation provides protection for the cable against anchor drags or other external impacts. This method results in approximately 6.5 ft (2 m) of shoaling on the seafloor. For certain crossings, Empire is also evaluating the use of traditional asset crossing measures protected with mattresses filled with either rock or concrete. Potential methods include either laying the cable directly on the seafloor with a protective mattress on top or laying the cable on top of a layer of protective mattress on the seafloor, and then adding a second protective mattress over the top of the cable. These solutions do not cause significant shoaling, resulting in a less than 3 ft (0.9 m) reduction in water depth. Removal of sediment at crossings of identified assets to facilitate installation may be conducted before the crossing installation to allow for sufficient burial of the submarine export cables and reduce the need for supplemental cable protection material or shoaling on the seabed. This method may not be feasible due to site-specific limitations on dredging in the vicinity of existing assets.

These asset crossing methods have been retained as practicable for use on a case-by-case basis at cable and pipeline crossings along the submarine export cable route. Where the submarine export cable route requires the crossing of assets, specific crossing designs will be developed and engineered. Cable crossing methodologies will be based on a variety of factors, including the type of asset to be crossed (i.e., material), the depth of the existing buried cable or pipeline, and whether the assets are in-service or out-of-service.

Empire also evaluated artificial reef and pipe-supported bridge crossing methods. An artificial reef concept would use an artificial reef structure as cable protection in lieu of the mattress or rock protection that would be employed for a traditional trenched asset crossing. However, Empire did not find examples of artificial reefs having been previously used for cable protection at asset crossings; therefore, the effectiveness of these structures is unknown. Because of the soft soils present at the locations of the existing cable and pipeline crossings, it was determined that a mattress foundation would likely need to be employed in combination with the artificial reef structures for sufficient support. The reef units also carry the risk of creating anchor snag points. Therefore, Empire determined that the use of an artificial reef in conjunction with asset crossings was not a practicable option for the Project.

A pile-supported bridging crossing would require driving piles to either side of the asset crossing, and significant trench dredging. Seabed impacts, as well as potential underwater noise impacts, would be greater than with the preferred solutions. This method is also more labor-intensive and costly than traditional crossing methods. It was therefore determined that a pile-supported bridge crossing is not a practicable solution for the Project.

Rock filled mattresses, concrete articulated mats and rock berm protection were determined to be practicable options for asset crossings, considering concerns such as hydraulics, scour, and anchor drag/impact. These methods therefore have been retained for case-by-case use at the cable and pipeline crossings along the submarine export cable route.

### 3.6.5 Pre-Sweeping and Dredging Alternatives

In certain limited areas of the submarine export cable siting corridor, where underwater megaripples and sandwaves are present on the seafloor, pre-sweeping may be necessary prior to cable lay activities. Pre-sweeping involves smoothing the seafloor by removing ridges and edges, where present. Empire evaluated a variety of pre-sweeping and dredging equipment for these activities. Methods evaluated include trailing suction hopper dredging (TSHD), hydraulic dredging/cutter suction dredging (CSD), mechanical dredging, and mass flow excavation. Based on its evaluation, Empire is proposing mass flow excavation as the primary method for pre-sweeping, subject to regulatory approvals.

#### 3.6.5.1 Pre-Sweeping and Dredging Equipment Alternatives

The primary pre-sweeping method will involve using a mass flow excavator from a construction vessel to smooth excess sediment on the seafloor along the footprint of the cable lay. A mass flow excavator uses jets to disturb and displace the material below the excavator. This equipment is deployed from a self-propelled vessel, making excavation continuous and adaptable. This technology may also incorporate dynamic positioning, allowing the operator to set way points and plan sediment disturbance with a high degree of accuracy. This equipment often works in close proximity to existing subsea objects in support of cable burial operations.

A TSHD is a self-propelled vessel that digs, stores, and pumps dredged material. TSHDs are beneficial in long, spread out excavation areas since they can freely move with no wires or spuds. This equipment can cover miles of excavation each day and return to a dig area for a “clean up” or small touch ups to a profile relatively easily. There is little to no support equipment needed for the dredge to dig, transport, and pump off/bottom dump material. However, active dig time may be reduced to accommodate other activities, such as sailing or disposal of materials. A typical mid-sized hopper dredge in the United States would be expected to remove between 1 and 3 ft (0.3 and 0.9 m) of material vertically, across a width of 6-12 ft (1.8 to 3.7 m). After filling the hopper, which typically will hold between 2,300 to 6,000 cubic yards (1,760 to 4,590 cubic meters), the TSHD will transit to a disposal site and prepare for disposal.

A TSHD can be used for ocean placement of material; for bottom placement, the dredge opens several gates/doors or splits its hull on a central hinge to release all the material over 4 to 12 minutes, usually while moving slowly through the disposal area to clean out the hopper. If pumping a slurry (combined water and sediment) of the dredged material to an upland disposal or beach location, the vessel discharge pipe will be connected to a land-based pipe and the operator will pump the slurry until the hopper is reasonably cleaned out. On a beach, the water runs into the ocean as the sediment settles on the beach. During upland disposal, typically the sediment settles in planned cells and the excess water discharges through weir boxes. If dry aggregate is required, the dredge will overflow any excess water using skimmers in the hopper, then will usually also require additional time to dry out the material. After it is adequately dried, cranes and/or conveyors can be used to offload the hopper. However, this dry aggregate method results in exceptionally long cycle times, and is often not selected due to cost implications and significant duration. Once the material disposal is completed, the dredge will travel back to the excavation area and continue with the next load.

A hydraulic dredge/cutter suction dredge (CSD) is a vessel with a large rotating cutter head that disturbs material then sucks it up and uses an onboard pump to pump it either through a pipeline directly to a disposal location or to a barge. A CSD can dig sand, clay, and rock in some cases, and can pump this material further than a hopper dredge due to the pump size. However, it is not self-propelled, so anchors and wires or spuds are used for small moves, and tugs are used for large moves or anchor resets. Because of this traveling limitation, CSDs are typically not used for narrow (<100 feet) and/or low-face (<5 feet) dig areas. They are exceptionally good at removing large amounts and can be expected to disturb and pump 8 ft (2.4 m) or more of vertical

material in one swing. If the dredge is close enough to the pump out location, a long pipeline can be run directly from dredge to disposal. The length of this pipeline can be upwards of 6 mi (9.6 km) if additional boosters are brought in; boosters are barges (or land-based stations) with large pumps that are strategically put in line to increase the velocity through the pipe. If the disposal area is too far for a continuous pipeline, the CSD can pump to a spider barge which will fill scows for transport to disposal. A spider barge is an anchored barge connected to the pipeline from which the material is pumped; it has several “arms” which open, close, raise, and lower to load material in scows based on the scow’s location. This method of CSD to spider barge allows the continuous pumping of material to scows, which are then sailed to an offshore disposal, location pumped to some type of upland disposal, or brought to a facility to be unloaded with a bucket or conveyors if dry aggregate is needed.

A mechanical or bucket dredge consists of a barge with a bucket to move material. The dredge moves itself a few hundred feet using spuds or wires, but ultimately requires several tugs for large moves or anchor resets. Therefore, this equipment is beneficial for protected waters with a wider dig area, to limit the amount of forward movement required. Mechanical dredges also require scows to move the material to a disposal site since there is no pump or material storage onboard. Each bucket of material, typically 12 to 30 cubic yards (9.2 to 22.9 cubic meters), is put in a scow alongside the dredge. When the scow is full, a tug brings that loaded scow to a disposal area and a different tug replaces an empty scow alongside the dredge, pausing digging for 20 to 60 minutes for each scow change. If material is to be pumped to an upland disposal or beach, each scow will have to be brought alongside an “unloader.” An unloader is a stationary vessel with a large pump that sucks material from the scow to a pipeline can run to a disposal cell or location on land. The unloader pumps slurry from the scow until it is relatively clean, then the scow makes its trip back to the dredging area. A less common, but available mechanical dredging method uses a high-powered backhoe to break up and load rock.

### 3.6.5.2 Pre-Sweeping and Dredging Equipment Alternatives Analysis

Use of a mass flow excavator for pre-sweeping activities (to smooth sandwaves and at utility crossings) is expected to be much shorter in duration than dredging using TSHD, CSD, or mechanical dredging equipment. The shorter duration will result in less physical presence of work vessels in the cable corridor, less interference with other marine activities and navigation, and reduced overall duration of disturbance to the seabed and the marine environment. The reduction in duration will also increase the likelihood of being able to complete submarine export cable installation activities within one construction season, which greatly reduces the duration of construction-related disturbances to the marine environment, including disturbances to marine wildlife and fisheries.

Due to the efficiency of the operation, the mass flow excavator can be used immediately prior to the cable installation, minimizing the potential for sediment build up between the time of the pre-sweeping operation and the cable installation due to seabed sediment mobility. A dredging operation would likely need to be conducted significantly in advance of the cable lay and burial operation, which would necessitate overdredging additional volumes to account for the seabed mobility in the interim, in order to ensure the correct depths and seabed conditions are present at the time of cable installation and burial.

Once the pre-sweeping activity is completed and the mass flow excavator moved to a different location, the disturbed sediment is expected to settle out quickly. Dredging equipment may result in longer duration of suspended sediment impacts, both due to the increased duration of operations at a given location along the submarine export cable route, and because of impacts associated with managing dredged material, such as barge overflow, hopper barge decanting, and/or onshore dewatering activities that may be necessary prior to disposal, as described in Section 3.6.5.1. MFE has the potential to generate greater sediment resuspension lasting for a shorter duration.

Use of mass flow excavation eliminates the dredged material disposal associated with this pre-sweeping methodology. With dredging, Empire would need to excavate, manage and dispose of material dredged from construction, including management of decanting and dewatering activities. Disposal of the volumes of dredged material anticipated for pre-sweeping will involve a significant cost to the Project, and introduce added logistical complexity associated with the management, sampling and transportation of the dredged material. Moreover, for pre-sweeping at utility crossings, dredging equipment is expected to be impracticable and/or prohibited in certain locations due to the potential risk of impact to existing assets. Mass flow excavation can remove material surrounding an existing asset with reduced risk of damage from contact with dredging equipment.

In the case that mass flow excavation cannot be used due to regulatory requirements, Empire would likely use a TSHD to pre-sweep sandwaves. Although not preferred, the TSHD allows more efficient production for pre-sweeping sandwaves than other dredging methods due to the independent mobility of the equipment, and disposal options.



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## **Appendix P. Responses to Comments on the Draft Environmental Impact Statement**

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## **P.1. Introduction**

On November 18, 2022, BOEM published a notice of availability for the Empire Wind Draft EIS, consistent with the regulations implementing NEPA (42 USC 4321 et seq.) to assess the potential impacts of the Proposed Action and alternatives. The Draft EIS was made available in electronic form for public viewing at <https://www.boem.gov/renewable-energy/state-activities/empire-wind> and electronic copies were delivered to other entities as specified in Appendix K of the Draft EIS. The NEPA review process requires agencies to allow the public the opportunity to comment on a Draft EIS. The notice of availability initiated a 60-day public comment period for the Draft EIS that closed on January 17, 2023. This appendix describes the Draft EIS public comment processing methodology and definitions, and also includes responses to comments received on the Draft EIS and describes where specific updates to the Final EIS can be found in the document.

## **P.2. Objective**

BOEM reviewed and considered all written and oral public submissions received during the Draft EIS public review and comment period. BOEM's goal was to identify comments to be addressed in this Final EIS and to categorize those comments based on the applicable resource areas or NEPA topics. This categorization scheme allowed subject matter experts to review comments directly related to their areas of expertise and allowed BOEM to generate statistics based on the resource areas or NEPA topics addressed in each of the comments. All public comment submissions received can be viewed online at <http://www.regulations.gov> by typing "BOEM-2022-0053" in the search field.

## **P.3. Methodology**

### **P.3.1 Terminology**

The following terminology is used throughout this appendix:

- **Submission:** The entire content submitted by a single person or group at a single time. For example, a 10-page letter from a citizen, an email with a portable document format (PDF) attachment, and a transcript of an oral comment given at a public hearing meeting were each considered to be a submission.
- **Comment:** A specific statement within a submission that expresses a sender's specific point of view, concern, question, or suggestion. A comment can consist of more than one sentence, as long as those grouped sentences express a single idea. One submission may contain many comments.
- **Substantive Comment:** Draft EIS submissions were reviewed to identify and categorize "substantive" comments. To be substantive, a comment must relate to the reasonably foreseeable impacts of the Proposed Action, alternatives, or cumulative actions and do one or more of the following:
  - Question (with supporting rationale) the accuracy of information in the Draft EIS
  - Question (with supporting rationale) the adequacy of, methodology for, or assumptions used for the environmental analysis
  - Present new information relevant to the analysis
  - Present reasonable alternatives or mitigation measures other than those analyzed in the Draft EIS
  - Present or cause modifications to alternatives or mitigation measures analyzed in the Draft EIS
  - Correct factual errors in the content of the Draft EIS

- General Comment: General comments are comments other than substantive comments. General comments may: (1) express interest or concern regarding an impact topic without providing specific comments on the information, methods, or findings presented in the Draft EIS, (2) express general support for or opposition to the proposed Projects, or (3) comment on a topic unrelated to the proposed Projects.

**P.3.2 Comment Submittals**

Federal agencies, state/local/tribal governments, and the general public had the opportunity to provide comments on the Draft EIS via the following mechanisms:

- Electronic submissions via [www.regulations.gov](http://www.regulations.gov) on docket number BOEM-2022-0053;
- Hard-copy comment letters submitted to BOEM via traditional mail; and
- Comments submitted verbally at each of the public hearings.

BOEM held three online public hearings via Zoom to solicit oral comments to inform preparation of the Final EIS. The hearings were free and open to the public with no reservations required. Locations and dates of these hearings are outlined in Table P.3-1.

**Table P.3-1 Public Hearings**

<b>Date</b>	<b>Time</b>	<b>Location</b>
December 7, 2022	5:00 p.m. Eastern Time	Zoom Webinar
December 13, 2022	5:00 p.m. Eastern Time	Zoom Webinar
December 15, 2022	1:00 p.m. Eastern Time	Zoom Webinar

All submissions initially provided by methods other than [www.regulations.gov](http://www.regulations.gov), including the transcripts of comments recorded at each public hearing listed in Table P.3-1, were uploaded to the docket. Each submission, including testimony by individual speakers at the public hearings listed in Table P.3-1, was assigned a unique identification number. That unique Submission ID was retained throughout the comment management process, for both submissions and the individual comments within those submissions.

**P.3.3 Comment Processing**

BOEM downloaded and reviewed all submissions from [regulations.gov](http://www.regulations.gov). These submissions were provided in Hypertext Markup Language (html) format, while attachments provided by stakeholders as part of their [regulations.gov](http://www.regulations.gov) submission were typically provided in PDF or Microsoft Word format. Text from all formats was parsed, coded, and exported into a single Microsoft Excel file that served as the primary submission database. In cases where an attachment did not contain comments specific to the docket for the Empire Wind Draft EIS, the attachment was retained separately for BOEM reference as applicable and linked to the main body of the submission through the unique Submission ID. Examples of this type of attachment include copies of comment letters that were originally submitted during the scoping period, copies of comment letters that were originally submitted on another docket, or attached photos, published reports, news articles, or other secondary material. The submission database also included information about each submission, including the submitter’s contact information, submission date, and whether the submitter was a government entity or agency.



Each submission was read to identify individual substantive and general comments (as defined under Section P.3.1, *Terminology*). Each comment was parsed, coded, and exported to a spreadsheet that served as the master comment database. Each comment then received a unique comment ID number, tied to the Submission ID. For example, the fourth comment identified in [regulations.gov](https://www.regulations.gov) submission 0001 was identified as BOEM-2022-0053-0001-0004.

Substantive comments from cooperating and participating agencies and the Lessee were organized by agency or organization and are presented verbatim in Sections P.4 and P.5. Other agency, stakeholder, and public comments were each assigned to one section of the Draft EIS, based on the document's table of contents, or to a general topic such as "NEPA/Public Involvement Process." Substantive comments are presented verbatim in Section P.6. General comments are summarized in Section P.7. and the specific comments that contributed to a comment summary are identified by comment number.

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## P.4. Responses to Cooperating and Participating Agency Comments on the Draft EIS

### P.4.1 Cooperating Federal Agencies

#### P.4.1.1. National Oceanic and Atmospheric Administration, National Marine Fisheries Service (BOEM-2022-0053-0149)

**Table P.4-1 Responses to Comments from National Oceanic and Atmospheric Administration, National Marine Fisheries Service (BOEM-2022-0053-0149)**

Comment	Response
<p>In response to the November 18, 2022, Notice of Availability we conducted this review as a cooperating agency with legal jurisdiction and special expertise over marine trust resources and fishing operations and fishing communities including resources protected by the Magnuson- Stevens Fishery Conservation and Management Act (MSA) and section 7 of the Endangered Species Act (ESA) under which we also serve as a consulting agency. We are also an action agency for this project to the extent that NOAA’s National Marine Fisheries Service (NMFS) provides Incidental Take Authorizations (ITA) under the Marine Mammal Protection Act (MMPA). If we determine the document is sufficient we will rely on and adopt your Final EIS (FEIS) to satisfy our independent legal obligations to prepare an adequate and sufficient analysis under the National Environmental Policy Act (NEPA) in support of our proposal to issue the ITA for the proposed project. If NMFS does not deem the EIS sufficient for adoption we would need to conduct an independent NEPA analysis to evaluate the impacts of the proposed issuance of the ITA which would add significant time to the permitting timeline.</p>	<p>Comment acknowledged.</p>
<p>In our dual roles as both a cooperating and adopting agency we provided comments on September 9, 2022 during an interagency review of the Preliminary DEIS (PDEIS). While some of our comments were addressed a significant portion of the comments we provided during the cooperating agency review are not reflected or resolved in the current version of the DEIS. Thus we remain concerned with the analysis of impacts from the Project on NOAA trust resources and fishing operations. Below we elaborate on these issues. Additional comments and examples are included in the attached spreadsheet (Attachment A). We recommend BOEM resolve these issues in the Final EIS.</p>	<p>Comment acknowledged.</p>

Comment	Response
<p>New Alternative Under Consideration Through our review of the DEIS we learned that BOEM included an additional alternative for consideration that was not included in the PDEIS or discussed with NMFS prior to release of the DEIS. This new alternative considers a different layout for EW1 based on economic and technical feasibility and proposes fewer overall turbine locations under a modified layout (turbines are removed from more central portions of EW1 but retained on Cholera Bank and in the setback between EW1 and EW2). Based on presentations made by the developer on November 29 and December 1, 2022 to the NYSERDA Environmental Technical Working Group (E-TWG) and the Fisheries Technical Working Group (F-TWG) respectively it was our understanding that 22 of the original turbine positions create technical challenges for the developer due to the presence of glauconite. The developer noted that this new layout identified as Alternative F in the DEIS was now <i>[Italics: their preferred alternative]</i>. They also noted that additional surveys would be conducted in the EW2 area which may result in the developer recommending additional modifications to the layout and number of turbines proposed for EW2.</p>	<p>Additional information on the presence of glauconite in the Lease Area and the constraints that glauconite poses for installation of WTGs has been added to the description of Alternative F in Section 2.1.7 of the Final EIS. Final EIS Figure 2-10 has also been updated to reflect the proposed layout for EW 2 under Alternative F based on results of geotechnical investigations.</p>
<p>We have received conflicting information related to both the proposed plans for the Project and the viability of some alternatives for the lease area under consideration in the DEIS. All alternatives carried forward for full evaluation in the DEIS should reasonably accomplish the underlying purpose and need of the proposed action; this will ensure that the DEIS is focused on providing a clear transparent comparative analysis of reasonable alternatives capable of implementation (in addition to No Action). The information provided at these NYSERDA meetings appeared to suggest that many other alternatives under consideration including the existing proposed action (Alternative A) habitat impact minimization alternative (Alternative B) and fisheries transit alternative (Alternative E) were no longer feasible. However in follow up discussions with Empire Wind and in one of their emails to NMFS on December 9 2022 Empire Wind indicated that the locations are still technically feasible despite the presence of glauconite. Further Empire Wind indicated that it still intends to install up to 57 turbines and one offshore substation in EW1 and up to 90 turbines and one offshore substation in EW2 for a total of 147 turbines and two offshore substations across both projects. We request BOEM provide further</p>	<p>Draft EIS Alternative F included a WTG array layout for EW 1 based on geotechnical information that was available at the time the Draft EIS was published. Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7. Final EIS Figure 2-10 has also been updated to include an indicative WTG and interarray cable layout for both EW 1 and EW 2 based on the pile drivability analysis. The refinement to Alternative F between the Draft EIS and Final EIS reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs).</p>

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<p>clarity on this issue to us and also discuss this within the FEIS so that the cooperating agencies and the public can have a better understanding of the specific project the developer is proposing to construct in the lease area. The FEIS should only evaluate alternatives that are feasible for implementation and meet the purpose and need for action as detailed in Chapter 2.</p>	
<p>We request that BOEM clarify how they plan to ensure that the agencies and the public have the opportunity to review and comment on any changes in alternatives or constraints with existing alternatives. We recommend that this be addressed as soon as practical and well prior to finalization of the FEIS. We continue to recommend avoidance of development on Cholera Bank due to the importance of this habitat area for fisheries resources and have worked with BOEM to identify an alternative for full evaluation that would reduce impacts to this important area (Alternative B). However we are unclear if this alternative remains viable or if it could be incorporated into the developer’s new preferred alternative or modified in a way that still meets the intent of the alternative. We also recommend BOEM clarify when agencies and the public will have the opportunity to comment on any additional layout modifications for EW2 should they occur after surveys are completed. Given our dual role as an action and consulting agency we would appreciate being made aware of and consulted with on any new alternative under consideration as soon as possible and prior to the release of the FEIS.</p>	<p>BOEM hosted an interagency meeting on April 12, 2023, to brief the cooperating and participating agencies on geotechnical constraints in the Lease Area related to the presence of glauconite.</p> <p>Based on review of Empire’s pile drivability analysis between the Draft EIS and Final EIS, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7. Final EIS Figure 2-10 has also been updated to include an indicative WTG and interarray cable layout for both EW 1 and EW 2 based on the pile drivability analysis. The refinement to Alternative F between the Draft EIS and Final EIS reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs). The refinement to Alternative F between the Draft EIS and Final EIS did not result in impacts that were not disclosed in the Draft EIS and therefore BOEM has determined that a supplemental Draft EIS (and associated public comment period) was not warranted. BOEM provided a draft Preferred Alternative Rationale with the redline Preliminary Final EIS for cooperating agency review and comment prior to publication of the Final EIS.</p>
<p>Project Design Envelope (PDE) While we understand that BOEM’s regulations allow for developers to identify a project design envelope (PDE) in their COPs to provide flexibility as details of the project are developed and broad PDEs can provide flexibility in the OCSLA review process the broad PDE here has created challenges during the Empire Wind regulatory process. This concern arises where as here the project proposed for environmental review and consultation is not</p>	<p>Consistent with BOEM’s draft guidance,<sup>1</sup> Empire’s COP proposes the Projects using a PDE concept. This concept allows Empire to define and bracket proposed Project characteristics for environmental review and permitting while maintaining a reasonable degree of flexibility for selection and purchase of Project components. The EIS assesses the impacts of the PDE using the “maximum-case scenario.” The maximum-case scenario is composed of each design parameter or</p>

<sup>1</sup> BOEM’s draft guidance on the use of design envelopes in a COP is available at: <https://www.boem.gov/sites/default/files/renewable-energy-program/Draft-Design-Envelope-Guidance.pdf>.



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<p>refined from the planning level PDE in the COP based on collection of new information or additional survey data that may generate design and layout changes. Project design and layout modifications may result in meaningful changes to the proposed action feasible alternatives and corresponding effects to marine resources. This approach has resulted in agencies and the public reviewing proposed actions that were broadly defined at the planning level but do not reflect project-level refinements or new information. Review of a proposed action that is much broader than the anticipated project complicates NOAA's ability to understand analyze and comment on the specific action and refined alternatives that may be authorized within the lease area. As the agency responsible for the stewardship of our ocean resources it is important to us that the decision maker has the opportunity to consider a reasonable range of options that allow for avoidance and minimization of impacts to NOAA trust resources and fishing operations.</p> <p>Modifications to the layout and project configurations for Empire Wind could have different impacts to our resources that require focused evaluation. Having a proposed action that more accurately matches the actual project implementation avoids many of the analytical issues inherent with a broad PDE and generally saves time in the consultation and permitting process in the long run.</p> <p>We would like to work with BOEM to explore options for this and future projects to allow for a more efficient and reliable regulatory process; only reasonable alternatives capable of being implemented should be put forward for review in the DEIS and consultation process. As an option BOEM could incorporate a step-down process or structure that allows for the PDE included in the COP to be refined to a more specific proposed action that can be evaluated in the regulatory process as information becomes available that results in modifications to the project plans. Alternatively BOEM could commence the regulatory process after all necessary site characterization surveys have been completed to allow for the PDE to be realistically refined to a feasible proposed action that reflects environmental and technical constraints.</p>	<p>combination of parameters that would result in the greatest impact for each resource. If the COP is approved, the Projects must be implemented within the defined PDE. If there are future changes to the Project design that are outside the PDE, additional review could be required.</p> <p>Recognizing NOAA's preference for reviewing a more refined Project design, the BA and EFH Assessment submitted to NMFS for the Projects in March 2023 included a description of the Proposed Action based on the COP PDE and also Empire's preliminary layout based on results of Empire's pile drivability analysis that was completed after publication of the Draft EIS. The Proposed Action identifies 174 potential WTG positions within which up to 147 WTGs would be installed, while Empire's preliminary layout identifies 138 WTG positions that the pile drivability analysis determined to be drivable or likely drivable.</p> <p>BOEM looks forward to further coordination with NOAA on process improvements that could be made to facilitate review of offshore wind COPs.</p>
<p>Approach to the Alternatives Analysis As we discussed with your agency during the review of the Ocean Wind DEIS we recommend that BOEM evaluate a "No Action" scenario that does not include all</p>	<p>The row for the No Action Alternative in Table 2-1 and Section 2.1.1 has been revised to remove the analysis of other reasonably foreseeable future activities as part of the No Action Alternative.</p>

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<p>future planned offshore wind development (i.e. a baseline that reflects the effects of past and ongoing wind and non- wind activities without planned future activities). We appreciate that BOEM has made several updates to the alternatives analysis in the Empire Wind DEIS specifically in Section 3 where the structure has been revised to be consistent with these discussions and the agreed upon approach for the Ocean Wind EIS. However the Section 2 description of the No Action Alternative still includes all other reasonably foreseeable impact-producing activities including the proposed but not yet approved offshore wind projects outlined in Appendix F (Planned Activities Scenario). This should be revised to ensure consistency in the document and clearly distinguish between impacts of the individual alternatives and the cumulative impacts of each alternative.</p>	
<p>While some structural improvements have been made the DEIS still does not fully evaluate each alternative and in many cases the analysis does not provide any meaningful distinctions between the impacts of the action alternatives. The document instead focuses on analyzing impacts of the proposed action while providing relative impacts for the other alternatives often with limited information and only qualitative descriptions. There is a lack of clear analysis or information allowing the reader to differentiate between the environmental consequences of alternatives. We are particularly concerned with the limited analysis for alternatives intended to minimize the impacts to sensitive habitats and fishery operations (Alternatives B and E) where location is critical in determining the scale scope and nature of impacts. Impacts to habitats on Cholora Bank and operations for squid and scallop fisheries will vary under each alternative but this is not reflected in the analysis. This lack of meaningful differentiation between alternatives leads BOEM to conclude that there is little to no difference between the effects of the proposed action and any other action alternatives. We disagree with the general conclusion that impacts to NOAA trust resources and fishing operations/communities would be the same among all alternatives considered; impact minimization alternatives have been developed in a manner that NMFS expects will result in a measurable and meaningful reduction in substantial impacts to various resources. These meaningful distinctions should be clearly reflected in impact conclusions and identified and disclosed in the comparative analysis</p>	<p>Additional analysis of impacts on squid and scallop fisheries under Alternatives B, E, and F that propose modifications to the WTG array has been added to Final EIS Section 3.9.6.</p>

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<p>of alternatives. We have provided suggestions for how to clarify these distinctions and recommend BOEM incorporate them to ensure accuracy of its analysis.</p>	
<p>Mitigation Measures As we have highlighted in past comments the evaluation and implementation of mitigation measures are critical components of the analysis in any NEPA document. We recommend the FEIS analyze and describe the anticipated impacts of the proposed action mitigation measures considered to be part of that action the effectiveness of these measures and the expected impacts if mitigation methods are applied. This structure is important to clarify the final impact determinations. An important element of that analysis is the likelihood that such measures will be required and implemented.</p>	<p>An analysis of proposed mitigation measures has been added to the mitigation section of each Chapter 3 resource section. Mitigation recommended for inclusion in the Preferred Alternative has also been identified and analyzed.</p>
<p>There are several instances where assumptions about the success of mitigation measures are made despite a lack of evidence. For example the fisheries compensation program is only briefly described and relies upon an evaluation of economic impacts that we have previously noted is incomplete as it does not analyze the full suite of potential impacts including those to non-federal fisheries shoreside support services and broader fishing communities. Further the document relies on the anticipated success of fisheries mitigation guidance that has not yet been finalized or implemented by BOEM. Despite these limitations the document concludes that fishery impacts would be reduced; a conclusion that is premature and unsupported. We recommend that the analysis in the FEIS analyze the effectiveness of mitigation measures or recognize the limitations of the analysis and not presume a reduction of fishery impacts based on the record developed so far.</p>	<p>A BOEM-proposed measure for fisheries mitigation based on current fisheries mitigation guidance has been added to Final EIS Appendix H and Section 3.9.11.</p>
<p>The DEIS also still contains sections where BOEM is relying on mitigation measures to reduce impacts but does not specify which of these measures if any are factored into the impact determination. While we understand that a final commitment to additional measures cannot be made until the ROD and COP approval decision stage the FEIS should be explicit as to what additional mitigation measures are anticipated to be required beyond the applicant's proposed measures and which measures were relied on in reaching the impact conclusions.</p>	<p>Mitigation recommended for inclusion in the Preferred Alternative is identified and analyzed in the Final EIS.</p>
<p>Analytical Issues During our review of the PDEIS in September we highlighted several analytical issues that we recommended be</p>	<p>Comment acknowledged.</p>

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<p>addressed prior to publication of the DEIS. We found that several of the analytical comments we made during that review have not been addressed in the DEIS. In addition to addressing the comments herein and in the attached spreadsheet we recommend additional review of our PDEIS comments so these issues can be resolved in the FEIS.</p>	
<p>Geographic Scale and Significance Criteria: Additional elements of the DEIS contribute to the lack of distinction among alternatives including the scale of the geographic area analyzed for each resource and the significance criteria definitions and their application to the various resources. The DEIS should analyze project impacts within the bounds of an appropriate geographic scale to allow for a meaningful understanding of effects to each resource from Impact Producing Factors (IPF). A geographic analysis area that is too broad may not predict the direct and indirect effects of the proposed action on a finer scale defined by the IPF. The significance criteria for some resources in combination with the defined area of analysis for each resource do not adequately consider variations in the intensity or scale of impacts and how these factors may affect resources at the project regional or population levels. The importance of the seasonal timing or temporal duration of impacts to resources is not clearly explained through the significance criteria or applied to the analysis. Overall the analysis does not provide a clear picture of what the effects of those spatial impacts and temporal losses mean for NOAA trust resources and the communities that rely on them. Consideration of both the scale and intensity of impacts in the definition and application of the significance criteria is necessary to support accurate impact conclusions and provide clear distinctions among action alternatives. This approach should be applied to the FEIS to ensure the benefits and drawbacks among the alternatives are clearly understood and meaningfully analyzed.</p>	<p>The rationale for the geographic extent of the geographic analysis area for each resource is explained in the introduction to each Chapter 3 resource section. In general, resources with more localized impacts (i.e., benthic resources) have a smaller geographic analysis area while the geographic analysis area for species that are highly mobile (i.e., marine mammals, sea turtles, and fish) are broader to include the movement range of species that could be affected.</p> <p>Section 3.3 defines the terminology used throughout the EIS to characterize the duration of impacts as short term (effects that may extend up to 3 years), long term (effects that may extend between 3 years and 35 years or the life of the Projects), or permanent (effects that extend beyond the life of the Projects).</p> <p>BOEM uses a four-level classification scheme to characterize the potential impacts of the alternatives. Resource-specific impact level definitions are presented in each resource section, and the impacts of each alternative align with the appropriate impact level, as supported by the analysis.</p>
<p>Support for Conclusions: Consistent with comments raised on the PDEIS in many instances the DEIS does not incorporate and/or consider the best available scientific information to support impact determinations. This results in mischaracterization of both NOAA trust resources and fishing operations as well as the anticipated project impacts to those resources and ocean users. While the DEIS includes some additional references and discussion of resources the document is not comprehensive and does not apply those findings to an</p>	<p>The discussion in Section 3.13.3.2 was revised to better incorporate the recent peer-reviewed literature relevant to stratification and the Mid-Atlantic Cold Pool. This includes a discussion on modification to wind-driven waves and currents by van Berkel et al. (2020). However, based on best available science, only a few species have been irrefutably identified as vulnerable to disruptions in Mid-Atlantic Cold Pool dynamics (e.g., Hofmann et al. 2018; Miller et al. 2016; Able et al. 2014). It has been difficult to irrefutably attribute environmental</p>

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<p>examination of the proposed action and alternatives. As a result conclusions in the document related to impact determinations lack supporting rationale. An example of this is the analysis of impacts from oceanographic wake effects and hydrodynamic changes from the presence of structures. Although the DEIS appears to include some updated peer-reviewed literature related to oceanographic wake effects from offshore wind projects the findings are not appropriately applied to the proposed project and potential impacts of the project on regional habitats (e.g. the Mid-Atlantic Cold Pool) protected species and fisheries. The best available science suggests that wind wakes may have broad- scale effects on biological and physical oceanography with implications for all trophic levels and this should be updated and reflected in the FEIS analysis.</p>	<p>conditions to the populations/recruitment of other species (see Myers 1998; Sissenwine 1984). A paragraph was added to Section 3.13.3.2 that identifies potential vulnerable populations to disruptions in the Cold Pool while noting that climate change is also a problem, and one that offshore wind aims to mitigate. The potential impacts from the Proposed Action alone are expected to be negligible, as determined in Section 3.13.5.3, given the scale of the Projects and uncertainty. Cumulative impacts that consider all other planned wind energy projects as well as existing conditions were determined to be moderate adverse as stated in Section 3.13.5.2.</p>
<p>We recommend BOEM thoroughly review the rationale for each impact level conclusion to ensure conclusions are fully supported by the text and to ensure consistency within the document and where appropriate with the analyses presented in other wind NEPA documents. For example the baseline No Action impact conclusion level for all marine mammal species is moderate despite healthy populations of marine mammals existing under baseline conditions. As detailed in the attached comments there are also several places in the DEIS where we identified inconsistent rationale for an impact level conclusion or where conclusions are inconsistent with text elsewhere in the document. When comparing across DEISs the reason for the difference in impact levels from the same IPF in the same area affecting the same resources is unclear in some cases. These inconsistencies within and among EISs should be resolved.</p>	<p>The impact of the No Action Alternative on marine mammals has been refined in Section 3.15 of the Final EIS to conclude minor impacts for odontocetes and pinnipeds (as adverse impacts on individuals may occur but population-level effects are not anticipated) and moderate impacts for mysticetes, as some species may experience population-level effects due to impacts on individuals.</p>
<p>Missing Analyses: There continue to be important analyses and conclusions that are absent from the DEIS many of which were identified in our PDEIS review. We continue to encourage BOEM to include an analysis of impacts to shoreside support services and fishing communities due to changes to fishing operations resulting from the proposed action. Such an analysis is necessary to ensure that all expected impacts are fully documented and that any potential fishery compensation funds developed as a mitigation measure are sufficient to address future claims. As BOEM notes in its draft fisheries mitigation guidelines there are existing methods that can be used to estimate impacts to shoreside support services and affected</p>	<p>BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>



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<p>communities. Such methods and resulting analysis should be included in the FEIS to be consistent with BOEM guidelines indicating any compensation should be based on documented impacts. We contend that incorporation of such an analysis in the FEIS instead of a separate cumulative analysis is within the scope of and consistent with NEPA and would provide BOEM with the information needed to make an informed decision regarding this project and to provide the public with the information needed to meaningfully participate in the process. NOAA staff are available to assist with the development of such an analysis.</p>	
<p>The DEIS is also missing project level and cumulative analyses related to marine resources and fisheries. For example impacts to marine resources from oceanographic changes (e.g. wind- wake effects) from project operation are primarily discussed in the benthic resources section and the analysis does not take a hard look at project level or cumulative effects of project operation on oceanographic features in this region. The document is also missing an analysis of impacts from nighttime pile driving which Empire Wind recently requested now be a component of the proposed action. The DEIS does not include a comprehensive cumulative impact evaluation for fishing operations affected by this project. Data describing project-specific contributions to anticipated regional cumulative fisheries impacts are available and should be included in the FEIS.</p>	<p>The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives. Specifically, refer to Section 3.6 for cumulative impacts on benthic resources; Section 3.9 for cumulative impacts on commercial fisheries; Section 3.13 for cumulative impacts on finfish, invertebrates, and EFH; Section 3.15 for cumulative impacts on marine mammals; and Section 3.19 for cumulative impacts on sea turtles. As discussed in response to comment BOEM-2022-0053-0149-0019, content has been added to the cumulative impacts analysis on commercial fisheries in Section 3.9.5.2.</p> <p>Empire confirmed with BOEM that it does not intend to utilize nighttime pile driving.</p>
<p>NOAA Scientific Surveys. As we have discussed previously we have significant concerns related to the major impacts offshore wind will have on our NOAA scientific surveys. The DEIS does not include any discussion or details on how these major impacts will be mitigated at the project level other than referencing the ongoing BOEM/NMFS survey mitigation efforts. However the mitigation strategy is not currently resourced and does not set requirements or standards with which projects must comply. In order to minimize the major adverse impacts expected on scientific surveys we recommend mitigation measures be required and implemented before development moves</p>	<p>BOEM has committed to working with NOAA to implement the Federal Survey Mitigation Strategy program (<a href="https://repository.library.noaa.gov/view/noaa/47925">https://repository.library.noaa.gov/view/noaa/47925</a>). As of May 2023, implementation is pending. As discussions between BOEM and NOAA on implementation of the program continue, specific details of appropriate mitigation measures will be added to the environmental analysis.</p>

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<p>forward consistent with our joint survey mitigation efforts. We will continue to work with you to ensure these details can be included in the FEIS.</p>	
<p>South Brooklyn Marine Terminal Port infrastructure improvements at the SBMT are planned for the purpose of upgrading the facility to enable it to serve as a staging facility and operations and maintenance (O&amp;M) facility to support the Project; this includes dredging bulkhead improvements additional wharves and construction of an O&amp;M facility. We previously highlighted issues regarding the SBMT and provide additional comments in the attached spreadsheet. We have also provided technical assistance comments to the U.S. Army Corps of Engineers New York District in response to their three Public Notices (NAN-2022-0900-EMI; NAN-2022-0901-EMI; NAN-2022-0902-EMI) for the actions. We recommend you review this information and use it to improve the analysis in the FEIS.</p>	<p>Comment acknowledged.</p>
<p>Contaminated sediments are prevalent in the Lower Bay Gravesend Bay The Narrows Upper Bay Gowanus Bay and the East River. Based on our review the DEIS inaccurately minimizes potential impacts of contaminated sediment dispersal/resuspension from dredging at the SBMT and from the use of the mass-flow excavator for pre-sweeping activities proposed at a number of locations along the export cable route to the SBMT. Additionally the DEIS does not fully describe and address all of the potential accessory actions (e.g. upland disposal offshore disposal capping with clean material) related to contaminated sediment removal/remediation.</p>	<p>The commenter does not state specifically how the Draft EIS inaccurately minimizes potential impacts of contaminated sediments being resuspended at SBMT. BOEM provided an assessment of potential water quality impacts in Section 3.21.5.1, <i>Impact of the Connected Action</i>, based on the available information BOEM has (note that SBMT improvements are not part of the Proposed Action or proposed by Empire). While contaminated sediment would be disturbed and removed, NYCEDC, who is the actual proponent of the SBMT work, would need to obtain all CWA permits, including Section 404 and Section 402 Water Quality Certification, to ensure water quality impacts are limited and standards are not exceeded. In addition, for onshore work, NYCEDC would need to obtain a CWA Section 402 National Pollutant Discharge Elimination System permit from NYSDEC to ensure water quality standards are not exceeded during onshore construction. Impacts on other resources from disturbing this contaminated sediment can be found in other EIS sections (e.g., Section 3.6, <i>Benthic Resources</i>).</p> <p>Regarding contaminated sediment disposal and capping, BOEM has no detailed information from NYCEDC on this. However, as stated in various sections of the EIS, the dredged material would be transported by barge for disposal at a licensed facility in accordance with all regulations and permit requirements. BOEM also assumes that</p>

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	capping (with clean material) would be conducted per regulations and requirements.
<p>The DEIS (section 3.15.5.1) also indicates that marine mammals are not present in the area affected by the SBMT project; NMFS disagrees as species such as seals and humpback whales may occur in the area (Rosenbaum et al. 2021[Footnote 1: Rosenbaum H. 2021. Assessing Cetacean Presence in the New York Harbor Using Passive Acoustic Monitoring. Final Report to the Hudson River Foundation: January 2021. Available at: <a href="https://www.hudsonriver.org/wp-content/uploads/2021/08/WCS-Final-Report-New-York-Cetaceans-2021.pdf">https://www.hudsonriver.org/wp-content/uploads/2021/08/WCS-Final-Report-New-York-Cetaceans-2021.pdf</a>). We request that our input be incorporated in the FEIS to accurately describe the resources in the project area address all potential actions and resulting impacts from activities at the SBMT and energy transmission to the SBMT including those related to contaminated sediments and habitat conversion or loss due to the dredging and filling activities at SBMT.</p>	<p>Information from Rosenbaum et al. 2021 and new information from the March 13, 2023 request from NYCEDC has been incorporated into the discussion of the connected action in Section 3.15.5.1.</p>
<p>We continue to have outstanding concerns about the Empire Wind DEIS as highlighted in this letter and in our attached technical comments and we welcome the opportunity to discuss them further with BOEM. We are committed to achieving the Administration's goals of expeditiously developing renewable offshore wind energy in a manner that is sustainable and conserves marine resources. We urge you to carefully review these comments and those in the attachment and address these significant issues prior to issuing the FEIS.</p>	<p>Comment acknowledged.</p>
<p>Section: S PDF Page: 8 Comments: Please add NMFS' "Need" so that the ES matches the text in Chapter 1. The NMFS paragraph should read "In addition the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) received a request for authorization to take marine mammals incidental to construction activities related to the Projects which NMFS may authorize under the Marine Mammal Protection Act (MMPA). NMFS's issuance of an MMPA incidental take authorization is a major federal action and in relation to BOEM's action is considered a connected action (40 CFR 1501.9(e)(1)). The purpose of the NMFS action—which is a direct outcome of Empire's request for authorization to take marine mammals incidental to specified activities associated with the Projects (e.g. pile driving)—is to evaluate Empire's request under the requirements of the MMPA (16 USC 1371(a)(5)(D)) and its</p>	<p>Revised as requested.</p>

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<p>implementing regulations administered by NMFS and to decide whether to issue the authorization. NMFS needs to render a decision regarding the request for authorization due to NMFS's responsibilities under the MMPA (16 USC 1371(a)(5)(A and D)) and its implementing regulations. If NMFS makes the findings necessary to issue the requested authorization NMFS intends to adopt after independent review BOEM's Final EIS to support that decision and to fulfill its NEPA requirements."</p>	
<p>Section 1.2 PDF Page: 44 Comments: Please add "construction" in the first sentence so that it reads as follows: "In addition the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) received a request for authorization to take marine mammals incidental to construction activities related to the Projects which NMFS may authorize under the Marine Mammal Protection Act (MMPA)."</p>	<p>Revised as requested.</p>
<p>Section 1.6 PDF Page: 48 Comments: This section reads as though it is only focusing on the assessing of impacts from the baseline and planned activities but does not specifically call out the impacts resulting from the proposed action or the alternatives. Please add "impacts from the proposed action and alternatives" to the first sentence in the paragraph under 1.6 starting after the word "assesses".</p>	<p>Revised as requested.</p>
<p>Section 2.1.1 PDF Page 2.4 Comments: Please revise Section 2.1.1 (No Action Alternative) to be consistent with the text developed during the Ocean Wind review process.</p>	<p>Revised as requested.</p>
<p>Section 2.1: PDF page: 49 Comments: Please change the third sentence from "to be infeasible or did not meet the purpose and need)" to "to be infeasible or did not meet BOEM's purpose and need)" to be congruent with other EISs currently under review.</p>	<p>This has been revised to "to be infeasible or did not meet the stated purpose and need."</p>
<p>Section: 3.2 PDF Page: 112 Comments: If a mitigation and/or monitoring measure is included in the impacts analysis for any given resource and if the inclusion of that measure impacts the finding of that analysis for a specific alternative it would have to be included in the preferred alternative and ROD in order for the assumptions and findings of the impact analysis to be valid. Please delete sentence that starts "BOEM may choose to incorporate one or more of these. ". Please add "Where the impacts of an action alternative are</p>	<p>Revised as requested.</p>

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<p>determined through the inclusion of any mitigation and monitoring measures all of those measures will be incorporated in the ROD if that alternative is selected."</p>	
<p>Chapter 3.6 – Benthic Resources Section: Global PDF Page: Comments: Impacts from mobilizing contaminated sediments (and exposing habitats and organisms to contaminants) should be comprehensively addressed. Additionally accessory actions (upland disposal over dredging and capping open ocean dumping) related to removal/remediation of contaminated sediments should also be comprehensively addressed.</p>	<p>Further information about the dispersion of contaminated sediments due to cable laying along the EW 1 export cable corridor and impacts on benthic organisms has been added to Section 3.6, <i>Benthic Resources</i>. Dredged sediments would be deposited into scows; allowed to settle for 24 hours prior to on-site dewatering (decanting), adhering to regulations and permit requirements; and then transported to an appropriately permitted upland disposal site for the contaminants that are present. Sediment capping is discussed in Section 3.6.5.1. No open ocean dumping is anticipated for the Projects.</p>
<p>Section: 3.6 PDF Page: 146 Comments: This comment is noted here and in the tab for Section 3.9 (Commercial Fisheries) because it applies to both and uses examples for impacts to both benthic habitat and fisheries. To allow for a clear distinction among alternatives it is imperative that the DEIS should thoroughly analyze the impacts of the proposed action and contain sufficient information to differentiate the impacts of each action alternative. Rather than using this approach in several instances the document focuses on analyzing impacts of the proposed action while providing relative impacts for the other alternatives often with mostly qualitative descriptions of potential impacts. If the proposed action differs from the preferred alternative or another alternative ultimately approved for this project there is the potential that the analysis of the approved alternative will be insufficient to accurately characterize the potential realized impacts of the approved action. This is particularly important for alternatives intended to minimize the impacts to sensitive habitats and fishery operations (Alternatives B and E) where location is critical in determining the scale scope and nature of impacts. For example removing turbines from Cholera Bank under Alternative B reduces impacts to unique benthic features and associated complex habitat as well as the squid fishery. However placing turbines in Cholera Bank under Alternatives A and F would increase such impacts while turbines in the setback area would increase impacts on the scallop fishery. We recommend that BOEM ensure the FEIS includes sufficient information to accurately describe the impacts of all alternatives and facilitate the comparison of impacts among alternatives.</p>	<p>Impacts of the various alternatives on fisheries are discussed in Section 3.9, <i>Commercial Fisheries and For-Hire Recreational Fishing</i>. The ecological importance of Cholera Bank is mentioned in Section 3.6.6; however, information regarding the scallop beds near the WTG positions that would be removed in Alternative E, as well as a comparison of Alternatives E and F, has been added to the text.</p>



Comment	Response
Chapter 3.9 – Commercial and Recreational Fishing Section: Global PDF Page: Comments: Please ensure that updated data from the September 2022 data request are incorporated into the FEIS.	Updated data from the September 2022 data request have been incorporated throughout the Final EIS.
Section: 3.9.1.2 PDF Page: 189 Comments: Please update data used in this section to also include party/charter vessel trip report data available on our website ( <a href="https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/WIND/WIND_AREA_REPORTS/rec/OCS_A_0512_Empire_Wind_rec.html">https://www.greateratlantic.fisheries.noaa.gov/ro/fso/reports/WIND/WIND_AREA_REPORTS/rec/OCS_A_0512_Empire_Wind_rec.html</a> ) for the entire lease area or for each project area via your September 2022 data request. This will provide more accurate information regarding party/charter fishing activities in the lease area than MRIP data due to the more accurate spatial data provided by vessel logbooks	Updated party/charter vessel trip report data from the September 2022 data request have been incorporated into the Final EIS.
Section: 3.9.3.2 PDF-Page: 196 Comments: Under cable emplacement and maintenance please revise impact conclusions to moderate instead of minor to be consistent with the impact conclusions in Table 3.9-28. While short-term and localized cable emplacement would disrupt fishing activities during installation and maintenance and before burial. Such activities would have no measurable impacts once the activities end if proper remedial action is taken such as burying cables to depth and through a communication plan identifying times and locations when such activities would occur which has become a standard mitigation measure in nearly all project EISs. Thus the impacts are more accurately characterized as moderate as defined in Table 3.9-28.	The impact designation for cable emplacement has been revised to moderate.
Section: 3.9 PDF Page: 203 Comments: This section should also list foundation locations as a parameter that would influence the magnitude of the impacts. Similar to landfall location where turbine foundations are placed affects impacts to commercial and for-hire fisheries. For example turbines placed in and around Cholera Bank would not only affect fisheries habitat but fishing operations on such habitat. Impacts would be reduced if turbines are placed elsewhere and discrete alternatives considered for this actions place turbines in different locations resulting in different impacts. Therefore the location parameter should be considered and discussed in this section.	Location has been added as a parameter that would influence the magnitude of impacts.
Section: 3.9.5 PDF Page: Comments: We are resubmitting a comment from the cooperating agency review of the PDEIS regarding the need for an evaluation of shoreside support service impacts and community	BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses.

Comment	Response
<p>dependence in this section. Our previous comment follows: "This section of the DEIS should include a more thorough evaluation of portside support services and community dependence on fishing. There is only one sentence on the bottom of page 3.9-60 indicating that shoreside businesses such as seafood processors may be impacted. This is insufficient and should be expanded to fully describe the affected environment for commercial and for-hire fishery operations to set the stage for evaluating impacts to fisheries and associated communities. According to BOEM's Draft Mitigation Guidance impacts to shoreside support could be compensated but must be included in the EIS to be considered for compensation. NMFS continues to strongly recommend BOEM integrate data regarding shoreside support businesses and port communities into project EISs and has provided references to support that effort. We are available to further assist as necessary. Please see the Quarterly Census of Employment and Wages: US Department of Labor Bureau of Labor Statistics. <a href="https://www.bls.gov/cew/home.htm">https://www.bls.gov/cew/home.htm</a>) and the number of non-employer entities Nonemployer Statistics: U.S. Census Bureau. <a href="https://www.census.gov/programs-surveys/nonemployer-statistics.html">https://www.census.gov/programs-surveys/nonemployer-statistics.html</a>); For each seafood industry business code NAICS Industry Codes: 3117 (Seafood product preparation and packaging) 44522 (Fish and seafood markets) 42446 (Fish and seafood merchant wholesalers) please provide the following: (1) Number of fisheries shoreside support service companies (by county and/or city) (2) Number of employees in seafood sectors by county (by county and/or city) (3) Average annual wages (4) Location quotient for employment and wages. See also data from the Fisheries Economics of the US data tool for the region <a href="https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states#">https://www.fisheries.noaa.gov/data-tools/fisheries-economics-united-states#</a> that describes the regional economic value of fisheries including sales value added and number of employees by state."</p>	<p>Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>
<p>Section: 3.9.5 PDF Page: 205 and 217Comments: Under cable emplacement and maintenance please insert a discussion of mobile gear impacts similar to the text on page 3.9-64 is necessary to complement the discussion of fixed gear impacts at the bottom of page 3.9-49. The last paragraph notes impacts to both fixed and mobile gear but only presents data for fixed gear operations. Also please revise the impact conclusions to "moderate" to be consistent with</p>	<p>A discussion of mobile gear impacts from cable emplacement that complements the discussion of fixed-gear impacts has been added to Section 3.9. The impact conclusion has been revised to moderate. A discussion of gear entanglement risks associated with boulder relocation prior to cable installation has been added to Section 3.9.</p>

Comment	Response
<p>Table 3.9-28 given the numerous mitigation measures discussed on page 3.9-60. If mitigation measures are necessary impacts are more than minor according to this table. Also please insert a discussion of the potential of boulder clearance/removal to increase the potential for gear loss/damage due to changing locations of existing or creating new potential snags. As described elsewhere gear damage could result in costs to repair and replace gear as well as lost fishing opportunity and associated revenue.</p>	
<p>Section: 3.9.5 PDF Page: 218 Comments: Under noise please note that injuries to sedentary shellfish species are not expected to be minimal. While finfish can reduce impacts to noise by leaving the ensonified area sedentary shellfish species such as surfclams or scallops are limited in their escapement behavior. Thus their impacts could be much higher than for finfish assuming the radius of injurious impacts is similar to that for small fish in the winter (2.5-2.7 miles) which is well beyond the likely movement area for even motile shellfish species like scallops. This is particularly important given the density of historic scallop fishing activity (and presence of scallops) in EW1 and EW2 as depicted in Figure 3.9-19. Injury and mortality of scallops could result in higher impacts to fishing activity by reducing catch levels and quality of harvested product which should also be discussed in this section.</p>	<p>A discussion of noise-related impacts on sedentary shellfish, with an emphasis on scallops, has been added to Section 3.9.</p>
<p>Section: 3.9.5 PDF Page: 219Comments: Under noise this section should note other impacts from noise such as sound pressure particle motion and vibration. Studies have found that longfin squid can be harmed by sound pressure and finfish can respond to particle motion. Noise and vibration from turbine installation and operation can cause sessile species such as surfclams and scallops to close their shells for prolonged periods reducing respiration and feeding activities which could adversely affect these species and associated commercial fisheries (see Roberts et al. 2015 and Elliott 2017). See our previous comments on other actions (e.g. Ocean Wind) for additional resources.</p>	<p>Discussion of the ability of invertebrates to sense particle motion and the potential for sound to interfere with respiration and feeding in bivalves has been added to Section 3.9.</p>
<p>Section: 3.9.5 PDF Page: 220 Comments: Under presence of structures include a discussion of the impacts of boulder clearance/removal and any associated mitigation measures. As noted above boulder relocation will present potentially new snags which could lead to gear damage/loss and impacts to fishing operations.</p>	<p>Text has been added under presence of structures to discuss the increased risk of gear loss or damage from boulder relocation.</p>

Comment	Response
<p>Section: 3.9.5 PDF Page: 221 Comments: Please note the limitations of the revenue exposure data included in this table. As we discussed in our cooperating agency comments (see NMFS Comment 1) and comments on other projects this and similar tables only represent federally permitted vessels. Such data do not represent a census of all fishing activity that may be affected by this and other related actions. While footnotes were included to indicate they represent data from permits issued by the Greater Atlantic Regional Fisheries Office in response to our cooperating agency comments such footnotes do not convey the limitations discussed in this comment and our previous comment. This table and associated discussion does not include an evaluation of shoreside support service impacts from reductions in fishing activity in the project area and the associated impacts to port communities. Such an analysis is also needed as identified in our comments (see NMFS Comment 6). In the response to our cooperating agency review comments BOEM indicated that such an analysis is beyond the scope of an EIS and that BOEM will consider conducting a separate cumulative analysis. We disagree. An EIS is the precise place for such a project-specific and cumulative analysis of community impacts and encourage BOEM to include an analysis of shoreside support services impacts consistent with methodology outlined in BOEM's draft mitigation guidance (e.g. INPLAN models and other methods) or through additional consultation with NMFS experts. Assuming this table would be used to support any fishery compensation estimates that may be negotiated pursuant to BOEM's draft fishery mitigation guidance such limitations must be accurately articulated to ensure any negotiations consider the limitations when estimating compensation needs. As presented this table would likely underrepresent such needs. Further as we noted in Comment 31 we do not advise using 2007 data. BOEM indicated that data would be excluded yet it remains in this table in the latest version of the DEIS. Please remove such data from this or similar tables for the FEIS.</p>	<p>A sentence has been added to Section 3.9 to indicate that the revenue exposure analysis was limited to data collected from federally permitted vessels and therefore does not represent a census of all fishing activity that may be affected.</p>
<p>Section: 3.9.5 PDF Page: 222 Comments: Please provide further analysis to support the conclusions that impacts to shoreside support services would be minimal to "considerable" and define the term "considerable." There is no link to port-specific information to substantiate this impact conclusion. Instead a general statement about low overall regional landings/revenue proportions is offered. While this</p>	<p>The analysis in Section 3.9 has been expanded to discuss the variation in revenue exposure among fishing ports. Text has been revised to highlight the variation in impacts across individuals, ports, and fisheries: "Considering the high level of variation in revenue risk across ports and across permit holders, the impacts on fishermen and other fishing industry sectors, including seafood processors and</p>

Comment	Response
<p>project may have low overall contributions to regional landings and revenues operations in the project area could have substantial impacts to affected communities. This section should at least reference port-specific analysis to justify this conclusion. An evaluation of commercial/party-charter annual landings/revenue within the project area compared to total annual port-specific landings/revenue would illustrate dependence upon fishing within the project area and whether community and shoreside support service impacts are in fact minimal or more substantive. Finally defining the term "considerable" is necessary for the reader to understand what level of impact this means relative to the impact categories listed in Table 3.9-28 as this term is not used before.</p>	<p>distributors, would be long term and minimal to major, depending on the permit holder, fishing port, and fishery in question.”</p>
<p>Section: 3.9.5 PDF Page: 222Comments: Please update this text to reflect annual party/charter data that are available for this project area on our website and through the September 2022 data request submitted by EIS contractors. Using data from 2012 is outdated and does not reflect recent fishing activity.</p>	<p>This text has been revised to rely on the recreational fisheries data from the September data request.</p>
<p>Section: 3.9.5 PDF Page: 223Comments: Please note that the introduction of hard bottom and structures into spawning areas used by squid on Cholera Bank could pose impacts to the species and therefore the fishery</p>	<p>Additional discussion of potential impacts on squid on Cholera Bank has been added to Section 3.9.</p>
<p>Section: 3.9.5.2 PDF Page: 224Comments: Please provide additional justification to support impact conclusions other than the total regional proportion of project impacts components (i.e. percentage of seabed acres disturbed relative to total seabed disturbed by other projects or regional acreage). Area and timing of impacts matter as does collective interactions of this project with other adjacent and regional projects. For example seabed disturbed in spawning areas or areas of high overlap with fishery operations have greater impacts than other areas of less importance to fisheries or individual species. This should be discussed in this section to enable the reader to appreciate the actual relative contribution of project impacts. There is minimal information presented in this section to support impact conclusions. Further there is no discussion of the cumulative socioeconomic impacts of this project in relation to regional fisheries operations. This must be included in the FEIS and referenced in this section and 3.9.5.3 as it is possible to estimate project-specific contributions to cumulative impacts of regional wind projects. For example see the</p>	<p>Additional discussion of affected areas in the context of commercial fishing activity has been added to the cumulative impacts section. Discussion of impacts on spawning areas is more relevant to Section 3.13, <i>Finfish, Invertebrates, and Essential Fish Habitat</i>. The area of impacts under the Proposed Action is not expected to overlap with other offshore wind projects, such that interactions are not anticipated. A discussion of the cumulative socioeconomic impacts has been added to this section.</p>



Comment	Response
<p>"Species Dependence" section of our commercial reports for each lease area available on our website. Similar data can also be derived from the project data request for evaluation by port and state.</p>	
<p>Section: 3.9.5.2 PDF Page: 224Comments: As we noted during our cooperating agency review please include a table similar to PDEIS Table 3.9-29 with future offshore wind development with ports in order to evaluate the total annual landings/revenue from each port that were landed from the project areas. For example divide average annual species landings in a particular port from within the project areas by the average annual total species landings in that port from all areas (i.e. including outside of the project areas). This more accurately reflects the dependency of particular ports on the project area than comparing landings from the project area in one port to total regional landings from ME to NC. The approach in these tables artificially dilutes the port dependence estimates by comparing port-specific project landings to cumulative regional landings in all ports. BOEM's response to this comment suggested that a separate cumulative impact analysis for all offshore wind projects would be conducted. However we contend that each project EIS should contain an adequate and cumulative analysis of impacts from all offshore wind projects as required by NEPA. Such an analysis is possible based on available data and we are happy to assist with evaluating cumulative fisheries impacts.</p>	<p>Revenue exposure of fishing ports across all OCS wind energy areas is not currently available. BOEM does not anticipate that these data will be available before the Final EIS is published.</p>
<p>Section: 3.9.6 PDF Page: 225Comments: Please provide additional detail to differentiate the impacts between the various alternatives relative to the proposed action Alternative A and other alternatives. The first paragraph indicates impacts among all alternatives would be the same but then describes how the alternatives would result in different impacts to fisheries operations. The discussion differentiating the alternatives does not go far enough to describe the unique elements that would alter the impacts between alternatives. For example the description of Alternative F notes that it may allow for the expansion of fishing due to the removal of turbines in the southeast portion of EW1. However the description of Alternative F fails to note that or the fact that it would place turbines in the northwest corner of EW1 on Cholera Bank where turbines would be removed under Alternative B and in the transit area identified by Alternative E. In doing so Alternative F would eliminate any benefits associated with</p>	<p>Additional text comparing Alternatives B, E, and F has been added to Section 3.9.6.</p>

Comment	Response
<p>squid spawning habitat conservation and increased fishing area on Cholera Bank associated with Alternative B and eliminate the transit lane and benefits to fishing operations from Alternative E for vessels that transit EW1/EW2 to fish in other areas. These impacts must be noted so the reader can effectively appreciate the different impacts that may result from any individual alternative or a combination of alternatives. For example Alternatives B and E cannot be selected in combination with Alternative F. That too must be noted in this section.</p>	
<p>Section: 3.9.6 and 3.9.6.1 PDF Page: 225-227 Comments: In both Sections 3.9.6 and 3.9.6.1 please include information to justify the cumulative negligible to moderate impact conclusions for Alternatives B E and F. There is no description of how these alternatives would impact individual IPFs to warrant these conclusions relative to the impact definitions in Table 3.9-28 other than general reference to fewer turbines than the proposed action. Given this section notes that these alternatives would not be substantially different than the impacts from the proposed action the impact range should more consistently be recorded as negligible to major without additional information as that is how the proposed action is characterized. These same comments generally apply to Section 3.9.7 and 3.9.7.1 for Alternatives C D and G.</p>	<p>Text has been added to Sections 3.9.6 and 3.9.7 to describe how IPFs would be affected by the alternatives. The alternatives are not expected to change any of the impact designations for individual IPFs even though some IPFs may be reduced or increased under certain alternatives.</p>
<p>Section: 3.9.6 PDF Page: 226 Comments: This comment is noted here and in the tab for Section 3.6 (Benthic habitat) because it applies to both and uses examples for impacts to both benthic habitat and fisheries. To allow for a clear distinction among alternatives it is imperative that the DEIS should thoroughly analyze the impacts of the proposed action and contain sufficient information to differentiate the impacts of each action alternative. Rather than using this approach in several instances as detailed in the attached comment spreadsheet the document focuses on analyzing impacts of the proposed action while providing relative impacts for the other alternatives often with mostly qualitative descriptions of potential impacts. If the proposed action differs from the preferred alternative or another alternative ultimately approved for this project there is the potential that the analysis of the approved alternative will be insufficient to accurately characterize the potential realized impacts of the approved action. This is particularly important for alternatives intended to minimize the impacts to sensitive habitats and fishery operations (Alternatives B</p>	<p>The discussion of the alternatives has been expanded to highlight the key fisheries that would be affected by each alternative and to discuss any IPFs that would be measurably different among alternatives.</p>

Comment	Response
<p>and E) where location is critical in determining the scale scope and nature of impacts. For example removing turbines from Cholera Bank under Alternative B reduces impacts to unique benthic features and associated complex habitat as well as the squid fishery. However placing turbines in Cholera Bank under Alternatives A and F would increase such impacts while turbines in the setback area would increase impacts on the scallop fishery. We recommend that BOEM ensure the FEIS includes sufficient information to accurately describe the impacts of all alternatives and facilitate the comparison of impacts among alternatives."</p>	
<p>Section: 3.9.9 PDF Page: 229 Comments: Please allow for additional information beyond that contained in Table 3.9-31 to inform any compensation program that may be adopted under this action and temper conclusions about the effectiveness of this mitigation measure. As noted in a previous comment Table 3.9-31 does not fully capture all impacts to commercial fisheries operations shoreside support services and fishing communities associated with this project. As a result a potential compensation program that bases compensation funds on the impacts documented in that table would likely underestimate compensation funds necessary to reduce major impacts to moderate impacts with no measurable effects for affected entities. The description of this program itself suggests the program "could" mitigate indefinite impacts but that is not assured especially if it is not adopted. Consistent with our comments on BOEM's draft fisheries mitigation guidance impacts to all fishing vessels affected by a project and shoreside support services and fishing communities dependent upon fishing operations in a project area should be analyzed in the EIS and included in any potential compensation program. Further we have concerns about the efficacy of compensation programs that would not address impacts for the life of the project. BOEM's guidance to reduce compensation after five years is predicated on the ability of vessels to fish elsewhere. We contend that opportunities to fish in other locations particularly for the squid and scallop fishery affected by this project will be reduced over time due to the development of regional wind projects. Thus a program that would limit compensation for the first five years of a project would likely not be adequate to compensate for potential impacts particularly given fishing regulations and factors other than wind projects (i.e. safety profit margins risk behavior etc.)</p>	<p>BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>

Comment	Response
<p>can limit a vessel operator's ability to fish in other locations. Finally moderate impacts defined in Table 3.9-28 are those that have no measurable effects if proper remedial action is taken. As noted above if compensation needs are based on Table 3.9-31 compensation will likely be inadequate resulting in measurable effects even after remedial action is taken. Therefore it is more appropriate to retain the original impact conclusions as minor to major.</p>	
<p>Section: 3.1 PDF Page: 230 Comments: Please insert additional information differentiating impacts between alternatives as discussed in a previous comment and a discussion of impacts if alternatives are combined. The description in this section again focuses mostly on the overall number of turbines instead of where the turbine locations may change (areas of increase and decrease). For example the discussion of differences between Alternatives E and F doesn't recognize that Alternative E creates a transit lane but Alternative F does not because additional turbines are placed in the area in which Alternative E would remove turbines. We also disagree that Alternative F would result in the greatest reduction in impacts to commercial fisheries. As noted above while it opens up more area in the central portions of EW1 most fishing activity occurs in the NW section near Cholera Bank or in the SE portion and EW2. Therefore impact reduction for certain fisheries would not likely be as great as suggested. Instead a combination of Alternative B and E would likely have the greatest reductions to commercial fisheries impacts.</p>	<p>Text has been added to Sections 3.9.6 and 3.9.7 to describe how IPFs would be affected by the alternatives. The alternatives are not expected to change any of the impact designations for individual IPFs even though some IPFs may be reduced or increased under certain alternatives.</p>
<p>Chapter 3.13 – Finfish Invertebrates EFH Section: Global PDF Page: Comments: Impacts from mobilizing contaminated sediments (and exposing habitats and organisms to contaminants) should be comprehensively addressed. Additionally accessory actions (upland disposal over dredging and capping open ocean dumping) related to removal/remediation of contaminated sediments should also be comprehensively addressed.</p>	<p>The discussion on resuspension of contaminants was moved and is now a separate paragraph with an expanded discussion in Section 3.13.3.2. A summary of the overall findings of the contaminant dispersal study for the Projects was added to Section 3.13.5.</p>
<p>Comments: The Section fails to identify discuss and analyze impacts to important habitats including those in and around the SBMT. For example the document does not address the elimination of winter flounder spawning and nursery habitat through filling and dredging activities nor does it discuss impacts to overwintering striped bass habitat. The section should comprehensively identify discuss and analyze impacts to all species and habitats.</p>	<p>The Draft EIS discusses specific important habitats where appropriate (e.g., Cholera Bank), while impacts on other habitats are discussed broadly. A paragraph was added to Section 3.13.5.1 that discusses winter flounder spawning habitat near SBMT and defines potential impacts. A discussion on overwintering juvenile striped bass was also added to the same section and SBMT impacts are discussed relative to those considered for winter flounder egg and larval stages.</p>

Comment	Response
	Disturbances to bottom sediments from activities associated with SBMT are expected to be temporary and return to pre-dredging conditions prior to overwintering.
Comments: Discussion/analyses of atmospheric and oceanographic impacts (e.g. wind-wake effects) are extremely limited and should be greatly expounded upon. In this section biotic and abiotic (e.g. hydrodynamics nutrients) impacts should be evaluated and discussed. Additionally it appears the limited discussions/analyses are in the incorrect section.	The discussion on the impacts of wake effects on nutrients and hydrodynamics was added to Section 3.13.3.2. The discussion of presence of structures is an appropriate location for this discussion.
Chapter 3.15 – Marine Mammals Section: General PDF Page: Comments: NMFS recommends BOEM thoroughly review its analysis of IFPs driving all impact level determinations which currently apply to all marine mammals. We make this recommendation for any given impact level determination and across alternatives. For example the DEIS concludes that the impacts of the proposed action (baseline) is moderate for mysticetes due to presence of structures and associated gear entanglement in one paragraph but later indicates the presence of structures “moderate” impact finding is due to associated gear entanglement as well as displacement into areas with higher risk of vessel strike. In addition as noted below the No Action moderate determination for all marine mammals is primarily driven by vessel noise and vessel strikes despite a lack of data suggesting these IFPs are currently having a moderate impact on some marine mammal taxa.	Impact level determinations were reviewed and revised as necessary.
Section: 3.15.6-7 PDF Page: 387 Comments: The cumulative impact conclusions for Alternatives B E and F (negligible to minor) are less than the cumulative impact conclusions for the No Action alternative (moderate). Similarly Alternatives C D and G indicate BOEM's cumulative impact finding is negligible to moderate- also less than the No Action cumulative impact finding of moderate. It is unclear how project alternatives that include future OCS buildout could have less of an impact than the No Action alternatives especially in consideration of the fact the DEIS names the primary source of the moderate No Action impact finding as presence of structures and vessel traffic. Please clarify how these impact conclusions are reached.	It is the <u>contribution</u> of Alternatives B, E, and F to the combined impacts of all ongoing and planned activities that would be negligible to minor. The cumulative impacts are stated to be similar to the cumulative impacts described for the Proposed Action (i.e., moderate for mysticetes and minor for odontocetes and pinnipeds). Clarifying language has been added to make this conclusion explicit.



Comment	Response
<p>Section: 3.15.3.3 PDF Page: 376 Comments: The DEIS states that The No Action Alternative including ongoing non-offshore wind and offshore wind activities would result in moderate adverse impacts on marine mammals. Adverse impacts would result mainly from vessel noise and vessel traffic. It is unclear how BOEM has reached the "moderate" conclusion for all marine mammal species given that for some marine mammal species healthy (and increasing) populations exist under baseline conditions while for other species baseline conditions are a significant driver of population decline. It is also unclear how BOEM has determined that vessel noise and vessel traffic are the primary cause of adverse impacts to all marine mammal species and that these IPFs are the cause of the moderate finding for all marine mammal species. NMFS recommends BOEM reconsider its findings and as previously suggested make determinations based on general marine mammal groups (e.g. odontocetes pinnipeds mysticetes) and the current status of the generalized groups. BOEM could also further breakout mysticetes into NARWs and non-NARWs given the unique current status and focus of NARWs.</p>	<p>The section has been revised to provide separate impact determinations for each marine mammal group and additional explanation for each determination provided.</p>
<p>Section: 3.15.5 PDF Page: 379 Comments: Please provide the evidence (e.g. modeling methods and results) that supports the statement TTS could potentially occur if marine mammals remain in proximity to operating turbines for a 24-hour period." when source levels are estimated to exceed 170 dB rms. Also please quantify "proximity" - this could be 100 m or 10000m.</p>	<p>This information comes from Stöber and Thomsen (2021). A reference and quantification of proximity have been added.</p>
<p>Section: 3.15.5 PDF Page: 379 Comments: The DEIS relies solely on Stober and Thomsen 2021 for its operational noise assessment; however many caveats in that paper are not included in the DEIS. For example the DEIS cites a source level of exceeding 170dB; however the paper indicates that the data came from geared turbines and the shift from using gear boxes to direct drive technology (which NMFS understands but has not confirmed would be used for Empire Wind) is expected to reduce the sound level by 10 dB. This caveat is missing from the DEIS. The paper also indicates that because of the broadband measurement the authors' extrapolation includes ambient noise and might therefore overestimate the wind turbine generated noise especially for low noise levels at small nominal powers. In addition the results in that study have not been validated and were</p>	<p>This section has been revised to include more information on Stöber and Thomsen 2021, including the study limitations identified in the comment.</p>

Comment	Response
<p>based on a small sample size. Please include critical caveats such as these in the FEIS.</p>	
<p>Section: 3.15.5 PDF Page: 380 Comments: Maximum Estimated Acoustic Ranges to PTS Thresholds (SEL) do not match values in LOA application. Please resolve this discrepancy.</p>	<p>The acoustic ranges presented in Table 3.15-6 are consistent with Tables 16 and 17 in the Letter of Authorization application.</p>
<p>Section: 3.15.5 PDF Page: 381-382 Comments: Mean Number of Marine Mammals Predicted to Receive Sound Levels Above Injury and Behavioral Thresholds does not comport with values in LOA application. Please resolve this discrepancy.</p>	<p>The values presented in Table 3.15-8 are consistent with Table 27 in the Letter of Authorization application.</p>
<p>Section: 3.15.5 PDF Page: 382 Comments: The DEIS states "with no pile driving occurring between July and October" which is inconsistent with the LOA application. If Empire has indicated in their COP that they would not pile drive between July and October please contact NMFS PR1 to discuss this inconsistency.</p>	<p>The Draft EIS has been revised to ensure consistency with the seasonal pile-driving restriction in the Letter of Authorization application and acoustic modeling report.</p>
<p>Section: 3.15.5 PDF Page: 382 Comments: The DEIS indicates that there will be time of day restrictions on driving; however Empire has indicated to BOEM and NMFS their desire to not have daily temporal restrictions. Please ensure this is updated in the FEIS.</p>	<p>Section 11.2.2 of Empire's Letter of Authorization application, <i>Pile Driving Weather and Time Restrictions</i>, states, "Impact pile driving will commence only during daylight hours no earlier than one hour after (civil) sunrise. Impact pile driving will not be initiated later than 1.5 hours before (civil) sunset." Language in the section has been clarified to indicate the restriction applies to initiation of pile driving.</p>
<p>Appendix F Section: F.2 PDF Page: 123 Comments: The largest geographic analysis area identified in this EIS is the marine mammal geographic analysis area. It includes the entire east coast and the Gulf of Mexico. Only port improvement and dredging projects at the Port of Corpus Christi is included in this list. Please ensure that the impacts of the Port and any other potential activities are fully analyzed in the geographic analysis area impact assessment for each relevant resource.</p>	<p>Section F.2.6 also includes planned dredging and port improvements in New York, which captures the two geographies where other planned dredging and port improvements could interact with port utilization associated with the Proposed Action and contribute to cumulative effects. Other ongoing and planned port improvements and dredging projects in other geographies would affect the baseline condition and resource trends within the geographic analysis area but would not directly interact with the Projects. The description of port utilization was clarified in Section 2.1.2.2 of the EIS to state that only SBMT would be used for construction laydown and staging while the Port of Albany, Port of Coeymans, and a port in the Corpus Christi area could serve as the starting point for the transport of select Project components or materials. Impacts of port improvements and dredging at SBMT are assessed in detail for each Chapter 3 resource as a connected action and in EIS Appendix Q. Project activities associated with Port of Albany, Port of Coeymans, and the Corpus Christi area are limited to port utilization and vessel transits, and the cumulative</p>

Comment	Response
	<p>impact analysis related to these port activities focuses on the incremental contribution of the Projects to IPFs associated with port utilization (i.e., air emissions, noise, lighting) and the incremental contribution of proposed vessel transits on applicable resources associated with the primary IPFs of air emissions, accidental releases, and vessel traffic (including potential for vessel strike).</p>
<p>Appendix G (3.19 Sea Turtles) Section: 3.19.5.1 PDF Page: 403 Comments: The last sentence says the GARFO pile driving calculator was used to evaluate pile driving impacts to sea turtles. The updated NMFS Multispecies Calculator should be used instead and calculations redone (bottom of webpage under NMFS Acoustic Thresholds and Tools: <a href="https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance">https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance</a>)</p>	<p>Calculations were redone with the NMFS Multi-Species Pile Driving Tool and Section 3.19.5.1 was updated accordingly.</p>
<p>Appendix H Section: H PDF Page:483 Comments: (Comment from NOAA NOS)In Row #166 please be advised that "Operations and Maintenance" should be added to the "Project Phase" column for this applicant-proposed measure (APM) so that it would read "Construction Operations and Maintenance Decommissioning". The mitigations for the interference with NOAA radar systems will require actions by the applicant throughout the life of the project (e.g. continuously operating and maintaining surface current and wave sensors within and around the periphery of the wind farm).</p>	<p>APMs are Lessee commitments and are not subject to revision by BOEM. Requirements that exceed Lessee APMs will be established through agency-proposed mitigation.</p>
<p>Section: H PDF Page:427 Comments: (Comment from NOAA NWS Radar Operations Center)This table includes the text: "Empire Wind will enter into a mitigation agreement with NOAA to mitigate operational impacts to NEXRAD weather radar systems. Possible mitigation measures might include the following: ... Employing adaptive clutter filters Changing the radar scan strategy to pass over areas with wind turbines and Using phased array radars to achieve a null in the antenna radiation pattern in the direction of the wind turbine..." These three excerpted potential mitigation measures are not that viable as a technique to mitigate wind turbine clutter. The best we can employ at present time is a Curtailment Agreement. This is for TDWR and NEXRAD WSR-88D Radars utilized by the Tri-Agency. Clutter filters would only work when the wind turbines are curtailed. Changing the radar scan strategy to pass over areas with wind turbines would effectively cause the radar to potentially miss inclement</p>	<p>BOEM acknowledges that a curtailment agreement is the most viable mitigation currently, with research being conducted into phased array radars. Other mitigation options will be removed.</p>

Comment	Response
<p>weather. And Phased Array radars are currently being looked into and may be many years away from operations.</p>	
<p>(Comment also applies to text on page 3.17-22) Section: H PDF Page:427 Comments: (Comment from NOAA NWS Radar Operations Center) Related to the comment above on Mitigation for NEXRAD weather radar systems the Radar Operations Center would like to ensure analyses can be conducted on the project area(s) or proposed wind turbine locations as soon as practical to capture any potential beam interference issues which could create data contamination to any of the Tri-Agency NEXRAD WSR-88D or TDWR radars. It is further requested that all projects work through the National Information Telecommunications Administration (NTIA) as they are the official source from which the ROC creates analyses for official records.</p>	<p>BOEM will share proposed WTG locations with the National Weather Service for analysis. BOEM will recommend lessees work through the National Information Telecommunications Administration.</p>
<p>Section: H PDF Page:425 Comments: General comment- There is no description of nighttime monitoring or how it will be conducted. Please add information in the FEIS related to this as we anticipate Empire will send that information soon.</p>	<p>The requirement for an Alternative Monitoring Plan, which would address nighttime monitoring, is included in Table H-1. Discussion of the Alternative Monitoring Plan has been added to the evaluation of HRG survey noise and impact pile-driving noise in Section 3.15.</p>
<p>Appendix J Section: J.2.2.1 PDF Page: 671 Comments: The assumed source levels for vibratory and goal posts are given in section J.2.2 however those for impact pile driving are not provided. Though they are provided in detail in the associated LOA it may be useful to have some numbers for impact pile driving in the EIS (perhaps ranges of values taken or maximum values for input parameters considered).</p>	<p>Estimated source level information has been added to the section.</p>
<p>Section: J.2.2.2 PDF Page: 671 Comments: For impact pile driving modeling it is not clear why source levels are provided using RMS and peak-to-peak metrics. Typically levels are provided as single strike sound exposure levels and peak (not peak-to-peak). Also please clarify if the levels provided are source levels (referenced to 1 m) and not levels at 10 m which is typically how levels for coastal pile driving are provided.</p>	<p>Peak SPL was mislabeled as peak-to-peak and has been corrected. The SEL source level was added. Appendix M-2 of the COP, where these values are provided, is not explicit as to the distance at which source levels were measured or estimated.</p>
<p>Section: J.2.2.2 PDF Page: 673 Comments: For vibratory pile driving modeling source levels provided are limited to the SEL metric. Typically levels for activities such as pile driving are provided as RMS. Also please clarify if the levels provided are source levels (referenced to 1 m) and not levels at 10 m which is typically how levels for coastal pile driving are provided.</p>	<p>Appendix M-2 of the COP, where these source levels are provided, only provides an SEL source level for these activities and is not explicit as to the distance at which source levels were measured or estimated.</p>

Comment	Response
<p>Section: J.3.1.2 PDF Page: 673 Comments: Please stipulate what NMFS spreadsheet was used for this modeling. Previously for sea turtles it was indicated that the GARFO pile driving tool was used. NMFS wants to confirm either the NMFS optional User Spreadsheet tool or NMFS multispecies pile driving calculator was used. Also it is unclear why was this type of pile driving modeled differently from other pile driving (JASCO; dBSea). Please explain.</p>	<p>The NMFS optional User Spreadsheet was used to evaluate goal post installation, which has been clarified in the section. Goal post installation is a standard, small-scale, coastal activity that is typically modeled with simpler propagation because at that scale of activity the modeling does not benefit from a more complicated model. Foundation installation is a significantly more impactful offshore activity with complex propagation mechanics that benefit from a more robust model that incorporates the parabolic equation and other specialty mathematics. It is also typical of NMFS permits to implement more complicated modeling for larger-scale pile driving, such as the foundation installation, and simpler spreadsheet modeling for smaller, coastal activities. This approach was discussed and agreed to by NMFS and BOEM acousticians.</p>
<p>Section: J.5.3 PDF Page:680 Comments: Under Injury in this Table is a row that says "PTS". This should be removed. Fish regenerate their inner hair cells and are believed not to have PTS. Please just refer to this as injury.</p>	<p>The table header row was revised as requested.</p>
<p>Section: J.6.1.1 PDF Page: 681 Comments: It would be helpful to provide some additional context to interpret these tables and have a better understanding of what factors are driving resulting exposure ranges seen in these Tables. For example does 1 vs 2 piles make a difference in exposure ranges (there seem to be slight changes in numbers with one monopile ranges being slightly larger than two monopiles [which is not intuitive] but are they significant or more a product of variation in the model?). Also providing information on why the Level B exposure range is larger for 9.6 m pile vs. T11 &amp; U3 &amp; R# 11 m monopiles would be helpful.</p>	<p>Clarifying information on factors driving variation in exposure range estimates has been added, including identification of factors that result in larger Level B isopleths associated with the 9.6-meter monopiles despite their smaller size.</p>
<p>Additional Comments Section: General PDF Page: Comments: Please ensure all tables graphs and figures are compliant with section 508. Include Alt text titles and descriptions so that reader software can access. For tables please ensure subheadings or nested cells are 508 compliant and that any colors used to indicate context is captured in an Alt text description.</p>	<p>Comment noted. The Final EIS will be Section 508 compliant.</p>



**P.4.1.2. U.S. Coast Guard (BOEM-2022-0053-0148)**

**Table P.4-2 Responses to Comments from U.S. Coast Guard (BOEM-2022-0053-0148)**

Comment	Response
<p>The DEIS adequately evaluates the impacts to navigation safety and USCG missions for Alternative A and the USCG concurs with the resulting minor to moderate adverse impacts. Of note this project was afforded two deviations from USCG promulgated guidance for Traffic Separation Scheme (TSS) setbacks (2NM) for navigation safety and Wind Turbine Generator (WTG) spacing (1NM) to support mission execution. These guidelines remain the USCG’s position to maximize safety of navigation and effective mission execution. Appropriate and timely implemented mitigations are essential to keeping the MTS safe and our ability to execute missions effectively. These mitigation measures are especially important involving the Project parameter for Empire Wind 1 (EW1) with the Offshore Export Cable Landfall at the South Brooklyn Marine Terminal site. Careful coordination with the MTS is required for construction and operations to support all users in this busy complex waterway.</p>	<p>BOEM agrees with the comments. BOEM is coordinating with USCG to mitigate potential impacts of WTGs on SAR operations. Multiple mitigation measures have been proposed to ensure SAR operations can continue within the Lease Area, including Empire facilitating USCG SAR exercises within and near the Lease Area (APM 200); Empire creating and implementing operational SAR procedures to foster cooperation with USCG in the event of an emergency (APM 201); and installation of closed-circuit television on structures within the array to monitor activity within the site, enable advance notice of any problems, and potentially aid in SAR operations (APM 198). For the continued safety of the Marine Transportation System, security and support vessels will communicate with vessels operating in the area during periods of construction activity (APM 253). During O&amp;M, marine coordination will be provided for vessels associated with the Projects with the end of managing Project vessel movements and monitoring third-party traffic (APM 196). No updates to the EIS were made in response to this comment.</p>
<p>As the proposed minimum distance between closest adjacent turbines would be 0.65 NM USCG Search and Rescue (SAR) may be impacted. Preferred spacing for USCG aviation assets to safely conduct SAR is at least one nautical mile between turbines and while 0.65NM project spacing may be unavoidable certain SAR capabilities may be impacted in adverse weather conditions or other factors. Small variances throughout the wind farm should not significantly affect SAR or navigation safety.</p>	<p>BOEM is coordinating with USCG to mitigate potential impacts of WTGs on SAR operations. Multiple mitigation measures have been proposed to ensure SAR operations can continue within the Lease Area, including Empire facilitating USCG SAR exercises within and near the Lease Area (APM 200); Empire creating and implementing operational SAR procedures to foster cooperation with USCG in the event of an emergency (APM 201); and installation of closed-circuit television on structures within the array to monitor activity within the site, enable advance notice of any problems, and potentially aid in SAR operations (APM 198). No updates to the EIS were made in response to this comment.</p>

Comment	Response
<p>The USCG supports selection of Alternative B: Remove up to six WTG positions from the Northwest End of EW 1. Although the intent is primarily to mitigate impact to Cholera Bank fisheries these turbines are the closest to the New York Bight Precautionary Area where the potential for congestion from traffic of all vessel types entering and exiting the TSS is expected.</p>	<p>Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that Alternative B would no longer meet the purpose and need and therefore Alternative B is not recommended for inclusion in the Preferred Alternative.</p>
<p>The USCG concurs with BOEM’s assessment of Alternative C-1 that a proposed cable route in shallow depth to the east of the U.S. Army Corps of Engineers’ (USACE) federal anchorage area will reduce the risk of unintentional anchor snags with larger vessels. We concur with BOEM’s assessment of Alternative C-2 that a proposed cable route in Ambrose Channel will increase the risk of unintentional anchor snags with larger vessels. For either alternative the USCG recommends the Project coordinate with USCG Sector New York and USACE. Installing and maintaining a cable near or within an anchorage or navigation channel will impact the MTS both temporarily and for the duration of the Project.</p>	<p>Alternative C-1 is incorporated into the Preferred Alternative.</p>
<p>Alternative F: Recommend updating the COP and NSRA and conduct a Supplemental Environmental Impact Statement (SEIS) to address changes and the absence of information on Figure 2-10 of the DEIS regarding EW2 before considering as a preferred alternative.</p>	<p>Additional information on the presence of glauconite in the Lease Area and the constraints that glauconite poses for installation of WTGs has been added to the description of Alternative F in Section 2.1.7 of the Final EIS. Final EIS Figure 2-10 has also been updated to reflect the proposed layout for EW 2 under Alternative F based on results of geotechnical investigations. The NSRA (COP Appendix DD) has also been updated to include an assessment of Empire’s refined base case for EW 1 and EW 2 and the refined layout for Alternative F is analyzed in Final EIS Section 3.16, <i>Navigation and Vessel Traffic</i>. Empire has not proposed a change to the PDE in the COP, which allows for installation of up to 147 WTGs within the 174 WTG positions identified in the PDE.</p>
<p>Alternative G: Cable Bridge Crossing of Barnums Channel Adjacent to Long Island Railroad Bridge. The Project does not need a permit to proceed. If the Project changes the USCG must be notified to reassess permit requirements.</p>	<p>Comment noted. Final EIS Chapter 2 states that USCG determined that the cable bridge crossing would not require a USCG permit.</p>

Comment	Response
<p>Approved cable routes must be coordinated with the USCG to mitigate impacts on the Federal and Private Aids to Navigation (ATON) and to facilitate USCG asset operational support for temporary / permanent changes to the ATON constellation. Additionally the Project must coordinate with USACE on determining appropriate burial depths along the route and in Federal channels within New York harbor.</p>	<p>Comment acknowledged.</p>
<p>Safety Zones: Establishing safety zones or other regulated navigation areas should not be used as key mitigating factors when considering risks and impacts. Commander USCG First District may consider safety zones in the lease area but will not be granted for the sole purpose of keeping project construction on track.</p>	<p>Adverse impacts of the Proposed Action on vessel traffic during construction and installation are discussed in Section 3.16.5. It is reasonable to expect that, per 33 CFR 165.20, if the Captain of the Port deems it necessary and practical for the safety of vessel navigation in the vicinity of any water area to limit access to authorized vessels, only that this action may be taken in the context of the Proposed Action; therefore, mention of this probability is justifiable for the discussion. APM 187 (Regular updates to the local marine community on safety zones) and APM 188 (Dynamic construction and safety zones – where feasible) are measures consistent with this rationale. Footnote 16 in Section 3.16.5 establishes the jurisdictional limitations of current Captain of the Port authority for regulating safety and security risks associated with the construction and operation of offshore renewable energy installations beyond 12 nm. No updates to the EIS were made in response to this comment.</p>
<p>Post ROD involvement: The USCG requests timely access to construction plans such as Facility Design Reports and/or Fabrication Installation Reports that may identify activities impacting USCG missions or MTS especially Cable Burial Plans and their associated risk and feasibility assessments. Early access may prevent conflicts with planned activities.</p>	<p>Comment acknowledged. USCG will be provided with an opportunity to review the measures contained in the ROD and Conditions of COP Approval.</p>
<p>Amending Mitigations: The USCG should be provided the opportunity to suggest changes to approved mitigations and terms and conditions before during and after installation of the wind farm.</p>	<p>Comment acknowledged.</p>
<p>Re-Evaluation: The USCG should be provided the opportunity to re-evaluate any required analyses submitted by Empire Wind or require additional analysis after installation (e.g. to determine post-installation radar and communications impact).</p>	<p>Comment acknowledged.</p>

**P.4.1.3. U.S. Department of the Interior, National Park Service (BOEM-2022-0053-0144)**

**Table P.4-3 Responses to Comments from U.S. Department of the Interior, National Park Service (BOEM-2022-0053-0144)**

Comment	Response
<p>The National Park Service (NPS) provides these comments in response to the “Notice of Availability of a Draft Environmental Impact Statement for Empire Offshore Wind LLC’s Proposed Wind Energy Facility Offshore New York” and the separately provided Empire Wind historic documents (the Marine Archaeological Resources Assessment (MARA); the Terrestrial Archaeological Resources Assessment (TARA); the Analysis of Visual Effects to Historic and Architectural Properties Report (AVEHAP) and AVEHAP Appendices; the Cumulative Historic Resources Visual Effects Assessment (CHRVEA); the Seascape Landscape and Visual Impact Assessment (SLVIA) and various other related documents). NPS is a Cooperating Agency in the review of the Empire Wind 1 and 2 projects under Title 41 of Fixing America’s Surface Transportation Act of 2015 (FAST-41) (42 U.S.C. § 4370m) and under the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4321 et seq.). NPS is also a consulting party under Sections 106 and 110(f) of the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 300101 et seq.).</p>	<p>Comment acknowledged.</p>
<p>As we detailed in our previous reviews of the Empire Wind Projects (1 and 2) NPS manages two units of the National Park System in the project area: Fire Island National Seashore (FIIS) and Gateway National Recreation Area (GATE). NPS also has program responsibilities for National Historic Landmarks (NHLs) in the project area. Finally NPS has responsibilities to liaison with state partners whenever Land and Water Conservation Fund (LWCF) state-side properties may be impacted by activities that could result in conversion as is proposed for Empire Wind 2. Our comments below focus primarily on following up on concerns expressed in previous reviews and seeking clarification or further changes in the analysis necessary to protect NPS units program lands and resources. We have found that BOEM’s response to a number of our previous comments as detailed in the BOEM Empire Wind Cooperating Agency Comments spreadsheet (BOEM spreadsheet) were listed as “Comment is still under review.” We request that these comments all be addressed with specific responses.</p>	<p>Comment acknowledged.</p>

Comment	Response
<p>Section 3.6 Benthic Resources – Impact Analysis – Accidental releases NPS PDEIS Comment: In addition to its land base NPS has jurisdiction over the water column on the intercoastal waterway side north of Fire Island National Seashore (NS) and jurisdiction from mean high tide to 1000 feet out including the ocean bottom on the ocean side south of Fire Island. Gateway National Recreation Area (NRA) also includes ocean waters within its boundaries. The potential impacts within the boundaries of Fire Island NS and Gateway NRA from accidental discharges of fuel trash debris from construction/ operation/decommissioning discharge of bilge water and associated invasive species should be addressed. Notification and coordination with Fire Island and Gateway should be included in any proposed mitigation plans (e.g. spill response plans). This should be addressed throughout the DEIS as there are accidental release sections in all Affected Environment sections.</p>	<p>The Fire Island National Seashore and Gateway National Recreation Area are outside of the geographic analysis area for benthic resources (see Figure 3.6-1 and associated explanation in the introduction of Section 3.6, <i>Benthic Resources</i>). However, the water quality geographic analysis area covers most of the water areas that the National Park Service has jurisdiction over (see Section 3.21, <i>Water Quality</i>) and addresses fuel, trash, debris, bilge impacts, and nonindigenous species in the geographic analysis area under the accidental releases and discharges IPFs. These potential impacts are largely addressed by regulatory requirements, including USCG management requirements and USEPA’s National Pollutant Discharge Elimination System Vessel General Permit.</p>
<p>Section 3.8 Coastal Habitat and Fauna – Impact Analysis – Accidental releases NPS PDEIS Comment: The potential impacts within the boundaries of Fire Island NS and Gateway NRA from accidental discharges of fuel trash debris from construction / operation / decommissioning discharge of bilge water and associated invasive species should be added to the DEIS and addressed. Notification and coordination with Fire Island and Gateway should be included in any proposed mitigation plans (e.g. spill response plans etc.). The pertinent section of BOEM’s response in the BOEM spreadsheet: Empire Wind has also developed an Oil Spill Response Plan (COP Appendix F) that incorporates contacting/consulting federal and state agencies if any shoreline under their jurisdiction would be affected. NPS was provided the COP including Appendix F for review. Please review and let BOEM know if there is anything in the Oil Spill Response Plan that should be added to satisfy NPS’s needs. NPS has reviewed Construction and Operations Plan (COP) Appendix F – Oil Spill Response Plan (OSRP) prepared by Equinor’s contractor. NPS makes the following comments: There is no mention of Gateway National Recreation Area (GATE) anywhere in the OSRP. Fire Island National Seashore (FIIS) is mentioned once in a chart of shoreline impact areas in Appendix H of the OSRP. It is unclear how this list would be used in an emergency response. The lands that comprise</p>	<p>The OSRP provides the framework and detailed process for responding to an accidental spill. While a comprehensive list of all federal, state, county, and municipal parks, refuges, seashores, beaches, or otherwise natural resource or recreational areas is not included in the OSRP (or their contacts), the process outlined in the OSRP ensures that these numerous entities would be contacted should a spill occur and its trajectory indicates a shoreline area under their jurisdiction could be affected. For example, Section 12 of the OSRP describes how at-risk resources are identified should a spill occur and the federal, state, and local officials and technical specialists that would be involved in addressing the spill. While the National Park Service or lands under its management and jurisdiction (e.g., Fire Island National Seashore or Gateway National Recreation Area) are not specifically mentioned throughout the OSRP (along with many other federal, state, county, and municipal resource land areas that are also not listed), the OSRP procedures would ensure the National Park Service would be contacted if land or resources under its jurisdiction have the potential to be affected by an accidental spill. The Draft OSRP will be refined during Project development and a Final OSRP will be provided to BOEM 60 days prior to the start of construction. The OSRP will then be updated as needed throughout the life of the Projects and contacts can be added or removed, as needed.</p>



Comment	Response
<p>GATE and FIIS are clearly shown in the numbered block maps included in the OSRP as lands that could be impacted by spills.</p>	
<p>NPS was provided with what appears to be a confidential version of Appendix F of the COP. However important sections of the Appendix have been redacted. We cannot tell how or if NPS would be included in any emergency response effort. For example Appendix H of the OSRP identifies Resources at Risk in a table. A number of the species including the Piping Plover are species that NPS has extensive programs and experience in managing. Much of the habitat for these species in the New York Bight are located at FIIS and GATE. Yet we cannot tell if our expertise is known to the developer or if we would be contacted in the event of an emergency as the table listing “other personnel with expertise in working with Resources at Risk” is redacted in the copy we were provided. NPS requests an unredacted copy of the OSRP and the opportunity to review and provide edits to the developer and BOEM for this critical element of future operations of the Empire Wind projects.</p>	<p>See response to comment BOEM-2022-0053-0144-0004. BOEM has requested an unredacted copy of the OSRP to share with cooperating agencies and will provide this to the National Park Service upon receipt.</p>
<p>Cultural Resources - PDEIS Comments Still Under Review NPS made a number of comments on the PDEIS addressing cultural resources. Almost all of these comments were answered with “comment still under review.” We could not find in the DEIS and supporting materials that our comments had been resolved. Here is one of our comments which still needs to be addressed: [Italics: NPS requested that BOEM meet with the NPS review team to identify and explain how the COP/ PDEIS identified the Historic Resources identified here would be adversely affected and why other historic resources in the immediate area and adjacent to these resources would not be impacted. This list of 14 does not include the Fort Tilden Historic District which is located on the Rockaway Peninsula shoreline immediately west of the Jacob Riis Park Historic District and immediately east of the Silver Gull Beach Club Historic District. The Breezy Point Surf Club Historic District is located approximate 0.5 miles west of the Silver Gull Beach Club Historic District on the Rockaway peninsula. The Fort Hancock and Sandy Hook Proving Ground National Historic Landmark District is not identified however the Sandy Hook Light which is an individually listed resource within the Landmark District is identified. These ocean facing historic districts are all within Gateway National Recreation Area a unit of the NPS. The Fort Tilden Historic District USCG Station Far</p>	<p>Thank you for this request. Please find feedback for each property below:</p> <ul style="list-style-type: none"> <li>• Fort Tilden Historic District is analyzed in the COP Volume 3, Appendix Z technical report. This property will have a view of the Projects. However, BOEM agrees with the technical report analysis, which recommends the Project-related visual effects will not diminish the significance of the character-defining elements for which the property has been listed in the NRHP. Properties that are significant under Criterion A in the area of military history, but which were not the scene of battles and engagements, acquire their significance from the flow of day-to-day activities performed by common soldiers and officers and by the advances made in military theory, practice, equipment, and construction that occurred at or were applied at a location over a broad sweep of time. As such, unobstructed ocean views are not character defining. Therefore, impacts on ocean views from the Projects would not represent adverse effects on these properties. Consequently, Fort Tilden Historic District is not further discussed in Section 3.10 or Appendix N.</li> <li>• Consideration of the Breezy Point Surf Club Historic District has been added to COP Volume 3, Appendix Z. BOEM has reviewed</li> </ul>

Comment	Response
<p>Rockaway Historic District and Miller Army Airfield Historic District are also within the APE and are part of Gateway National Recreation Area.] NPS requests that BOEM meets with us to resolve all of these comments. BOEM answers to some our comments proposed resolving them via the Section 106 process. NPS has been an active participant in this process but does not believe the set up of the Section 106 meetings would be conducive to meeting this objective. We believe a separate meeting would be more efficient.</p>	<p>the technical report and finds this property will be adversely affected by the Projects. The Final EIS has been revised to include this finding, including proposed mitigation to resolve adverse effects.</p> <ul style="list-style-type: none"> <li>Fort Hancock and Sandy Hook Providing Ground NHL is analyzed in the COP Volume 3, Appendix Z technical report. This property will have a view of the Projects. However, BOEM agrees with the technical report analysis, which recommends the Project-related visual effects will not diminish the significance of the character-defining elements for which the property has been listed in the NRHP. Properties that are significant under Criterion A in the area of military history, but which were not the scene of battles and engagements, acquire their significance from the flow of day-to-day activities performed by common soldiers and officers and by the advances made in military theory, practice, equipment, and construction that occurred at or were applied at a location over a broad sweep of time. As such, unobstructed ocean views are not character defining. Therefore, impacts on ocean views from the Projects would not represent adverse effects on these properties. Consequently, Fort Hancock and Sandy Hook Proving Ground NHL is not further discussed in Section 3.10 or Appendix N.</li> </ul> <p>Miller Army Airfield Historic District is analyzed in the COP Volume 3, Appendix Z technical report. This property will have a view of the Projects. However, BOEM agrees with the technical report a analysis, which recommends the Project-related visual effects will not diminish the significance of the character-defining criterion for which the resource was listed in the NRHP. Properties that are significant under Criterion A in the area of military history, but which were not the scene of battles and engagements, acquire their significance from the flow of day-to-day activities performed by common soldiers and officers and by the advances made in military theory, practice, equipment, and construction that occurred at or were applied at a location over a broad sweep of time. As such, unobstructed ocean views are not character defining. Therefore, impacts on ocean views from the Projects would not represent adverse effects on these properties. Consequently, Miller Army Airfield Historic District is not further discussed in Section 3.10 or Appendix N.</p>

Comment	Response
<p>National Historic Landmarks (NHLs) - PDEIS Comments Still Under Review NPS commented on the PDEIS: [Italics: NPS requests that BOEM meet with the NPS review team to identify and explain how the COP identified the 14 listed Historic Resources would be adversely affected and why other historic resources in the immediate area and adjacent to these resources would not be impacted. In addition to those referenced in comments above please include Navesink Light Station (otherwise known as Navesink Twin Lights) National Historic Landmark in Highlands Monmouth County NJ. We believe that Navesink Light Station NHL is within the Cultural Resources Geographic Analysis Area/Visual Area of Potential Effect and given the site's high elevation and open sweeping views to Sandy Hook Bay the entrance to NY Harbor and the Atlantic Ocean and the proposed Empire Wind 1 &amp;2 projects there is a high potential for adverse visual effects to this NHL. Furthermore Water Witch Historic District in Middleton NJ is nearby situated at a similar elevation and orientation and was determined to be among the 14 historic properties in the Visual Effects Assessment to be adversely affected by the offshore components of the project.] We note that Navesink Twin Lights NHL still does not appear to be included in the list of adversely affected resources in the Finding of Effect document (Appendix N). We also note that the New Jersey State Historic Preservation Officer (SHPO) agreed with NPS that it should be included at the last Section 106 consultation meeting. We ask that Navesink Twin Lights NHL be included.</p>	<p>Twin Lights (Navesink Lighthouse) NHL is analyzed in COP Volume 3, Appendix Z. BOEM has reviewed this analysis and agrees that the integrity of the foreground historic viewshed is already substantially altered such that the addition of WTGs in the background viewshed will represent a small incremental change relative to the existing conditions. Included in the foreground viewshed is the New Jersey Route 36 bridge across the Shrewsbury River and modern commercial and residential development in the towns of Highlands and Sea Bright. As such, BOEM finds there is no adverse effect on this property. Therefore, it is not further discussed in the EIS.</p>
<p>We highlight here another of our comments on the PDEIS to which BOEM responded that the comment was still under review. [Italics: BOEM said in the PDEIS: "Lighting: ...The susceptibility and sensitivity of cultural resources to lighting impacts from the Proposed Action would vary based on the unique characteristics of individual cultural resources. Nighttime lighting impacts would be restricted to cultural resources for which a dark nighttime sky is a contributing element to their historic integrity cultural resources stakeholders use at night and resources that do not generate a substantial amount of their own light pollution." Our comment on this statement was: It should be noted that dark and dark nighttime sky may not and more often than not will not be explicitly identified as a contributing element of a site's historic integrity or cultural resources stakeholders use at night [in formal</p>	<p>Language regarding nighttime lighting impacts on cultural resources has been added to the Final EIS in Chapter 3, Section 3.10. As a result of BOEM consultation with the National Park Service, it is now understood that "a dark nighttime sky should be assumed to be a character-defining feature of certain resource types," which may include battlefields, lighthouses, or properties associated with the Underground Railroad.</p>

Comment	Response
<p>documentation]. For resources such as light houses/stations and observatories it should be assumed but there are many resource types with nighttime/ dark sky values (e.g. resources associated with historic events that may have occurred in night hours (e.g. [the Underground Railroad] and battlefields) and other values associated with darkness as part of a setting or place of contemplation for visitors.]</p>	
<p>It is also important to note that National Register and National Historic Landmark nominations the principal documents describing historical significance and resource integrity of designated properties very likely would not explicitly address nighttime skies as a contributing element to historic integrity. Furthermore National Register nomination forms and requirements have evolved over time and can vary significantly in depth and breadth ranging from a few pages to hundreds of pages in length. More recent nominations may more fully consider contemporary relevance and more complex social and environmental contexts.</p>	<p>As noted in response to comment BOEM-2022-0053-0144-0008, information on nighttime lighting impacts has been added to the Final EIS in Chapter 3, Section 3.10. BOEM, after consultation with the National Park Service, acknowledges that a dark nighttime sky should be assumed to be a character-defining feature of certain resource types, even if the NRHP nomination does not explicitly call attention to that quality as a character-defining feature. BOEM understands that NRHP nomination forms and requirements have changed over time, and a dark nighttime sky may not have been included in the past for certain resource types, including battlefields, lighthouses, or properties associated with the Underground Railroad, for example.</p>
<p>Additionally while National Register and National Historic Landmark site &amp; facilities may not be regularly staffed at night there are a variety of ways visitors and user groups may passively enjoy and associate with important cultural resources and where a dark night sky/dark seascape setting contributes to that experience. For example battlefields and cemeteries are often used by individuals and groups as places of quiet reflection contemplation connection and ceremony. Lighthouses and Light Stations such as Sandy Hook Light and Navesink Twin Lights are often iconic symbols of a community's maritime history and identity where views to the resource especially from the water and from long distances particularly at night are important.</p>	<p>As noted in response to comment BOEM-2022-0053-0144-0008, information on nighttime lighting impacts has been added to the Final EIS in Chapter 3, Section 3.10. The light intensity seen from terrestrial historic properties will be limited by the distance between resources and the nearest lighting source, which will be over 23 miles from the nearest shoreline. The light intensity will be further reduced by variable atmospheric and environmental conditions.</p> <p>If Empire implements the ADLS recommendation, aviation lighting on WTGs and OSS will only activate when aircraft is within a predefined distance from the structures. More information on the ADLS system can be found in EIS Chapter 3, Section 3.20. ADLS would reduce the duration of nighttime aviation lighting potential impacts to less than 1% of normal operating time.</p>
<p>NPS does not believe BOEM should require explicit acknowledgement in nomination paperwork that a dark night sky is a contributing element to their historic integrity. We also do not agree with the other qualifiers BOEM has added "cultural resources stakeholders use at night and resources that do not generate a substantial amount of their own light pollution" and once again ask for the citation for the inclusion of this direction.</p>	<p>As noted in response to comment BOEM-2022-0053-0144-0008, language addressing nighttime lighting impacts on cultural resources has been revised in the Final EIS in Chapter 3, Section 3.10.</p> <p>BOEM understands that NRHP nomination forms and requirements have changed over time, and the revised language acknowledges a dark nighttime sky may be a character-defining feature for certain resource types, including battlefields, lighthouses, or properties</p>

Comment	Response
	associated with the Underground Railroad for example, even if this is not explicitly stated in previously prepared documentation.
<p>Night Lighting and Visual Impact Concerns NPS thanks BOEM for addressing most of our night lighting and visual impact concerns between the preliminary DEIS and this publicly available version. We have a few remaining concerns we would like to see addressed. We reviewed the materials provided and did not find any nighttime static or video simulations in the Seascape Landscape and Visual Impact Assessment (SLVIA) or anywhere else in the DEIS materials (including in the DEIS itself its appendices and the Construction and Operations Plan (COP) and its appendices). The static views in the SLVIA are all daytime views. We also looked online at BOEM's Empire Wind web site and could only find the summer 2021 simulations from Jones Beach and Ocean Grove Beach. The updates to these simulations promised at the beginning of the video do not seem to be available. Were they ever completed? In addition the nighttime views on these two online videos are obscured by the white text boxes that fly into the viewer's foreground as the nighttime hours progress. It is impossible to clearly see the view behind the white text boxes especially as the nighttime hours pass so quickly during the simulation. We also looked online at the developer's virtual simulation hall web site (Project - Empire Wind). The videos provided there are undated but appear to be the same ones as are provided on the BOEM web site and suffer from the same obscured view due to the same white text boxes that appear in the nighttime views. Given that impacts to the nighttime views have been raised as an issue by NPS and others it would be helpful to provide nighttime static images (with wind turbine generator lights on) and (unobscured) video simulations in or prior to the release of the final EIS. We are pleased to see the proposal to use Aircraft Detection Lighting Systems (ADLS) and other light mitigating measures but would like to understand how the proposed projects would appear especially during the early nighttime hours when most shoreline viewers would see them.</p>	<p>A static nighttime visual simulation has been added to Appendix M as Attachment M-2. Revised video simulations were also transmitted to the National Park Service.</p>
<p>We did find one typo which you might want to correct. On page 3-20-25 in Chapter 3 of the DEIS Gateway National Recreation Area is referred to as "Golden Gate National Recreation Area" which is a national park in San Francisco CA. The remainder of the sentence is correct as to visitor expectations.</p>	<p>Thank you. This has been corrected in the Final EIS.</p>



Comment	Response
<p>Finally implementation and monitoring of the mitigation measures will be key. NPS requests that BOEM set up a program to monitor the night sky resource before and after these projects. Empire Wind 1 and 2 are among the earliest offshore wind projects in the US. The data gained would be valuable both in assessing and potentially adjusting the mitigation for these specific Empire Wind projects as well as providing important insights for the offshore wind projects that will come afterward.</p>	<p>A mitigation measure that would require monitoring of ADLS activation has been added to Appendix H and Section 3.20.</p>
<p>Land and Water Conservation Fund (LWCF) Assisted Sites Any property acquired and/or developed using LWCF assistance cannot not be wholly or partly converted to other than public outdoor recreation uses without the approval of NPS pursuant to the LWCF Act (54 U.S.C. § 200305(f)(3)) and implementing regulations (36 C.F.R. § 59.3). The conversion provisions of the LWCF Act regulations and guidelines in the LWCF Program Manual (U.S. Department of the Interior National Park Service Land and Water Conservation Fund State Assistance Program Federal Financial Assistance Manual Volume 71 2021) apply to each area or facility for which LWCF assistance is obtained regardless of the extent of participation of the program in the assisted area or facility and consistent with the contractual agreement between NPS and the State (Grant Agreement). The Town of Hempstead received LWCF assistance for Lido Beach Town Park (LWCF grants #36-00231- Lido Beach Town Park and #36-00731 - Lido Beach Pool Complex) and the City of Long Beach received LWCF assistance for the Long Beach boardwalk dune area and swimming facilities (LWCF grants #36-00897 - Long Beach Boardwalk #36-00930 - Long Beach Boardwalk II and #36-01046 - Long Beach Boardwalk Phase III). The LWCF Program is administered in New York by the Office of Parks Recreation and Historic Preservation (OPRHP). OPRHP in consultation with NPS will determine if this project triggers a conversion. To inform that determination we request that the FEIS identify all LWCF assisted sites in the study area and analyze the impacts of the alternatives to public outdoor recreation at these sites. Please refer to the December 9 2021 letter from Diana Carter LWCF Alternate State Liaison Officer with the OPRHP regarding the proposal. Guidelines for Underground Utility Easements and Rights-of-Way are detailed in the LWCF Program Manual Chapter 8 – Page 111. NPS requests a meeting with</p>	<p>Additional information on the Land and Water Conservation Fund assisted sites near proposed onshore infrastructure was included in Section 3.18.1, <i>Description of the Affected Environment for Recreation and Tourism</i>, and Section 3.18.5, <i>Impacts of the Proposed Action on Recreation and Tourism</i>, of the Final EIS.</p> <p>Information provided by Diana Carter of New York State Parks, Recreation and Historic Preservation in June 2023 as well as prior correspondence between that agency and the Lessee indicate that the boundary for the Long Beach Boardwalk extends from New York Avenue on the west to Neptune Boulevard to the east. The northern boundary is the northern edge of the boardwalk. The proposed Landfall A (Riverside Blvd), Landfall B (Monroe Blvd), and Landfall E (Laurelton Blvd) appear to be outside the boundary of the Land and Water Conservation Fund-protected parkland of the Long Beach Boardwalk (Project No. 36-01046, 36-00930, 36-00897). New York State Parks, Recreation and Historic Preservation determined that as long as there is no surface disturbance or remnant surface structures from construction activities within the Land and Water Conservation Fund Protected Boundary, a conversion of Land and Water Conservation Fund protected property is not required. Diana Carter has also indicated that the staging area proposed for Town Park at Point Lookout has no Land and Water Conservation Fund protections. The location of Landfall C at Lido Beach Town Park West also has no Land and Water Conservation Fund protections. As noted in their December letter, however, there would be recreational concerns with Landfall option D at Lido Beach Town Park (Project No. 36-00731 and 36-00231). The Lessee’s preferred alternative is Landfall A, at Riverside Blvd and East Broadway.</p>

Comment	Response
BOEM and OPRHP to ensure a conversion determination can be made in a timely manner.	

**P.4.1.4. U.S. Environmental Protection Agency (BOEM-2022-0053-0118)**

**Table P.4-4 Responses to Comments from U.S. Environmental Protection Agency (BOEM-2022-0053-0118)**

Comment	Response
<p>The U.S. Environmental Protection Agency (EPA) has reviewed the Bureau of Ocean Energy Management’s (BOEM) Draft Environmental Impact Statement (DEIS) for the Empire Wind Offshore Wind Farm (the Project) pursuant to the National Environmental Policy Act (NEPA) Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and our NEPA review authority under Section 309 of the Clean Air Act. EPA serves as a cooperating agency for the Project and in that capacity actively coordinated with BOEM throughout the entire NEPA process. Our input to BOEM included comments on the Administrative Draft of the EIS (September 9, 2022) scoping comments (July 26, 2021) and input on the purpose and need and alternatives considered for the Project. Empire Offshore Wind LLC (Empire) proposes both a 816-megawatt (MW) Empire Wind 1 (EW1) Project and 1260-MW Empire Wind 2 (EW 2) Project wind energy facility situated in federal waters sited 14 miles (12 nautical miles [nm]) south of Long Island New York and 19.5 miles (16.9 nm) east of Long Branch New Jersey. The Project would consist of up to 147 wind turbine generators inter-array cables up to three offshore substations two onshore substations and two transmission cable routes making landfall at the South Brooklyn Marine Terminal (SBMT) and Long Beach New York. The DEIS evaluates the No Build Alternative in addition to eight alternative configurations including options intended to avoid potential impacts to sensitive ecosystems. The construction and operation of the Project could result in a wide range of impacts to resources that are within EPA’s areas of jurisdiction and expertise. EPA offers the attached detailed technical comments on the DEIS for your consideration. The enclosed comments are intended to be consistent with our ongoing work in the Region to support local communities and reduce environmental impacts. Thank you for the</p>	<p>Comment acknowledged.</p>

Comment	Response
<p>opportunity to provide comments on this DEIS. EPA looks forward to the receipt and review of the Final EIS and we are committed to continuing to work with BOEM throughout the NEPA process and in the future especially as full projects come to fruition.</p>	
<p>EPA recommends that Table 2-3 include an indication of if mitigation is required to included for each of the resource categories.</p>	<p>This has been added as suggested.</p>
<p>EPA urges BOEM to consider including decommissioning in the discussion of project impacts. It is indicated that funding is required to be secured for decommissioning and similarly it should be assumed that construction of the offshore wind development will result eventually in decommissioning and associated impacts. Given that the Project is anticipated to have an operational life of 35 years decommissioning of the facilities should be considered in the DEIS as it is reasonably foreseeable.</p>	<p>The description of the Proposed Action in Chapter 2 of the EIS includes a description of construction, O&amp;M, and conceptual decommissioning. The impact of each of these activities, including conceptual decommissioning, is analyzed in Chapter 3 of the EIS. Prior to implementation of any activities associated with decommissioning, BOEM would require Empire to submit a decommissioning application for technical and environmental review.</p>
<p>“The alternatives listed in Table 2-1 are not mutually exclusive. BOEM may “mix and match” multiple listed Draft EIS alternatives to result in a preferred alternative that will be identified in the Final EIS provided that: (1) the design parameters are compatible; and (2) and the preferred alternative still meets the purpose and need (pg. 2-1).” This methodology is ambiguous and does not provide transparency to reviewers of what the preferred alternative that the lead agency and project sponsors are recommending. For the public to provide meaningful comments the comparison of alternatives should be complete comprehensive and provide clear differences in the alternatives.</p>	<p>A new heading has been added to each Chapter 3 resource section titled <i>Summary of Impacts of the Preferred Alternative</i>. This section includes a brief summary of the impacts of the combination of the EIS alternatives that compose the Preferred Alternative, based on the analysis of each individual EIS alternative in preceding sections.</p>
<p>The DEIS characterizes most alternatives as causing similar impacts (see Table S-2) despite there being measurable differences in some of the alternatives (for example Alternatives B and E which attempt to minimize impacts to access to fishing). EPA believes that this may be an artifact of the broad and generalized metrics used to classify impacts. The DEIS should indicate how substantial a reduction in impacts would be necessary to result in any discernible difference in the impact determination given these broad evaluation metrics. Additionally the DEIS would benefit from a clearer quantitative comparison of impacts across alternatives (when applicable) that would justify the selection of the proposed alternative.</p>	<p>Alternatives reduced impacts on some resources; however, they did not always result in a change to the resource’s impact level conclusion. The minimization of impacts is identified and quantified where possible in the summary and comparison of impacts of the alternatives in Chapter 3 resource sections and Table 2-4.</p>

Comment	Response
<p>Alternative F does not have a complete description and does not include a site plan for EW2. Additional information regarding the nature of the geotechnical considerations discussed should be included in the alternative's description. EPA urges BOEM to more fully describe this alternative in order to allow for meaningful analysis.</p>	<p>Additional information on the presence of glauconite in the Lease Area and the constraints that glauconite poses for installation of WTGs has been added to the description of Alternative F in Section 2.1.7 of the Final EIS. Final EIS Figure 2-10 has also been updated to reflect the proposed layout for EW 2 under Alternative F based on results of geotechnical investigations.</p>
<p>BOEM published a Process for Identifying Alternatives for Environmental Reviews of Offshore Wind Construction and Operations Plans pursuant to the National Environmental Policy Act (June 22, 2022). This document established standard screening criteria for alternatives to be analyzed in EISs. It is not clear how Alternative F was propagated as the limited information provided is not sufficient to determine whether the alternative is technically feasible (refer to Screening Criteria number 7).</p>	<p>See response to comment BOEM-2022-0053-0118-0007.</p>
<p>Pursuant to Section 328 of the Clean Air Act (CAA) EPA is required to establish federal air permitting rules to control air pollution from the outer continental shelf (OCS) in order to attain and maintain ambient air quality standards and comply with the provisions of part C of Title I of the CAA. EPA promulgated permitting rules at 40 CFR part 55 which establish air pollution control requirements for OCS sources consistent with section 328(a)(I) of the CAA. OCS projects located within 25 nautical miles of a state seaward boundary are required to comply with the air quality requirements of the corresponding onshore area (COA) which are incorporated by reference into 40 CFR 55 including applicable permitting requirements. OCS projects located beyond 25 nautical miles from the state seaward boundary are subject to federal air quality requirements including the Prevention of Significant Deterioration (PSD) preconstruction permit program (see 40 CFR 52.21) and/or Title V operating permit program requirements (see 40 CFR 71) and any applicable New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAPS). Permits issued pursuant to 40 CFR Part 55 regulate air emissions related to construction and operation activities associated with OCS sources including certain vessels that are OCS sources or are servicing or associated with the OCS sources.</p>	<p>Comment acknowledged.</p>
<p>EPA is aware that an air quality analysis is being conducted as part of the CAA permit and that the results from this analysis after review will be included in the EIS. Please include results comparing the proposed</p>	<p>Impact information from the OCS air quality permit application will be added to the EIS when available.</p>

Comment	Response
<p>actions' impacts to the National Ambient Air Quality Standards (NAAQS) and PSD increment on Class I and Class II areas and the Air Quality Related Values (AQRV) impacts. Additionally any language regarding the impacts of the proposed action should be modified accordingly in the Final EIS.</p>	
<p>Further EPA recommends the air quality analysis include information comparing the modelled concentrations to the NAAQS state air quality standards or other relevant reference measures which would allow for a more quantitative assessment to determine if emissions would adversely impact the air quality resource. Absent such a comparison it is unclear how a determination of minor adverse impacts can be made.</p>	<p>Concentrations will be modeled for the OCS air quality permit application and will be added to the EIS when available.</p>
<p>In addition EPA recommends that BOEM conduct an analysis to determine whether emissions not covered by the OCS permit particularly those emissions originating within the nonattainment area boundaries will cause or contribute to a new violation of the NAAQS increase the frequency or severity of any existing violation of the standards or delay timely attainment of the standards. Alternatively BOEM could ensure no adverse impact on the NAAQS from these emissions by demonstrating that they are contemporaneously offset.</p>	<p>Dispersion modeling was conducted for the emissions covered in the OCS air permit scope and for SBMT. The OCS air permit modeling does not include the onshore emission sources for EW 2, as that is not appropriately within the scope of the OCS air permit. However, the OCS air permit modeling includes onshore receptors for the EW 2 landfall and onshore ambient background data, and does include emissions associated with the EW 2 cable installation. The EW 2 landfall is in Nassau County, which is a nonattainment area for the 8-hour ozone NAAQS.</p> <p>The air quality impact analysis conducted for SBMT includes upgrade-related construction activities during which the majority of and most-intensive air emissions from all sources would occur on site. The analysis, conducted via dispersion modeling, not only estimates the contributions of the Projects to ambient pollutant concentrations in the neighborhood but also includes the monitored ambient concentrations recorded at the closest monitoring station; these monitored ambient conditions reflect background stationary and mobile sources such as off-site traffic along local roadways and highways. The results from the analysis of the most-intensive use of emission sources during SBMT Project construction plus the ambient monitoring results from other sources show compliance with the applicable NAAQS.</p>
<p>Qualitative statements such as "impacts due to construction are expected to be small" may be misleading. Even with the required permits impacts may not be small these statements should be modified to better reflect the situation.</p>	<p>Qualitative statements have been revised where applicable.</p>



Comment	Response
<p>The discussion of air quality impacts of the connected action (Appendix G - 3.4.5.1) states that air quality dispersion modeling for the SBMT would be compliant with NAAQS and New York State Ambient Air Quality Standards (AAQS). However although NAAQS are complied with there could be local impacts of emissions related to construction and operation. A discussion of the potential for these local impacts and possible mitigation methods should be included in the DEIS.</p>	<p>The SBMT Environmental Assessment Form Supplemental Air Quality and Climate Change Analysis discusses localized impacts and mitigation in Section 2.3.1.2, <i>Fugitive Dust</i>. The EIS discusses APMs that would address localized impacts in Section 3.4.5.3, <i>Conclusions</i>.</p>
<p>Additionally EPA recommends that air quality impacts associated with construction and utilization of the connected action be quantitatively assessed in the EIS. Although air quality dispersion modeling is referenced the results and comparison with NAAQS and New York State AAQS should be incorporated as a table in Section 3.4.5.1.</p>	<p>A table of SBMT dispersion modeling results has been added to Section 3.4.5.1 of the Final EIS.</p>
<p>Please clarify whether the air quality geographic analysis area encompasses the 40 km from the [Bold and italics: center] of the Wind Farm Area or whether it is from the most inland point of the Wind Farm Area.</p>	<p>As shown on Figure 3.4-1, the air quality geographic analysis area encompasses the area within 25 miles (40 kilometers) of the outer boundary of the Wind Farm Development Area.</p>
<p>According to the EIS the nearest Class I area is the Brigantine Wilderness Area located 108 km southwest of the Projects. EPA encourages BOEM to consider the application of long- range transport air quality models to evaluate impacts for transport distances in the 100-200 km range. Please refer to the Memorandum on the Clarification of Prevention of Significant Deterioration (PSD) Guidance for Modeling Class I Area Impacts (October 19 1992). In particular this guidance indicates that impacts from large sources located at distances greater than 100 km need to be considered when such impacts reasonably could affect the outcome of the Class I analysis.</p>	<p>BOEM anticipates that the OCS air quality permit application will evaluate impacts on Class I areas. The results of the Class I area evaluation will be added to the EIS when available.</p>
<p>EPA appreciates the incorporation of information on state policies and plans to develop renewable energy resources. EPA further recommends BOEM consider how energy generation may shift after the production tax credit phases out.</p>	<p>The Inflation Reduction Act extended the renewable energy production tax credit through 2024; it previously expired for wind at the end of 2021. BOEM will consider the potential effects of its expiration, recognizing that the production tax credit is one of many tax and financial considerations that can affect developers' and investors' decisions on energy generation.</p>
<p>EPA recommends the No Action Alternative avoid the assumption that another action will substitute energy resources should the federal action not take place. Projected emissions should be considered relative to this revised baseline. Furthermore the assumption that</p>	<p>Should the federal action not take place, the grid Independent System Operator would dispatch the available energy resources necessary to satisfy the demand for electricity. The available energy source with the lowest marginal cost would be dispatched first. At any particular time</p>

Comment	Response
<p>electricity would likely be provided by fossil fuel-fired facilities in absence of offshore wind projects is questionable given that renewable resources constitute a significant portion (39%) of the current energy mix (refer to footnote 3 on page 3.4-6).</p>	<p>the available source with the lowest marginal cost might or might not be a renewable source.</p>
<p>Please clarify why Ocean Winds East and the Vineyard Mid-Atlantic LLC project are the only planned offshore wind activities considered in the Cumulative Impacts analysis. There are several other offshore wind activities planned nearby that should be considered.</p>	<p>Section 3.4.4.2, <i>Cumulative Impacts of the No Action Alternative</i>, identifies that the planned offshore wind activities within the air quality geographic analysis are that could contribute to impacts on air quality include Ocean Winds East and the Vineyard Mid-Atlantic LLC projects. While there are several other offshore wind activities planned in the region, these are outside of the air quality geographic analysis area, which is defined as the airshed within 25 miles of the Wind Farm Development Area and the airshed within 15.5 miles of onshore construction areas and ports that may be used for the Projects.</p>
<p>EPA requests clarification on the definition of impact levels related to the Minor/Moderate impact level classification with respect to air quality impacts. Please specify whether there are substantive differences between minor and moderate impact levels. Additionally please clarify what level constitutes “detectable” emissions.</p>	<p>The commenter appears to be referring to Table 3.4-1. In Table 3.4-1 the distinction between "minor" and "moderate" is a qualitative evaluation.  <i>Detectable</i> refers to levels below which the emissions are extremely difficult or impossible to discern or measure. Detectable does not refer to instrument or laboratory detection limits.</p>
<p>The EIS states that “air quality impacts due to offshore wind projects within the air quality geographic analysis area are anticipated to be small relative to those of combined impacts of larger emission sources in the region such as fossil-fueled power plants.” Such claims should be substantiated by a detailed comparison between project lifetime emissions and emissions from fossil-fueled power plants. Executive Order 13990 (E.O. 13990 86 FR 7037; January 20, 2021) urges agencies to “consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions including as appropriate and relevant the 2016 GHG Guidance”.</p>	<p>The EIS discusses avoided emissions and indicates that Project emissions over the Project lifetime would be less than the emissions from fossil-fueled power plants that would occur in the absence of the Projects. BOEM expects that Project lifetime emissions from other offshore wind projects also would be less than the corresponding emissions from fossil-fueled power plants.</p>
<p>Additionally as the DEIS states that minor air quality benefits are projected EPA recommends that BOEM expand upon this discussion to explain how the net greenhouse gas reductions would help meet relevant national and local climate action goals and commitments. As there will still be greenhouse gas emissions produced during construction and operations and maintenance a chart comparing the magnitudes of the produced emissions and avoided emissions would also be helpful in assessing Project impacts and benefits.</p>	<p>Section 3.4.5 of the EIS provides the magnitudes of Project emissions and avoided emissions and indicates that Project emissions over the Project lifetime would be less than the emissions from fossil-fueled power plants that would occur in the absence of the Projects. The net GHG reductions would help meet the New York and New Jersey GHG emission reduction goals and commitments discussed in Section 3.4.3.1.</p>

Comment	Response
It should be made clear whether the connected action is included in emissions estimates or a discussion of these estimates should be included alongside estimates of the rest of the project.	A clarification has been added to the Final EIS.
EPA acknowledges the substantial additions to the DEIS including the incorporation of information on the social cost of GHGs. In addition to this information EPA recommends that BOEM include additional estimates on upstream emissions to fully disclose the direct and indirect emissions associated with the Project. Emissions associated with production and processing (particularly manufacturing materials that constitute the foundation and wind turbine tower) are a reasonably foreseeable effect of the Project that should be evaluated.	Information has been added to the EIS describing life cycle considerations and providing references to recent life cycle analyses of offshore wind.
EPA recommends that the Final EIS be revised to include estimates of greenhouse gases including carbon dioxide (CO <sub>2</sub> ) nitrous oxide (N <sub>2</sub> O) methane (CH <sub>4</sub> ) and sulfur hexafluoride (SF <sub>6</sub> ) in tables 3.4-2 and 3.4-3. Providing estimates of these emissions separately and individually discloses the different environmental impacts associated with emissions for each of the GHGs.	Emissions estimates for individual GHGs have been added to Tables 3.4-2 and 3.4-3.
EPA recognizes the long-term potential benefits of the proposed large-scale offshore wind renewable energy project with respect to greenhouse gas reductions and climate change and acknowledges the importance of the Project for meeting New Jersey's renewable energy goals under Executive Orders 8 and 92. Furthermore such projects are consistent with the goals outlined in Executive Order 14008 Tackling the Climate Crisis at Home and Abroad.	Comment acknowledged.
Additionally EPA believes that the document would benefit from a more robust consideration of climate change risks to the proposed action in the description of the affected environment. This should include consideration of climate resiliency measures particularly for infrastructure that may be vulnerable to the impacts associated with climate change (such as sea level rise more frequent storms etc.).	See the responses to comments BOEM-2022-0053-0054-0001 and BOEM-2022-0053-0054-0002.
As currently depicted the scale on the middle panel of figure 3.21-1 is unclear. Please revise this so that it is more apparent against the background on the figure.	The figure has been revised to provide more clear scales.
The DEIS would benefit from a figure that depicts the primary waterbodies as they are not shown to high resolution in figure 3.21-1.	Figure 3.21-1 has been revised to add labels for the Hudson River in the top pane and a label for Corpus Christi Bay in the bottom pane. The scale of the geographic analysis area in the vicinity of New York does not support adding labels for distinct waterbodies within the

Comment	Response
	portion of the geographic analysis area that includes the Lease Area and export cable routes. These labels would not be legible.
As mentioned in the DEIS the proposed EW 1 and EW 2 export cable landfalls onshore export and interconnection cable routes onshore substations and Operations and Maintenance (O&M) facility overlay a sole source aquifer. Potential impacts to the quality of the sole source aquifer including activities that would affect recharge to the aquifer and groundwater quality should be disclosed and addressed in the Final EIS. The Final EIS should state the project sponsors intent to follow appropriate State and Federal regulations with regard to storage transport and disposal of hazardous waste and materials.	Recognition of the two USEPA-designated sole source aquifers beneath the EW 1 and EW 2 Project area has been added to EIS Section 3.21.1, <i>Description of the Affected Environment for Water Quality</i> . In addition, more current groundwater level information in the Project area was added to the same section. Furthermore, an analysis of potential impacts on groundwater quality and recharge has been added to Section 3.21.5, <i>Impacts of the Proposed Action on Water Quality</i> , under the land disturbance IPF.
While the Water Quality section discusses the waterbodies within the geographic area and current impairments we recommend the Final EIS attempt to quantify the extent that the Project would contribute to existing impairments or cause new impairments to waterbodies. The DEIS states "impacts from suspended contaminated sediments would result in detectable localized short-term degradation of water quality in exceedance of water quality standards in a few locations along the EW 1 offshore export cable corridor". These locations and the magnitude of expected exceedances should be specified.	The EIS discloses <i>potential</i> impacts on water quality from construction, O&M, and decommissioning of the Projects. It is not possible to specifically quantify every water quality impact because BOEM cannot predict exactly what will occur or the circumstances of a particular water quality impact event. However, Empire cannot proceed with any construction until all appropriate water quality permits are obtained that ensure water quality standards are not exceeded, including CWA Section 402 (State Pollutant Discharge Elimination System permit issued by NYCDEC) and 401 Water Quality Certification (also issued by NYCDEC). The terms and conditions of these permits would also include any requirements to comply with Total Maximum Daily Load plans, which is a water quality improvement plan for impaired 303(d)-listed surface waters; this would ensure all appropriate measures are taken for potential impacts on 303(d)-impaired waters.
EPA recommends that BOEM continue to coordinate with the relevant resource agencies to ensure that water resources are protected from impacts associated with activities under the proposed action. As there are waterbodies within the geographic analysis are included on the state's 303(d) lists there is an increased focus on ongoing efforts to improve water quality. We recommend the Final EIS include up-to-date information on the status of permit application processes.	BOEM and Empire will continue to coordinate with the relevant agencies to ensure water quality is protected from impacts associated with the Projects, including potential impacts on 303(d) impaired waters (see response to comment BOEM-2022-0053-0118-0033). EIS Appendix A, Table A-1, <i>Required Environmental Permits and Approvals for the Proposed Projects</i> , provides the current status of all required permits and approvals for the Projects.
We recommend the conclusions section be modified to include a table that clearly compares water quality impacts across each of the presented alternatives. As currently written in text form it is challenging to derive meaningful comparisons that may reveal an alternative with the least environmental impacts.	The summary of comparison between all alternatives (in table format) is provided in the Draft EIS <i>Summary</i> section, Table S-2, and Draft EIS Section 2.4, Table 2-4. As shown, there is no notable difference among any of the alternatives for water quality impacts.

Comment	Response
<p>EPA understands that Empire will be conducting wetland delineation to confirm the extent and presence of regulated wetlands to further inform a wetlands impact analysis. We look forward to reviewing this information along with any proposed mitigation/restoration measures once it becomes made available.</p>	<p>Comment noted.</p>
<p>The Final EIS should discuss any concern of the capacity of the region for compensatory mitigation of cumulative wetland impacts of ongoing and planned offshore wind development.</p>	<p>BOEM cannot predict where onshore project components of future offshore wind projects may be sited and whether or not there would be permanent wetland fill requiring compensatory mitigation. However, given the developed nature of the onshore environment in the wetlands geographic analysis area (see Figure 3.22-1), which consists of the highly urbanized and developed landscapes of the New York metropolitan area, it is unlikely that there would be substantial permanent wetland fill (if any) should another future offshore wind project overlap with the Projects' wetland geographic analysis area; therefore, a significant area for compensatory mitigation is unlikely. If permanent wetland fill were to occur, the future applicant for that fill placement would be required to compensate for lost wetland functions per CWA Section 404 requirements. Methods of compensatory mitigation could include restoration, establishment, enhancement, or preservation, which could be accomplished through permittee-responsible mitigation, buying credits in an existing mitigation bank, or in-lieu fee. Therefore, given the anticipated low potential for permanent wetland impacts, BOEM does not believe there is a concern for capacity of the geographic analysis area for compensatory mitigation, should it be needed.</p>
<p>The DEIS states that onshore export and interconnection cables and their duct banks would be retired in place during decommissioning (p.2-17). Possible long-term and permanent impacts of this should be discussed in the Final EIS.</p>	<p>No additional impacts are anticipated from retiring cables and duct banks in place. Retiring onshore components in place avoids the ground disturbance that would result if the components were removed and the retention of the retired duct banks could facilitate future use for other purposes.</p>
<p>The DEIS states that “the primary sources of ongoing offshore impacts (to cultural resources) include dredging cable emplacement and activities that disturb the seafloor (pg. 240)”. Later the DEIS states that there are no ongoing offshore wind activities within the geographic area. The Final EIS should clarify what activities dredging and cable emplacement would be associated with if there are no ongoing offshore wind activities analyzed as part of the No Action Alternative.</p>	<p>Thank you for your comment. The first paragraph of Section 3.10.3.1 indicates, “Under the No Action Alternative, baseline conditions for cultural resources described in Section 3.10.1, <i>Description of the Affected Environment for Cultural Resources</i>, would continue to be affected by regional commercial, industrial, and recreational activities.” These refer to non-offshore wind activities. As such, the language indicating the “primary sources of ongoing offshore impacts include dredging, cable emplacement, and activities that disturb the seafloor”</p>



Comment	Response
	<p>later in the first paragraph of Section 3.10.3.1 refers to non-offshore wind activities.</p> <p>The second paragraph of Section 3.10.3.1 addresses offshore wind activities with the language, “There are no ongoing offshore wind activities within the geographic analysis area for cultural resources.”</p> <p>BOEM finds the separation of these statements in different paragraphs to be sufficient for differentiating between ongoing non-offshore wind activities and ongoing offshore wind activities under the No Action Alternative.</p>
<p>The DEIS mentions a Memorandum of Agreement (attached as Appendix N) to establish commitments for avoiding minimizing and mitigating impacts on cultural resources. The Final EIS should further explain who the Memorandum of Agreement would be with the status of the document and if any outside stakeholders were consulted in the drafting of the agreement.</p>	<p>Section 3.10.11 has been revised to reference Appendix H, Table H-2, with additional reference to Appendix N, Attachment N-1 (<i>Memorandum of Agreement</i>). This revised language in Section 3.10.11 also refers to Section N.2.2.3 of Appendix N, which outlines the consultation process, including consultation associated with the Memorandum of Agreement. Finally, this revised language in Section 3.10.11 refers to Attachment 2 of Attachment N-1 (<i>Memorandum of Agreement</i>) in Appendix N, which lists the consulting parties to the Projects, including tribal nations.</p>
<p>A discussion of potential impacts of helicopter use on Scenic and Visual Resources should be included in the DEIS.</p>	<p>Helicopter use has been added to the Final EIS.</p>
<p>EPA recommends the DEIS incorporate a table that indicates different land use types and impacts to the various land use types associated with each alternative. The table should quantify changes in land use and acreage impacted.</p>	<p>Changes to land use as a result of the Proposed Action are only anticipated if EW 2 Onshore Substation C is selected. The proposed EW 2 Onshore Substation C would be sited on an approximately 5.2-acre property with existing commercial and recreational uses. Because Alternatives B, C, D, E, and F alter offshore aspects of the PDE, they would not result in different impacts on the various land use types when compared to the Proposed Action.</p>
<p>The DEIS discusses the potential benefits of port utilization at SBMT and Port of Albany “on land use and coastal infrastructure due to increased port utilization and resulting economic activity (Section 3.14 pg. 356).” This section should also mention the potential adverse impacts to the neighboring communities and due to changes in land uses.</p>	<p>Information on the potential impacts on neighboring communities as a result of increased port utilization was added to Section 3.14.5.2, <i>Cumulative Impacts of the Proposed Action</i>.</p>
<p>The DEIS should make clear how port construction and improvements other than the SBMT will be evaluated for environmental processes outside of the scope of this review. If known those review processes should be mentioned.</p>	<p>Section 3.14.3.2, <i>Cumulative Impacts of the No Action Alternative</i>, describes how port construction and improvement projects, other than the connected action, would be evaluated as part of their individual environmental review processes.</p>

Comment	Response
<p>On page 3.14-6 the DEIS states that “Construction and installation of new aboveground infrastructure such as onshore substations and O&amp;M facilities could result in the long-term conversion of land from existing conditions to use for electric power generation and transmission.” The conclusion is then made that “Impacts on land use and coastal infrastructure from land disturbance would be localized and short term.” Please discuss or correct this discrepancy.</p>	<p>Additional clarification was added to the land disturbance IPF analysis under Section 3.14.3.2, <i>Cumulative Impacts of the No Action Alternative</i>, to clarify the discrepancy.</p>
<p>EPA appreciates commitments made by BOEM such as development of an anchoring plan a benthic monitoring plan and the applicant-proposed measures to avoid siting structures on sensitive habitat and establishing seasonal work windows to avoid sensitive life stages.</p>	<p>Comment acknowledged.</p>
<p>The DEIS finds that all alternatives including the proposed action as well as the cumulative impacts of the proposed action in combination with the connected action and other ongoing and planned activities would have negligible to moderate and moderate beneficial impacts. This lack of differentiation between alternatives and cumulative impacts may be a result of the generalized impact categories provided for analysis. EPA recommends that BOEM include further discussion of a comparison between alternatives that would help to display design differences in the alternatives.</p>	<p>The Final EIS uses a four-level classification scheme to characterize the potential impacts of the alternatives. Resource-specific impact level definitions are presented in each resource section, and the impacts of each alternative align with the appropriate impact level, as supported by the analysis. EIS alternatives reduced impacts on some resources; however, they did not always result in a change to the resource’s impact level conclusion. The minimization of impacts is identified and quantified where possible in the Final EIS.</p>
<p>Indian Nation Issues and Coordination Executive Order 13175 Consultation and Coordination with Indian Tribal Governments (E.O. 13175 65 FR 67249; November 6, 2000) was issued to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications and to strengthen the U.S. government-to-government relationships with Indian tribes.- EPA notes the DEIS mentions ongoing consultation with tribal nations. We recommend the Final EIS describe the process and outcomes of consultations with these tribal governments including major issues raised and how those issues were addressed.</p>	<p>Thank you for this recommendation. Please see response to comment BOEM-2022-0053-0118-0040.</p>
<p>Additionally EPA encourages continued outreach and involvement of tribes in evaluating terrestrial and marine archaeological resources designing marine surveys and interpreting results. We also recommend that tribes be invited to participate in the development of an unanticipated discovery plan for offshore and onshore construction activities.</p>	<p>Thank you for this comment. To reduce the risk of potential impacts on marine cultural resources, Empire has committed to APMs for avoidance, minimization, and mitigation. Interested parties, including Native American tribes, “will continue to be provided opportunities for involvement in marine survey protocol design, execution of the surveys, and interpretation of the results” (Draft EIS page 3.10-17). In</p>

Comment	Response
	<p>addition, “tribes have further opportunities to participate in the development of detailed property-specific mitigation planning and execution related to submerged historic properties that may be affected by the Projects and the interpretation of data collected through mitigation efforts” (Draft EIS page 3.10-17).</p> <p>In addition, BOEM will require mitigation measures as conditions of COP approval, which include measures to avoid or mitigate impacts on identified archaeological resources, implementation of archaeological monitoring and post-review discoveries plans, and implementation of historic properties treatment plans. Section 3.10.11 has been revised to explicitly indicate consultation will include consulting tribes.</p> <p>Consulting tribes have been invited to provide input on the draft Marine Post-Review Discovery Plan and Terrestrial Monitoring and Post-Review Discovery Plan, which are included as an Attachments 6 and 7 of the Memorandum of Agreement (Appendix N, Attachment N-1).</p>
<p>The Council on Environmental Quality (CEQ) which oversees implementation of NEPA has promulgated a guidance document to assist agencies in implementing EJ principles (See Environmental Justice Guidance under the National Environmental Policy Act Council on Environmental Quality December 10, 1997). EPA has a strong commitment to promote the principles of EJ outlined in Executive Order 12898 - Federal Actions to Address EJ in Minority and Low-income Populations. According to the Executive Order “Each Federal Agency shall analyze the environmental effects including human health economic and social effects of Federal actions including effects on minority communities and low-income communities when such analysis is required by NEPA. Mitigation measures outlined or analyzed in an environmental assessment environmental impact statement or record of decision whenever feasible should address significant and adverse environmental impacts of proposed Federal actions on minority communities and low-income communities.” Further Executive Order 14008 requires agencies to make achieving environmental justice part of their missions by developing programs policies and activities to address the disproportionately high and adverse human health environmental climate-related and other cumulative impacts on disadvantaged communities as well as the</p>	<p>Comment noted.</p>

Comment	Response
<p>accompanying economic challenges of such impacts. [Footnote 1: Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad (Jan. 27, 2021)]</p>	
<p>As currently written the environmental justice analysis does not consider cumulative impacts in the determination of disproportionately high and adverse impacts. In accordance with the Promising Practices for EJ Methodologies in NEPA Reviews [Footnote 2: Interagency Working Group on Environmental Justice Promising Practices for Environmental Justice Methodologies in NEPA Reviews (p.39) March 2016] “agencies may wish to consider factors that can amplify identified impacts (e.g. the unique exposure pathways prior exposures social determinants of health) to ensure a comprehensive review of potential disproportionately high and adverse impacts to minority populations and low- income populations.” CEQ’s guidance [Italics: Environmental Justice: Guidance Under the National Environmental Policy Act] (1997) also encourages agencies to consider relevant public health and industry data concerning the potential for multiple or cumulative exposures to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards to the extent such information is reasonably available. . . even if certain effects are not within the control or subject to the discretion of the agency proposing the action”. EPA recommends BOEM consider how relevant existing conditions in communities with EJ concerns across cumulative environmental health socioeconomic and climate stressors may ultimately lead to impacts that are disproportionately high and adverse.</p> <p>Communities with EJ concerns are often disproportionately burdened by environmental hazards and stressors unhealthy land uses psychosocial stressors and historical traumas all of which drive environmental health disparities. The Final EIS should consider whether communities may already be experiencing existing pollution and social/health burdens. For example EJ Screen analysis indicates that adjacent port communities near Paulsboro experience high levels of Particulate Matter 2.5 (PM2.5) diesel particulate matter and are rated as high air toxics cancer and respiratory risk. EPA encourages BOEM to consider the cumulative impacts of these existing conditions that together with the proposed action may result in disproportionately adverse impacts on affected communities with EJ concerns.</p>	<p>The commenter is correct that the determination of disproportionately high and adverse impacts is made for the Proposed Action alone and not for cumulative impacts of the Proposed Action in combination with the planned activities scenario described in Appendix F. However, BOEM’s environmental justice analysis does consider the contribution of other environmental stressors in establishing the baseline condition in the affected environment, using EJSCREEN to identify neighborhoods in the Onshore Project area that are in higher percentiles for indices related to PM<sub>2.5</sub>, ozone, diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard indices. See EIS Section 3.12.3 for a discussion of neighborhoods in the geographic analysis area that are burdened with higher levels of exposure to environmental hazards and adverse health outcomes. Note that Empire does not propose to use the port of Paulsboro and Paulsboro is not included in the geographic analysis area for the Projects.</p>

Comment	Response
<p>Additionally the FEIS should further describe the health effects of impacts. - The DEIS makes the conclusion that utilization of SBMT would not result in high and adverse effects of environmental justice populations because the relative emissions are expected to be within the NAAQS for each pollutant. In considering impacts EPA urges that compliance with the NAAQS does not equate to no potential impacts and possible localized impacts to human health and the environment. EPA recommends the DEIS further consider localized impacts that port utilization may have on nearby communities.</p> <p>While EPA has issued formal designations as “attainment” or nonattainment” regarding certain criteria air pollutants these designations may not always be representative of all localized air quality impacts and resulting health disparities. For instance previously unidentified “hot spots” that exceed the level of the PM2.5 NAAQS may exist even in areas designated as attainment.- Claims of minor air quality impacts to communities with EJ concerns are unsupported given the current level of analysis in the DEIS. Further modeling is required to support these claims.</p>	<p>BOEM concurs that compliance with the NAAQS does not equate to “no potential impacts”; however, using the NAAQS criteria for identification of “high and adverse impacts” is an objective and defensible criterion for impact analysis with a regulatory basis.</p> <p>For onshore construction activities, the EIS reports estimated emissions by county and emissions are not directly compared to the NAAQS because air dispersion modeling was not completed for all areas of onshore construction.</p> <p>However, air dispersion modeling was conducted for the connected action at SBMT, which is the primary port to be used by Empire for construction and long-term O&amp;M of the Projects. Air dispersion modeling for SBMT estimated pollutant concentrations for the highest-emissions periods for SBMT construction and operation. The results showed that all concentrations due to the SBMT connected action would be within the NAAQS and New York AAQS.</p> <p>CEQ’s NEPA implementing regulations specify that data and analysis in an EIS should be commensurate with the importance of the impact. BOEM’s approach to the EIS analysis is consistent with this objective in that air dispersion modeling was completed for the most important source of emissions relative to environmental justice populations within the geographic analysis area and emissions were estimated but not modeled for other sources of construction emissions that would be predominantly short term and geographically dispersed (i.e., for construction of onshore infrastructure). Temporary use of major ports for shipping construction materials is treated qualitatively because the Proposed Action would represent a small percentage of total cargo volume shipped through ports other than SBMT.</p>
<p>The DEIS states “The same type of construction and operations activities would occur in areas with and without environmental justice populations and the impacts on environmental justice populations would be similar to impacts experienced by the general population (p. 294).” Therefore BOEM has determined that air emissions generated by construction operation and decommissioning of onshore infrastructure would not disproportionately affect environmental justice populations.” As mentioned previously an analysis of impacts should consider existing burdens on the community and the incremental impact of the proposed actions emissions. This type of analysis is further supported by the [Italics: Promising Practices for EJ</p>	<p>Thank you for your comment. As noted above, BOEM did consider the existing environmental and health burdens within environmental justice populations in reaching its determination. BOEM has reviewed the environmental justice conclusions presented in the Draft EIS and confirms the earlier determination that impacts of the Proposed Action on environmental justice populations would not be disproportionately high and adverse.</p>



Comment	Response
<p>Methodologies in NEPA Reviews] guidance which states that "Agencies may wish to recognize that in instances where an impact from the proposed action initially appears to be identical to both the affected general population and the affected minority populations and low-income populations there may be inter-related ecological aesthetic historic cultural economic social or health factors that amplify the impact (e.g. unique exposure pathways social determinants of health community cohesion). After consideration of factors that can amplify an impact to minority populations and low-income populations in the affected environment an agency may determine the impact to be disproportionately high and adverse." [Footnote 2: Interagency Working Group on Environmental Justice Promising Practices for Environmental Justice Methodologies in NEPA Reviews (p.39) March 2016]</p>	
<p>The DEIS concludes that noise associated with the proposed action will not have disproportionate and high adverse impacts on communities with EJ concerns. As stated above impacts being similar across all populations and similar to existing daytime noise does not necessarily mean that impacts are not disproportionately high and adverse. Conclusions on impacts should take into account existing burdens to neighborhoods when making these determinations.</p>	<p>The most adverse noise levels during construction of the Proposed Action would be associated with impact pile driving for onshore substation foundations and cable bridge piles, vibratory pile driving for nearshore cofferdams, and HDD for cable landfalls and the Wreck Lead channel crossing. SBMT is surrounded by a light industrial area and construction noise generated at SBMT would diminish at the distance of the nearest residential areas (see predicted sound contours for HDD at the EW 1 landfall as shown on COP Appendix L, Figure L-9, for example). For EW 2, the highest noise levels would be generated in the vicinity of the cable landfalls, the Wreck Lead crossing, the cable bridge crossing of Barnums Channel, and within onshore substation parcels. Of these, only the south side of the Wreck Lead channel crossing falls within an environmental justice neighborhood (see Figure 3.12-2), supporting the conclusion that environmental justice populations would not be disproportionately affected by EW 2 construction noise. In addition, the immediate waterfront area on the south side of Wreck Lead Channel is currently used for storage of shipping containers and for utility infrastructure, with the nearest residences two blocks to the south, which would reduce the exposure of residences to HDD noise. This has been added to Final EIS Section 3.12.5.</p>
<p>EPA recommends BOEM develop a stakeholder outreach/EJ public engagement plan for areas that may be impacted by the proposed action and provide an opportunity for affected communities to inform</p>	<p>BOEM has facilitated effective public outreach throughout the EIS process as demonstrated through broad participation in scoping meetings and public hearings and public input received through</p>

Comment	Response
<p>the project’s mitigation measures. This outreach plan should detail information on planned engagement milestones and commitments to meetings with potentially impacted communities and community organizations.</p>	<p>comments submitted on regulations.gov or through verbal testimony at public meetings during scoping and the public review period for the Draft EIS. BOEM has not identified disproportionately high and adverse effects on environmental justice populations and targeted environmental justice outreach outside of the public involvement process undertaken for NEPA is not planned.</p>
<p>EPA encourages BOEM to determine if linguistically isolated populations reside in the geographic areas impacted by the proposed project and provide appropriate translation and interpretation services to ensure meaningful engagement. All outreach efforts should be documented in the EJ section of the DEIS.</p>	<p>There are no additional public review and comment periods planned for the Empire Wind EIS prior to publication of the Final EIS in September 2023. BOEM will consider USEPA’s request to provide translation and interpretation services as part of BOEM’s outreach plan for future environmental reviews when linguistically isolated populations reside within the geographic analysis area.</p>
<p>The DEIS narrows the discussion of EJ impacts to resources with major impacts initially. By not including other resources that may have moderate or minor impacts the analysis has the potential to miss disproportionate impacts.</p>	<p>The environmental justice analysis is not limited to review of only major impacts and reference to screening for major impacts has been removed from the introductory paragraph of Section 3.12.2. The rest of this section correctly explains that adverse impacts that affect environmental justice populations were carried forward for further analysis of disproportionately high and adverse effects.</p>
<p>The DEIS states that the NYS State Environmental Quality Review Act (SEQRA) Environmental Analysis (October 2022) completed for SBMT “determined that the connected action would not result in significant adverse impacts for any of the impact analysis areas and therefore would not result in any disproportionately high and adverse effects on minority and low-income populations (p. 3.12-26.)” The Environmental Analysis considered a radius of 0.25 miles. It should be made clear that impacts from construction and operation of SBMT are also considered as part of the DEIS using the EJ geographic analysis area developed for Empire Wind.</p>	<p>A sentence clarifying that the impact of long-term O&amp;M activities at SBMT are also considered in the environmental consequences for the Proposed Action has been added to the end of Section 3.12.5.1 as clarification.</p>

**P.4.2 Cooperating State Agencies**

**P.4.2.1. New York State Agencies (BOEM-2022-0053-0121)**

**Table P.4-5 Responses to Comments from New York State Agencies (BOEM-2022-0053-0121)**

Comment	Response
<p>Alternative B: The Agencies support Alternative B that would remove six (6) wind turbine positions in the northwestern portion of the Lease Area. This alternative offers expanded access to commercial fishing grounds reduction in navigational safety risks for commercial vessel traffic by increasing the setback distance to the highest density vessel traffic in the adjacent traffic lanes and Precautionary Area a reduction in adverse impacts to hard bottom habitats of Cholera Bank and improved conditions for scenic and visual resources compared to other action alternatives including the Proposed Action. As the Nation’s busiest port complex the NY/NJ Harbor is an economic driver for NYS and the region. Likewise New York’s robust commercial fishing industry is of economic significance to the State with areas like Cholera Bank providing prime fishing grounds. Alternative B prioritizes these important industries while reducing impacts to key coastal resources.</p>	<p>Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7.</p>
<p>Alternative D: The Agencies support Alternative D that proposes to avoid impacts to the sand borrow area off Long Beach NY. This sand borrow area is routinely used for beach nourishment projects and is the largest and closest borrow area to Nassau County’s south shore. Deeper burial depths to avoid the sand borrow area have been deemed infeasible by the developer therefore if the export cable crosses the sand borrow area it is expected to restrict the use of the borrow area and result in long-term impacts to nearby beaches and future resilience projects. If the borrow area is unavoidable the Agencies recommend that BOEM prepare an assessment of the volume of material that would become inaccessible as a result of the Proposed Action. Geophysical and geotechnical information collected to support development of the cable route should be used to delineate or verify the suitability of impacted sand resources.</p>	<p>Alternative D is incorporated into the Preferred Alternative.</p>
<p>Alternative F: Additional detail should be provided to explain the basis for the optimized turbine layout identified as Alternative F in the DEIS. Specific emphasis should be given to the justification for removing</p>	<p>See response to comment BOEM-2022-0053-0118-0007. An assessment of Empire’s most current base-case layout for the turbine array was added to Appendix I of the Empire Wind NSRA (COP</p>

Comment	Response
<p>turbine positions; explaining the need for turbine positions in the far northwest portion of the lease area; describing potential impacts to habitats in and adjacent to Cholera Bank; and describing potential impacts to fishing access and navigational safety given the irregular layout. The EIS should provide a descriptive analysis of this alternative to clearly explain the potential impacts something which is not provided for in some impact categories. For example Section 3.13 does not identify the impacts of Alternative F to Finfish Invertebrates and Essential Fish Habitat relying only on the assessment that “[t]he total area of habitat disturbed by or converted to hard-bottom habitat would not change under Alternatives B E and F compared to the Proposed Action.”</p>	<p>Appendix DD) and is analyzed in Section 3.16 of the Final EIS. The impact of retaining WTG positions in the northwestern portion of the Lease Area on Cholera Bank is analyzed under the impacts of Alternative A (Proposed Action), as these positions are included in Empire’s PDE. Impacts of the refined layout for Alternative F on commercial fishing and finfish are analyzed in Section 3.9 and Section 3.13 of the Final EIS.</p>
<p>Furthermore the Agencies recommend evaluating the technical feasibility of combining Alternatives B (removing six turbines) and F (optimized layout). Options to that either combine Alternatives B and F or refine Alternative F by substituting turbine positions in the northwest for those further to the southeast where geotechnical conditions are more promising should be thoroughly explored.</p>	<p>Empire’s optimized layout with consideration of glauconite in the Lease Area (Alternative F) includes 134 WTG positions that Empire found to be drivable, 2 WTG positions that are likely drivable with a reduced margin, and 2 WTG positions that are expected to be drivable with further engineering optimization for a total of 138 WTGs to be installed (compared to the Proposed Action of up to 147 WTGs). Given the reduction in WTG positions found to be drivable, BOEM determined that removal of 6 drivable WTG positions under Alternative B in combination with Alternative F would no longer meet the purpose and need.</p>
<p>Level of Impacts: The Agencies urge BOEM to refine its impact level definitions system to afford greater weight for impact avoidance. For example alternatives that allow for sensitive benthic habitat to be preserved should rank as less impactful than the proposed action that will negatively impact those habitats.</p>	<p>BOEM does not apply a ranking system to analysis of EIS alternatives. However, the relative impact of alternatives on each resource is considered in selection of the Preferred Alternative.</p>
<p>Weather and Natural Events: In Section 2.3 in the third bullet point (“[s]evere weather and natural events”) the DEIS should clearly describe the design parameters for the Wind Turbine Generators (“WTGs”) the weather conditions they have been designed to withstand the prevalence of such conditions and the likelihood of failure. As a point of reference a good example of the type of analysis we are recommending can be found in the DEIS for the Sunrise Wind Project on page 2-44 of that document. Such an analysis is important to assessing the impacts of severe weather events on the Proposed Action.</p>	<p>Additional information regarding the design parameters for the WTGs has been added to the severe weather and natural events bullet point in Section 2.3 of the EIS.</p>

Comment	Response
<p>In Section 3.4.5 the Social Cost of Greenhouse Gases (SC-GHG) is not exclusive to the three gases mentioned but applies to any GHG. For example the Environmental Protection Agency (EPA) has published SC values for HFCs that were not initially provided by the Interagency Working Group (IWG). For other gases such as SF6 an estimate can be produced using Global Warming Potential (GWP). Although modeled values are preferred by the IWG the GWP can provide information on some of the potential damages associated with radiative forcing. It is preferable to use the GWP as a temporary measure when needed rather than assume that these gases do not cause damages or that the cost of these damages is zero.</p>	<p>Social cost of sulfur hexafluoride estimates have been added to the EIS using the method suggested by the commenter.</p>
<p>The EIS should estimate the SC-SF6 as SF6 equipment will be installed and is expected to leak continuously during the equipment's useful life. As in the case of the CO2 CH4 and N2O damage estimates provided here the SC-SF6 would be estimated by converting the annual emission of SF6 to CO2e multiplying that emission by the SC-CO2 for that year and then summing across all years to calculate Net Present Value (NPV). We recommend using the GWP values provided in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment WG1 report from 2021 rather than the Fourth Assessment Report from 2007. The older GWPs are used in GHG accounting because of the national guidelines for emission reporting. However it would not be appropriate to use the 2007 values when estimating damages as they do not reflect the best available science or the substantial growth in GHG concentrations since that time.c. It would be useful to reference other data tables that contain the emissions estimate for each gas in each year.</p>	<p>Social cost of sulfur hexafluoride estimates have been added to the EIS using the method suggested by the commenter.</p> <p>The EIS has retained the use of Fourth Assessment Report Global Warming Potential values for consistency with other BOEM analyses.</p>
<p>In DEIS Appendix G Table 3.4-2 add notes clarifying (a) whether the data are based on Appendix K of the COP and include among other emissions sources emissions from all vessels travelling between SBMT and the Offshore Project Area and SBMT and third- party supply facilities (i.e. offshore wind and Staging); and (b) that these projections do not include emissions from Berthing Vessels which are addressed at Section 3.4.5.1 and in SBMT Environmental Assessment (EA) Appendix P.</p>	<p>The COP includes emissions for all emission sources, including vessels, within the scope of the Empire Wind Projects; please see Appendix K of the COP. This not only includes emissions from all vessels traveling between SBMT and the Offshore Project area, but also the following:</p> <ul style="list-style-type: none"> <li>• Vessels carrying monopile foundations sourced from overseas and either staged in Canada or brought directly to their offshore installation locations;</li> <li>• Vessels traveling from the Port of Albany, on the Hudson River in upstate New York, which was assumed to be the starting point for</li> </ul>



Comment	Response
	<p>the transit of the transition pieces for each turbine foundation, as well as for the wind turbine towers;</p> <ul style="list-style-type: none"> <li>• Vessels traveling from a submarine cable factory just north of Charleston, South Carolina;</li> <li>• Vessels traveling from a yet-to-be-determined port in the Corpus Christi, Texas area transporting the OSS topsides for EW 1 and EW 2, to the installation locations in the Lease Area. These will be brought directly to their offshore construction locations by a heavy transport vessel; and</li> <li>• Vessels traveling from Halifax, Nova Scotia for the transit of scour protection rock and gravel. Rock and gravel will be brought directly to the offshore construction locations by a fall pipe vessel.</li> </ul> <p>(b) Emissions from berthing vessels are not found in the COP, but in Appendix P of the Draft EIS, <i>Environmental Analysis of the South Brooklyn Marine Terminal Port Infrastructure Improvement Project</i> (SBMT EA). See Draft EIS Appendix P, SBMT EA Appendix P, Section 2.2.2.</p>
<p>In DEIS Appendix G Section 3.4.5.1 amend the final two paragraphs to read: “Emission sources associated with <u>construction and operations of SBMT</u> would include land-based non-road equipment and on-road vehicles <u>vessels performing dredging HVAC equipment emergency generators</u> <u>and vessels</u> <del>accessing</del> <u>berthed at the site</u> [Footnote 5: SBMT EA Appendix P (Supplemental Air Analysis) at section 2.2.1 indicates that emissions from such vessels during transit are separately captured in Appendix K to the COP. (“The vessels associated with transit for OSW construction have been accounted for in the Empire Wind Projects’ COP (May 2022) so they are not considered in this analysis.”)] <u>for staging and construction of the Empire Projects</u>. These emissions potentially could increase pollutant concentrations above the levels that were modeled for SBMT. <u>SBMT performed air quality dispersion modeling to estimate pollutant concentrations for the highest- emissions periods for SBMT construction and operation. The results showed that all concentrations during each phase would be well within the NAAQS and New York AAQS (NYCEDC 2022 Table 3.20-6);</u></p>	<p>The EIS text has been revised as requested.</p>

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<p>[underline] DEIS Appendix P SBMT EA Appendix P at pg. 205) [end underline]. [crossout] Construction and operation of the Proposed Action at SBMT would include land- based non-road equipment and on-road vehicles vessels accessing the site and emergency generators. These emissions potentially could increase pollutant concentrations above the levels that were modeled for SBMT.[end crossout] Comparison of the relative emissions for the Projects and SBMT indicates that the combined concentrations for the Projects and SBMT would be expected to be within the NAAQS and New York AAQS for each pollutant for all years of the Projects' construction and operation."</p>	
<p>In DEIS Appendix G Section 3.4.5.1 add a final paragraph that aggregates impacts of the connected action with localized impacts of the Proposed Action (i.e. allocated to Kings County) for those pollutants that can have localized impacts on air quality. The analysis should include emissions from (i) construction of SBMT (NYCEDC 2022 Table 3.20-6) (ii) operations of SBMT during Empire construction (NYCEDC 2022 Supplemental Air Analysis) and (iii) emissions from construction of Empire allocated to Kings County (COP Appendix K Section K-3 Geographic Allocation of Emissions).</p>	<p>Information on combined localized impacts of SBMT and Project construction has been added to the Final EIS.</p>
<p>In DEIS Appendix G Section 3.4.5.3 amend conclusions regarding the Connected Action to include conclusions on aggregate localized impacts (from Section 3.4.5.1 as amended above) counting both local emissions evaluated as part of the Proposed Action and emissions evaluated as part of the Connected Action.</p>	<p>A conclusion statement for combined localized impacts of SBMT and Project construction has been added to the Final EIS.</p>
<p>Section 3.12 has emissions tables for Albany County and Nassau County but no table for Kings County. There is a general reference to modeling in the SBMT EA but that data does not include offshore wind data allocated to Kings County.</p>	<p>A table of emissions for Kings County has been added to Section 3.12.5, as requested.</p>
<p>Pipe stringing activities (Section 3.8): Pipe stringing is expected to be required for EW2 cable landfall where trenchless technologies will be utilized. This work and the anticipated staging locations potential beach access and/or possible temporary restrictions on public access should be acknowledged and evaluated in the EIS. If it is truly uncertain then the Agencies recommend identifying this in Section 3.8.4 (variances in impacts).</p>	<p>The details on pipe-stringing staging are not available in the COP. Furthermore, Empire's CWA Section 404 permit application states that Empire is evaluating potential off-site upland staging areas for the pipe string fabrication. The Section 404 permit application does state that a pipe-stringing area to fabricate a single conduit of pipe string would be approximately 20 to 25 feet wide by the length of the pipe string (approximately 2,460 feet). After fabrication, the pipe or conduit string would be floated out to the offshore HDD exit point, where it will be installed by using the drill string to pull it back through the drill hole.</p>

Comment	Response
	Although it is likely that the pipe-stringing staging area would be located in already disturbed areas given the developed nature of the landing location, BOEM has identified the pipe-stringing activity staging area as a variance in EIS Section 3.8.4.
Sediment transport analyses in NYS waters (Section 3.8): impact of exposure from the contaminated sediment plume and exposed contaminated sediments on aquatic biota should be analyzed in greater detail and at a finer scale.	Potential impacts from contaminated sediment plumes and exposed sediments on water quality and aquatic biota are addressed in EIS Section 3.6, <i>Benthic Resources</i> , Section 3.21, <i>Water Quality</i> , and in the EFH Assessment. EFH consultation is ongoing, and a completed EFH assessment can be found at: <a href="https://www.boem.gov/renewable-energy/state-activities/nmfs-efh">https://www.boem.gov/renewable-energy/state-activities/nmfs-efh</a> .
Analyze cumulative effects of water quality and sediment conditions during and following construction for the Empire and SBMT projects. The Agencies recommend incorporating the EW1 Article VII sediment transport analyses into the EIS. [Footnote 6: See items 41 and 43 <a href="https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=65825&amp;MNO=21-T-0366">https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=65825&amp;MNO=21-T-0366</a> ]	Discussion of cumulative impacts on water quality and sediment conditions is included in Section 3.21, <i>Water Quality</i> . Section 3.21.5, <i>Impacts of the Proposed Action on Water Quality</i> , includes a summary of analyses from the <i>Empire Wind 1 Sediment Transport Study</i> (Deltares 2022), which is cited in the EIS.
Geographic analysis area (Section 3.9): The Agencies recommend that the range of states included in the commercial and for-hire fishing analysis should be reduced to reflect the states with active commercial fishing in the project. NYS has routinely commented that the range used to evaluate the average revenue and landings is too broad to evaluate a specific fishing area and leads to a diluted assessment of the overall effect on fisheries and fishing industries that may be affected by the Project. For comparison BOEM analyzed a well-defined and appropriate Regional Fisheries Area in the Revolution Wind DEIS (see Revolution Wind DEIS Figure 3.9- 2). Establishing a project-specific Regional Fisheries Area should be the standard for all offshore wind environmental reviews. Fishermen operating off New York should be afforded a similar detailed analysis as those operating off Rhode Island and Massachusetts.	The geographic analysis area is defined as the Mid-Atlantic and New England region, consistent with other COP EISs in this region. The comparison analysis for the Lease Area needs to be against the defined geographic analysis area. Accompanying landings and revenue from the Lease Area were presented to provide context for the percentages of revenue from the Lease Area.
[The analysis of potential impacts of the Project on fishing industries should include:] A quantitative analysis of fisheries economic exposure along the export cable corridors and shoreside industries (e.g. processors fuel suppliers distributors). The Agencies suggest relying on the RIDEM 2017 analysis for the export cable corridors in federal waters. [Footnote 7: See <a href="https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf">https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/bnatres/fishwild/pdf/RIDEM_VMS_Report_2017.pdf</a> ] Revolution Wind Vineyard Wind and South Fork Wind included	BOEM has determined that the qualitative analysis provided in Section 3.9.5 under the cable emplacement and maintenance IPF is appropriate for temporary cable route disturbance. BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.

Comment	Response
<p>quantitative exposure analyses of the wind farm area cable corridors and shoreside industries which set a precedent of analyzing the entire project area and full scope of potential upstream and downstream effects. BOEM’s draft fisheries mitigation guidance articulates the importance of developing accurate revenue exposure estimates in order to evaluate the potential for income losses to fishing industries and demonstrate the need for compensation. [Footnote 8: See Docket BOEM-2022-0033 and <a href="https://www.boem.gov/renewable-energy/reducing-or-avoiding-impacts-offshore-wind-energy-fisheries#:~:text=On%20November%2023%2C%202021%2C%20BOEMto%20commercial%20and%20recreational%20fisheries">https://www.boem.gov/renewable-energy/reducing-or-avoiding-impacts-offshore-wind-energy-fisheries#:~:text=On%20November%2023%2C%202021%2C%20BOEMto%20commercial%20and%20recreational%20fisheries</a>] Omitting the cable corridors and shoreside industries from this analysis would undervalue the revenue exposure estimate and is a departure from BOEM’s past EISs.</p>	
<p>[The analysis of potential impacts of the Project on fishing industries should include:] Careful consideration of methods to adjust for inflation over time and address regional and fishery-specific variation in shoreside industries. For example a 2020 report by Murray et al. [Footnote 9: Murray T.J. 2020. Economic Impacts of Reduced Uncertainty Associated with Fishery Management Actions with Summer Flounder Report to the Science Center for Marine Fisheries June 2020 available at <a href="https://scemfis.org/wp-content/uploads/2020/06/Econ_Flounder_2020.pdf">https://scemfis.org/wp-content/uploads/2020/06/Econ_Flounder_2020.pdf</a>.] provided estimates of value added for summer flounder that suggest a multiplier of 12X and a 2020 study from Scheld [Footnote 10: Scheld A. M. 2020. Economic Impacts Associated with the Commercial Fishery for Longfin Squid (<i>Doryteuthis pealeii</i>) in the Northeast U.S. Virginia Institute of Marine Sciences 2020 available at <a href="https://scemfis.org/wp-content/uploads/2020/03/LFS_EI_Report.pdf">https://scemfis.org/wp-content/uploads/2020/03/LFS_EI_Report.pdf</a>] reported a multiplier for longfin squid of 7.64X.</p>	<p>Revenue exposure for the Proposed Action was evaluated based on NMFS guidelines for evaluating socioeconomic impacts of offshore wind projects, which require a summary of ex-vessel revenue in the project area that has been adjusted for inflation to the most recent year. BOEM is proposing a mitigation measure that would require Empire to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>
<p>[The analysis of potential impacts of the Project on fishing industries should include:] Compensation for gear loss and damage that extends through operations and beyond if Project infrastructure is not fully removed.</p>	<p>Empire would implement a gear loss and damage compensation program that would extend through Project operations. Empire would be required to remove or decommission all Project infrastructure and clear the seabed of all obstructions when these facilities reach the end of their 35-year designed service life.</p>
<p>[The analysis of potential impacts of the Project on fishing industries should include:] A compensation value that is inclusive fair and equitable so that demonstrated impacts can be offset regardless of</p>	<p>Levels of funding to be set aside for fisheries compensation will be based on average annual revenue exposure within the Lease Area over the past 14 years, adjusted for inflation. The revenue exposure levels are estimated from ex-vessel revenues that reflect the price at</p>

Comment	Response
<p>where fishermen land their catch or where shoreside businesses are located.</p>	<p>which fishermen have sold their catch during this time period. BOEM generally expects that actual lost income is a portion of the total revenue exposure.</p>
<p>[The analysis of potential impacts of the Project on fishing industries should include:] A Record of Decision that emphasizes the need for a compensatory mitigation claims process that is transparent data-driven and uncoupled from states' Coastal Zone Management Act (CZMA) reviews and in so doing provides compensation for demonstrated impacts to communities and businesses in a fair and equitable manner.</p>	<p>BOEM recommends lessees establish a neutral third party to administer mitigation funds, process claims, and handle appeals or adjustments. The lessee or the neutral third party should honor verified claims from eligible entities. BOEM's suggested model is based on individual claims and directs funds to affected businesses. This mechanism ensures that claims are commensurate with the impacts on the claimant rather than pooled into a more general fund that may benefit the fishing industry more broadly.</p>
<p>Cable emplacement (Section 3.9): The analysis of impacts to commercial and for-hire fishing industries should be updated to reflect that significant displacement from construction noise and traffic will occur. As explained in BOEM's Fisheries Mitigation Guidance projects should assume 100% displacement during construction activities. Moreover cable emplacement activities will be longer than a few "hours" as currently characterized in the EIS especially in the Harbor approaches and NYS waters. The assessment should account for the pre-installation activities that will require pre-sweeping pre-jetting sand wave leveling and other site preparation weeks prior to cable installation. For example EW1 pre-installation activities as well as cable burial depth requirements of at least 15ft deep in certain locations necessitate specialized installation tools complex anchoring and spudding techniques and longer installation timeframes all of which have the potential to displace fishing activity along the export cable route on the order of months (not hours or weeks). The analysis of cable emplacement activities should more specifically address the unique circumstances and specialized installation techniques.</p>	<p>BOEM assumes that 100% displacement will occur within the Lease Area during construction. Rolling 500-meter construction zones would be used to minimize displacement along the submarine export cable corridor.</p> <p>Text describing pre-sweeping and pre-trenching activities has been added to Section 3.9.5 under cable emplacement and maintenance. Text has been added to note that target burial depth would be 15 feet in federally maintained navigation features, which would require specialized tools and longer installation times. The duration of impacts has been revised to "hours to days depending on the installation activity" to account for activities that require more time.</p>
<p>Sand borrow area (Section 3.14): The EIS should be updated to acknowledge the potential for longer-term impacts to beach and resilience projects from installing the EW2 export cable as part of the Proposed Action (vs. Alternative D) and subsequently restricting the use of the large sand borrow area off Long Beach NY. See also Item 1.c above.</p>	<p>An evaluation of the differences in impacts on sand borrow areas between the Proposed Action and Alternative D due to the change in the EW 2 export cable placement, is included in the Final EIS under Section 3.17.7.</p>
<p>The Agencies recommend updating the EIS to acknowledge that Alternatives B and F would more closely align with the two (2) nautical mile Traffic Separation Scheme setback distances specified in the</p>	<p>As noted in Section 3.16.6, Alternatives B and F would remove some WTGs (up to six) from the edges of the turbine array layout. Each alternative would still allow for installation of up to 147 WTGs as</p>



Comment	Response
<p>U.S. Coast Guard Marine Planning Guidelines and therefore have long-term risk reduction. [Footnote 11: USCG. 2019. Guidance on the Coast Guard’s Roles and Responsibilities for Offshore Renewable Energy Installations (OREI). NVIC 01-19. Available at: <a href="https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2019/NVIC%2001-19-COMDTPUB- P16700-4-dtd-01-Aug-2019-Signed.pdf?ver=2019-08-08-160540-483">https://www.dco.uscg.mil/Portals/9/DCO%20Documents/5p/5ps/NVIC/2019/NVIC%2001-19-COMDTPUB- P16700-4-dtd-01-Aug-2019-Signed.pdf?ver=2019-08-08-160540-483</a>]</p>	<p>defined in Empire’s PDE with the remaining and majority of the planned exterior wind turbine positions (along the northern and southern edges of the array) at a minimum 1-nm setback from the TSS. The WTG positions removed from the northwestern end of EW 1 for either Alternative B or F would decrease impacts on large (deep-draft) commercial vessel powered or drift allision risks (particularly for vessels traveling within the Hudson Canyon to Ambrose TSS lane) not because of a reduction in setback overall but because of the omission of the WTGs altogether. BOEM considered the navigation safe distance recommendations published in the USCG Marine Planning Guidelines (Enclosure 3 of NVIC 01-19) in conjunction with other mitigations of relevance in the Proposed Action such as a straight-edged alignment with the TSS lanes and suitable lighting and marking in consultation with USCG for risk reduction to navigation safety. No updates to the EIS were made in response to this comment.</p>
<p>The Agencies recommend that clarifying edits be made to the DEIS wherever vessel numbers are quantified to make clear whether such references include the nature of such vessels (i.e. construction or support) and whether they will be making trips to and from ports such as SBMT.</p>	<p>Port utilization for the Proposed Action is discussed in Section 3.16.5 (<i>Impacts of the Proposed Action on Navigation and Vessel Traffic</i>). Between 18 and 36 vessels could be operating simultaneously in the geographic analysis area at any given time during peak construction periods for the Proposed Action. These vessels would either be involved in construction activities or supporting construction activities as described in Table 3.4-1 of Volume 1 of the COP. Project vessel traffic numbers for construction activities are shown in Table 3.16-4 of the EIS. Vessels would transport components from the Port of New York and New Jersey to the Wind Farm Development Area. In some cases, WTG and cable components may be shipped from outside of the New York Bight area (from Texas and South Carolina) directly to the Wind Farm Development Area. SBMT is under consideration for the staffed O&amp;M facility from which O&amp;M-related crew transport would be accomplished. See discussion of the connected action in Section 3.16.5.1. No updates to the EIS were made in response to this comment.</p>
<p>The EIS should assess the feasibility of including mitigation measures to preserve public access to the beach throughout construction and minimize cable emplacement activities during the peak recreation season from Memorial Day through Labor Day which is of particular importance for the EW2 cable landfall. The EIS acknowledges that</p>	<p>Cable emplacement activities are not expected to significantly affect the onshore area. Onshore business would remain open during the entire construction period and the proposed cable landfall activities’ impacts on beach access would be limited. Although some facilities or parking spaces within the public roadway adjoining the beach may be temporarily restricted during cable installation to ensure public safety,</p>

Comment	Response
<p>impacts on recreation and tourism would be greater if construction were to occur during this season.</p>	<p>other nearby public access points for the beach would remain open for the duration of construction and for the operating life of the cable. The horizontal directional drills at the cable landfall would be entirely beneath the surface of the beach, and thus would have no impact on the public's ability to use the beach for recreational purposes.</p>
<p>It is not clear how the potential for water quality exceedances of contaminants was assessed. This should be clearly defined and described in the EIS. It should be noted that the "Sediment Transport Analysis" report (COP Appendix J) modeling was completed using non-site-specific data. Additionally Section 3.21-1 Description of the Affected Environment for Water Quality should mention the potential for increases in contaminant concentrations (not just total suspended solids and turbidity) in ambient waters from sediment disturbing activities.</p>	<p>See response to comment BOEM-2022-0053-0118-0033 regarding assessment of water quality exceedances.</p> <p>The Sediment Transport Analysis (COP Appendix J) is sufficient to provide a reasonable assessment of sediment plumes that could result from construction of the Projects. Information specific to the immediate Project location is not always available and these modeling efforts may use available information from nearby locations in developing the analysis. BOEM notes that the model approach and results provide a conservative estimate of the maximum potential suspended sediment transport and deposition impacts. Therefore, the model establishes an envelope of potential maximum impact with the actual impacts likely to be less than the impacts disclosed.</p> <p>Draft EIS Section 3.21.1, <i>Description of the Affected Environment for Water Quality</i>, describes the existing water quality conditions in the Project area. General discussions of contaminants are discussed under the "Other" part of the section. Disturbance of contaminated sediments for the Projects are described in Section 3.21.5, <i>Impacts of the Proposed Action on Water Quality</i>, under the cable emplacement and maintenance IPF.</p>
<p>The Connected Action will disturb and expose high Class B and Class C contaminated sediments. [Footnote 12: NYSDEC. 2004. Technical &amp; Operational Guidance Series (TOGS) 5.1.9: In-Water and Riparian Management of Sediment and Dredged Material. Division of Water Bureau of Water Assessment and Management. Available at: <a href="https://www.dec.ny.gov/docs/water_pdf/togs519.pdf">https://www.dec.ny.gov/docs/water_pdf/togs519.pdf</a>] The Agencies recommend further consultation with U.S. Army Corps of Engineers and NYSDEC on anticipated minimization and mitigation measures.</p>	<p>BOEM will coordinate with USACE and NYSDEC as cooperating agencies for the EIS. NYCEDC will also coordinate with USACE and NYSDEC directly on anticipated impacts and mitigation for the connected action through the USACE permitting process for in-water work.</p>
<p>Attachment H-2: The Agencies recommend coordinating with state and federal resource agencies to develop a new mitigation measure that requires avoidance of Unexploded Ordnance (UXO) detonation and where demonstrated to be necessary for the Project to seasonally restrict detonation to minimize protected marine species impacts. The</p>	<p>Empire conducted a UXO risk assessment and determined that the risk level for UXO is relatively low for most installation activities in the Lease Area. Risk level for UXO is medium along a portion of the EW 1 export cable route. Empire continues to evaluate the potential for UXO presence in the immediate Project area. It is anticipated that portions</p>

Comment	Response
<p>applicant should consult with state and federal agencies regarding seasonal restriction windows if detonation is necessary.</p>	<p>of the export cable route(s) would be surveyed and potentially cleared for UXO. Avoidance is the preferred approach for any identified UXO. When avoidance is not possible, UXO may be relocated to a safe location out of the work area using a lift and shift technique. Empire has not proposed UXO detonation in the COP.</p>
<p>Attachment H-3 Bird and Bat Monitoring Framework: The Framework currently proposes to initiate monitoring after EW2 is completed despite the phased construction schedule (turbine installation for EW1 is expected to begin in 2025-2026 while turbine installation for EW2 is expected to begin 2026-2027). The Agencies suggest considering the feasibility of initiating the Bird and Bat Monitoring Framework after EW1 is operational to allow the possibility of adaptive management by collecting important data from the beginning of Project operations and continuing after the Project is fully operational.</p>	<p>Over the past couple of years, the agencies have been working with the developer and BOEM on the framework. The rationale for initiating monitoring after EW 2 was to avoid confounding monitoring results with ongoing construction of EW 2. BOEM welcomes further discussion on the framework and subsequent plan with the developer and agencies.</p>
<p>Because the Agencies will rely upon the EIS for compliance with SEQRA adherence to the SEQRA EIS requirements is needed. SEQRA requires that EISs for electric generating facilities assess consistency with the most recent state energy plan. See 6 NYCRR 617.9(b)(5)(e). On April 8 2020 the New York State Energy Planning Board adopted amendments to the 2015 New York State Energy Plan to incorporate the CLCPA commitments. CLCPA commits the State to eliminating 100% of the electricity sector’s greenhouse gas emissions by 2040 the most aggressive clean energy requirement in the nation. To support this effort CLCPA increased the State’s interim renewable electricity commitments from 50% to 70% by 2030 to be achieved in part by the development of 9 gigawatts of offshore wind energy generating capacity by 2035. The DEIS should make clear that the Proposed Action advances the commitments of CLCPA and consequently the State Energy Plan. Accordingly DEIS Page 1-4 paragraph 4 should be modified as follows: “The Projects would contribute to New York’s goal of 9 gigawatts (GW) of offshore wind energy generation by 2035 as outlined in the New York State Climate Leadership and Community Project Act and likewise advance the goals of the 2015 New York State Energy Plan as amended on April 8 2020.”</p>	<p>Revised as requested.</p>

The New York State Agencies are New York State Department of Environmental Conservation, New York State Department of State, New York State Energy Research and Development Authority, and New York State Office of Parks, Recreation and Historic Preservation.

**P.4.2.2. New York State Department of Environmental Conservation (BOEM-2022-0053-0120)**

**Table P.4-6 Responses to Comments from New York State Department of Environmental Conservation (BOEM-2022-0053-0120)**

Comment	Response
<p>This letter focuses on comments associated with the SBMT facility connected action and the associated State Environmental Quality Review Act (SEQR) documents in DEIS Appendix P. Appendix P – Environmental Analysis of the South Brooklyn Marine Terminal Port Infrastructure Improvement Project General 1. SEQR regulations [Footnote 2: 6 NYCRR 617.9(b)(5)(iii)(d)] require that an Environmental Impact Statement (EIS) address “any growth-inducing aspects of the proposed action.” Growth-inducing aspects should be discussed anywhere there is discussion of indirect impacts.</p>	<p>Discussions of growth-inducing effects have been added to Sections 3.1, <i>Introduction</i>, 3.2, <i>Land Use, Zoning and Public Policy</i>, 3.3, <i>Socioeconomics</i>, and 3.4, <i>Community Facilities and Services</i>, and any other sections where appropriate in the Final Environmental Assessment.</p>
<p>Section 2.1 Reasonable Alternatives to the Proposed Project 2. SEQR regulations [Footnote 3: 6 NYCRR 617.9(b)(5)(v)] require that an EIS include “a description and evaluation of the range of reasonable alternatives to the action that are feasible considering the objectives and capabilities of the project sponsor. The description and evaluation of each alternative should be at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. The range of alternatives must include the no action alternative. The no action alternative discussion should evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future in the absence of the proposed action. The range of alternatives may also include as appropriate alternative: (a) sites; (b) technology; (c) scale or magnitude; (d) design; (e) timing; (f) use; and (g) types of action.” The Environmental Assessment (EA) does not provide a sufficient detailed alternative site analysis for sites considered by Equinor for staging and the Operations and Maintenance (O&amp;M) facility beyond SBMT. The EA should include an alternative site analysis “at a level of detail sufficient to permit a comparative assessment of the alternatives discussed.”</p>	<p>Section 2.1.2.1 of the EA discusses the site alternatives that were evaluated. The site alternatives evaluated in addition to SBMT included Howland Hook, Port Ivory (Parcel C), and Red Hook Container Terminal. As described in Section 2.1.2.1 of the Environmental Assessment, none of these site alternatives would meet the project’s purpose and need, so they are not practicable. As a result, a further detailed evaluation of these alternatives was not undertaken. Moreover, two of the three site alternatives would cause greater environmental impacts. In addition, the Environmental Assessment will reference and consider the information contained in NYSERDA’s Ports Cumulative Impact Study.</p>
<p>Section 3.3 Socioeconomic Conditions 3. Section 7(3) of the Climate Leadership and Community Protection Act (Climate Act) provides that all New York State agencies shall ensure that their decisions “not disproportionately burden disadvantaged communities” and affirmatively “prioritize reductions of greenhouse gas emissions and co-pollutants.” The New York State Climate Justice Working Group</p>	<p>Environmental Assessment Section 3.3.5, Environmental Justice, has been revised to reflect the SBMT project’s location in a disadvantaged community. As established in Section 3.3.5.5, the SBMT project would not result in any significant adverse impacts, and therefore would not result in any disproportionately high and adverse effects on environmental justice or disadvantaged communities. The further</p>

Comment	Response
<p>identified Disadvantaged Communities as required by the Climate Act. Please see <a href="https://gisservices.dec.ny.gov/gis/dil/">https://gisservices.dec.ny.gov/gis/dil/</a> for an interactive map of communities that meet the Disadvantaged Communities criteria. A review of the referenced interactive map by NYSDEC staff determined that the SBMT facility has the potential to impact a Disadvantaged Community. As such additional information pursuant to Climate Act Section 7(3) should be included in Section 3.3.5 Environmental Justice including the calculation of the co-pollutant emissions from each GHG source at the facility and the discussion of any alternatives or mitigation measures that will be used to reduce the impact of those emissions on the facility's neighbors.</p>	<p>reduction of GHG emissions including the co-pollutant emissions from each GHG source via alternatives or mitigation measures will be discussed and quantified if it can be reasonably estimated (e.g., the leakage of hydrofluorocarbons from the heating, ventilation, and air conditioning system cannot be reasonably estimated) with a summary to be included in Section 3.3.5. These alternatives and mitigation measures during construction and operation would include (1) potential use of electric cranes during permanent operations, (2) no use of natural gas service for heating and other uses, (3) incorporation of solar panels, (4) use of hybrid service operations vessels in lieu of fossil fuel vessels, (5) potential provision of electrical works to support vessel hoteling while at berth in lieu of running vessel diesel engines, and (6) use of shore power for construction (instead of diesel generators) and other BMPs will be implemented. In addition, the primary crew transfer vessels that will be needed during both construction and O&amp;M will use the engine models per the highest USEPA Tier marine engine standards in 40 CFR 1042 (which is Tier 4 for engines rated at 600 kilowatts or greater, and Tier 3 for engines rated at less than 600 kilowatts Section 3.3 will also be updated to reflect the final disadvantaged communities map.</p>
<p>4. As the DEIS acknowledges minority and low-income populations meeting New York State's definition of environmental justice populations are present in the vicinity of SBMT and the onshore substation for Empire Wind 1. [Footnote 4: See DEIS at 3.12.1.1] This community has historically endured exposure to adverse air quality and related health impacts in part due to exposure to emissions from fossil fuel based peak power plants and other sources of pollution like the Brooklyn Queens Expressway. [Footnote 5: See DEIS at 3.12.3.1 p. 3.12-13] The Empire Wind Project is expected to have long term beneficial impacts on air quality throughout the New York City region due to anticipated retirement of fossil fuel powered generation facilities. [Footnote 6: See DEIS at 3.12-21] However as the DEIS acknowledges environmental justice communities near onshore construction and ports "could experience adverse impacts from air emissions." [Footnote 7: See DEIS at p 3.12-19] While the DEIS further states that it expects these impacts to be "minor temporary and variable" an aggregate assessment of these localized impacts for the</p>	<p>The air quality impact analysis was conducted for SBMT upgrade-related construction activities during which the most intensive air emissions from all sources would occur on site. The analysis, conducted via dispersion modeling, not only estimates the contributions of the project to ambient pollutant concentrations in the neighborhood but also includes the monitored ambient concentrations recorded at the closest monitoring station; these monitored ambient conditions reflect background stationary and mobile sources such as off-site traffic along local roadways and highways. Therefore, the contributions from off-site sources were accounted for in the modeling in an aggregated way. The results from the analysis of the most intensive use of emission sources during the SBMT project construction plus the ambient monitoring results from other sources show no violation of the NAAQS. It can be anticipated that during other SBMT operational periods when emissions are lower, there would be fewer impacts as compared to the phases modeled (which showed no violation of the NAAQS). Therefore, potential air quality impacts during the SBMT project's construction and operational</p>



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<p>SBMT community should be prepared and included in the EA to reconfirm that impacts will be minor.</p>	<p>conditions would be minor. No further aggregated analysis is warranted. Please also see the response to comment 9.</p> <p>The worst-case condition during construction phases with the most equipment and shortest distance between the source and receptors was described in Chapter 20. The modeling results are summarized in Table 3.20-6. These results will be cross-referenced.</p> <p>The total concentrations summarized in Table 3.20-6 consist of (1) the worst-case neighborhood levels that would occur from project construction activities and (2) the levels collected from the closest monitoring stations to reflect the ambient background concentration levels contributed from the existing sources around the closest stations. These monitoring stations with continuous monitoring results were selected by USEPA/NYSDEC to establish city-wide representative ambient air quality conditions with contributions from all existing sources. By combining both elements, the predicted total concentrations within the neighborhood would consist of both project-induced and existing source contributions. As shown in Table 3.20-6, these combined contributions would not cause an exceedance of the NAAQS or City de minimis thresholds.</p> <p>USEPA research indicates that pollutant concentrations from ground-level mobile sources such as those considered in this modeling (e.g., trucks, equipment) generally decrease to background levels within 500–600 feet. <a href="https://www.epa.gov/sites/default/files/2015-11/documents/420f14044_0.pdf">https://www.epa.gov/sites/default/files/2015-11/documents/420f14044_0.pdf</a>. Therefore, for receptors beyond a certain distance from these sources, the potential air quality impacts would be negligible. This research is consistent with the screening distances established in the <i>CEQR Technical Manual</i> and used in the analysis.</p>
<p>Section 3.11 Water and Sewer 5. The following general comments apply to Section 3.1.1:a. A water quality monitoring plan should be implemented during dredging and in- water construction b. Turbidity curtains should be installed used and maintained. c. Where contamination of aquatic sediments are summarized sediment contamination should be provided in the context of NYSDEC’s Division of Water Technical &amp; Operational Guidance Series 5.1.9 (TOGS 5.1.9) (e.g. individual contaminants present and classification based on TOGS 5.1.9 criteria).d. Where there is discussion of the removal of existing cofferdams more information should be provided including: the</p>	<p>5a - A water quality monitoring plan will be implemented, following permit requirements, and developed in coordination with NYSDEC.</p> <p>5b - Turbidity curtains will be used to the extent possible during in-water work, and as reflected in permit requirements.</p> <p>5c - Environmental Assessment Sections 1.2, 1.3.2.2, 3.10.3.1, and 3.20.2.1.4 discuss sediment contamination in the context of Technical &amp; Operational Guidance Series 5.1.9. In addition, a copy of the Data Usability Summary Report was submitted as Appendix H to the Permit Information Packet submitted with the Joint Permit Application.</p>

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<p>area and volume of material to be removed; type of habitat that will be created and whether this habitat will be shaded by the proposed platform; what type of sediments are in the cofferdam; if there are any contaminants that would be exposed to the waterway; and what BMPs will be used during the removal to protect the surrounding waters.</p>	<p>5d – Initial information regarding the 35W cofferdam removal is given in Joint Permit Application Section 2.1.3.5. A revised summary of in-water work table is attached; this table more accurately reflects the following information: Removal of the cofferdam will remove a total of 16,259 cubic yards of fill and structure over an area of 0.4581 acre (19,953 square feet). The area will receive 4,101 cubic yards of stone fill, for a net removal of 12,158 cubic yards of fill. The exposed new habitat will extend from the existing “pier” surface to the mudline.</p> <p>The newly created habitat will be of four types: upland slope, covered with layers of bedding and riprap stone (identical to adjacent riprap slopes) (0.0645 acre, 0.0475 acre of which will be shaded); tidal wetland slopes covered with stone (0.2082 acre, 0.1534 acre of which will be shaded); marine habitats covered with stone (0.0416 acre, 0.0307 acre of which will be shaded); and marine habitats of open fill exposed through removal of the cofferdam (0.1437 acre, 0.1058 acre of which will be shaded).</p>
<p>6. 3.11.3.2 Future with Project – please address the following comments on this section: a. This section does not specify the discharge point for Drainage Area B. This should be described in more detail. b. Drainage Area D is described as both a direct discharge and reusing an existing connection to city sewer. This requires clarification. c. Drainage Areas D and H are proposed to reuse existing city sewer connections. Please mark out proposed connection location to existing sewer on Figure 3.11-2 (if different from the mark out for Drainage Area E) and revise the narrative as necessary.</p>	<p>6a -Upon New York Department of Environmental Protection review and approval, Drainage Area B will be connected via the existing 18-inch-diameter stormwater sewer to the existing New York Department of Environmental Protection 48-inch stormwater sewer in 39th Street. 6b- Upon developing the design, it has been determined that Drainage Area D will not be connected to city sewer; it will only discharge directly to the bay. All proposed discharges to the bay will have new hydraulic separators installed and will be approved by the New York Department of Environmental Protection. 6c - As mentioned above, Drainage Area D will not be connected to city sewer. Drainage Area H will connect to an existing 24-inch storm sewer in 29th Street. As noted, all proposed discharges to the bay will have new hydraulic separators installed and will be approved by the New York Department of Environmental Protection. The narrative will be updated accordingly in the Final Environmental Assessment.</p> <p>The majority of the outfalls were deemed inadequate structurally or did not have the hydraulic capacity to meet design and regulatory requirements. All but one existing outfall will be upgraded, which will involve upgrading the pipe and structure at existing outfall locations. No expected excavation or fill within navigable waters is expected. No new outfalls are proposed.</p>

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<p>7. Figure 3.11-2 does not include the 35th street "pier" in a drainage area but pavement removal is planned for this section.</p>	<p>The final pavement and grading of 35th Street is currently being designed; that design will determine the appropriate drainage area. All drainage will pass through a new hydraulic separator before discharge to the bay. Please see response to BOEM-2022-0053-0120-0006.</p>
<p>Section 3.13 Energy 8. In accordance with 6 NYCRR 617.9(b)(5)(iii)(e) this section should include the following narrative: "impacts of the proposed action on the use and conservation of energy (for an electric generating facility the statement must include a demonstration that the facility will satisfy electric generating capacity needs or other electric systems needs in a manner reasonably consistent with the most recent state energy plan)."</p>	<p>SBMT is not an electric generating facility and this requirement does not apply. The relevant impacts on use and conservation of energy are minimal because the current design of the O&amp;M building includes Leadership in Energy and Environmental Design certification. In addition, the building will be fully electric with high-efficiency heating, ventilation, and air conditioning equipment meeting or exceeding requirements. A discussion on the use and conservation of energy will be added to the Environmental Assessment.</p>
<p>Section 3.15 Air Quality 9. Amendments to the SBMT EA are recommended. Specifically the discussion in Section 3.15 focuses solely on regional level impacts and compliance with National Ambient Air Quality Standards (NAAQS) without discussion of potential local impacts even though data on the latter is available. The EA also screens out specific impact components individually without considering whether more detailed analysis would or would not be warranted if considered in aggregate (e.g. combined emissions from off-site on-road vehicle trips and HVAC emissions).</p>	<p>Pursuant to the City Environmental Quality Review Technical Manual, a detailed analysis is not warranted for the localized impacts anticipated during the SBMT operational phase.</p> <p>It should be noted that a detailed localized analysis was conducted for the SBMT construction period solely per the city-specific guidance; it is not required under the federal guidance for either the 2-year (2024 and 2025) SBMT site upgrade or the 2-year SBMT staging phase (EW 1 and EW 2 construction phases, 2026 and 2027), or for both periods, if conservatively considered as a 4-year period of construction. According to 40 CFR 93.123(c)(5), "CO, PM10, and PM2.5 hot spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site." Therefore, any aggregated assessment via dispersion modeling with comparisons of NAAQS (i.e., hot spot analysis) is not warranted under NEPA. The operational condition from 2028 and beyond (after EW 1 and EW 2 become operational) is purely speculative and cannot be reasonably defined at this time. The estimate of potential annual emissions during SBMT operations beyond 2028 conservatively assumed that activities would be comparable to the SBMT staging phase (EW 1 and EW 2 construction phases) for a disclosure purpose and making a comparison primarily as part of general conformity rule applicability analysis. Off-site vehicle trips during operation are</p>

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	<p>negligible since vehicle trips do not even exceed the traffic screening threshold per City Environmental Quality Review. In addition, heating, ventilation, and air conditioning will be powered by the grid, resulting in no criteria pollutant emissions. Therefore, a detailed aggregated analysis is not warranted.</p> <p>Although this comment references operational impacts, given the greater amount of equipment and closer distances to sensitive receptors during the construction phase as compared to the operational phase, the cross-reference to Table 3.20-6 showing construction-related impacts will be made.</p> <p>Traffic screening is relevant to specific intersections where pedestrians (receptors) are immediately adjacent to the sources and have the potential to be affected by traffic congestion. The same adjacency does not exist for vessels, which are typically far from the sensitive receptors; therefore, no similar screening procedures/thresholds have been established in the City Environmental Quality Review Technical Manual, nor is it necessary to consider these sources for the SBMT project (also see explanation provided in response to comment #4). In this case, the vessel traffic would occur 1,000 feet or more from the closest sensitive receptors. As a result, a localized impact analysis is not warranted per the City Environmental Quality Review Technical Manual distance screening threshold.</p>
<p>10. 3.15.1 Affected Environment – In the first paragraph and Table 3.15.2 consider that while the closest monitoring stations show just under the NAAQS New York State shares a nonattainment area with Connecticut and those monitors show design values above the NAAQS.</p>	<p>The document will add a brief discussion of nonattainment status of the region within which Kings County is located. Table 3.15-2 reflects the air quality conditions at a local level where the project is located.</p>
<p>11. Section 3.15.2.2 Future with Project – A new subsection should be added to report on the results of the supplemental analysis provided in the Supplemental Air Quality and Climate Change Analysis. This new subsection should make it clear that the analysis considered quantitative emissions from all land-based sources including the emissions from off-site on-road vehicles discussed in Section 3.15.2.2.1; from on-site emissions discussed in Section 3.15.2.2.2 including HVAC equipment cranes and other on-site vehicles and equipment; and from Berthed Vessels. This new subsection should address not only regional level NAAQS screening criteria but localized</p>	<p>This section was prepared by following the City Environmental Quality Review analysis guidance (2021 City Environmental Quality Review Technical Manual) as the quantification of these operational emissions is not warranted. However, the direct and indirect emissions presented in the Supplemental Air Quality and Climate Change Analysis, included as Environmental Assessment Appendix P, will be incorporated into this section in the Final Environmental Assessment. The City Environmental Quality Review Technical Manual establishes various source- (stationary or mobile source) specific screening thresholds in terms of source-receptor distances within which an impact analysis via a quantitative analysis is warranted. Because the</p>

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screening criteria consistent with City Environmental Quality Review (CEQR) microscale analysis.	proposed on-site operation of these sources such as cranes, vessels, trucks, etc. would not operate within the applicable distance between the stationary/mobile sources and sensitive receptors, “quantification of these operational emissions is not warranted.” Even though Section 3.20 pertains to construction activities, we will add a statement cross-referencing Table 3.20-6. Also see response to BOEM-2022-0053-0120-0009.
12. 3.15.2.2.2 On-site Sources – in the third paragraph the statement that mobile equipment operation would not result in “significant adverse air quality impacts” because they will operate 600 feet away does not address the NAAQS requirements.	The 2021 City Environmental Quality Review Technical Manual establishes a screening radius of 400 feet beyond which non-major stationary sources are unlikely to result in significant air quality impacts in terms of NAAQS. The sentence will be revised to reflect the 400-foot screening criterion and its connection to the NAAQS requirements.
13. Section 3.15.2.3 Indirect Effects and Cumulative Impacts - Expand or supplement the cumulative impacts discussion to account for cumulative emissions of the SBMT Project with Empire Wind Project emissions allocated to Kings County in the COP Appendix K viewing on both a regional and local level.	Both operational and construction emissions for the SBMT project will be combined with the emissions presented in the COP for other projects within Kings County to provide cumulative emissions on a regional level in the Final Environmental Assessment.
14. 3.20.4.2.2.4 Fugitive Dust - Clarify if the statement “measures would be implemented as practicable to reduce pollutant emissions in accordance with applicable regulation” means that there will be compliance with regulations or if there are any planned efforts to go above and beyond.	The statement means that the project will comply with regulations, which are designed to minimize potential emissions.
15. 3.20.4.2.2.5 Analysis Periods – The first sentence states “[t]he resulting emission factors were used....” Explain what the emission factors resulted from. If it’s from a MOVES run please explain methodology. Alternatively if it is referring to Table 3.20.4.2.3 a reference to that table should be included in the text.	The methodology will be explained and further information provided. The phrase “resulting emission factors” refers to the emissions factors described in the preceding two sections: the engine emission factors estimated from MOVES and the fugitive dust emissions from AP-42. These emission factors from equipment engines were then used in association with other factors, such as engine operating hours, size, and load factors, to calculate short- and long-term emission rates as depicted in the profile figures (Figures 3.20-3 through 3.20-5) for further dispersion modeling.
16. Figure 3.20.6 NOx Annual Emission Rate Profile: Consider highlighting that this is less than the conformity de minimis threshold.	Change has been made.
17. 3.20.4.2.2.8 Impact Determination – In the third paragraph it states that because the proposed construction duration is less than 3 years the NAAQS with a 3-year average do not apply. It should be noted that	Potential impacts from temporary construction activities are not treated in the same way as continuing operational activities for which the NAAQS were established. Those NAAQS that require 3 years of data



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<p>the length of a project does not change its impact on the NAAQS. This comment also applies to Table 3.20-5.</p>	<p>to determine compliance do not apply to temporary activities of shorter duration. Per New Source Review Workshop Manual (<a href="https://www.epa.gov/sites/default/files/2015-07/documents/1990wman.pdf">https://www.epa.gov/sites/default/files/2015-07/documents/1990wman.pdf</a>), USEPA “allows for the exclusion of temporary emissions (e.g., emissions occurring during the construction phase of a project) when establishing the impact area and conducting the subsequent air quality analysis.” Therefore, such temporary/shorter-duration emissions do not require air quality analysis, which is relevant to the comparison with the NAAQS.</p> <p>This section addresses potential on-site localized emissions impacts on the neighborhood in terms of concentration levels for localized pollutants with respect to NAAQS. The General Conformity Rule covers both direct and indirect off-site emissions that can be reasonably estimated including those regional pollutants such as NO<sub>x</sub> or VOCs that are not addressed in this section. Therefore, there is a separate section (3.20.4.2.4) that addresses meeting the General Conformity Rule requirement for all relevant pollutants (see Table 3.20-7).</p> <p>As previously explained, the NAAQS comparison analysis for short-term construction activities is not warranted per common impact modeling practice. Moreover, the General Conformity Rule states “CO, PM10, and PM2.5 hot spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established ‘Guideline’ methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site” (40 CFR 93.123(c)(5)).</p> <p>Therefore, the analysis performed and discussed in Section 3.20 is not required under NEPA or the State Environmental Quality Review Act. However, given more stringent requirements established in the City Environmental Quality Review Technical Manual, this analysis including demonstrating compliance with City de minimis thresholds was conducted.</p>
<p>18. Table 3.20.7 General Conformity Annual Emissions (in tons) - The NO<sub>x</sub> number for dredging does not appear to be accurate and is important for this determination. It appears that a column adjustment may be needed.</p>	<p>The printout error of NO<sub>x</sub> in the table has been corrected.</p>

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<p>Appendix P Supplemental Air Quality and Climate Change Analysis General 19. Regarding SF6 this GHG is specifically mentioned in Section 3 of the Supplemental Air and Climate Change Analysis (the “Supplemental Analysis”) but is not mentioned in Section 4 of the Supplemental Analysis. In a few places in Sections 3.15 and 3.16 of the EA this sentence is added “[t]herefore air quality conditions within the Study Area as compared to the existing baseline condition would be impacted by the operation of an emergency generator at the onshore substation and from GHG emission leakages of sulfur hexafluoride from gas-insulated switchgear installed at the onshore substation.” While it is likely that the overall CO2e emission reductions that could be achieved through this Project that is not sufficient justification to ignore these emissions in Section 4 of the Supplemental Analysis entirely and to introduce new SF6 equipment if alternatives are available. The CLCPA Draft Scoping Plan discusses why New York State needs to phaseout SF6 equipment (Strategy E7 page 167). This Project should seek to avoid the SF6 emissions noted in Sections 3.15 and 3.16 of the EA. Section 4 of the Supplemental Analysis should describe these emissions; include why SF6 emissions are a particular environmental concern (e.g. the Draft Scoping Plan discusses their high GWP and atmospheric lifetime of &gt;3000 years); provide a rationale for why non-SF6 equipment was not considered for this Project; and indicate how SF6 emission leakage will be controlled.</p>	<p>Switchgear-related sulfur hexafluoride has been added to the Supplemental Air and Climate Change Analysis.</p>
<p>Section 2 Air Pollutant Emissions Estimate 20. Section 2.13 Greenhouse Gas Emissions – This section lists the GHGs subject to the CLCPA and Part 496. However Section 4 Greenhouse Gas Emissions and CLCPA Consistency reports only some GHG emissions associated with energy (i.e. fuel combustion and electricity). There are also emissions from the fluorinated GHGs SF6 and HFCs. This includes from the use of gas insulated switchgear and HVAC equipment (electric heating and cooling). Section 4 should be updated to include all the GHGs subject to the CLCPA and Part 496.</p>	<p>The switchgear-related GHGs will be included in Section 4. However, the leakage of hydrofluorocarbons from the heating, ventilation, and air conditioning system cannot be reasonably estimated. A hydrofluorocarbon leak control discussion (as summarized in response to comment #23) will be added to Section 4.</p>
<p>21. 2.3.1.2 Fugitive Dust - Clarify if the statement “measures would be implemented as practicable to reduce pollutant emissions in accordance with applicable regulation” means that there will be compliance with regulations or if there are any planned efforts to go above and beyond.</p>	<p>Fugitive dust measures will be in compliance with the regulations, which are designed to minimize potential emissions. In addition, a Community Air Monitoring Plan will be implemented during subsurface work as part of the NYSDEC Brownfield Cleanup Program.</p>

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<p>Section 4 Greenhouse Gas Emissions and CLCPA Consistency<sup>22</sup>. NYSDEC recently updated the fossil fuel emission factors to be used in Climate Act analyses based on updated information. The revised factors can be found here <a href="https://www.dec.ny.gov/energy/99223.html">https://www.dec.ny.gov/energy/99223.html</a>. The calculations should be revised using these factors.</p>	<p>Update has been made.</p>
<p>23. Regarding HFCs and HVAC there is not sufficient information as to the HFCs that will be associated with the electric “heating and cooling” equipment referred to in Section 4.2 and 4.3 of the Supplemental Analysis. In Section 4.3 the use of electric heating is cited as a lower GHG option compared to gas but there is no explanation as to whether the equipment in question contains HFCs (i.e. if it is a heat pump). However HFCs used in HVAC equipment are also subject to the Climate Act and were the subject of the Draft Scoping Plan strategies B11 and W5. It would be appropriate for Section 4 to indicate which HFCs may be emitted (i.e. refrigerant blend) an estimate of HFC leakage and an indication how operational and end-of-life emissions would be controlled. If the Project seeks to install HVAC equipment with high-GWP refrigerants (i.e. those with a 20-year GWP above 750) for which lower-GWP alternatives are available then this should be reconsidered or justified. The adoption of high-GWP HFC refrigerant is not consistent with the Climate Act. Given the federal phasedown under the AIM Act these refrigerants are expected to also be associated with higher maintenance costs as soon as 2024.</p>	<p>The current design of the O&amp;M building includes Leadership in Energy and Environmental Design certification with minimal impacts on energy conservation. In addition, the building will be fully electric with high-efficiency heating, ventilation, and air conditioning equipment. Rooftop air source heat pumps will be used to provide heating and cooling for the O&amp;M base. During the winter, additional heating will be provided with variable air volume duct-mounted electric heating coils. The rooftop units will include hydrofluorocarbon refrigerants (R410A), which have a high global warming potential of over 2,000. While there is the potential for leakage, periodic maintenance will be performed to inspect and test the refrigerants to minimize the likelihood of leakage. When the refrigerant is removed in the future, it will be removed and stored in accordance with USEPA regulations. Moreover, some manufacturers indicate that newer refrigerants (R-454B with low global warming potential of 466) will be available in 2025 to replace the R410A; if that occurs, such refrigerants will replace R410A when appropriate and when such replacement can be accomplished without reducing the rooftop units’ cooling and heating capacities.</p>
<p>24. Section 4.3 Consistency with Climate Leadership and Community Protection Act – This section states that the project is consistent with the achievement of the Statewide Emission Limits of the Climate Act because any volume of GHG emissions will be overshadowed by the reductions in electricity emissions offered by OSW. All GHG emissions sources must be all but eliminated by 2050 under the law regardless of the type of project being proposed. Additionally a correction should be made to reflect that the Climate Act targets are mandates not goals.</p>	<p>The Consistency with Climate Leadership and Community Protection Act requires reaching net zero, which refers to a state in which the GHGs going into the atmosphere are balanced by removal out of the atmosphere. For example, the new GHG emissions sources (e.g., equipment) required to run EW 1 and EW 2 would be substantially lower than those produced by fossil fuel power plants (i.e., a GHG removal that is greater than those generated from the new GHG sources, resulting in net-zero target being achieved). The Consistency with Climate Leadership and Community Protection Act does not require the elimination of all GHG emissions sources by 2050, although the SBMT project does minimize GHGs to the extent possible. The final Scoping Plan issued pursuant to the Consistency with Climate Leadership and Community Protection Act (<a href="https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-12-19-NYS-Climate-Action-Council-Finalizes-Scoping-Plan-to-">https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-12-19-NYS-Climate-Action-Council-Finalizes-Scoping-Plan-to-</a></p>

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	<p><a href="#">Advance-Nation-Leading-Climate-Law</a>) “outlines actions needed for New York to achieve 70 percent renewable energy by 2030; 100 percent zero-emission electricity by 2040; a 40-percent reduction in statewide greenhouse gas emissions from 1990 levels by 2030, an 85-percent reduction from 1990 levels by 2050; and net-zero emissions statewide by 2050.” The targeted reduction from 1990 level further indicates that not all GHG emissions sources will be eliminated by 2050.</p> <p>The Applicant acknowledges the importance of reducing GHG emissions, and GHG emissions have been minimized to the maximum extent practicable for the SBMT project. The SBMT project is critical in supporting the development of offshore wind and helping New York State achieve the Consistency with Climate Leadership and Community Protection Act’s mandates. As stated in the NYSERDA Port study, “the short-term emissions of the OSW ports that would occur regionally during construction would be greatly offset by the regional net air pollution reduction (CO2, methane, PM 2.5 and other GHG) that would occur once the 9,000 megawatts (MW) of the OSW farms are operational” (S-15). Moreover, according to that study, in the “Planned Alternative” scenario, which includes SBMT, “New York state would avoid more than 8.7 million tons of GHG emissions, 1,800 tons of NOx, 780 tons of SO2, and 180 tons of PM 2.5 compared to a business-as-usual scenario without OSW energy” (S-16)</p> <p>A similar discussion will be added to the Environmental Assessment.</p>
<p>25. Table 4-3 Upstream Indirect GHG Emissions Associated with Operation of the Proposed Project - There appear to be issues with some of the numbers in Table 4-3 as follows: a. The two rows for on-site equipment diesel fuel use do not appear to have used the 20-year GWP for at least methane and potentially nitrous oxide when the CO2e column was calculated. b. The two rows for electric power use have methane and nitrous oxide values ten times higher than what NYSDEC calculates based on usage and emission factors given.</p>	<p>The calculation has been corrected, and the table has been updated.</p>
<p>Section 5 Climate Change26. Section 5.1 Community Risk and Resiliency Act (CRRRA) - CRRRA requires applicants for major permits in New York State to demonstrate consideration of future physical climate risk. Climate hazards most relevant to offshore wind projects are effects of sea level rise and more frequent extreme precipitation on related onshore development. Section 5.1 should incorporate</p>	<p>The following statement will be added to Section 5.1: “The upgraded stormwater management system for SBMT is being designed for extreme storm events with rainfall intensity duration curves obtained from the Extreme Precipitation in New York and New England data, available at: <a href="https://precip.eas.cornell.edu/#/data_and_products">https://precip.eas.cornell.edu/#/data_and_products</a>.”</p>

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<p>projected sea level rise; change in extreme precipitation parameters; and a resilience assessment of the onshore facility and of its effects on natural and cultural resources under projected conditions of extreme precipitation. The projected frequency and magnitude of extreme precipitation events as provided by the Northeast Regional Climate Center should be incorporated into siting and design of onshore projects.</p>	
<p>27. Section 5.2.4 Sea Level Rise - This section misstates projected sea level rise for New York City as 12 to 48 inches by 2100. However both the reference provided (Horton et al. 2014 and 6 NYCRR Part 490) provide a range of 15 to 75 inches of sea level rise in New York City by 2100. The other reference provided (Frankson et al 2022) provides a projection of 12 to 48 inches of global sea level rise by 2100 but as described in the first paragraph of this section the rate of sea level rise at New York City exceeds the rate of global sea level rise. This portion of the section should be corrected. An expected end of project date of 2050 appears to be implicit but should be stated more explicitly to clarify the selection of sea level rise projections. The projections cited for 2050 (8 to 30 inches) are correct and the risk assessment (Section 5.3.2.3) indicates the potential for some ponding to occur at between two and three feet of sea level rise.</p>	<p>The following discussion has been added to Section 5.2.4: “The Operations and Maintenance Base buildings are being designed for sea level rise projections per the NYC Mayor’s Office of Resiliency, Climate Resiliency Design Guidelines - Version 4.0. The value used for SLR is 16 inches considering a 2050s End of Useful Life Horizon. This value is consistent with the DEC regulation’s Medium Projection for the New York City/Lower Hudson Region.”</p>
<p>28. Section 5.2.4 Sea Level Rise - Siting and design decisions should incorporate the projections provided by 6 NYCRR Part 490 including application of the medium projection (16 inches by 2050s) for non-critical facilities and equipment and the high projection (30 inches by 2050s) for critical facilities and equipment for the expected life of the Project. NYSDEC is available for consultation to determine what elements of the Project may be considered critical facilities and equipment.</p>	<p>The following discussion has been added to Section 5.2.4: “An SLR value of 16 inches has been adopted for the design of both critical and noncritical facilities within the SBMT in accordance with NYC Mayor’s Office of Resiliency, Climate Resiliency Design Guidelines. A distinction in design is made between critical and noncritical facilities and equipment in the required freeboard level. Per the NYC Climate Resiliency Design Guidelines, the freeboard considered for noncritical facilities and equipment is 12 inches, while the freeboard for critical facilities and equipment is 24 inches. For the SBMT O&amp;M Base, the office building is being designed as a critical facility and the warehouse as noncritical.”</p> <p>The assumed sea level rise for critical facilities was not 16 inches. The minimum first floor elevation for critical features (buildings, above ground electrical utilities) in the proposed design is 21.83 feet North American Vertical Datum of 1988 (NAVD88).</p> <p>The 1% flood elevation at the site is 13.0 feet NAVD88. The 0.2% flood elevation is 14.33 feet. Sea level rise (high projection) for the</p>



Comment	Response
	<p>2050s is 2.5 feet. NYSDEC’s freeboard requirement for critical structures is 3.0 feet (36 inches).</p> <p>The required design elevations are as follows:            1% storm = 13.00 feet + 2.5 feet + 3.0 feet = 18.5 feet            0.2% storm = 14.33 feet + 2.5 feet + 3.0 feet = 20.33 feet</p> <p>Therefore, all critical structures are designed to be 3.33 and 1.5 feet above the requirements for the 1% and 0.2% events, respectively.</p> <p>The other features included in the discussion and analysis are the non-critical structures, which include bulkheads, wharf decks, and roadways. These will all remain above the mean higher high water and sea level rise (high projection) for the 2050s as designed. They would, however, be submerged during flood events but designed to do so with no damage. Additional information and details can be found in the attached revised SBMT Policy 6.2 document and New York City Department of City Planning flood evaluation worksheet.</p>
<p>29. Section 5.2.5.2 – Correct spelling of “coastal” in last sentence of the first paragraph. NYSDEC appreciates the opportunity to provide comments on the Empire Wind DEIS for the SBMT connected action. Please feel free to contact me at karen.gaidasz@dec.ny.gov for further detail on the above comments.</p>	<p>Correction has been made.</p>

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## P.5. Responses to Lessee Comments on the Draft EIS

**Table P.5-1 Responses to Comments from Empire Offshore Wind, LLC (BOEM-2022-0053-0136)**

Comment	Response
<p>[Bold: Corrections to the DEIS Recitation of the PDE.] The description of the Project Design Envelope (“PDE”) in the DEIS deviates in minor respects from the PDE set forth in the COP and the administrative record. A table providing the correct PDE parameters is provided in Attachment B. To be clear Attachment B does not propose changes in the PDE; rather it indicates corrections to the description of the PDE in the DEIS to align it with the COP and the administrative record.</p>	<p>The commenter’s specific comments in their Attachment B regarding how the description of PDE in the Draft EIS deviates from the PDE in the COP have been addressed in the responses to comments BOEM-2022-0053-0136-0114 through BOEM-2022-0053-0136-0124.</p>
<p>[Bold: O&amp;M Base.] Empire plans to construct and operate an operations and maintenance (“O&amp;M”) base at SBMT to support the Project. [Footnote 6: DEIS at Appendix F.] The O&amp;M base covers approximately 4.5 acres on an upland portion of SBMT and will include offices a control room a warehouse a shop and pier space from which Empire can monitor and control Project operations. Empire has proposed the O&amp;M base as part of the Project. However Section 2.1.2.4 of the DEIS describes the O&amp;M construction project as part of other efforts to upgrade and improve SBMT including work for which NYCEDC is pursuing authorizations from USACE. [Footnote 7: Id.] The DEIS appropriately identifies the SBMT upgrade project as a connected action but the construction and operation of the O&amp;M base is better described as part of the Project because the O&amp;M base is being constructed as part of the Project by Empire (the permit applicant) not NYCEDC (the permit applicant for the SBMT upgrade project) and because the O&amp;M base will support Empire’s offshore wind projects not the broader offshore wind industry generally as the SBMT facility is expected to do.</p>	<p>The EIS considers that construction of the O&amp;M base is part of the connected action and that use of the O&amp;M base is part of the Proposed Action. Inclusion of construction of the O&amp;M base at SBMT as part of the Port Infrastructure Improvement Project is consistent with the Environmental Assessment Form for SBMT (Appendix Q, Section 1.3.1.7) and the USACE permit applications for both SBMT and EW 1. Therefore, no change has been made to the EIS.</p>
<p>[Bold: Ports.] In the COP Empire identified SBMT as the sole port supporting construction and staging activities for the Projects. [Footnote 8: See Empire COP at Sections 1.2.3 3.4.] The DEIS mistakenly also identifies the following as construction and staging ports as under consideration for the Project: (1) Port of Albany in Albany New York (2) Port of Coeymans in Coeymans New York and (3) Corpus Christi Texas. [Footnote 9: DEIS at 2-15.] Unlike SBMT these three ports will not be construction and staging ports nor will</p>	<p>Text has been added to Section 2.1.2.1.2 of the Final EIS to clarify that the Port of Albany, Port of Coeymans, a port in Corpus Christi, and a cable facility in South Carolina could serve as the starting point for the transport of Project components or construction materials and that construction staging would occur at SBMT.</p>

Comment	Response
<p>they support Project operations. Instead these three ports are anticipated starting points for vessel transits delivering components to Empire at SBMT or the Lease Area. For instance Empire may accept offshore substation topsides that are delivered from Corpus Christi and towers that are delivered from Port of Albany. Empire requests that BOEM strike Port of Albany Port of Coeymans and Corpus Christi from the list of potential construction and staging ports.</p>	
<p>[<b>Bold:</b> Impact Analysis at Non-Project Ports.] The DEIS evaluates the impacts of potential commercial activities at ports such as Corpus Christi Port of Albany and Port of Coeymans where offshore wind suppliers may manufacture components or source materials for the offshore wind industry and the Project. [Footnote 10: See DEIS at Sections 3.4 (Air Quality) 3.11 (Demographics Employment and Economics) 3.12 (Environmental Justice) 3.14 (Land Use and Coastal Infrastructure) 3.15 (Marine Mammals) 3.16 (Navigational and Vessel Traffic) 3.21 (Water Quality).] The DEIS appears to include these impact analyses based on the assumption that Empire intends to use these ports [Footnote 11: The DEIS also notes that Empire will be sourcing cables from South Carolina but the DEIS does not conduct similar analyses (e.g. environmental justice community impacts water quality coastal land use and resources etc.) as it does for Corpus Christi Port of Albany and Port of Coeymans.] to “support the construction of the Projects.” [Footnote 12: DEIS at 3.12-11.] But including an analysis of onshore impacts at these distant ports unnecessarily expands the NEPA analysis to areas and commercial activities that are not part of the Project and are not interdependent with the proposed federal action. [Footnote 13: For example Appendix F at page F-8 describes a project to deepen part of Corpus Christi Ship Channel. This project is only tenuously relevant to the proposed action and the Project which lies more than 1600 miles distant. Only two vessel transits from Corpus Christi are expected to occur.] Empire does not propose to use these ports for construction staging or operations for the Project and the work that suppliers may conduct there would be linked to the Project only by commercial contract and does not constitute a connected action for federal review. [Footnote 14: 40 C.F.R. (Section) 1501.9(e) (defining connected actions).] Consistent with the recommendation to remove Corpus Christi Port of Albany and Port of Coeymans from the DEIS list of construction and</p>	<p>Port utilization is an impact-producing factor that BOEM analyzes in Chapter 3 resource sections as described in EIS Section 3.1 and Table 3.1-1, and the identification of ports that would be utilized for the Projects contribute to the definition of the geographic analysis area boundary for resources that could be affected by port activity (i.e., air quality; water quality; demographics, employment, and economics; environmental justice, and land use and coastal infrastructure). The cable facility was not used to define the geographic analysis area boundary in the Draft EIS for resources that buffer ports because a single business with waterfront access has different characteristics when compared to a commercial port with multiple tenants, extended hours of operation, intermodal transportation connections (by ship, rail, trucks), and high volumes of activity. The primary activity associated with the cable facility relates to vessel transits between the cable facility and the Lease Area. Therefore, in the Final EIS, the geographic analysis area definition has been expanded to include the cable facility as a point of origin for the sourcing of materials for certain resources that could be affected by vessel transits but for which the geographic analysis area boundary did not already include the location of the cable facility (i.e., for water quality, air quality, and navigation). It is noted that Draft EIS Section 3.16, <i>Navigation and Vessel Traffic</i>, already considered transits between the cable facility and the Lease Area even though the facility was outside the defined geographic analysis area, because the cable facility transits were analyzed in Empire’s NSRA (COP Appendix DD). The geographic analysis area for marine mammals, sea turtles, and finfish, invertebrates, and EFH was already sufficiently large to encompass the transit route between the cable facility and the Lease Area and for these topics the analysis of vessel transits between the cable facility and the Lease Area has been made explicit in the Final EIS.</p>

Comment	Response
<p>staging ports Empire suggests that the impact analyses in the EIS be commensurately limited reflecting that no Project activities or connected actions are occurring at these ports. However Empire recommends that the EIS retain information and analysis relating to potential vessel transits from relevant port locations such as the air emissions marine mammal and navigational safety analyses. [Footnote 15: In Appendix K to the COP Empire included the air emissions from vessel transits moving major components like offshore substation topsides from Corpus Christi TX and cables from Charleston SC.]</p>	
<p>[<b>Bold: EW 2 Point of Interconnection.</b>] The DEIS indicates that the Point of Interconnection (“POI”) for the EW 2 Project will occur in Oceanside NY. Empire Wind confirms that the POI for EW 2 will be in Oceanside NY and clarifies that it will be at the site of the Onshore Substation A alternative. Given limited space and physical constraints at the POI substation the Long Island Power Authority (“LIPA”) and and/or its agent PSEG must construct new facilities to allow the interconnection of EW 2 at this site. However LIPA also may contract with Empire for it to permit and construct such facilities on LIPA’s behalf. LIPA will own and operate these facilities. These new facilities would be interconnected to the Oceanside substation and another nearby existing substation the Valley Stream substation owned by LIPA. The impacts associated with constructing and operating of the new LIPA facilities are similar to those of constructing an EW 2 Onshore Substation at the same location.</p>	<p>The Long Island Power Authority substation has been added to the description of the Proposed Action in Chapter 2, Section 2.1.2.1.1.</p>
<p>[<b>Bold: WTG Grid Orientation.</b>] Table 2-1 in Section 2-1 states that “Grid orientation facilitates southeast-to-northwest trawling.” However Empire understands that the predominant trawl direction is southwest-to-northeast based on bathymetry squid trawler plotter tracks VMS data AIS trawler and dredger racks and direct observations. Empire has designed its WTG layout where feasible in rows correlated to the dominant trawl directions of most active and potentially impacted fisheries. [Footnote 16: Empire COP at Section 3.3.1.8 (see Layout Rule #8).] Empire recommends that the EIS be revised to indicate in Table 2-1 that the predominant trawl direction is southwest-to-northeast.</p>	<p>The description of the grid orientation for Alternative A in Table 2-1 of the Final EIS has been revised as suggested.</p>
<p>[<b>Bold: Submarine Export Cable Lengths.</b>] Table 2-1 states that EW 1 could include a submarine export cable of up to 40 nm (74 km) in</p>	<p>Revised the text in Chapters 1 and 2 of the Final EIS to clarify that EW 1 includes a submarine export cable route of up to 41 nm (76</p>



Comment	Response
<p>length and that EW 2 would include a submarine export cable of up to 26 nm (48 km). [Footnote 17: This language also is found on DEIS pages 1-4 2-2 and 2-4.] Empire Wind recommends re-phrasing to indicate that the cable lengths refer to the distance of the centerline cable route and that there will be multiple cables in each route. The lengths of actual submarine export cable installed will be longer because of the multiple cables installed within each route.</p>	<p>kilometers) and that EW 2 includes a submarine export cable route of up to 26 nm (48 kilometers). A footnote was also added to explain that the length refers to the distance along the centerline of the submarine export cable corridor, measured from the edge of the Lease Area to the export cable landfall, and that multiple cables may be included within each cable route.</p>
<p>[<b>Bold:</b> Dredging and Backfilling.] Section 2.1.2.1.1 at page 2-7 states that dredging can be completed through clamshell dredging suction hopper dredging or hydraulic dredging and that no backfilling is proposed for dredging if used for landfall or waterway and wetland crossing. However if dredging is used to trench and install a cable backfilling would be necessary such as if dredging is used to install the submarine export cable near the EW 1 landfall at SBMT. [Footnote 18: See Empire COP at Section 3.4.1.4.] In addition Empire may backfill HDD dredge pits and any inland open cut wetland or waterway crossings. Backfilling may be accomplished using the excavated dredged material or clean fill as appropriate. Empire recommends that the EIS be updated accordingly.</p>	<p>Section 2.1.2.1.1 in the Final EIS has been revised as recommended.</p>
<p>[<b>Bold:</b> EW 1 Landfall at SBMT.] Section 2.1.2.1.1 describes the construction methodology for installing the EW 1 submarine export cable at the SBMT landfall. [Footnote 19: A similar description is found in Section 2.1.9 of the DEIS.] Empire recommends revising this description to match the updated methodology as reflected in other Empire permit applications as follows: The proposed method for cable landfall installation is to pull the submarine export cables through angled steel conduits through the bulkhead along the shoreline at SBMT. Empire will demolish the existing relieving platform and construct a new pile supported platform and bulkhead at the cable landfall as part of site preparation activities and will install the conduits for cable landfall. Sheet piling will also be installed in the water to support the conduits.</p>	<p>The description of the construction methodology for installing the EW 1 submarine export cable at the SBMT landfall has been updated in Section 2.1.2.1.1 and Section 2.1.9 of the Final EIS, as recommended.</p>
<p>[<b>Bold:</b> Cable Burial Inspection.] Section 2.1.2.2 states the surveys of the submarine export cables and interarray cables would be completed annually for the first 3 years then every 2 years to confirm the cables have not become exposed. This summary of Empire's cable inspection protocol is incomplete. As stated in Section 3.5.1 of the COP Empire's cable burial inspection proposal is as follows and</p>	<p>The description of surveys for the submarine export cables and interarray cables has been updated in Section 2.1.2.2.2 of the Final EIS, as recommended by the commenter.</p>

Comment	Response
<p>Empire recommends that the EIS be revised accordingly: Surveys of the submarine export cables and interarray cables routes to confirm the cables have not become exposed or that the cable protection measures have not worn away. Following the full coverage as-built survey annual risk-based inspections will be conducted for the first three years. For the remainder of the Operations Term risk-based bathymetric surveys will be conducted every two years. Risk-based burial depth surveys will be conducted every five years with coverage to be determined through the use of Distributed Temperature and Distributed Acoustic/Vibration Sensing (DAS/DVS) systems; however full coverage of the submarine export and interarray cables routes will occur within the proposed five years. Additional survey activities will be completed on an as-needed basis determined based upon various factors such as extreme weather events.</p>	
<p>[Underline: 1. Alternatives Not Carried Forward] Empire supports BOEM's decision to consider but not carry forward alternatives that are not feasible or do not fulfill the Project's purpose and need. As proposed in Empire's COP "[t]he purpose of the Project is to generate renewable electricity from an offshore wind farm(s) located in the Lease Area to address the need identified by New York for renewable energy and help the State of New York Public Service Commission achieve their renewable energy goals." [Footnote 23: Empire COP at 1-22.] Through Empire's OREC contracts [Footnote 24: See Offshore Wind Renewable Energy Certificate Purchase and Sale Agreement by and between the New York State Energy Research and Development Authority and Empire Offshore Wind LLC Agreement No. 145651 (Oct. 23 2019); Offshore Wind Renewable Energy Certificate Purchase and Sale Agreement by and between the New York State Energy Research and Development Authority and Empire Offshore Wind LLC Agreement No. 145651 (Jan. 14 2022).] the State of New York has demonstrated a need for 2076 MW of power from the Lease Area. [Footnote 25: See id.] As such Empire supports BOEM's decision to dismiss alternatives that could prevent the Project from delivering 2076 MW of power to the State of New York.</p>	<p>Comment acknowledged.</p>
<p>Specifically Empire agrees with BOEM's decision not to carry forward an alternative that considers approval of EW 1 or EW 2 but not both. [Footnote 26: DEIS at 2-35.] As BOEM explains in the DEIS such an alternative if adopted would preclude Empire's ability to fulfill its</p>	<p>Comment acknowledged.</p>

Comment	Response
<p>commitment to deliver the requisite power to the State of New York within the timeline specified in Empire's OREC contracts. The DEIS correctly recognizes that approval of EW 1 or EW 2 individually would impact Empire's schedule and procurement plans jeopardize commercial synergies between the two wind farms and reduce economies of scale and economic benefits for local industry ultimately undermining the robustness of the Project as a whole. Empire is similarly supportive of BOEM's decision to consider but not carry forward an alternative that contemplates use of gravity-based ("GBS") foundations. Empire extensively studied the potential use of GBS foundations for three years spending millions of dollars and devoting countless hours towards understanding whether GBS foundations could be installed in the Lease Area. Ultimately GBS foundations were found not to be technically or commercially feasible for the Project.</p>	
<p>Empire is also supportive of BOEM's decision to address protections for the North Atlantic Right Whale ("NARW") through mitigation and monitoring rather than through the adoption of an alternative requiring clearance zones for NARW that extend at least 1000 meters.</p>	<p>Comment acknowledged.</p>
<p>[Underline: 2. Alternatives Carried Forward in DEIS] Empire appreciates BOEM's decision to focus the DEIS analysis on reasonable alternatives that fulfill the purpose and need for the proposed action. Of the alternatives carried forward in the DEIS Empire encourages BOEM to carefully consider geotechnical data gathered by Empire in its decision to adopt or not adopt a particular alternative. As BOEM is aware Empire has continued to gather geotechnical data on the Lease Area to further mature the Project. Empire's surveys and analysis of the Lease Area reveal significant presence of glauconite. High levels of glauconite at an installation site might result in pile refusal or make it difficult to drive piles at certain proposed WTG locations. Anticipating this possibility Empire's COP includes alternative WTG locations that remain necessary in the event Empire encounters difficulty installing WTGs in particular locations. The adoption of alternative(s) that limit Empire's ability to install WTGs at alternate locations (not to exceed the number of turbines contemplated by the PDE) could threaten Empire's ability to meet its contractual obligations to the State of New York. Empire's ability to add WTGs beyond the nameplate capacity of the contractual obligations allows Empire to mitigate against the risk of pile refusal</p>	<p>Between the Draft EIS and Final EIS, BOEM independently reviewed the results of Empire's pile drivability analysis that assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7. Per the Department of the Interior's NEPA regulations at 43 CFR 46.420(d), the Preferred Alternative will reflect the alternative that BOEM believes would best accomplish the purpose and need of the Proposed Action while fulfilling its statutory mission and responsibilities, given consideration of economic, environmental, technical, and other factors. Based on review of the findings in the Final EIS and with consideration of new information on the presence of glauconite in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations, BOEM has</p>

Comment	Response
<p>and maintain energy delivery while certain WTGs are non-operational due to periodic maintenance. On this basis Empire urges BOEM to conclude in the FEIS that Alternative B which contemplates removal of up to six turbines from the northwestern portion of the EW 1 project area would jeopardize the viability of the Project given the geotechnical limitations of various WTG sites and the need for alternative sites in the event of pile refusal. Empire continues to support Alternative A the Proposed Action Alternative. Such action may be refined (within the PDE parameters) given the geotechnical limitations of the Lease Area. One such refinement is reflected in Alternative F which incorporates Empire’s updated geotechnical analysis and the likely need for the northwestern WTG positions given potential pile refusal in various portions of the Lease Area. Empire asks that BOEM take the geotechnical limitations outlined herein into account as it considers comments on the DEIS evaluates the appropriateness of each alternative and prepares the FEIS.</p> <p>The DEIS assesses Alternative B under which the EW 1 layout would be modified to remove up to six WTG positions from the northwestern end of EW 1 to “reduce potential impacts at the edge of Cholera Bank and on scenic resources and navigation safety.” [Footnote 27: DEIS at S-7.] Alternative B also would establish a No Surface Occupancy (“NSO”) area where WTG positions would be excluded. [Footnote 28: Id.] Empire emphasizes that all available positions including the six proposed for removal are required to ensure that Empire can meet its contractual obligations to the State of New York. As detailed above the presence of glauconite in the Lease Area requires that Empire have flexibility to utilize the maximum amount of turbine locations contemplated within the PDE. Glauconite presence may require the use of the six WTG locations proposed for removal if foundations cannot be installed elsewhere in the Lease Area. Accordingly Empire urges BOEM to revise the FEIS to state that Alternative B would jeopardize Empire’s ability to fulfill its contractual obligations.</p> <p>Empire respectfully disagrees with the assertion in the DEIS that Alternative B will avoid impacts on benthic resources and commercial and recreational fishing. The DEIS describes Alternative B as avoiding adverse impacts to hard-bottom substrates in Cholera Bank which are “often associated with higher levels of biodiversity than surrounding less-complex sediments and contribute to increased habitat</p>	<p>recommended Alternatives C-1, D, F, G, and H for inclusion in the Preferred Alternative.</p>

Comment	Response
<p>heterogeneity and biodiversity on larger scales.” [Footnote 29: Id.] The DEIS states that “Cholera Bank is an area of variable depth that contains patches of rocky-bottom habitat in a broader region of primarily soft-bottom habitat and is a popular location for recreational fishing.” [Footnote 30: Id.] Elsewhere in the DEIS BOEM asserts that Alternative B would result in fewer impacts on commercial and recreational fishing in Cholera Bank by “ensur[ing] that traditional fishing grounds in the biologically productive Cholera Bank area would remain open to commercial and for-hire recreational fishing vessels . . .” [Footnote 31: Id. at 2-41 to 2-42 3.9-70.] However Empire’s geotechnical analyses of the proposed NSO area adjacent to Cholera Bank indicate that this area does not contain unique habitat and is in fact similar to the rest of the Lease Area. The site-specific data gathered by Empire indicate there is no discernable difference in benthic resources between foundation locations considered for removal under Alternative B and locations within the rest of the EW 1 project area. Approximately 84 percent of the proposed NSO area consists of sand or fine-grained sediment which does not qualify as “complex” under NMFS Greater Atlantic Fisheries Office (“GARFO”) definitions. [Footnote 32: National Marine Fisheries Service Greater Atlantic Fisheries Office Habitat Conservation and Ecosystem Services Division Recommendations for Mapping Fish Habitat (Mar. 29 2021) <a href="https://media.fisheries.noaa.gov/2021-03/March292021_NMFS_Habitat_Mapping_Recommendations.pdf?nu">https://media.fisheries.noaa.gov/2021-03/March292021_NMFS_Habitat_Mapping_Recommendations.pdf?nu</a> ll (defining “soft bottom habitat” as “Fine Unconsolidated Substrate groups (i.e. Sand Muddy Sand Sandy mud and Mud) including the subgroups (i.e. Very Coarse/Coarse Sand Medium Sand and Fine/Very Fine Sand)” and “complex habitat” as “Rock Substrate subclasses (i.e. Bedrock/Megaclast) and Coarse Unconsolidated Substrate groups (i.e. Gravels Gravel Mixes Gravelly and Shell) including subgroups (i.e. Boulder Cobble Pebble/Granule Gravel Pavement Sandy Gravel Muddy Sandy Gravel Muddy Gravel Gravelly Sand Gravelly Muddy Sand and Gravelly Mud”).] A nearly identical percentage covers the remainder of the Lease Area. [Footnote 33: Empire COP Section 5.5.] The biological production of Cholera Bank would not be impacted by the installation of turbines in the proposed NSO area and thus Alternative B would not prevent impacts on commercial or recreational fishing related to a decrease in biological production.</p>	



Comment	Response
<p>BOEM's 2016 Environmental Assessment analyzing the Lease Area suggested excluding Cholera Bank from BOEM's proposed lease sale and BOEM did remove this area (1779 acres) as reflected in the revised EA. [Footnote 34: See Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Revised Environmental Assessment Dkt. No. BOEM-2016-070 2-2 4-37 4-88 4-99 (2016) (Revised EA).] Removal of this area was based on NMFS input rendered in public comment letters. [Footnote 35: See National Marine Fisheries Service Comments on BOEM's Call for Information and Nominations Docket No. BOEM-2014-0087 and BOEM-2014-0003) (July 8, 2014); National Marine Fisheries Service New York Wind Energy Area Environmental Assessment (EA)/Essential Fish Habitat (EFH) Assessment Docket No. BOEM-2016- 2016-042 (Jul. 11 2016).] Those public comment letters did not seek to remove additional portions (the now proposed NSO area) from leasing. [Footnote 36: Id.] Thus Project-specific high resolution geophysical ("HRG") and geotechnical data does not support the inference that Alternative B would avoid or substantially lessen one or more impacts on benthic resources or commercial and recreational fishing resulting from the Proposed Action. [Footnote 37: 43 CFR (Section) 46.415(b).] Empire requests that BOEM reconsider its analysis of the impacts of Alternative B in the FEIS in light of the data and conclude that Alternative B would jeopardize the viability of the Project.</p>	
<p>Empire requests that BOEM adopt Alternative A the Proposed Action Alternative pursuant to which Empire would construct EW 1 and EW 2 within the range of design parameters described in Volume 1 of the Empire COP.</p> <p>The layout proposed by Alternative A provides Empire with the flexibility to install the number of WTGs necessary to deliver on its obligations to the State of New York while accommodating the geotechnical considerations associated with pile driving in the Lease Area. Each element of the Proposed Action Alternative is the result of years of work on the part of Empire to design an environmentally sound commercially viable offshore wind project that reflects the input of cooperating agencies and stakeholder groups. The Proposed Action Alternative reflects Empire's careful balancing of each of these interests resulting in a thoughtfully designed Project proposal with</p>	<p>Per the Department of the Interior's NEPA regulations at 43 CFR 46.420(d), the Preferred Alternative will reflect the alternative that BOEM believes would best accomplish the purpose and need of the Proposed Action while fulfilling its statutory mission and responsibilities, given consideration of economic, environmental, technical, and other factors. Based on review of the findings in the Final EIS and with consideration of new information on the presence of glauconite in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations, BOEM has recommended Alternatives C-1, D, F, G, and H for inclusion in the Preferred Alternative.</p>

Comment	Response
<p>strong support from surrounding communities. For the reasons explained herein and in Empire’s COP Empire requests that BOEM adopt Alternative A the Proposed Action Alternative.</p>	
<p>Finally Empire also notes that Figure 2-6 of the DEIS depicts Alternative B as potentially excluding 12 turbines from the proposed NSO area rather than six. Empire requests BOEM revise Figure 2-6 in the FEIS to show the removal of only six WTGs.</p>	<p>Figure 2-6 correctly shows that six WTG positions would be removed from potential development as indicated by the gray WTG color in the legend. The No Surface Occupancy area as shown would further define an area within which WTG positions would not be relocated.</p>
<p>Empire supports Alternative C-1 traversing the Gravesend Anchorage Area. Alternative C-2 would route the EW 1 cable through the Ambrose Navigation Channel an actively maintained channel. From October 2020 through July 2021 Empire met with various agencies and stakeholders to discuss submarine export cable routing alternatives within and adjacent to Gravesend Anchorage Area including meeting with the United States Coast Guard (USCG) USACE New York Harbor Operations NYSDEC NYSDOS NYSDPS NYSDOT and NYSOGS and maritime stakeholders. Feedback from these discussions was incorporated into the adoption of Alternative C-1 as Empire’s preferred submarine export cable route. While the cable would be buried 15 feet below the seabed routine and future planned dredging of the channel would increase the risk of cable exposure. The complexity of installation potential marine stakeholder impacts and stakeholder feedback received by Empire weigh against Alternative C-2. Empire has conducted extensive analyses and detailed design of the C-1 alternative through the Gravesend Anchorage Area. Selection of Alternative C-2 would add significant and unnecessary delay and expense.</p>	<p>Alternative C-1 is incorporated into the Preferred Alternative.</p>
<p>The DEIS analyzes the impacts of Alternative D pursuant to which BOEM would only approve submarine export cable route options for EW 2 that avoid the sand borrow area offshore Long Island. [Footnote 39: DEIS at 2-23.] Empire supports this Alternative and is largely supportive of all EW 2 export cable routes identified in Empire’s COP except the routes that transect or are immediately adjacent to the sand borrow area (i.e. those routes making landfall at Lido Beach namely the EW2 Landfall C). Empire understands that cable placement in the sand borrow area could complicate USACE’s use of the sand borrow area and is disfavored by USACE.</p>	<p>Alternative D is incorporated into the Preferred Alternative.</p>
<p>If adopted Alternative E would remove seven WTG positions from EW 2 to create a 1-nm setback between EW 1 and EW 2 to improve</p>	<p>Between the Draft EIS and Final EIS, BOEM independently reviewed the results of Empire’s pile drivability analysis that assessed the</p>

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<p>access for fishing. [Footnote 40: Id.] Empire does not support this alternative. Empire submitted an NSRA that demonstrated minimal navigational safety risk impacts from the proposed layout in Alternative A so no navigational safety mitigation measure is needed. Moreover as the DEIS notes a 1-nm buffer between EW 1 and EW 2 may cause vessel traffic to become concentrated in the buffer zone thus increasing the risk of collision or allision. Without a buffer zone vessel traffic would likely remain dispersed within the Lease Area.</p> <p>In addition Empire emphasizes that all available positions including the seven proposed for removal under this alternative are required to ensure that Empire can meet its contractual obligations to the State of New York. As detailed above the presence of glauconite in the Lease Area requires that Empire have flexibility to utilize the maximum amount of turbine locations contemplated within the PDE. Glauconite presence may require the use of the seven WTG locations proposed for removal if foundations cannot be installed elsewhere in the Lease Area. Accordingly Empire recommends against adopting this alternative.</p>	<p>presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternative E would no longer meet the purpose and need and therefore Alternative E is not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives E and F in Final EIS Sections 2.1.6 and 2.1.7.</p>
<p>Under Alternative F the EW 1 layout would be optimized as shown in DEIS Figure 2-10 to maximize annual energy production and minimize wake losses while addressing geotechnical considerations. [Footnote 41: Id. at 2-23 2-26.] Alternative F is an optimization of Alternative A the Proposed Action Alternative that considers the results of Empire's geotechnical analysis and the presence of glauconite at various locations in the Lease Area. Alternative F reflects the WTG locations where pile refusal is less likely. Alternative F would also minimize wake effects and create an open space that may be favored by stakeholders such as the fishing industries. Empire notes that Figure 2-10 depicting Alternative F only depicts optimization of the EW 1 layout but Empire continues to refine and optimize the expected EW 2 layout within the confines of the PDE to address geotechnical risks and wake effects. Empire has identified similar geotechnical concerns that will likely result in further optimization of the EW 2 layout as for EW 1.</p>	<p>Final EIS Figure 2-10 has also been updated to reflect the proposed layout for EW 2 under Alternative F based on results of geotechnical investigations.</p>
<p>Under Alternative G BOEM would require that the EW 2 onshore cable crossing at Barnums Channel be constructed using an above-water cable bridge. [Footnote 42: Id. at 2-23.] Empire supports this proposed alternative as a simpler and feasible method to cross Barnums</p>	<p>Alternative G is incorporated into the Preferred Alternative.</p>

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<p>Channel that has fewer impacts to wetlands and is more cost effective than cable burial.</p>	
<p>[Underline: 3. Inconsistent Identification of Cultural Impacts in Alternatives] The DEIS analyzes potential impacts on cultural resources from the proposed Project alternatives and ongoing and planned activities in the cultural resources geographic analysis area. In Section 2.4 of the DEIS BOEM states that Alternative A the Proposed Action “would have negligible to major impacts on cultural resources” and that “the No Action Alternative would result in minor to major impacts on cultural resources.” [Footnote 45: Id. at 2-46 (see Table 2-4).] BOEM also states that all other Alternatives would result in similar impacts to the Proposed Action. [Footnote 46: Id.] However in Section S.5 of the DEIS BOEM reaches a different conclusion finding that impacts of the Proposed Action are “moderate” and that the impacts of all other alternatives are also “moderate.” [Footnote 47: Id. at S-12 (see Table S-2).] BOEM also states in this section that the No Action Alternative would have “[m]inor to major” impacts. [Footnote 48: Id.] Empire recommends that BOEM clarify its conclusions by using uniform language concerning the degree of anticipated impact to cultural resources.</p>	<p>Sections 2.4, S.5, and 3.10 have been updated for consistency.</p> <p>No Action Alternative: Considering the ongoing regional commercial, industrial, and recreational activities (non-offshore wind activities), the No Action Alternative would result in impacts ranging in severity from minor to major, depending on the range of non-offshore wind projects that cause impacts from onshore ground-disturbing activities, the introduction of intrusive visual elements, dredging, cable emplacement, and activities that disturb the seafloor. There are no ongoing offshore wind activities in the geographic analysis area for cultural resources.</p> <p>Cumulative Impacts of No Action: Considering the impacts of the No Action Alternative in combination with other planned non-offshore wind activities and planned offshore wind activities (without the Proposed Action), the No Action Alternative would result in cumulative impacts ranging from minor to major, as with the No Action Alternative. However, BOEM anticipates that implementation of existing state and federal cultural resource laws and regulations would reduce the magnitude of overall impacts on cultural resources due to requirements to avoid, minimize, or mitigate Project-specific impacts on cultural resources. These state and federal requirements may not be able to reduce the severity of impacts on some cultural resources due to the unique character of specific resources but would reduce the severity of potential impacts in a majority of cases, resulting in overall moderate cumulative impacts on cultural resources.</p> <p>Alternative A, Proposed Action: Considering only the impacts of the Proposed Action (without any other non-offshore wind activities or other offshore wind activities) would result in moderate impacts.</p> <p>Cumulative Impacts: The impacts of the Proposed Action in combination with other planned offshore wind activities would be major.</p> <p>Alternatives B through H would be similar to Alternative A for alternative impacts and cumulative impacts.</p>
<p>Also in its discussion of cumulative impacts on cultural resources BOEM concludes that the cumulative impacts of the No Action Alternative are “moderate” while describing the non-cumulative</p>	<p>Please refer to the response to comment BOEM-2022-0053-0136-0029, which identifies updates implemented to Chapter 2 and Section 3.10, <i>Cultural Resources</i>, to clarify these conclusions.</p>

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<p>impacts of the No Action Alternative as “minor to major.” [Footnote 49: Id. at 2-46 (see Table 2-4) S-12 (see Table S-2).] The DEIS does not explain how the cumulative impacts could be lower than the No Action Alternative in isolation. Empire recommends BOEM clarify its determination regarding the cumulative impacts of the No Action Alternative.</p>	
<p>[<b>Bold: Benthic Resources Geographic Area.</b>] The DEIS describes the potential impacts on benthic resources from the Proposed Action each Alternative and ongoing and planned activities in the benthic resources geographic analysis area. In Section 3.6 BOEM states that “the benthic resources geographic analysis area as shown on Figure 3.6-1 includes the Wind Farm Development Area plus a 10-mile (16.1-kilometer) buffer area and 330-foot-wide export cable routes (includes buffer width).” [Footnote 50: DEIS at 3.6-1.] This characterization differs from Empire’s COP wherein Empire describes a 1250-foot wide anchor corridor and does not include a “buffer area.” [Footnote 51: Empire COP at 3-17.] Empire requests that the geographic analysis area for benthic resources be revised to analyze impacts within the 1250-foot anchor corridor proposed by Empire in its COP.</p>	<p>As described in Section 3.6, the geographic analysis area is based on the predicted extent of the most widespread impact (namely, suspended sediment) from the proposed Projects. BOEM confirms that the extent of the geographic analysis area for benthic resources is appropriate for analysis of impacts on benthic resources.</p>
<p>[<b>Bold: Hard Bottom Acreage.</b>] The DEIS provides information on cable emplacement and maintenance for other planned offshore wind activities noting that the planned offshore wind activities would install buried or armored export and interarray cables. BOEM states that planned offshore wind activities would install buried or armored export and interarray cables some of which may traverse the geographic analysis area. The DEIS concludes that “[p]rotective cable armor would create hard-bottom habitat up to 5 meters wide along cable corridors and would cover approximately 43 acres (17.4 hectares) of bottom sediments.” [Footnote 52: DEIS at 3.6.9-3.6-10.] Empire believes that the estimated bottom sediment coverage may be too low. Empire’s Project is expected to create 92 acres of hard-bottom habitat through its installation of cables and Empire does not believe this number differs significantly from the approach taken by other planned offshore wind projects. Thus Empire expects that hard bottom habitat covering the estimated 43 acres of bottom sediment may not accurately reflect the impacts of other planned offshore wind activities in the geographic analysis area. Empire respectfully requests that</p>	<p>Calculations are based on maximum-case scenario estimates assuming maximum build-out within the benthic resources geographic analysis area. BOEM developed these estimates based on offshore wind demand, as discussed in its 2019 study <i>National Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the North Atlantic Outer Continental Shelf</i> (BOEM 2019). Estimates were developed by summing acreage or number calculations across all offshore wind lease areas noted as occurring within, or overlapping, a given geographic analysis area. This likely overestimates some impacts in cases where offshore wind lease areas only partially overlap analysis areas, and thus provides the most conservative estimate of future offshore wind development. If offshore export cable hard protection information for a future project could not be obtained from a publicly available COP, then it was assumed to be similar to the Vineyard Wind 1 Project, which is 0.357 acre per mile of offshore export cable. The only proposed offshore wind farm within the geographic analysis area for benthic resources is the Vineyard Mid-Atlantic LLC in Lease Area OCS-A 0544, for which the amount of offshore export cable hard</p>



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<p>BOEM clarify how this figure was calculated and if necessary correct this estimate.</p>	<p>protection is estimated to be 43 acres (120 miles of export cables x 0.357 acres/mile = 42.84 [rounded to 43] acres).</p> <p>The interarray hard cable protection for the Vineyard Mid-Atlantic LLC project is unavailable and assumed to be zero. The EIS text has been revised to indicate that the reported value of 43 acres of scour protection only includes the export cables and not the interarray cables.</p>
<p>The DEIS also states that “[e]xport and interarray cables from planned offshore wind development would add an estimated 280 miles (451 kilometers) of buried cable to the geographic analysis area . . .” [Footnote 53: Id. at 3.6-10.] Empire expects that this estimate is too low given that Empire alone is expected to add an estimated 260 nautical miles (481 kilometers) of buried interarray cable to the Lease Area. [Footnote 54: Empire COP at ES-3.] Further the Project will include up to 66 nautical miles (122 kilometers) of submarine export cable. [Footnote 55: Id.] Empire does not believe Empire’s cable estimates far exceed that proposed by other planned projects in the geographic analysis area. [Footnote 56: See Final Environmental Impact Statement for the South Fork Offshore Wind Project at Table E4-6 (showing thousands of acres of hard bottom habitat conversion from submarine export cables and interarray cable protections).] Accordingly Empire respectfully requests that BOEM clarify how this figure was calculated and if necessary correct this estimate.</p>	<p>Calculations are based on maximum-case scenario estimates assuming maximum build-out within the benthic resources geographic analysis area. BOEM developed these estimates based on offshore wind demand, as discussed in its 2019 study <i>National Environmental Policy Act Documentation for Impact-Producing Factors in the Offshore Wind Cumulative Impacts Scenario on the North Atlantic Outer Continental Shelf</i> (BOEM 2019). Estimates were developed by summing acreage or number calculations across all offshore wind lease areas noted as occurring within, or overlapping, a given geographic analysis area. This likely overestimates some impacts in cases where offshore wind lease areas only partially overlap analysis areas, and thus provides the most conservative estimate of future offshore wind development. The number of turbines for those offshore wind lease areas without an announced number of turbines has been calculated based on lease size, a 1- by 1-nm grid spacing, or the generating capacity BOEM assumes that each offshore wind development would have its own cable (both onshore and offshore) and that future projects would not utilize a regional transmission line. The length of offshore export cable for those offshore wind lease areas without a known project size was assumed to include two offshore cables totaling 120 miles (193 kilometers). If information for a future project could not be obtained from a COP, the length of interarray cabling was assumed to be the average amount per foundation based on the COPs submitted to date, which is 1.48 miles (2.4 kilometers). In addition, for those offshore wind lease areas that require more than one OSS, it was assumed that an additional 6.2 miles (9.9 kilometers) of inter-link cable would be required to link the two OSS. The only proposed offshore wind farm within the geographic analysis area for benthic resources is the Vineyard Mid-Atlantic LLC in Lease Area OCS-A 0544, which, based on the size of the offshore wind lease area, has an estimated maximum of 102 WTGs and 2 OSS</p>

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	(total of 104 foundations) $([104 \times 1.48] + 6.2 = 160$ miles of interarray cables; $160 + 120$ [estimated export cables] = 280 total miles of cable).
<p>[<b>Bold: Bird Strike Comparisons.</b>] BOEM’s description of the potential impacts on bird resources states that “an estimated 19229 birds could be killed annually from the 2803 WTGs that would be added for offshore wind development.” [Footnote 57: DEIS at 3.7-13.] BOEM bases this conclusion on the mortality rates of birds from WTG collisions in the “contiguous United States” from “onshore wind turbines in 39 states.” [Footnote 58: Id. at 3.7-13.] Empire is concerned that onshore bird mortality data is not representative of offshore bird mortality. As the DEIS recognizes “the relative density of birds in the OCS is low.” [Footnote 59: Id.] However Empire requests that BOEM explicitly recognize in the FEIS that bird impacts will likely be less than what is estimated in the DEIS because density of birds is lower on the OCS than onshore.</p>	<p>The EIS was revised to clarify the point that the bird impacts offshore would likely be less than onshore regarding collision impacts.</p>
<p>[<b>Bold: Bird Carcasses.</b>] The DEIS discusses proposed mitigation measures to address impacts to birds and bats including a number of reporting requirements. After reporting a death of a listed bird or bat however the DEIS states that “within 24 hours of the sighting and if practicable [Empire will] carefully collect the dead specimen and preserve the material in the best possible state.” [Footnote 60: Id. at 3.5-14; see also H-19.] However the collection of carcasses was not included in Empire’s Proposed Bird and Bat Monitoring Framework. [Footnote 61: Appendix H (attachment H-3).] Empire explained that “[d]ue to health and safety concerns and logistical constraints it will not be possible to collect carcasses.” [Footnote 62: Appendix H (attachment H-2 at 5); see also Empire COP at 5-80 (“Any Carcasses that have federal or research bands will be reported” but no mention of collecting carcasses).] Empire will not have permits required to handle and collect such specimens. Accordingly Empire requests that carcass collection requirements be removed from the FEIS. Empire also requests that the reporting obligation be extended to 5 days because it is unclear why such reporting must be so immediate and because Empire requires sufficient time for operational needs and to complete the administrative process to make the report.</p>	<p>BOEM appreciates Empire’s concerns and will work with Empire and USFWS to amend the requirement so that it works for everyone.</p>
<p>Section 3.10.5.2 (cumulative impacts of the proposed action) and Table 3.10-4 show that all 147 WTG positions would be visible from</p>	<p>Section 3.10.5.2 indicates BOEM conducted a Cumulative Historic Resources Visual Effects Analysis to evaluate cumulative visual</p>

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<p>eight of the historic properties in the APE. This section states that the cumulative impacts would be major due to the long-term impacts on archaeological resources. Empire recommends that the EIS explain how this conclusion was reached by explaining the conservative assumptions used in this analysis. Specifically the PDE includes 147 WTGs and it is unclear which positions the DEIS used to evaluate the impacts of 147 WTGs. In addition the EIS should clarify the methodology used for determining visibility of WTGs from the Historic Districts.</p>	<p>impacts from the presence of structures on the 16 properties (BOEM 2022) determined to be adversely affected by the Proposed Action. The Cumulative Historic Resources Visual Effects Analysis provides a description of methodology for analysis of cumulative visual effects on historic properties and can be found here: <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/EW_CHRVEA_draft_WEB.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/EW_CHRVEA_draft_WEB.pdf</a>. The methodology does not include a different approach for historic districts. Rather, the location within the historic district that represents the worst-case scenario for visibility is selected for the purpose of analysis.</p> <p>Language in Section 3.10.5.2 has been revised to acknowledge archaeological impacts analysis is based on the PDE, which includes submerged ground disturbance for 147 WTGs as a worst-case scenario.</p>
<p>[<b>Bold: List of Threatened or Endangered Species – Atlantic Salmon and Manta Rays.</b>] The DEIS includes a list of endangered species in the Project or Geographic Analysis area. This list includes Atlantic salmon and manta rays as species that may occur in the Project Area. [Footnote 63: DEIS at 3.13-5.] The DEIS also provides that manta rays are subject to potential vessel strikes stating “[p]roject-related vessel activity would temporarily increase collision risk with . . . giant manta ray in the nearshore and estuarine environments during the construction phase.” [Footnote 64: Id. at 3.13-29.] Empire believes that giant manta rays are unlikely to occur in the Project Area and “may transit through the Project Area and be temporarily exposed to Project-related activities” but “[are] not expected to be affected by the Project.” [Footnote 65: Empire COP at 5-161.] Empire emphasizes that vessel strikes involving giant manta rays are very unlikely given their infrequent presence in the Project area and suggests that the FEIS include this additional context. A recent study of manta ray range and distribution off the U.S. Atlantic coast found that while manta rays do occur in the northern mid-Atlantic Bight they have most commonly been observed at the shelf-edge where upwelling occurs (Farmer et al. 2022 below). The study also notes that higher concentrations of manta rays are found in warmer waters below Cape Hatteras corresponding to the Gulf Stream.</p>	<p>In the peer-reviewed study by Farmer et al. (2022), there is a non-zero probability of occurrence of giant manta ray in areas that overlap the Project area from June to October, as predicted from statistical models from different combination scenarios of data from four monitoring surveys (see Figures 3, 4, and 6 in Farmer et al. 2022). To support the claim that giant manta rays are unlikely to be at risk of vessel strikes, the commenter references Farmer et al. (2022). In referencing the study, the commenter states that giant manta ray in the northern Mid-Atlantic Bight has “most commonly been observed” at the OCS edge, most likely a reference to Figure 1 in the study. However, the purpose of that study was to address the sparse nature of available data represented on Figure 1; therefore, the modeling approach was needed to better predict potential spatial occurrence. Given this, the predicted model probabilities of occurrence should be taken as the best available science. Furthermore, a recent study by McGregor et al. (2019) that is also cited in the Draft EIS has documented that vessel strikes on manta ray species do occur and are potentially underreported or unnoticed.</p>
<p>[<b>Bold: EMF Impacts.</b>] The DEIS discusses the impact of electromagnetic fields (“EMF”) on certain species. BOEM states that</p>	<p>The studies on potential EMF impacts referenced in the comment (Snyder et al. 2019; Kilfoyle et al. 2018; Taormina et al. 2018; Wyman</p>

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<p>“adverse impacts of EMF on finfish invertebrates and [essential fish habitat] have been documented in scientific literature. Behavioral and physiological impacts of EMF have been documented in benthic epifaunal and infaunal invertebrates and finfishes . . . However finfish responses to EMF have been mixed and contradictory even within species . . .” [Footnote 66: DEIS at 3.13-21 (internal citations omitted).] In contrast Empire’s COP notes evidence suggesting that EMF would have negligible or no impacts on individuals or populations. [Footnote 67: Empire COP at 5-187 (“Given the data from operational wind projects field experiments in Europe and the United States (Snyder et al. 2019; Kilfoyle et al. 2018; Taormina et al. 2018; Wyman et al. 2018; Love et al. 2017; Dunlop et al. 2016; Gill et al. 2014) modeling results of the potential effects of EMF on fish and invertebrates in the Project Area (Appendix EE) and Empire’s commitment to cable burial impacts of energized cables on fish and invertebrates would be negligible. No adverse effect of existing subsea cables offshore or in state waters of New York has been demonstrated for any marine resource (NYSERDA 2017; Copping et al. 2016). EMF generated by the buried submarine export and interarray cables would be detectable by some benthic fish and invertebrates but would not adversely impact individuals or populations (Snyder et al. 2019).”).] Thus Empire requests that BOEM revise its discussion of EMF impacts to reflect the conclusion provided and evidence cited in Empire’s COP.</p>	<p>et al. 2018; Love et al. 2017; Dunlop et al. 2016; Gill et al. 2014) have been reviewed and were considered in initial drafts of the Draft EIS for the Projects. However, newer studies that demonstrate EMF impacts on finfish and invertebrates could not be ignored.</p> <p>Snyder et al. (2019) highlight some of the mixed and contradictory results of impacts on marine finfish and invertebrates in their review of previous peer-reviewed studies. However, the determinations made in that study seem to be unsupported by the literature. Kilfoyle et al. (2018) admit that their statistical approaches likely produced false lack of adverse impacts of EMF on coral reef fish. They noted a “strong indication” that coral reef fish were more abundant when EMFs were not present. The commenter also lists a review study by Taormina et al. (2018), but the study does not support that EMF would have “negligible or no impacts on individuals or populations.” Rather, Taormina et al. discuss the potential negative impacts of EMF while identifying some of the marine species that may be affected. The Wyman et al. (2018) study mentioned by the commenter is cited in the Draft EIS. While the model in Wyman et al. indicates mixed behavioral reactions of Chinook salmon (<i>Oncorhynchus tshawytscha</i>) to EMFs, the authors do not assert or support a conclusion of “negligible or no impacts.” The Wyman et al. (2018) study is cited in the Draft EIS as one of the studies that found mixed reactions of fish to EMFs. The Love et al. (2017) study is a potential example of individual species potentially being unaffected by EMF. However, it was not considered in the Draft EIS due to its experimental design that may have complicated the results in the study. Love et al. include a discussion on the potential influence of bait plumes from their experimental design. In the study, more crabs did not cross cables emitting EMFs than those that did cross the cables. Love et al. acknowledge that attraction to bait plumes may overcome the propensity of crabs to avoid EMFs. The Dunlop et al. (2016) study was not previously reviewed or considered for the Draft EIS. After review, it was found that the study has important survey design limitations, which are discussed in the publication. A Before-After Control-Impact survey design would have been better suited for that study. For this reason, the study by Dunlop et al. (2016) is not considered in the Draft EIS. Gill et al. (2014) is cited in the Draft EIS. This book chapter discusses EMF impacts on marine organisms while identifying species that do</p>

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	<p>and do not react to EMFs. The chapter does not support the claim that EMFs have “negligible or no impacts” for all marine organisms.</p> <p>Many of the peer-reviewed studies discussed in the Draft EIS were published later than the studies mentioned by the commenter. They provide important new evidence on potential adverse impacts of EMF on marine organisms or directly demonstrate potentially adverse impacts. For example, Harsanyi et al. (2022) demonstrate behavioral and developmental effects of EMF on European lobster (<i>Homarus gammarus</i>) that could potentially have population-level impacts. Also discussed in the Draft EIS, physiological impacts of EMF of marine organisms have been demonstrated (e.g., Jakubowska et al. 2019; Stankevičiūtė et al. 2019).</p> <p>Some examples were included in the Draft EIS discussion on studies that found no adverse impacts of EMF on lesser sand eels (<i>Ammodytes marinus</i>), based on an appropriately designed experiment. However, such findings for individual species do not support a broad statement of “negligible or no impacts.”</p> <p>The commenter also mentions that “Empire’s commitment” to burying cables as support for a determination of “negligible impacts.” Cable burial is discussed in the Draft EIS. To clarify that cable burial increases distance from but does not eliminate EMF, the following edit was made in Section 3.13.3.2: “EMF strength rapidly decreases with distance from cables and would therefore mostly be confined to within a few meters of cable corridors. While burial increases the distance between cables and exposed surficial sediments or the water column, EMF is not eliminated or reduced when cables are buried or contained in a shield (Hutchison et al. 2021).” The following was also added in Section 3.14.5: “Under the Proposed Action, interarray and export cables are proposed to be buried to at target depth. As mentioned in Section 3.13.3.2, burial may reduce, but not eliminate, EMF intensity in surficial sediments and the water column by increasing the distance between cable and habitat.”</p>
<p>[<b>Bold: Oceanographic Study Limitations.</b>] Section 3.15.3.2 (Cumulative Impacts of the No Action Alternative for Marine Mammals) (see page 3.15-16) and Section 3.13.3.2 (Cumulative Impacts of the no Action Alternative for Finfish Invertebrates and Essential Fish Habitat) (see pages to 17) describe the cumulative impacts arising from potential large- and small-scale oceanographic impacts. These discussions</p>	<p>The section has been expanded and now notes the paucity of studies or modeling efforts for the Atlantic OCS and provides additional information on the systems in which modeling has occurred.</p>



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<p>however should place greater emphasis on the uncertainty of potential impacts resulting from the physical presence of WTGs and include caveats to address limitations and gaps in existing studies. The existing studies for instance have been limited to modeling studies from Europe. The ocean circulation system in Europe (depth circulation stratification) is not equivalent to that of the western North Atlantic. Further there is a limited amount of existing research globally and even more limited for offshore wind in the western North Atlantic. No modeling studies have been completed that incorporate regional ocean circulation with the presence of WTGs and appropriate atmospheric forcing. As each regional system will have different drivers of oceanographic processes clear caveats should be included when referencing modeling from other systems when forecasting the potential effects of offshore wind development in the western North Atlantic.</p>	
<p>[Underline: 5. Land Use and Coastal Infrastructure (Section 3.14)] [Bold: References to the SBMT Joint Permit Application.] In various places the DEIS appears to refer to the draft SBMT Joint Permit Application (“JPA”) submitted by NYCEDC to USACE in December 2021. [Footnote 68: DEIS at Sections 2.1.2.4 and 3.16.5.1 Appendix B at B-28.] There were significant changes between this draft JPA and the final JPA submitted October 2022. For example Section 3.16.5.1 of the DEIS states that “[a]pproximately 148500 cubic yards would be dredged from a total area of approximately 13.1 acres to provide safe navigation and deepened berthing locations for design vessels” [Footnote 69: DEIS at 3.16-22.] while the final JPA indicates 189000 cubic yards would be dredged from this area. [Footnote 70: New York City Economic Development Corporation South Brooklyn Marine Terminal Port Infrastructure Improvement Project U.S. Army Corps of Engineers/New York State Department of Environmental Conservation (NYSDEC) Joint Permit Application USACE Application # NAN-2022-0900-EMI (October 2022).] Additional differences between the two versions include the proposed in water work window; more bulkhead work along Pier 39; removal of fill on Pier 35 for mitigation; expanded time-of-year restrictions; approximately 400 feet of additional sheet pile along the southeast side of the 39th Street Pier; and removal of coffer dams on the west side of the 35th Street Pier for fill mitigation. As a result Empire recommends that all</p>	<p>The Final EIS was revised to reflect changes in the final Joint Permit Application submitted in May 2023.</p>

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references to the JPA be revised to reflect the final JPA submitted on October 24 2022.	
On page 3.15-4 the DEIS provides a description of the NARW and provides statement about species density. Empire recommends that the EIS rely on Roberts and Halpin 2022 which reflects more recent density estimates in the Project Area.	Density estimates provided in the Draft EIS are consistent with density estimates provided in the acoustic modeling appendix of the COP (Appendix M-2) and the Letter of Authorization application for the Projects and are the density estimates utilized to quantify acoustic impacts on marine mammals.
On page 3.15-4 the DEIS states that the NARW is “critically” endangered. Empire recommends removing “critically” from this statement as the term is an IUCN designation but the species is listed as “endangered” under the ESA.	This term has been utilized in other offshore wind Final EISs and will be retained in the Final EIS for the Projects.
On page 3.15-24 the DEIS states that a proposed mitigation measure the Letter of Authorization is a seasonal restriction on pile driving from January 1 through April 30. However Empire has proposed measures to avoid minimize and mitigate impacts of pile- driving noise on marine mammals (Appendix H Attachment H-1) including seasonal pile-driving restrictions (APM 106) with no pile driving occurring between July and October Empire recommends that all references to this seasonal restriction be updated accordingly.	In Section 2.1.1 of the Letter of Authorization application, it states that impact pile driving for EW 1 and EW 2 “will not occur from January 1 through April 30.” This seasonal restriction is consistent with the acoustic modeling and exposure estimates presented in Appendix M-2 of the COP. The Draft EIS has been revised to ensure consistency with this window.
On page 3.15-23 the DEIS states that up to five NARWs could be exposed to sound levels exceeding injury. Empire recommends striking this statement because it does not account for noise attenuation and could result in confusion as no NARW Level A takes are modeled with the incorporated noise attenuation measures and therefore no Level A NARW takes are requested in Empire’s application for a Letter of Authorization.	Exposure estimates for unmitigated noise have been removed.
On page 3.15-20 the DEIS states that underwater sound propagation modeling for drilling was conduct. Empire clarifies that this modeling was not conducted for drilling as it does not plan to drill as part of the construction activities. Empire recommends that the DEIS be updated accordingly.	Because foundation drilling has been removed from the COP, references to foundation drilling associated with the Proposed Action have been removed from the section.
On page 3.15-25 the DEIS states that all trap gear should be removed. Empire recommends removing the reference to trap gear as it does not plan to conduct trap surveys.	The gear utilization IPF evaluation has been updated to remove trap gear, as the request for information response for the BA did not indicate that traps would be used to capture fish for acoustic tagging. Please note that page 38 of the fisheries monitoring plan identifies commercial fish traps as potential gear for capturing fish for acoustic tagging and needs to be updated.

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<p>[<b>Bold: Drilling.</b>] In its discussion of impacts of the Proposed Action on sea turtles the DEIS states that “drilling could occur if pile driving is not possible for the entire piling installation. However the probability of such an action is considered low.” [Footnote 71: DEIS at 3.19-17.] This statement is unnecessary because Empire’s LOA application did not assess drilling as drilling was not included in the COP. Empire recommends that this statement be removed for accuracy and to ensure consistency with the ESA and MMPA analyses.</p>	<p>As drilling during pile installation has been removed from the COP, the statement has been removed from the Final EIS section.</p>
<p>[<b>Bold: Vibratory Pile Driving.</b>] While discussing potential impacts to sea turtles from pile driving during construction the DEIS states “[m]odeling results indicated that the extent of the ensonified area associated with vibratory pile driving for the Projects is relatively small (distance from the pile generally less than 328 feet [100 meters]) compared to the ensonified area produced during impact pile driving. Therefore this impact evaluation focuses on impact pile driving.” [Footnote 72: Id. at 3.19-18 (emphasis added).] This statement does not distinguish that impact pile driving will be used for foundation installation and vibratory pile driving will be used for cofferdam construction. As written this statement incorrectly implies that vibratory pile is associated with foundations. Empire requests that BOEM clarify the distinct uses of impact pile driving and vibratory pile driving to ensure that sound impacts are properly understood by interested stakeholders.</p>	<p>Clarifying language has been added indicating that vibratory pile driving would occur during cofferdam installation and that the associated ensonified area is small relative to the area ensonified during impact pile driving for foundation installation.</p>
<p>[<b>Bold: Water Quality Standards.</b>] Section 3.21 of the DEIS discusses potential impacts on water quality that could result from each Alternative and ongoing and planned activities in the water quality geographic analysis area. In this section BOEM concludes that “[i]mpacts from suspended contaminated sediments would result in detectable localized short-term degradation of water quality in exceedance of water quality standards in a few locations along the EW 1 offshore export cable corridor” [Footnote 73: Id. at 3.21-14.] and that “[i]mpacts from suspended contaminated sediments in a few locations along the EW offshore export cable route would be moderate.” [Footnote 74: Id. at 3.21-19.] The Section 401 Water Quality Certificate (“WQC”) process is separate from the NEPA review process and any Section 401 WQC will be issued upon conditions if any that are necessary to ensure compliance with applicable water quality standards. Thus DEIS statements about potential exceedance of water quality standards are premature at this time. Adjustments will</p>	<p>BOEM needs to make a statement on the potential impacts for each IPF being evaluated based on the impact level definitions defined in Table 3.21-2. BOEM understands that water quality impacts would be avoided and minimized by obtaining the applicable water quality permits (e.g., 401 Water Quality Certification, State Pollutant Discharge Elimination System permit). To address the commenter’s concern, BOEM has added text to the commenter’s cited EIS text to indicate that a 401 Water Quality Certification would be required and would avoid and minimize potential water quality impacts.</p>

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<p>be made to ensure the project complies with the Section 401 WQC and any other applicable water quality standards. Therefore Empire respectfully requests that any statements about exceeding water quality standards be deleted from the FEIS or revised to clarify that estimates as to the Project’s compliance with water quality standards are based on standard operating procedures not the water quality standards and Section 401 WQC applicable to the Empire project which has yet to be issued.</p>	
<p>[<b>Bold: Wetland Impacts.</b>] In Section 3.22 BOEM discusses potential impacts on wetlands from the proposed Projects alternatives and ongoing and planned activities in the geographic analysis area. In describing the areas containing wetlands the DEIS states that “[m]ost of the wetland area is related to nearshore and adjacent areas to Reynolds Channel and Barnums Channel.” [Footnote 75: Id. at 3.22-7.] The DEIS explains that “Empire is evaluating both open cut and HDD methods to cross Reynolds Channel” and concludes that “[w]ith either method impacts would be short term and BOEM does not anticipate any long-term or permanent impacts on the wetlands or their functions and the total temporary impact of 0.51 acre would represent less than 0.01 percent of this wetland type in the geographic analysis area.” [Footnote 76: Id. at 3.22-8.] In its analysis the DEIS did not mention the permanent filling of slips at Onshore Substation C within Reynolds Channel. These activities were identified in Empire’s USACE application. [Footnote 77: Empire Offshore Wind LLC Application to the U.S. Army Corps of Engineers (Nov. 4 2022) available at NAN-2022-00902-EMI &gt; New York District Website &gt; New York District Regulatory Branch – Public Notices (army.mil); see also DEIS at Section 3.4.3 and at Appendix O.] Empire recommends that the FEIS include the referenced filling of slips in Reynolds Channel to ensure that the FEIS accurately conveys impacts to potential impacts to the waters of the U.S.</p>	<p>Information on filling the slips in Reynolds Channel has been added to Final EIS Section 3.22.5.</p>
<p>[<u>Underline: 10. Appendix A (List of Required Permits and Consultations)</u>] [<b>Bold: Schedule.</b>] Table A-1 and Section A.2.2.6 indicates that Empire’s Letter of Authorization application to NMFS was submitted on August 12 2022. [Footnote 78: DEIS at A-6.] However the application was deemed adequate and complete on August 12 2022. Empire suggests the EIS be updated accordingly. In addition page 1-5 in Section 1.2 states that the Corps “anticipates</p>	<p>Corrections have been made to Table A-1 and Section A.2.2.6 in Appendix A to reflect the submittal date of the Letter of Authorization application and the date on which NMFS deemed the application complete. Clarifying text has been added to Section 1.2 to reflect that a pre-construction notification application was submitted by Empire to USACE in October 2022.</p>

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<p>requests for authorization of a permit action” but Empire submitted its applications to the Corps for EW 1 and EW 2 on October 3 2022 as reflected in Table A-1 of Appendix A. [Footnote 79: DEIS at A-1.]</p>	
<p>[Underline: 11. Appendix F] [Bold: Cumulative Impacts.] When considering the cumulative impacts of each alternative BOEM considers potential impacts of the other planned offshore wind activities on each resource. The scope of other planned offshore wind activities considered to cumulatively impact each resource depends on the resource’s geographic analysis area. The approach taken by BOEM in Appendix F of the DEIS to determine which other planned offshore wind activities are reasonably foreseeable for the purpose of analyzing cumulative impacts is consistent with Vineyard and South Fork’s FEISs which considered cumulative impacts of all other planned offshore wind projects conducting site assessment activities; all projects with power offtake agreements awarded; all projects with COPs approved or submitted; all projects for which the developer had publicly announced development plans regardless of whether a COP had been approved or submitted or offtake awarded; all announced and scheduled state offtake solicitations whether or not they are linked to plans or arrangements with particular developers; and all remaining planned but unscheduled Atlantic state solicitations for existing lease areas. [Footnote 80: See Vineyard Wind 1 FEIS at 1-7; South Fork Wind Farm and South Fork Export Cable Project FEIS at I-204 E4- 3-E4-21 (“The South Fork Wind Farm EIS Cumulative Activities Scenario is presented in Appendix E of the EIS . . . mirrors the Vineyard Wind Methodology for Assessing Cumulative Impacts.”).] When initially outlining its methodology for assessing cumulative impacts of other planned offshore wind activities in the Empire DEIS BOEM states in Section 1.6.2 that it “considers past and present activities in the geographic analysis area including those related to offshore wind projects with an approved construction and operations plan (e.g. Vineyard Wind 1 and South Fork) and approved past and ongoing site assessment surveys. . . The impacts of future planned offshore wind projects are predicted using information from and assumptions based on COPs submitted to BOEM that are currently undergoing independent review.” [Footnote 81: DEIS at 1-8.] However Appendix F shows BOEM’s methodology for assessing the reasonable foreseeability of other planned offshore wind projects to be much</p>	<p>Section 1.6.2, <i>Cumulative Impacts of Ongoing and Planned Activities</i>, refers to Appendix F, <i>Planned Activities Scenario</i>, for additional information regarding future planned activities. As explained in Appendix F, the methodology for developing the list of reasonably foreseeable offshore wind projects is the same as for the Vineyard Wind 1 project and details of the scenario development are described in the Vineyard Wind 1 Final EIS (BOEM 2021a). The methodology for developing the list of reasonably foreseeable offshore wind projects is not reiterated in Section 1.6.2 due to page limit requirements for NEPA documents. Accordingly, no changes have been implemented.</p>



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<p>broader than what is described in Section 1.6.2 [Footnote 82: Id. at F-122.] consistent with the approach taken by BOEM in other EISs. Accordingly BOEM should consider expanding its description of its methodology for evaluating cumulative impacts of other offshore wind projects in Section 1.6.2 of the DEIS to accurately reflect the methodology used in Appendix F.</p>	
<p>[<b>Bold: NEXRAD Radar.</b>] In Appendix H of the DEIS BOEM details mitigation and monitoring measures that Empire has proposed. BOEM proposes that “Empire will enter into a mitigation agreement with NOAA to mitigate operational impacts to NEXRAD weather radar systems.” [Footnote 83: Id. at H-3.] Included in this mitigation measure are: a “[w]ind farm curtailment/curtailment agreement”; “[e]mploying adaptive clutter filters”; “[c]hanging the radar scan strategy to pass over areas with wind turbines”; “[u]sing phased array radars to achieve a null in the antenna radiation pattern in the direction of the wind turbine”; and “[c]urtailment.” [Footnote 84: Id.] Empire emphasizes that curtailment would have a drastic effect on the Project’s annual power production and prevent the Project from fulfilling its obligations to the State of New York under the OREC contracts. The Project proposed in the COP is designed to fulfill the purpose and need without planned excess capacity (and related environmental impacts) and therefore does not accommodate curtailment. Furthermore long- term curtailment could result in Empire investing in project components designed to increase capacity including additional WTGs within the limit of the Project’s PDE only to be prevented from recouping this investment. For these reasons long-term curtailment could undercut the financial sustainability of the Project as a whole. Empire requests that all curtailment measures be removed from mitigation measures under consideration.</p>	<p>Curtailment is currently the only viable mitigation option for NEXRAD radar systems. NOAA National Weather Service Radar Operations should be consulted through the National Information Telecommunications Administration prior to any change in curtailment measures.</p>
<p>[<b>Bold: Foundation Surveys.</b>] The DEIS states “Empire must monitor potential loss of fishing gear in the vicinity of WTG foundations by surveying at least ten different WTGs in each EW 1 and EW 2 project area annually.” [Footnote 85: Id. at H-17.] In addition the measure requires Empire to “conduct surveys by remotely operated vehicles divers or other means to determine the locations and amounts of marine debris” and to report results annually to BOEM and BSEE. [Footnote 86: Id. at H-17-18.] In the reported results BOEM would require the Project to include “photographic and/or video</p>	<p>This measure does not require removal of marine debris identified during the required surveys. The Draft EIS has been reviewed to ensure that removal of debris is not stated or implied.</p>

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<p>documentation of the survey and debris encountered . . . and the disposition of any located debris (i.e. removed or left in place).” Empire believes this mitigation measure if required would be overly burdensome. First little commercial fishing has occurred in the Lease Area since 2012 making the requirement that Empire conduct separate surveys for lost fishing gear unnecessary. [Footnote 87: See National Oceanic and Atmospheric Administration National Marine Fisheries Service Socioeconomic Impacts of Atlantic Offshore Wind Development (August 2022) available at <a href="https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development">https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development</a>; National Oceanic and Atmospheric Administration National Marine Fisheries Service Sea Turtle Bycatch Reduction in Trawl Fisheries (August 2022) available at <a href="https://www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/sea-turtle-bycatch-reduction-trawl#what-are-we-considering">https://www.fisheries.noaa.gov/new-england-mid-atlantic/endangered-species-conservation/sea-turtle-bycatch-reduction-trawl#what-are-we-considering</a>.] Second surveying for and monitoring loss of fishing gear and providing detailed data to BOEM and BSEE on an annual basis for the life of the Project is a significant undertaking that will be unreasonably burdensome and overlap with other programs related to commercial fishing (e.g. gear loss compensation claims). Finally the DEIS alludes to the requirement that Empire remove marine debris identified during surveys but this is outside the scope of the mitigation measures proposed by Empire Project’s COP. There are safety hazards associated with cleanup of marine debris of unknown origin as these materials may be toxic or dangerous. Empire requests that BOEM remove this mitigation measure or revise this mitigation measure to clarify that the mitigation measure solely requires surveying of debris but does not require any retrieval of debris as a result.</p>	
<p>[<b>Bold: Mesh Size Requirements.</b>] Another mitigation measure proposed by BOEM provides that “[a]ll hydraulic dredge intakes should be covered with a mesh screen or screening device that is properly installed and maintained to minimize potential for impingement or entrainment of fish species. The screening device on the dredge intake should prevent the passage of any material greater than 1.25" in diameter with a maximum opening of 1.25" x 6" . . . Intake velocity should be limited to less than 0.5 ft/sec.” [Footnote 88: DEIS at H-20.] Empire notes that this standard is inappropriate for this type of project</p>	<p>BOEM has removed this mitigation measure from the list of measures recommended for inclusion in the Preferred Alternative in the Final EIS. If BOEM decides to approve the COP, the ROD will identify which of the mitigation and monitoring measures have been adopted as terms and conditions.</p>

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<p>and is usually applied only to projects with continuous operations. For example 0.5 ft/second is a compliance standard for minimizing fish impingement contained in EPA's regulations implementing Section 316(b) of the Clean Water Act. [Footnote 89: See 33 U.S.C. (Section) 1326(b) (2018); 40 C.F.R. Part 125.] Clean Water Act Section 316(b) regulations and associated impingement/entrainment reduction measures are specific to cooling water intakes which are not present in the Project as proposed. Empire has not seen this standard applied to dredging as required here and emphasizes that such a standard would be impractical because of added cost and delay. Thus Empire requests that BOEM remove this proposed mitigation measure.</p>	
<p>[<b>Bold: Vessel Alert System for Cable Burial Depth.</b>] The DEIS proposes a mitigation measure pursuant to which "Empire will install a cable alert system that alerts vessels to the presence of cables which could shift over time both horizontally and vertically." [Footnote 90: DEIS at H-23.] This mitigation measure is unnecessary and not feasible. Empire is not aware of any system to detect real-time horizontal or vertical changes in the cable position and it is not possible to use an Automatic Identification System ("AIS") to track the real-time cable position. Even if real-time AIS position reporting of the cable was possible reporting the cable position may unduly clutter a vessel's display and may be sent unnecessarily to an overbroad group of vessels (that are not anchoring). In addition the measure is unnecessary because cables will be buried 6 to 15 feet below the seabed minimizing the hazard to vessels and the cable. However Equinor intends to utilize a service that can create GPS coordinates around the as-built location of the cable. The service would detect vessels traveling under a speed threshold in the vicinity of the cable that are most likely to drop an anchor and send a notification to those vessels that an asset is buried. In addition Empire will have temperature and acoustic monitoring in place that will register potential anchor strikes. Empire also anticipates that it will be required to provide notification if the cable would exit the 30 ft easement provided in state waters. As a result Empire requests that BOEM revise this requirement so that Empire is required solely to provide notification for zones based on the as-built cable route rather than use a cable alert system for each individual cable.</p>	<p>This mitigation measure has been revised as requested.</p>

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<p>[<b>Bold: Time of Day and Time of Year Pile Driving Restrictions.</b>] The DEIS includes time of day and time of year piling driving restrictions primarily to mitigate impacts to marine mammals and sea turtles. [Footnote 91: DEIS at 3.19-20 (i.e. time-of-day restrictions use of soft-start procedures and use of noise mitigation techniques that achieve a 10-dB attenuation); DEIS at 3.15-13-14 (analyzing impacts on marine mammals based on hours of pile driving per day); DEIS at 3.15-30 (an Alternative Monitoring Plan may be necessary if Empire pursues a night-time operations exception).] The Proposed Action would produce noise from pile driving during installation of up to 147 WTG foundations for a maximum of 2 foundations per 24 hours which may require revisions to the impacts currently analyzed in Sections 3.15.5 3.15.9 and 3.19. [Footnote 92: See id.] In addition Section 3.19 of the DEIS describes a seasonal pile driving restriction proposed by Empire that would restrict pile driving activity between July and October when sea turtle densities in the Project area are generally highest. Empire has proposed a seasonal pile driving closure from January through April in order to minimize potential impacts to the North Atlantic Right Whale but has not proposed a pile driving closure from July to October. Empire Wind notes that when coupled with the voluntary seasonal restriction from January through April this proposed July to October seasonal restriction would prevent the Project from completing construction and delivering first power within the timeline currently proposed in the COP.</p>	<p>As described in Table 3.15-9, an Alternative Monitoring Plan is required for pile driving under any conditions with low visibility, such as inclement weather. The requirement for this plan is not limited to nighttime pile-driving operations. Acoustic modeling results from both one- and two-foundation(s)-per-day scenarios were reviewed when drafting the Draft EIS. As noted in Section 3.15.5, the one-foundation-per-day scenario is presented in the marine mammals section of the Draft EIS, as it resulted in the greatest number of marine mammal exposures and was therefore identified as the maximum-case scenario for that resource.</p>
<p>[<b>Bold: Operation Sound Field Verification Plan.</b>] BOEM proposes to require that Empire Project develop an Operational Sound Field Verification Plan to ascertain noises emitted from the offshore wind area. [Footnote 93: DEIS at H-19.] Pursuant to requirements proposed in Appendix H this plan must be reviewed and approved by BOEM and NMFS. [Footnote 94: Id.] Developing such a plan would be challenging for the Empire Project. Unlike pile driving for which BOEM has published guidance on specific sound exposure modeling and sound field measurement [Footnote 95: See BOEM Draft BOEM Nationwide Recommendations for Impact Pile Driving Sound Exposure Modeling and Sound Field Measurement for Offshore Wind Construction and Operations Plans (October 2022).] there is no available BOEM guidance on an Operational Sound Field Verification Plan. Therefore many of the expectations of such a plan remain unclear. Moreover the</p>	<p>A requirement for an Operational Sound Field Verification Plan is not included in the Final EIS.</p>

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<p>purpose of such a plan is unclear because there is no anticipated take from the sound of operational WTGs and such a plan would not be used to verify modeled zones. Without clear purpose for and clarity on the sound field verification requirements Empire recommends BOEM remove this mitigation measure.</p>	
<p>[<b>Bold: Vessel Speed Restrictions.</b>] Table H-1 specifies various vessel speed restrictions in certain circumstances when marine mammals or sea turtles are present. For instance on page H-7 the mitigation measure requires vessel speeds of &lt;4 knots until a separation distance of at least 100 meters is achieved. Similarly as stated on page H-18 when an ESA-listed marine mammal is sighted within 500 meters of the forward path of the vessel the vessel speed is restricted to &lt;10 knots. Empire recommends that these mitigations measures remain focused on avoiding and minimizing impacts and less so on prescriptive vessels speeds. In addition the measure should set forth clear exceptions when safety so requires.</p>	<p>The sighting of protected species within 100 meters of a vessel is within the minimum separation distance and can be indicative of other animals nearby that are submerged and go unobserved. Animals should be avoided before they appear within 100 meters of vessel unless they unexpectedly surface. The requirement to slow vessel speed is intended to provide additional precaution to avoid injury or mortality when minimum separation distances cannot be maintained for whatever reason. BOEM does agree that maintaining minimum separation distances is the primary mechanism to avoid impacts on listed species when animals are sighted beyond 100 meters. Slowing vessel speed is required when such a separation distance is not followed.</p>
<p>[<b>Bold: New Requirements and Plans.</b>] The DEIS includes new mitigation measures. Empire requests further detail and clarity on what BOEM expects to be included in these plans. Empire notes that some of the plans are inconsistent with each other and recommends that BOEM ensure there is no duplication in the requirements of these and other plans. For instance Appendix H requires submission of a Passive Acoustic Monitoring Plan but Empire understands that such plan should be submitted to BOEM and NMFS.</p>	<p>BOEM has reviewed proposed mitigation measures in the Final EIS to confirm that they are not conflicting or duplicative.</p>
<p>[<b>Bold: Pile-Driving Monitoring Plan.</b>] The DEIS provides that “BOEM will require Empire to prepare and submit a Pile Driving Monitoring Plan to NMFS and BSEE . . . for review and concurrence at least 90 days before start of pile driving.” [Footnote 96: DEIS at 3.13-33.] Empire is preparing a Protected Species Mitigation and Monitoring Plan to be submitted to NMFS. This Protected Species Mitigation and Monitoring Plan will include detailed descriptions of monitoring and mitigation measures to be implemented during foundation installation geophysical surveys, and cable landfall activities. In the interest of avoiding unnecessary duplication Empire requests clarification regarding the requirements for the Pile Driving Monitoring Plan - if confirmed that these requirements are met by the Protected Species Mitigation and Monitoring plan Empire requests that the EIS clarify that</p>	<p>The measure is intended to ensure that the Department of the Interior and USACE also receive and review the plan. The plan must address comments to the Department of the Interior’s satisfaction. Pile driving in state waters will be provided to USACE for review. The MMPA does not cover all these requirements and these additional measures are necessary.</p>

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<p>the requirement for submittal of the Pile Driving Monitoring Plan can be met by submitting the Protected Species Mitigation and Monitoring Plan.</p>	
<p>[<b>Bold:</b> Protected Species Mitigation and Monitoring Plan Renders the Pile Driving Monitoring Plan Unnecessary.] The DEIS provides that Empire must “prepare and submit a Pile Driving Monitoring Plan to NMFS and BSEE . . . for review and concurrence at least 90 days before start of pile driving. The plan will detail all plans and procedures for sound attenuation as well as for monitoring ESA-listed whales and sea turtles during all impact and vibratory pile driving. The plan will also describe how BOEM and Empire will determine the number of whales exposed to noise above the Level B harassment threshold during pile driving with the vibratory hammer to install the cofferdam at the sea to shore transition. Empire will obtain NMFS’s concurrence with this plan prior to starting any pile driving.” [Footnote 97: Id.] As noted above Empire intends to provide a Protected Species Mitigation and Monitoring Plan to NMFS and BOEM that will include substantially the same information as the Pile Driving Monitoring Plan. Empire recommends that the EIS recognize the Protected Species Mitigation and Monitoring Plan will be sufficient.</p>	<p>The measure is intended to ensure that the Department of the Interior and USACE also receive and review the plan. The plan must address comments to the Department of the Interior’s satisfaction. Pile driving in state waters will be provided to USACE for review. The MMPA does not cover all these requirements and these additional measures are necessary.</p>
<p>[<b>Bold:</b> Fishing Vessel Adaptation Fund.] An additional mitigation measure proposed by BOEM is Empire establishment of an “adaptation fund to equip vessel operators with necessary safety training and equipment including suitable marine vessel radar where appropriate.” [Footnote 98: Id. at H-23.] This mitigation measure is not included in the COP or Navigational Safety Risk Assessment (“NSRA”). While Empire is committed to a fishing vessel adaption fund it requests that BOEM work with Empire in developing the specifics of the fund and recognize the existing mitigation funds that Empire has already committed.</p>	<p>The referenced mitigation measure is not recommended for inclusion in the Preferred Alternative.</p>
<p>[<b>Bold:</b> Sound Field Verification.] Table H-1 of Appendix H describes a measure for Empire to ensure “sound field verification” coverage for Proposed Project Phase C. [Footnote 99: Id. at H-6 (Table H-1).] The DEIS describes this measure as requiring “Empire to ensure that PSO coverage is sufficient to reliably monitor the clearance or shutdown zones if they are expanded due to the verification of sound fields from Project activities. Additional observers will be deployed on additional platforms for every 1500 meters that a clearance or shutdown zone is</p>	<p>This condition is intended to ensure that if sound field verification measurements show that the modeling underestimated the size of the exclusion zones, then the Department of the Interior, NMFS, or both may require additional measures including increasing the size of the pre-clearance and shutdown zones and increase the number of protected species observers that may be required to effectively monitor the zones. BOEM is proposing this as an additional measure</p>



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<p>expanded beyond the distances modeled prior to verification.” [Footnote 100: Id.] This proposed measure adds PSO requirements in addition to those proposed in Empire’s LOA application. [Footnote 101: Incidental Take Authorization: Empire Offshore Wind LLC - Construction of the Empire Wind Project (EW1 and EW2) off of New York 87 FR 55409 (Sept. 9 2022) available at <a href="https://www.fisheries.noaa.gov/action/incidental-take-authorization-empire-offshore-wind-llc-construction-empire-wind-project-ew1?check_logged_in=1">https://www.fisheries.noaa.gov/action/incidental-take-authorization-empire-offshore-wind-llc-construction-empire-wind-project-ew1?check_logged_in=1</a>.] Moreover Empire lacks clarity on what the mitigation measure actually requires. For example the number of additional PSOs required; whether the required monitoring area is expanding to include interarray cables; and whether these additional PSOs are now required 24-hours a day is unclear. Empire respectfully requests that these additional requirements be removed from the FEIS to conform with the PSO framework proposed in Empire’s LOA application. This will ensure consistency with the LOA and streamline implementation of the APMs. Alternatively Empire recommends that BOEM clarify the additional PSO requirements in the FEIS.</p>	<p>to ensure ESA-listed species mitigations are adequate in the event sound field verification results show that impacts were underestimated.</p>
<p>[<b>Monitoring Zones for Sea Turtles.</b>] Table H-1 also includes a “[m]onitoring zone for sea turtles” for Proposed Project Phase C. [Footnote 102: DEIS at H-6 (Table H-1).] The DEIS states that “[t]o ensure that any “take” is documented BOEM BSEE and USACE will require Empire to monitor and record all observations of ESA- listed sea turtles over the full extent of any area where noise may exceed 175 dB rms during any pile driving activities and for 30 minutes following the cessation of pile driving activities.” [Footnote 103: Id.] Empire has yet to complete its ESA Section 7 Consultation which will outline mitigation requirements related to the Project’s impacts on ESA-listed species. For this reason Empire requests that this proposed requirement indicate that it derives from the ESA Section 7 Consultation process and note that it may be revised as a result of the ESA Section 7 Consultation.</p>	<p>ESA consultation with NMFS is planned to conclude approximately concurrent with issuance of the Final EIS. Terms and conditions of the NMFS Biological Opinion for the Empire Wind Projects will be reflected in the ROD.</p>
<p>[<b>Known Submerged Cultural Resources.</b>] Appendix L lists unavoidable adverse impacts of the Proposed Action. [Footnote 104: Id. at L-1] Unavoidable impacts to cultural resources include “[p]hysical impacts on known submerged archaeological resources” and “[p]hysical impacts on known ancient submerged landforms with archaeological or [traditional cultural property] potential.” [Footnote</p>	<p>Appendix N, Attachment N-1 (<i>Memorandum of Agreement</i>), and Appendix L have been revised to acknowledge that Empire will avoid known shipwrecks or potential shipwrecks based on magnetic anomalies and acoustic contacts data collected during survey for each target. Targets 01–21, 23, 24–25, 26, and 28–30 will be avoided by a minimum distance of 50 meters from the known extent of the resource</p>

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<p>105: Id.] However the Project COP details the measures that will be taken to completely avoid impacts to certain submerged cultural resources through siting buffer zones consultation with Native American Tribes planned areas where vessels cannot anchor and continual evaluation. [Footnote 106: Empire COP at 6-9 and 6-10; Empire COP Appendix X at iv.] Empire recommends that BOEM clarify that Empire plans avoidance of impacts to known submerged cultural resources where possible as reviewed below in the discussion of Appendix N.</p>	<p>for placement of Project structures and when conducting seafloor-disturbing activities. Targets 22 and 27 will be avoided by a minimum distance of 50 meters from the known extent of the resource for placement of Project structures and when conducting seafloor-disturbing activities.</p> <p>Empire will avoid ancient submerged landform features (Targets 32, 34, 37–38, 40, 43–44, 46, and 50). No additional avoidance buffer is required for these ancient submerged landform features given avoidance of the ancient submerged landform features is based on the defined spatial extent of each ancient submerged landform feature, which has been determined based on the maximum observed presence of the seismic reflector and unique buffer area designed to account for minimal positioning errors or lack of resolution.</p>
<p>[<b>Bold: Rights-of-Way Conversion.</b>] BOEM states that “[c]onversion of undeveloped areas to utility right-of-way or easement” is an unavoidable impact of the Proposed Action. [Footnote 107: DEIS at L-2.] However the Empire COP details how such impacts can be avoided with the preferred cable route options. The COP describes why certain EW 2 routes were considered and rejected due to impacts to community and environment and the preferred cable routes carried forward due to their avoidance of these impacts. [Footnote 108: See Empire COP at 2-33-37.] Based on the preferred routes listed in Section 2.1.4.4 of the COP conversion of undeveloped areas to utility right-of-way or easement is avoidable. Empire recommends that BOEM clarify that Project’s preferred cable routes would avoid conversion of undeveloped areas to utility right-of-way or easement.</p>	<p>Text in Appendix L, <i>Other Impacts</i>, was clarified to state that the unavoidable impact would be conversion from existing use to utility right-of-way or easement.</p>
<p>[<b>Bold: Irreversible Impacts.</b>] The DEIS indicates that the Proposed Action will have a potential irreversible impact on bats. [Footnote 109: DEIS at L-4.] In explaining the possible irreversible impact BOEM states that “[i]rreversible impacts on bats could occur if one or more individuals were injured or killed . . .” [Footnote 110: DEIS at L-4.] However as demonstrated elsewhere in the DEIS the mortality of an individual animal is not an irreversible impact absent a population-level impact. For example within the same section of the DEIS BOEM states that “local mortality of finfish and invertebrates and habitat alteration and loss of SAV habitat could occur” but because there is not a population level impact the impact is not irreversible. [Footnote 111: Id.</p>	<p>The rows for bats and birds in Table L-2 of the Final EIS have been revised to clarify that irreversible impacts result from population-level effects and injury or mortality of individuals would not result in irreversible impacts on bats or birds.</p>

Comment	Response
<p>at L-5.] Empire recommends that BOEM clarify the use of “irreversible” and whether it applies to individual or population level impacts.</p>	
<p>[<b>Bold: Gilgo State Park.</b>] Table N-1 of the DEIS provides a “Summary of Cultural Resources Investigations Performed by Empire in the Terrestrial Marine and Visual APE.” [Footnote 112: Id. at N-13.] The table includes key findings and recommendations relating to Empire’s visual effects on historic properties. [Footnote 113: Id. at N-15.] The table states that “[Appendix Z] identified 14 historic districts and 25 individual properties within the offshore infrastructure PAPE” and lists the identified sites. [Footnote 114: Id. at N-15.] However Gilgo State Park is not identified in this table despite the finding in Appendix Z of the Empire COP that Gilgo State Park would be adversely impacted. [Footnote 115: See Empire COP at Vol. 2c page 6-50 and Table 6.3-5.] Likewise Gilgo State Park is omitted from the list of sites in Section N.6 for which Applicant Proposed Measures have been proposed. [Footnote 116: DEIS at N-42.] Empire requests that Gilgo State Park be included in the FEIS in all appropriate places to ensure consistency with the COP and accuracy of the visual resources analysis so that interested stakeholders are properly informed and visual impacts are properly analyzed.</p>	<p>BOEM has revisited application of viewshed modeling as the basis for APE delineation and determined the Gilgo State Park location point does not fall within the viewshed. However, the park parcel boundary does fall within the viewshed. As such, portions of the park are within the visual APE. BOEM has revised Section 3.10 and Appendix N, including the Memorandum of Agreement, to find Gilgo State Park adversely affected. Gilgo State Park is a consulting party (see Attachment 2 to Attachment N-1 in Appendix N) and has been invited to provide input on mitigation measures stipulated to resolve adverse effects on Gilgo State Park, as will as the other identified adversely affected historic properties.</p>
<p>[<b>Bold: Ancient Submerged Landform Features.</b>] In its discussion of findings of Adverse Effects under Section 106 of the NHPA the DEIS states that 22 ancient submerged landforms (“ASLFs”) with archaeological or TCP potential will be adversely affected by the Project. [Footnote 117: See id. at N-1 N-2 N-13 (Table N-1) N-26 N-37.] However Appendix X of the Empire COP identified only 13 ASLFs that could potentially be impacted by the Project. [Footnote 118: Empire COP Appendix X at vi-v.] As explained in Appendix X of Empire’s COP appropriate buffers and other mitigation measures have been proposed for the 13 ASLFs that may be impacted by the Project. Therefore Empire respectfully requests that the FEIS update the ASLFs expected to be impacted by the Project to reflect what is provided in the most recent version of Appendix X of the COP and the Marine Archaeological Resources Treatment Plan (“MARTP”) submitted in November 2022.</p>	<p>BOEM’s finding has been updated to determine that the undertaking will adversely affect 13 ancient submerged landform features (Targets 31, 33, 35–36, 39, 41–42, 45, 47–49, 51–52) from physical disturbance in the Lease Area and export cable construction. This information has been revised in Section 3.10 and Appendix N, including the Memorandum of Agreement.</p>
<p>[<b>Bold: Avoidance Buffers.</b>] In Section N.4.1.1.2 BOEM discusses avoidance and mitigation measures for ASLFs. The DEIS states that these measures may include “avoidance buffers.” [Footnote 119: DEIS</p>	<p>Language in Appendix N, including the Memorandum of Agreement, has been revised to indicate Empire will avoid ancient submerged landform features (Targets 32, 34, 37–38, 40, 43–44, 46, and 50). No</p>

Comment	Response
<p>at N-26.] Empire emphasizes that it has applied a unique buffer appropriate for each individual ASLF. As demonstrated in Appendix X to the COP these unique buffers have been incorporated into each ASLF polygon. [Footnote 120: Empire’s Qualified Marine Archaeologist SEARCH provides: “ASLF polygons include the full extent of the features mapped including preserved thalwegs terraces margins floodplains and similar subaerial components. Delineation of each feature was conducted along the lower unconformity horizon and mapped to the outer erosive edge. As part of the mapping efforts QMAs included a buffer of at least 50 meters around the identified feature boundary to account for positioning errors archaeological avoidance zones and acoustic ringing that may obscure feature boundaries.”] Empire recommends that the DEIS clarify that “avoidance buffers” are not universally applied to all ASLFs to better reflect the COP’s proposed mitigation and avoidance measures for each individual ASLF.</p>	<p>additional avoidance buffer is required for these ancient submerged landform features given avoidance of the ancient submerged landform features is based on the defined spatial extent of each ancient submerged landform feature, which has been determined based on the maximum observed presence of the seismic reflector and unique buffer area designed to account for minimal positioning errors or lack of resolution.</p>
<p>[<b>Archaeological Monitoring.</b>] In Table N-1’s discussion of terrestrial archaeological resources in the EW 2 terrestrial PAPE the DEIS states that it was recommended by Tetra Tech that “an archaeological monitor be present at three locations with moderate archaeological sensitivity to identify any archaeological resources that may potentially be revealed during construction activities.” [Footnote 121: DEIS at N-14 (see Table N-1).] Similarly in Section N.6 BOEM’s discussion of measures to avoid minimize or mitigate adverse effects identifies several APMs that Empire has committed to including “monitoring during construction in three locations on Barnum Island for EW 2.” [Footnote 122: DEIS at N-41.] An archaeological monitor will be present where the Project’s ground-disturbing activities intersect the “Archaeological Monitoring Area” depicted in Figure Y-2-12 in Attachment Y-2 of COP Appendix Y. [Footnote 123: See Empire COP Appendix Y Attachment Y-2 at Figure Y-2-12.] Empire requests that BOEM’s reference to “three locations” be revised in the FEIS to reflect the area where Empire will deploy an archaeological monitor pursuant to Appendix Y of the Empire COP.</p>	<p>Appendix N, Section N.6, has been updated to specify, “An archaeological monitor will be present where the Projects’ ground-disturbing activities intersect the “Archaeological Monitoring Area” depicted on Figure Y-2-12 in Attachment Y-2 of COP Appendix Y.”</p>
<p>[<b>Consistency with the Empire MARA.</b>] Empire appreciates BOEM’s effort to gather information and facilitate discussions surrounding cultural resources in the DEIS as this information is valuable for interested stakeholders. Recognizing the value of these</p>	<p>Language in the Memorandum of Agreement has been revised to specify that Empire will avoid known shipwrecks or potential shipwrecks based on magnetic anomalies and acoustic contacts data collected during survey for each target. Targets 01–21, 23, 24–25, 26,</p>

Comment	Response
<p>discussions Empire requests BOEM ensure that Appendix N of the FEIS is consistent with Appendix X of Empire’s COP which was submitted in November 2022. Appendix X provides the most recent information contained in Empire’s MARA. For example the Draft Memorandum of Agreement in Appendix N of the DEIS states that “Empire will encroach on the avoidance buffers for thirty (30) marine archaeological resources (Targets 1- 30).” [Footnote 124: DEIS Appendix N Attachment A Memorandum of Agreement at 6] However this statement is not accurate. Appendix X of the COP explains that the buffers of Targets 1-30 will not be encroached upon and thus no further mitigation plan will be needed. Empire respectfully requests that the sentence be removed in the DEIS or revised to reflect the COP.</p>	<p>and 28–30 will be avoided by a minimum distance of 50 meters from the known extent of the resource for placement of Project structures and when conducting seafloor-disturbing activities. Targets 22 and 27 will be avoided by a minimum distance of 50 meters from the known extent of the resource for placement of Project structures and when conducting seafloor-disturbing activities.</p>
<p>The Draft Memorandum of Agreement in Appendix N of the DEIS states that “Empire will avoid ASLFs previously identified during marine archaeological resource assessments for the Project by a distance of no less than 50 meters from the known extent of the resource for placement of Project structures and when conducting seafloor-disturbing activities to the extent practicable”. [Footnote 125: Id. at 5.] In Appendix X Empire has applied a unique specific buffer appropriate for each ASLF that is incorporated into the actual ASFL polygon . In addition the Draft MOA states that “Empire will avoid potential submerged cultural resources” and “in no event would the buffer be less than 100 meters from the known extent of the resource.” [Footnote 126: DEIS at Appendix N Attachment A at 6.] However Empire has assigned buffers to each potentially submerged cultural resource based on the extent of magnetic anomaly or acoustic contact associated with each target as explained in Appendix X and all of these assigned buffers will be avoided. Empire requests that the identified buffer zones be removed from the FEIS to reflect the most recent version of the COP as Empire does not believe additional buffers are needed or appropriate.</p>	<p>Language in the Memorandum of Agreement has been revised to specify that Empire will avoid ancient submerged landform features (Targets 32, 34, 37–38, 40, 43–44, 46, and 50). No additional avoidance buffer is required for these ancient submerged landform features given avoidance of the ancient submerged landform features is based on the defined spatial extent of each ancient submerged landform feature, which has been determined based on the maximum observed presence of the seismic reflector and unique buffer area designed to account for minimal positioning errors or lack of resolution.</p>
<p>The HPTP proposed an engineering survey and not a project for West Bank Light Station as prescribed in the Draft MOA.</p>	<p>BOEM has revised the Memorandum of Agreement and Historic Properties Treatment Plan for Above-Ground Properties Subject to Adverse Visual Effect for consistency and to reflect input on measures to resolve adverse effects on West Bank Light Station provided by consulting parties during Consultation Meeting #3 and Consultation Meeting #4.</p>

Comment	Response
<p>The HPTP proposed to assist the stakeholder with ongoing rehabilitation of the property and did not propose a structural survey for Romer Shoal Light Station as prescribed in the Draft MOA.</p>	<p>BOEM has revised the Memorandum of Agreement and Historic Properties Treatment Plan for Above-Ground Properties Subject to Adverse Visual Effect for consistency and to reflect input on measures to resolve adverse effects on Romer Shoal Light Station provided by consulting parties during Consultation Meeting #3 and Consultation Meeting #4.</p>
<p>The HPTP proposed HABS/HAER documentation for Fire Island Lighthouse Sandy Hook Lighthouse and Fort Hancock U.S. Life Saving Station whereas the Draft MOA proposes structural surveys and funding of a project for these resources instead.</p>	<p>BOEM has revised the Memorandum of Agreement and Historic Properties Treatment Plan for Above-Ground Properties Subject to Adverse Visual Effect for consistency and to reflect input on measures to resolve adverse effects on Fire Island Lighthouse, Sandy Hook Lighthouse, and Fort Hancock U.S. Life Saving Station provided by consulting parties during Consultation Meeting #3 and Consultation Meeting #4.</p>
<p>The HPTP proposed interpretive signage at Jacob Riis Historic District Jones Beach State Park Gilgo State Park and Robert Moses State Park. The Draft MOA proposes HABS/ HAER and website materials in addition to interpretive signage. The Draft MOA omits mitigation for Gilgo State Park.</p>	<p>BOEM has revised the Memorandum of Agreement and Historic Properties Treatment Plan for Above-Ground Properties Subject to Adverse Visual Effect for consistency and to reflect input on measures to resolve adverse effects on Jacob Riis Historic District, Jones Beach State Park, Gilgo State Park, and Robert Moses State Park provided by consulting parties during Consultation Meeting #3 and Consultation Meeting #4.</p>
<p>The HPTP proposed the development of a fitness path which was agreed upon mitigation between Empire and the stakeholder. The Draft MOA proposes additional mitigation.</p>	<p>BOEM has revised the Memorandum of Agreement and Historic Properties Treatment Plan for Above-Ground Properties Subject to Adverse Visual Effect for consistency and to reflect input on measures to resolve adverse effects on Point O'Woods provided by consulting parties during Consultation Meeting #3 and Consultation Meeting #4.</p>
<p>[Bold: Housing Supply and Cost.] Appendix L Section L.2 discusses irreversible and irretrievable commitment of resources resulting from implementation of the Proposed Action. As the DEIS explains "CEQ considers a commitment of a resource irreversible when the primary or secondary impacts from its use limit the future options for its use" whereas "[a]n irretrievable commitment refers to the use loss or consumption of a resource particularly a renewable resource for a period of time." [Footnote 127: DEIS at L-3.] In Table L-2 BOEM has identified irretrievable impacts within the "Demographics Employment and Economics" resource area. In its explanation the DEIS concludes "[c]onstruction activities could temporarily increase contractor needs housing needs supply requirements and demand for local businesses</p>	<p>Table L-2 has been revised to provide context and clarity regarding the size of the anticipated workforce relative to the population of New York City and the timeline for construction activities.</p>



Comment	Response
<p>leading to an [Italics: irretrievable] loss of workers for other projects. These factors could lead to increased housing and supply costs.” [Footnote 128: Id. at L-5 (Table L-2) (emphasis added).] Empire is concerned that this statement overstates the economic impact of the Proposed Action given the size of the workforce relative to the size of the population of the New York City area and the size of this Project compared to the number of other construction activities in the area. Empire raises these concerns considering that the construction activities are temporary. Empire requests BOEM add context to this section of the FEIS to ensure stakeholders have clarity regarding the size of the anticipated workforce relative to the population of New York City and the timeline for construction activities.</p>	
<p>[Location in DEIS: Volume 1, Sections S.2 and 1.2, Pages S-2 and 1-5.] The following statement is in the DEIS on pages S-2 and 1-5: "The USACE Philadelphia District anticipates requests for authorization of a permit action to be undertaken through authority delegated to the District Engineer by 33 CFR 325.8, pursuant to Section 10 of the RHA (33 USC 403) and Section 404 of the CWA (33 USC 1344)." This statement requires minor correction as requests for authorization with the USACE have already been submitted and deemed complete. In addition, the correct district office is the USACE New York District.</p>	<p>This statement has been made past tense in Section S.2 and Section 1.2 of the Final EIS and the District has been updated to the New York District.</p>
<p>[Location in DEIS: Volume 1, Section S.4, Table S-1, Page S-6.] In Table S-1 on page S-6, the final bullet within the Offshore Substation Section contains a typo. The parentheses at the end of the phrase “with ancillary facilities” should be removed.</p>	<p>Parentheses removed.</p>
<p>[Location in DEIS: Volume 1, Section S.4, Table S-1, Page S-6 and S-7.] In Table S-1 on pages S-6 and S-7, within the “Onshore Substations and Interconnector Cable” row, the term “interconnector” should be changed to “interconnection” consistent with project terminology used throughout the rest of the document.</p>	<p>Revised as requested.</p>
<p>[Location in DEIS: Volume 1, Section S.4, Table S-1, Page S-6 and S-7.] Consider clarifying the interconnection cables lengths in the Project Design Envelope Parameters for both EW 1 and EW 2, and whether they are considered as part of the onshore export cable. The “Onshore</p>	<p>Revised for consistency with the bullet list in COP Volume I, Section 1.2.3.</p>

Comment	Response
<p>Export Cable” row includes “up to two onshore export cable routes for EW 2 of approximately 5.6 mile (9.1 kilometer) in length”; this cited 5.6-mile route length is inclusive of both onshore export and interconnection cable routes. However, this section also states, “No onshore export cable proposed for EW 1.” EW 1 does include 0.2 miles (0,4 km) of interconnection cable route. The exclusion of this distance for EW 1 could give the erroneous impression that there are no onshore cables in the proposed action for EW 1.</p>	
<p>[Location in DEIS: Volume 1, Section 1.2, Page 1-4.] On page 1-4, the statement “awarded to Empire and its 816 MW EW 1 Project on July 21, 2020” is incorrect. The EW 1 bid was awarded on July 18, 2019.</p>	<p>Revised as requested.</p>
<p>[Location in DEIS: Volume 1, Section 1.2, Page 1-5.] On page 1-5 there is reference to “Project 1” and “Project 2”. This should be changed to “EW 1” and “EW 2” consistent with project terminology used throughout the rest of the document.</p>	<p>Revised as requested.</p>
<p>[Location in DEIS: Volume 1, Section 2.1.2.1, Page 2-5.] On page 2-5, “Onshore Export and Installation Cables” should read “Onshore Export and Interconnection Cable Installation.”</p>	<p>Revised to “Onshore Export and Interconnection Cables.”</p>
<p>[Location in DEIS: Volume 1, Section 2.1.2.1, Page 2-10.] The DEIS states that the Project “would connect into the Oceanside 138-kilovolt (kV) Substation (Oceanside POI) owned by National Grid and operated by Public Service Enterprise Group Incorporated (PSEG) Long Island.” The Oceanside 138-kV Substation is owned by LIPA and operated by PSEG Long Island.</p>	<p>Revised as suggested.</p>
<p>[Location in DEIS: Volume 1, Section 2.1.2.1.2, Page 2-14.] On page 2-14, Paragraph 2, the value of 15 feet in meters (4.7 meters) should be corrected to 4.6 meters.</p>	<p>Revised as suggested.</p>
<p>[Location in DEIS: Volume 1, Section 2.1.2.4, Page 2-19.] On page 2-19, Paragraph 2, the phrase “riprap slope with the tidal zone (Wit replacement of identical material),” “wit” should be corrected to with “with.”</p>	<p>Revised as suggested.</p>
<p>[Location in DEIS: Volume 1, Table 2-3, Page 2-34]</p>	<p>Added “potential land use conflicts” to the reasons the 65<sup>th</sup> Street Railyard location was not retained within the PDE.</p>

Comment	Response
<p>The discussion of the 65th Street Railyard alternative as a cable landfall omits the mention of land use and planned development conflicts that also make this alternative impractical.</p>	
<p>[Location in DEIS: Volume 1, Table 2-4, Page 2-45.] On page 2-45, the Differences Among Action Alternatives column for Commercial Fisheries and For-Hire Recreational Fishing does not provide a conclusion as the other topic.</p>	<p>Impact conclusions have been added to Table 2-4 for commercial fisheries and for-hire recreational fishing.</p>
<p><b>Affected Environment and Environmental Consequences</b> Location in DEIS: Volume 1, Section 3.1, Page 3-2. Table 3.1 on page 3-2 lists a number of impact-producing factors (IPFs) that are not proposed for the Project, including cable cooling systems, aircraft, and gravity base foundations. This should be clarified to indicate that the example sources and activities are not Project-specific, or else remove IPFs that are not part of the Project scope.</p>	<p>A footnote had been added to Table 3-1 explaining that the sources and activities listed in Table 3-1 are typical of offshore wind projects and are not meant to be project-specific. Select sources and activities listed in Table 3-1 may not be applicable to the EW 1 and EW 2 Projects.</p>
<p><b>Benthic Resources</b> Location in DEIS: Volume 1, Section 3.6, Page 3.6-13 On Page 3.6-13, the DEIS refers to 102 WTGs and 2 OSS. Empire plans to install up to 147 WTGs</p>	<p>The referenced 102 WTGs and 2 OSS are associated with planned offshore wind activities in the geographic analysis area (excluding the Proposed Action). This describes the cumulative No Action Alternative baseline. No change has been made.</p>
<p><b>Benthic Resources</b> Location in DEIS: Volume 1, Section 3.6, Page 3.6-16. On page 3.6-16, in the third bullet, remove the term “interlink cables” as this is not consistent with project terminology used throughout the document.</p>	<p>Revised as requested.</p>
<p><b>Commercial Fisheries and For-Hire Recreational Fishing</b> Location in DEIS: Volume 1, Section 3.9.5, Page 3.9-64. On page 3.9-64, in paragraph 3, the phrase “fishing industry representatives have stated that their operations require a minimum distance greater than 1 nm between WTGs (the proposed action would have 0.65 nm spacing).” This should clarify that 0.65 nm is the minimum spacing for the proposed action.</p>	<p>Revised as requested.</p>
<p><b>Commercial Fisheries and For-Hire Recreational Fishing</b> Location in DEIS: Volume 1, Section 3.9.5.2, Page 3.9-69.</p>	<p>This has been corrected to reference 149 foundations.</p>

Comment	Response
<p>The DEIS states “The 147 foundations for the Proposed Action would represent less than 5 percent of the 3,101 foundations that would be installed on the OCS for planned offshore wind farms.” Note that this statement omits the OSS foundations; there are 149 foundations as part of the Proposed Action including both wind turbine generator (WTG) and offshore substation (OSS) foundations.</p>	
<p><b>Cultural Resources</b> Location in DEIS: Volume 1, Section 3.10, Page 3.10-27, Table 3.10-4, and Appendix N, Page N-1, N-2, and N-42. For Sandy Hook Light and Water Witch rows, the word “Middleton” is misspelled and should be “Middletown”.</p>	<p>Revised as requested.</p>
<p><b>Cultural Resources</b> Location in DEIS: Volume 1, Section 3.10, Page 3.10-27, Table 3.10-4 and Appendix N, Pages N-1 and N-42. Highlands is the incorrect town for the Fort Hancock, U.S. Life Saving Station. The town should be listed as Middletown.</p>	<p>Revised as requested.</p>
<p><b>Environmental Justice</b> Location in DEIS: Volume 1, Section 3.12.1.1, Page 3.12-3. On page 3.12-3 the New York definition of “an environmental justice population” provided differs slightly from the New York State Department of Environmental Conservation (NYSDEC) Commissioner Policy 29 (CP-29, 2003) definition. CP-29 includes the following definitions: “Minority community means a census block group, or contiguous area with multiple census block groups, having a minority population equal to or greater than 51.1%* in an urban area and 33.8%* in a rural area of the total population;” and “Low-income community means a census block group, or contiguous area with multiple census block groups, having a low-income population equal to or greater than 23.59% of the total population.”</p>	<p>In their comments on the preliminary Draft EIS, the New York State agencies requested that the EIS consider the criteria for Disadvantaged Communities as identified by the New York State Climate Action Council’s Climate Justice Working Group at: <a href="https://climate.ny.gov/resources/disadvantaged-communities-criteria/">https://climate.ny.gov/resources/disadvantaged-communities-criteria/</a>. The criteria used in Final EIS Section 3.12 are consistent with the criteria posted as of May 2023. See FAQ Question #7 at the link above. However, the citation has been updated.</p>
<p><b>Environmental Justice</b> Location in DEIS: Volume 1, Section 3.12, Page 3.12-19. On page 3.12-19, correct the statement “Empire has committed to measure to minimize impacts” to “Empire has committed to measures to minimize impacts.”</p>	<p>Revised as requested.</p>

Comment	Response
<p><b>Environmental Justice</b> Location in DEIS: Volume 1, Section 3.12, Page 3.12-19. On page 3.12-19 and 3.12-21, it is not explained why emissions from both EW 1 and EW 2 are provided for Nassau County and Albany County, but not Kings County where EW 1 is located.</p>	<p>A table summarizing EW 1 and EW 2 air emissions in Kings County has been added to the Final EIS.</p>
<p><b>Land Use and Coastal Infrastructure</b> Location in DEIS: Volume 1, Section 3.14.3.3, Page 3.14-6. On page 3.14-6 there are erroneous parenthesis in paragraph 3.</p>	<p>Parenthesis has been deleted.</p>
<p><b>Land Use and Coastal Infrastructure</b> Location in DEIS: Volume 1, Section 3.14, Page 3.14-8. On page 3.14-8, remove mention of the Onshore Substation B site, which is not part of the proposed action.</p>	<p>Reference to Onshore Substation B has been deleted.</p>
<p><b>Navigation and Vessel Traffic</b> Location in DEIS: Volume 1, Section 3.16.5, Page 3.16-16. The reference made on page 3.16-16 in the following statement "(COP Appendix DD, page 102; Empire 2022)" has the incorrect page number. The page number should read page 103.</p>	<p>Page number has been revised.</p>
<p><b>Water Quality</b> Location in DEIS: Volume 1, Section 3.21.1, Page 3.21-4. The DEIS only includes one impaired waterbody along the EW 2 Project route; it omits Barnums Channel (Hog Island Channel), which is also an impaired waterbody.</p>	<p>Barnums Channel has been added to Table 3.21-1 in the Final EIS.</p>
<p><b>Water Quality</b> Location in DEIS: Volume 1, Section 3.21.2, Page 3.21-7. In the last paragraph of page 3.21-7, the volumes of coolants and lubricants that could be stored within the Vineyard Mid-Atlantic LLC WTGs and OSS are presumed to be 41,310 gallons of coolants and 444,086 gallons of lubricants, not 41.310 gallons and 444.086 gallons, respectively.</p>	<p>Revised as suggested.</p>
<p><b>Air Quality</b> Location in DEIS: Volume 2, Appendix G, Section 3.4, Page 3.4-1. On Page 3.4-1, the airshed is stated as 25 miles or 40 kilometers however, 25 miles is approximately 46.3 kilometers.</p>	<p>Conversion of 25 miles to approximately 40 kilometers is confirmed. No change has been made.</p>

Comment	Response
<p><b>Birds</b> Location in DEIS: Volume 2, Appendix G, Section 3.7.9, Page 3.7-29. On page 3.7-29 the text should refer to avian monitoring instead of bat monitoring.</p>	<p>The referenced text was revised between the Draft EIS and Final EIS and the comment is no longer applicable.</p>
<p><b>Sea Turtles</b> Location in DEIS: Volume 2, Appendix G, Section 3.19, Page 3.19-19. Please note that the term “exclusion zone” is not consistent with the LOA. The DEIS should refer to “pre-clearance” and “shut-down” zones consistent with latest guidance from the National Marine Fisheries Service.</p>	<p>Language has been updated to “clearance” and “shutdown” zones, consistent with the language in Appendix H.</p>
<p><b>Wetlands</b> Location in DEIS: Volume 2, Appendix G, Section 3.22.1, Page 3.22-1. The DEIS states that authorization from the USACE and NYSDEC is required prior to dredge or fill of jurisdictional wetlands. Although this is typically true for dredge and fill activities, the electric transmission facilities for EW 1 and EW 2 in state waters will be subject to Article VII of the New York Public Service Law; therefore, the dredge or fill of state jurisdictional wetlands associated with the electric transmission facilities will be subject to authorization from the New York Public Service Commission, rather than NYSDEC.</p>	<p>Final EIS Section 3.22.1 has been revised to reflect that authorization for dredge and fill of wetlands is required from USACE and the New York Public Service Commission under Article VII.</p>
<p><b>Finding of Adverse Effect</b> Location in DEIS: Appendix N, Attachment A Draft MOA Within Attachment A, Draft MOA, page 2, paragraph 5, the Cyclone Roller Coaster is not a designated NHL.</p>	<p>Reference to the Cyclone Roller Coaster as a designated NHL has been removed. The Memorandum of Agreement has been revised to indicate that the NHLs in the offshore viewshed APE are the Fort Hancock and Sandy Hook Proving Ground Historic District and Sandy Hook Light.</p>
<p>[Location in DEIS: Volume 1: Section S.4.8, Page S-8; Section 2.1.2.1.1 Page 2-9; Section 2.1.8, Page 2-23; Section 3.21-7, Page 3.21-20. Appendix G: Section 3.22.5, Page 3.22-8.] <b>Cable Bridge.</b> The description of the cable bridge design and installation is incorrect. The cable bridge PDE includes up to four support columns and up to 12 steel pipe piles within the waterway.</p>	<p>Revisions have been implemented in Section S.4.8, Section 2.1.2.1.1, Section 2.1.8, Section 3.21, and Appendix G: Section 3.22 of the Final EIS to correct the number of support columns and steel pipe piles within the waterway associated with the cable bridge.</p>
<p>[Location in DEIS: Volume 1, Section 2.1.2.1.2, Page 2-15.] <b>Localized Dredging at Submarine Asset Crossings.</b> The description of localized dredging relating to submarine asset crossings</p>	<p>Revisions have been implemented in Section 2.1.2.1.2 of the Final EIS to reflect the correct excavation quantities.</p>



Comment	Response
<p>states that approximately 679 cubic yards (519 cubic meters) would be excavated. The PDE for asset crossing dredging is 735 yd<sup>3</sup> (562 m<sup>3</sup>).</p>	
<p><b>Benthic Resources</b> [Location in DEIS: Volume 1, Section 3.6, Page 3.6-19 and Page 3.6-21.] The DEIS states that “protective cable armor associated with the export and interarray cables would create hard-bottom habitat up to 5 meters wide along cable corridors and would cover approximately 123 acres (50 hectares) of bottom sediments” and also states “The Proposed Action plans up to 147 WTGs and two OSS including up to 134 acres of hard scour protection around the WTG foundations and export and interarray cables.” These numbers are inconsistent with Section U.5.3 of Appendix U of the COP, which states that hardbottom substrate would be introduced in up to 139 ac (56.2 ha) of the Lease Area for the operational duration of the Project, as well as up to 92 ac (37.2 ha) where interarray and export cable protection is used.</p>	<p>First quote: Values have been confirmed based on latest available information. Sentence has been revised for clarity and now states, “Protective cable armor would create hard-bottom habitat up to 5 meters wide along up to 10 percent of the length of the export cables and up to 10 percent of the length of the interarray cables corridors and would cover approximately 123 acres (50 hectares) of bottom sediments.” Second quote: Values have been updated based on the latest available information as presented in the most recent version of the EFH report. Sentence now states, “The Proposed Action plans up to 147 WTGs and two OSS including up to 259 acres (105 hectares) of hard scour protection around the WTG foundations, OSS foundations, and export and interarray cables.”</p>
<p>[Location in DEIS: Appendix E, Page E-1.] <b>Length of submarine export cables.</b> Please note that the length of the “total length of the submarine export cables” for EW 1 and EW 2 in Table E-1 provides the length of each submarine export cable route from the edge of the Lease Area to the cable landfall. Since there are multiple cables proposed along each route, as well as submarine export cables within the Lease Area connecting to the offshore substation, this route length does not equal the total length of the installed submarine export cables.</p>	<p>Revisions were implemented in Table E-1 in the Final EIS to clarify that the parameter is the “total length of submarine export cable route.” A footnote was also added to explain that the length refers to the distance along the centerline of the submarine export cable corridor, measured from the edge of the Lease Area to the export cable landfall, and that multiple cables may be included within each cable route.</p>
<p>[Location in DEIS: Appendix E, Page E-3.] <b>Hydraulic Oil Volume.</b> The amount of hydraulic oil utilized for WTGs is incorrected listed as 1,000 liters when it should be 1,200 liters.</p>	<p>The amount of hydraulic oil in liters has been corrected in Table E-3 of the Final EIS.</p>
<p>[Location in DEIS: Appendix E, Page E-4.] <b>Seafloor Footprint and Seabed Penetration of Wind Turbine, Monopile Foundation, and Piled Jacket Foundation Installation Vessels.</b> The DEIS lists the Seafloor Footprint and Seabed Penetration for the Monopile Foundation Installation Vessel. The Monopile Foundations will be installed by a vessel using dynamic positioning. Monopile Foundation Installation Vessel Seafloor Footprint and Seabed Penetration should be removed DEIS.</p>	<p>Revisions have been made to Table E-3 of the Final EIS to reflect these changes to the monopile foundation, piled jacket foundation, and wind turbine installation parameters.</p>

Comment	Response
<p>The DEIS lists the Seafloor Penetration for Piled Jacket Foundation Installation Vessel. The Piled Jacket Foundations will be installed by a vessel using dynamic positioning. Piled Jacket Installation Vessel Seabed Penetration should be removed from the DEIS.</p> <p>The DEIS lists correctly the Seafloor Footprint for the Wind Turbine Installation Vessel. However, the Seabed Penetration for the Wind Turbine Installation vessel is missing. The correct value here is 82 ft (25 m).</p> <p>The DEIS does not list Seabed Penetration of the offshore substation commissioning accommodation vessel. The correct values here is 0.5 acre (0.2 hectare) Seafloor Footprint and 82 ft (25 m) Seabed Penetration.</p>	
<p>[Location in DEIS: Appendix E, Page E-4.]</p> <p><b>Anchor Corridor Width.</b> It is important to note that the 1,250-ft (381 m) anchor corridor width stated is on either side of the submarine export cable siting corridor in state waters.</p>	<p>Revised footnote 20 in Table E-3 of the Final EIS to clarify that this width is on either side of the submarine export cable siting corridor in state waters.</p>
<p>[Location in DEIS: Appendix E, Page E-7.]</p> <p><b>Offshore HDD Exit Work Area Footprint.</b> The offshore (exit) work area footprint for the landfall should be changed to 150 ft by 150 ft (46 m by 46 m) instead of 100 ft by 100 ft (30 m by 30 m).</p>	<p>Revised as requested.</p>
<p>[Location in DEIS: Appendix E, Page E-8.]</p> <p><b>Trench Installation Width.</b> Remove the sentence at the end of footnote 19 "Typical installation width is anticipated to be 1.5 feet (0.5 meter)." This is a typo, as the maximum trench width is 10 ft (3 m) and the typical trench width is 5 ft (1.5 m).</p>	<p>Deleted the last sentence of footnote 19 in Table E-3 of the Final EIS as suggested.</p>
<p><b>Appendix M</b></p> <p>[Location in DEIS: Appendix M, Table M-2, Page M-5.]</p> <p>WTG Mid-Tower Light Height. Value for WTG mid-tower light (263 ft [78 m] MLLW) height was not provided by Empire.</p>	<p>Empire's response to a request for information regarding the height of the mid-tower light has been added as a footnote to Table M-2. The response did not provide a specific height for the mid-tower light but noted that the mid-tower light would be approximately halfway from the highest nacelle point and lowest astronomical tide above sea level.</p>
<p><b>Appendix M</b></p> <p>[Location in DEIS: Appendix M, Table M-2, Page M-5.]</p> <p>Yellow Tower Base Color. Value for yellow tower base color height (50 ft [15.2 m] HAT) was not provided by Empire.</p>	<p>Based on Empire's response to a request for information, the height of the yellow tower base color has been updated to 68.9 feet (21 meters) above HAT.</p>

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**P.6. Responses to Other Agency, Stakeholder, and Public Comments on the Draft EIS**

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**P.6.1 Purpose and Need**

**Table P.6.1-1 Responses to Comments on the Purpose and Need**

Comment No.	Comment	Response
BOEM-2022-0053-0027-0001	President Biden’s Executive Order 14008 is irrelevant to the purpose and need of the proposed action. BOEM begins its discussion of the purpose and need of the DEIS as the need to follow the President’s Executive Order 14008 “Tackling the Climate Crisis at Home and Abroad”. As inferred by the Supreme Court in its decision <i>West Virginia v. EPA</i> the Executive Branch has no authority to regulate carbon dioxide without a law passed by Congress. As the purpose of the offshore wind project is to reduce carbon dioxide emissions the Executive Order is irrelevant and these comments should be removed from the DEIS.	The purpose and need section of Chapter 1 appropriately recognizes that Executive Order 14008 states one of the policies of the United States is to “spur[ ] well-paying union jobs and economic growth, especially through innovation, commercialization, and deployment of clean energy technologies and infrastructure.” Consequently, BOEM does not agree that the Executive Order is irrelevant. BOEM has authority under the OCSLA to authorize renewable energy activities on the OCS. The purpose of BOEM’s action is to determine whether to approve, approve with modifications, or disapprove Empire Wind’s COP. BOEM’s decision on Empire Wind’s COP does not regulate sources of CO <sub>2</sub> emissions.
BOEM-2022-0053-0102-0003	Section 1.2 of the DEIS (Purpose and Need of the Proposed Action) notes that it is a goal of the Empire Wind 1 and 2 project developer to meet the existing state energy procurements for these projects. However the procured amount of energy is not referenced in statements which use the terms “purpose” or “need.” This is an important nuance because the National Environmental Policy Act requires consideration of a range of alternatives which could meet the defined purpose and need. We expressed concern that DEIS documents for other wind projects (e.g. Revolution Wind) implied that only alternatives which would generate the full procured amount of electricity could meet the purpose and need. This could limit BOEM’s ability to reduce the potential negative impacts of the project by considering approval of a smaller project than that proposed by the developer. We suggest that this FEIS and future NEPA documents more clearly indicate that the agency is not bound to consider approval only of projects that can produce a certain level of electricity (e.g. the amount procured by the state(s) via the power purchase agreement(s)). BOEM should consider federal and state renewable energy targets as well as existing procurements	BOEM’s alternatives screening criteria for COP EISs is outlined in BOEM’s <i>Process for Identifying Alternatives for Environmental Reviews of Offshore Wind Construction and Operations Plans pursuant to the National Environmental Policy Act</i> , published June 22, 2022, and available at: <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/BOEM%20COP%20EIS%20Alternatives-2022-06-22.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/BOEM%20COP%20EIS%20Alternatives-2022-06-22.pdf</a> .  Consistent with BOEM’s screening criteria, an alternative would be considered but not analyzed in detail if it would result in the development of a project that would not



Comment No.	Comment	Response
	when preparing an EIS and determining whether to approve a project. However it should be made clear that BOEM may approve a project smaller than what is proposed or procured. We suggest expanding on this to make it clear that the project will avoid risks to the health of marine ecosystems ecologically and economically sustainable fisheries and ocean habitats. BOEM should clearly acknowledge that if these risks cannot be avoided they should be minimized mitigated and compensated for.	satisfy contractual offtake obligations.

**P.6.2 Proposed Action and Alternatives**

**Table P.6.2-1 Responses to Comments on the Proposed Action and Alternatives**

Comment No.	Comment	Response
<b>No Action</b>		
BOEM-2022-0053-0113-0009	<p>[Bold: No Action Alternative:] We hereby incorporate our comments on Revolution Wind regarding the No Action Alternative here as the same arguments apply. [Footnote 18: See <a href="https://www.regulations.gov/comment/BOEM-2022-0045-0059">https://www.regulations.gov/comment/BOEM-2022-0045-0059</a>.] BOEM has corrupted a true No Action Alternative which has served to water down the impact of the individual project under DEIS review in this case Empire Wind. The No Action Alternative on Table 2-1 of the DEIS includes “all other existing or other reasonably foreseeable future activities described in Appendix F”. Appendix F contains all other leases currently leased on the Atlantic OCS whether permitted or not for a total of 34 projects. [Footnote 19: See Empire Offshore Wind Projects Environmental Impact Statement (boem.gov) Table F-2.] This alternative confuses a true NEPA No Action with a Cumulative Impacts Analysis also required by NEPA. BOEM cannot legally conflate the two as it affects the analysis results. The No Action alternative in a true NEPA sense would analyze a disapproval of the Empire Wind project and include only the 3 projects that BOEM has already approved (i.e. Vineyard Wind and South Fork Wind Farm and two experimental turbines off Virginia). A Cumulative Impacts Analysis would include all future foreseeable projects- which would include not only permitted projects but also potential additional wind farms in all currently leased BOEM areas as well as the potential for new leases in the Central Atlantic Call Area. The difference in analysis between 3 projects and 34 projects makes a difference when examining impacts from the Empire Wind project. However the DEIS uses the No Action Alternative for its Cumulative Impacts Assessment despite the fact that the two are not the same. By doing so it waters down the impact of the project under consideration. This is unacceptable and must be re-analyzed.</p>	<p>The row for the No Action Alternative in Table 2-1 and Section 2.1.1 has been revised to remove the analysis of other reasonably foreseeable future activities as part of the No Action Alternative. This revision is consistent with the Draft EIS analysis in Chapter 3 sections that considered the Vineyard Wind 1, South Fork, Coastal Virginia Offshore Wind (two WTGs), and Block Island projects as ongoing activities and all other reasonably foreseeable planned offshore wind projects as cumulative impacts of the No Action Alternative. This correction in Chapter 2 does not affect the Chapter 3 analysis that was presented in the Draft EIS and the Draft EIS impact analysis is consistent with the commenter’s recommended approach, with the exception that BOEM considers only future projects in existing offshore wind lease areas as reasonably foreseeable.</p>
BOEM-2022-0053-0130-0021	<p>Framing of the No Action Alternative In the DEIS the No Action Alternative hinges upon the full buildout of existing and foreseeable future activities - including other energy development - without also providing information or comparison of alternatives against an undeveloped (no construction) region. As presented this DEIS presupposes the approval of future OSW projects that have not even begun an environmental assessment nor have the public had</p>	<p>See response to previous comment BOEM-2022-0053-0113-0009. The No Action Alternative assesses the impact of ongoing activities (excluding the Proposed Action). The cumulative impacts of the No Action Alternative consider the impact of ongoing</p>

Comment No.	Comment	Response
	<p>the opportunity to provide input to. This results in multiple issues: The DEIS provides the public with misleading information as it assumes construction of OSW in all the leases in the region. Project approval must not be expected preemptively. The public cannot reasonably differentiate and assess if this project and regional OSW development are worth the impacts they will cause. The impacts of this project are diluted and obscured as they are only compared against regional buildout rather than no development. Contribution of this project to cumulative impacts is minimized. One project may not seem “that bad” in comparison to the potential buildout of all leases and WEAs in the region but the cumulative impacts of all these projects will be the most harmful to the environment and other ocean users.</p>	<p>activities and other reasonably foreseeable planned activities (excluding the Proposed Action). The Proposed Action considers the impact of the Empire Wind Projects within the context of existing conditions and ongoing activities. The cumulative impacts of the Proposed Action considers approval of the Empire Wind Projects in combination with other reasonably foreseeable planned activities within the geographic analysis area for each Chapter 3 resource topic.</p>
<p>BOEM-2022-0053-0130-0022</p>	<p>At a minimum an additional alternative should be analyzed and compared against the design envelope of Empire Wind: a No Development Alternative. The No Action Alternative as presented should still be included in the DEIS but a complimentary No Development Alternative should be provided to the public also. Again this demonstrates the need for a robust cumulative impact assessment and mitigation measures aimed to address cumulative impacts to understand the true impacts of OSW in the NY Bight.</p>	<p>The No Action Alternative assumes that BOEM would not approve the Empire Wind COP and that the Empire Wind Projects would not be built. Cumulative impacts of the No Action Alternative and cumulative impacts of the action alternatives are also analyzed in the EIS.</p>
<p>BOEM-2022-0053-0143-0018</p>	<p>The only "No-Action alternative" evaluated was energy production from the burning of fossil fuel to produce the energy that the Empire Wind power plant would otherwise supply. There weren't any "No Action Alternatives" that involved the use of carbon capture. There weren't any "No-Action Alternatives" that involved implementation of energy conservation policy. There weren't any "No-Action Alternatives" that involved low- or no-carbon forms of producing energy such as distributed rooftop solar or advanced nuclear fission projects to supply the energy that the Empire Wind power plant would otherwise supply. There weren't any "No-Action Alternatives" that involved any combination of these strategies. Such No-Action Alternatives could meet the goal of reducing greenhouse gas emissions while avoiding the harms to the marine environment (organisms and their habitats) directly and indirectly caused by the proposed Empire Wind offshore wind project but no such alternatives were considered by the Bureau in the DEIS. Also no alternatives were considered that combined any one or more of these above-mentioned risk-mitigating or risk-avoiding alternatives with a version of the Empire offshore wind power</p>	<p>The No Action Alternative assumes that BOEM would not approve the Empire Wind COP and that the Empire Wind Projects would not be built. Ongoing activities that contribute to existing baseline conditions are also described under the No Action Alternative. Ongoing and reasonably foreseeable planned activities that could contribute to cumulative impacts of the No Action Alternative and cumulative impacts of the action alternatives are described in Appendix F, <i>Planned Activities Scenario</i>. Alternate technologies for energy generation or conservation would not meet BOEM's screening criteria for alternatives to be analyzed in detail<sup>1</sup> because they would</p>

<sup>1</sup> See BOEM's *Process for Identifying Alternatives for Environmental Reviews of Offshore Wind Construction and Operations Plans pursuant to the National Environmental Policy Act* published June 22, 2022, and available at: <https://www.boem.gov/sites/default/files/documents/renewable-energy/BOEM%20COP%20EIS%20Alternatives-2022-06-22.pdf>.

Comment No.	Comment	Response
	plant project that has a significantly reduced in number of turbines and/or footprint to mitigate the expected or stated unknown harms	not meet BOEM's purpose and need or the goals of the Applicant as described in EIS Section 1.2, <i>Purpose of and Need of the Proposed Action</i> .
<b>Alternative A</b>		
BOEM-2022-0053-0110-0012	The Network acknowledges BOEM's thorough Scoping and Alternatives analysis process and is pleased to note that the proposed Action Alternatives have no significantly different resource impact ratings than the Proposed Action. We emphasize the importance of maximizing the capacity to deliver energy from the project in order to achieve commitments while reducing costs amplifying community benefits and safeguarding the environment. In that we believe that Alternatives C-G address particular concerns however each of these alternatives are presented without consideration of the other alternatives. The Network believes the most successful alternative may be an amalgamation of parts of each. In order to recognize and support the required clean energy transition these alternatives must be looked at in conjunction with each other. One solution may negate and/or exacerbate the impacts of another when the examination is not wholistic.	Per the Department of the Interior's NEPA regulations at 43 CFR 46.420(d), the Preferred Alternative will reflect the alternative that BOEM believes would best accomplish the purpose and need of the Proposed Action while fulfilling its statutory mission and responsibilities, given consideration of economic, environmental, technical, and other factors. Based on review of the findings in the Final EIS and with consideration of new information on the presence of glauconite in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations, BOEM has recommended Alternatives C-1, D, F, G, and H for inclusion in the preferred alternative.
BOEM-2022-0053-0110-0014	[Bold: Alternative A] The Network [Bold: recommends] that BOEM implement the goals of Alternative A while recognizing based on the valuable input that BOEM has received during the process there are ways to improve upon the project while ensuring the timeline move forward without delay.	
BOEM-2022-0053-0110-0016	With any of these alternatives if there is no difference between the environmental impacts of the alternatives and the Proposed Action the Network encourages BOEM to defer to the project developers preferred alternative.	
<b>Alternative B</b>		
BOEM-2022-0053-0102-0004	Based on the layout maps provided we assume Alternative B would allow for the same maximum number of turbines as Alternatives A and E; however this is not explicitly stated in the DEIS text.	All Draft EIS alternatives that modified the turbine array layout would have allowed Empire to construct up to 147 WTGs in the Lease Area. Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has
BOEM-2022-0053-0110-0015	[Bold: Alternative B] Ensuring that impacts to culturally-significant resources are limited is a critical part of the entire permitting process and the Network applauds BOEM's years-long stakeholder process before and after wind energy area identification to properly identify these situations. The Network encourages BOEM consider the economic and environmental impacts of any Reduction of Surface Occupancy options due to the decrease in potential energy generation. Removing or relocating turbines without sufficient	

Comment No.	Comment	Response
	justification would set a powerful precedent that will impact other projects in the future limiting the overall capacity of the U.S. market in the near- term and economically weakening the supply chain.	determined that Alternative B would no longer meet the purpose and need and therefore Alternative B is not recommended for inclusion in the Preferred Alternative. The refinement to Alternative F between the Draft EIS and Final EIS based on the pile drivability analysis reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs).
BOEM-2022-0053-0113-0013	Alternative B which would remove 6 turbines at the northwest end of the lease area would be preferable to having those turbines exist; however it is uncertain what impacts any new developer proposal due to problematic sediment discovery will have on this as well as other Alternatives.	
<b>Alternative C</b>		
BOEM-2022-0053-0100-0005 & -006	Between the two options that BOEM has proposed we concur with the Coast Guard and the Corps that it is preferable to bury the cable in the Gravesend Bay anchorage area. The shallow area along the perimeter of the anchorage is used less frequently and a cable buried there is less likely to pose a safety risk for vessel operators – provided that the cable is buried a minimum of 15 feet. We also urge the Corps to ensure that the cable retains its depth. Gravesend Bay is a dynamic environment with uncertainties relating to water flow sand erosion storms and other naturally occurring phenomena that might cause the burial depth to change or the cable’s location to shift. Additionally we urge BOEM to bury the cable further to the east along the defined perimeter of the anchorage in order to maximize anchoring space. The Gravesend Bay anchorage area is used by a variety of vessels including towing vessels. Ferries and other passenger vessels occasionally transit through the Bay and tankers conduct lightering and bunkering operations in the anchorage. While the shallow portions of the anchorage are used less frequently they provide a natural harbor for smaller craft to anchor in times when the anchorage is crowded.	Alternative C-1 (routing the export cable through the Gravesend Anchorage Area) is incorporated into the Preferred Alternative. Final EIS Appendix H includes a mitigation measure that would require Empire to develop and implement a cable maintenance plan that requires prompt remedial burial of exposed and shallow-buried cable segments, addresses repeat exposures, and establishes a process for identifying when cable burial depths reach unacceptable risk levels.
<b>Alternative D</b>		
BOEM-2022-0053-0110-0017	[Bold: Alternative D] The Network encourages BOEM to carefully consider any removal of seabed for cable lay corridor to evaluate whether the economic and environmental benefits and costs of the removal outweigh the proposed cable plan.	New York State cooperating agencies, USACE, and Empire all support avoidance of the sand borrow area and Alternative D is incorporated into the Preferred Alternative.
<b>Alternative E</b>		
BOEM-2022-0053-0102-0005	Based on the layout maps provided we assume that Alternative E would allow for the same maximum number of turbines as Alternatives A and B; however this is not explicitly stated in the DEIS text.	All Draft EIS alternatives that modified the turbine array layout would have allowed Empire to construct up to 147 WTGs in the

Comment No.	Comment	Response
BOEM-2022-0053-0110-0018	[Bold: Alternative E] Ensuring that impacts to culturally-significant resources are limited is a critical part of the entire permitting process and the Network applauds BOEM's years-long stakeholder process before and after wind energy area identification to properly identify these situations. The Network encourages BOEM consider the economic and environmental impacts of any Reduction of Surface Occupancy options due to the decrease in potential energy generation. Removing or relocating turbines without sufficient justification would set a powerful precedent that will impact other projects in the future limiting the overall capacity of the U.S. market in the near- term and economically weakening the supply chain.	Lease Area. Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that Alternative E would no longer meet the purpose and need and therefore Alternative E is not recommended for inclusion in the Preferred Alternative. The refinement to Alternative F between the Draft EIS and Final EIS based on the pile drivability analysis reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs).
BOEM-2022-0053-0113-0003	This is particularly pertinent as the necessary modifications are likely to render other Alternatives such as the Alternative E setback between EW1 and EW2 untenable should the project go forward with the planned number of turbines. Therefore all the impacts of newly proposed layouts must be taken into account both direct and indirect impacts on other Alternatives and uses/issues.	
<b>Alternative F</b>		
BOEM-2022-0053-0102-0010	It is our understanding that the aim of the modified layout under Alternative F is to avoid the mineral glauconite which was detected during geotechnical surveys of the Empire Wind 1 project area. However these details are not stated in the DEIS. The DEIS does not make it clear why special geotechnical considerations are needed for Alternative F but not the other alternatives.	Additional information on the presence of glauconite in the Lease Area and the constraints that glauconite poses for installation of WTGs has been added to the description of Alternative F in Section 2.1.7 of the Final EIS. Final EIS Figure 2-10 has also been updated to reflect the proposed layout for EW 2 under Alternative F based on results of geotechnical investigations.
BOEM-2022-0053-0102-0011	It is also our understanding that Alternative F may be preferred by the project developer at this time despite the fact that Alternative A is identified in the DEIS as the proposed action and is the focus of the COP and impact analyses. If Alternative F is in fact preferred the COP should be modified to reflect that this is the new proposed action and it should be described as such in the FEIS.	Empire has not proposed a change to the PDE in the COP, which allows for installation of up to 147 WTGs within the 174 WTG positions identified in the Lease Area. The use of a PDE provides flexibility for final design and Alternative F as proposed is within the PDE parameters and would not cause an update to the COP.
BOEM-2022-0053-0110-	[Bold: Alternative F] The Network encourages BOEM consider the economic and environmental impacts of any Reduction of Surface Occupancy options due to the decrease in potential energy generation. Removing or relocating	All action alternatives analyzed in the Draft EIS allowed for up to 147 WTGs to be installed within the 174 WTG positions



Comment No.	Comment	Response
0019	turbines without sufficient justification would set a powerful precedent that will impact other projects in the future limiting the overall capacity of the U.S. market in the near-term and economically weakening the supply chain.	identified in Empire’s PDE and were determined to meet the purpose and need of the Proposed Action while also seeking to address specific resource conflicts raised during scoping.
BOEM-2022-0053-0130-0007	Due to recent geological discoveries for turbine location surveying the Equinor team reached out to RODA with the availability of the DEIS to update interested fishermen with their findings and layout Alternative F for EW 1. [Footnote 4: RODA held a webinar Dec. 9 2022 for fishermen who had participated in the previous layout workshops for Equinor to provide updates from their geological survey work.] The presence of glauconite in certain prospective pile driving areas limited the available site locations for turbines deriving a different layout (Alternative F) than the layout option developed through the Equinor-RODA workshops (Alternative E). Fishing industry participants that attended the update-webinar received information about the technical constraints discovered by Equinor’s geologic survey and were able to ask questions to the geologic and engineering team. Transparent and informed discussions such as these set a good foundation for conflict reduction and potential future work between industries. Equinor’s commitment to leaving part of Cholera Bank open to fishing was further demonstrated as the developer did not survey the open area when geologic constraints pushed them off anticipated turbine locations. Unfortunately the presence of glauconite in parts of EW 1 minimized the ability for Equinor to include a buffer between EW 1 and 2 and still meet their 816 MW power commitment. While the extra spacing between turbines in Alternative F northwest of the boundary between EW 1 and 2 may reflect a similar buffer recommended in Alternative E RODA has not had the opportunity to consult fishing industry participants that may consider using that area as a corridor for transit.	Comment acknowledged.
BOEM-2022-0053-0140-0024	The Draft EIS evaluates the No Action Alternative and eight action alternatives (one of which has sub-alternatives).S.4.7 Alternative F—Wind Resource Optimization with Modifications for Environmental and Technical Considerations (S-8 pg 14/510) states that this “ under this Alternative the wind turbine layout would be optimized to maximize annual energy production and minimize wake loss while addressing geotechnical considerations”. This is precisely the concern that COA has been voicing on proposed projects. How will this Project or its Alternatives including Alternative determine what is the best turbine layout and how does the proposed action claim that it will maximize annual energy production? What are the geotechnical	Empire evaluates wake losses using engineering wake models, as is standard industry practice. The layout of a wind farm can be designed in such a way as to minimize these losses; however in the case of the layouts for EW 1 and EW 2, optimization for wake loss has not been possible because of restrictions on the available foundation locations due to seabed geotechnical conditions.

Comment No.	Comment	Response
	<p>considerations that need to be addressed and where can one find this information? How will this Project minimize wake losses when it is clearly documented in research to be a major issue impacting the efficiency of the turbines? With hundreds of turbines co-located in the geographic analysis area wake loss effects will be significant and could cause adverse consequences and result in economic impacts [Footnote 64: Lundquist et al. Costs and consequences of wind turbine wake effects arising from uncoordinated wind energy development 2018. <a href="https://www.osti.gov/servlets/purl/1484339">https://www.osti.gov/servlets/purl/1484339</a>.] (Lundquist et al. 2018).</p>	<p>Additional information on the presence of glauconite in the Lease Area and the constraints that glauconite poses for installation of WTGs has been added to the description of Alternative F in Section 2.1.7 of the Final EIS. Due to geotechnical constraints in the Lease Area, WTG locations under Alternative F have been optimized based on installation risk of the monopile foundations, rather than annual energy production.</p>
<b>Alternative H</b>		
BOEM-2022-0053-0117-0005	<p>We believe that Alternative H best accomplishes these standards by reducing resuspension of polluted materials during dredging for the Empire Wind 1 export cable. In this letter we make several recommendations for strengthening the FEIS in order to best achieve the above standards for the equitable high-road and environmentally responsible development of the Project.</p>	<p>Alternative H is incorporated into the Preferred Alternative.</p>
BOEM-2022-0053-0117-0015	<p>We believe that Alternative H best achieves our standards for the equitable high-road and environmentally responsible development of offshore wind projects by reducing the resuspension of polluted materials during dredging for the Empire Wind 1 export cable. We also urge BOEM to consider the following recommendations for strengthening the FEIS in order to further achieve these standards.</p>	<p>Alternative H is incorporated into the Preferred Alternative.</p>
<b>General Alternatives</b>		
BOEM-2022-0053-0004-0002	<p>The location of the future windfarm should be shifted East. The farm should be placed in front of Jones Beach and the cable routed through Jones Beach along Wantagh Parkway to any connection point (substation) along Wantagh Parkway or close to it. No people live there making it a much safer place to build a wind farm</p>	<p>Evaluating an alternate location for the wind energy facility outside of the Lease Area would constitute a new Proposed Action and would not meet BOEM's purpose and need to respond to Empire Wind's proposal and determine whether to approve, approve with modifications, or disapprove the COP to construct, operate and maintain, and decommission a commercial-scale offshore wind energy facility within the Lease Area. BOEM's regulations require BOEM to analyze Empire Wind's proposal to build a</p>
BOEM-2022-0053-0025-0001	<p>I too believe the wind farm would be better located off of Jones Beach and not Long Beach. While I appreciate and support wildlife I am a greater supporter of human life. We are after all the ones who pay the taxes and vote.</p>	
BOEM-2022-0053-0013-0001	<p>We need clean energy however it has to be done correctly without putting our properties and our health at risk. The same windfarm would be acceptable if shifted East and placed in front of Jones Beach with cable routed through Jones Beach and then along Wantagh Parkway. But neither this windfarm nor</p>	

Comment No.	Comment	Response
BOEM-2022-0053-0021-0001	<p>its cable have a place on or anywhere near Long Beach Island. It is not acceptable to risk our communities health and quality of life.</p> <p>I am opposed to the Empire Offshore Wind facility being placed offshore in Long Beach. This will not give our community any benefit and could potentially cause an oil spill or endanger our wildlife off of our shores. We are a very small community and the project placement would be better served as suggested by some offshore in Jones Beach and the Wantagh parkway which has no residential life right there.</p>	<p>commercial-scale wind energy facility on the Lease Area.</p>
BOEM-2022-0053-0050-0001	<p>We urge the agency to be extremely judicious in delineating areas within which turbine positions will not be allowed and to be mindful of the opportunity cost of foregone carbon-free electric generation. BOEM should take a conservative approach to allow for the potential loss of additional positions due to unforeseen circumstances.</p>	<p>In identifying the Preferred Alternative, BOEM may “mix and match” multiple listed EIS alternatives provided that: (1) the design parameters are compatible; and (2) the Preferred Alternative still meets the purpose and need. An action alternative that would not allow the Lessee to satisfy contractual offtake obligations would not meet the purpose and need.</p>
BOEM-2022-0053-0100-0004	<p>We urge BOEM to work with the Army Corps to more seriously evaluate whether an option exists to minimize the cable’s contact with the Ambrose Channel while avoiding the anchorage area altogether. We understand that it is a best practice to bury cables perpendicularly across a navigable channel minimizing the area of overlap between the cable and the channel and greatly reducing the likelihood of an accidental anchor strike. If such an option is available here we ask BOEM to consider it.</p>	<p>Empire undertook a comprehensive routing constraints analysis to determine the preferred EW 1 submarine export cable route options as described in COP Volume 1, Sections 2.1.2.1 and 2.1.3.1. This review included coordination with USACE and USCG to understand their requirements for crossing federal navigation channels and anchorages. In its comments on the Draft EIS, USCG concurred with the Draft EIS’s assessment of Alternatives C-1 and C-2. Empire’s Individual Permit Application that proposes the route through the anchorage area is currently under review with USACE and a permit decision is anticipated in Quarter 1 of 2024.</p>
BOEM-2022-0053-0102-0006	<p>We assume that unless otherwise stated in the DEIS none of the alternatives are mutually exclusive. However this is not clearly and explicitly stated in the DEIS. For example it should be made clear if Alternatives B and E could be combined. Based on the maps provided we assume that Alternative F cannot</p>	<p>EIS Section 2.1 explains that the alternatives listed in Table 2-1 are not mutually exclusive. BOEM may “mix and match” multiple listed EIS alternatives to result in the Preferred Alternative provided</p>

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	be combined with Alternatives B or E; however this is not explicitly stated.	that: (1) the design parameters are compatible; and (2) the Preferred Alternative still meets the purpose and need. Based on review of additional site investigation completed between the Draft EIS and Final EIS, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore could not be combined with other EIS alternatives. See Final EIS Sections 2.1.3, 2.1.6, and 2.1.7 for additional information on the findings related to the presence of glauconite in the Lease Area and potential impacts on pile drivability.
BOEM-2022-0053-0102-0007	The FEIS should more clearly indicate that 15-MW turbines will be used under each alternative based on the project developer's preferred supplier agreement with Vestas. This should be explicitly stated in the executive summary the descriptions of each alternative and the impacts sections because impacts can vary based on the size of the turbines. The turbine size is acknowledged in other sections of the DEIS; however it is not clearly stated in the descriptions of each alternative. This is relevant for determining the number of turbines which could be used under each alternative to meet the existing energy procurements for each project. Overall we support consideration of higher MW turbines because they can reduce the footprint of the project while still generating the same amount of power as a project with lower MW turbines and a larger footprint. As previously stated BOEM should not be bound to only consider approval of projects which can meet existing procurements especially when only one turbine size is presented as an option. However this is still relevant information to consider for each alternative.	The EIS analyzes the maximum-case scenario within the PDE for Project parameters, as defined in COP Volume 1 and summarized in EIS Appendix E. For WTGs, the maximum PDE parameters are defined in terms of specifications for WTG number, height, and rotor diameter, rather than the make, model, and generating capacity of the WTG. The description of each action alternative includes a statement that the alternative would be constructed, operated, maintained, and decommissioned within the range of design parameters outlined in the COP, except for modifications that would limit or alter the PDE based on the alternative description. For the purpose of alternatives screening, BOEM did consider that Empire has entered into a supplier agreement for a 15-MW WTG, as noted in footnote 1 to Table 2-3.
BOEM-2022-0053-0102-0008	A minimum turbine spacing of 0.65 nautical miles is indicated for Alternative A but is not specified for the other alternatives. We assume the other alternatives use this same minimum spacing; however this should be clarified. BOEM should also explain why options for wider spacing were not considered.	See response to previous comment. The PDE defined in the COP is applicable to all action alternatives unless the alternative specifically modifies or limits the PDE.

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		BOEM did consider a wider 2-nm by 2-nm spacing that was recommended in scoping comments but determined that the alternative would not meet the purpose and need (see EIS Chapter 2, Table 2-3).
BOEM-2022-0053-0102-0009	If a 0.65 nautical mile spacing is required to meet the existing energy procurements then this is another example of the problematic restrictions that existing procurements place on BOEM when developing alternatives to minimize negative impacts.	During Project design, Empire engaged with regulatory agencies and maritime stakeholders to establish a set of Layout Rules that would guide the final proposed WTG array layout and restrict array patterns that would be employed in order to address particular navigational issues, interested party concerns, or environmental sensitivities. These Layout Rules are defined in COP Volume I, Section 3.3.1.8, Table 3.3-11. Specific to WTG spacing, Rule 6 establishes a minimum WTG spacing of 0.65 nm.
BOEM-2022-0053-0102-0012	It is concerning that the description of Alternative F implies that Alternatives A B and E may not be technologically feasible given that under Alternative F there would be “modifications for environmental and technical considerations.” Based on the level of detail provided in the DEIS it is not possible for us to discern if this is an accurate interpretation. If this is the case it is very concerning that the DEIS would analyze alternatives that are not technologically feasible. We do not understand how a project that is not feasible can be considered a reasonable alternative as required by NEPA since it cannot meet the purpose and need. This limits the range of options available to reduce the negative impacts of the project is confusing to readers of the DEIS and poses challenges for informed public comment on the DEIS. Readers may focus their time and comments on the proposed action due to limited resources. We suggest that BOEM publish more details on the nature of the technological concerns addressed by Alternative F and the feasibility of the other alternatives. BOEM should then allow for additional public comments based on this additional information.	Draft EIS Alternative F included a WTG array layout for EW 1 based on geotechnical information that was available at the time the Draft EIS was published. Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7. Final EIS Figure 2-10 has also been

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		<p>updated to include an indicative WTG and interarray cable layout for both EW 1 and EW 2 based on the pile drivability analysis. The refinement to Alternative F between the Draft EIS and Final EIS reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs). Impacts of Alternative F on marine biological resources (i.e., benthic resources; finfish, invertebrates, and EFH; marine mammals) would be similar to but slightly reduced in the Final EIS compared to the Draft EIS due to the reduction in the maximum number of WTGs that could be installed. The refinement to Alternative F between Draft EIS and Final EIS did not result in impacts that were not disclosed in the Draft EIS and therefore BOEM has determined that a supplemental Draft EIS was not warranted.</p>
<p>BOEM-2022-0053-0102-0013</p>	<p>It is also not clear if the Empire Wind 2 project area has been surveyed to the same extent as Empire Wind 1 and if these same geotechnical challenges may later arise for the Empire Wind 2 project area. All of these concerns highlight challenges with the environmental review process for offshore wind energy projects to date. Geotechnical and geophysical survey work should be completed before finalizing the COP to inform the DEIS and before finalizing the alternatives analyzed in the DEIS. This can help ensure that all alternatives considered in the DEIS are technologically feasible.</p>	<p>See response to comment BOEM-2022-0053-0102-0012. The description of Alternative F has been refined in the Final EIS to reflect the results of the pile drivability analysis for EW 2 that was completed between the Draft EIS and Final EIS.</p>
<p>BOEM-2022-0053-0102-0014</p>	<p>The organization of the offshore export cable alternatives is also confusing. Alternative D is focused on Empire Wind 2 while Alternatives C and H only include analyses for Empire Wind 1. We recommend grouping the turbine and cable layout alternatives by project to evaluate each project individually and then in combination. This type of organization is included within Appendix O but not in the main DEIS document.</p>	<p>The organization of the alternatives analysis by Project in Appendix O reflects that Empire has submitted separate permit applications to USACE for EW 1 and EW 2. Empire covers both the EW 1 and EW 2 Projects in a single COP and BOEM's decision is whether to approve, approve with modifications, or disapprove the COP. Reordering and re-labeling the EIS</p>



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		alternatives between Draft EIS and Final EIS introduces potential for error and would make it difficult to track changes to the EIS between Draft EIS and Final EIS. Therefore, this suggestion has not been implemented.
BOEM-2022-0053-0102-0016	We are concerned that the DEIS did not analyze in detail the impacts of each alternative and the cumulative impacts from these alternatives. The impacts analysis and the cumulative impact analysis focus on the proposed action alternative (i.e. Alternative A) which as we understand it may no longer be preferred by the developer and may no longer be a technologically viable option. The impacts for all impact producing factors should be both qualitatively and quantitatively described for each individual alternative and compared against the no action alternative given this information will be used to determine necessary minimization mitigation and compensation measures. For example Sections 3.9.6 includes the impact analysis of Alternatives B E and F combined into one section and without specific detailed information as was provided for the proposed action. The impacts of these alternatives should be differentiated in much greater detail than what is included in Section 3.9.10 such that tradeoffs can be accurately described and commented on by the public. If additional impacts of Alternatives B E and F are included elsewhere in an appendix then a cross reference should be provided.	Empire proposes developing the Projects using a PDE concept. The EIS assesses the impacts of the PDE described in the Empire Wind COP and presented in Appendix E using a “maximum-case scenario.” The maximum-case scenario is composed of each design parameter or combination of parameters that would result in the greatest impact for each resource. The EIS alternatives modify or narrow the design of specific aspects of the PDE. Therefore, the analysis of the action alternatives focuses on impacts of the alternatives that differ from the Proposed Action, within the context of the No Action Alternative baseline condition. Because the Proposed Action includes a range of design options within the PDE, it is still viable and is retained for detailed analysis in the Final EIS.
BOEM-2022-0053-0102-0017	In the DEIS it is unclear how and to what extent the impacts of Alternative F for example differ between the proposed action as it pertains to which fisheries and species will be most impacted.	Final EIS Figure 2-10 has been updated to show the proposed turbine array layout for both EW 1 and EW 2 based on geotechnical investigations. Alternative F would allow for installation of 138 WTGs compared to up to 147 WTGs under the Proposed Action. Additional analysis of impacts on squid and scallop fisheries under Alternatives B, E, and F that propose modifications to the WTG array has been added to Final EIS Section 3.9.6.
BOEM-2022-0053-0102-	We support a combination of the following alternatives: Alternative B to reduce impacts to Cholera Bank an important fishing area containing sensitive hard	Between the Draft EIS and Final EIS, Empire and BOEM further assessed the

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0025	bottom habitats. Alternative E to improve navigation safety for fisheries and other ocean users by creating a 1 nautical mile set back between Empire Wind 1 and Empire Wind 2. Alternative H to reduce the environmental impacts of dredge or fill activities.	presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. Alternative H is recommended for inclusion in the Preferred Alternative.
BOEM-2022-0053-0103-0004	CZM supports the WTG array layouts that increase fishing access while meeting power production goals for the project however given the variability in revenue intensities across fisheries species the location of WTGs must be considered in relation to the impact on the most affected fisheries. The corridor that alternative E provides increases access to a broad array of fishers while Alternative F is the preferred option for the most impacted New Bedford-based sea scallop fishery. We therefore recommend a preferred layout alternative be developed that allows for both a corridor and a contiguous fishing zone in an area where sea scallop fishing is productive while remaining within the project design envelope.	Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that Alternative E would no longer meet the purpose and need and therefore is not recommended for inclusion in the Preferred Alternative. Alternative F is recommended for inclusion in the Preferred Alternative.
BOEM-2022-0053-0110-0010 & 0011	While the Network begins by commending BOEM for recognizing the importance of public policy by maintaining a commitment to achieving at least 147 15MW nameplate capacity for the Proposed Action and each of the Action Alternatives we encourage BOEM closely examine whether the environmental safety and/or societal benefits of each alternative outweighs the loss of clean energy output. Offshore wind project developers are currently dependent on state procurement processes to receive an offtake agreement and due to state timelines or market competition may not have secured an offtake agreement that is reflective of their entire project portfolio or that maximizes the public good. We commend BOEM for weighing state policy choices in the EIS process but encourage BOEM to recognize that future state energy needs may not have been defined yet and alternative offtake pathways including corporate or governmental procurement agreements may be utilized in the future. Every reduction in a turbine is a reduction in clean renewable energy	Empire has assessed the minimum number of WTGs that would be needed to meet its contractual commitments including contingency for maintenance, and BOEM considered this as part of the alternatives screening process. Alternative F (Wind Resource Optimization with Modifications for Environmental and Technical Considerations) is recommended for inclusion in the Preferred Alternative and includes all 138 WTG positions that Empire determined to be drivable based on additional site investigations and studies to quantify the extent of glauconite deposits

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	<p>production that can be used in the future. As noted above the cumulative environmental benefit of the EW1 and EW2 projects is substantial especially in comparison to the absence of any action and the continued reliance on current energy generation. Additionally while BOEM considers the minimum turbines needed to achieve public policy objections the Network encourages analysis to factor in unexpected disruptions to service. Routine maintenance may require turbines to be shutdown occasionally and developers may have factored in extra turbine placements to mitigate time lost to service.</p>	<p>across the Lease Area as well as their potential impact on pile drivability (including two positions determined to be drivable with reduced margin and two positions that are expected to be drivable with engineering optimization). Empire’s pile-drivability analysis determined that the remaining 36 WTG positions have a higher risk for pile refusal and are not proposed for WTG installation under Alternative F.</p>
<p>BOEM-2022-0053-0113-0006</p>	<p>BOEM acknowledged in this Memo that “Selection of an Area ID option that maximizes leasing area by deferring consideration of known conflicts to a later stage in the process (e.g. pending Site Assessment Plan or COP approval) may increase the risk that BOEM leases some acreage that is later determined to be unsuitable for development. This could result in the lessee not having the ability to develop portions of the lease area in which it has invested....” [Footnote 12: BOEM Director’s Memo dated March 14 2016 titled “Decision Memorandum on New York Area Identification Pursuant to 30 CFR Section 585.211(b)” p. 23.] By choosing to perpetuate conflicts with commercial fishing and lease the entire NY WEA BOEM knowingly did this. Now at the DEIS stage BOEM has adopted a Purpose and Need statement that primarily includes an Executive Order on Tackling the Climate Crisis NY state climate goal legislation NY state solicitations for offshore wind and the developer’s goals. [Footnote 13: See DEIS Section 1.2.] There is a phrase about “promoting ocean co-use” but there is no true alternative for de-conflicting with fisheries that BOEM has long known present very real and documented conflicts in the lease area. None of the DEIS Proposed Alternatives revisit the Options considered in the 2016 Director’s Memo to deconflict with the squid and scallop fisheries which BOEM deferred to later in the process. We request that BOEM revisit and analyze each of these Options as Alternatives in a Supplemental DEIS. This will require BOEM to analyze Alternatives that do not include the developer’s preferred number of turbines or a number of turbines that will fulfill any Power Purchase Agreements that the Developer has with NY state or other entities. Only then can BOEM fulfill both its NEPA obligations as well as the first step under OSCLA to prevent interference with reasonable uses. If BOEM does not even begin the step to analyze what preventing interference would entail it cannot fulfill this obligation.</p>	<p>Empire developed the Proposed Action (Alternative A) WTG array layout to include a contiguous area without WTGs in the northwest portion of the EW 1 Project area to reduce conflicts with the squid fishery. The Preferred Alternative (Alternative F) includes the open area described for the Proposed Action and adds a second contiguous area without WTGs on the eastern end of the EW 1 Project area that would reduce conflicts with the scallop fishery. The Preferred Alternative also proposes a reduction in WTG number (up to 138 WTGs installed under the Preferred Alternative compared to up to 147 WTGs installed under the Proposed Action) and removes select perimeter WTGs. The EIS meets the commenter’s objective to analyze alternatives that reduce conflicts with squid and scallop fisheries and a supplemental EIS is not warranted.</p>

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BOEM-2022-0053-0113-0010	BOEM has not considered a reasonable range of alternatives per NEPA. It has constrained its Alternatives that meet the developer's goals of a certain number of turbines not the consideration of prevention of interference with reasonable uses which requires analysis such as those in Options 1-3 of the 2016 BOEM Director's memo which we request to be added to the DEIS and analyzed.	See response to comment BOEM-2022-0053-0113-0006.
BOEM-2022-0053-0113-0012	As BOEM has only to date analyzed Alternatives that fulfill the developer's proposals and desired number of turbines we request that BOEM also analyze Alternatives that do not meet the developer's desired number of turbines but which would fully and partially deconflict with the fisheries operating in the area including those areas analyzed in Options 1-3 of the 2016 Director's memo. Such reasonable range of analysis and Alternatives is necessary for the "balanced" decision making that BOEM describes in M- Opinion 37067 "to determine the appropriate balance between two or more goals that conflict or are otherwise in tension." Without Alternatives representing such a range this purported balance cannot be analyzed or considered.	See response to comment BOEM-2022-0053-0113-0006.
BOEM-2022-0053-0117-0033	The combination of project alternatives should be chosen that ensures the environment and wildlife are protected while maximizing the creation of quality high-paying jobs and economic benefits.	Comment noted. Per the Department of the Interior's NEPA regulations at 43 CFR 46.420(d), the Preferred Alternative will reflect the alternative that BOEM believes would best accomplish the purpose and need of the Proposed Action while fulfilling its statutory mission and responsibilities, given consideration of economic, environmental, technical, and other factors. Based on review of the findings in the Final EIS and with consideration of new information on the presence of glauconite in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations, BOEM has recommended Alternatives C-1, D, F, G, and H for inclusion in the Preferred Alternative.
BOEM-2022-0053-0119-0003	Empire Wind should adopt Alternatives B C-2 and H to protect important benthic habitat such as complex hard bottom structures in the Lease Area as well as in along the export cable corridors and landings.	
BOEM-2022-0053-0119-0004	Empire Wind should adopt Alternatives C-2 D and G to avoid and minimize impacts to forage fish habitats that are important to avian species such as the Roseate tern and other local seabirds.	
BOEM-2022-0053-0142-0002	Empire Wind should adopt Alternatives B, C-2, and H to protect important benthic habitat such as complex hard bottom structures in the Lease Area as well as in along the export cable corridors and landings.	
BOEM-2022-0053-0142-0003	Empire Wind should adopt Alternatives C-2, D, and G to avoid and minimize impacts to forage fish habitats that are important to avian species such as the Roseate tern and other local seabirds.	
BOEM-2022-0053-0130-0006	To date Equinor is the only offshore wind developer in the U.S. who has engaged the regional fishing industry outside of the regulatory process on layout specifics—which are the basis for any potential compatibility and coexistence between these two industries. Through an iterative process	Comment acknowledged.

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	<p>Equinor continued to refine optional layouts that incorporated direct feedback from the fishing industry such as; relocating 3-5 turbines located on the resource-rich Cholera Bank committing to utilizing the largest turbines available at the appropriate time which may lend to removing 3-5 additional turbines providing transparent technical reasoning when incorporating feedback was infeasible and continuing an open dialogue on future phases of the lease build out. In 2021 RODA and Equinor followed up to consider alternative layouts for the EW 2 project area. Unfortunately in this case there was far less flexibility and no clear preferred option that would maintain some fishing access. The second phase of this project in particular overlaps with scallop fishing activity and additional efforts are needed to address impacts as described below.</p>	
<p>BOEM-2022-0053-0130-0009</p>	<p>BOEM's draft analysis recognizes the potentially major impacts to fishing marine mammals and navigation of the proposed project. Yet not all mitigation proposals offered by the fishing industry were evaluated as alternatives in the DEIS. These are summarized below; a full discussion is included in RODA's scoping comments.</p>	<p>BOEM's Draft EIS identified negligible to moderate and minor beneficial impacts for marine mammals, minor to moderate impacts on navigation, and minor to major impacts on commercial fishing depending on the fishery.</p> <p>The commenter is correct that not all proposals offered by the fishing industry were analyzed as EIS alternatives. However, mitigation to address impacts on commercial and for-hire recreational fishing and other resource conflicts has been recommended for inclusion in the Preferred Alternative as described in Chapter 3 resource sections and Appendix H, <i>Mitigation and Monitoring</i>.</p>
	<p>- Additional layout modifications in the Empire Wind 2 project area to preserve fishing access;</p>	<p>The Draft EIS did analyze an alternative that would establish a separation between EW 1 and EW 2 and maintain fishing access (EIS Alternative E). However, based on new information related to the presence of glauconite in the Lease Area, BOEM has determined that Alternative E would no longer meet the purpose and need and is not recommended for inclusion in the Preferred Alternative (see Final EIS</p>

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		Sections 2.1.6 and 2.1.7).
	- Immediate strategies to address impacts to protected resources during the length of the lease so they are ready to be implemented immediately once impacts are detected;	Empire has proposed a bird and bat monitoring plan and a fisheries and benthic monitoring plan that are analyzed as part of the Proposed Action. See Appendix H, Attachments H-3 and H-4.
	- Safe transit areas through the Empire Wind and any future NY Bight lease areas under consideration analyzed and implemented using a cumulative effects approach;	Alternatives that would affect the layout of the turbine array in other offshore wind lease areas are outside the scope of the Empire Wind COP EIS. BOEM's decision based on the findings of the Empire Wind EIS will be to approve, approve with modifications, or disapprove Empire's COP and the Empire Wind EIS does not support decision-making related to COPs for other offshore wind leases.
	<ul style="list-style-type: none"> <li>- Adequate independent processes for gear loss claims;</li> <li>- Adhere to a holistic approach to determining and awarding compensation from economic loss to fishing and fishing businesses;</li> <li>- Direct and transparent collaboration with the fishing industry on shoreside considerations including port infrastructure dock usage and economic impacts or opportunities;</li> <li>- Monitor fisheries impacts for the life of projects and utilize adaptive management;</li> </ul>	As described in Final EIS Section 3.9, mitigation measures recommended for inclusion in the preferred alternative include compensation for gear loss or damage and compensation for lost fishing income (including related to shoreside services). In addition, Empire has proposed a fisheries and benthic monitoring plan that is analyzed as part of the Proposed Action (see Appendix H, Attachment H-4).
	- Improved federal environmental review analysis and clear identification of scientific unknowns;	BOEM's analysis of incomplete and unavailable information is included as EIS Appendix D.
	- Require deicing technology and practices;	Based on statistics used in the Metocean Design Basis for the WTG and OSS, Empire expects that ice formation would typically be very limited and of brief duration. Empire would employ weather monitoring to assess the risk of icing and spray down iced surfaces with water that may need immediate access. No special



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		measures are required or recommended to prevent icing and have not been included in the Project design.
	<ul style="list-style-type: none"> <li>- Perform “micrositing” of turbines and cables with fishermen who know the ecosystem;</li> <li>- Prohibit turbines foundations and cables in sensitive habitat including spawning areas and important fishing grounds;</li> </ul>	BOEM considered specific recommendations for WTG and cable siting that were provided during public comment periods for scoping and the notice of availability of the Draft EIS, or that arose through interagency coordination with cooperating agencies, or through consultations with NMFS for EFH and the ESA. The Preferred Alternative reflects the alternative that BOEM believes would best accomplish the purpose and need of the Proposed Action while fulfilling its statutory mission and responsibilities, given consideration of economic, environmental, technical, and other factors.
	<ul style="list-style-type: none"> <li>- Resolve impacts to National Marine Fisheries Service (NMFS) fishery-independent surveys;</li> </ul>	NOAA and BOEM developed a federal survey mitigation strategy that was published in December 2022 as NOAA Technical Memorandum NMFS-NE-292. The purpose of this strategy is to describe the approach NOAA Fisheries and BOEM will use to mitigate the impacts of offshore wind energy development on NOAA Fisheries surveys, with specific application to the Northeast U.S. Region (Maine to North Carolina). This strategy calls for the development of a Northeast Federal Survey Mitigation Program as a specific action. The Mitigation Program will include Survey-Specific Mitigation Plans for each affected survey including both vessel and aerial surveys. This strategy is intended to guide implementation of the Mitigation Program through the duration of wind energy development in the Northeast U.S.

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	<p>- Ensure that any economic benefits of offshore wind accrue to the U.S.—not at some undetermined point in the future but now.</p>	<p>The purpose of the EIS is to disclose the impact of approving Empire’s COP. Directing the economic benefits of offshore wind to specific entities is outside the scope of the Empire Wind EIS.</p>
<p>BOEM-2022-0053-0130-0023</p>	<p>Impact Analysis of Alternatives It is imperative that the public is able to differentiate impacts from the various alternatives presented in the DEIS to understand the suitability of prospective project alternatives. The DEIS analyzes the impacts of multiple grouped alternatives primarily to the Proposed Action rather than against each other. Using fisheries as an example the DEIS presents Impacts Analysis for Commercial and For-Hire Recreational Fisheries for Alternatives B E and F together and finds impacts to be negligible to moderate. [Footnote 13: See Empire Wind DEIS p. 3.9-70] It is unclear in the document how impacts from the three alternatives differ from each other if one alternative has a lower impact threshold than others or if all alternatives span from negligible to moderate impacts. Instead the impact analysis compares the collective back to the Proposed Action which the DEIS assumes would be the most likely “Alternative”. From discussions with Equinor it is our understanding that there are technical constraints that make the Proposed Action unfeasible and yet it is still the project design that all other alternatives are compared against.</p>	<p>Empire proposes developing the Projects using a PDE concept. The EIS assesses the impacts of the PDE that is described in the Empire Wind COP and presented in Appendix E using a “maximum-case scenario.” The maximum-case scenario is composed of each design parameter or combination of parameters that would result in the greatest impact for each resource. The EIS alternatives modify or narrow the design of specific aspects of the PDE. Therefore, the analysis of the action alternatives focuses on impacts of the alternatives that differ from the Proposed Action, within the context of the No Action Alternative baseline condition. Because the Proposed Action includes a range of design options within the PDE, it is still viable and is retained for detailed analysis in the Final EIS.</p>
<p>BOEM-2022-0053-0130-0025</p>	<p>Confusion is further compounded as the different alternatives can be combined for the Final EIS. The alternatives listed in Table 2-1 are not mutually exclusive. BOEM may “mix and match” multiple listed Draft EIS alternatives to result in a preferred alternative that will be identified in the Final EIS provided that: (1) the design parameters are compatible; and (2) and the preferred alternative still meets the purpose and need.” (DEIS page 2-1) This is concerning in the sense that the public cannot effectively understand what is the preferred alternative. It is setting up an opportunity for a bait-and-switch when the preferred alternative will not be revealed until the publication of the Final EIS. Principles of transparency and informed decision-making should never be undermined and the public should be fully informed throughout the process.</p>	<p>BOEM’s identification of the Preferred Alternative is informed in part through consideration of public comments on the Draft EIS, and mitigation recommended for inclusion in the Preferred Alternative is informed by consultations that were ongoing at the time of Draft EIS publication. Identification of the Preferred Alternative in the Final EIS supports consideration of public comments on the Draft EIS and incorporates the results of consultations.</p>
<p>BOEM-2022-</p>	<p>The Bureau has created a dichotomous choice between – on the one hand -</p>	<p>Alternatives that would consider alternate</p>

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0053-0143-0021	<p>power production via fossil fuel-burning without austere or even reasonably strong energy conservation measures and on the other hand executing the full offshore Empire wind project or only nominally reducing it. Because of this the "alternatives" are not very meaningful and are designed to foster the conclusion that approval of the proposed project is the best of the "alternatives". This conclusion is one that can only be arrived at with the illusion of choice combined with the failure to properly consider the adverse impacts on marine life habitat and ecological systems of the project which failure involves failure to consider all important impact producing factors and the making of unsupported conclusions that harm will not be substantial.</p>	<p>approaches to meet demand for electric energy (i.e., through conservation or burning of fossil fuels) are outside BOEM's jurisdiction and would not address BOEM's regulatory need to determine whether to approve, approve with modifications, or disapprove Empire's COP for Renewable Energy Lease Number OCS-A 0512. The EIS has analyzed the impacts of the Projects on marine resources, with regard for IPFs, and impact conclusions are summarized in each Chapter 3 resource and in Table 2-4.</p>
BOEM-2022-0053-0143-0022 & -0023	<p>[<b>Bold:</b> The Bureau of Ocean Energy Management while not explicitly having the responsibility to review projects or alternatives not within its jurisdiction must review such projects or alternatives as have been stated above in collaboration with other agencies to open the possibility of choosing the course of action that will best preserve the valuable ocean resources over which it is its jurisdictional responsibility to manage] while helping to meet the energy needs of the country if ocean energy after comparison of all options is the best choice considering all tradeoffs and in compliance with federal laws to preserve coastal resources within and near the coast of states which laws rightly canalize and restrict such choices in order not to forfeit valuable coastal resources that are exceptionally difficult or impossible to replace and from which and so that humanity can expect to continue to receive "dividends" into the future of abundant ocean life for the human food and nutrient supply the large-scale ability of the ocean to regulate climate economic well-being of the many whose traditional livelihoods depend on the ocean the ocean's role in water cycling with respect to distribution of precipitation wave-dampening properties of healthy submerged vegetation populations that prevent infrastructure damage to coastal communities and valuable physical health and mental hygiene benefits of recreational and leisure interactions with coastal waters and coastal wildlife.</p> <p>In light of this it is irrational to reject and fail to consider any real alternatives and accept the rigid near-full build-out action alternatives simply because it is the only one that meets the stated requirements to achieve fulfillment of imposed renewable energy quotas by a date certain.</p>	<p>BOEM must ensure that activities approved under OCSLA Section 8(p), 43 USC 1337(p), are carried out in a manner that provides for safety; protection of the environment; prevention of waste; conservation of natural resources of the OCS; coordination with relevant federal agencies; protection of the national security interests of the United States; protection of correlative rights in the OCS; a fair return to the United States for any lease, easement, or right-of-way under this subsection; prevention of interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone, the high seas, and the territorial seas; consideration of the location of, and any schedule relating to, a lease, easement, or right-of-way for an area of the OCS and any other use of the sea or seabed, including use for a fishery, a sea lane, a potential site of a deepwater port, or navigation; public notice and comment on any proposal submitted for a lease, easement, or right-of-way under this subsection; and oversight, inspection,</p>

Comment No.	Comment	Response
		<p>research, monitoring, and enforcement relating to a lease, easement, or right-of-way under this subsection.</p> <p>While all of the factors are applicable to BOEM's decision whether to approve, approve with modifications, or disapprove the COP, many of these factors are also salient when selecting a Preferred Alternative.</p>
BOEM-2022-0053-0146-0001	<p>The NJDEP's Division of Land Resource Protection (DLRP) strongly encourages Empire Wind to select a proposal and/or alternative which results in the least impact to regulated areas and/or environmentally sensitive areas and which is consistent with all applicable regulations including but not limited to the Coastal Zone Management Rules at N.J.A.C. 7:7.</p>	<p>Comment acknowledged. Empire considered regulatory and environmental constraints as part of its siting process. BOEM will select the Preferred Alternative in consultation with other agencies that will adopt the Final EIS in support of its ROD.</p>

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**P.6.3 Air Quality**

**Table P.6.3-1 Responses to Comments on Air Quality**

Comment No.	Comment	Response
BOEM-2022-0053-0040-0001	One thing I want to point out is that we want to echo the call of Uprose and support their call for a more information on the air quality particularly in the Sunset Park community. We do not want to see any emission increases in Sunset Park particularly for fine particulate matter even during construction stages so whether it's mitigation or whatever needs to be done an alteration of the plan that cannot be an added burden onto that community and I understand it would just be for construction but construction is going to last for a year and that is something that needs to be assessed and also looked at very closely.	The EIS estimates (Section 3.4.5.1) that ambient pollutant concentrations during construction of the Proposed Action, combined with the impacts of SBMT operations, will not exceed the NAAQS or New York AAQS. EIS Section 3.12 ( <i>Environmental Justice</i> ) provides further detail on potential air quality and environmental justice impacts in the Sunset Park area. The Proposed Action emissions reported in Section 3.12 are a summary of Empire's emissions estimates reported in Appendix K of the COP. Empire's emissions are not analyzed as part of SBMT's emissions but are considered separately and are additive to the emissions modeled for SBMT. Empire assessed the combined emissions to estimate impacts relative to the NAAQS.
boem-2022-0053-0054-0001	To ensure that the Project is designed to withstand the increasing effects of climate change BOEM should analyze the climate change risks facing the Project and the Project's resilience to those risks. The Sabin Center recommends that BOEM incorporate this analysis into Section 2.1 of the DEIS as part of BOEM's analysis of alternatives. There is a legal basis for performing this analysis. In August 2016 the Council on Environmental Quality (CEQ) issued final guidance (the "2016 GHG Guidance") instructing federal departments and agencies to consider the risks that climate change poses to projects.	The U.S. Global Change Research Program Fourth National Climate Assessment provides regional assessments of predicted climate impacts for 10 different geographic areas of the United States. Focusing on the existing and potential climate change risks that could potentially affect the Projects, the Fourth National Climate Assessment notes the following climate-related impacts in the northeast region of the United States: <ul style="list-style-type: none"> <li>• Average annual temperatures in the northeast are projected to rise between 4.0°F and 5.1°F by 2050 relative to the near-present average, with an increase in the number and intensity of extreme heat events, especially in highly urbanized areas;</li> <li>• Rainfall intensity has increased, with monthly precipitation projected to be about 1 inch greater during December through April by the end of the century;</li> <li>• Sea level rise along the mid-Atlantic coast (from Cape Hatteras to Cape Cod) is occurring at three to four times the global average rate, due to land subsidence caused by rebound effects from the melting of glaciers after the last ice age, as well as shorter-term effects such as the recent slowing of the Gulf Stream current;</li> </ul>



Comment No.	Comment	Response
		<ul style="list-style-type: none"> <li>• Average storm surge heights caused by hurricanes in the New York City area have increased by more than 3.9 feet over the last 1,000 years, which has coupled with sea level rise to contribute to storm surges that reach farther inland, as demonstrated by recent events such as Superstorm Sandy; and</li> <li>• Many infrastructure systems in the northeast, particularly drainage and sewer systems, flood and storm protection systems, transportation, and power supply systems, are either nearing their planned life expectancy or were not designed for projected climate variability, leading to increased risk of disruptions.</li> </ul> <p>Based on the regional climate-related impacts described above, the following potential impacts on Project infrastructure have been identified:</p> <ul style="list-style-type: none"> <li>• Project-related infrastructure at the O&amp;M support facilities at SBMT, as well as the EW 1 and EW 2 onshore POIs, onshore substations, and related facilities, could be particularly vulnerable to inundation during significant storm surge events.</li> <li>• Regional climate-related vulnerabilities in the electric transmission system could potentially have indirect impacts on the Projects' ability to deliver electric power during system disruptions.</li> <li>• Regional climate-related vulnerabilities in the New York City area transportation system could potentially have indirect impacts on the Projects' ability to perform O&amp;M tasks at either its onshore or offshore facilities.</li> </ul>
BOEM-2022-0053-0054-0002	<p>The DEIS should provide a similar type of analysis with respect to climate change risks facing onshore and offshore components of the Project. In the DEIS BOEM briefly addresses climate change risk in at least one instance noting at page 3.14-11 that one "office/administration building" connected to the Project "would have at-grade parking beneath the building in order to elevate the first-floor level to mitigate against possible flooding and sea level rise." BOEM should consider the extent to which climate change induced sea level rise and flooding will affect</p>	<p>At SBMT, several measures are being taken for climate resiliency of the infrastructure. They include:</p> <ul style="list-style-type: none"> <li>• The upgraded stormwater management system for SBMT is being designed for extreme storm events with rainfall intensity duration curves obtained from the <i>Extreme Precipitation in New York and New England</i> data, available at: <a href="https://precip.eas.cornell.edu/#/data_and_products">https://precip.eas.cornell.edu/#/data_and_products</a>.</li> <li>• The O&amp;M base buildings are being designed for sea level rise projections per the NYC Mayor's Office of Resiliency, Climate Resiliency Design Guidelines - Version 4.0. The value used for</li> </ul>

Comment No.	Comment	Response
	other components of the Project.	<p>sea level rise is 16 feet considering a 2050s End of Useful Life Horizon. This value is consistent with the NYSDEC regulation's Medium Projection for the New York City/Lower Hudson Region.</p> <p>A sea level rise value of 16 feet has been adopted for the design of both critical and noncritical facilities within SBMT in accordance with the New York City Mayor's Office of Resiliency, Climate Resiliency Design Guidelines. A distinction in design is made between critical and noncritical facilities and equipment in the required freeboard level. Per the New York City Climate Resiliency Design Guidelines, the freeboard considered for noncritical facilities and equipment is 12 feet, while the freeboard for critical facilities and equipment is 24 feet. For the SBMT O&amp;M base, the office building is being designed as a critical facility and the warehouse as noncritical.</p> <p>For the EW 2 onshore cable route, including Barnums bridge in Hempstead, New York, and the onshore substation, designs have incorporated a 500-year flood elevation plus an additional 1.5 feet of sea level rise that is anticipated over the next 30 years. The substation will be designed to either elevate equipment to the design basis elevation or, for equipment that cannot be elevated, use flood walls or other preventative and mitigative measures appropriate to protect against the same flooding conditions. The remaining portions of the cable route are buried.</p>
BOEM-2022-0053-0054-0003	BOEM should also consider other climate- related risks relevant to offshore wind energy projects including but not limited to changes in the frequency of high-wind events extreme storms and frozen precipitation as well as changes in wave action and shifts in wind turbulence intensity and direction.	Additional information on climate risks to the Projects has been added to Section 2.3 of the Final EIS.
BOEM-2022-0053-0143-0047	There need be a transparent accounting of the total project GHG (greenhouse gasses) expected to be emitted by the project including not only (1) construction but also (2) transport of both materials and prefabricated parts to the shore including intercontinental transportation if any (3) fabrication of parts (4) refinement of steel (with transparently-stated estimates of total weightof steel needed for the project with detail about per mast and per converter or other stations) (5) mining fo ore to make the steel. A large	Information has been added to the EIS describing life-cycle considerations and providing references to recent life-cycle analyses of offshore wind.

Comment No.	Comment	Response
	<p>amount of material is required to make a wind turbine power plant. Indeed more material is required to build a wind-turbine power plant than most forms of power generation. The mining refinement and manufacture of raw materials and transport of raw materials and assembled parts should all be accounted for.</p>	
<p>BOEM-2022-0053-0143-0048</p>	<p>Reduction in ocean productivity and consequential aqueous CO<sub>2</sub> rise must also be accounted for as an offset of any Carbon Dioxide emissions that has been spared by the plant's operations.</p>	<p>The commenter appears to be referring to the potential effects of the Project alternatives on CO<sub>2</sub> levels in the ocean. CO<sub>2</sub> levels in the ocean affect productivity. Atmospheric CO<sub>2</sub> levels affect the rate at which the ocean absorbs CO<sub>2</sub> from the atmosphere. Consequently, changes in CO<sub>2</sub> levels in the ocean would partially reflect changes in atmospheric CO<sub>2</sub> levels.</p>
<p>BOEM-2022-0053-0147-0002</p>	<p>The Final EIS should offer a more granular analysis considering the extent to which Empire's proposal will improve air quality and public health in those Sunset Park communities most directly burdened by Empire Wind 1 and the SBMT Port Improvement Project.</p>	<p>The EIS estimates (Section 3.4.5.1) that ambient pollutant concentrations during construction will not exceed the NAAQS or New York AAQS. EIS Section 3.12 (<i>Environmental Justice</i>) provides further detail on potential air quality and environmental justice impacts in the Sunset Park area.</p>

**P.6.4 Bats**

**Table P.6.4-1 Responses to Comments on Bats**

Comment No.	Comment	Response
BOEM-2022-0053-0053-0008	<p>Offshore wind development may cause negative impacts to bird and bat populations from collisions with turbines and habitat displacement. Rotor speed rotor size the amount of turbines turbine location turbine lighting and the cumulative impact of other turbine projects are all factors that BOEM must examine and mandate mitigation measures to reduce negative impacts as much as possible. These factors can greatly affect the level of negative interaction between turbines and birds and bats. Offshore wind development may also displace bird and bat populations from foraging and migration grounds or cause avoidance of wind farms altogether [Footnote 14: Loss S; Will T; Marra P. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. <i>Biological Conservation</i>: Vol. 168 Pp. 201–209. Available at: <a href="http://www.fws.gov/migratorybirds/pdf/management/lossetal2013windfacilities.pdf">www.fws.gov/migratorybirds/pdf/management/lossetal2013windfacilities.pdf</a>] [Footnote 15: 15 Smallwood K. 2013. Comparing bird and bat fatality-rate estimates among North American wind-energy projects. <i>Wildlife Society Bulletin</i>: Vol. 37 No. 1 Pp. 19-33. Available at: <a href="http://onlinelibrary.wiley.com/doi/abs/10.1002/wsb.260">onlinelibrary.wiley.com/doi/abs/10.1002/wsb.260</a>.] [Footnote 16: Sjollem A. Gates J. Hilderbrand R. &amp; Sherwell J. 2014. Offshore Activity of Bats Along the Mid-Atlantic Coast. <i>Northeastern Naturalist</i>: Vol. 21 No. 2 Pp. 154-163. Available at: <a href="http://doi.org/10.1656/045.021.0201">doi.org/10.1656/045.021.0201</a>]. Impacts of avoidance should be examined through an ecosystem based management lens to determine the overall footprint of this disturbance with careful monitoring and evaluation mechanisms clearly communicated in a transparent and public manner in place to address any adjustments that might help mitigate negative outcomes.</p>	<p>Potential bird/bat collisions and habitat displacement in the offshore environment due to presence of offshore wind infrastructure are addressed in EIS Section 3.5, <i>Bats</i>, and Section 3.7, <i>Birds</i>, under the presence of structures IPF. BOEM acknowledges that the number, size, and location of WTGs can influence the magnitude of the impacts on bats/birds and has analyzed impacts under the maximum-case scenario (see EIS Section 3.5.4 and Section 3.7.4), which means that any potential variances in the Project build-out would result in impacts similar to or less than those described in the EIS. BOEM also reiterates that the current understanding of bird and bat use of the offshore wind environment is that they are present in low numbers compared to the onshore environment; this is stated (with supporting references) in EIS Sections 3.5 and 3.7. BOEM has also added information to EIS Section 3.7 regarding a study that modeled the effects of offshore wind farms on bird movements, where it was found that wider WTG spacing resulted in less bird avoidance, and that the WTG spacing BOEM anticipates (0.6 nm to 1 nm) would result in little, if any, avoidance of an offshore wind farm.</p> <p>Adjustments to help mitigate negative outcomes of WTGs on birds and bats are addressed in Empire’s <i>Bird and Bat Monitoring Framework</i>, BOEM’s adaptive management mitigation measures, and BOEM’s COP approval conditions. See response to comment BOEM-2022-0053-0142-0008 below for more information.</p>

Comment No.	Comment	Response
BOEM-2022-0053-0142-0007	The FEIS should consider the full scope of impacts to federally and state protected birds and bat species that trigger conservation obligations and address collision risk for species most at risk of collision. In addition it must include habitat loss that birds may experience beyond the footprint of project construction and operation.	<p>The full scope of impacts from the Projects are addressed in EIS Section 3.5, <i>Bats</i>, and Section 3.7, <i>Birds</i>. The IPFs analyzed in both EIS sections address all birds and bats, whether they are federally or state-listed as endangered or threatened, have some other special designation, or have no designation at all. The impact types and mechanisms apply to all bird species regardless of status. BOEM recognizes that species with special designations may be more sensitive to the impact types and mechanisms compared to those species with no special designations or protections. For federally listed threatened and endangered birds and bats, BOEM developed a BA and is consulting with USFWS, as required under Section 7 of the ESA. Measures to address those species are listed in the BA and have been included in the Final EIS (see Table 3.5-3 and Table 3.7-4). For New York State-listed threatened and endangered species, or otherwise special-status species, Empire would need to comply with all New York State laws and regulations regarding potential impacts on these species. The abundance of birds at most risk of collision and displacement in the offshore environment is considered low (see Figure 3.7-3 and Figure 3.7-4 and associated text).</p> <p>Habitat loss beyond the footprint of a Project component is largely related to noise impacts, which is an IPF covered in both Section 3.5, <i>Bats</i>, and Section 3.7, <i>Birds</i>.</p>

Comment No.	Comment	Response
BOEM-2022-0053-0142-0008	BOEM should require Empire Wind to pursue studies to further strike avoidance mitigation methods to ensure that migratory species like bats birds and other offshore wildlife are protected especially as technologies advance.	As stated in EIS Section 3.5, <i>Bats</i> , Empire has committed to implementing a Bird and Bat Monitoring Framework that outlines an approach to post-construction bird and bat monitoring that supports the advancement of the understanding of bat interactions with offshore wind farms. The Bird and Bat Monitoring Framework is Attachment H-3 of Appendix H. In addition, BOEM has included an adaptive management mitigation measure in Section 3.5.9, <i>Proposed Mitigation Measures</i> , to address potential future bat and bird impacts during offshore operations. Furthermore, BOEM anticipates the bird and bat mitigation/adaptive management for the Projects to be similar to that of recent BOEM COP approvals (e.g., Vineyard Wind COP approval conditions for birds and bats [found at <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/VW1-COP-Project-Easement-Approval-Letter_0.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/VW1-COP-Project-Easement-Approval-Letter_0.pdf</a> ]). The Avian and Bat Protection Conditions (Condition Section 5.2.3) includes an avian and bat monitoring plan for construction and operations. As part of the monitoring plan, new mitigation measures and monitoring may be imposed by BOEM if impacts deviate substantially from the impact analysis in the EIS.
BOEM-2022-0053-0143-0054	<p>That bats are generally unlikely to encounter a turbine (or come into its proximity) is not a reasonable conclusion given the distances from shore stated by the DEIS at which various species of bat were acoustically observed, and the modest amount of observational effort expended to make those observations.</p> <p>The EIS appears to consider collision risk but ignores the impact producing factors of air pressure changes, operational noise, ultrasound-generating equipment, and light pollution.</p> <p>By disrupting nocturnal landscapes worldwide, light pollution caused by artificial light at night is recognized as a major threat to biodiversity. Bats comprise one of the taxa for which even low intensity artificial light conditions may disrupt normal feeding behaviors. In rural and open-ocean areas, dusk signifies the beginning of feeding time and artificial light delays feeding. Aircraft</p>	<p>The estimates of bat offshore presence and likelihood of collision presented in the Final EIS are based on the current best available science, including bat life history characteristics and offshore bat surveys. Based on this best available science, the expected occurrence of bats in the offshore wind turbine area is expected to be low, and therefore the number of bats potentially exposed to barotrauma and collision risk is also low.</p> <p>BOEM has completed a study of IPFs on the North Atlantic OCS to consider in an offshore wind development planned activities scenario (BOEM 2019). That study is incorporated in the Final EIS by reference. Although operational noise and light are IPFs included in that study, ultrasonic noise and pressure changes are</p>



Comment No.	Comment	Response
	<p>warning lights on turbines are very bright so that they can be seen by aircraft pilots from ample distance away sufficient to avoid collision of even fast travelling aircraft. Wind-turbine power plants can create their own fog or mist by rapidly drawing up air with higher moisture content at the water's surface to a higher altitude where the air is cooler, inducing water vapor to form. This usually occurs when the wind speed is low, which is the condition under which bats feed. Cloud cover amplifies skyglow of artificial light conditions. Artificial light conditions inhibit and delay feeding by bats because they give false signals that daytime is still waning. Fine variations of light levels could affect the spatiotemporal distribution of even a common species usually considered to be "light tolerant", with potential cascading effects on individual fitness and population dynamics, stressing how urgent it is to protect against light pollution and preserve and restore dark areas to protect biodiversity.</p>	<p>not included. Of the subset of IPFs that were analyzed for bats in the Final EIS, light pollution and operational noise were not included. IPFs analyzed in the Final EIS are those that represent the greatest threat to bats and their habitat due to offshore wind-related construction, operations, and decommissioning.</p> <p>The frequency and sound level generated from operating WTGs depends on WTG size, wind speed and rotation, foundation type, water depth, seafloor characteristics, and wave conditions. BOEM (2019) noted that the level of noise appeared to be significantly influenced by natural ambient noise, suggesting the airborne noise from WTG operation would likely be less than 65 dB equivalent continuous SPL, measured at 164 feet (50 meters) from a WTG tower, and even this level of noise appears to be significantly influenced by natural ambient noise. This level is not much greater than ambient noise in a suburban neighborhood or city park and would therefore be unlikely to affect bats in the vicinity of WTGs.</p> <p>A recent review of bat attraction to wind turbines (Guest et al. 2022) found that ultrasonic noise produced by the various parts of wind turbines (nacelles, blades, etc.) attenuates over fairly short distances and it is unlikely that bats are attracted to the ultrasonic noise produced by operational wind turbines.</p> <p>Empire has committed to several measures that would minimize lighting impacts on bats and birds. Red flashing FAA lights and yellow flashing marine navigation lights will be used on the WTGs instead of constant white light, which has been shown to reduce fatality rates in eastern red bat, the most prevalent species observed offshore. Furthermore, Empire has committed to using an FAA-approved ADLS, which will only activate the FAA hazard lighting when an aircraft is in the vicinity of the wind facility, to reduce the visibility of nighttime lighting and nighttime visual impacts. The use of an ADLS will significantly reduce the number of</p>

Comment No.	Comment	Response
		hours FAA lighting will be illuminated. To further reduce potential lighting impacts, Empire would limit, where practicable, lighting (not required by FAA and USCG) during offshore construction.
BOEM-2022-0053-0143-0055	The Bureau decided to make the "baseline conditions for bats" of the no-action alternative include the execution of all other ongoing and planned Offshore Wind projects. So, it is against this that (only the differential) effects of adding Empire Wind to the mix of numerous wind-turbine power plants planned to be built along the Eastern Atlantic Coast was estimated.	The No Action Alternative evaluates the impacts of ongoing activities, including non-offshore wind and offshore wind-related activities in the geographic analysis area, on baseline conditions for bats. This analysis includes the impacts of two operational offshore wind projects (Block Island and Coastal Virginia Offshore Wind) and two offshore wind projects currently under construction (Vineyard Wind 1 and South Fork). The cumulative impacts analysis of the No Action Alternative considers ongoing activities in combination with planned non-offshore wind and planned offshore wind activities in the geographic analysis area. Ongoing and planned activities are assumed to follow current regional trends and to occur regardless of whether the Projects are approved. The Final EIS analyzes the impacts of the Proposed Action and alternatives on bats both alone and in combination with ongoing and planned non-offshore wind and offshore wind activities. Separate impact-level conclusions for the Proposed Action and alternatives alone and for the Proposed Action and alternatives in combination with ongoing and planned activities are presented in the Final EIS.

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**P.6.5 Benthic Resources**

**Table P.6.5-1 Responses to Comments on Benthic Resources**

Comment No.	Comment	Response
BOEM-2022-0053-0102-0023	<p>Hydrodynamic effects and disturbances on benthic resources are included in the DEIS however not to the extent that they are likely to occur. For example the presence of structures could impact the Mid- Atlantic Cold Pool regarding changes in temperature mixing larval transport of important commercial and recreational fish species (e.g. sea scallops) and temperature corridors used for migration for multiple important fishery species. This is an area of ongoing research. [Footnote 3: For example two recent reports on potential impacts of offshore wind energy development on the Cold Pool are available at the following links: (<a href="https://scemfis.org/wp-content/uploads/2021/01/ColdPoolReview.pdf">https://scemfis.org/wp-content/uploads/2021/01/ColdPoolReview.pdf</a>); (<a href="https://rucool.marine.rutgers.edu/wp-content/uploads/2020/10/PartnersWorkshop_WhitePaper_Final.pdf">https://rucool.marine.rutgers.edu/wp-content/uploads/2020/10/PartnersWorkshop_WhitePaper_Final.pdf</a>)]. The FEIS should clearly document what is known about potential impacts to the Cold Pool and resulting potential impacts to marine species and fisheries. The FEIS should acknowledge data gaps and ongoing research and should consider potential impacts resulting from this project as well as cumulative impacts from all planned wind energy projects throughout the region.</p>	<p>A discussion of the Cold Pool and possible impacts from the presence of foundation structures, as well as data gaps, has been added to Section 3.6, <i>Benthic Resources</i>.</p>
BOEM-2022-0053-0102-0024	<p>We are also concerned about the impacts of boulder removals required for cable installation especially when done via plow. The DEIS indicates that the site preparation activities and cable installation could be done by jet plow mechanical plow or mechanical trenching in one section of the document (page 3.10-25) and in another section (page 3.21-13) jetting is listed as the primary method and dredging is yet another option. The FEIS should specify which installation techniques will be used and if done via plow the plow width and the size of the area that will be impacted should also be clearly stated. The nature of the impact from plowing is very different from dredging used to harvest seafood and the scientific literature on fishing gear impacts is unlikely to provide a reasonable proxy for the impacts of boulder clearance plows. For example fishermen attempt to avoid boulders to reduce the risk of costly damage to fishing gear.</p>	<p>The use of mechanical dredging is anticipated at locations where the EW 1 submarine export cable route crosses other pre-existing assets, to facilitate achieving the required burial depth for the EW 1 cable route within the Bay Ridge Channel and SBMT, and along the EW 2 export cable route approaching landfall. A mechanical plow is less efficient than jetting and is only anticipated to be used in limited site-specific conditions. Mechanical trenching may be used on seabed with hard materials not suitable for plowing or jetting. Jetting is the most efficient cable-installation methodology and minimizes the extent and duration of cable-installation-related disturbance and will be used for the majority of cable-installation activities. Export and interarray cable trenches are expected to be a maximum of</p>

Comment No.	Comment	Response
		5 feet (1.5 meters) wide and to have a maximum seafloor disturbance width of 33 feet (10 meters) along the lengths of the cables. When feasible, boulders will be relocated to non-complex benthic habitat. Although the relocation process is likely to injure or kill encrusting organisms and damage biogenic structures, over time, the relocated boulders would be recolonized, contributing to the habitat function provided by existing complex benthic habitat. This information has been added to the EIS.
BOEM-2022-0053-0102-0031	We recommend developing a clear strategy for boulder relocation that is protective of habitats in the area potentially relocating them to soft bottom directly adjacent to existing hard bottom areas. Mobile gear fishing activity should be considered when planning specific placement options; relocation areas with similar habitat impacts might have higher or lower potential for conflict with trawling and dredging activities. We also recommend using grabs to relocate boulders whenever possible vs. relying on plowing. Plowing will have a much larger impact on benthic habitats as compared to grabs. Recreational fishermen often fish on boulder habitats. We recommend that maps post boulder relocation be made available to the recreational and commercial fishing communities and others.	When feasible, boulders will be relocated to non-complex benthic habitat. Although the relocation process is likely to injure or kill encrusting organisms and damage biogenic structures, over time, the relocated boulders would be recolonized, contributing to the habitat function provided by existing complex benthic habitat.
BOEM-2022-0053-0117-0025, -0026, -0027	In regards to the Empire Wind 2 export cable however the DEIS states that the route passes through Reynolds Channel an area contaminated by urban/storm runoff and that the developer has not conducted benthic surveys or obtained samples. In contract the developer has conducted survey work throughout the rest of the export cable corridor routes for both Empire Wind 1 and Empire Wind 2. We strongly urge BOEM and the developer to conduct pre-construction sampling at this site especially as this area is notably an environmental justice community with relatively higher levels of exposure to PM2.5 ozone diesel particulate matter air toxics cancer risk and air toxics respiratory hazard index. We also ask that BOEM consider whether the developer should employ a similarly protective dredging technique at this site as Alternative H which aims to reduce the amount of contaminants released from the sediment during dredging. BOEM should also consider the use of protective dredging techniques where possible to minimize dispersal of contaminated	Empire anticipates using HDD to cross Reynolds Channel (described as its preferred method for the crossing in its EW 2 Individual Permit Application). This method would avoid disruption to the sediments in Reynolds Channel. The onshore work areas required for the use of HDD will be located on previously developed commercial/industrial parcels adjacent to Reynolds Channel. Empire would also implement an HDD Contingency Plan (APM 97) to minimize potential releases and inadvertent return of HDD fluid at the EW 2 export cable crossing of Reynolds Channel. Impacts on air quality due to construction, O&M, and decommissioning

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	<p>sediment particularly in proximity of environmental justice communities disproportionately exposed to environmental harms. Finally pre-construction, construction, and post-construction monitoring should be conducted especially in areas of known vulnerability such as those adjacent to known sources of contaminants and near environmental justice communities.</p>	<p>activities are discussed in Section 3.4, <i>Air Quality</i>.</p>
<p>BOEM-2022-0053-0143-0004</p>	<p>The commonly held perception that there's virtually endless ocean area for the marine fauna and flora displaced or impacted by offshore wind power plant projects to exist in sufficient numbers and without adverse impact to their respective ecosystems is simply a falsity. The size of the Atlantic Ocean is immense relative to that of the U.S. Outer Continental Shelf ('shelf') which is a limited resource.</p>	<p>The entire U.S. OCS includes 1.7 billion acres of submerged lands, subsoil, and seabed. (103,784,260 acres of which are the Atlantic continental shelf). The Lease Area is approximately 79,350 acres in size; however, only limited areas will be temporarily disturbed or permanently converted to hard substrate due to Project activities and structures. Approximately 1,913 acres will be temporarily disturbed due to anchoring (18 acres) and cable-laying activities (1,895 acres). Approximately 257 acres of soft-bottom habitat will be converted to hard-bottom habitat due to WTG foundations and their scour protection and cable scour protection. While the OCS is small relative to the Atlantic Ocean, the seafloor area that will be temporarily disturbed and permanently converted to hard-bottom due to the Projects is small relative to the OCS.</p>
<p>BOEM-2022-0053-0143-0014</p>	<p>Of the 1.4 million trillion cubic meters [Footnote 11: 14000000000000000000 cubic meters] of ocean water only about 55 trillion cubic meters of it are shelf waters. That is less than one one hundredth of one percent of the oceans waters sit on the outer continental shelf but this (less than one one hundredth) does ten to fifteen percent of the work taking dissolved carbon dioxide out of the ocean by fostering conditions favorable for the cumulative actions of the tiny autotrophic organisms within it to photosynthesize. Accumulation of Marine Construction also called marine urbanization is associated with reduction in productivity. Artificial structures in marine environments increases the availability of hard surfaces that can be colonized by sessile invertebrates (mussels barnacles anemones etc.) which are heterotrophs. For example the hard surfaces in the world's ports have created new habitat for 950000 metric tons of sessile invertebrates <u>which themselves release about</u></p>	<p>The possible implications of the accumulation of sessile invertebrates on offshore structures such as wind turbine foundations and the foundations of oil and gas rigs is different from the situation described in Malerba et al. (2019). The term "marine urbanization" refers to manmade structures such as piers, wharves, docks, and floating barges located on coastlines, whereas the Projects are approximately 14 to 19.5 miles offshore. Physical and biological factors and ecological processes differ between the offshore and coastal/inshore environments and the potential impacts on inshore/coastal waters described by Malerba et al. (2019) do not</p>



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	<p>600 metric tons of CO<sub>2</sub> per day] and consume 5 million mega joules of energy daily. [M.E. Malerba C.R. White and D.J. Marshall 2019.</p>	<p>necessarily translate to the offshore environment. Although filter feeders may have a “halo effect” on phytoplankton abundances in the immediate water volume around an offshore foundation, they can only consume phytoplankton as fast as the water flows past, and thus their feeding activities are limited by the physical delivery of phytoplankton within the water. BOEM is not aware of any scientific studies documenting an impactful decrease in phytoplankton abundance due to the presence of filter-feeders on other offshore structures (e.g., oil and gas rigs) in locations such as the Gulf of Mexico, which currently has over 4,000 rigs, nor is BOEM aware of any studies documenting increased CO<sub>2</sub> in the presence of these offshore structures. Additionally, phytoplankton themselves respire and thus produce CO<sub>2</sub>. The consumption of phytoplankton plays an important role in the carbon cycle; the loss of phytoplankton to consumers results in the creation of fecal pellets and pseudofeces that fall to the bottom and can eventually become buried, serving as a major CO<sub>2</sub> sink.</p>
<p>BOEM-2022-0053-0143-0015</p>	<p>The mechanisms by which sessile heterotrophs reduce productivity is that they collectively consume vast quantities of autotrophs reducing the capacity per unit volume of water of autotrophs in that water to draw CO<sub>2</sub> out of the ocean water. Artificial structures increase sessile heterotrophs by two mechanisms. One mechanism is that they greatly increase hard surface areas that sessile heterotrophs are able to grow on and secondly the heterotrophs directly reduce the autotrophs by eating them. The second mechanism is that structures (such as towers platforms barges piers quays etc.) cast shadows; The shading reduces autotroph proliferation.</p>	<p>Piers, wharves, and docks that constitute marine urbanization are generally close to the water surface and result in shading effects that remain more constant throughout the day. In contrast, the decks of OSS will be 174 feet (53 meters) AMSL and the nacelles of WTGs will be up to 525 feet (160 meters) AMSL, which allows for the sunlight to penetrate the water column near and under these structures during most of the day. Any waters shaded by offshore structures are moving waters that would flow out of shaded areas, and thus any shading of phytoplankton in these waters would be temporary and would not significantly affect phytoplankton photosynthesis</p>

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		<p>and proliferation. Additionally, water exchange/ flow may be affected in developed/urban settings and the photic zone in these coastal areas are depth limited and often turbidity limited, whereas offshore wind farms are in offshore areas with unimpeded water movement/exchange, as well as much deeper photic zones that can support a greater amount of primary productivity. Hydrographic changes due to the presence of offshore foundations may increase local mixing in the vicinity of the wind farm, which may in turn result in increased nutrient availability for phytoplankton. Additionally, foundations for offshore structures provide vertical hard structure in the photic zone that otherwise would not be present and support the growth of autotrophic micro- and macroalgae, which also remove CO<sub>2</sub> from the water column. While filter-feeders do reduce phytoplankton abundance through their feeding activities, the role of offshore structures as artificial reefs is well documented, and they attract invertebrates and pelagic and demersal fish, many species of which feed on filter-feeding heterotrophs. Their feeding activities will keep the filter-feeder population in check and the proportional effect of filter-feeders on the phytoplankton abundances will be reduced. Finally, BOEM is not aware of any scientific studies documenting a decrease in phytoplankton abundance in the presence of other offshore structures such as oil and gas rigs in locations such as the Gulf of Mexico, which currently has over 4,000 rigs, nor is BOEM aware of any studies documenting increased CO<sub>2</sub> in the presence of these offshore structures.</p>
BOEM-2022-0053-0143-0016	Shade-cast by the marine construction and consumption of plankton by suspension-feeding sessile heterotrophs that colonize the hard surfaces of the marine construction are expected to reduce productivity on the outer	Any waters shaded by offshore structures are moving waters that would flow out of shaded areas, and thus any shading of phytoplankton in

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	<p>continental shelf by feeding on plankton a large proportion of which prey are autotrophic producers. The sessile inverts also produce CO<sub>2</sub> themselves. The estimated quantitative effect of the Empire Wind Power Plant's contribution to productivity reduction via this "trophic footprint" of fouling heterotrophs when taken together with that of other wind-turbine power plant projects planned on the outer continental shelf (some of which are floating wind farms in which each turbine sits on a 2-acre shade-casting tethered platform) has not been estimated by BOEM in the DEIS with respect to mass quantity (tonnage) of excess dissolved CO<sub>2</sub> that will result from the U.S. Atlantic Offshore wind program's impairment of primary productivity on the Outer Continental Shelf.</p>	<p>these waters would be temporary and would not significantly affect phytoplankton photosynthesis and proliferation. Although filter feeders may have a "halo effect" on phytoplankton abundances in the immediate area around an offshore foundation, they can only consume phytoplankton as fast as the water flows past, and thus their feeding activities are limited by the physical delivery of phytoplankton within the water. BOEM is not aware of any scientific studies documenting an impactful decrease in phytoplankton abundance or related "trophic footprint" in the presence of other offshore structures such as oil and gas rigs in locations such as the Gulf of Mexico, which currently has over 4,000 rigs, nor is BOEM aware of any studies documenting increased CO<sub>2</sub> in the presence of these offshore structures. Additionally, phytoplankton themselves respire and thus produce CO<sub>2</sub>. The consumption of phytoplankton plays an important role in the carbon cycle; the loss of phytoplankton to consumers results in the creation of fecal pellets and pseudofeces that fall to the bottom and can eventually become buried, serving as a major CO<sub>2</sub> sink. As for floating wind platforms, none of the 39 currently operational/planned/under-construction offshore wind farms in the Atlantic OCS will be floating wind farms; therefore, floating wind farms are not included in the discussion of cumulative impacts in the EIS.</p>
BOEM-2022-0053-0143-0017	<p>Knowing these "trophic footprint" effects of marine construction the conclusions of the Bureau in the DEIS—that concrete bottom scour pads surrounding wind energy structures and other structures that comprise the ocean power plants will be "beneficial" on account of the fact that they will serve as substrate that fosters growth of new communities of organisms built around sessile heterotroph organisms—is a conclusion that is very difficult to make rational sense of.</p>	<p>While filter-feeders do reduce phytoplankton abundance through their feeding activities, the role of offshore structures as artificial reefs is well documented and they attract invertebrates and pelagic and demersal fish, many species of which feed on filter-feeding heterotrophs. Their feeding activities will keep the filter-feeder</p>

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		<p>population in check and the proportional effect of filter-feeders on the phytoplankton abundances will be reduced. The consumption of phytoplankton plays an important role in the carbon cycle; the loss of phytoplankton to consumers results in the creation of fecal pellets and pseudofeces that fall to the bottom and can eventually become buried, serving as a major CO<sub>2</sub> sink.</p>
<p>BOEM-2022-0053-0143-0026</p>	<p>The undersigned were unable to complete the assessment of impact to sea grass populations in New York State of the Empire Wind power plant. The evaluations and recommendations for New Jersey are appended as Appendix C. It is strongly urged that such an analysis of proximity of offshore wind sound-generating activity to sea grasses as well as standards for harm be established so that adverse effects can be fully evaluated prior to any project being approved by BOEM.</p>	<p>No seagrass was observed during benthic characterization surveys conducted in the wind Farm Development Area and along the nearshore and offshore export cable routes. Seagrass and other SAV are confined to shallow inshore and coastal waters due to their photosynthetic nature and the majority of seagrass in New York is found in the waters behind Long Beach and Long Island and in Jamaica Bay. Near Long Branch, New Jersey, seagrass is in shallow coastal waters in the Navesink River. The wind Farm Development Area is 14 miles (12 nm) south of Long Island, New York and 19.5 miles (16.9 nm) east of Long Branch, New Jersey. Any noise from pile-driving activities and operational WTGs is not likely to reach inshore seagrass beds at a level that would exceed behavioral and injury thresholds for any finfish present in seagrass beds. Please see Section 3.13, <i>Finfish, Invertebrates, and Essential Fish Habitat</i>, for a detailed discussion of the impacts of noise on finfish and invertebrates.</p>
<p>BOEM-2022-0053-0143-0027</p>	<p>The delineation of the affected area for benthic resources (within which impacts to benthic resources were given consideration) (a) is irrational because it was decided based on likely regions in which suspension of sediment could have effects. The region in which construction noise and ongoing operation noise would have effects on benthic resources was not used to define the area of potential effects in which impacts to benthic</p>	<p>Based on noise modeling performed in support of the Projects and current knowledge of the impacts of underwater anthropogenic noise on fish and invertebrates, the spatial extent of potential sediment resuspension and deposition is greater than the extent of potential noise</p>

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	<p>resources were given consideration in the DEIS. The effects of noise on benthic organisms was not given proper consideration. See Appendix A for considerations that are recommended to be included.</p>	<p>impacts, and therefore the larger area of potential impacts (i.e., sediment resuspension and deposition) is used to define the geographic analysis area (the Wind Farm Development Area plus a 10-mile/16.1-kilometer buffer) for benthic resources. The most substantial source of underwater noise associated with the Proposed Action would be impact pile driving during construction. Based on maximum sound levels during pile driving, the radius of behavioral impacts on fish was estimated to extend as far as 6,590 meters in the summer and 7,510 meters in the winter, and the radius of injurious impacts across all fish was estimated to extend as far as 70 meters in both the summer and winter. Based on cumulative sound exposure during pile driving, the radius of injurious impacts on fish was estimated to extend as far as 4,030 meters in the summer and 4,350 meters in the winter for smaller fish that are most vulnerable to sound. Because of the relatively small footprint of injurious sound and the ability for most fish to swim away from noise sources, injurious noise from pile driving is not expected to cause population-level impacts on fish. Impacts of pile-driving noise on invertebrates, which are generally less sensitive to sound than fish, are expected to occur only in close proximity to the sound source. Operating WTGs generate non-impulsive, underwater noise that is audible to some finfish and invertebrates. The WTGs are expected to generate operational noise on the order of 110 to 125 dB<sub>RMS</sub> within the 10-Hz to 8-kilohertz frequency range and particle acceleration effects on the order of 10 to 30 dB re 1 micrometer per second squared at a reference distance of 50 meters (Tougaard et al. 2020). These noise effects are below injury and behavioral effects thresholds for all fish and</p>

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		<p>invertebrate species, indicating that potentially significant underwater noise effects from the Proposed Action on habitat suitability would be restricted to a very small area around each monopile. Sensitivity thresholds have not been established for most species of invertebrates, but their lack of a gas-filled structure associated with hearing suggests that their sensitivity to noise may be similar to that of fish without swim bladders. Therefore, noise from operating WTGs is not expected to produce impacts on finfish and invertebrates.</p>
<p>BOEM-2022-0053-0143-0031</p>	<p>The DEIS purports that recovery from non-permanent impacts to benthic resources is expected to occur rapidly. “benthic communities affected by the one-time disturbance associated with wind farm cable installation would likely recover in the short term” [DEIS 3.6- 10]. This appears to be contradicted by available evidence from other wind farms for which restoration of ecological communities took 5 years and resulted in decreases in biodiversity.</p>	<p>Estimates of recovery time following disturbance vary by region, species, and type of disturbance. Studies on benthic community recovery at European offshore wind farms after cable emplacement have found recovery times in the range of months to less than 5 years. For example, a study by Daan et al. (2006) found that, 6 months after construction of a wind farm in the Dutch North Sea, the benthic community in sandy areas between monopile foundations was not significantly different in terms of species composition, diversity, density, and biomass from five of six reference locations. Another study by Leonhard and Pedersen (2006) documenting the recovery of the soft-sediment benthic community after the construction of a wind farm in the Dutch North Sea found no significant differences in the infaunal community between pre-construction and 3-year post-construction sampling. Although the post-construction recovery of benthic communities along export and interarray cable routes was not monitored for Block Island Wind Farm in Massachusetts, BOEM documented the recovery of seafloor sediments and found that approximately 62 percent of the export cable scar had recovered within 4 months of cable-</p>



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		<p>laying activities, with the remainder of the export cable scar being partially recovered. Forty-one percent of the interarray cable scar had completely recovered 2 years after cable-laying activities (HDR 2020).</p>
<p>BOEM-2022-0053-0143-0032</p>	<p>In support of its assertion in the Draft EIS that recovery from cable-laying would be quick the Bureau cites evidence that recovery following sand mining in the U.S. Atlantic and Gulf of Mexico takes between 3 months to 2.5 years. However the means by which sand is harvested/mined from the ocean floor for beach nourishment and the means by which sand is removed to create trenches for cable-laying differ grossly. To create the trenches for offshore- wind-energy-related cables downward-directed high-pressure jets and/or rotating vortices will be used to blast trenches on the seafloor into existence . The Bureau cannot possibly be under the illusion that the latter does not causes greater sediment and ecosystem disturbance that is more difficult to recover from. The reference to recovery timeframe referencing disturbances from sand mining as approximate equivalents is disingenuous.</p>	<p>Ocean sand mining occurs via suction dredging (static or dynamic) and can produce pits ranging in depth from 25–50 centimeters (for dynamic suction dredging) to up to 10 meters (for static suction dredging). Export and interarray cables for the Projects have a target burial depth of 6 feet and a total trench depth of 8 feet (2.43 meters), except in locations where deeper cable burial depths (15-foot burial depth, 17- 22-foot trench depth) are necessary due to cable crossings and navigational channels. The depth range at which benthic infaunal organisms live in the sediments is generally less than 30 centimeters, meaning that both suction dredging and jet plowing remove sediments to a depth beyond that in which infaunal organisms dwell and both result in the death and injury of infaunal, semi-infaunal, and non-motile epibenthic species in the dredge footprint. Results of sediment transport and deposition modeling in the Lease Area and offshore export cable corridor from construction and installation activities demonstrated that the duration and height of the suspended sediment above the bottom would be influenced by particle size and bottom currents (COP Appendix J; Empire 2023). In the Lease Area and offshore export cable corridor, which are composed of relatively sandy sediments, maximum turbidity plume distances were estimated to range between 328 and 1,640 feet (100 and 500 meters), with water column concentrations returning to ambient conditions within 4 hours. The sediment deposition</p>

Comment No.	Comment	Response
		<p>thickness from cable emplacement was estimated to fall below 0.004 inch (0.01 centimeter) within 246 feet (75 meters) of the trench centerline, indicating that only fish and invertebrates in the immediate vicinity of the trench would be affected. BOEM documented the recovery of seafloor sediments from construction at Block Island Wind Farm and found that approximately 62 percent of the export cable scar had recovered within 4 months of cable-laying activities, with the remainder of the export cable scar being partially recovered. Forty-one percent of the interarray cable scar had completely recovered 2 years after cable-laying activities (HDR 2020).</p>
<p>BOEM-2022-0053-0143-0033</p>	<p>The Bureau is aware that as a prefatory step to cable installation a mass flow excavator will be used to blast or blow (not dig) trenches into the seafloor via the use of powerful jets or what are essentially upside-down tornadoes created with rotating machinery powerful enough to blast away - with high velocity water flows – piles of large rocks. It is also known that these excavators which blast water at the seafloor create huge plumes of sediment that the current can carry a distance away from the trench site smother sea life on the ocean floor and clog feeding siphons of ecologically important marine fauna. The Bureau's approximation of the effects of trenching for wind energy projects via looking to the effects of sand harvesting projects is less than appropriate. The DEIS has not made any attempt to compare the difference in impacts of the use of various methods and the Bureau has not conditioned its approval of the projection any choice of equipment to minimize effects.</p>	<p>Jetting is the most efficient cable-installation methodology and minimizes the extent and duration of cable-installation-related disturbance and will be used for the majority of cable-installation activities. Export and interarray cable trenches are expected to be a maximum of 5 feet (1.5 meters) wide and to have a maximum seafloor disturbance width of 33 feet (10 meters) along the lengths of the cables. Results of sediment transport and deposition modeling in the Lease Area and offshore export cable corridor from construction and installation activities demonstrated that the duration and height of the suspended sediment above the bottom would be influenced by particle size and bottom currents (COP Appendix J; Empire 2023). In the Lease Area and offshore export cable corridor, which are composed of relatively sandy sediments, maximum turbidity plume distances were estimated to range between 328 and 1,640 feet (100 and 500 meters), with water column concentrations returning to ambient conditions within 4 hours. The sediment deposition</p>

Comment No.	Comment	Response
		<p>thickness from cable emplacement was estimated to fall below 0.004 inch (0.01 centimeter) within 246 feet (75 meters) of the trench centerline, indicating that only non-motile fish and invertebrates in the immediate vicinity of the trench would be affected.</p>
<p>BOEM-2022-0053-0143-0034</p>	<p>The DEIS has opted to cite a predictive estimate by NMFS of recovery of the soft-bottom benthic community at Block Island Wind Farm (predicting recovery within 3 years) that was made prior to the farm being built rather than using any empirical measures of recovery in the ten years since the farm was built.</p>	<p>EIS text has been updated to describe the recovery of seafloor sediments at Block Island Wind Farm and now states: "BOEM documented the recovery of seafloor sediments from construction at Block Island Wind Farm and found that approximately 62 percent of the export cable scar had recovered within 4 months of cable-laying activities, with the remainder of the export cable scar being partially recovered. Forty-one percent of the interarray cable scar had completely recovered 2 years after cable-laying activities (HDR 2020)." Reports on benthic community recovery at Block Island Wind Farm are limited to areas near the turbine foundations and do not include recovery of the benthic community in the export and interarray cable corridors. Benthic assemblages near the Block Island Wind Farm turbine foundations transitioned to fine, organically rich sediments with dense aggregations of mussels within 4 years post-construction, with effects of the presence of foundations decreasing with distance from the turbine (Hutchison et al. 2020).</p>

**P.6.6 Birds**

**Table P.6.6-1 Responses to Comments on Birds**

Comment No.	Comment	Response
BOEM-2022-0053-0119-0009	The FEIS should consider the full scope of impacts to federally and state protected birds and bat species that trigger conservation obligations and address collision risk for species most at risk of collision. In addition it must include habitat loss that birds may experience beyond the footprint of project construction and operation.	<p>The full scope of impacts from the Projects are addressed in EIS Section 3.5, <i>Bats</i>, and Section 3.7, <i>Birds</i>. The IPFs analyzed in both EIS sections address all birds and bats, whether they are federally or state-listed as endangered or threatened, have some other special designation, or have no designation at all. The impact types and mechanisms apply to all bird species regardless of status. BOEM recognizes that species with special designations may be more sensitive to the impact types and mechanisms compared to those species with no special designations or protections. For federally listed threatened and endangered birds and bats, BOEM developed a BA and is consulting with USFWS as required under Section 7 of the ESA. Measures to address those species are listed in the BA and have been included in the Final EIS (see Table 3.5-3 and Table 3.7-4). For New York State-listed threatened and endangered species or otherwise special-status species, Empire would need to comply with all New York State laws and regulations regarding potential impacts on these species. The abundance of birds at most risk of collision and displacement in the offshore environment is considered low (see EIS Figure 3.7-3 and Figure 3.7-4 and associated text).</p> <p>Habitat loss beyond the footprint of a Project component is largely related to noise impacts, which is an IPF covered in both Section 3.5 and Section 3.7.</p>
BOEM-2022-0053-0140-0054	(1) Displacement of Habitat a. Behavioral responses to offshore wind farms may cause birds to avoid previously used habitats. This phenomenon has been dubbed displacement. At Robin Rigg offshore wind farm in Scotland the monitoring program showed evidence of a	Section 3.7.3.2, <i>Cumulative Impacts of the No Action Alternative</i> , and Section 3.7.5, <i>Impacts of the Proposed Action on Birds</i> , address bird displacement risk under the presence of structures IPF. As stated

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	decrease in the number of common scoter ( <i>Melanitta nigra</i> ) one year after construction.	in the latter EIS section, the exposure and relative vulnerability assessment to estimate the collision and displacement risk of various offshore bird species encountering the Lease Area is minimal to low for most bird species (see COP Appendix Q, Avian Impact Assessment, for full details on the avian collision and displacement risk, here: <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan">https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan</a> ). Sea ducks, particularly scoters, are expected to be vulnerable to displacement. However, as depicted on EIS Figure 3.7-4, modeled use of the Lease Area by bird species with high displacement sensitivity is low. For example, estimated mean annual densities of scoters (total per square kilometer) within the Lease Area range from 0.009 for surf scoter to 0.070 for black scoter (COP Appendix Q, Table 2-16). BOEM notes that the Robin Rigg offshore wind farm in Scotland has a much more compressed turbine layout (approximately 500 meters or 0.27 nm) between turbines) than anything proposed or anticipated on the Atlantic OCS (0.6-nm to 1-nm turbine spacing) and, therefore, may not be an appropriate comparison in this particular issue.
BOEM-2022-0053-0140-0055	(2) Risk of Collision a. There is concern for birds colliding with wind turbines. This has been a big issue with onshore wind projects specifically in the middle of the country. b. Weather increases the risk of collision and the ocean is an area with some of the harshest weather conditions.	Section 3.7.3.2, <i>Cumulative Impacts of the No Action Alternative</i> , and Section 3.7.5, <i>Impacts of the Proposed Action on Birds</i> , address bird collision risk under the presence of structures IPF. As stated in the latter EIS section, the exposure and relative vulnerability assessment to estimate the collision and displacement risk of various offshore bird species encountering the Lease Area is minimal to low for most bird species (see COP Appendix Q, Avian Impact Assessment, for full details on the avian collision and displacement risk, here: <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan">https://www.boem.gov/renewable-energy/state-</a>

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		<a href="#">activities/empire-wind-construction-and-operations-plan</a> ).
BOEM-2022-0053-0140-0056	<p>(3) Migration Barriers a. The barrier effect may have a negative impact on birds. The birds' behavioral avoidance response to the wind farm may lead to detours circumventing the structures ultimately extending the total flying distance and energy use. This energy loss is critical for birds experiencing other stressing factors to their populations or for those migrating. b. Furthermore for species such as the common eider (<i>Somateria mollissima</i>) the reproductive success is related to the females' body reserves during the breeding period. By increasing the energy use for common eiders their body mass may drop thus affecting the breeding output. c. Results from the monitoring programs at Nysted and Horns Rev offshore wind farms in Europe showed that all birds generally avoid wind farms if they block migration pathways. The specific level of avoidance depends on the species with some going further out of their way to avoid the area. Over 50 percent of the birds avoided passing through the wind farms at half a mile to a mile.</p>	<p>The effects of offshore wind farms on bird movement ultimately depend on bird species, size of the offshore wind farm, spacing of the turbines, and extent of extra energy cost incurred by the displacement of the flying birds (relative to normal flight costs pre-construction) and their ability to compensate for this degree of added energy expenditure. Little quantitative information seems available on how offshore wind farms may act as a barrier to movement, but a modeling effort by Madsen et al. (2012) looked a bird movement through offshore wind farms based on bird movement data collected at the Nysted offshore wind farm in the western Baltic Sea. A summary of this study has been added to Section 3.7.3.2, <i>Cumulative Impacts of the No Action Alternative</i>, under the presence of structures IPF. In short, the modeling effort indicates that the Project turbine spacing would be wide enough to allow bird movement and would not act as an impediment to migration.</p> <p>BOEM notes that turbine spacing in offshore wind farms in Europe is generally more compressed than what is being proposed on the Atlantic OCS. For example, the commenter mentions Nysted and Horns Rev wind farms. Distance between turbines for these wind farms is shown below, which, based on the Madsen et al. (2012) modeling, indicates they would have some level of impediment to bird migration. These distances are much narrower than distances proposed between turbines on the Atlantic OCS.</p> <ul style="list-style-type: none"> <li>• Horns Rev 1: turbines are 560 meters (0.3 nm) from each other in both directions</li> <li>• Horns Rev 2: turbine spacing is 500 meters (0.27 nm) in both directions</li> </ul>



Comment No.	Comment	Response
		<ul style="list-style-type: none"> <li>Nysted: turbine spacing is 480 meters (0.26 nm) (east/west) and 900 meters (0.48 nm) (north/south)</li> </ul>
BOEM-2022-0053-0143-0040	<p>A gargantuan study was undertaken to determine whether the Empire Wind power plant might cause population-level impacts on aves. It partially relied on older historical data very sensitive to errors in guesses as to what multipliers must be used to make up for the variation in observational effort. The study can be briefly summarized as follows. In the (triangular) lease area of proposed construction counts by species were performed using aerial surveys conducted along parallel lines spaced about a half mile apart (Fig.1 pg.8 Appx P of the COP) using a camera mounted on the underbelly of the aircraft. They also flew a plane over a more or less square area the "OPA" flanked by on its north side by the southern coast of New York and south side by the underwater cliff of the outer continental shelf. They then indexed what proportion of the population is estimated to be exposed to the lease area and interpreted that as a measure of the importance of the lease area compared to other surveyed areas. Next they compared lease area to (model-predicted) density over the larger NW Atlantic. Density in NW Atlantic was derived from 'MDAT' models based on data from a variety of historical data (different surveys and observations).</p>	<p>BOEM has reviewed and used multiple sources to describe bird presence and abundance on the Atlantic OCS and in the lease Area and to assess potential impacts. These sources are cited in Section 3.7, <i>Birds</i>. As stated in EIS Appendix D, Section D.1.4, <i>Birds</i>, BOEM acknowledges that there will always be some level of incomplete information on the distribution and habitat use of birds in the offshore portions of the geographic analysis area, and that there will always be some level of uncertainty regarding the potential for collision risk and avoidance behaviors for some bird species because offshore wind on the Atlantic OCS is in its infancy. However, datasets used by both Empire and BOEM to describe the affected environment and to assess potential impacts represent the best available data and, therefore, are sufficient to support scientific judgment and informed decision-making. See EIS Appendix D, Section D.1.4, <i>Birds</i>, for more information.</p>
BOEM-2022-0053-0143-0041	<p>Concerns over paucity of data producing Type II error (failure to reject the null hypothesis that abundance would not differ across areas because of woeful lack of power to detect differences) has not been fully addressed. The Null hypothesis (examining if density is same in lease area compared to outside then the lease area is not important to the population) is inappropriate under the circumstance that abundance count in one area is expected to have dependency with abundance count in neighboring or other areas for migratory animals or animals who move between areas examined for abundance.</p>	<p>See response to comment BOEM-2022-0053-0143-0040. The aerial survey data cited in the EIS (which is from COP Appendix O) are just one piece of information that BOEM used to describe birds in the Lease Area. The aerial survey is a snapshot in time and, as stated in the aerial survey report (see COP Appendix O), the data are only presented for the months where a species of bird was recorded. Empire chose to conduct bird surveys specific to its Lease Area (something not specifically required by BOEM for a COP submittal) with a method of its choosing. BOEM has reviewed the bird survey report and believes the information is valuable to add to the other information BOEM used to describe birds in the Lease Area and geographic analysis area.</p>

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BOEM-2022-0053-0143-0042	Density estimates - whether abundance data harvested in aerial studies (or rather predicted using this data) is reflective of actual abundance – is questionable. Is capture in the photo of a ~300x200m area below the airplane of birds present in the area using snaps at a single flash in time at a single location at a time going to be representative of abundance given that birds are highly mobile the individual photographs were taken at different times (i.e. was an appropriate transformation performed to transform the raw counts to expected population densities?) and given that the pilot had to reduce altitude for many of the observations which may cause birds to change direction away from the flight path.	See response to comments BOEM-2022-0053-0143-0040 and BOEM-2022-0053-0143-0041. The survey analysis and methodology for the digital aerial survey are described in COP Appendix O, Section 3 of the report.
BOEM-2022-0053-0143-0043	There should have been red flags about the problem of working with scarce data and paucity of data issues. Data was very scarce for most species attempted to be studied. There is concern over the quality of the observational and survey data fed into the MDAT models; Potential problems with using historical data to compare lease area densities (estimated from measurements in 2018) to densities over the NW Atlantic modeled from historical data namely: Were temporal declines in abundance accounted for properly -or- was an implicit assumption that species abundance has not declined over the decades made? Was discounting/weighting for unevenness over space of the survey effort appropriately Unlike radar studies aerial photography can only be conducted during the daytime. This does not account for nocturnal flight activity which based on empirical evidence for very many species is substantially higher at night.	Marine-Life Data and Analysis Team bird models have been developed to describe regional-scale patterns of bird abundance, including on U.S. Atlantic waters. The Marine-Life Data and Analysis Team analysis integrates 38 years of survey data (1978–2016) from the Atlantic Offshore Seabird Dataset Catalog with a range of environmental variables to produce long-term average annual and seasonal models. Marine-Life Data and Analysis Team Version 2 relative abundance and distribution models were produced for 47 avian species using U.S. Atlantic waters from Florida to Maine. The models are based on data collected at much larger geographic and temporal scales than a survey for a particular area (e.g., an aerial survey of an offshore wind lease area). Marine-Life Data and Analysis Team data were also collected using a range of survey methods. The larger geographic scale is helpful for determining the importance of the offshore wind lease areas to marine birds relative to other available locations in the northwest Atlantic and is thus important for determining overall exposure of birds offshore to offshore wind lease areas, including the Project Lease Area. Marine-Life Data and Analysis Team data represent several government entities (e.g., NOAA National Centers for Coastal Ocean Science, Duke University) working together to

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		<p>deliver the best available marine life data, including for avian species. The data are credible and based on a thorough process; as such, it is an important piece of information to include when describing the existing conditions for birds in the Lease Area and geographic analysis area.</p> <p>Details on how the Marine-Life Data and Analysis Team data were developed and the scientific peer review process can be found at <a href="https://seamap.env.duke.edu/models/mdat/">https://seamap.env.duke.edu/models/mdat/</a> and <a href="https://seamap.env.duke.edu/models/mdat/MDAT-Technical-Report.pdf">https://seamap.env.duke.edu/models/mdat/MDAT-Technical-Report.pdf</a>.</p>
BOEM-2022-0053-0143-0044	<p>If there was no evidence of collision or displacement in the literature that species was assigned a "minimal" vulnerability classification on the index (for collision risk given exposure). However we (a) don't have any offshore wind-turbine power plants installed in the United States as of yet except for one very tiny (five turbines) near block island (b) have relatively few terrestrial ones installed in the Atlantic states. The interpretation is that [Bold: if] measured density in the triangular lease area is not greater than density in other areas [Bold: then] no population-level impacts are expected to be experienced by that species from development in this triangular lease area. However even if this were true wind power plant development in ten other areas would affect the validity of the conclusion for the Empire Wind plant. Up to 10 additional areas in NY/NJ waters cumulatively totaling 630000 acres went up for call and are likely to be developed for wind turbine power plants.</p>	<p>Assuming the comment is referring to the exposure and relative vulnerability assessment determination for bird species (i.e., "minimal"), the full report and methodology on how these determinations were made for the different bird species in the Lease Area can be found in COP Appendix Q (as cited in the EIS). The methods for exposure assessment, vulnerability framework, risk determination, and uncertainty are described in Section 2.1, <i>Methods</i>, of the assessment.</p> <p>BOEM acknowledges that the only wind farms in operation on the Atlantic OCS are Block Island Wind Farm (five turbines) and Coastal Virginia Offshore Wind Pilot (two turbines), and that there will always be some level of incomplete information on the distribution and habitat use of birds in the offshore portions of the geographic analysis area (see response to comment BOEM-2022-0053-0143-0040). However the best available data indicate that bird presence/abundance on the Atlantic OCS is generally low compared to onshore (as cited in EIS Section 3.7, <i>Birds</i>). In addition, BOEM provides an overly liberal estimate of potential bird deaths from constructing all future wind farms on the Atlantic OCS in EIS Section 3.7.3.2, <i>Cumulative Impacts of the No Action Alternative</i>, under the presence of</p>

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		<p>structures IPF. Based on mortality rates from onshore wind farms, where bird abundance is much higher than offshore, an estimated 19,229 birds could be killed annually from the 2,803 WTGs that would be added in the future for offshore wind development on the Atlantic OCS. As stated in the same EIS section, potential annual bird kills from WTGs would be relatively low compared to other causes of migratory bird deaths in the United States; feral cats are the primary cause of migratory bird deaths in the United States (2.4 billion per year), followed by collisions with building glass (599 million per year), collisions with vehicles (214.5 million per year), poison (72 million per year), collisions with electrical lines (25.5 million per year), collisions with communication towers (6.6 million per year), and electrocutions (5.6 million per year). Based on these numbers, the future offshore wind turbines would account for 0.0005 percent of all annual bird deaths in the United States. Because the wind farm bird kill rate is based on onshore wind farm data, the percentage would be even lower for wind turbines on the Atlantic OCS given the lower presence/abundance of birds on the Atlantic OCS.</p>
BOEM-2022-0053-0143-0045	<p>The scientific literature (not in the study report) shows that bird flight altitude during migration varies by species within a minority of species is highly variable even under consistent conditions and that most species reduce flight altitude and/or fly at low altitudes during inclement weather. The survey airplane in appendix P flew at altitudes 1020-1360 ft only on days with good visibility and terminated surveys flights when conditions were not conducive to photography or when unsafe to fly e.g. during icing conditions etc. The turbines are expected to be 952 feet tall rotor is expected to sit at elevation between 952 feet and 98 feet. The data collected in the aerial survey would be missing data from individuals of species who usually fly at higher altitudes but lower their altitude into the Rotor Swept Zone during bad weather. It would be advisable if the studies on which the Bureau intends to rely could survive scrutiny by the boards of approval</p>	<p>Empire's aerial surveys (COP Appendix P) did not collect bird flight altitude. In addition, as mentioned in the response to comment BOEM-2022-0053-0143-0041, the aerial survey data cited in the EIS (which is from COP Appendix O) are just one piece of information that BOEM used to describe birds in the Lease Area. Furthermore, the exposure and relative vulnerability assessment determination for bird species (COP Appendix Q) specifically addresses the RSZ as part of the collision vulnerability assessment and looks at bird flight altitudes with respect to turbines for the different bird groups. Details on the methods and results can be found in</p>

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	<p>for publication in peer reviewed reputable scientific journals. Does the United States really wish to rely on a study that has been deemed not fit for publication? Do we the United States really want to gamble substantial portions of the western hemisphere's bird populations by relying on this clunky study that appears to be riddled with so many validity concerns and hasn't been vetted by a publisher of a peer-reviewed journal? - and - Is there really any substitute for actually determining bird migration trajectories over the course of a few years for a good sampling of species known to migrate over the OCS to predict how such trajectories will be impacted by wind project siting decisions?</p>	<p>COP Appendix O. The overall conclusions from the assessment are reported in EIS Section 3.7, <i>Birds</i>.</p>
<p>BOEM-2022-0053-0143-0046</p>	<p>The size shape and location of the proposed lease sites have been informed by suitability for power plant development (water depth wind speed) and by commercial navigation trajectories but have not been informed or their locations and shapes narrowed down or canalized by bird migration trajectories (which to date have not been mapped). This reflects a lack of priority by planners developers and by federal (BOEM) and state (NYSERDA) agencies. Many ideas on how to use Artificial Intelligence to aid in data interpretation so that accelerated data collection can occur in a mere few years to acquire such trajectories (which would show spatiotemporal distribution of different species and the routes they take) to meet the aggressive wind development schedule in a moderately responsible manner. However none of these were responded to nor were appropriate studies developed or conducted before the lease areas were chosen.</p>	<p>Although this comment does not raise any specific concern regarding the conclusions or adequacy of the EIS, BOEM notes that significant effort was put into establishing the offshore wind lease areas, including the Empire Wind Lease Area. BOEM identified the New York WEA through extensive collaboration and consultation with stakeholders including BOEM's New York Intergovernmental Renewable Energy Task Force, federal agencies, federally recognized tribes, the New York Department of State and other state agencies, the general public, and other relevant stakeholders beginning in November 2010. The Intergovernmental Renewable Energy Task Force held planning meetings in New York in November 2010, April 2012, September 2013, and April 2016. Multiple resources were considered (including birds) in identifying the shape and size of the Lease Area. The full leasing history can be found here: <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind">https://www.boem.gov/renewable-energy/state-activities/empire-wind</a>. Lastly, to BOEM's knowledge, a tool that uses artificial intelligence has not been developed.</p>

**P.6.7 Coastal Habitat and Fauna**

**Table P.6.7-1 Responses to Comments on Coastal Habitat**

Comment No.	Comment	Response
BOEM-2022-0053-0140-0022	<p>The EIS should encompass all applicable protocols for evaluating wildlife impacts of wind turbines located in tidal waters that are set forth in NJDEP's Technical Manual for Evaluating Wildlife Impacts of Wind Turbines Requiring Coastal Permits. For offshore projects the NJDEP Technical Manual requires for instance a habitat evaluation including species surveys to establish the movement corridors and distribution of birds bats and marine organisms at the project site. The surveys are to include information regarding species composition abundance distribution behavior and for birds and bats flight patterns and heights. The surveys must further document species diversity abundance and behaviors of birds bats and marine organisms such as marine mammals sea turtles and fish using the habitat including airspace where the turbine(s) will be constructed. BOEM should similarly require and review such surveys and other requirements included in the NJDEP Technical Manual. [Footnote 63: New Jersey Department of Environmental Protection Technical Manual available at <a href="https://www.nj.gov/dep/landuse/download/cp_013.pdf">https://www.nj.gov/dep/landuse/download/cp_013.pdf</a>.]</p>	<p>While the Projects are not within New Jersey or coastal waters under New Jersey jurisdiction, the suggested NJDEP guidelines to consider for offshore wind is noted. BOEM has considered and included many of the suggestions in the NJDEP manual (e.g., bird diversity and abundance). In addition, as stated in the EIS Empire has committed to implementing a Bird and Bat Monitoring Framework that outlines an approach to post-construction bird and bat monitoring that supports the advancement of the understanding of bat interactions with offshore wind farms. The Bird and Bat Monitoring Framework is Attachment H-3 of EIS Appendix H. In addition, BOEM has included an adaptive management mitigation measure in EIS Section 3.5.9, <i>Proposed Mitigation Measures</i>, to address potential future bat and bird impacts during offshore operations.</p>



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**P.6.8 Commercial Fisheries and For-Hire Recreational Fishing**

**Table P.6.8-1 Responses to Comments on Commercial Fisheries and For-Hire Recreational Fishing**

Comment No.	Comment	Response
BOEM-2022-0053-0014-0001	A review of the Empire Wind Fisheries Monitoring Survey Methods (Mitigation and Monitoring Appendix H) reveals that there are no plans for either Atlantic Surfclam surveys or plans to mitigate the loss of access to Atlantic Surfclam biomass within the Empire Wind lease area even though there are documented commercial quantities of Atlantic Surfclam and commercial harvest of Atlantic Surfclam within the lease area	Empire will develop a Fisheries Mitigation Plan (Appendix V to the COP), which will provide descriptions of fish surveys. Empire would implement a compensation program for lost income for commercial fishers consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment. Levels of funding required by Empire to be set aside for fulfilling verified claims would be commensurate with revenue exposure levels in Table 3.9-31, which includes revenue exposure of the surfclam fishery.
BOEM-2022-0053-0014-0002	The Empire Wind FMP must include Atlantic Surfclam surveys utilizing fisheries monitoring protocols appropriate to collect and compare data across multiple projects for a regional approach to mitigation to be successful.	Empire's fish surveys will use gear that is consistent with regional fisheries independent surveys, which will enable data to be compared across multiple projects.
BOEM-2022-0053-0014-0003	The Empire Wind FMP must show how the project will contribute to a regional stock enhancement program mitigating the loss of access the industry will suffer due to construction and operation of the lease.	BOEM assumes that the Proposed Action will result in loss of access to the Lease Area for some fishing vessels and fisheries because of the increased difficulty of fishing there. Mitigation for this loss of access would be achieved primarily through a fisheries compensation program whose funding would be based on the revenue exposure levels summarized in Table 3.9-31.
BOEM-2022-0053-0102-0019	Figures 3.9-14 through 3.9-23 and Table 3.9-31 include average revenue data over many years. While this is helpful to gain a broad understanding of the level of revenue exposure in the lease area and cable routes including data by	Commercial fisheries effort, landings, and revenue in the Lease Area are summarized by year in Tables I-26 through I-70 of

Comment No.	Comment	Response
	year is most helpful similar to what is provided in NOAA's Socioeconomic Impacts tool. Fisheries revenues can fluctuate for a variety of reasons (warming waters change in fishing regulations etc.) therefore an average value may not always accurately describe the economic value of the fishery.	Appendix I ( <i>Supplemental Information</i> ). Average values are presented in Section 3.9 in order to limit the volume of information included in the main text.
BOEM-2022-0053-0102-0020	Figures 3.9-14 through 3.9-23 use data that are a minimum of ten years old (2007-2012). These data should be updated to the latest available data to better reflect recent fishing information and should match other data provided in the DEIS.	The revenue intensity maps shown on Figures 3.9-14 through 3.9-23 are based on the most recent publicly available geographic information systems data. These maps were included to provide a complement to the tables summarizing revenue exposure over the period of 2008–2021. Fisheries mitigation measures will be determined based on the more recent data presented in the tables.
BOEM-2022-0053-0102-0021	The comparisons being made in the fisheries tables (e.g. Volume 1 Table 3.9-10) are somewhat confusing to track. Some are within the lease area only and some are relative to the fishery overall. More detailed table captions and column headers would be useful in addition to explaining the tables in the body of the EIS.	Footnotes have been added to the tables describing effort, landing, and revenue in the Lease Area to clarify how the percentages were calculated.
BOEM-2022-0053-0102-0022	Impacts to private recreational anglers are not included in the main body of the DEIS but are included in Appendix G (Assessment of Resources with Minor (or Lower) Adverse Impacts). This analysis should be expanded upon and should more clearly describe the data limitations for private recreational fishing. For example data are not available to determine the amount of private recreational fishing effort that takes place within the lease area and the export cable corridor routes because those data are not collected. The FEIS should evaluate impacts to this user group using qualitative methods and quantitatively to the extent possible.	A paragraph has been to the beginning of Section 3.9.1.2 to note the presence of private anglers and the limited data for characterizing that group.
BOEM-2022-0053-0103-0001	Sections 3.6 and 3.9 of the DEIS discuss the impacts on benthic habitats and the commercial and recreational fishing industries. According to the DEIS 29.2% of landings and 33.58% of revenue from the Lease Area are connected to New Bedford MA making it by far the most impacted port among those that fish the Lease Area. The DEIS lists historical landings and revenue by port and by species and it projects direct economic exposure by fishery for the 2020-2030 period but it does not account for the indirect economic effects or break down the direct economic exposure by state. Given the large share of impact expected to fall on Massachusetts ports - and on one port and fishery in particular - the FEIS should provide an economic exposure analysis specific	Table 3.9-11 has been added to show revenue exposure by state. Tables 3.9-10 and 3.9-12 show revenue exposure by fishing port. As described in Table 3.9-25, a compensation measure has been added that will require Empire to conduct an analysis of impacts on shoreside support services, thereby accounting for indirect economic effects.

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	to Massachusetts fishermen and ports. The economic exposure analysis should include evidence-based multipliers that accurately reflect those economic impacts both upstream (e.g. purchasing of supplies) and downstream (e.g. processing and transportation) that are proportional to landings. Direct and indirect economic exposure should be calculated by port and by fishery so that mitigation measures may be appropriately directed to the fisheries and associated industries most impacted.	
BOEM-2022-0053-0103-0002	The DEIS reports that annual revenue exposure for for-hire recreational fishing in the EW 1 and EW 2 WEAs is not available. In place of that information the DEIS uses an economic analysis conducted by BOEM of recreational for-hire boats as well as for-hire and private-boat angler trips that might be affected by the overall New York WEA of which the EW 1 and EW 2 WEAs are a part. The for-hire recreational fishery value for New York and New Jersey within the Empire Wind 1 and Empire Wind 2 reported in the DEIS is \$37000 and \$22000 respectively. The FEIS should include an estimate of the Massachusetts for-hire recreational fishery value in the WEAs.	As summarized in Table 3.9-25, the only two states that reported for-hire recreational fishing trips to the Lease Area are New York and New Jersey.
BOEM-2022-0053-0103-0003	The FEIS should include a compensatory mitigation plan for impacts to the fishing industry associated with the Project. The plan should include the updated potential economic exposure of commercial and for-hire recreational fisheries as a result of the Project. It should also address the uncertainties associated with the impacts on commercial fishermen during the construction operation and decommissioning of the Project (e.g. whether impacts to fishermen will be experienced beyond five years after construction) and include and describe financial multipliers necessary to account for “upstream” and “downstream” economic impacts to the fishing industries associated with the Project. Resulting economic exposure values should be broken down by state and by port. These values should be used to inform mitigation measures required by BOEM in conditions included in the Record of Decision.	Empire will develop a Fisheries Mitigation Plan (Appendix V to the COP), which will include a detailed description of the compensatory mitigation plan. The compensation program for lost income for commercial fishers will be consistent with BOEM’s draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment. Also see responses to BOEM-2022-0053-0149-0047 and BOEM-2022-0053-0103-0001 above.
BOEM-2022-0053-0103-0006	In Section 3.9.5 Impacts of the Proposed Action on Commercial Fisheries and For-Hire Recreational Fishing the DEIS states that during construction “Empire would implement measures to avoid minimize and mitigate impacts of anchoring on commercial and for-hire recreational fisheries including continued engagement with fisheries stakeholders to alert local fishing industries to relevant construction activities through the use of in-person communications social media website communications and Local Notices to Mariners.” On average 139 unique commercial fishing vessels from the New Bedford port traversed the Lease Area each year during 2010-2019 and a total	Empire would provide sufficient notice of Project activities to all mariners, including those from Massachusetts. Empire will develop a Fisheries Mitigation Plan (Appendix V to the COP), which will provide detailed communication protocols.

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	<p>of 351 vessels from all ports fished for sea scallops in the Lease Area. CZM's discussions with the New Bedford Port Authority suggest that Massachusetts fishermen in particular sea scallop dredgers fish in and adjacent to the Project area. All Project communications describing the various vessels activities ports of origin and best practices for ensuring safe navigation around construction activities should provide sufficient notice to mariners including those from Massachusetts.</p>	
<p>BOEM-2022-0053-0113-0011</p>	<p>Alternative A the Proposed Action as well as other Alternatives align the turbines with a 0.65 nm spacing. This does not include the 207 foot diameter of scour protection at each base As we have repeatedly stated to BOEM even the 1 nm spacing of the Vineyard Wind project is not enough for our vessels and mobile bottom tending gear to safely operate within the wind farm. Neither can we safely operate over electrical cables or any scour protection and/or cable protection. We have demonstrated to BOEM previously in our Vineyard Wind SEIS comments that even developers with existing projects overseas explicitly warn mobile bottom tending gear that snagging in such cables can cause "serious risk of loss of life". Therefore BOEM cannot expect a different situation here. As such operating in such an array is not an option. We acknowledge that Alternative A does contain open area at the northwestern end of the lease in an attempt by the developer not BOEM to deconflict with the squid fishery that operates in the area. We do appreciate and acknowledge this attempt by the developer to accommodate squid fishing activity within their design parameter while maintaining their desired number of turbines. However as BOEM is well aware since it possesses confidential electronic chart data from over 20 commercial squid vessels that we submitted to the agency before the WEA was identified as leased that the vessel activity in that area begins outside of the lease traverses through the lease and ends outside the lease. It will not be possible to follow bottom contours for effective harvest and maintain these tows. To do so would require operating vessel gear towed in between the 0.65 nm spacing of turbines which spacing is less due to scour protection and over cables on the edges of the lease area risking getting hung up while entering the TSS. Gear is towed well behind the vessel and is likely to hang up on infrastructure that would appear well away from the vessel itself.</p>	<p>BOEM acknowledges that some commercial fishing vessels may choose to avoid the Lease Area during O&amp;M of the Projects. Mitigation for loss of fishing access would be achieved primarily through a fisheries compensation program whose funding would be based on the revenue exposure levels summarized in Table 3.9-31.</p> <p>To mitigate for gear damage or loss resulting from entanglement with Project structures, Empire would implement a gear loss and damage compensation program that would extend through Project operations. Empire would be required to remove or decommission all Project infrastructure and clear the seabed of all obstructions when these facilities reach the end of their 35-year designed service life.</p>
<p>BOEM-2022-0053-0113-0014</p>	<p>[Bold: Fisheries Data:] We request that BOEM cease using multispecies FMP data as a measure of impact to specific fisheries and fisheries stakeholders within that FMP. When an FMP such as the sea scallop fishery has only one species associated with the FMP using FMP revenue or metrics is appropriate</p>	<p>Tables and accompanying text in Section 3.9 have been revised to report commercial fisheries data by species instead of FMP.</p>

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	<p>as it can be attributed to one fishery. For the Mackerel/Squid/Butterfish FMP however the FMP covers two species of squid two species of mackerel and butterfish all of which are associated with different permits (i.e. a vessel may have one squid permit but not another) and different fishing grounds. Therefore using the FMP as a whole will dilute impacts to a particular fishery/permit. We request that BOEM update the DEIS with this information which is necessary to analyzing impacts on the summer longfin squid fishery in particular. We also request that BOEM include fisheries activity/revenue estimates that occur adjacent to the lease in these impacts due to the nature mobile bottom tending gear of activity described above and as depicted in the confidential fisheries data submitted to BOEM prior to the area ID and lease of the NY WEA/Empire Wind lease. For tows that begin outside of the lease area and traverse through the lease area the entire tow will be lost should the project be approved. Therefore all that associated and connected fishing activity must be included in analysis.</p>	<p>The commercial fisheries landings and revenue in the Lease Area are based on percentages of a trip that overlapped spatially with the WEAs. These percentages were applied to landings and values for that trip and summed. This differs from simply using the self-reported vessel trip report/clam logbook locations, as those place all value from that trip at a single point.</p>
<p>BOEM-2022-0053-0113-0015</p>	<p>[<b>Bold: BOEM Conclusions Regarding Cumulative Fisheries Impacts:</b>] While we agree with BOEM that cumulative fisheries impacts will result in “major adverse impact because some commercial fisheries [including the squid fishery] and fishing operations would experience substantial long-term disruptions” from both the proposed project and planned offshore wind activities elsewhere we object to the conflation of the No Action and Cumulative Impacts Alternatives as stated above. We also object to BOEM’s assumption and assertion that this rating of “major” incorporates climate change and fisheries management actions in both the No Action and Cumulative Impacts sections as these water down the impact of BOEM’s direct actions. Climate change has been assessed by the Northeast Fisheries Science Center as positive for the squid resource rather than negative and the squid fishery is a most impacted fishery by the proposed project. [Footnote 20: See Hare et al “A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast US Continental Shelf” A Vulnerability Assessment of Fish and Invertebrates to Climate Change on the Northeast U.S. Continental Shelf   PLOS ONE Feb 2016.] Therefore the impact to the squid fishery will be significant and BOEM cannot blame climate change for the impacts of its own action. This contradicts science. It also cannot blame fisheries management which is outside the scope of its authority for the consequences of its own action.</p>	<p>The impacts analysis is separated into the No Action Alternative and cumulative impacts. The No Action Alternative considers ongoing activities, whereas cumulative impacts consider ongoing activities and planned offshore wind. The EIS concludes that impacts of the No Action Alternative would be moderate to major and that the major impact rating for some fisheries is primarily driven by regulated fishing effort and climate change. Therefore, BOEM’s determination is that fisheries will experience a range of impacts from multiple factors not related to planned offshore wind. The EIS concludes that cumulative impacts would be major, indicating that the added impacts of planned offshore wind would elevate the impact designation from moderate to major for some fisheries. Therefore, BOEM’s conclusion is that planned offshore wind would contribute to adverse effects on fisheries.</p>



Comment No.	Comment	Response
BOEM-2022-0053-0114-0002	<p>FSF has on numerous occasions explained to BOEM the effects of offshore wind development on the local benthic ecosystem including alterations of ocean currents that disrupt scallop larval distribution and settlement scouring of the ocean floor that creates inhospitable conditions for scallops to develop sediment plumes that diminish scallops' nutritional resources the proliferation of non-native species that compete with scallops for resources or that prey on scallops directly and others. When considering the Biden Administration's plans to build out large swaths of the Atlantic Ocean commons with thousands of offshore wind turbines it is inconceivable then that BOEM could acknowledge the scallop fishery's economic value without considering a single alternative that would alleviate the worst of these impacts. We would therefore request that prior to finalization of the EIS BOEM work with the scallop fishery to craft additional alternatives designed to mitigate some of these impacts.</p>	<p>Mitigation for economic impacts resulting from loss of access to the Lease Area would be achieved primarily through a fisheries compensation program whose funding would be based on the revenue exposure levels summarized in Table 3.9-31. As shown in that table, the average annual revenue exposure of the scallop fishery was \$2.1 million, the largest of any FMP fishery by a wide margin. Text has been added to Section 3.9.6 to describe the impacts of Alternative E on the scallop fishery. Alternative E would establish a separation between EW 1 and EW 2 by removing seven WTG positions from the center of the Lease Area, where scallop fishing effort is most intense based on historical revenue intensity data. The removal of these WTG positions would result in reduced impacts on scallop beds.</p>
BOEM-2022-0053-0114-0004	<p>The DEIS's analysis of revenue exposure greatly undervalues shore-side revenue and does not account for lost habitat from a cumulative buildout of proposed offshore wind developments The average annual value of the Atlantic sea scallop fishery is over \$500 million in landed value to scallop vessels. However the overall value of this resource to the regional economy is several times larger than landed value when factoring in revenue for shore-side entities including ports processors and restaurants among others. Indeed the commercial scallop fishery serves as the backbone for most major New England and Mid-Atlantic coastal fishing communities. In the case of Empire Wind the majority of scallops derived from this WEA are landed at the Port of New Bedford. Therefore not only does offshore wind development in certain locations of the EW 1 and EW 2 lease areas pose a direct threat to the scallop fishery but these losses will also reverberate through coastal communities' economies (as acknowledged in part at DEIS 3.9-20 Tables 3.9-17 and 3.9-18). In the DEIS BOEM provides a revenue exposure analysis to "estimate the amount of commercial fishing revenue that would be foregone if fishing vessel operators choose to no longer fish in offshore wind lease areas and cannot capture that revenue in different locations." DEIS at p. 3.9-44. This revenue</p>	<p>BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>

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	<p>exposure analysis appears to be based on BOEM’s draft Fisheries Mitigation and Compensation Guidelines. While we appreciate the DEIS’s recognition of fisheries compensation its revenue exposure analysis fails to capture or even consider the true multiplier effect of these landings on shoreside entities. Indeed value-related shoreside fishery multipliers are generally multiples of landed value not the small fractions thereof as set forth in BOEM’s Draft Mitigation and Compensation Guidelines.</p>	
<p>BOEM-2022-0053-0114-0006</p>	<p>Additionally BOEM surmises that “[c]onsidering the low revenue risk across ports together with the small number of vessels and fishing activity that would be affected by the Projects the impacts on other fishing industry sectors including seafood processors and distributors and shoreside support services would be long term and [Underlined: minimal to considerable] depending on the fishery in question.” DEIS at 3.9-66 (emphasis added). BOEM cannot credibly reach such a conclusion especially given the known cumulative impacts from developing all existing and future WEAs on the East Coast. For instance the New York Bight lease areas which lie near and even directly adjacent to the Empire Wind WEA also conflict with highly valuable scallop resources. The buildout of these WEAs over the ensuing years will prohibit access to the underlying scallop resource (due to the inability of scallop dredges to navigate among and between offshore wind turbines). Further as BOEM has acknowledged “[t]he presence of the WTG foundations and associated scour protection as well as cable protection would convert existing sand or sand with mobile gravel habitat to hard bottom which in turn would reduce habitat for target species that prefer soft-bottom habitat (e.g. surfclams [Bold Underlined: sea scallops] squid summer flounder).” DEIS at 3.9-45 (emphasis added). This cumulative effect in terms of both lost fishing opportunity and lost scallop habitat should factor more heavily into the revenue exposure analysis.</p>	<p>The impact designation that this comment references was on page 3.9-66 of the Draft EIS and pertains to the impacts of the Proposed Action on shoreside support services. Given that a quantitative analysis of impacts on shoreside support services has not been conducted for the Proposed Action, this statement has been removed in the Final EIS. As provided in Section 3.9.5.3, BOEM expects that the Proposed Action will have moderate to major impacts on commercial fisheries, depending on the fishery and fishing vessel. This impact designation includes impacts on shoreside support services.</p>
<p>BOEM-2022-0053-0114-0007</p>	<p>The DEIS’s use of annual average revenue does not accurately reflect the episodic nature of the scallop fishery. The DEIS avers that the average annual landings value for scallops in the EW 1 and EW 2 lease areas were \$445485 and \$1642992 respectively between 2010 and 2019. DEIS at 3.9-12 Table 3.9-9. However using averages to value the scallop fishery within EW 1 and EW 2 does not take into account the episodic nature of the scallop settlement and recruitment. For instance according to NMFS in 2011 scallop revenue from within the Empire Wind footprint was over \$7 million. <a href="https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-">https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-</a></p>	<p>Commercial fisheries effort, landings, and revenue in the Lease Area are summarized by year in Tables I-26 through I-70 of Appendix I (<i>Supplemental Information</i>). Average values are presented in Section 3.9 in order to limit the volume of information included in the main text.</p>

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	<p>offshore-wind- development?utm_medium=email&amp;utm_source=govdelivery (last visited January 17 2023).</p>	
<p>BOEM-2022-0053-0116-0005</p>	<p>BOEM is making a finding that not constructing the Project consisting of 174 wind turbines will have the same impact on commercial fishing as constructing the Project. The reason given for this assertion is that previously approved BOEM projects NOAA as the regulator and climate change will do to the fishermen what this Project will do. This is a flawed analysis and should be revisited. Indeed this statement is an admission that the already approved activities will contribute to major adverse impacts to the commercial fishing industry and to suggest that additional projects would not to and exacerbate these impacts seems implausible.</p>	<p>The EIS analyzes the impacts of the Proposed Action separately from other activities so that the effects on commercial and recreational fisheries can be isolated. In Section 3.9.5.3, BOEM concludes that the impacts resulting from the Proposed Action alone would be moderate to major for commercial fisheries, depending on the fishery and fishing vessel. Therefore, BOEM's conclusion is that the Proposed Action would have adverse effects on commercial fisheries.</p>
<p>BOEM-2022-0053-0116-0008</p>	<p>We strongly encourage BOEM to take advantage of its authority to actively monitor a project and require the developer to demonstrate that they are not having additional negative impact throughout the life of the project. There must be some follow-up to make sure that the developer's assertions and BOEM assumptions that are based on them were indeed accurate. We feel that BOEM must require that a developer confirm the impact of the development at some point after the lease area has been fully operational such as 5 years after construction was commenced. We also feel strongly that it should not be the fishermen or government agencies/institutions who pay for any studies or surveys to assess the actual impact of the development. The proponent of a project who made certain assertions to obtain the permit must be the one to conduct whatever research is necessary to prove their assertions to be correct. The costs associated with the verification of the proponent's statements will not be burdensome particularly given the importance to addressing the externalities and impacts generated by the Project.</p>	<p>BOEM's Guidelines for Mitigating Impacts to Commercial and Recreational Fisheries recommend that lessees work with state and federal fisheries management agencies to explore the need and methods to monitor changes in fishing activity as a result of proposed offshore wind energy development. In 2021, the Responsible Offshore Science Alliance (<a href="https://www.rosascience.org">rosascience.org</a>) worked with state, federal, and fisheries constituents to develop the Offshore Wind Monitoring Framework and Guidelines document (<a href="https://www.rosascience.org/files/ugd/99421e_b8932042e6e140ee84c5f8531c2530ab.pdf">https://www.rosascience.org/files/ugd/99421e_b8932042e6e140ee84c5f8531c2530ab.pdf</a>). This document is an important resource in understanding necessary considerations in developing pre-construction, construction, and post-construction fisheries monitoring surveys.</p>
<p>BOEM-2022-0053-0130-0002</p>	<p>Equinor has made significant modifications to its project layout through unprecedented direct and transparent collaboration with fishermen. This resulted in proposed alternatives for a greater "open area" in a portion of the lease area that may maintain some mobile gear fishing access which would not have been possible in the "even grid" spacing originally proposed.</p>	<p>Comment noted. Impacts of the proposed Projects on commercial and for-hire recreational fishing are assessed in Section 3.9 of the Final EIS.</p>

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	<p>[Footnote 2: Alternatives B E and F include an “open area” as determined by layout discussions with Equinor.] Additional recommendations based on these layout discussions identified a 1-nm setback between Empire Wind 1 (EW 1) and Empire Wind 2 (EW 2) Alternative E in the DEIS to improve access for fishing and navigational transit. It is important to note that although this layout reduces impacts to fishing by preserving a small portion of access to fishable area major impacts from planned development of the EW 1 and 2 projects and in NY Bight overall will remain. Mobile gear access to most of the EW 1 project area and likely all of the EW 2 area will be impossible due to site conditions and anticipated project plans.</p>	
<p>BOEM-2022-0053-0130-0024</p>	<p>BOEM does provide a Comparison of Alternatives for Commercial Fisheries (DEIS p. 3.9-74) which provides some qualitative information about the differences between the various alternatives. But the information provided is not detailed and does not describe what fisheries would be more or less impacted. Instead BOEM should clearly present the different impacts of the alternatives and how they compare against each other.</p>	<p>The discussion of the alternatives has been expanded to highlight the key fisheries that would be affected by each alternative and to discuss any IPFs that would be measurably different among alternatives.</p>
<p>BOEM-2022-0053-0130-0030</p>	<p>Commercial Fishing Analysis Sustainable American fisheries rely on monitoring and data collection activities tailored toward answering key fisheries management questions under the “best available science” mandate of the Magnuson-Stevens Act. This means available data is typically not well-suited to inform fine-scale OSW planning or test hypotheses related to its environmental impacts. This is particularly true when considering available socioeconomic data for fisheries and OSW. Concern remains about the datasets utilized in the COP to reflect commercial fishing activity in and around the Project Area. Section 7 of the COP’s Navigation Safety Risk Assessment Appendix[Footnote 15: See Construction and Operations Plan Appendix DD page 67 (dated July 2021)] (NSRA Appendix) overly relies on outdated AIS information from one 12 month time frame four-and-a-half years ago (August 2017 - July 2018). This should have been updated to include April of 2016 through the publication of the COP. It bears noting that under applicable USCG regulations not all commercial fishing vessels are required to possess and utilize AIS. As a result the statement in Section 7.2.4.5 of the NSRA Appendix “[f]ishing vessels accounted for approximately 8% of AIS traffic throughout the survey period” likely significantly underestimates the actual amount of commercial fishing traffic in the survey area.” VMS datasets were also used to determine fishing activity within the Project Area. (NSRA Appendix Section 7.2.7) As with the use of AIS data it is concerning that only 2015-16 was incorporated into the analysis for the same reasons outlined</p>	<p>The following text has been added to the description of the vessel orientation plots in Section 3.9 to address this:  “While vessels moving at lower speeds are generally actively fishing, transiting vessels may move at lower speeds during inclement weather conditions or when protected species are present. Consequently, these polar histograms may overestimate the number of actively fishing vessels.”</p>

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	<p>above. The VMS data provided does show low to high areas of fishing activity. Again not every vessel which operates in the area will be represented as not all fisheries require VMS. Concerns also exist regarding assumptions made in analyzing these datasets. In this DEIS as with others BOEM assumes that “a lower speed may indicate active fishing (rather than transit)”; but this fails to account for lower speeds which may be indicative of inclement weather conditions or prevalence of protected species (for example the North Atlantic Right Whale).</p>	
<p>BOEM-2022-0053-0130-0031</p>	<p>The NSRA Appendix provides visual observations from the survey vessel Ocean Researcher which recorded visual observation data of non-AIS targets within the vicinity of the Lease Area between June 8th and June 27th. (Section 7.2.8) Given the limited timeframe upon which visual observation data was collected the results are of limited value. Anecdotal information from on the water operators have stated that when a survey vessel is operating in an area the behavior of important commercial and recreational fish stock is altered. Some fish stocks will move out of the area to avoid the noise; while others act more erratically and are less likely to be catchable. BOEM must be consistent in the datasets and time periods used to present information in the DEIS. The data used to quantify revenue and percentage of revenue harvest from the EW 1 and 2 areas spanned from 2006 to 2019 but mean annual revenue demonstrated by the maps (DEIS page 3.9-51 to 60) show data only until 2012. The DEIS provides no information for why only partial datasets are shown even if a larger dataset was used in analyses.</p>	<p>The tabular data used to quantify revenue and percentage of revenue from the EW 1 and EW 2 and the geographic information systems data used to generate the heat maps of fishing revenue intensity are from different sources. The tabular data were obtained from an NMFS data request. The geographic information systems data were taken from a 2017 BOEM analysis of socioeconomic impacts of offshore wind. The geographic information systems data are the most recent available spatial data on revenue intensity and were included to provide a complement to the more recent tabular data.</p>
<p>BOEM-2022-0053-0130-0032</p>	<p>“On average commercial fishing activity in New England and the Mid-Atlantic generated approximately \$1.2 billion in annual ex-vessel revenue from 2010 through 2019.” (DEIS page 3.9-3) While this shows the economic benefits to the fishing vessels it does not account for any downstream economic activity. Failing to identify quantify and assess these downstream impacts is a flaw in the DEIS analysis. In addition to analyzing economic impacts the DEIS fails to undertake an analysis of the impacts to jobs in the commercial fishing/seafood industry. (See section D below) In 2018 the Mid-Atlantic seafood industry supported 136813 jobs while the New England seafood industry supported 211359 jobs. [Footnote 16: See National Marine Fisheries Service. 2022. Fisheries Economics of the United States 2019. U.S. Dept. of Commerce NOAA Tech. Memo. NMFS-F/SPO-229A 236 p. Mid-Atlantic includes the states of Delaware Maryland New Jersey New York and Virginia. New England includes the states of Connecticut Maine Massachusetts New Hampshire and Rhode Island.] The commercial fishing revenue information</p>	<p>BOEM is proposing a mitigation measure that would require Empire to conduct an analysis of impacts on shoreside seafood businesses and to develop a plan to compensate for losses to shoreside businesses. Please refer to Appendix H, Table H-1 for this BOEM-proposed measure.</p>

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	<p>provided needs to be put in context. There are many small businesses reliant upon access to fishing grounds within the lease areas and have developed business plans and made investments over the years with the expectation of utilizing those grounds. For example according to Table 3.9.9 the average annual revenues generated by the Summer Flounder/Scup/Black Sea Bass fishery within the lease areas was \$36197. These revenues are likely indispensable to the small businesses prosecuting that fishery.</p>	
<p>BOEM-2022-0053-0130-0033</p>	<p>Impacts to Small Businesses The DEIS fails to address the impacts that the Empire Wind project will have on small businesses which will include the vast majoring of fishing companies and supporting businesses. Negligible to minor adverse cumulative impacts are anticipated but the DEIS maintains that the fishing industry is expected to be able to adapt its fishing practices over time (DEIS Appendix G page 3.11-13). Fishermen and the fishing industry have reiterated time and time again that it is not easy for adaptation to occur because serious economic investments and management restrictions can make it prohibitive. The impacts to fishing and processing jobs must not be diminished in the DEIS. As recommended by the U.S. Small Business Administration for Fisheries Mitigation Guidance BOEM must conduct a Regulatory Flexibility Act (RFA) analysis of its proposals including this DEIS to adequately understand the impacts of offshore wind development activities on small businesses. [Footnote 17: See <a href="https://www.regulations.gov/comment/BOEM-2022-0033-0055">https://www.regulations.gov/comment/BOEM-2022-0033-0055</a>] Improved data and analyses of impacts to commercial fishing businesses port operators marine equipment retailers onshore processors fish markets and other fishing industry representatives should inform mitigation strategies.</p>	<p>An analysis of impacts on small businesses has been added to Section 3.9.</p>
<p>BOEM-2022-0053-0130-0037</p>	<p>Impacts to Fisheries Surveys Fisheries management relies on fishery dependent and independent data collection to understand and track populations over time and to set sustainable quotas. Disruptions to survey methodology and data collection without adequate time and analyses for adjustment will be detrimental to our understanding of fish stocks and ultimately may lead to reduced quotas for the fishing industry. RODA acknowledges that BOEM and NMFS have recently published the final federal survey mitigation strategy but is concerned that the active surveys that overlap with Empire Wind will be negatively impacted by this project should adapted survey methods not be implemented immediately. A finding of major impacts to scientific research and surveys (DEIS page 3.17-19) cannot be downplayed and the proposed mitigation measures do not provide reassurance that our future understanding of the biological resources will not be gravely hindered.</p>	<p>A paragraph has been added to both Sections 3.9.3 and 3.9.5 to describe how impacts on fisheries independent surveys may cause reductions in catch and revenue.</p>



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	Any reduction of or impact to fisheries surveys will likely result in increased uncertainty for stock assessments leading to changes to fisheries management and reduction in allowable catch. BOEM and NMFS must immediately work to implement strategic plans as soon as possible to minimize any 'lost time' between existing surveys and future adapted surveys.	
BOEM-2022-0053-0140-0017	-[Bold: Natural Capital:] [Footnote 57: "Natural Capital" is defined by the NJ Department of Environmental Protection as "the economic value of goods and services provided by various naturally-occurring assets over an extended period a period that for some assets is essentially perpetual on any meaningful human time scale."] According to the New Jersey Department of Environmental Protection the ecological goods and services provided by the state's marine ecosystems equate to \$5.3 billion/year for estuaries and tidal bays and \$389 million/year for other coastal waters [in 2004\$] including the coastal shelf out to the three-mile limit. New Jersey beaches provide the highest value per acre of any other habitat by far with an ecoservices value of \$330 million/yr. [Footnote 58: Valuing New Jersey's Natural Capital: An assessment of the economic value of the state's natural resources. April 2007 State of New Jersey New Jersey Department of Environmental Protection <a href="http://www.state.nj.us/dep/dsr/naturalcap/">http://www.state.nj.us/dep/dsr/naturalcap/</a> ] New Jersey did not include the economic value of the fish and shellfish present in these ecosystems nor the important and valuable resources of the OCS such as the reef and canyon systems in their analysis. Similar values can be expected for both the northern and southern shores of Long Island but actual dollar values are not readily available as New York has not conducted a formal analysis of the ecosystem services of their natural resources. However all these revenues rely directly on a healthy marine environment and would appear to be highly incompatible with the industrialization of the NY/NJ Bight. The DEIS does not adequately address the impacts and measures to avoid reduce or mitigate harm to these important clean ocean activities to ensure they are sustained.	Commercial and for-hire recreational fisheries represent one of many components of the ecological goods and services provided by marine ecosystems in New Jersey and New York. The impacts of the Proposed Action on commercial and for-hire recreational fishing and the proposed measures to mitigate those impacts are thoroughly described in Section 3.9. Comments regarding impacts on other components of ecological goods and services should be targeted to the relevant sections of the EIS.
<b>Mitigation for Commercial Fishing</b>		
BOEM-2022-0053-0113-0021	(1) The Compensation for lost fishing income (#15 p. H-23) is described as "The lessee shall implement a compensation program for lost income for commercial and recreational fishermen and other eligible fishing interests for construction and operations consistent with BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 or as modified in response to public comment" with BOEM and BSEE as the enforcement agencies. This is problematic for several reasons.	Additional detail on the proposed fisheries mitigation to compensate fishermen for lost income due to displacement from fishing grounds and shoreside businesses for losses indirectly related to the Projects has been added to the Final EIS. See BOEM-proposed mitigation and monitoring measure for commercial and recreational

Comment No.	Comment	Response
	<p>(a) First the compensation plan does not exist and the DEIS contains no details so we cannot comment on it or assess its adequacy. Please release a Supplemental EIS containing a full description of the plan funding levels and mechanisms how it is to be administered and the application process.</p> <p>(b) Secondly BOEM has not yet completed its Draft Guidance for Fisheries Compensation nor responded to extensive fishing industry comments on this Draft. The public still does not know what the Final Guidance will look like whether it incorporates and addresses our concerns or even if this or the state’s current RFI for fisheries compensation is outside of their legal authorities. Seafreeze documented significant concerns with the BOEM Draft which can be found here: <a href="https://www.regulations.gov/comment/BOEM-2022-0033-0088">https://www.regulations.gov/comment/BOEM-2022-0033-0088</a> and here <a href="https://www.regulations.gov/comment/BOEM-2022-0033-0090">https://www.regulations.gov/comment/BOEM-2022-0033-0090</a>. As impacts to shoreside businesses and valuation estimates for both shoreside businesses and fisheries themselves were incorrectly estimated and derived in the Draft we have serious concerns that this will be the case in the Final document. However either way we currently do not know the status of that document and cannot effectively comment on this DEIS mitigation measure per NEPA. This is concerning particularly considering that the DEIS itself estimates impacts to fisheries to be “major”: “BOEM expects that the impacts resulting from the Proposed Action would be moderate to major for commercial fisheries...” [Footnote 29: DEIS p. 3.9-60.] Therefore without detailed information of the proposed compensation plan and related as of now non-existent and non-enforceable fisheries compensation guidance we are precluded from providing input on this measure yet are being faced with major impacts as a result of the Empire Wind project. We request that a detailed compensation plan as well as detailed Final Guidance document be provided to stakeholders for public comment prior to development of a Final EIS for the Empire Wind project.</p> <p>(c) Thirdly BOEM has repeatedly stated that it cannot require compensation and as such all compensation is “voluntary” at the discretion of developers. It is unclear then how BOEM can claim to be an “enforcement” agency of a proposed compensation plan when it repeatedly has stated it does not have the legal authority to require compensation. If it does not have the legal authority to require compensation it cannot have the authority to enforce such compensation. Please explain.</p>	<p>fisheries (measure #1) in Appendix H, Table H-1.</p> <p>Conditions related to fisheries compensation for commercial and for-hire recreational fisheries will be included in the ROD for the Projects and will be consistent with <i>BOEM’s Guidelines for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR Part 585</i>. As a condition of Project approval, Empire will be required to comply with the provisions contained in this guidance, including the development and implementation of a fisheries compensation plan.</p>
BOEM-2022-0053-0116-0001	The draft guidance failed to propose any definitive requirements as to the calculation of losses or even how to properly address shoreside losses. We remain concerned with the overall lack of clarity and enforceability in the	BOEM is proposing a mitigation measure that would require Empire to compensate commercial and for-hire recreational

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	<p>language presented in the draft document. Throughout the document equivocal words such as "may be required" "reasonable efforts" "if needed" "when feasible" "recommend" and "should consider" are used. BOEM must make every effort to make certain that there is a uniform approach to fisheries mitigation through all lease areas and developers.</p>	<p>fishermen for loss of income due to unrecovered economic activity resulting from displacement from fishing grounds and for loss of income in shoreside businesses for losses indirectly related to the Projects. This measure would require Empire to conduct an analysis of impacts on shoreside businesses. This BOEM-proposed measure has been added to Final EIS Section 3.9.11 and Appendix H, Table H-1.</p>
<p>BOEM-2022-0053-0116-0002</p>	<p>The first is that 5 years post construction will be sufficient for compensating fishermen for revenue lost as a result of the construction of the Project. There is no way such a time frame is sufficient to help the fishermen recover from any impact of the project on their livelihood. Also if it is left to the developer to decide how long the compensation period must go they will always default to the shorter period. BOEM must make the period mandatory and much longer.</p>	<p>The draft guidance establishes a minimum standard of compensation for 5 years post-construction. The actual duration of compensation will be provided in the Fisheries Mitigation Plan and will be based on Project-specific details.</p>
<p>BOEM-2022-0053-0116-0003</p>	<p>The second flawed assumption is that somehow the fishermen can just "adjust somewhat" and that their losses associated with losing the ability to fish in large areas of the ocean where fishermen have fished for in some cases hundreds of years will be mitigated. There is a reason fisherman have fished for the same species in the same locations for years. The introduction of hundreds of wind turbines and new ecosystems in those areas cannot be addressed by a direction to the fishermen that they "adjust somewhat". The fishermen are an existing user of the OCS. Statutorily BOEM must address the impact of the new use on them. "Adjust somewhat" is a direction to the fishermen not the developer. The burden for mitigating the impact of offshore wind on the commercial fishing industry must rest with BOEM and the developers.</p>	<p>BOEM assumes that the Proposed Action will result in loss of access to the Lease Area for some fishing vessels and fisheries. As described above, BOEM is proposing a mitigation measure that would require Empire to implement a fisheries compensation program that would mitigate for this loss of revenue. This requirement places the burden for mitigating impacts on the developer.</p>
<p>BOEM-2022-0053-0130-0034</p>	<p>Proposed Fisheries Mitigation Measures Compensation for Gear Loss and Damage: Compensation for gear loss or damage as a result of interactions with the Project should be assured. Language should be added which allows fishery participants to be compensated for all gear loss and damage resulting from interactions with infrastructure supporting an OSW facility. Exceptions would exist for interactions which are intentional or the result of gross negligence on the part of the vessel operator. There are a number of things outside of the operator's control which could result in interactions with infrastructure and facilities supporting OSW. [Footnote 18: Mechanical failures</p>	<p>BOEM is proposing a mitigation measure that would require Empire to implement a gear loss and damage compensation program. This BOEM-proposed measure has been added to Final EIS Section 3.9.11 and Appendix H, Table H-1.</p>

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	abrupt and unforeseeable changes in wind or current etc could all result in interactions with facilities supporting an offshore wind array. Interactions which would not have occurred but for the presence of the array should be fully compensable to such fishermen.]	
BOEM-2022-0053-0130-0035	Compensation for Lost Fishing Income: BOEM's draft guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf was woefully inadequate in its approach to fisheries compensation. RODA submitted detailed comments outlining those inadequacies and we incorporate those comments by reference. [Footnote 19: See <a href="https://www.regulations.gov/comment/BOEM-2022-0033-0083">https://www.regulations.gov/comment/BOEM-2022-0033-0083</a> ]	Additional detail on the proposed fisheries mitigation to compensate fishermen for lost income due to displacement from fishing grounds and shoreside businesses for losses indirectly related to the Projects has been added to the Final EIS as a BOEM-proposed mitigation and monitoring measure for commercial and recreational fisheries (measure #1) in Appendix H, Table H-1.
BOEM-2022-0053-0130-0036	Mobile Gear-Friendly Cable Protection Measures: In developing such protection measures Equinor needs to engage with fishery participants in an effort to understand their needs. In particular bottom tending gear such as surfclam and scallop dredges bottom-trawl and others should be consulted to mitigate impacts to fleets utilizing that gear type. This may result in preferred orientation of subsea cables and cable protection or other recommendations from operators in the region should they choose to continue fishing in the Empire Wind area.	BOEM is proposing a mitigation measure that would require cable protection measures to reflect the pre-existing conditions at the site. This mitigation measure would ensure that seafloor cable protection does not introduce new hangs for mobile fishing gear. This BOEM-proposed measure has been added to Final EIS Section 3.9.11 and Appendix H, Table H-1.
BOEM-2022-0053-0142-0011	Empire Wind should pursue opportunities to support healthy fisheries in and around the project site for the long term including but not limited to carefully designed reef-enhancement at turbine foundations and a decommissioning plan that considers preservation of the reefs expected to form at foundations over the project's lifespan.	BOEM does not require lessees to design and install reef enhancements, although the EIS notes the beneficial artificial reef effects that would result from the introduction of offshore structures.

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**P.6.9 Cultural Resources**

**Table P.6.9-1 Responses to Comments on Cultural Resources**

Comment No.	Comment	Response
BOEM-2022-0053-0002-0001	It will disrupt the area of the wreck of the sailing ship "Mexico" which sunk off the coast of Lodo Beach 1/2/1837. This wreck is known as the Irish Burial Ground since hundreds of Irish immigrants were killed. Some bodies were recovered on the beach then known as Hempstead Beach in the Town of Hempstead.	<p>As part of COP preparation, Empire prepared Appendix X, <i>Marine Archaeological Resources Assessment</i>, detailing the results of cultural resource investigations to identify and assess impacts on marine archaeological resources, such as shipwrecks, within the geographic analysis area. The Marine Archaeological Resources Assessment identified 52 potential historic properties: 30 marine archaeological resources and 22 ancient submerged landform features. Previous maritime investigations associated with the USACE Storm Damage Reduction Project were reviewed as part of research conducted for the Marine Archaeological Resources Assessment. That prior study considered the <i>Mexico</i> (COP Appendix X, page 53). However, the <i>Mexico</i> is not among the reported shipwrecks within 1.0 mile of the Projects (COP Appendix X, Table 8). As such, it is not among the shipwrecks identified as adversely effect by the Projects.</p> <p>A summary of these findings can be found in Appendix N of the Final EIS. BOEM has reviewed the final Marine Archaeological Resources Assessment and determined the data sufficient for identifying historic properties within the marine APE and within the connected action portion of the APE for this undertaking.</p>
BOEM-2022-0053-0117-0032	Further regarding outreach the DEIS states that BOEM is consulting with several federally recognized tribes including the Delaware Tribe of Indians The Delaware Nation The Shinnecock Indian Nation and Wampanoag Tribe of Gay Head (Aquinnah) and has invited a number of state- recognized tribes to be consulting parties on the proposed Projects including the Lenape Indian Tribe of Delaware Nanticoke Indian Tribe Nanticoke Lenni-Lenape Tribal Nation Powhatan Renape Nation Ramapough Lenape Indian Nation and Ramapough Mountain Indians. However the DEIS also notes that New York has eight federally recognized tribes in	Information has been added to Appendix N regarding tribal consultation. BOEM initiated good-faith tribal consultation on April 29, 2021, with nine federally-recognized tribes and six non-federally recognized tribes. Of those contacted, four federally recognized tribes became consulting parties: the Delaware Tribe of Indians, The Delaware Nation, The Shinnecock Indian Nation, and the Wampanoag Tribe of Gay Head (Aquinnah). A table of entities invited to be consulting parties can be found in Attachment 2 to Attachment N-1



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	<p>addition to one federally non- recognized tribe who were not invited implying that these tribes were not invited due to their geographic location outside of the analysis area. The DEIS also notes tribes in Texas that could be affected by a port location in Corpus Christi TX including three federally recognized tribes several state-recognized tribes and one tribe that is neither state nor federally recognized. While the National Historic Preservation Act does not require it BOEM should consult all state recognized tribes who may have resources that could potentially be affected by the Project to help ensure the advancement of the environmental justice goals set by the Biden-Harris Administration. Consultation with the Karankawa tribe in Texas may be particularly important given potential environmental justice concerns in that area.</p>	<p>(<i>Memorandum of Agreement</i>) in Appendix N, including invited tribes. A table of consulting parties can also be found in Attachment 2 to Attachment N-1, including consulting tribes.</p> <p>The eight federally recognized tribes and one non-federally recognized tribe in New York were not invited to consult because the geographic analysis area is not within the area documented as being traditionally inhabited by those tribes.</p>
<p>BOEM-2022-0053-0145-0001</p>	<p>The DEIS does not provide adequate visual simulations. The visual simulations provided to consulting parties are insufficient incomplete and not prepared in a way to reasonably assist consulting parties with understanding adverse effects to historic properties. They fail to show the actual impact of the WTGs from sufficient observation points; thus BOEM must revise them to assess adverse impacts to all historic properties.</p>	<p>COP Appendix AA.5.1.3 states, “approximately 1/3 of KOPs, primarily those representing locations with high viewer sensitivity and high potential for impacts to existing visual resources, were selected for development of simulations to demonstrate how the constructed Project will appear to future viewers” (COP Appendix AA:AA-67). One simulation was prepared for each selected KOP in the visual offshore study area and depicted proposed representative WTGs. Nighttime simulations were prepared for Jones Beach State Park (New York) and Ocean Grove (New Jersey). All simulations depict weather conditions at the time photograph was completed; as indicated for each simulation, weather conditions ranged from partly cloudy to clear to overcast. Empire prepared simulations of the WTGs with the sun at various angles throughout the day to help identify where turbines were most noticeable. Time-lapse videos were also prepared for Jones Beach State Park and Ocean Grove (see <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan">https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan</a>). These show the frequency and intensity of the proposed FAA lighting during nighttime hours. Visual simulations were made available to Section 106 consulting parties to support</p>

Comment No.	Comment	Response
		<p>their availability to provide input on impacts on historic properties when BOEM distributed COP Appendix Z (<i>Analysis of Visual Effects to Historic Properties</i>) and the Cumulative Historic Resources Visual Effects Analysis. Visual simulations were made available to the public in the VIA in COP Appendix AA.</p>
<p>BOEM-2022-0053-0145-0002</p>	<p>In addition revisions are needed so that BOEM can resolve adverse effects through avoidance minimization or mitigation measures. As the responsible agency BOEM must provide consulting parties and the public with adequate and easily accessible information that informs all parties of potential impacts. However the DEIS does not include sufficient visual simulations showing the adverse impacts of the Project within the Project Area during and after construction.</p>	<p>As noted in response to comment BOEM-2022-0053-0145-0001, BOEM has made available to the public the VIA as COP Appendix AA with visual simulations, and the assessment of visual effects on historic properties to consulting parties. BOEM has determined the studies and reports are sufficient for assessing effects on historic properties within the visual APE. A summary of these findings can be found in Appendix N. BOEM finds that the simulations and assessment of visual effects is sufficient to consult on the undertaking and represents a good-faith effort to identify historic properties within the visual APE potentially affected by the undertaking.</p> <p>BOEM has detailed proposed avoidance, minimization, and mitigation measures in the draft Memorandum of Agreement, which was made available to consulting parties as an attachment to Draft EIS Appendix N on November 18, 2022, and distributed for download on January 3, 2023. BOEM has engaged in subsequent consultation meetings to request input on resolution of adverse effects from consulting parties including Consultation Meeting #3 and Consultation Meeting #4.</p>
<p>BOEM-2022-0053-0145-0003</p>	<p>Furthermore the visual simulations are far too limited in scope. There are no simulations depicting the construction impacts for example and all simulations are from a single viewpoint at ground level.</p>	<p>As noted in response to comment BOEM-2022-0053-0145-0001, BOEM has reviewed the VIA with visual simulations and the assessment of visual effects on historic properties, and determined the studies and reports are sufficient for assessing effects on historic properties within the visual APE.</p> <p>Construction impacts have not been simulated for wind energy projects because they are classified as temporary effects. COP Appendix AA.5.2 states that, “navigation lights associated with large vessels (i.e., barges and jack-up vessels) and lights necessary to perform construction</p>

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		<p>activities may be visible from coastal vantage points. However, visual effects resulting from nighttime construction activities will be limited to select locations within the Lease Area” (COP Appendix AA:AA-70). While all simulations are from a single viewpoint at ground level, there are simulations from elevated vantage points as well. The simulations consist of a panoramic photograph with a focused view of the simulated Projects and two time-lapse videos, from Jones Beach State Park, New York and Ocean Grove Beach, New Jersey, respectively.</p>
<p>BOEM-2022-0053-0145-0004</p>	<p>Additional simulations representing each season with strict adherence to best practice guidelines and methodology as identified by BOEM’s Compendium Report for the New York Call Area and that show worst case scenarios are necessary.</p>	<p>The Compendium Report for the New York Call Area is not a guideline or methodology document. As stated in the summary, this was a visibility study “conducted for a hypothetical wind energy project...located on the OCS offshore New York” that attempted to demonstrate potential visibility of this hypothetical project through meteorological assessments, viewshed modeling, and accurate and realistic visual simulations from offshore Long Island. However, the report does note the viewshed simulations and study were prepared to “characterize the potential offshore visibility of offshore wind turbines from locations along coasts of New York and New Jersey under different seasons, times of day, and weather conditions.”</p> <p>COP Appendix AA acknowledges that it was developed prior to BOEM’s development of the “Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States” guidelines (2021) (COP Appendix AA:AA-26). Instead, the consultants utilized “certain elements” of the Bureau of Land Management Visual Resource Management system (COP Appendix AA:AA-26).</p> <p>BOEM reiterates that the visualizations prepared for the Project COP Appendix AA, COP Appendix Z, and Cumulative Historic Resources Visual Effects Analysis documentation present a broad range of lighting and</p>

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		<p>atmospheric conditions appropriate to assess the potential visual effects on historic properties in the APE. BOEM finds the documentation acceptable and sufficient to enable any reviewing parties to understand the basis of BOEM's determination and findings on the undertaking under NHPA Section 106 (per 36 CFR 800.11(a)).</p> <p>It is neither feasible nor required to simulate all potential viewing conditions for BOEM to determine whether individual historic properties would be adversely affected and to accurately characterize the nature of any such adverse effects. The visualizations presented in the COP Appendices AA and Z were created methodically to accurately characterize views of the Projects from representative viewpoints throughout the APE. Consistent with BOEM's guidance and extensive analyses of visual effects conducted over the previous decade on offshore wind facilities, COP Appendices AA and Z contain sufficient field photography and visualizations to accurately depict how the Projects would appear from vantages throughout the APE. The Project visualizations have been prepared by qualified consultants and reviewed by BOEM's visual and Section 106 subject matter experts to best support robust and accurate characterization of Project visibility. BOEM is uniquely experienced in preparing and evaluating visual studies for offshore wind facilities and has consistently moved to incorporate best practices from ongoing research. BOEM's guidance and requirements are applied sufficiently for the Projects.</p>
BOEM-2022-0053-0145-0005	<p>Observation points should include different heights to and from all historic districts including Point O'Woods and should also include multiple assessments for the National Register-eligible Robert Moses State Park and National Register-listed Fire Island Lighthouse and Historic District. In addition observation points should include the Fire Island National Seashore which has provided countless people with a place for solitude access to nature and an uninterrupted seascape for centuries. Empire Wind will irreparably alter this setting.</p>	<p>Figure AA-21 in the VIA maps the KOPs in the visual offshore study area and the type of simulation produced. The Sunken Forest KOP was determined to be representative of the view from Point O'Woods.</p> <p>While the simulations were produced from ground level, the Fire Island Lighthouse KOP is from 160 feet in elevation (ground level plus tripod height), Norman J. Levy Park and Preserve is from 105 feet (ground level plus tripod), and Hartshorne Woods Park is from 165 feet</p>

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		<p>(ground level plus tripod). Therefore, the KOPs do represent elevated views.</p> <p>The SLVIA in Volume 2 of the Draft EIS includes cumulative effects daytime simulations from Fire Island Light, Jones Beach, and Point Pleasant (northeast and southeast views).</p>
BOEM-2022-0053-0145-0006	<p>Overall the visual simulations provide a “best case” representation only of the Project’s visual impacts and BOEM does not provide enough information for the Association or other consulting parties to evaluate less favorable scenarios. To ensure it adheres to its obligation to provide complete and adequate information in addition to the above changes BOEM should abide by the following best practices in when developing revised visual simulations: · Standards and methodology as identified in the “Renewable Energy Viewshed Analysis and Visualization Simulation for the New York Outer Continental Shelf Call Area: Compendium Report”; · Panoramic Photomontages such as Trueview Simulations; · Single Frame simulations per season and during specific times of local concern (e.g. sunset) from nondeceptive angles or perspectives (e.g. ground level vs. elevated portions of lighthouses or lifesaving stations). The public should be able to easily compare the visual simulations from different developers “apples to apples” for projects within the same viewshed; and · Use of 3D software that permits the viewer to create custom views such as submitted in the 400-page visual simulation assessment within the DEIS for Deepwater Wind’s Block Island Wind Farm.</p>	<p>Figure AA-21 in the VIA maps the KOPs in the visual offshore study area and the type of simulation produced. The Sunken Forest KOP was determined to be representative of the view from Point O’Woods.</p> <p>While the simulations were produced from ground level, the Fire Island Lighthouse KOP is from 160 feet in elevation (ground level plus tripod height), Norman J. Levy Park and Preserve is from 105 feet (ground level plus tripod), and Hartshorne Woods Park is from 165 feet (ground level plus tripod). Therefore, the KOPs do represent elevated views.</p> <p>The SLVIA in Volume 2 of the Draft EIS includes cumulative effects daytime simulations from Fire Island Light, Jones Beach, and Point Pleasant (northeast and southeast views).</p>
BOEM-2022-0053-0145-0011	<p>It is concerning then to see the lack of minimum guidelines and best practice standards established for offshore wind projects in the United States especially as they relate to adverse visual impacts upon National Historic Landmarks and historic properties sites and districts listed or eligible for listing in the National Register of Historic Places. It is essential to apply consistent criteria to this project and subsequent future sites. Due to the high cultural and historic sensitivity of the historic district the Association insists that best practice criteria be applied. Minimum standards should include: · · Requiring the least impactful nighttime lighting such as ADLS; · Requiring all windfarms in a</p>	<p>BOEM appreciates your concern and perspective regarding the need for guidelines and best practice standards for offshore wind projects as they related to adverse visual impacts on NHLs and historic properties, sites, and districts listed or eligible for listing in the NRHP. While establishment of program-wide guidelines and best practices is beyond the scope of the environmental analysis for the Projects, BOEM will take your comment into consideration as it administers its program. Existing guidance that has been applied in preparation of the COP and the EIS include Guidelines</p>

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	<p>specific region to use the same non-reflective paint color determined to be most effective in minimizing the visual impacts per specific atmospheric/geographical conditions of the lease sites; Establishing minimum set-back standards from land with specific considerations for historic landmarks and areas with tourism-driven economies;</p>	<p>for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585 (<a href="https://www.boem.gov/sites/default/files/renewable-energy-program/Guidelines-for-Providing-Archaeological-and-Historic-Property-Information-Pursuant-to-30CFR585.pdf">https://www.boem.gov/sites/default/files/renewable-energy-program/Guidelines-for-Providing-Archaeological-and-Historic-Property-Information-Pursuant-to-30CFR585.pdf</a>).</p>
<p>BOEM-2022-0053-0145-0012</p>	<p>For communities with historical significance BOEM should help ensure that local stakeholders receive fair and direct access to any state and federal agencies or resources which may provide critical regulatory guidance on how best to avoid minimize and mitigate the local impacts of offshore windfarms. This support would be provided independent of the Section 106 process and would for example identify and encourage dialogue between communities with their State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP);</p>	<p>As part of the NEPA process, the public is offered the opportunity to review and comment on the Draft EIS. Independent of the Section 106 process, the NEPA process does not require BOEM to facilitate access for the public to state agencies or other federal agencies (such as the New Jersey SHPO or ACHP). However, as part of the NEPA scoping public meetings, BOEM did provide the NEPA Substitution for Section 106 Consulting Party Guide Updated March 10, 2021 (available at <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/NEPA-Substitution-Consulting-Party-Guide.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/NEPA-Substitution-Consulting-Party-Guide.pdf</a>), which provides a links to ACHP documents—A Citizen’s Guide to Section 106 Review and Integrating NEPA and Section 106—via its Empire Scoping Virtual Meetings website (<a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-farm-deis-project-page-virtual-meetings">https://www.boem.gov/renewable-energy/state-activities/empire-wind-farm-deis-project-page-virtual-meetings</a>). In addition, environmental justice considerations are analyzed in the EIS in Section 3.12.</p>
<p>BOEM-2022-0053-0145-0014</p>	<p>The proposed mitigation in the Draft MOA is inadequate meaningless and impractical. The DEIS includes a draft Memorandum of Agreement that includes proposed mitigation for the adverse effects expected for Point O’Woods. The proposed mitigation centers largely around “the creation of walking tours” as well as funding for “paths hedges plantings and benches.” No one associated with BOEM has visited Point O’Woods. Thus BOEM’s proposed mitigation reflects a remarkable failure to conduct meaningful consultation. Point O’Woods is a private residential community and the creation of public walking tours is neither practical nor feasible. In any event a walking tour would not offset expected adverse effects to Point O’Woods a fact which anyone who has visited Point O’Woods would understand. Moreover</p>	<p>The mitigation proposed in the draft Memorandum of Agreement with the Draft EIS was based on outreach conducted by Empire. It was provided in the Draft EIS to serve as a starting point for BOEM’s consultation with Point O’Woods and other consulting parties, as well as seek public input. In addition BOEM sought further input on the draft Memorandum of Agreement during Section 106 Consultation Meeting #3 and Section 106 Consultation Meeting #4. This process represents good-faith consultation and is compliant with Section 106 of the NHPA.</p>



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	<p>funding for “paths hedges plantings and benches” is both vague and unhelpful. It is inconceivable that BOEM proposes to resolve adverse effects from massive offshore wind turbines to a unique centuries-old historic community through screening this community’s views of the ocean through a landscaping scheme. This proposal is even more egregious considering the known adverse effects that BOEM has recognized will impact the community. The Association reminds BOEM of its obligation to resolve all adverse effects including cumulative effects. Mitigation should be proportionate to the degree of harm caused to offset adverse effects yet the DEIS’ proposal is meaningless.</p>	
<p>BOEM-2022-0053-0145-0015</p>	<p>Furthermore any proposal of mitigation at this stage—before BOEM or Empire Wind has addressed comments on the historic resources reports and before consultation with the New York SHPO and consulting parties—is inappropriate and contrary to the NHPA. BOEM’s decision to include a proposed Memorandum of Agreement before consulting parties have even met with BOEM to discuss resolving adverse effects is evidence that BOEM is rushing the environmental review process does not take its Section 106 responsibilities seriously. Failure to amend the DEIS including the Memorandum of Agreement and to provide for a thorough and lawful Section 106 process will result in a Final EIS and Record of Decision that is arbitrary capricious and contrary to law.</p>	<p>BOEM initiated consultation on April 29, 2021, with SHPOs, tribal governments, and other interested parties and notified them of BOEM’s intention to use the NEPA substitution process to fulfill Section 106 obligations under 36 CFR 800.0(c) in lieu of the procedures set forth in 36 CFR 800.3 through 800.6. BOEM distributed information about the project, invitations to interested parties to become consulting parties, and the NOI to prepare an EIS. BOEM then conducted virtual public scoping meetings on June 30, July 8, and July 13, 2021. BOEM distributed Project modification information to consulting parties on September 7, 2022.</p> <p>BOEM held the first virtual NHPA Section 106 Consultation Meeting on September 12, 2022, and on November 18, 2022, shared the complete survey and assessment reports, as well as the technical memorandum that detailed the APE for the undertaking. NHPA Section 106 Consultation Meeting #2 occurred during the Draft EIS public comment period and included a discussion of the distributed documents to date and a question-and-answer session. The Draft EIS was available for public review and comment from November 18, 2022, to January 17, 2023. The Draft EIS included BOEM’s intention to use a Memorandum of Agreement to establish commitments to implementing measures to avoid, minimize, or mitigate impacts on cultural resources prior to Project construction. A draft Memorandum of</p>

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		<p>Agreement was included in Appendix N for review with the Draft EIS. Inclusion of the draft Memorandum of Agreement provides consulting parties and the public an opportunity to comment on the agreement, as is appropriate under Section 106 of the NHPA, and demonstrates BOEM's commitment to compliance with this regulation in good faith. As noted in the Draft EIS, BOEM plans to hold two additional consultation meetings to consult on the Memorandum of Agreement prior to issuing the ROD, and acknowledges that additional consultation may be scheduled prior to issuing the ROD if further consultation is needed to resolve adverse effects via the Memorandum of Agreement. The Final EIS has been updated to provide details about Section 106 consultation that occurred after publication of the Draft EIS, and a revised, executed Memorandum of Agreement based on subsequent consultation with consulting parties and responsive to public comments is attached to the Final EIS. This approach is consistent with good-faith compliance with Section 106 of the NHPA.</p>

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**P.6.10 Demographics, Employment, and Economics**

**Table P.6.10-1 Responses to Comments on Demographics, Employment, and Economics**

Comment No.	Comment	Response
BOEM-2022-0053-0027-0010	<p>Projects should be denied as projected costs are higher than benefits. BOEM copied a benefit analysis from the New York Public Service Commission (PSC) into Appendix O in the DEIS. The analysis shows a net direct economic benefit in 2020\$ of \$1.6 billion over the 35 year project life. The analysis also shows \$0.9 billion in indirect and \$0.8 billion in induced benefits based on the direct benefits. The primary issue with this analysis is it completely ignored offsetting costs of the project and those costs shift spending from elsewhere in the economy. Those negative direct economic effects also have negative indirect and induced costs. A second issue is the discount factor used in the analysis was only 3%. BOEM as a federal agency should be using the US Office of Management &amp; Budget recommendation of using a 7% discount factor [Footnote 15: US Office of management &amp; Budget Bulletin A94 Discount Rates <a href="https://www.wbdg.org/FFC/FED/OMB/OMB-Circular-A94.pdf">https://www.wbdg.org/FFC/FED/OMB/OMB-Circular-A94.pdf</a>] on projects with an expected life beyond 7 years which lowers the direct benefit from \$1.6 billion to \$1.2 billion. A third issue is the cost of federal Investment Tax Credits (ITC). The costs can be estimated by calculating the annual premium electricity price increase over the project life. Purchase contracts provide a guaranteed price for power produced less any revenue received from the sales of energy and capacity value to the New York Independent System Operator. For Empire Wind 1 the premium price expected for Offshore Wind Renewable Energy Credits was \$25/MWh [Footnote 16: NYSERDA Empire Wind 1 OREC price <a href="https://www.nysERDA.ny.gov/About/Newsroom/2019-Announcements/2019-10-23-Governor-Cuomo-Announces-Finalized-Contracts-for-Empire-Wind-and-Sunrise-Wind-Offshore-Wind-Projects">https://www.nysERDA.ny.gov/About/Newsroom/2019-Announcements/2019-10-23-Governor-Cuomo-Announces-Finalized-Contracts-for-Empire-Wind-and-Sunrise-Wind-Offshore-Wind-Projects</a>] with an annual generation expectation of 2.8 million MWh or \$70 million a year in premium electricity cost. For Empire Wind 2 the premium price expected for Offshore Wind Renewable Energy Credits is at a minimum \$35/MWh with an annual generation expectation of 4.5 million MWh or \$156 million a year in premium electricity cost. The total cost of \$226 million a year for 35 years at a 7% discount rate is \$2.8 billion. The federal government provides a 30% ITC for offshore wind projects. No estimate of the total investment to build the Empire Wind project is available. However</p>	<p>It is unclear which analysis the comment is referring to. Appendix O of the Draft EIS includes an Alternatives Analysis for USACE Joint Permit Applications. The economic benefits analysis that was included as Appendix O of the COP utilized the Impact Analysis for Planning (IMPLAN) model, which is an accepted model for estimating the benefits from offshore wind. BOEM will balance environmental with economic and other considerations in its decision-making pursuant to NEPA and its implementing regulations.</p>

Comment No.	Comment	Response
	<p>the Dominion Energy in Virginia provided investment information this year for the Coastal Virginia Offshore Wind project. They expect to invest \$9.8 billion for a 2600 MW project or about \$3.8 million/MW [Footnote 17: State Corporation Commission SCC Approves Coastal Virginia Offshore Wind Project <a href="https://www.scc.virginia.gov/newsreleases/release/SCC-Approves-Coastal-Virginia-Offshore-Wind-Projec">https://www.scc.virginia.gov/newsreleases/release/SCC-Approves-Coastal-Virginia-Offshore-Wind-Projec</a>]. The Empire Wind Project is 2100 MW so the investment might be \$8 billion with the federal government providing \$2.4 billion in tax credits as the investment is made. There are other potential costs such as lost tourism from fewer people coming because of the visual appearance discussed elsewhere in this document and lost fishing revenue or higher cost. These costs are not estimated here. Just using premium electric costs and the ITC cost shows costs outweigh benefits \$5.2 billion to \$1.2 billion at a 7% discount rate or \$6.7 billion to \$1.6 billion with a 3% discount rate a four to one disadvantage. Clearly on a Benefit Cost Analysis basis BOEM should not approve these projects.</p>	
BOEM-2022-0053-0110-0007	<p>In an assessment completed by Empire the EW 1 and EW2 projects are expected to provide a total of \$2.0 billion in direct indirect and induced economic benefits along with about \$1.3 billion in personal income. (COP Appendix 0; Empire Wind 2022). The proposed EW1 and EW2 projects are already directly contributing to the formation of a U.S. supply chain and major investments are dependent on its advancement. The port investment alone will have substantial impacts on redevelopment efforts in two different regions in New York. To bolster their commitment to the project Empire Wind is creating an operations and maintenance (O&amp;M) hub and staging area at South Brooklyn Marine Terminal (SBMT) with a total investment of \$200 –\$250 million in infrastructure upgrades while also pursuing the development of SBMT as a low- emissions facility. In addition this project is supporting the construction of a Jones Act Compliant [Underline: plug-in hybrid service operations vessel] (SOV) that will be the first in the US offshore wind sector capable of sailing partly on battery power. The construction of the vessel will support approximately 250 high skilled U.S. jobs. The SOV will be constructed with [Underline: components from across 34 U.S. states.] As part of this project Empire Wind is supporting a \$357 million tower manufacturing facility at Port of Albany that will support numerous projects in the future. The Port of Albany’s proposal to build an offshore wind tower manufacturing facility at the Port of Albany is forecast to create approximately 500 construction</p>	Comment noted.

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	jobs 355 direct and full- time new manufacturing and support jobs. Empire Wind is also sourcing scour protection from the Port of Coeymans in upstate New York.	
BOEM-2022-0053-0110-0008	Advancement of Empire Wind project would have other direct impacts on New York’s economy. Approximately 1261 direct jobs are anticipated to be created during the construction phase of the Project for EW 1 with an additional 2154 direct jobs for EW 2. (COP Volume 2e p 8-8; Empire Wind 2022). In total approximately 2326 direct indirect and induced jobs are anticipated to be created during the construction phase of the Project for EW 1 with an additional 4046 jobs for EW 2 (COP Volume 2e p 8-8; Empire Wind 2022). The Project is expected to lead to the creation of jobs during operations. In an assessment completed by Empire approximately 1797 direct jobs are anticipated to be created during the lifetime of the Project for EW 1 with an additional 2723 direct jobs for EW 2. In total approximately 4069 direct indirect and induced jobs are anticipated to be created during the lifetime of the Project for EW 1 with an additional 6173 jobs for EW 2 (COP Volume 2e p 8-10)	BOEM recognizes the economic benefits that are anticipated to result from the Projects. Section 3.11 has been revised to clarify the number of annual O&M jobs anticipated to result from the Projects. Annual jobs in FTE differ from person-years of employment as presented in the COP. Annual jobs would occur each year during the approximately 34-year-long O&M phase.
BOEM-2022-0053-0117-0016	In the Final EIS BOEM should clarify whether economic impacts related to tower manufacturing at the Port of Albany and activities related to the SBMT are included in the overall job creation estimates or if those would be additional beneficial impacts. BOEM should also consult the local communities to ensure these impacts are covered in adequate detail and report on the outcomes of such stakeholder engagement in the Final EIS.	Economic impacts related to tower manufacturing at the Port of Albany and activities related to SBMT are not captured in the overall job creation estimates provided in the Draft EIS, as these activities are not part of the Proposed Action. As noted in the COP (Appendix O), this report focuses on the economic benefits of Empire’s expenditures directly related to the two offshore wind facilities and excludes benefits derived from the expenditures on port upgrades. However, potential economic benefits from the port upgrades are discussed in the Environmental Assessment Form for SBMT (Draft EIS, Appendix P) and the Port of Albany grant application. According to the Environmental Assessment Form, SBMT is an essential part of the City of New York’s Offshore Wind NYC Plan, which outlines a 15-year strategy to invest \$191 million in the city’s offshore wind industry, create over 13,000 jobs, generate \$1.3 billion in average annual investment, and direct 40



Comment No.	Comment	Response
		<p>percent of job and investment benefits toward women, minorities, and environmental justice communities. Section 3.3.5.6 of the Environmental Assessment Form describes outreach to the affected communities. Also, according to the Port of Albany grant application, that project will require approximately \$158 million in construction costs. The Port of Albany project is anticipated to create hundreds of construction jobs and up to 400 maritime and manufacturing jobs. Moreover, p. 3.11-19 of the Draft EIS states that, “During operations, SBMT is expected to support approximately 85 employees, with roughly 80 percent being in the professional services sector. The remaining 20 percent of employees are anticipated to work within the construction sector, a major employment industry within some of the affected geographies.” In addition, the Projects’ cumulative impacts including potential economic benefits associated with port utilization are discussed on p. 3.11-21 of the Draft EIS.</p>
BOEM-2022-0053-0117-0017	<p>The number of jobs created is an important and quantifiable benefit that is foundational to assessing the socioeconomic impacts of this project. However job quality should also be included. To ensure that federal investments in clean energy projects deliver quality family-sustaining jobs and support a robust domestic supply chain a range of labor domestic content and equity standards should be evaluated in the FEIS. This includes strong labor provisions like Project Labor Agreements (PLAs) prevailing wage neutrality policies on collective bargaining “ABC tests” to protect against worker misclassification and wage theft apprenticeship and pre-apprenticeship utilization or other union-affiliated training programs labor-management job training programs community benefit agreements local hire targeted hire and the utilization of domestically-produced materials and components. Union neutrality agreements are also key for ensuring that collective bargaining agreements and workers’ organizing rights are respected. The National Labor Relations Act states in Title 29 Chapter 7 Subchapter II Section 1.[§151.]: “It is declared to be the policy of</p>	<p>Section 3.11 of the Draft EIS and Final EIS provides information on Empire’s proposed investments in community development and workforce training and readiness funds in New York state.</p> <p>Also, as explained in the COP (Appendix O; Empire 2023), Empire expects to source fuel and supplies such as food locally. Additionally, foreign crews will be on a 2-week rotation, allowing them to spend their wages in local communities. There is also additional local investment related to the construction of the onshore substation and the connection of the Projects to the electrical grid. Following construction, Empire expects significant total O&amp;M investments for the lifespan of the Projects.</p>

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	<p>the United States to eliminate the cause of uncertain substantial obstructions to the free flow of commerce and to mitigate and eliminate these obstructions when they have occurred by encouraging the practice and procedure of collective bargaining and by protecting the exercise by workers of full freedom of association self-organization and designation of representatives of their own choosing for the purpose of negotiating the terms and conditions of their employment or other mutual aid or protection.” The evaluation of high-road labor provisions within the FEIS is in alignment with federal policy and will help to ensure the efficient and timely development of offshore wind projects and related support infrastructure. Limitations that BOEM may face around the inclusion of such details should also be noted in the Final EIS.</p>	<p>According to the data provided by Empire, O&amp;M investments start in 2021, and Empire estimates those to be annual investments in supplies, equipment, and necessary personnel of approximately \$20 million. These investments are expected to occur annually for 34 years (through 2054). Empire’s decision to base O&amp;M locally creates significant near- and long-term local investment regardless of foundation type or nameplate capacity.</p> <p>The Projects will also utilize ports, including for tower manufacturing at the Port of Albany.</p>
<p>BOEM-2022-0053-0117-0018</p>	<p>In Empire’s promotional materials they name that the South Brooklyn Marine Terminal (SBMT) will be an economic engine to the Sunset Park community to which a diverse population and a high percentage of immigrants call home. They state that they are trying to find workers in the communities where the project interconnects to the grid for permanent jobs such as in O&amp;M and that they’ve established a community engagement education and outreach center adjacent to the SBMT for the local community. The FEIS should state these efforts as well as documenting any outreach to the local community including but not limited to the Sunset Park Task Force to ensure these opportunities are indeed being made accessible and to understand whether community feedback is being integrated into project plans. Groups like UPROSE in South Brooklyn have reported requests for improvements to SBMT such as making sure specialized ships do not idle and pump harmful exhaust and securing space on the rooftop of Empire’s buildings for solar projects.</p>	<p>Section 3.11 of the Draft EIS and Final EIS provides information on Empire’s proposed investments in community development and workforce training and readiness funds in New York state. Section 3.12 of the Draft EIS and Final EIS discusses the Projects’ potential effects on environmental justice populations.</p>
<p>BOEM-2022-0053-0117-0019</p>	<p>The Draft EIS reports that Empire is investing in various community development and workforce training and readiness funds in New York State. Empire estimates the aggregate value could be between \$25 million and \$30 million for both EW 1 and EW 2 over the lifetime of the two facilities. BOEM says that although the annual contributions are relatively small at less than \$1 million per year and are expected to support an additional 10 to 15 jobs annually for the entire 30+ year operation the socioeconomic impacts are likely to be far greater than the jobs they would support. BOEM further describes that these funds would support workforce training and readiness. The FEIS should elaborate on these funds and the socioeconomic impacts referenced.</p>	<p>The Final EIS (Section 3.11) describes the socioeconomic benefits anticipated to result from Empire’s community development and workforce training and readiness investments in New York state. Section 3.12 of the Draft EIS and Final EIS discusses the Projects’ potential effects on environmental justice populations.</p> <p>The Innovation Hub is an accelerator program for startups that Equinor is funding and siting in Sunset Park. This is in partnership with NYCEDC, New York University Tandon School,</p>

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	<p>The FEIS should also include what type of workforce training and readiness programs this fund supports as well as information related to the prevention of economic disruption and employment loss for energy workers and communities. The best approach to energy transition will bring immediate and long-term benefits to workers and communities and invest in bottom-up planning local leaders and helping communities to access federal resources capacity building and technical assistance. [Endnote xxxvi: For more information see the BlueGreen Alliance National Energy Transition Policy Framework. May 5 2021. Available online: <a href="https://www.bluegreenalliance.org/resources/bluegreen-alliance-national-energy-transition-policy-framework0/">https://www.bluegreenalliance.org/resources/bluegreen-alliance-national-energy-transition-policy-framework0/</a>] The FEIS should also indicate whether funds will be used for union training programs and retention of a union workforce and included targeted training for underserved and underrepresented workers.</p>	<p>the Urban Future Lab, and the National Offshore Wind Research Consortium. Located in Equinor's New York headquarters by SBMT, the hub will cultivate startups that bring new technological solutions to the growing U.S. offshore wind supply chain.</p> <p>Equinor and NYCEDC have established the Equinor Offshore Wind Ecosystem Fund, a \$5 million clean energy community fund to support sustainable growth, empowerment of underserved areas, and climate justice in New York City. The fund is designed to provide historically marginalized and potential environmental justice areas and populations in New York City with opportunities to benefit from the emerging offshore wind industry. This includes supporting applications that make the offshore wind industry more accessible by furthering workforce development initiatives, creating obtainable career pathways, and elevating local businesses' and individuals' participation in the industry.</p> <p>Equinor will be introducing the GENext Program that will focus on the next generation of youths, learners, skilled labor, safety training, and diverse small business capacity building entering the offshore wind industry. The program will be organized into three phases: Phase 1 will utilize the future Learning Center as the hub for curriculum support; science, technology, engineering, and math (STEM) initiatives; and program support to regional youth programs. Phase 2 will extend to educational institutions and training facilities utilizing a regional strategy for workforce development by supporting community colleges, state schools, trade schools, and training facilities. Phase 3 will focus on supply chain and capacity building for</p>

Comment No.	Comment	Response
		<p>minority- and women-owned business enterprises/service disabled veteran-owned small business, diverse small business development, skilled labor that strengthens New York state manufacturing and construction trades, and basic safety and technical training for offshore wind.</p> <p>Equinor has had direct engagement with unions, including meetings with union leaders from the national and local levels. Equinor has been collaborating with suppliers to craft labor agreements for its U.S. renewables offshore wind projects and is reviewing its first draft project labor agreement with the applicable suppliers for the SBMT port construction upgrade work, as well as the construction work for the onshore substation to be located at SBMT.</p>
BOEM-2022-0053-0117-0021	BOEM should make efforts to describe the employment impacts and what efforts are being made to source workers and materials locally. Maximizing the creation of manufacturing jobs across a domestic offshore wind supply chain is key for this industry to fulfill its economic benefit potential. As mentioned earlier in the report supply chain constraints caused by global bottlenecks are one of the greatest risks for achieving 30 GW of offshore wind by 2030.	<p>Section 3.11 of the Draft EIS and Final EIS provides information on Empire’s proposed investments in community development and workforce training and readiness funds in New York state.</p> <p>Also, as explained in the COP (Appendix O; Empire 2023), Empire expects to source fuel and supplies such as food locally. Additionally, foreign crews will be on a 2-week rotation, allowing them to spend their wages in local communities. There is also additional local investment related to the construction of the onshore substation and the connection of the offshore wind project to the electrical grid. Following construction, Empire expects significant total O&amp;M investments for the lifespan of the Projects. According to the data provided by Empire, O&amp;M investments start in 2021, and Empire estimates those to be annual investments in supplies, equipment, and necessary personnel of approximately \$20 million. These investments</p>

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		<p>are expected to occur annually for 34 years (through 2054). Empire’s decision to base O&amp;M locally creates significant near- and long-term local investment regardless of foundation type or nameplate capacity.</p> <p>The Projects will also utilize ports, including for tower manufacturing at the Port of Albany.</p> <p>Moreover, as explained in the COP (Section 8.1.2; Empire 2023), in total, approximately 2,326 direct, indirect, and induced jobs are anticipated to be created during the construction phase of the Projects for EW 1, with an additional 4,046 jobs for EW 2 (see COP Appendix O, Economic Impacts of the Empire Wind Project [EW 1 and EW 2], for additional information). Most of these jobs are anticipated to be within the geographic analysis area, specifically along the onshore export and interconnection cable routes in Kings and Nassau Counties in New York. New jobs are also likely to be located around the construction and staging areas.</p>
BOEM-2022-0053-0117-0022	Average and maximum job creation utilizing 25% domestic content versus 100% domestic content in offshore wind projects results in a difference of approximately 30000-40000 jobs from 2023-2030. [Endnote xl: Ibid page 45] In the DEIS BOEM only includes one example of job creation related to supply chain - the tower manufacturing planned at the Port of Albany.	See response to BOEM-2022-0053-0117-0021 above.
BOEM-2022-0053-0117-0023	Likewise when it comes to jobs related to O&M the other major opportunity for the creation of long-term jobs and economic benefits BOEM should provide greater detail about efforts being made to recruit and train a local union workforce. Since the U.S. does not have any utility-scale offshore wind projects operational in federal waters the local workforce might be expected to receive training overseas. Those expectations should also be described to the greatest extent possible as well as efforts to make such training accessible along with any plans Empire has to facilitate this training of the local workforce while supporting the retention of union jobs.	See responses to BOEM-2022-0053-0117-0021 and BOEM-2022-0053-0117-0019 above.
BOEM-2022-0053-0119-	Robust socioeconomic analysis is critical to reach maximum economic benefits from offshore wind projects. The FEIS should detail all anticipated	The Projects’ total construction jobs would include indirect jobs at ports. The Projects are

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0011 & BOEM-2022-0053-0142-0009	job-creation involving port utilization and development supply chain and manufacturing of offshore wind components construction operations and maintenance and decommissioning. In addition to salary information should include health and safety certifications, training pathways, recruitment and retention plans, project labor agreements and union neutrality commitments if applicable and commitments and requirements for targeted hire of disadvantaged and underrepresented communities.	<p>anticipated to result in approximately 1,185 indirect construction jobs in supply chain industries over the construction period. As stated in Section 3.11, the offshore wind tower manufacturing facility that would be developed at the Port of Albany, in Albany County, would create up to 350 direct jobs in the region. There would be approximately 85 employees at SBMT during operations to support storage, staging, pre-assembly, and the transfer of WTG components.</p> <p>Anticipated salaries are provided in Section 3.11 of the Draft EIS.</p> <p>See also response to BOEM-2022-0053-0117-0019 above.</p>
BOEM-2022-0053-0147-0003	The Final EIS should include a more granular analysis of the economic benefits of the proposal and include an inquiry into what steps if any Empire is taking to ensure that Sunset Park residents are candidates for long-term well-paying and safe jobs. The EIS should consider whether residents of Sunset Park have substantive opportunities for employment in entry level positions associated with the proposal as well as positions requiring more experience. Furthermore the Final EIS should explain whether residents in disadvantaged communities such as those in Sunset Park will likely be employed in a wide range of jobs created by the project including those in professional and managerial services.	Section 3.11 of the Draft EIS and Final EIS provides information on Empire’s proposed investments in community development and workforce training and readiness funds in New York state. Section 3.12 of the Draft EIS and Final EIS discusses the Projects’ potential effects on environmental justice populations.
BOEM-2022-0053-0147-0009	With the exception of the three displaced marine operator jobs, the DEIS and its appendices do not provide much insight on the number of jobs that might be displaced by the other potential economic disruptions identified. Nor does the DEIS assign a dollar amount to these potential economic disruptions or give an estimated value of the likelihood that these disruptions would occur. The Final EIS should offer a more granular account of these potential economic burdens and offer readers a better sense of the likelihood that these harms will befall residents of Sunset Park.	As discussed in the Draft EIS, the Projects are not expected to result in measurable adverse impacts on demographics, employment, or economics. Section 3.12 of the Draft EIS and Final EIS discusses the Projects’ potential effects on environmental justice populations.
BOEM-2022-0053-0147-0010	Finally although materials in the DEIS and its Appendices consider and dismiss the possibility that the proposal and the connected action will increase rents in the communities surrounding SBMT [Footnote 44: SBMT	Page 3.11-18 of the Draft EIS states that, “Employment and economic benefits of the Proposed Action at SBMT and Port of Albany



Comment No.	Comment	Response
	<p>EA at 44-45.] the authors do not consider whether the employment opportunities generated by Empire and the NYC Economic Development Corporation would put upward pressure on rents. The Final DEIS should expressly consider this possibility.</p>	<p>would have long-term, minor beneficial impacts. Some of the new employment may be supported by the existing workforce and would not be expected to exacerbate housing conditions in the geographic analysis area." Also, as stated in Table L-2 of the Final EIS, given the size of the workforce relative to the size of the population of the New York City area and the size of the Projects compared to the number of other construction activities in the area, and considering that the construction activities are temporary, the Projects are not expected to result in a shortage of housing or workers for other projects. Therefore, the Projects are not expected to significantly affect rents. This finding is consistent with the Applicant's COP (Empire 2023), which states that the anticipated increase of workers relocating into the area is unlikely to be greater than the available number of temporary housing units and is not expected to create a shortage; in addition, onshore construction activities are proposed to take place during the off-season, to avoid impacts with the local peak tourism seasons. Therefore, due to the temporary nature of the construction activities, property values are not anticipated to be negatively affected during the construction phase.</p>

**P.6.11 Environmental Justice**

**Table P.6.11-1 Responses to Comments on Environmental Justice**

Comment No.	Comment	Response
<p>BOEM-2022-0053-0034-0001 &amp; 0002</p>	<p>Sunset Park is an environmental justice community in South Brooklyn and home to three peaker plants the Gowanus Expressway waste transfer sites and other industrial uses. As the Draft EIS notes, Sunset Park is in the 86<sup>th</sup> to 91<sup>st</sup> percentile for PM<sub>2.5</sub> and other pollutants that cause significant health issues in the community. In 2019, Uprose published the grid or Green Resilient Industrial District, which is a community lead vision for Sunset Park that prioritized the need for well-paying, working-class green jobs based in multi-scale green energy initiatives such as offshore wind. Uprose has fought hard to obtain a working waterfront in hopes of attracting green manufacturing and circular economy opportunities. The commenter is pleased to see this vision in part relies by Equinor's investment in SBMT. However, it must be ensured that the Sunset Park community is protected throughout the Projects and process. Of primary concern to Uprose is health and well-being of the immediate Sunset Park community.</p> <p>While we are eager for the improved air quality regionally we are concerned about the increases in local air pollution during the construction and decommissioning phases of this project. The EIS should in the body of its text clearly describe any potential mitigation measures for reducing local air pollution. This does not include pollution offsets. As part construction and wind farm construction continues we urge Equinor to maintain its commitment to the Sunset Park community by working towards zero greenhouse gas and co-pollutant emissions from boats trucks vehicles and other machinery port replication, by working with residents to identify truck routes to the South Brooklyn Marine Terminal that mitigate traffic burdens in Sunset Park and protect the safety of pedestrians cyclists and drivers, by ensuring that Sunset Park residents are candidates for long term well paying jobs at entry level as well as executive positions, by ensuring the waste from offshore wind operations is handled in a safe and healthy manner that does not disproportionately burden Sunset Park or other EJ communities, by prioritizing the use of materials locally sourced from the Sunset Park industrial businesses, and by providing consistent reporting to the public on mitigation efforts with the opportunity for community members to direct and correct the efforts if</p>	<p>See response to comment BOEM-2022-0053-0147-0005 for description of Empire's APMs and NYCEDC's minimization measures planned for SBMT to reduce air emissions.</p> <p>Equinor has stated that as part of securing the lease for SBMT (which is owned by New York City), Equinor entered into a Memorandum of Understanding with NYCEDC in which Equinor agreed to develop SBMT as a low-emissions facility, coordinate with NYCEDC in Equinor's creation of the \$5 million Offshore Wind Ecosystem Fund, develop the Projects in an equitable and inclusive manner, establish and maintain a community outreach center, and provide NYCEDC with a \$500,000 private capital contribution for a capacity building program for minority- and women-owned business enterprises in the maritime and offshore wind industry.</p> <p>The Ecosystem Fund, noted above, will allocate a significant portion of the awards to frontline, disadvantaged communities, including and in particular, the Sunset Park area.</p> <p>In addition, Equinor is assessing siting options for the establishment of a local offshore wind learning center and developing a local engagement plan for its design and programming. Although the program design is ongoing, the learning center is expected to offer educational programming on offshore wind and renewable energy to K-12 students in New York City public schools, as well as workforce development programs tailored to the local</p>

Comment No.	Comment	Response
	<p>needed, and by continuing engagement with the Sunset Park community which Equinor has already demonstrated through its \$5 million community system fund. As one of the first offshore wind projects of this magnitude in the United States it is crucial that this project be a replicable national model of a just transition. We are enthusiastic for the potential of demonstrating an effective community corporate co-governance model.</p>	<p>community. Equinor is also currently refining its local workforce development plan and developing a minority- and women-owned business enterprises procurement strategy for the Projects that is expected to deliver direct benefits to the Sunset Park community.</p>
<p>BOEM-2022-0053-0117-0002</p>	<p>The Empire Wind Project proposed in this DEIS will deliver 2,076 megawatts (MW) of clean, local wind energy, serving a critical role in New York’s goal to deploy 9,000 MW of offshore wind by 2035. The 2019 policy in which this goal was established, the Climate Leadership and Community Protection Act (“Climate Act”), included several nation-leading provisions for how climate goals must be achieved. One such provision set a target for disadvantaged communities to receive 40 percent of the overall benefits from the state’s climate programs and at a minimum, 35 percent of those benefits. Since this Project will utilize the South Brooklyn Marine Terminal (SBMT) for operations and maintenance (O&amp;M) located in the historic environmental justice community of Sunset Park in Brooklyn NY it is of increased importance for the NEPA process to include robust assessment of environmental justice impacts in alignment with the Climate Act.</p>	<p>Final EIS Section 3.12 and Section 3.3.5 of Appendix P assess the environmental justice impacts of the Projects and the connected action at SBMT. See response to comment BOEM-2022-0053-0034-0002 for a description of the commitments made by Equinor that will deliver direct benefits to the Sunset Park community.</p>
<p>BOEM-2022-0053-0117-0003</p>	<p>The Climate Act also declared that it is in the interest of the state to “ensure labor harmony and promote efficient performance of work on climate change related sites by requiring workers to be well-trained and adequately compensated” and “advance our equity goals by ensuring quality employment opportunities in safe working environments.” Following the passage of the Climate Act, in 2020, New York became the first state to pass comprehensive labor standards on clean energy work in the 2021 budget bill that included prevailing wage and project labor agreement requirements for construction on renewable energy projects that are 5 MW or larger, and a requirement that 2 covered projects buy American steel and iron where feasible. This approach to offshore wind deployment that centers equity and maximizes the creation of quality jobs for workers is essential for projects to deliver their full potential of benefits for New York and the United States. Reviewing the Project’s impacts on workers and ensuring that it delivers maximum benefits to the people of New York especially underserved and disadvantaged communities is of critical importance in the Final EIS.</p>	<p>Final EIS Section 3.11 and Section 3.12 describe the socioeconomic benefits anticipated to result from Empire’s community development and workforce training and readiness investments in New York state.</p> <p>These investments include establishment of an Innovation Hub as an accelerator program for startups that bring new technological solutions to the rapidly growing U.S. offshore wind supply chain and establishment of a \$5 million Ecosystem Fund supporting applications that make the offshore wind industry more accessible by furthering workforce development initiatives, creating obtainable career pathways, and elevating local businesses’ and individuals’ participation in the industry.</p> <p>Equinor has had direct engagement with unions. at the national and local levels. Equinor has</p>

Comment No.	Comment	Response
		<p>been collaborating with suppliers to craft labor agreements for its U.S. renewables offshore wind projects and is reviewing its first draft project labor agreement with the applicable suppliers for the SBMT port construction upgrade work, as well as the construction work for the onshore substation to be located at SBMT.</p>
<p>BOEM-2022-0053-0117-0024</p>	<p>The DEIS also includes a section with information related to demographics of geographies impacted by the construction of the project in New York and Texas where the offshore substations will be deployed. Of these jurisdictions the counties in Texas have some of the highest percentages of non-white populations as well as the highest percentage of the population with less than a high school degree. The Final EIS should describe what efforts are being made to provide culturally competent information and the training and support services necessary for these impacted communities to access the job benefits of offshore wind activities. Of the impacted jurisdictions listed in New York Kings County (where the SBMT is located) has the highest non-white population and percentage of the population with less than a high school degree. Given that this community is in closest proximity to the SBMT and will be arguably the most impacted by the construction and operation of this project the Final EIS should hone in on the specific efforts being made to ensure communities in this county receive equitable benefits from the project. The City of Albany and Town of Hempstead in Long Island are two other jurisdictions likely to be significantly impacted by the Project and also are among the highest non-white populations and populations with less than a high school degree. BOEM should also make efforts to include in the Final EIS what pursuits are being undertaken by Empire to ensure these communities have access to job benefits of the project.</p>	<p>See responses to comments BOEM-2022-0053-0034-0002 and BOEM-2022-0053-0117-0003 for a description of the commitments made by Equinor regarding job training and workforce agreements, and the anticipated direct benefits to the Sunset Park community. Empire’s proposed activities in the vicinity of the Port of Albany, New York and Corpus Christi, Texas are limited in scope, as these locations would only serve as the starting point for the transport of Project components during construction. As noted by the commenter, impacts associated with construction and O&amp;M of the Projects and connected action at SBMT are anticipated to be greatest in the vicinity of SBMT; therefore, this is where community benefits are also focused.</p>
<p>BOEM-2022-0053-0119-0005 &amp; 0006</p>	<p>Use protective dredging techniques where possible to dispersing contaminated sediment particularly in proximity of environmental justice communities disproportionately exposed to environmental harms. Conduct appropriate pre-construction, construction, and post-construction monitoring especially in areas of known vulnerability (i.e. adjacent to known sources of contaminants near environmental justice communities).</p>	<p>BOEM has included Alternative H in the Preferred Alternative. Alternative H specifies a method of dredge or fill activities (clamshell dredging with environmental bucket) that would reduce the discharge of dredged material during construction of the EW 1 landfall. Empire is proposing trenchless methods for inland water crossing in the USACE permit application for EW</p>
<p>BOEM-2022-0053-0142-</p>	<p>Use protective dredging techniques where possible to dispersing contaminated sediment particularly in proximity of environmental justice</p>	

Comment No.	Comment	Response
0004	communities disproportionately exposed to environmental harms.	2, including HDD installation methods for the Reynolds Channel crossing and a crossing via an above-water cable bridge for the Barnums Channel crossing. These construction methods would reduce the potential for discharge of dredged material.
BOEM-2022-0053-0147-0001	<p>New York State has passed its own legislation aimed at securing a just transition. For example, in 2020 the state enacted the Accelerated Renewable Energy Growth and Community Benefit Act, which confers benefits to communities that host large scale renewable energy projects. Most importantly, the Climate Leadership and Community Protection Act in 2019, which requires agencies to ensure disadvantaged communities receive a target of 40%, and no less than 35% “of the overall benefits of spending on clean energy and energy efficiency programs, projects or investments.” Section 7(3) of the statute also requires all state agencies to refrain from issuing permits and other administrative approvals for projects that will disproportionately burden disadvantaged communities, and to prioritize greenhouse gas and co-pollutant emissions reductions in these communities.</p> <p>Section 7(3) is nowhere mentioned in the DEIS but it is of profound import. In order to proceed both the Empire Wind 1 project and the SBMT Port Improvement Project require further permits and approvals from state agencies in New York. [Footnote 20: See DEIS Volume 2 at A-1; SBMT EA at 17.] But under Section 7(3) these state agencies must issue denials if these projects have disproportionate impacts on disadvantaged communities such as those in Sunset Park. In effect Section 7(3) requires Empire Wind to mitigate any disproportionate impacts on Sunset Park communities identified in the DEIS.</p>	See responses to comments BOEM-2022-0053-0034-0002 and BOEM-2022-0053-0117-0003 for a description of the commitments made by Equinor that would bring direct benefits to disadvantaged communities, including and in particular the Sunset Park community. See response to comment BOEM-2022-0053-0147-0005 for a description of Empire’s APMs and NYCEDC’s minimization measures planned for SBMT to reduce air emissions during construction and operation of the Projects and connected action at SBMT.
BOEM-2022-0053-0147-0004	The DEIS also states that in relation to its proposal, Empire is making investments in “various community development and workforce training and readiness funds in New York State,” which may result in the creation of 10 to 15 jobs per year for the entire lifetime of the offshore wind projects. The Final EIS should clarify the amount of these funds that are being directed towards disadvantaged and environmental justice communities in general and communities in Sunset Park in particular.	See responses to comments BOEM-2022-0053-0034-0002 and BOEM-2022-0053-0117-0003 for a description of the commitments made by Equinor regarding community development and workforce training.
BOEM-2022-0053-0147-	Despite the fact that BOEM states that these disproportionate air impacts are not large the agency must in the Final EIS describe what if any mitigation measures Empire intends to undertake to shield communities in	APMs to reduce impacts of the Projects are described in Appendix H, Attachment H-2. The APMs applicable to air quality are NO <sub>x</sub> and VOC

Comment No.	Comment	Response
0005	Sunset Park resulting from these threats to air quality and public health.	<p>emission reduction credits (APM 27); vessels will meet Tier III NO<sub>x</sub> standards (APM 28); ultra-low diesel fuel usage (APM 29); low-sulfur diesel fuel usage (APM 30); Project-related vessels will comply with applicable USEPA, or equivalent, emission standards (APM 31); data sharing with BOEM regarding horsepower rating of all propulsion and auxiliary engines, duration of operation in state waters, load factor, and fuel consumption (APM 32); Empire will provide vessel engines and emissions control equipment information to BOEM and USEPA per the ROD and the issued OCS air permit (APM 33); and compliance with state regulations on Project-related vehicles, diesel engines, and engine idling (APM 34).</p> <p>In addition, NYCEDC has committed to measures to reduce air emissions associated with the connected SBMT Port Infrastructure Improvement Project as outlined in the Supplemental Air Quality and Climate Change Analysis appended to the Environmental Assessment for SBMT (Final EIS Appendix Q). These measures include using electric power for building heating instead of natural gas; incorporating stringent electric efficiency standards; supplying wayside power cables to support vessel hoteling while at berth in lieu of running vessel diesel engines; temporarily using diesel-powered equipment during construction that meets USEPA standards for diesel engines; and assessing alternative technologies for non-diesel equipment to meet heavy lift demands during operational phases.</p>
BOEM-2022-0053-0147-0006	BOEM states that the combination of “air emissions, noise, lighting, and traffic” resulting from the utilization of SBMT will have disproportionate adverse impacts on environmental justice populations. Despite the fact that BOEM states that these impacts will not be high and adverse the	APMs to reduce impacts of the Projects are described in Appendix H, Attachment H-2. To reduce impacts related to air emissions, noise, lighting, and traffic, Empire would install onshore



Comment No.	Comment	Response
	<p>Final EIS should clearly describe what if any mitigation measures Empire intends to undertake to shield communities in Sunset Park resulting from these threats to air quality and public health. A detailed description of these mitigation measures is especially important with regard to traffic.</p>	<p>components within existing right-of-way and within previously developed areas designated for such uses to the extent practicable (APM 144); implement APMs to control air emissions (APM 28 through APM 31); develop a Traffic Management Plan for construction activities in coordination with affected local municipalities (APM 145); and establish temporary, localized construction zones to minimize areas or sections of road closures (APM 163). Additionally, Empire would implement lighting reductions such as downward Project lights, motion sensor lights, and limiting artificial light (APM 56); onshore substation light will reduce light pollution, where feasible (APM 139); implementation of a noise complaint hotline (APM 38); vessels nearshore and transiting vessels will comply with noise standards (APM 41); and noise-generating equipment may be located inside or outside with use of noise barriers (APM 42). In addition, NYCEDC has committed to measures to reduce air emissions associated with the connected SBMT Port Infrastructure Improvement Project as described in response to comment BOEM-2022-0053-0147-0005.</p>
<p>BOEM-2022-0053-0147-0008</p>	<p>The Environmental Assessment Form for the SBMT Port Improvement Project states that the project may “increase the potential for human exposure to hazardous materials. This includes present and future users of the site, and construction workers.” The Environmental Assessment form also states that the proposal “would require dredging of contaminated sediment that has the potential to expose... site workers and the public in the absence of appropriate protection and mitigation measures.”<sup>38</sup> The assessment specifically adds that “construction of the [Empire Wind] 1 Project underground cables and onshore substation” could disturb hazardous materials.</p> <p>The Final EIS should incorporate these findings regarding risks of exposure to hazardous materials into the environmental justice analysis chapter of the document. BOEM should specifically consider whether</p>	<p>As noted in Appendix Q, Section 3.10.2.6, remediation of the SBMT project site would be conducted pursuant to the New York State Brownfield Clean-up Program. The Interim Remedial Measure Work Plan that would be implemented prior to the start of construction would identify associated health and safety measures to be undertaken at the project site to prevent workers and neighbors from being exposed to contamination during remediation and construction activities. A Remedial Action Workplan that would also include implementation of a Construction Health and Safety Plan and a</p>

Comment No.	Comment	Response
	<p>environmental justice communities in Sunset Park might be disproportionately burdened by the risks of these exposures. In conducting this environmental justice analysis BOEM should consider potential exposures to residents and to construction workers from these communities.</p>	<p>Community Air Monitoring Plan would be prepared to identify the final remedy to be undertaken at the project site. With implementation of appropriate protection and mitigation measures, there would be no significant adverse impacts during construction. Specific to construction of the EW 1 landfall, BOEM has included Alternative H in the Preferred Alternative. Alternative H specifies a method of dredge or fill activities (clamshell dredging with environmental bucket) that would reduce the discharge of dredged material (such as sediment in the cable corridor) during construction of the EW 1 landfall.</p>
<p>BOEM-2022-0053-0147-0011</p>	<p>The Final EIS should in the body of its text provide a more detailed summary of environmental justice mitigation measures proposed. BOEM should clearly describe any potential mitigation measures for reducing local air pollution and other adverse impacts discussed above. Mitigation measures for reducing air pollution should not include pollution offsets as such measures can exacerbate inequities endured by disadvantaged communities and are marred by numerous other problems</p>	<p>See responses to comments BOEM-2022-0053-0147-0005, -0006, and -0008 above.</p>

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**P.6.12 Finfish, Invertebrates, and Essential Fish Habitat**

**Table P.6.12-1 Responses to Comments on Finfish, Invertebrates, and EFH**

Comment No.	Comment	Response
BOEM-2022-0053-0102-0032	We strongly support all efforts to avoid impacts to Submerged Aquatic Vegetation (SAV) and other structured habitats throughout the entire project areas including along the cable route.	SAV is not present in the Wind Farm Development Area or along export cable corridors. See Section 3.6.5.1 for a discussion of the absence of SAV within 700 feet of the SBMT connected action.
BOEM-2022-0053-0140-0038	-The National Oceanic and Atmospheric Administration (NOAA) and National Marine Fisheries Service (NMFS) are charged under the Magnuson-Stevens Fishery Conservation and Management Act to protect important habitats of federally managed marine and anadromous fish species including by protecting Essential Fish Habitat. It appears the repeated requests by this federal agency have been ignored or not fully complied with as evidenced in a NOAA/NMFS March 29 2021 [Footnote 5: March 29 2021 Letter from Louis A. Chiarella Assistant Regional Administrator for Habitat Conservation National Oceanic and Atmospheric Administration National Marine Fisheries Service to Michelle Morin Chief Environmental Branch Office of Renewable Energy Programs Bureau of Ocean Energy Programs RE: "Updated Recommendations for Mapping Fish Habitat" available at Mappings Recs FINAL (squarespace.com).] letter: [Italics: "As we discussed in our May 27 2020 letter to you we have found that the existing Bureau of Ocean Energy Management (BOEM) benthic survey guidelines for collecting acoustic and benthic data across a lease area] [Bold: have not been applied consistently and are inadequate] [Italics: to ensure the collection of sufficient site-specific baseline data for our consultations. While your guidelines state that consultation with our agency is recommended prior to conducting these surveys applicants have not consistently done so and as a result] [Bold: our recommendations have not been incorporated consistently across all projects.] [Italics: We hope that these recommendations will help to alleviate that inconsistency.] [Italics: The attached updated document	Empire's benthic survey data complied with BOEM benthic survey mapping guidance. For benthic surveys that occurred after the NMFS benthic habitat mapping recommendations were published, Empire also took those recommendations into consideration during its benthic survey efforts. Extensive acoustic, photographic, and video survey data were provided to NMFS for further review during the Project EFH consultation. Analyses of survey data are found in COP Appendix T here: <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan">https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan</a> . Impacts on benthic habitat are analyzed in the Draft EIS in Section 3.6 and in the EFH assessment here: <a href="https://www.boem.gov/renewable-energy/state-activities/nmfs-efh">https://www.boem.gov/renewable-energy/state-activities/nmfs-efh</a> . All considerations in the Draft EIS were made based on best available science and relevant developer-provided Project information.

Comment No.	Comment	Response
	<p>provides additional information for each step in the mapping process includes details on sampling frequency and incorporates recommendations for mapping inshore habitats such as submerged aquatic vegetation. In addition as we have discussed with your staff we understand that in many cases benthic sampling is conducted concurrently with the collection of acoustic data. However] [Bold: this method is not consistent with standards for habitat mapping.] [Italics: We strongly recommend that you work with the developers to ensure that they use the 2 acoustic data to focus and refine additional targeted benthic sampling to characterize habitat delineations. Incorporating these recommendations will provide the level of accurate and precise baseline habitat data necessary for an efficient and effective consultation process.”] [Footnote 6: March 29 2021 Letter from Louis A. Chiarella Assistant Regional Administrator NMFS to Michelle Morin Environmental Branch Chief BOEM at 1-2 (emphasis added).] The letter continues:[Italics: “We encourage BOEM and developers to meet with us early in the process prior to developing benthic survey plans to facilitate an understanding of our resource concerns and information needs for the consultation process.”] [Footnote 7: See id at 2.]Enclosed in the letter is NMFS’ “Recommendations for Mapping Fish Habitat” document. The fact that the agency must make repeated efforts to obtain cooperation and compliance by applicants and even BOEM is unacceptable and is evidence of a reckless approach by BOEM in OSW development.-A study included as a reference for base-line assessment conducted for the New Jersey Department of Environmental Protection’s (NJDEP) on offshore wind was completed in July 2010 – over 13 years ago. These studies are out-dated. It is also unlikely that they would meet the NMFS’s Recommendations for Fish Habitat assessments.</p>	
BOEM-2022-0053-0140-0044	<p>Further water column stratification could affect a number of species vital to fisheries and local ecosystem health including summer flounder. [Footnote 20: T.M. Grothues and E. A. Bochenek 2011: Fine scale spawning habitat delineation for</p>	<p>BOEM does not expect that activities associated with the development of the Projects would lead to increased stratification or that increased stratification would threaten ecosystem health. Rather, development and operation of</p>

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	<p>winter flounder (<i>Pseudopleuronectes americanus</i>) to mitigate dredging effects –Phase II (Cycle 8) 2/2011.] The health of habitat for these and other species is closely associated with Mid-Atlantic Ocean conditions. Further increased mortality and reduced reproductive success of shellfish and other species has been associated with warming-induced shifts to the stratification of cycles in oceanographic conditions. [Footnote 21: D. A. Narvaez D. M. Munroe E. E. Hofmann J. M. Klinck and E. N. Powell 2015: Long-term dynamics in Atlantic surfclam (<i>Spisula solidissima</i>) populations: the role of bottom water temperature. <i>Journal of Marine Systems</i> 141 136-148.] This indicates that further alterations to ocean mixing may lead to changes in vital species activities across the board. Turbine arrays may directly or indirectly affect seasonal processes that dictate water column nutrient transfer among ecosystems and species. [Footnote 22: Travis Miles Josh Kohut and Daphne Munroe et al. Could federal wind farms influence continental shelf oceanography and alter associated ecological processes? A literature review Rutgers University and Science Center for Marine Fisheries (SCEMFIS) (Dec. 1 2020) available at <a href="https://scemfis.org/wp-content/uploads/2021/01/ColdPoolReview.pdf">https://scemfis.org/wp-content/uploads/2021/01/ColdPoolReview.pdf</a>] Building arrays of offshore wind turbines off the Mid-Atlantic states could have effects on the annual cycle of ocean water temperatures that are critical to the region’s fish and shellfish habitat. In addition to impacts on the Atlantic cold pool and the high regional fishery productivity that it supports heat absorbed by Ocean Wind 1’s steel monopoles will warm the surface water and water column including local benthic areas and this may extend to cumulative effects from the heat dissipated by the entire 98-turbine array. [Footnote 23: Travis Miles et al Could federal wind farms influence continental shelf oceanography and alter associated ecological processes? A literature review. SCEMFIS (2020) <a href="https://scemfis.org/wpcontent/uploads/2021/01/ColdPoolReview.pdf">https://scemfis.org/wpcontent/uploads/2021/01/ColdPoolReview.pdf</a>] This would have significant and serious impacts on the ecosystem including cumulative impacts. The DEIS fails to fully assess the impacts of these combined projects to these</p>	<p>the Projects could lead to increased mixing in the water column. The Draft EIS includes a discussion of how mixing of the water column could potentially affect the strong seasonal stratification in the Atlantic OCS, otherwise known as the Mid-Atlantic Cold Pool. Species that may be vulnerable to disruptions of the Mid-Atlantic Cold Pool have been identified in the Draft EIS. Modeled disruptions to hydrodynamics in the Atlantic OCS and theoretical impacts on resources are discussed based on the best available peer-reviewed literature, including more recent studies by groups that include some of the same authors in Narvez et al. (2015). The more recent studies by Timbs et al. (2018) and Hofmann et al. (2018) are more appropriate for the discussion on Atlantic surfclam as they relate to the Mid-Atlantic Cold Pool. A discussion of potential changes in nutrient dynamics and resulting impacts is included in the Draft EIS. Determinations for impacts were made considering cumulative effects from the Projects and existing and future developments (see Section 3.13.5.2).</p>



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	unique ecosystems and therefore cannot avoid reduce or mitigate effects that threaten the sustainability of marine resources.	
BOEM-2022-0053-0140-0052	(2) [Bold: Habitat Change]e. Introducing hard substructures into the marine environment creates artificial reefs leading to the settlement of marine organisms in the area. This can be positive as well as negative. It increases biodiversity but can also potentially introduce new harmful species (including invasive species) and disrupt food chains. f. The creation of these large homogenous changes to the sea floor will change the environment and the impact it has on marine life is uncertain but could result in displacement.	A discussion of reef effects from presence of structures is included in Section 3.13.3.2. These paragraphs discuss the potential impacts of redistribution of fish populations and vulnerability to predation or fishing pressure due to attraction to artificial reefs. One example of a species that may benefit from presence of new structure is mentioned (citing Stevens et al. 2019). However, BOEM mostly disagrees that impacts due to the presence of structures and reef effects would be positive. A discussion was added in Section 3.13.3.2 that considers the potential expansion of invasive species.
BOEM-2022-0053-0140-0053	(3) [Bold: Dredging and Ports]g. Impacts on benthic species during dredging for cable placement will disrupt benthic species through impingement entrainment and capture. In addition “Habitat disturbance and modification associated with dredging may also affect benthic prey species.” [Footnote 34: See id page 3.19-22.] Many benthic species represent the base of the marine food chain.	BOEM agrees with the comment. A discussion of these potential impacts is included in Section 3.13.5, including mention of potential entrainment of fish during dredging.
BOEM-2022-0053-0143-0028	The Bureau has not provided any basis for its conclusion that “the likelihood of invasive species becoming established as a result of offshore wind activities is “very low ”and “highly unlikely”. Although in its assessment of this likelihood it did consider bilge water discharge its assessment ignored the alteration of benthic habitat from smooth featureless seafloor to introduction of hard bottom concrete aprons and structures which could serve as invasion stepping stones to a myriad of invasive fishes invertebrates and their pathogens. Thus it considered the increase in risk to benthic resources of the project to be only “marginally higher” than existing risk from transoceanic shipping because its focus was on bilge water. The assessment focused on bilge water and not habitat modification serving as semi-permanent areas that could serve as “stepping stones” for invasive species to far more easily successively reach more and more regions of the Atlantic.	The determination of low risk of introduction of invasive species from accidental releases was made based on the relatively low risk of accidental releases and Empire’s implementation of measures to reduce risks (BOEM 2021a). However, the risk of expansion of invasive species distributions in the OCS is a possibility, as suggested by the commenter. Information was added in Section 3.13.3.2 discussing the “stepping-stone” hypothesis by Reubens et al. (2014) and others.

Comment No.	Comment	Response
BOEM-2022-0053-0143-0029	<p>For example the offshore wind structures can reliably provide fixed-location altered ecosystems in proximity to one another that allows the troublesome lionfish species to invade waters off the coast of New Jersey Delaware and Virginia (which are now free of any populations or aggregates of lionfish) wreaking havoc on the native fish there and destroying or seriously adversely impacting the fisheries in these states. [Bold: The native marine species that lionfish are decimating serve important ecological commercial and recreational purposes]. [Why are lionfish such a problem? <a href="https://oceanservice.noaa.gov/facts/lionfish.html">https://oceanservice.noaa.gov/facts/lionfish.html</a>]</p>	<p>The risk of expansion of invasive species distributions in the OCS is a possibility, as suggested by the commenter. Information was added in Section 3.13.3.2 discussing the “stepping-stone” hypothesis by Reubens et al. (2014) and others.</p>
BOEM-2022-0053-0143-0030	<p>Contrary to the implication of the DEIS an invasive species does not need to outcompete local benthic fauna in order to adversely affect local benthic fauna; It may simply introduce predation pressures to which local benthic fauna do not have any or any adequate defense.</p>	<p>There are no statements in Section 3.13 of the Draft EIS that suggest that an invasive species would need to outcompete local fauna to adversely affect local communities. If the commenter is referring to a statement made on page 3.13-11 of the Draft EIS, the discussion states that the establishment of invasive species could require certain conditions. This discussion on the same page states that invasive species could have adverse impacts on resources. More information was added in Section 3.13.2 on the potential spread of invasives due to the presence of structures and further mention of potential impacts.</p>
BOEM-2022-0053-0143-0036	<p>The effects of magnetic fields are not necessarily minor just because the effects of the magnetic field extends to less than 50 feet from the cable. The conclusion that “Any effects... would be local and would not have population-level impacts” cannot be said for Sturgeon and other animals that use the Hudson and are very magneto sensitive. The mitigation suggested to protect sturgeon populations is insufficient and there is no indication that approval is conditioned upon such mitigation.</p>	<p>The conclusion in the Draft EIS is that the presence of EMF could have “minor to moderate” adverse impacts on finfish, invertebrates, and EFH. This determination is based on the need for further studies on population-level impacts while taking into consideration the recent studies that demonstrate potential population-level impacts for a few species (e.g., Harsanyi et al. 2022). Regarding the comment on sturgeon populations, and as discussed in the Draft EIS, Acipenseridae are magneto sensitive and could potentially be affected by the presence of EMF. However, studies in the peer-reviewed literature have found mixed results on actual impacts on sturgeon (e.g., Klimley et al. 2017).</p>

<b>Comment No.</b>	<b>Comment</b>	<b>Response</b>
BOEM-2022-0053-0143-0037	Wind-turbine power plants impact local atmospheric conditions through their wakes characterized by reduced wind speed and increased turbulence. At certain threshold humidity levels localized sharp drop in air pressure caused by the blade pass causes water vaporization which when subjected to the turbulence in the wake of a turbine enables the water vapor to expand over a larger area. This turbine-induced low cloud cover in turn impacts zooplankton abundance and ecosystems as autotrophic activity is impaired which affects heterotrophic planktonic organisms.	A discussion was added on the atmospheric stratification from warming of air below wind turbine height (Section 3.13.3.2). The commenter does not reference studies that indicate impacts on zooplankton abundance and the ecosystem due to this potential phenomenon. BOEM is not aware of studies that specifically address that idea.

**P.6.13 Land Use and Coastal Infrastructure**

**Table P.6.13-1 Responses to Comments on Land Use and Coastal Infrastructure**

Comment No.	Comment	Response
BOEM-2022-0053-0140-0018	<p>Another area of consideration is the onshore infrastructure necessary to manage this new coastal-dependent industry of offshore wind energy development. Each offshore wind energy project will need operation and maintenance facilities. Further there is the need for larger manufacturing centers and marshaling ports. As such COP EIS must include the following for operation and maintenance:<a href="https://porteconomicsmanagement.org/pemp/contents/part6/port-resilience/hurricanes-global-container-ports/">https://porteconomicsmanagement.org/pemp/contents/part6/port-resilience/hurricanes-global-container-ports/</a> a. Type of maintenance approach (ship-based air support);b. Land use requirements; c. Proximity to the offshore wind farm; d. Storage capabilities for spare components; e. Wharf area required bearing capacity; f. Ship depth requirements; and g. Secondary impacts from influx of workers and support services. Specifically COA advocates that the COP-EIS include land-based facilities that:1. reduce the overall footprint;2. are climate resilient;3. are as energy efficient as possible; and4. sited in environmentally friendly locations.</p>	<p>A discussion of land use requirements of the proposed onshore Project infrastructure, including onshore substations and O&amp;M facilities, and impacts as a result of increased port utilization is included in Section 3.14, <i>Land Use and Coastal Infrastructure</i>. As described in Chapter 2, <i>Alternatives</i>, Empire is considering using both ships and helicopters to perform any maintenance needed on WTGs after construction with spare components stored at the O&amp;M facility.</p>
BOEM-2022-0053-0140-0019	<p>Moreover the impact of sea level rise and increased storm activity including hurricanes leave onshore areas vulnerable and these critical risk assessments were not considered. This is especially important because this region is predicted to be more vulnerable to storms. For example[<i>Italics: About 38% of all the global container port activity occurs in areas subject to high hurricane risk. Coastal China South Korea Japan and the American Eastern Seaboard are the most potentially disrupted areas with high container port activity levels. In addition to disrupting and stopping port activity hurricanes can damage port equipment and superstructures. Yard activity can be disrupted with toppled containers and flooder areas damaging cargo and equipment. Connections with the hinterland can also be damaged such as with flooded road and rail connectors. On some acute occasions port infrastructure such as piers can be damaged. A container port usually takes two to three days after a category 1 hurricane to resume full operations. If a container port is a transshipment hub the disruptions caused by a hurricane can be extensive for the schedule integrity of maritime shipping networks and could favor the use of alternative hubs. [Footnote: Port Economics Management and Policy “Risk of Hurricanes for Global Container Ports 2019” as seen 1/17/2023</i> <a href="https://porteconomicsmanagement.org/pemp/contents/part6/port-">https://porteconomicsmanagement.org/pemp/contents/part6/port-</a></p>	<p>A description of the potential impacts of severe weather and natural events, including hurricanes, is included in Section 2.3, <i>Non-Routine Activities and Low-Probability Events</i>.</p>

<b>Comment No.</b>	<b>Comment</b>	<b>Response</b>
	resilience/hurricanes-global-container-ports/]The DEIS does not adequately identify these required and connected onshore facilities and activities and therefore it is incomplete.	

**P.6.14 Marine Mammals**

**Table P.6.14-1 Responses to Comments on Marine Mammals**

Comment No.	Comment	Response
BOEM-2022-0053-0054-0004 & 0005	In Section 3.15.3 of the DEIS which addresses “Impacts of the No Action Alternative on Marine Mammals” BOEM should analyze the extent to which the impacts of climate change under the No Action Alternative pose a population-level threat to marine mammals. The DEIS for Empire Wind however does not contain any such assessment. An analysis of the likelihood of population-level impacts to marine mammals under the No Action Alternative is essential for BOEM to accurately establish the environmental baseline against which to evaluate impacts of the project. Since a large-scale buildout of wind projects (including offshore wind) is a central element of the U.S. effort to reduce greenhouse gas emissions this analysis would also help readers assess what would happen to marine mammal populations if this large-scale buildout does not occur. Therefore the Sabin Center recommends that BOEM perform such an analysis here as it has done in evaluating similar projects.	The impacts of the No Action Alternative presented in Section 3.15.3.3 include the impacts of existing environmental trends, including climate change. The impact level definitions presented in Section 3.15.2, which are used for impact determinations in Section 3.15.3, include whether population-level effects are anticipated.
BOEM-2022-0053-0075-0002	The environmental impact statement also indicates that “marine mammals could be intermittently exposed to pile-driving noise for up to 8 consecutive years from one or more projects with additional potential exposure possible beyond 2030.” This pile driving “is expected to occur for 4 to 6 hours at a time.” As someone who lives in proximity to a pile driving project that is currently underway I can attest to the deafening repetitive noise associated with such a project. The environmental impact report claims “the intense impulsive noise associated with impact pile driving can cause behavioral and physiological effects” in marine mammals. This can “limit an individual’s ability to locate prey detect predators navigate or find mates and could therefore have long-term effects on individual fitness.” These effects could leave whales more susceptible to vessel strikes as it impairs their cognitive ability to avoid incoming vessels.	The evaluation of impacts of impact pile driving in Section 3.15.3.2 has been revised to explicitly address masking, including masking of “threats” such as predators or vessels.
BOEM-2022-0053-0119-0007	Using best available science BOEM and Empire Wind should implement and enhance protective measures for the critically endangered North Atlantic right whale and other vulnerable marine species including but not limited to noise-mitigation technologies clearance and exclusion zones and seasonal restrictions.	Measures required in NMFS’s final Letter of Authorization governing incidental take of marine mammals and BOEM’s proposed measures that are adopted based on ESA consultation with NMFS will be incorporated into the terms and conditions of COP approval. These measures include noise mitigation strategies, clearance and



Comment No.	Comment	Response
		shutdown zones, and time-of-year restrictions as defined in Empire’s Letter of Authorization application and Appendix H of the Final EIS.
BOEM-2022-0053-0140-0035	Currently there are 11 companies conducting pre-construction activities for offshore wind energy development as indicated by the Active Authorizations for Incidental Take Authorizations. [Footnote 3: National Oceanic and Atmospheric Administration Incidental Take Authorizations for Other Energy Activities (Renewable/LNG) as seen 1/9/2023 <a href="https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable">https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable</a> .] What monitoring is being done documented and publicly shared to ensure these pre-construction activities are protective of marine life? If monitoring to protect marine life is poorly conducted or lacking what promise does that hold for monitoring planned during construction and operation?	Mitigation, monitoring, and reporting associated with pre-construction activities are identified for each individual incidental take authorization based on the specific activities proposed and can be reviewed at the link provided by the commenter.
BOEM-2022-0053-0140-0040	It is clear that the monitoring and response systems in place to ensure marine protections are insufficient or not functioning even during pre-construction activities. The current unprecedented wave of whale deaths along the NY/NJ coastline is an example. In less than 40 days seven dead whales – all endangered or protected species – washed-up on New York and New Jersey beaches. This incident highlighted the fact that there is a lack of clear transparent and inclusive monitoring regarding the current OSW activities by federal and state agencies and a lack of standardization for responses that can determine potential links to OSW activities. Absent such systems there is deniability by the OSW industry and responsible suspicion by a concerned public.	Ongoing activities off New York and New Jersey are currently limited to HRG surveys. BOEM and NMFS have assessed the potential effects of HRG surveys associated with offshore wind development in the Atlantic. Following a rigorous assessment, NMFS has concluded that these types of surveys are not likely to harm whales or other endangered species. BOEM requires developers to use protective measures, such as protective species observers, exclusion zones, and independent reporting, to avoid whales during these survey activities. Both the Marine Mammal Commission and NJDEP have issued their independent statements on this topic making similar determinations. NMFS is the lead for determining causes of whale strandings and is working with its partnerships to continue to gather data to help determine the cause of death for these mortality events. BOEM will not speculate on the cause of death of these whales.

Comment No.	Comment	Response
		<p>More information regarding offshore wind and whales is provided by NMFS at <a href="https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/frequent-questions-offshore-wind-and-whales">https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/frequent-questions-offshore-wind-and-whales</a> and by BOEM at <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Offshore%20Wind%20Activities%20and%20Marine%20Mammal%20Protection_1.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Offshore%20Wind%20Activities%20and%20Marine%20Mammal%20Protection_1.pdf</a>.</p>
<p>BOEM-2022-0053-0140-0049</p>	<p>(5) [Bold: Mitigation measures: The DEIS states: “Sound levels can be greatly reduced during pile driving activities using sound attenuation devices...The most commonly considered mitigation strategy is the use of bubble curtains.” However research has found that Bubble curtains do not work for all marine mammals. Again while COA recognizes and commends the whale detection buoys and publically available data the DEIS fails to adequately assess the impacts to marine mammals to ensure survival of the NARW and other marine mammals.</p>	<p>Use of sound-attenuation devices such as bubble curtains are only one strategy within a layered mitigation strategy that includes APMs for visual monitoring, use of soft-start methods, clearance and shutdown zones, sound field verification, and seasonal restrictions and BOEM-proposed measures for passive acoustic monitoring and pile driving monitoring plans, sufficient protected species observer coverage, notification, and reporting requirements. ESA consultation with NMFS is underway and findings of the Biological Opinion are not anticipated to be available until September 2023; however, a jeopardy decision is not expected for NARW or any other ESA-listed marine mammal.</p>
<p>BOEM-2022-0053-0140-0043</p>	<p>Equinor should acknowledge those species protected by New Jersey State Law as well since the projects are located just 19 miles from New Jersey’s coast.</p>	<p>The referenced statement does not appear on Draft EIS page F-13, as noted in the commenter’s footnote. Furthermore, the Proposed Action does not include facilities in New Jersey or within New Jersey state waters, and the State of New Jersey is not identified as having jurisdiction over required permits or approvals for the Projects (see Appendix A, Table A-1).</p>

Comment No.	Comment	Response
BOEM-2022-0053-0140-0046	<p>Thus the DEIS must ensure the protection of these mammals. It seems implausible that construction of Empire Wind 1 and 2 could co-exist with the diversity quantity and activities of whale activity. Indeed the DEIS fails to provide evidence of a symbiotic existence. Some more specific deficiencies in the Draft EIS review of marine mammal impacts include:(1) [Bold: Noise Pollution from Pre-construction and Construction activities:] Primary noise-generating activities during construction have been identified as impact pile driving during wind turbine foundation installation vibratory pile driving during cofferdam installation and bulkhead repair and impact pile driving of small piles used for bridge foundations and for temporary HDD “goal posts.” a. Studies have shown that construction noise related to offshore wind farms (especially pile driving) may cause behavioral changes and negative impacts on seals porpoises dolphins and whales. b. Research on Beaked Whale strandings in the Mariana Archipelago indicate the strandings may be associated with sonar activities. The researchers note that “to investigate the cause of death in sonar-associated strandings they need to be reported quickly. Skilled technicians need to be available to promptly examine carcasses before they begin to decompose.” The researchers state “For many species of animals including humans occasional and unpredictable noise is often perceived as a threat. The research found that the likelihood that the strandings were coincidental is less than 1 percent. Also disruption effects have been measured up to 20 miles from the construction site. c. A report regarding acoustic data in the project area is referred to in the DEIS however the footnote in the DEIS states the results would be reported in June 2022. Where and what are the results of the acoustics report and how will it impact the information being reviewed in this DEIS?(2) [Bold: Noise from Operation]a. This includes both the noise from the turbines themselves which emit a constant low-frequency noise and also the increased vessel traffic from operations and maintenance (O&amp;M) activities. b. The operational noise stems from vibrations in the tower caused by the gearbox mesh in addition to the generator causing underwater noise.</p>	<p>The underwater acoustic assessment report (Appendix M-1 of the COP), dated June 2022, is available at <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/Public_EOW%20COP%20Appendix%20M-1_Undrwr%20Acous%20Assess.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/Public_EOW%20COP%20Appendix%20M-1_Undrwr%20Acous%20Assess.pdf</a>. Results of this assessment were included in the Draft EIS and taken into account when making impact determinations.</p>
BOEM-2022-0053-0140-0047	<p>(3) [Bold: Vessel Strikes]a. Increased vessels and activities by these vessels may result in increased strikes with marine mammals such as the critically endangered Northern Atlantic right whale. This includes from construction and O&amp;M. b. There is also concern that the wind farms will displace other marine commerce and transit funneling those vessels into narrower lanes which may increase strikes. c. The COP EIS must account for competing uses and navigation impacts of offshore wind facilities. With increased or altered traffic patterns the risk of collisions and spills of gas oil and chemicals may increase</p>	<p>Effects of the Proposed Action on navigation are analyzed in a separate section of the EIS (Section 3.16). Effects of vessel collisions and accidental releases on marine mammals are already addressed in this section of the EIS, and vessel strike mitigation is included as part of the Proposed Action.</p>

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	<p>with negative effects to water quality and marine life. Exposure to oil and other hydrocarbons from oil spills can drastically affect marine mammals and ecosystems. Further vessel strike mitigation is vital to reducing collision between both commercial and noncommercial vessels and North Atlantic right whales. [Footnote 10: Rutgers University Offshore Wind Energy Symposium “Lightning Talks Session 1” Slide 11 January 12 2023 <a href="https://osw.rutgers.edu/wp-content/uploads/sites/930/2023/01/OSW-Symposium_PM-lightning-session-1.pdf">https://osw.rutgers.edu/wp-content/uploads/sites/930/2023/01/OSW-Symposium_PM-lightning-session-1.pdf</a>.] The COP EIS should also consider spacing between offshore wind turbines and high-traffic areas through either increased spacing or based on consultation with the National Marine Fisheries Service and the United States Coast Guard.</p>	
<p>BOEM-2022-0053-0140-0048</p>	<p>(4) [Bold: More Protective Consideration of the North Atlantic Right Whale]a. According to the NMFS not one NARW can be lost without further imperiling the species. This highly endangered species is exceptionally vulnerable to additional barriers in its migratory patterns and prime foraging habitat. While BOEM requires mandatory minimization procedures and marine mammal observers for construction and operation of offshore wind projects it is not enough. Current minimization measures including passive acoustic monitoring (PAM) via glider [Footnote 27: Moscrop et al. Vocalization rates of the North Atlantic right whale J. CETACEAN RES. MANAGE. 3(3):271–282 2001 available at <a href="https://www.researchgate.net/publication/268273193_Vocalisation_rates_of_the_North_Atlantic_right_whale">https://www.researchgate.net/publication/268273193_Vocalisation_rates_of_the_North_Atlantic_right_whale</a>] do not account for when marine mammals are not vocalizing. Right whales vocalize frequently. But these vocalizations tend to be “irregular and non-repetitive” and based on activity level. [Footnote 28: See Id.] Further it is likely that most known marine mammal mortalities occur via ship-strike. [Footnote 29: Ship Strikes and Right Whales Marine Mammal Commission (last accessed 4/28/2012) available at <a href="https://www.mmc.gov/priority-topics/species-of-concern/north-atlantic-right-whale/ship-strikes/">https://www.mmc.gov/priority-topics/species-of-concern/north-atlantic-right-whale/ship-strikes/</a>] While PAM marine mammal observers shut-down procedures and other mitigation measures can be useful during construction and building spatio-temporal baseline data there is uncertainty regarding right whale behavior and offshore wind foundations and vessel activity. The COP EIS needs to address this problem.</p>	<p>Mitigation measures in the EIS include both passive acoustic monitoring and visual monitoring, which would provide for detection of non-vocalizing marine mammals, as well as vessel strike avoidance measures.</p>
<p>BOEM-2022-0053-0143-0007</p>	<p>In expressions of estimated impact on populations of marine life and other wildlife of various individual energy projects (including the subject Empire Wind project) of the offshore wind program generally and of regional programs in numerous statements that have been published throughout this NEPA process the federal agencies and commissioned assigns [underlined: when explaining</p>	<p>As acknowledged in Section 3.15.3.2, there is uncertainty regarding how marine mammals, particularly large whales, will react to the presence of offshore wind structures, as these would be novel</p>

Comment No.	Comment	Response
	<p>how a conclusion]—that a species or taxon is not expected to be significantly adversely affected by operation of the wind-turbine power plants— [underlined: is reached] one of the common statements is that the animals are expected to be able to avoid operating turbines or that they will not be likely to physically contact them. There is no earnest examination of or supported conclusions about whether animals will or won't travel between turbines or will avoid the lease area altogether or will suffer noise-induced physiological oxidative stress from attempting to travel through or inhabit within an operating power plant in between the turbines and what the consequence of that are for different taxa.</p>	<p>structures on the Atlantic OCS. The potential for avoidance and the impact of such avoidance are evaluated in the EIS under the presence of structures IPF, and noise impacts, including physiological stress, are evaluated under the noise IPF.</p>
<p>BOEM-2022-0053-0143-0013</p>	<p>The bureau has not (other than for pile driving during construction) [Footnote 9: The Bureau has to some degree considered effects of sound-generating hydrographic studies for site characterization. However the rationality of the conclusions (of negligible to minor adverse impact for most taxa is questionable given known empirical studies published in peer-reviewed scientific journals of the effects of the types and frequencies of sound and given the known sound signatures and received levels of sound pressure caused by emission from sound-generating equipment that has been declared by the developers as those they intend to use to conduct the surveys. (SEE APPENDIX A)] determined the radius of harm (for example of operating turbines) or made any statements about impacts to the respective taxa when the radii of harm of individual turbines may overlap. [Footnote 10: The Bureau has not actually quantitatively estimated effects (of the projects it is tasked with reviewing) on any taxon or species by issuing a quantitative estimate of decline in fitness (reductions in survival rates or reproductive rates) average condition or recruitment (replacement rate) from Offshore Wind Activity within and near the power plant footprint nor performed any energy budget analyses on any species.]</p>	<p>As noted in Section 3.15.5, acoustic radii were quantified for impact pile driving and vibratory pile driving, both of which are presented in the section. Additionally, an estimated acoustic radius for operational WTG noise based on the best available information is provided in Section 3.15.5. Overlapping radii is not a concern during pile driving, as simultaneous pile driving would not occur. If acoustic radii associated with operating WTGs overlap, marine mammals would be expected to avoid the area. Impacts of avoidance of the Lease Area are evaluated under the presence of structures IPF.</p>
<p>BOEM-2022-0053-0143-0039</p>	<p>The Bureau does not consider operational noise from the Empire Wind proposed power plant nor cumulative noise from other offshore wind activity in the region generally to be a significant concern. (See e.g. Section 3.6-28 benthic animals). The notion that turbine noise can be masked at the distances stated in the DEIS is dependent upon the irrational passing of the sound of the turbine through a mathematical model to smooth out the signature spectral peaks on the sound spectrum. The notion expressed in the COPs and environmental reviews including the DEIS that operational noise can be expected to be significantly masked by background noise is unsubstantiated. Large Wind Turbine noise is characterized by sharp spectral peaks at the blade-passing frequency and its integer harmonics. Only after the recorded sound of a turbine is passed through a traditional smoothing (a mathematical) algorithm can the output be deemed to</p>	<p>Studies on operational noise in existing wind farms, along with studies evaluating the relationship between sound levels and turbine power, represent the best available science and information for evaluating impacts of operational wind noise. These studies are summarized in Section 3.15.3.2 of the Draft EIS. Cumulative noise of operating wind farms is evaluated in Sections 3.6.3.2, 3.13.3.2, 3.15.3.2, and 3.19.3.2. Operating wind turbine noise associated with the Proposed Action is</p>

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	<p>be something that can be ‘masked’ by background noise. Though it has been argued that this transformation needs to be performed to be able to even compare the magnitude of turbine noise to background noise the sound signatures of operational wind-turbines should not be passed through mathematical smoothing algorithms before assessing whether they will blend in with or be obscured by background noise because the output of such smoothing algorithms [Bold: is not representative of the sound that is actually experienced]. Therefore the conclusion that the sound can be “masked” by background sounds such as the sound of ocean itself –which sounds do not have such properties as sharp spectral peaks—is extremely doubtful.</p>	<p>evaluated in Sections 3.6.5, 3.13.5, 3.15.5, and 3.19.5.</p>
<p>BOEM-2022-0053-0143-0052</p>	<p>The Draft EIS does not recognise that noise (even noise well below the permanent hearing threshold for damage) causes oxidative stress that is physiologically damaging and that such physiological damage is not limited to the hearing apparatus. This topic has been covered in our letter to BOEM on NARW Strategy and is attached as Appendix E as well as in parts of Appendix A. We respectfully request BOEM refer to those sections on physiological harm caused by noise-induced oxidative stress [Footnote 16: We incorporate this document in toto into our comments but wish that BOEM acknowledge that oxidative stress is an adverse impact of noise and acknowledge the thresholds for and radii of harm.] and take such harm into consideration when estimating the adverse impact of operational noise hydrographic survey activities and construction.</p>	<p>The EIS does recognize the potential for physiological stress in marine mammals as a result of noise exposure. There have been no studies linking oxidative stress in marine mammals and exposure to noise and no establishment of noise thresholds that trigger such stress.</p>
<p>BOEM-2022-0053-0143-0053</p>	<p>We request BOEM fully acknowledge and estimate all fitness consequences to marine life of the project using the guidance in Appendices A and E and reassess.</p>	<p>The appendices to the comment letter do not provide any guidance for attempting to quantify fitness consequences. The analysis presented in the EIS is adequate to assess effects on marine species.</p>
<p>BOEM-2022-0053-0178-0001</p>	<p>The environmental statement acknowledges that “the presence of structures associated with offshore wind facilities could result in avoidance and displacement of marine mammals, which could potentially move them into areas with lower habitat value or with higher risk of vessel collision or fisheries interactions.” With that in mind, the biological assessment produced by the National Marine Fisheries Service provided some proposed mitigation to reduce these risks. The proposed strategies ultimately fall short of ensuring marine mammal safety. For example, the biological assessment indicated that “all vessel operators will reduce vessel speed to 10 knots (18.5 km/hr) or less when any lare whale, any more/calf pairs, whale or dolphin pods, or larger assemblages of cetaceans are observed (within 100m) near an underway</p>	<p>Vessel speed reductions are one of the most effective mitigation measures to minimize vessel strike risk. Although this risk cannot be completely eliminated, speed reductions combined with the other vessel strike mitigation measures (e.g., separation distances and use of dedicated visual observers) are expected to reduce the risk sufficiently that such interactions are extremely unlikely to occur.</p>



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	<p>vessel.” While this suggestion would help to reduce the speed at which a vessel may strike a whale, it does not take into account that “marine mammals are expected to be most vulnerable to vessel strikes when within the vessel’s draft and not detectable by visual observers (e.g., animal below the surface or poor visibility conditions such as bad weather or low light)” (Empire Offshore Wind Projects Environmental Statement, 2022). If vessel operators are unable to see a marine mammal, they are unable to reduce their speed which can lead to fatal vessel strikes. While the biological assessment does indicate that a passive acoustic monitoring system will be used to detect vocalizations of North Atlantic Right Whales, the report does not indicate if the PAM system will be used to monitor the vocalizations of other marine mammals. Despite efforts to reduce the risk of vessel strikes, the increase in vessel traffic (up to 276 vessels) paired with a vessel operator’s inability to observe a marine mammal, does not ensure marine mammal safety.</p>	
<p>BOEM-2022-0053-0178-0002</p>	<p>The biological assessment also acknowledges that the following animals will be adversely affected by the impact pile-driving needed to complete the project: Fin Whales, North Atlantic Right Whales, Sperm Whales, Kemp’s Ridley Sea Turtle, Leatherback Sea Turtle, Loggerhead Sea Turtle, and the Atlantic Sturgeon. Many of these animals are experiencing population declines, including the North Atlantic Right Whale and the Kemp’s Ridley Sea Turtle which are both listed as critically endangered. In order to save these animals from extinction, it is crucial that we do not cause them any stress or undo harm which could potentially risk the survival of their species. While the biological assessment considers possible mitigation measures to reduce the potential side effects of pile-driving, the proposed measures do not address all of the factors impacting our marine life. For example, the biological assessment claims that “impact pile driving of foundations will not occur from January 1 through April 30” or “from December 1 through December 31, unless unanticipated delays” arise. While these dates are helpful because they include a crucial migratory period for the critically endangered North Atlantic Right Whales, they fall short of NOAA’s proposed speed reduction days of November 1-May 30. The dates provided in the biological assessment also do not take into account the effect that impact pile-driving will have on marine mammals that live in the area year round. With a plentiful food source, Humpback Whales can be found in our waters all year long.</p>	<p>The time-of-year restriction for pile driving is designed to reduce impacts on NARWs, as their population numbers are critically low. The exposure modeling for impact pile driving accounted for the seasonality of occurrence for all marine mammal species. Modeling results indicated that only a small number of fin and minke whales and one fin whale may experience an injury (i.e., PTS) due to impact pile driving (Table 3.15-14). These exposure estimates do not account for the use of protected species observers and passive acoustic monitoring to implement clearance and shutdown zones, which would further reduce the impacts associated with impact pile driving. Impacts on other species would be limited to behavioral disturbance of individuals. Neither injury nor behavioral disturbance associated with impact pile driving is anticipated to have population-level effects for any species that occurs in the Project area.</p>

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BOEM-2022-0053-0178-0003	<p>According to the environmental impact report, “the intense, impulsive noise associated with impact pile driving can cause behavioral and physiological effects” which can “permanently limit an individual’s ability to locate prey, detect predators, navigate, or find mates and could therefore have long-term effects on individual fitness.” To subject any whales, regardless of the season, to this trauma is unconscionable, inhumane, and threatens the success of the struggling populations. The biological assessment also indicates that if a marine mammal is observed in the vicinity of the impact pile-driving, the pile-driving will cease for a period of time. This relies solely on human observations and does not take into account the marine mammals that go undetected by the human eye because they are below the surface. This also does not take into account the effects that impact pile-driving can have on marine mammals in the surrounding area. The deafening sound of impact pile-driving will be easily detected by marine mammals because of their ability to use echolocation. As previously referenced, the environmental impact report acknowledges the permanent effects that impact pile-driving can have on marine mammals. These side effects can ultimately make them more susceptible to entanglements and vessel strikes. While some mitigation measures have been taken into consideration, they are not enough to ensure the safety of these precious marine animals. Due to the fact that animal safety is not ensured and critically endangered species are at risk, the Empire Offshore Wind Plant can not proceed as planned.</p>	<p>The implementation of a shutdown would be informed by both a visual observer and a passive acoustic monitoring operator, to increase detection probabilities for marine mammals. As stated in the BA and the Final EIS, only a small number of fin and minke whales may experience PTS (Table 3.15-14). This number may be further reduced by the use of protected species observers and passive acoustic monitoring to implement clearance and shutdown zones. No population-level impacts due to physiological or behavioral effects are anticipated for any species that occurs in the Project area.</p>

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**P.6.15 Navigation and Vessel Traffic**

**Table P.6.15-1 Responses to Comments on Navigation and Vessel Traffic**

Comment No.	Comment	Response
BOEM-2022-0053-0027-0005	<p>BOEM has inappropriately lowered the adverse impact on navigation and vessel traffic from major to moderate. Earlier this year BOEM concluded in the Ocean Wind 1 DEIS adverse project impacts would be major as seen in the following quotes:“ The impacts of the Proposed Action on navigation and vessel traffic would be major. The Proposed Action when combined with impacts from ongoing and planned activities including offshore wind would be major due primarily to the increased possibility for marine accidents which could produce significant disruptions for ocean users in the geographic analysis area. Proposed Action structures would increase the risk of allision as well as collision with other vessels navigating through WTGs and could interfere with marine radars. Radar is the main tool used to help locate other nearby vessels that are not otherwise visible particularly in adverse weather when visibility is limited. “The navigational complexity of transiting through the Wind Farm Area including the potential effects of WTGs and OSS on marine radars would increase risk of collision with other vessels (including non-Project vessels and Proposed Action vessels).” (3.16-18 Volume 1 Ocean Wind DEIS). Now BOEM uses similar wording but considers the risks to be negligible to moderate. “Impacts on navigation could include changes to navigational patterns and effectiveness of marine radar and other navigation tools for vessels approaching or navigating within or near the array. In conjunction with or in addition to vessel congestion this could result in the increased risk of incidents such as collision and allision which could result in personal injury or loss of life from a marine casualty damage to boats or turbines and oil spills.” (3.16-15).Increased navigational awareness while navigating through turbines could lead to increased crew fatigue which could also increase the risk of allision or collision and resultant injury or loss of life. The navigational complexity of transiting through the Wind Farm Development Area including the potential effects of wind turbines and offshore substations on marine radars would increase risk of collision with other vessels (including non-Project vessels and Proposed Action vessels). Furthermore the presence of the turbines could complicate offshore Search &amp; Rescue and resultant increased fatalities.” (3.16-18). “BOEM anticipates that cumulative impacts would range from minor to moderate. Wind activities would increase the</p>	<p>BOEM recognizes that the operating environment of the affected area for Lease OCS-A 0498 (Ocean Wind 1) is different from that of the New York/New Jersey Bight and the unique characteristics of each offshore wind lease area environment was considered during the drafting of the respective EISs. The impacts of the Ocean Wind 1 project were downgraded to moderate in the Ocean Wind 1 Final EIS. After review of the impact levels for each project (Ocean Wind 1 and EW 1 and EW 2), no updates to the Empire Wind Final EIS were made in response to this comment.</p>

Comment No.	Comment	Response
	<p>risk of allision and navigational complexity in the geographic analysis area resulting in an increased risk of collisions and allisions that could result in personal injury or loss of life from a marine casualty damage to boats or turbines and oil spills.”(3.16-25).</p>	
<p>BOEM-2022-0053-0100-0002</p>	<p>We appreciate BOEM seeking stakeholder feedback on the placement of undersea power cables. AWO members have long recognized that these cables represent a “hidden” hazard to navigation. Indeed there have been past instances of vessels striking undersea cables either during routine or emergency anchoring. These strikes and snares are a major safety risk for vessels and their crews and have done millions of dollars’ worth of damage to the cables.</p>	<p>As the commenter notes, Empire has conducted outreach to maritime users and regulators regarding submarine export cable routing to take all factors into account when considering cable placement. Section 3.16.5 addresses the adverse impacts of any deviations from “normal” anchorage activities such as vessels anchoring in an emergency scenario and posting a potential hazard to subsea cables. Empire will conduct a Cable Routing study (APM 205) to develop submarine export cable routes that avoid or minimize interactions with anchorage areas. Empire will also prepare a CBRA to identify appropriate cable burial depths and identify any needs for additional cable protections (APM 207) to protect cables from accidental strikes and snares.</p>
<p>BOEM-2022-0053-0113-0016</p>	<p>[<b>Bold: Navigational Safety Risk Assessment:</b>] We continue to raise the issue that having the developer of a project conduct the sole Navigational Safety Risk Assessment relied upon by both BOEM and the USCG is unacceptable as it involves a clear conflict of interest. We request therefore that the USCG conduct its own Navigational Safety Risk Assessment for the project including a full radar modeling study akin to the USCG Cape Wind study [Footnote 21: See Appendix M to the Cape Wind Energy Project Final EIS January 2009. Submitted to the United States Coast Guard December 16 2008; USCG Order #HSCG24-08-F-16A248 Cape Wind Radar Study.] which uses the size turbine projected for the Empire Wind projects as well as documented vessel traffic in the area and a full impact assessment on the search and rescue (SAR) capabilities of the USCG resulting from marine radar interference on USCG vessels and loss of HF radar coverage.</p>	<p>An NSRA was completed as part of the COP and was conducted per the guidelines in the USCG Navigation and Vessel Inspection Circular 01-19. As a cooperating agency, USCG has provided analysis of the NSRA within the process of EIS development. Moreover, USCG has published and sought comments for the Atlantic Coast PARS (USCG 2016) and the Northern New York Bight PARS (USCG 2021), which supplements and builds upon the Atlantic Coast PARS. These studies analyze all available sources of data relevant to the vessel traffic and navigation safety aspects of the affected area and serve as the basis for the relevant section analysis within the Project EIS. The Areas Offshore of</p>

Comment No.	Comment	Response
		<p>Massachusetts and Rhode Island PARS (USCG 2020) is a more recent reference, which included effects of radar due to WTGs and is incorporated as part of the EIS. In addition, the EIS analysis incorporates the timely National Academies of Sciences, Engineering, and Medicine (2022) report on WTG impacts on marine radar, <i>Wind Turbine Generator Impacts to Marine Vessel Radar</i>. It is outside the scope of the NEPA process to require additional USCG analyses or studies beyond what USCG has relied upon for its review and decisions regarding the Projects.</p>
<p>BOEM-2022-0053-0113-0018</p>	<p>In our EA comments on the Empire Wind lease attached for reference we highlighted the safety issues at hand including the fact that BOEM not only ignored but specifically rejected the USCG recommendation for a 2nm setback from the TSS when defining the lease boundaries [Footnote 22: See USCG letter to BOEM regarding the NY Area ID September 28 2015 attached.] due to BOEM’s desire to “ensure that lessees have sufficient flexibility to microsite a project within their lease areas”. [Footnote 23: See EA at NY-Public-EA-June-2016.pdf (boem.gov) p. 2-3 and 2-4 in BOEM’s explanation for rejecting a 2 nm setback from the TSS.] However BOEM’s priority was in the words of BOEM Director Hopper to be a “history maker” with the NY WEA rather than a responsible steward of human and natural life. [Footnote 24: See our comments on the Empire Wind NOI p. 3 regarding Director Hopper’s statement at the April 28 2016 NY Task Force meeting.]</p>	<p>BOEM considered the navigation safe distance recommendations published in the USCG Marine Planning Guidelines (Enclosure 3 of NVIC 01-19) in conjunction with other mitigations of relevance in the Proposed Action such as a straight-edged alignment with the TSS lanes and suitable lighting and marking in consultation with USCG for risk reduction to navigation safety. Presence of structures as impacts for the Proposed Action is discussed in Section 3.16.5 (<i>Impacts of the Proposed Action on Navigation and Vessel Traffic</i>). The risks associated with the Proposed Action were assessed on a qualitative and quantitative basis by Empire and results are presented in Section 3.16.5. The primary increase in marine accidents related to the presence of Proposed Action structures would be for a fishing vessel in transit colliding with a structure once every 169 years (this assessment is based on AIS data only). The powered allision risk for passing commercial vessels and a structure within the Lease Area was estimated to occur approximately once every 976 years. Assuming a 10-percent traffic increase to</p>



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		<p>represent potential future traffic trends, it was estimated that the powered allision risk would rise from one incident per 976 years to one per 888 years (COP Appendix DD, pages 132–133; Empire 2023). BOEM considered all relevant guidelines, proposed mitigations, and assessment of relevant impacts as part of the EIS development. No updates to the EIS were made in response to this comment.</p>
<p>BOEM-2022-0053-0140-0002</p>	<p>In addition to the many potential impacts to wildlife and marine and coastal resources Empire Wind’s COP EIS should consider the top-down impacts of the increased vessel activity increased onshore activity shifts in recreational and commercial ocean uses and the foundation cabling and interconnection infrastructure associated with the project. The Empire Wind DEIS does not adequately consider changing traffic patterns navigational safety and port access conflicts. Specifically: a. The siting of the Empire Wind project is squeezed in between busy shipping lanes. B. One danger is that vessel density – ships operating within the same sea space – would be increased by the funneling effect of constricting traffic between turbine arrays. C. There is also concern that the development of these wind projects in close proximity will displace transit corridors and create narrow lanes where vessels are expected to travel. This could lead to increased accidents and spills. D. The Port of New York and New Jersey is a massive economic enterprise that is a hub for vessel traffic. There are four container terminals in the port whose combined volume makes it the largest on the East Coast. Consider these port statistics: 577649 vehicles – 6.3 million TEUs of containerized cargo – 730617 cruise ship passengers – 8596 deep-sea vessel transits – Over 4000000 smaller vessel harbor transits.e. Another consideration is the speed and agility of large ships maneuvering a small competitive space. For example it can take an ultra large 2.5 miles of full astern to brake to a halt.</p>	<p>The impact assessment for the Proposed Action, presented in Section 3.16.5 of the Draft EIS, included a comprehensive evaluation of adverse impacts on vessel traffic and navigation including a discussion on cable emplacement (and maintenance) impacts and vessel traffic impacts. See also Section 3.18, <i>Recreation and Tourism</i>. No updates to the EIS were made in response to this comment.</p>
<p>BOEM-2022-0053-0140-0005</p>	<p>Another consideration is the radar shadow effect of rotating turbine blades that can affect navigation radars.</p>	<p>The Draft EIS addresses the adverse impacts of WTG structures on marine vessel radars in Section 3.16.5. As part of its assessment, BOEM considered the analysis of marine radar effects included in the NSRA (COP Appendix DD) and the National Academies of Sciences, Engineering, and Medicine 2022 study</p>

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		published by the National Academies Press (2022) titled <i>Wind Turbine Generator Impacts to Marine Vessel Radar</i> .
BOEM-2022-0053-0140-0006	The distance between the sea surface and the lower edge of the blades of the turbines is a significant cause for concern for ships. The height of a Maersk container ship is 240 feet and a cruise line is 180 feet. These can potentially lead to accidents especially given the problems with radar.	The impact assessment for the Proposed Action, presented in Section 3.16.5 of the Draft EIS, included a comprehensive evaluation of adverse impacts on vessel traffic and navigation including a subsection titled “presence of structures.” Vessels that exceed a height of 85 feet (26 meters) are unlikely to transit within the array and will need to navigate around or navigate with caution through the wind farm. Deeper-draft commercial vessels transiting within the New York Bight utilize the pre-established IMO routing measures (TSS lanes) and most of the traffic was shown to utilize the center of the TSS lanes (according to AIS vessel density data) passing the Wind Farm Development Area at a distance of 2 nm (3.7 kilometers) or greater.
BOEM-2022-0053-0102-0028 & 0029	The fishing industry has proven to be adaptable in the face of change; however, more deliberate mitigation measures that support vessel radar upgrades could minimize impacts to fisheries and others navigating through and around the project area. An adaptation fund is noted in Appendix H. Additional information about the size of the fund and how extensively it may support funding and training would be helpful. Additional details about the overall fisheries mitigation and compensation fund would also be useful. It is difficult to assess the extent to which such funds might mitigate the impacts described in the DEIS without more information.	The referenced mitigation measure is not recommended for inclusion in the Preferred Alternative. See Table H-2 additional information on the rationale for not including this measure in the Preferred Alternative.
BOEM-2022-0053-0102-0030	We recommend that the terms and conditions specify that developers are responsible for the safe disposal of UXO unearthed due to construction activities. Our understanding is that some UXOs might be detected via surveys but are not exposed; in such cases only mariner notification may be sufficient given disposal may present greater risks. Clear timely and repeated communication about UXO locations and any changes in the location or status of UXOs is essential and should not rely only on email notifications.	There are additional risks (environmental and safety, for example) associated with disposal of UXO and avoidance is the preferred mitigation method. Additional information on the recommended Risk Mitigation Framework can be found at: <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/MEC-UXO%20White%20">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/MEC-UXO%20White%20</a>

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		<p><a href="#">Paper.pdf</a>.</p> <p>In the event avoidance is not possible, the Projects propose disposal methods of controlled deflagration or relocation. When UXO is confirmed, a Local Notice to Mariners is filed and is shared with NOAA for nautical chart inclusion and addition to its database (<a href="https://www.fisheries.noaa.gov/inport/item/66208">https://www.fisheries.noaa.gov/inport/item/66208</a>).</p> <p>Additional methods of notification and development of a dashboard are options being discussed with BOEM and BSEE to address the concerns for communication beyond email notification.</p>
BOEM-2022-0053-0113-0022	<p>(2) The Navigation Safety Adaptation Fund ([number]16 p. H-23) is described “Empire will establish an adaptation fund to equip vessel operators with necessary safety training and equipment including suitable marine vessel radar where appropriate” and is to be overseen by BOEM and BSEE. It is first unclear whether BOEM/BSEE have the expertise necessary to determine adequacy of such measures. It is also clear from the BOEM-sponsored NAS study that both current magnetron radar and Doppler/solid-state radar experience interference from offshore wind turbines; however there is lack of information on Doppler/solid state radar performance in the vicinity of turbines with more study needed. It is unclear then how BOEM defines “suitable marine vessel radar” in this mitigation measure. Please explain. If future studies show that Doppler/solid state MVR still cannot be fully optimized in a wind turbine environment please explain what course of action BOEM will take in response. Please also explain how proceeding without this knowledge/verification but with the knowledge that the two types of MVR available are affected by offshore wind turbines complies with the OSCLA requirements for safety and navigation particularly since the Empire Wind project is projected to be operational and impacting mariners prior to future studies being complete.</p>	<p>The referenced mitigation measure is not recommended for inclusion in the Preferred Alternative.</p>

**P.6.16 Other Uses (Marine Minerals, Military Use, Aviation)**

**Table P.6.16-1 Responses to Comments on Other Uses (Marine Minerals, Military Use, Aviation)**

Comment No.	Comment	Response
BOEM-2022-0053-0027-0006	<p>Radar adverse impacts should be classified as major. BOEM states “Air traffic control national defense weather and oceanographic radar within the line of sight of the offshore infrastructure associated with the Proposed Action may be affected by the O&amp;M phase of the Projects. Potential impacts for radar operations over and in the immediate vicinity of the Project area include unwanted radar returns (clutter) resulting in a partial loss of primary target detection and a number of false primary targets a loss of ocean surface current data and a partial loss of weather detection including false weather indications. 3.17-16. Following is a summary of the key issues of radar interference by offshore wind turbines. There are major unknowns exacerbated by the fact the largest installed turbines are only about 600’ tall while proposed turbines now range between 850’ and 1040’ with equivalently larger blade diameters. Study titles are underlined with quotation marks for direct quotes. United States Coast Guard Port Access Route Study: Northern New York Bight [Footnote 6: United States Coast Guard Port Access Route Study: Northern New York Bight <a href="https://www.federalregister.gov/documents/2021/04/12/2021-07469/port-access-route-study-northern-new-york-bight#:~:text=On%20June%2029%2C%202020%2C%20the%20Coast%20Guard%20publishedthe%20First%20Coast%20Guard%20District%20area%20of%20responsibility.">https://www.federalregister.gov/documents/2021/04/12/2021-07469/port-access-route-study-northern-new-york-bight#:~:text=On%20June%2029%2C%202020%2C%20the%20Coast%20Guard%20publishedthe%20First%20Coast%20Guard%20District%20area%20of%20responsibility.</a>]“Conducting this study three recurring themes were raised that were determined to fall outside the scope of this study. Specifically potential Offshore Renewable Energy Installations (OREI) impacts to Coast Guard Search and Rescue (SAR) operations the impacts of Wind Turbine Generators on the efficacy of marine vessel radar and potential impacts to vessels fishing in Wind Energy Areas.” Wind Turbine Generator (WTG) Impacts to Marine Vessel Radar (MVR) (2022) [Footnote 7: Wind Turbine Generator (WTG) Impacts to Marine Vessel Radar (MVR) (2022) <a href="https://nap.nationalacademies.org/read/26430/chapter/2">https://nap.nationalacademies.org/read/26430/chapter/2</a>]“WTGs are large structures predominantly constructed of steel. As a result they generally have significant electromagnetic reflectivity and the capacity to interfere with radar systems in their vicinity. Additionally the rotating blades can return large and numerous Doppler-shifted reflections as the blades move relative to a receiving radar system. The installation of</p>	<p>The Draft EIS addresses the adverse impacts of WTG structures on marine vessel radars in Section 3.16.5. As part of its assessment, BOEM considered the USCG analysis of WTG array impacts on marine vessel radar included as part of the Areas Offshore of Massachusetts and Rhode Island PARS (USCG 2019), published May 14, 2020, and the National Academies of Sciences, Engineering, and Medicine 2022 study published by the National Academies Press (2022) titled <i>Wind Turbine Generator Impacts to Marine Vessel Radar</i>. This latter reference, cited by the commenter, is already incorporated in the Draft EIS.</p> <p>USCG indicated in the Areas Offshore of Massachusetts and Rhode Island PARS that “vessels have different types of radar with varying capabilities” and that radar operator proficiency is a factor in properly detecting targets using a radar system in and around a wind farm.</p> <p>The National Academies of Sciences 2022 study on WTG impacts on marine vessel radar concludes that WTGs do cause interference to marine vessel radar, decreasing the effectiveness of the Maritime Transportation System and potentially complicating maritime surface SAR operations.</p>

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	<p>WTGs towering hundreds of meters above the sea surface across the U.S. OCS therefore poses potential conflicts with a number of radar missions supporting air traffic control weather forecasting homeland security national defense maritime commerce and other activities relying on this technology for surveillance navigation and situational awareness. Upcoming COPs include WTGs with hub heights and rotor diameters approaching 175 m and 250 m respectively.”</p> <p>“Due to their size structure and proposed placement offshore the maritime community expressed concern that WTGs may cast radar shadows obfuscating smaller vessels exiting wind facilities in the vicinity of deep draft vessels in Traffic Separation Schemes. Other possible forms of radar interference that may preclude safe navigation within an offshore wind facility such as radar clutter and mirror effects (false signaling). WTGs may produce strong reflected multiple and side lobe echoes that can mask or complicate the identification of real targets. A loss of contact with smaller vessels due to the various forms of MVR interference could complicate MTS operations and is therefore particularly consequential when conducting maritime surface SAR operations in and adjacent to an offshore wind farm.”</p> <p>“MVRs are not optimized to operate in the complex environments of a fully populated continental shelf wind farm. There is no simple MVR modification resulting in a robust WTG operating mode. Additionally in contrast to investments by developers and operators of air traffic control and military radar systems compelling WTG mitigation techniques for MVR have not been substantially investigated implemented matured or deployed.”</p> <p>“Conclusion 1: Wind turbines in the maritime environment affect marine vessel radar in a situation-dependent manner with the most common impact being a substantial increase in strong reflected energy cluttering the operator’s display leading to complications in navigation decision-making.”</p> <p>Finding 5.2: WTGs lead to interference in MVR including strong stationary returns from the wind turbine tower the potential for a strong blade flash return for certain geometries and Doppler spread clutter generated along the radial extent of the WTG blade which could obfuscate smaller watercraft or stationary objects such as buoys. Additionally own vessel platform multipath is a significant challenge for returns from WTGs leading to ambiguous detections and a potentially</p>	

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	<p>confusing operator picture.</p> <p>Finding 5.3: When conducting maritime surface SAR operations in and adjacent to an offshore wind farm use of MVR could be challenging because wind turbines can cause significant interference and shadowing that suppress the detection of small contacts.</p> <p>Finding 5.4: There is no currently available “WTG mode” for MVRs and operator control of detection threshold to mitigate strong returns will frequently lead to the unintended consequence of suppressing detections of small targets.</p> <p>Finding 5.5: There is a paucity of field collected data to understand and evaluate the impacts of WTGs on currently deployed MVR models and support comprehensive development of ameliorating methods. Similarly the impact of anomalous propagation and returns from range ambiguous regions on MVR is poorly understood due to lack of experimental data.</p> <p>Finding 6.1: In contrast to investments by developers and operators of air traffic control and military radar systems compelling WTG mitigation techniques for MVR have not been substantially investigated implemented matured or deployed. Following are images of actual radar screens with false images:“ [See original comment for FIGURE 1.3 Photograph of the display of a shipboard radar operated in a U.K. wind farm.] “[See original comment for Marico FIGURE 2.10 Illustrative plan position indicator display for magnetron-based radar from the Kentish Flats experiments where the points A B and C highlight the phenomena of multiple target echoes due to wind turbine generator–radar interaction] “[See original comment for Radar screen near 5 turbine Block Island RI 5 turbine project]”</p>	
BOEM-2022-0053-0027-0007	<p>Military Aviation and Installation Assurance Siting Clearinghouse coordinated within the Department of Defense (DOD) a review of the New York Bight Offshore Call Areas “Encroachment is often irreversible and as the New York Bight continues to see increased density of offshore wind energy development few areas will remain free and clear to support DON training activities. Therefore the DOD requests BOEM defer leasing all remaining unleased portions of W-107B/C as well as lease blocks in W-107A within 30 nautical miles of the New Jersey coastline if BOEM moves forward with leasing in the Hudson South Call Area. Any vertical obstructions in these areas would foreclose the DON’s ability to safely conduct training missions in the region such as low-level rotary wing aircraft operations.” This brings into question what</p>	<p>BOEM is continuing to work with DOD and the Military Aviation and Installation Assurance Siting Clearinghouse to determine potential conflicts with DOD activities from the Projects. As described in Section 3.17.5 of the Final EIS, as part of an initial DOD Clearinghouse review, DOD determined that the Proposed Action would adversely affect radar used for the North American Aerospace Defense Command’s air defense mission. Two mitigation strategies were developed with DOD to minimize radar impacts (see Appendix H). Empire intends to enter into a partnership with the DOD Clearinghouse</p>



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	negative impacts are currently approved lease areas that are within the 30 nautical mile exclusion zone should be reconsidered. Comments from Seafreeze LTD. On Vineyard Wind Supplement to Draft Environmental Impact Statement pages 67 to 73 on military impacts of OSW showing exclusion & restriction zones.	to discuss additional mitigation for potential impacts resulting from the construction and installation of the Projects.
BOEM-2022-0053-0113-0007	It is also apparent in the NY WEA BOEM process that other OSCLA concerns were ignored including national security (as the WEA directly overlays with a USCG Department of Homeland Security Weapons Training Area) [Footnote 14: See March 8 2013 letter attached.] navigational safety (the USCG recommendation for a 2 nm setback from the TSS in order to reduce the safety/navigational risk from “high” to “medium”) [Footnote 15: See USCG letter to BOEM regarding the NY Area ID September 28 2015 attached] safety (the NOAA IOOS input regarding the loss of HF radar used by the USCG for Search and Rescue) [Footnote 16: See July 14 2014 letter from Zdenka Willis Director US IOOS Program Office to BOEM Re BOEM Dockets BOEM-2014-0087 and BOEM-2014-0003 attached.] etc.	BOEM is coordinating with USCG to mitigate potential impacts of WTGs on SAR operations. Multiple mitigation measures have been proposed to ensure SAR operations can continue within the Lease Area. To mitigate potential impacts of WTGs on high-frequency radar systems used by NOAA Integrated Ocean Observing System, Empire will enter into a mitigation agreement with NOAA. Possible mitigation measures may include data sharing from turbine operators, wind farm curtailment under specific situations, signal processing enhancements, and antenna modifications. See Appendix H, <i>Mitigation and Monitoring</i> , for more information.
BOEM-2022-0053-0113-0017	Attached is a letter dated November 25 2019 to the Senator V. Susan Sosnowski of the RI Senate Fisheries Task Force regarding USCG analysis and own vessel capabilities with regards to offshore wind. The USCG clearly states that its own vessels will be subject to the impacts discussed in the 2013 DOE Final Report entitled [Italics: Assessment of Offshore Wind Farm Effects on Sea Surface Subsurface and Airborne Electronic Systems] [Footnote 25: Final Report DE-EE0005380 Assessment of Offshore Wind Farm Effects on Sea Surface Subsurface and Airborne Electronic Systems The University of Texas at Austin prepared for the U.S. Department of Energy 9/30/2013.] which has also been recently confirmed and cited by the BOEM- sponsored National Academies of Sciences (NAS) study “Wind Turbine Generator Impacts to Marine Vessel Radar (2022)”. [Footnote 26: “Wind Turbine Generator Impacts to Marine Vessel Radar (2022) National Academies Press available at <a href="https://nap.nationalacademies.org/catalog/26430/wind-turbine-generator-impacts-to-marine-vessel-radar">https://nap.nationalacademies.org/catalog/26430/wind-turbine-generator-impacts-to-marine-vessel-radar</a> . See BOEM sponsorship at page ii: “This activity was supported by contracts between the National Academy of Sciences and Bureau of Ocean Energy Management under Award Number 140M0119D0001/140M0121F0013. National Academies of Sciences	The Draft EIS addresses the adverse impacts of WTG structures on marine vessel radars in Section 3.16.5. The National Academies of Sciences, Engineering, and Medicine 2022 study published by the National Academies Press (2022) titled <i>Wind Turbine Generator Impacts to Marine Vessel Radar</i> and referenced by the commenter is already incorporated in the Draft EIS.  BOEM expects that certain technology-based measures and non-technology-based measures will be used to reduce impacts on marine radar such as greater use of AIS and electronic charting systems, new technologies like light detection and ranging (LiDAR), employing more watch-standers, and avoidance of wind farms altogether. As the presence of WTGs could complicate offshore SAR operations, BOEM notes in the Draft EIS that certain proposed mitigation measures such as USCG SAR exercises within and near the Lease Area (APM 200) will

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	<p>Engineering and Medicine. 2022. Wind Turbine Generator Impacts to Marine Vessel Radar. Washington DC: The National Academies Press. <a href="https://doi.org/10.17226/26430">https://doi.org/10.17226/26430</a>.” USCG are equipped with the same type of Marine Vessel Radar (MVR) as commercial fishing vessels as discussed in the NAS study which found no immediate solution to the MVR interference issue. Therefore not only will commercial fishing vessels experience radar interference as a result of offshore wind projects; so will USCG vessels attempting to conduct search and rescue (SAR). Most SAR occurs in inclement weather when maximized and unimpeded radar signals will be necessary.</p>	<p>support reduction of impacts. Other proposed mitigations to support a SAR operation near or within the array are:</p> <ul style="list-style-type: none"> <li>• APM 198 (closed-circuit television installed on certain structures in the array)</li> <li>• APM201 (operational SAR procedures in place that detail how the Projects will cooperate with USCG in the event of an emergency situation)</li> <li>• APM204 (provision of self-help capability resources or facilities available to Empire that may assist in the event of an emergency)</li> </ul>
<p>BOEM-2022-0053-0113-0019</p>	<p>BOEM has also ignored for years the impacts to HF radar resulting from offshore wind development. In fact this issue was first raised to BOEM in 2014 as a NOAA response to the NY Call Area now proposed Empire Wind project. [Footnote 27: See July 14 2014 letter from Zdenka Willis Director US IOOS Program Office to BOEM Re BOEM Dockets BOEM-2014-0087 and BOEM-2014-0003 attached.] Subsequently in 2020 BOEM was party to a DOE webinar series that highlighted the fact that the issue not only impacted USCG SAR operations but also that it was very much still unsolved. [Footnote 28: See Offshore Wind Turbine Radar Interference Mitigation Webinar Series   Department of Energy July 27 2020 Oceanographic High Frequency (HF) Radar Webinar.] BOEM not only ignored this input as well as subsequent related concerns by the commercial fishing industry but it did nothing to solve the problem from then until now almost 10 years later. Therefore BOEM cannot approve the Empire Wind project and claim that it has addressed an issue that it has been well aware of for nearly 10 years when OSCLA requires safety at every point along the way of offshore wind leasing.</p>	<p>BOEM is committed to working with the commercial fishing industry and NOAA to mitigate potential impacts of the Proposed Action. To mitigate potential impacts of WTGs on high-frequency radar systems used by NOAA Integrated Ocean Observing System, Empire will enter into a mitigation agreement with NOAA. Possible mitigation measures may include data sharing from turbine operators, wind farm curtailment under specific situations, signal processing enhancements, and antenna modifications. See Appendix H, <i>Mitigation and Monitoring</i>, for more information.</p>
<p>BOEM-2022-0053-0113-0020</p>	<p>MVR radar interference onboard USCG vessels combined with lack of HF radar to pinpoint search locations will undoubtedly impact the effectiveness of USCG SAR. Therefore we request that prior to any COP approval or Empire Wind Final EIS the USCG conduct a radar interference modeling study as well as SAR assessment that incorporates MVR interference/loss to its own vessels and HF radar /interference loss for SAR techniques to determine the impacts to effective SAR and therefore safety per the OSCLA resulting from the Empire Wind project in an independent Navigational Safety Risk Assessment.</p>	<p>BOEM is coordinating with USCG to mitigate potential impacts of WTGs on SAR operations. Multiple mitigation measures have been proposed to ensure SAR operations can continue within the Lease Area, including Empire facilitating USCG SAR exercises within and near the Lease Area (APM 200), creating and implementing operational SAR procedures to foster cooperation with USCG in the event of an emergency (APM 201), and installing closed-circuit television on structures within the array</p>

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		<p>to monitor activity within the site, enable advance notice of any problems, and potentially aiding in SAR operations (APM 198).</p> <p>An NSRA was completed as part of the COP and was conducted per the guidelines in the USCG Navigation and Vessel Inspection Circular 01-19.</p>
<p>BOEM-2022-0053-0113-0023</p>	<p>(3) The High-frequency radar mitigation (#18 p. H-24) described as “Empire must develop a mitigation plan to be reviewed and coordinated with the NOAA IOOS Surface Currents Program Manager for purposes of implementing measures that correct for wind turbine interference. Measures would include sharing real time telemetry of surface currents waves and other oceanographic data with the Surface Currents Program into the public domain measured at locations in the Project confirmed by the Surface Currents Program and its high-frequency radar operators as sufficient to allow NOAA IOOS mission objectives to be met” does not indicate if this mitigation will be effective by the time of proposed project commissioning and operation. The 2020 DOE webinar series held jointly with BOEM on offshore wind turbine radar interference detailed clearly the extreme loss of HF radar in the Empire Wind lease area from both that lease and other NY/NJ leases and the impact this will have on USCG SAR.</p> <p>Since that time BOEM has issued more leases in the NY Bight. It is uncertain whether effective mitigation at this stage exists for HF radar as there will be very little ocean space unaffected by one or more leases at this time and leases continue to proliferate. In 2019 as detailed in our comments on the Vineyard Wind SEIS the “High Frequency Radar Wind Turbine Interference Community Working Group Report” stated that “For small numbers of turbines pathways to mitigate the interference exist. Yet the offshore wind industry will soon outpace these simplified solutions as plans for large farms of turbines are moving towards installation. This near-future scenario greatly exceeds the scope of initial efforts and at present no operational solutions exist to mitigate the future interference.”</p> <p>As we are unaware of any comprehensive advances made on this issue since 2019 and since offshore wind has continued to expand since 2019 it would appear that the situation has grown more severe and not less so. This is concerning for maritime stakeholders who may be in need of USCG SAR. Please explain what provable effective and operational</p>	<p>This measure has been replaced in Final EIS Appendix H with a measure proposed by the NOAA Integrated Ocean Observing System Surface Currents Program.</p>

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	solutions are guaranteed by the time BOEM projects Empire Wind to be operational.	

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**P.6.17 Recreation and Tourism**

**Table P.6.17-1 Responses to Comments on Recreation and Tourism**

Comment No.	Comment	Response
BOEM-2022-0053-0027-0008	<p>Visual impacts of turbines in the Proposed Project on Tourism should be considered “major” instead of “moderate” and a new study is needed to determine potential economic costs. No Final EIS should be issued for any project until that study is available. BOEM states “The visibility of the Projects would introduce a major level of character change to the view; attract hold and dominate the viewer’s attention.” (3.20-19). The cumulative impact of the project in combination with other projects would also have a major adverse impact especially because of nighttime aircraft and vessel flashing warning lights. Despite an admitted major adverse impact the DEIS offers no estimate of the adverse economic impact on tourism even claiming in section 3.18 the impacts on tourism would be minor to minor beneficial. The Ocean Wind DEIS was released June 24 of this year and included a detailed discussion of visual impacts. This discussion was excluded from the Empire Wind DEIS. In the Ocean Wind DEIS BOEM stated “The turbines will be 15 miles off Atlantic City are 906’ tall and will be theoretically visible to a viewer at the ocean surface or at beach elevations at distances up to 39.6 miles with clear-day conditions”. The Empire Wind turbines will only be 14 miles off Jones Beach and will be 951’ tall with blade diameters of 853’. The Ocean wind DEIS quotes a University of Delaware study [Footnote 8: U.S. Bureau of Ocean Energy Management University of Delaware “Atlantic Offshore Wind Energy Development: Values and Implications for Recreation and Tourism” March 2018 Authors: George Parsons and Jeremy Firestone <a href="https://www.boem.gov/espis/5/5662.pdf">https://www.boem.gov/espis/5/5662.pdf</a>] “evaluating the impacts of visible offshore turbines on beach use found that turbines visible more than 15 miles from the viewer would have negligible impacts on businesses dependent on recreation and tourism activity (Parsons and Firestone 2018). Below is a copy of the chart quoted from the UD study. The University of Delaware study did its survey by showing panning photomontages on a computer screen of 579’ tall turbines respondents were also provided instructions on the distance to the screen from which they should view the images and were asked to view the project at three distances offshore – near medium and far. After each distance was viewed respondents were asked whether the presence of the wind power project would have affected their beach experience/enjoyment -- making it worse somewhat worse</p>	<p>At an eye level of 5.5 feet (1.7 meters) above sea level, the Delaware study’s 579-foot (176.5-meter) WTGs would be visible out to 32.4 miles (52.1 kilometers). The 951-foot (290-meter) Project WTGs would be visible out to 40.5 miles (65.2 kilometers). Greater eye-level heights would increase the visible distance in both cases. At the Projects’ distance from the nearest beach of 14.1 miles (22.7 kilometers), the upper 512 feet (156.1 meters) of the Delaware study’s 579-foot (176.5-meter) WTG would be visible to viewers. At this distance, the upper 866.9 feet (264.2 meters) of Project WTGs would be visible. Therefore, in both the 2018 Parsons and Firestone study and the Projects’ cases, the WTGs’ hubs, nacelles, navigation lights, and rotor blades would be visible to viewers on the nearest beach. The taller Project WTGs would result in increased numbers of WTGs visible in the wind farm. Such additional WTGs would be seen as lower than/below the tops of the forward row of WTGs and would be increasingly obscured by those intervening in the view. The wind farm would be perceived as a mass of WTGs, rather than as individual WTGs.</p> <p>Additional information clarifying the difference in WTG heights between the studies used and those proposed for the Projects was included in the Final EIS.</p> <p>BOEM has determined that impacts on recreation and tourism from the presence of structures would be moderate because</p>



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	<p>neither worse nor better somewhat better or better. If they responded worse or somewhat worse they were then asked a certainty-response question. They used the response to this question to construct certainty-adjusted data. Note no such certainty adjustment was used for those who favored wind turbines. Results from nighttime views were never released. The survey group also included about 35% of respondents who never actually visited the beach. In March 2021 one of the authors (Parsons) stated in a Delaware Today Magazine interview [Footnote 9: Delaware Today Magazine Jordan Howell 4/15/2021 <a href="https://delawaretoday.com/life-style/skipjack-wind-farm/">https://delawaretoday.com/life-style/skipjack-wind-farm/</a>] the study is no longer applicable because turbines used today are so much larger. However even with the studies problems it has some use. The figure shows at 10 miles 29% found the view worse while only 10% found it better for a 19% difference choosing worse. At 7 miles 38% found the view worse compared to 7% favorable a 31% difference. So ignoring the taller towers in the Empire Wind 1 project we see perhaps 25% of tourists will find the cumulative impact worse. The impact of taller towers can be approximated by assuming the towers are 1.64 times closer (the ratio of 579' tall towers to 951' tall towers). The proposed Empire Wind project would be equivalent to about 10 miles off the coast. The proposed project then should be considered to have a major impact on tourism. A study by Lutzeyer et.al. (2017) "The Amenity Costs of Offshore Wind Farms: Evidence from a Choice Experiment" [Footnote 10: North Carolina State University "The Amenity Costs of Offshore Wind Farms: Evidence from A Choice Experiment" March 216 Lutzeyer ET. al. <a href="https://www.aminer.org/pub/5c8c9f8a4895d9cbc6134d87/the-amenity-costs-of-offshore-wind-farms-evidence-from-a-choice-experiment">https://www.aminer.org/pub/5c8c9f8a4895d9cbc6134d87/the-amenity-costs-of-offshore-wind-farms-evidence-from-a-choice-experiment</a>] was quite a contrast to the UD study. The Lutzeyer study worked with beach home rental companies and surveyed only people who had recently rented a house on or near the beach. The study found 38 percent of beach renters would likely not come back to a beach with daytime visible turbines regardless of the distance as shown in the study quote below with visualizations showing turbines from 5 miles to 18 miles from shore. In addition others would return only with a rental discount depending on the distance. Overall the willingness to accept estimates for the Never View class imply that these respondents would likely exit the local rental market if turbines were present rather than make intensive margin tradeoffs among rental price and characteristics of the viewshed. The Lutzeyer study also showed nighttime visualizations of red flashing aircraft warning lights and respondents stated even higher rates of objection with 54 percent not likely to return to a beach</p>	<p>affected activities or communities would likely have to adjust somewhat to account for disruptions due to the Projects. This impact level reflects survey results suggesting a range of visitor experience related to views of offshore wind farms, with some respondents reporting their beach experience would be worsened while other respondents reported that their experience would be improved or took a neutral position (would neither improve nor worsen their experience).</p> <p>Additional analysis of impacts on the vacation rental market was added to the Final EIS.</p> <p>Impacts on vacation rentals and visitor preferences would be lower than described in the Lutzeyer et al. 2017 study for nighttime views because Empire would implement ADLS. The ADLS would reduce the duration of the FAA hazard lighting system lighting to a total of 30 hours per month, or only 7.5 percent of the time full-time obstruction lights would be active, compared to standard continuous FAA hazard lighting analyzed in the Lutzeyer et al. 2017 study.</p>

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	<p>with nighttime visible turbines. The visualizations showed 5 to 7 MW turbines about the same size as the UD study. Again this study confirms visible turbines in the propose project will have a major impact on tourism. Not referenced by BOEM in the DEIS is a 2015 BOEM study about a viewshed analysis it did for the New York Outer Continental Shelf Area (Renewable Energy Viewshed Analysis and Visual Simulation for the New York Outer Continental Shelf Call Area: Compendium Report OCS Study BOEM 2015-044) [Footnote 11: Renewable Energy Viewshed Analysis and Visual Simulation for the New York Outer Continental Shelf Call Area: Compendium Report OCS Study BOEM 2015- 044 <a href="https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/Visual-Simulations/Compendium-Report.pdf">https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/NY/Visual-Simulations/Compendium-Report.pdf</a>]. It simulated the visual impact of one hundred and fifty-two 6.2 MW wind turbines from 16 observation points in New York and New Jersey. The simulation most relevant to LBI is the Jones Beach observation point because the turbine array was roughly parallel to that shore. The closest point of the turbine array to Jones Beach was 15 miles the same distance as the Proposed Project. The study ranked the visible impact on a scale from 1 to 6. The visual impact from Jones Beach scored a 6 its highest rating. A 6 rating was defined as; "Dominates the view because the study subject fills most of the field for views in its general direction. Strong contrast in form line color texture luminance or motion may contribute to view dominance". Since the height of a 6.2 MW turbine is 63% of the proposed Empire Wind project turbines that visual impact would be equivalent to the project turbines at 24 miles. So the proposed project would still register a major visual impact based on the BOEM study. We note based on this study officials in New York and BOEM determined that the proposed offshore wind turbine lease area off the Hamptons is too close and ruins the serene ocean viewshed and created a 20 mile exclusion zone [Footnote 12: New York State Comments on Department of Interior Bureau of Ocean Energy Management NYS_BOEM_NY_Bight_Call_Comments.pdf East Hampton Star 'No Wind Farm in Fairways' <a href="https://www.governor.ny.gov/sites/default/files/atoms/files/NYS_BOEM_NY_Bight_Call_Co mmments.pdf">https://www.governor.ny.gov/sites/default/files/atoms/files/NYS_BOEM_NY_Bight_Call_Co mmments.pdf</a>]. They also noted it is a threat to navigation fishing and endangered marine mammals. The Fairway lease area sat as close as 12 miles off the Long Island coast near the Hamptons extending out to 30 miles. Why is an exclusion zone OK for the Hamptons but not Jones Beach? BOEM should cancel the Empire Wind 1 project. In Appendix D "Analysis of incomplete or unavailable information". In D.1.15 BOEM states</p>	

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	<p>“BOEM has determined that incomplete and unavailable resource information for recreation and tourism or for other resources on which the analysis of recreation and tourism impacts rely was either not relevant to reasonably foreseeable significant adverse impacts was not essential to a reasoned choice among alternatives alternative data or methods could be used to predict potential impacts and provided the best available information or the overall costs of obtaining the information were exorbitant or the means to do so were unknown. Therefore the information provided in the EIS is sufficient to support sound scientific judgments and informed decision-making related to the proposed uses of the onshore and offshore portions of the geographic analysis area”. In fact all the currently available studies on the impact of visible turbines on tourism are out-of-date as the turbine size has increased dramatically. Existing studies used turbine heights of 579’ to 600’. The proposed project uses 951’. The Kitty Hawk North COP uses turbines 1042’ tall. A new study is needed that focuses on the economic impact of taller turbines on tourism similar to the NC State study. We note BOEM paid the University of Delaware only \$350000 for its study a small price considering over \$100 billion may be invested on planned offshore wind projects.</p>	
<p>BOEM-2022-0053-0105-0001</p>	<p>With turbines that are 853 feet tall this project will be the most visible modern wind project in the world. It will have a severe impact on our local economy including: Losses in tourism revenue (estimated at \$300 million per year). Property value losses (ranging from \$1 million for ocean fronts to \$189k for ocean view homes) with corresponding implications for other property owners. Vacation rental losses (55% of previous renters of oceanfront &amp; ocean view properties indicated they would not return if turbines were visible even if offered an incentive). Job losses in multiple areas including hotels restaurants and related services.</p>	<p>Thank you for your comment. Please see the response to comment BOEM-2022-0053-0027-0008 above.</p>
<p>BOEM-2022-0053-0140-0014</p>	<p>[<b>Bold: Recreational Fishing;</b>] NJ and NY’s recreational fishermen took over 7.5 million trips and generated \$2.7 billion. In 2003 the American Sportfishing Association estimated that recreational fishing brought \$724634011 in retail sales with a total multiplier effect [Footnote 48: “Multiplier” is defined as “An effect in economics in which an increase in spending produces an increase in national income and consumption greater than the initial amount spent. For example if a corporation builds a factory it will employ construction workers and their suppliers as well as those who work in the factory. Indirectly the new factory will stimulate employment in laundries restaurants and service industries in the factory’s vicinity” The New</p>	<p>Thank you for your comment. Clarifying information on the economic impact of recreational fishing was added to Section 3.18.1, <i>Description of the Affected Environment for Recreation and Tourism</i>, of the Final EIS. More information on for-hire recreational fishing can be found in Section 3.9, <i>Commercial Fisheries and For-Hire Recreational Fishing</i>.</p>

Comment No.	Comment	Response
	<p>Dictionary of Cultural Literacy Third Edition Houghton Mifflin Company 2002. Available at Answers.com 26 Oct. 2005. <a href="http://www.answers.com/topic/multiplier-effect.">http://www.answers.com/topic/multiplier-effect.</a>] of \$1363259834 to the state of New Jersey. [Footnote 49: American Sportfishing Association Fishing Statistics Economic Impacts of Fishing available at <a href="http://www.asafishing.org/asa/statistics/economic_impact/state_allfish_2003.html">http://www.asafishing.org/asa/statistics/economic_impact/state_allfish_2003.html</a> (last visited July 14 2005).] Recreational fishing accounts for 12021 jobs in New Jersey with salaries and wages totaling \$328359434. [Footnote 50: See Id] The sport generates \$7750295 in New Jersey income taxes and \$56339961 in federal income taxes. [Footnote 51: See Id.] The same report indicates that recreational fishing in New York generated \$1116861525 in retail sales with a total multiplier effect of \$2011716251. [Footnote 52: American Sportfishing Association Fishing Statistics “Economic Impacts of Fishing” available at <a href="http://www.asafishing.org/asa/statistics/economic_impact/state_allfish_2003.html">http://www.asafishing.org/asa/statistics/economic_impact/state_allfish_2003.html</a> (last visited July 14 2005).] The sport accounts for 17083 jobs and \$503486172 in salaries and wages in New York. [Footnote 53: See Id.]</p>	
<p>BOEM-2022-0053-0140-0015</p>	<p>-[<b>Bold: Tourism:</b>] According to the NJ Department of Commerce travel and tourism in New Jersey contributes \$44 billion in economic activities each year and generates over 517000 direct and indirect jobs (the third largest private sector employer) and keeps growing. [Footnote 54: The Economic Value of Tourism in New Jersey Tourism Satellite Account Calendar Year 2016 Tourism Economics An Oxford Economics Company <a href="https://www.visitnj.org/sites/default/master/files/2016-nj-economic-impact.pdf">https://www.visitnj.org/sites/default/master/files/2016-nj-economic-impact.pdf</a>] New York’s coastal economy is valued at \$20 billion. [Footnote 55: National Ocean Economics Program.]</p>	<p>Thank you for your comment. A description of the economic impact of tourism is included in both Section 3.18.1, <i>Description of the Affected Environment for Recreation and Tourism</i>, and Section 3.11, <i>Demographics, Employment, and Economics</i>.</p>
<p>BOEM-2022-0053-0140-0016</p>	<p>-[<b>Bold: Surfing:</b>] A report conducted in 2011 by Surfrider found that NJ and NY accounted for over \$3.8 million and that NJ’s surfing economic impact is twice NY’s. [Footnote 56: A Socioeconomic and Recreational Profile of Surfers in the United States A report by Surf-First and the Surfrider Foundation by G. Scott Wagner Chad Nelsen and Matt Walker July 2011 <a href="http://public.surfrider.org/files/surfrider_report_v13.pdf">http://public.surfrider.org/files/surfrider_report_v13.pdf</a>.]</p>	<p>Thank you for your comment. Clarifying information on surfing was added to Section 3.18.1, <i>Description of the Affected Environment for Recreation and Tourism</i>, of the Final EIS.</p>

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**P.6.18 Sea Turtles**

**Table P.6.18-1 Responses to Comments on Sea Turtles**

Comment No.	Comment	Response
BOEM-2022-0053-0140-0050	<p>Four species of sea turtles can be found in the waters of the NY/NJ Bight: Atlantic green (<i>Chelonia mydas</i>) loggerhead (<i>Caretta caretta</i>) leatherback (<i>Dermochelys coriacea</i>) and Kemp’s ridley (<i>Lepidochelys kempii</i>) turtles (Morreale S. and Standora E. 1998 2005). All of these species are either threatened or endangered at the state and federal levels. [Footnote 30: Summary Report of the New York Bight Sea Turtle Workshop (Jan 30 2018).] The impacts to sea turtles are not adequately addressed in this application. While they may not nest here sea turtles migrate through the project area and can be expected to experience impacts. Equinor and BP says “there is sufficient marine mammal and sea turtle data to inform spatial planning and support assessments in the COP and IHA applications.” [Footnote 31: Bureau of Ocean Energy Management. Empire Offshore Wind Draft Environmental Impact Statement Volume 1 November 2022 page F-17. <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf</a>] Yet research shows there is limited information available on the effects of noise on sea turtles and the hearing capabilities of sea turtles are still poorly understood.” [Footnote 32: See id page M-1-9.] Further “NOAA Fisheries anticipates behavioral response for sea turtles from impulsive sources such as impact pile driving to occur at SPL 175 dB which has elicited avoidance behavior of sea turtles (Table M-1-3; Blackstock et al. 2018). COA’s concerns about impacts from the Proposed Action on sea turtles include:(1) Expert marine scientists do not know the noise impacts on sea turtles. It is important that this information be known and addressed in the Final EIS if issued.(2) The DEIS notes that sea turtles are at risk from impingement entrainment as well as capture from the construction and operation of Empire Wind 1 and 2. Impingement and entrainment of sea turtles due to offshore and inshore dredging activities for cable placement as well as port utilization are a possible risk that needs to be avoided. [Footnote 33: See id page 3.19-12.](3) Spatial planning to avoid reduce or minimize harm is implausible as the footprint of the project is predetermined and turtles utilize the area. Moving turbines within the area will not change the turtles’ need for open habitat devoid of obstacles noise turbidity and other impacts which will have negative impacts to these endangered species. The DEIS fails to adequately address impacts to these endangered species.</p>	<p>Hearing capabilities have been evaluated for each of the four sea turtle species expected to occur in the Project area (Table 3.19-2), and these studies represent the best available science. This information on hearing capabilities, along with available studies on noise impacts on sea turtles and NMFS recommended acoustic thresholds, was used to assess noise impacts on sea turtles associated with the Proposed Action (Section 3.19.5).</p> <p>The risk of physical interactions with dredge equipment (i.e., entrainment, impingement) inshore is evaluated under the port utilization IPF in Section 3.19.5.1. An additional assessment for offshore dredging has been added to Section 3.19.5 under the cable emplacement IPF.</p> <p>The potential impacts of sea turtle avoidance of the Lease Area are evaluated under the presence of structures IPF in Section 3.19.5.</p>



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**P.6.19 Water Quality**

**Table P.6.19-1 Responses to Comments on Water Quality**

Comment No.	Comment	Response
BOEM-2022-0053-0053-0007	BOEM must analyze and mitigate impacts to water quality and habitat from offshore wind projects. During installation of the turbine foundations and power cables sediment will become suspended and impact the marine environment especially if the sediment contains any toxic materials from historical offshore dumping. Careful analysis of turbine siting should be conducted to minimize the impact from such pollution during construction. Impacts from any fluids released from turbines during operation such as lubricating oils and coolants must be monitored and mitigated to the greatest extent possible.	Section 3.21, <i>Water Quality</i> , addresses the potential water quality impacts from construction, O&M, and decommissioning of the Projects under the accidental releases, anchoring, cable emplacement and maintenance, port utilization, presence of structures, discharges, and land disturbance IPFs. Mayflower would need to obtain all necessary federal and state permits for protecting water quality, including a CWA Section New York State Section 401 Water Quality Certification and Section 402 National Pollutant Discharge Elimination System permit. The terms and conditions of these permits would include any necessary mitigation or monitoring requirements to ensure water quality standards are not exceeded.
BOEM-2022-0053-0053-0010	During the Horizontal Directional Drilling (HDD) segment of the Projects when the power cable comes ashore BOEM must monitor closely for release of drilling fluids and mandate only the use of nontoxic and natural drilling fluids. Likewise any lubricants greases oils or coolants used on the turbines themselves must be as nontoxic as possible and closely monitored for any leakage.	BOEM has revised the accidental releases IPF in Section 3.21.5 to include a discussion on potential HDD inadvertent releases/returns. Empire has committed to implementing an agency-approved inadvertent return plan as well as an HDD Contingency Plan to minimize an inadvertent fluid return. Accidental or inadvertent releases of petrochemicals are also addressed in the same section. As stated, Empire would develop an SPCC plan and an OSRP to avoid and minimize inadvertent spills and releases of petrochemicals.
BOEM-2022-0053-0140-0057	The Empire Wind projects will intersect many impaired waterbodies in the NY/NJ Bight. These waterbodies are impaired by PCBs dioxin pathogens and floatables to name a few and as pointed out in Table 4.2-1 in the COP. The NY/NJ Harbor region is notorious for toxic chemicals found in benthic sediments. These sediments will be disturbed in the digging and cable-burying process. According to Empire Wind's COP [ <i>Italics: Despite improvements in water quality</i>	As stated in Section 3.21.5, <i>Impacts of the Proposed Action on Water Quality</i> , under the cable emplacement and maintenance IPF, the potential release of contaminated sediments from cable burial was assessed with a contaminated sediment dispersion model. Based on consultation with NYSDEC, the dispersion of contaminants was

Comment No.	Comment	Response
	<p>legacy chemicals in the sediments including mercury polychlorinated biphenyls (PCBs) dichlorodiphenyltrichloroethane and dioxin still exceed acceptable levels and these contaminants can be resuspended in the water column during major storm events or from activities such as dredging.] [Footnote 35: Bureau of Ocean Energy Management Empire Offshore Wind: Empire Wind Projects (EW 1 and EW 2) Construction and Operations Plan June 2022. <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/Public_EOW%20COP_v5_Volume%201_Redacted.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/Public_EOW%20COP_v5_Volume%201_Redacted.pdf</a>] These pollutants have found their way into the human food chain and have caused numerous species to be subject to fish consumption advisories. [Footnote 36: See e.g. <a href="https://www.nj.gov/dep/dsr/Fish_Advisories_2018.pdf">https://www.nj.gov/dep/dsr/Fish_Advisories_2018.pdf</a>.] COA recommends sediment quality testing be required in the areas identified for cabling to understand how water quality will be impacted by stirring-up sediments to bury cables. COA is additionally concerned that the project cables will come ashore at the Brooklyn Marine Terminal. This Terminal was previously found to have a cocktail of pollutants at levels exceeding the Effects-Range Low and Median guidelines.[Footnote 37: May 1 2000 Letter from Clean Ocean Action to John R. Hartmann Operations Division Chief USACE regarding Permit number Buttermilk-00.] PAHs PCBs copper lead silver and dioxins compounds were found to bioaccumulate in clams and worms tested in sediment from the Terminal. [Footnote 38: See id.] The cable-burying process will cause suspension of such pollutants at the Terminal and throughout the NY/NJ Bight.</p>	<p>assessed for those locations where the seabed contaminant concentrations averaged over the anticipated trenching depths that exceed Class C or high Class B concentrations. Details of the model results and impact conclusions are disclosed in the Draft EIS. Furthermore, in-water work for cable emplacement would require a USACE Department of the Army permit and a New York State Section 401 Water Quality Certification from NYSDEC to ensure the in-water work complies with state water quality standards. The terms and conditions of the New York State Section 401 Water Quality Certification would also include any requirements to comply with Total Maximum Daily Load plans, which is a water quality improvement plan for impaired 303(d)-listed surface waters; this would ensure all appropriate measure are taken for potential impacts on 303(d) impaired waters.</p> <p>Contaminated sediment disturbance and water quality impacts related to SBMT are also addressed in Section 3.21.5.1, <i>Impact of the Connected Action</i>, and are based on the available information BOEM has (note that SBMT improvements are not part of the Proposed Action or proposed by Empire). While contaminated sediment would be disturbed and removed, NYCEDC, who is the actual proponent of the SBMT work, would need to obtain all CWA permits, including a New York State Section 401 Water Quality Certification to ensure water quality impacts are limited and standards are not exceeded. The terms and conditions of the New York State 401 Water Quality Certification would also include any requirements to comply with any Total Maximum Daily Load plan that may be in place (at the time of construction) for impaired 303(d) listed surface waters of Gowanus Bay; this would ensure all appropriate measure are taken for potential impacts on 303(d) impaired waters.</p>

Comment No.	Comment	Response
BOEM-2022-0053-0140-0058	<p>Further a baseline for water quality is not known for the NY/NJ Bight (Empire Wind COP 4-48). For instance “the surface waters along the onshore export and interconnection cable routes have not been monitored likely due to their small size.” The project areas including cable areas may also have been exposed to previous ocean dumping activities in the region. The Cellar Dirt Sewage Sludge and Mud Dump sites and historic garbage and waste dumping activities are all within the potential area of influence. Therefore how will water quality impacts be measured if there are no baselines? How can there be mitigations if baselines are not known? The EIS must address this lack of baseline data.</p>	<p>The data sources used to describe the existing water quality conditions (or baseline) are found throughout Section 3.21.1, <i>Description of the Affected Environment for Water Quality</i>. One important piece of baseline water quality information is the list of 303(d) impaired waters in the Project area (as described in Table 3.21-1 and associated text); this information is based on state water quality impairment reporting that is required under the CWA. Each state is required to submit a list of impaired waters to USEPA every 2 years. If a surface water is not on this list, then established water quality parameters are not being exceeded and the surface water is considered to support its use for its classification.</p> <p>Furthermore, the Projects would require a CWA Section 402 permit and a New York State Section 401 Water Quality Certification from NYSDEC to ensure the Projects do not result in exceedance of water quality standards. The terms and conditions of these permits would also include measures to avoid and minimize water quality impacts as well as any requirements to comply with Total Maximum Daily Load plans, which is a water quality improvement plan for impaired 303(d)-listed surface waters; this would ensure all appropriate measure are taken for potential water quality impacts on surface waters, including 303(d) impaired waters.</p>
BOEM-2022-0053-0143-0038	<p>The impacts of oceanographic alterations induced by wind turbine foundations were not adequately examined and were underestimated in the DEIS. Water passing by the foundations of wind turbine structures cause turbulent wakes. Turbulence kinetic energy is significantly enhanced within the wind- turbine wake in stable conditions with areas near the water's surface seeing an increase of more than 30% a few kilometers downwind of the power plants and turbulent wakes extending 30 km or more [Bodini N. Lundquist J.K. &amp; Moriarty P. Wind plants can impact long-term local atmospheric conditions. Sci Rep 11 22939 (2021)].</p>	<p>The Draft EIS addresses the hydrodynamic effects and associated water quality impacts from the presence of wind turbines in the offshore environment in Section 3.21.3.2, <i>Cumulative Impacts of the No Action Alternative</i>, and Section 3.21.5, <i>Impacts of the Proposed Action on Water Quality</i>, under the presence of structures IPF. Hydrodynamic effects from the presence of wind turbines is also addressed in other sections of the EIS (e.g., Section 3.6, <i>Benthic Resources</i>). The</p>

Comment No.	Comment	Response
	<p><a href="https://doi.org/10.1038/s41598-021-02089-2">https://doi.org/10.1038/s41598-021-02089-2</a>. Turbulent wakes are induced when sea currents flow around the foundation of offshore wind turbines. Eddies in the turbulent wake resuspend seabed particulates (sand or mud) which increases water turbidity and alters regional resuspension and sedimentation dynamics.</p>	<p>comment does not specifically state how the impact was not adequately examined so BOEM cannot directly respond to the assertion. However, clarifying information on hydrodynamic effects has been added to Final EIS Section 3.21.5 under the presence of structures IPF. BOEM also notes that the study referenced in the comment is based on a study of land-based wind farms in the central United States, which are unlikely to affect the surrounding environmental conditions in the exact same way as wind turbines in the offshore environment.</p>
BOEM-2022-0053-0143-0049	<p>Please quantify how much neodymium in weight will be required for all turbines of the Empire Wind power plant combined and the environmental waste – by each type - that will be created as a result. Also discuss risks for waterways when leachate contaminates from injecting mountainsides with potent acids and other chemicals enters the water supply.</p>	<p>This comment does not raise any specific concern regarding the conclusions or adequacy of the Draft EIS.</p>

**P.6.20 Mitigation and Monitoring**

**Table P.6.20-1 Responses to Comments on Appendix H (Mitigation and Monitoring)**

Comment No.	Comment	Response
BOEM-2022-0053-0035-0003	Something else that we would like to point out to as has been said before we are very concerned about increased particulate matter pollution around the Brooklyn Terminal from increased vehicle, building, and dredging type operations and need more mitigation strategies are better defined and steadfastly adhered to.	NYCEDC has committed to measures to reduce air emissions associated with the SBMT Port Infrastructure Improvement Project as outlined in the Supplemental Air Quality and Climate Change Analysis appended to the Environmental Assessment for SBMT (Final EIS Appendix Q). These measures include using electric power for building heating instead of natural gas; incorporating stringent electric efficiency standards; supplying wayside power cables to support vessel hoteling while at berth in lieu of running vessel diesel engines; temporarily using diesel-powered equipment during construction that meets USEPA standards for diesel engines; and assessing alternative technologies for non-diesel equipment to meet heavy lift demands during operational phases.
BOEM-2022-0053-0042-0003	There will be future opportunities in the project's state and local permitting processes to see more of our vision for offshore wind realized. We would like to see concrete and clear mitigation steps for preventing additional environmental pollution at the SBMT including the increase of electrification with water transport.	
BOEM-2022-0053-0053-0001	As the federal agency responsible for approval of offshore wind projects BOEM must require that offshore wind projects have a standardized and publicly available monitoring program in place before and after wind projects are constructed. Offshore wind projects at the scale proposed constitute a new type of ocean use in our waters so monitoring environmental community and recreation indicators for possible negative impacts is crucial. The standardized data from such monitoring programs can then be used to adaptively manage and mitigate negative impacts from future projects or halt the construction of future projects. The offshore wind industry needs to move with caution as they develop offshore ocean areas. Without standardized publicly available and mature monitoring programs in place major negative impacts could occur without BOEM or the public's knowledge.	Mitigation and monitoring measures recommended for inclusion with the Preferred Alternative are described in Appendix H. If BOEM decides to approve the COP, the ROD will identify which of the mitigation and monitoring measures have been adopted as terms and conditions of COP approval.
BOEM-2022-0053-0053-	For each of the environmental impacts listed above BOEM must analyze and mitigate them seasonally as different species have varied sensitivities at	Appendix H, Table H-1, <i>Potential Agency-Proposed Mitigation and Monitoring Measures</i>



Comment No.	Comment	Response
0011	different times of the year. Mitigation options to address seasonal movements of marine species must be assessed. Future developers of these leases must release a detailed construction schedule so that BOEM and the public can assess the effects on marine species. The cumulative impact from other planned offshore wind projects must also be addressed as the offshore wind energy industry is poised to grow exponentially in the next decade.	<i>Analyzed</i> , and Lessee-proposed measures in the Letter of Authorization include specific measures with time-of-year restrictions for marine mammals, sea turtles, and fish.
BOEM-2022-0053-0102-0001	The analysis in the DEIS has important ramifications for the terms and conditions that may be implemented through final project approval including fisheries mitigation and compensation measures. With this in mind we strongly encourage BOEM to consider the recommendations listed in the wind energy policies adopted by both Councils and which apply across all projects [Footnote 2: Available at <a href="https://www.mafmc.org/s/MAFMC_wind_policy_Dec2021.pdf">https://www.mafmc.org/s/MAFMC_wind_policy_Dec2021.pdf</a> ].	Comment noted.
BOEM-2022-0053-0102-0002	We also urge BOEM to adopt the recommendations from NOAA Fisheries for this project including their recommendations for data considerations impacts analysis and ways to minimize potential negative impacts to marine habitats commercial and recreational fisheries and fishery species.	BOEM is coordinating with NMFS as a cooperating agency on the EIS and through ESA and EFH consultations. NMFS-proposed measures recommended for inclusion in the Preferred Alternative are identified in the Final EIS.
BOEM-2022-0053-0102-0026 & 0027	<p>These comments supported many of the mitigation measures recommended in that draft guidance. We recommend that all final mitigation guidelines be reflected in terms and conditions for BOEM's approval of this project.</p> <p>Appendix H includes the analyzed potential mitigation and monitoring measures; however it is unclear which of these measures are likely to be required by BOEM as opposed to optional. Assumptions about which mitigation measures are required will affect the impact determinations and overall conclusions. For example time of year restrictions on construction can be used to protect sensitive spawning and fishing periods. The Councils are supportive of time of year restrictions to reduce potential impacts to sensitive life stages of fishery species and to reduce impacts to fisheries; however further detail should be provided in the FEIS on how this would be done and what exactly this measure would achieve. "Installation of scour protection as needed" and "where feasible planning the location and timing of construction activities that minimize overlap with areas or times of high activity" are also listed as mitigation measures (Table H-3) though it is not clear when scour protection would be needed or not or what constitutes</p>	An analysis of proposed mitigation measures has been added to the mitigation section of each Chapter 3 resource section. Mitigation recommended for inclusion in the Preferred Alternative has also been identified and analyzed at the end of each Chapter 3 section. NMFS-recommended conservation measures as part of the EFH consultation and recommended measures included in the Preferred Alternative are identified in the Final EIS.

Comment No.	Comment	Response
	areas of high fishing activity. Overall we recommend working with NOAA Fisheries on these determinations and identification of sensitive spawning and fishing periods to avoid as ways to mitigate impact.	
BOEM-2022-0053-0103-0005	Appendix H Mitigation and Monitoring contains several proposed long-term monitoring efforts to determine if the cable laying process or hardcover necessary to ensure cable burial has long-term effects on benthic biota. What appears to be absent from the long-term monitoring is a program to ensure the long-term burial of the export and inter-array cables. The FEIS should include a robust program for monitoring the depth of the cable beneath the sediments and a procedure for notifying agencies and fisheries representatives promptly when cable segments are exposed or identified to be at less than the required depth. Further the FEIS should describe the protocols that will be engaged for reburying the cable.	A mitigation measure that would require Empire to develop and implement a Cable Maintenance Plan is recommended for inclusion in the Preferred Alternative. The Cable Maintenance Plan would require prompt remedial burial of exposed and shallow-buried cable segments, address repeat exposures, and establish a process for identifying when cable burial depths reach unacceptable risk levels.
BOEM-2022-0053-0116-0004	We recognize that not all mitigation measures are within BOEM's statutory and regulatory authority but could be adopted and imposed by other governmental entities. Yet we feel strongly that if BOEM decides to approve the Project's COP then mitigation and monitoring must be clearly stated and identified. If such measures are not adopted specific reasons for non-adoption must be presented and verified.	Mitigation recommended for inclusion in the Preferred Alternative is identified in the Final EIS.
BOEM-2022-0053-0119-0008	Robust monitoring data collection and reporting is essential to evaluating impacts of offshore wind projects on marine coastal and avian wildlife. The FEIS should account for the limitations in the survey methods used to assess the project area for species present and Empire Wind should employ pre-construction construction and post-construction monitoring.	Empire has committed to implementing monitoring for birds, bats, fisheries, and benthic resources as described in Appendix H, Attachments 3 and 4.
BOEM-2022-0053-0119-0010	BOEM should require Empire Wind to pursue studies to further strike avoidance mitigation methods to ensure that migratory species like bats birds and other offshore wildlife are protected especially as technologies advance.	Empire has committed to implementing a bird and bat monitoring framework as described in Appendix H, Attachment 3.
BOEM-2022-0053-0130-0008	An Improved Layout Alone Is Not Sufficient to Meet Mitigation Requirements Given the level of disruption OSW development will cause to the local environment and the existing industries that rely on it comprehensive mitigation strategies are essential. Collaborative layout planning while critical to reducing some impacts cannot fully mitigate all avoidable conflicts. Full-scale mitigation must be required as part of this process. This would include environmental mitigation particularly full decommissioning (not conceptual as BOEM has referred to	Proposed mitigation for the Projects is outlined in Appendix H. As described in Section 2.1.2.3, during decommissioning, monopile and piled jacket foundations would be removed by cutting below the mudline in accordance with standard practices. If necessary, the sediments inside the foundation would be used to backfill the depression once the foundation is

Comment No.	Comment	Response
	decommissioning in prior EISs) where the environment is restored to its original state at the end of the lease period including removal of all cables gravity bases turbine components and protection methods. Mitigation refers to siting and project design principles specifically adopted to reduce impacts to fishing. It is not satisfied through compliance with standard mandatory health and safety regulations although these are important. Mitigation is also not synonymous with compensation.	removed. The scour protection used around the foundations would be removed unless leaving it in place to preserve established marine conditions is deemed appropriate through consultation with the proper authorities. Offshore cables would be lifted out of the seabed and cut into pieces or reeled onto barges for transport.
BOEM-2022-0053-0130-0010, -0011, & 0012	We urge BOEM to reconsider this policy. Specifically for the Empire Wind and all other proposed OSW projects the agency should include alternatives for analysis in each of its environmental review documents describing specific fisheries mitigation solutions and afford these full neutral consideration. Stand-alone alternatives will more clearly inform public comment and allow better evaluation of potential mutual benefits or tradeoffs. As a public agency BOEM's consideration of alternatives should include those that reasonably mitigate impacts to fishing whether or not a developer has voluntarily proposed to incorporate them in its Construction and Operations Plan (COP) and whether or not they could require reasonable modifications to private contracts. This is especially true as in the case of this Empire Wind DEIS when highly affected members of the public have properly proposed specific fisheries mitigation alternatives for analysis and public input through the scoping process.	The Draft EIS did include analysis of an alternative (Alternative B) that was developed to reduce impacts on Cholera Bank by removing six WTG positions from the western end of EW 1. The Proposed Action also includes a "gap" in the western end of EW 1 that was arrived at through coordination with the Responsible Offshore Development Alliance to maintain access for squid fishing while still achieving the required generation capacity to meet contractual commitments. The mitigation measures defined in Draft EIS Appendix H are analyzed for all action alternatives. The Final EIS also identifies the mitigation that BOEM recommends for inclusion in the Preferred Alternative. Mitigation for commercial and for-hire recreational fisheries added between the Draft EIS and Final EIS includes a measure requiring the Lessee to establish a mitigation fund consistent with BOEM's draft Guidance for Mitigating Impacts to Commercial and Recreational Fisheries on the Outer Continental Shelf Pursuant to 30 CFR 585 (see Final EIS Section 3.9 and Appendix H).
BOEM-2022-0053-0140-0007	During operations and maintenance Empire Wind has committed to "Periodic inspections of offshore Project components including foundations scour protection and submarine export and interarray cables to verify integrity of the Project components and to confirm adequate burial." The EIS	A mitigation measure that would require that Empire develop and implement a Cable Maintenance Plan is recommended for inclusion in the Preferred Alternative. The

Comment No.	Comment	Response
	<p>must require a time frame commitment for inspections such as every 6 months. This is necessary because sediments and sands shift and can expose cables or other infrastructure related to the Empire Wind projects causing safety hazards.</p>	<p>Cable Maintenance Plan would require prompt remedial burial of exposed and shallow-buried cable segments, address repeat exposures, and establish a process for identifying when cable burial depths reach unacceptable risk levels.</p>
<p>BOEM-2022-0053-0142-0005</p>	<p>Conduct appropriate pre-construction construction and post-construction monitoring especially in areas of known vulnerability (i.e. adjacent to known sources of contaminants near environmental justice communities). Using best available science BOEM and Empire Wind should implement and enhance protective measures for the critically endangered North Atlantic right whale and other vulnerable marine species including but not limited to noise-mitigation technologies clearance and exclusion zones and seasonal restrictions.</p>	<p>Empire has committed to implementing monitoring for birds, bats, fisheries, and benthic resources as described in Appendix H, Attachments 3 and 4. Proposed measures to reduce impacts of underwater noise on protected marine species include Letter of Authorization measures proposed by Empire and BOEM-proposed measures included in the NMFS BA as described in Appendix H and include sound-attenuation measures, clearance and shutdown zones, and seasonal restrictions.</p>
<p>BOEM-2022-0053-0142-0006</p>	<p>Robust monitoring data collection and reporting is essential to evaluating impacts of offshore wind projects on marine coastal and avian wildlife. The FEIS should account for the limitations in the survey methods used to assess the project area for species present and Empire Wind should employ pre-construction construction and post-construction monitoring.</p>	<p>Empire has committed to implementing monitoring for birds, bats, fisheries, and benthic resources as described in Appendix H, Attachments 3 and 4. Monitoring for pile-driving activities, vessel strike avoidance, and live and hard-bottom benthic features are also proposed in Appendix H.</p>
<p>BOEM-2022-0053-0145-0013</p>	<p>Requiring—to the extent to which harm to historic and cultural resources cannot be avoided or minimized—appropriate project mitigation measures to offset the impacts to communities such as community benefit agreements offshore wind mitigation trust funds or other economic development arrangements as are standard in the offshore wind industry globally. At this critical juncture in the development of the U.S. offshore wind industry stakeholders are open minded if not supportive of a successful industry that shares benefits with local communities that will bear the brunt of adverse impacts and certain risk of loss to property values and their economies.</p>	<p>Mitigation for impacts on historic and cultural properties will be determined through NHPA Section 106 consultation and documented in the Finding of Effect, historic property treatment plans, and the Memorandum of Agreement for the Projects. See Appendix A for a list of consulting parties that are participating in Section 106 consultation and Appendix N for the Finding of Effect, historic property treatment plans, and the Memorandum of Agreement</p>

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**P.6.21 NEPA/Public Involvement Process**

**Table P.6.21-1 Responses to Comments on NEPA/Public Involvement Process**

Comment No.	Comment	Response
BOEM-2022-0053-0113-0002	<p>[Bold: Project Modifications:] It has come to our attention that the developer proposing Empire Wind did not complete its geotechnical surveys prior to submitting the COP and during those surveys has recently discovered problematic sediment in the lease area. Due to this discovery the Alternatives considered by the document do not represent what is actually possible to construct in the lease area due to sediment type. This is yet another flaw in the BOEM process; namely that the order of analysis documentation and review is out of sync with developer activity and reality. It is our understanding that the developer itself intends to submit a new proposed layout incorporating modifications due to this sediment discovery via public comment on this DEIS docket. If this is the case BOEM must release a Supplemental EIS specifically incorporating these modifications for public comment. A final project layout should not be something submitted as a public comment on a DEIS; it should be something clearly articulated and solicited for public comment within the DEIS.</p>	<p>Draft EIS Alternative F included a WTG array layout for EW 1 based on geotechnical information that was available at the time the Draft EIS was published. Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification have been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7. Final EIS Figure 2-10 has also been updated to include an indicative WTG and interarray cable layout for both EW 1 and EW 2 based on the pile drivability analysis. The refinement to Alternative F between the Draft EIS and Final EIS reduced the total number of WTG positions that could be developed under Alternative F from up to 147 WTGs to up to 138 WTGs (loss of 9 WTGs). The refinement to Alternative F between the Draft EIS and Final EIS did not result in impacts that were not disclosed in the Draft EIS and therefore BOEM has determined that a supplemental Draft EIS was not warranted.</p>



Comment No.	Comment	Response
BOEM-2022-0053-0113-0004 & -0005	<p>OSCLA Claims: The disclaimer that BOEM has included on page 1-6 of the Empire DEIS is unique to this project and is clearly a defensive statement due to the fact that BOEM completely ignored its legal obligations when siting and leasing the Empire Wind lease. OSCLA does not require that BOEM “consider” this list of issues at the end of its process during the DEIS phase while it determines COP approval. The law clearly states that the Secretary [Bold: “shall ensure that any activity] under [subsection 8(p) is [Bold: carried out in a manner that provides for]- (A) safety (B) protection of the environment... (G) protection of correlative rights in the Outer Continental Shelf... (prevention of interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone the high seas and the territorial seas...” This clearly refers to not only the COP review process but also the Area ID and leasing processes as well. Obviously BOEM has not sited nor leased the Empire Wind project area in compliance with these enumerated requirements.</p> <p>We communicated with BOEM early in the NY WEA/Area ID process prior to WEA designation and prior to lease sale. We provided BOEM with confidential information from over 20 vessels prior to WEA designation detailing the intense conflict that siting a WEA in this location would create. We highlighted the fact that BOEM’s shoddy data being used for Area ID did not include impacts to the squid fishery or any RI port although RI contains the primary ports responsible for coastwide squid landings and the squid fishery is substantially impacted by the proposed project. Our concerns were noted in the BOEM Director’s Memo dated March 14 2016 titled “Decision Memorandum on New York Area Identification Pursuant to 30 CFR Section 585.211(b)” as were other squid and scallop fishery concerns with the siting of the WEA. [Footnote 6: See document attached.] However that Memo authorized the Area ID despite these concerns. The Memo on NY Area ID actually did contain multiple Options to remove aliquots from the Call Area to accommodate the squid and scallop fisheries. Option 1 recommended the removal of 173 aliquots prior to leasing to deconflict with the squid and scallop fisheries. [Footnote 7: Ibid p. 24.] Option 2 recommended the removal of 160 aliquots to deconflict with the squid and scallop fisheries. [Footnote 8: Ibid p. 25.] Option 3 recommended the removal of 147 aliquots to accommodate the squid and scallop fisheries. [Footnote 9: Ibid p. 26.] However BOEM’s Director chose Option 4 “No removal of area to accommodate squid and scallop fisheries at this time (consider leasing the entire Call Area with 1 nm navigational setback)”. [Footnote 10: Ibid p. 28 p. 36.] Despite calls from NMFS multiple US Senators as well as stakeholders [Footnote 11: See our</p>	<p>Comment acknowledged. BOEM’s review and determination regarding compliance with subsection 8(p)(4) of the OSCLA, 43 USC 1331 et seq., will be documented as an appendix to BOEM’s ROD for the Projects.</p>

Comment No.	Comment	Response
	<p>comments on the Empire Wind NOI at Regulations.gov.] BOEM chose not to deconflict with fisheries but to maintain these conflicts. This is a violation of OCSLA as the law requires that the Secretary “shall ensure” the prevention of interference of reasonable uses of the US EEZ at every stage of its offshore wind process.</p>	
<p>BOEM-2022-0053-0113-0008</p>	<p>Additionally with regards to OCSLA compliance BOEM is quick to emphasize in its Section 1.3 “Regulatory Overview” its April 9 2021 legal memo “M-Opinion 37067” regarding OCSLA compliance and fisheries which reverses BOEM’s legal memo on the same subject from December 14 2020 “M- 37059”. [Footnote 17: Attached with this comment.] It is clear that such swings of legal opinion in the span of only five months has nothing to do with the law itself but rather on political changes in Administration. BOEM has no internal legal or procedural standards other than political ones. If this is not the case and BOEM has clear and repeatable internal standards for review that do not change regardless of Administration and/or clear and repeatable standards and thresholds for what constitutes prevention of interference with reasonable uses or clear and repeatable standards and thresholds for deconflicting with uses of the ocean other than offshore wind we request a full disclosure and explanation of those standards and thresholds including implementation dates. We also request a full explanation for the change in BOEM’s legal stance on this issue within the short time span of five months.</p>	
<p>BOEM-2022-0053-0113-0024</p>	<p>BOEM’s process refuses to go beyond acknowledgment of conflicts and cross into the realm of actively deconflicting. This is because BOEM has [Bold: no standard] for determining how much conflict is too much conflict particularly with regards to fisheries. The 2016 Director’s Memo states on page 5 “BOEM has not established a value or ‘revenue threshold’ for determining if areas should be removed from leasing consideration due to fisheries conflicts.” This position has not changed since 2016. Without standardized processes by which areas from leases can be eliminated for buildout to account for prevention of interference with reasonable uses of the EEZ BOEM cannot fulfill its own legal obligations.</p>	<p>Under OCSLA and its implementing regulations, the Secretary of the Interior ensures that any authorized activities are carried out in a manner that provides for the prevention of interference with reasonable uses (as determined by the Secretary) of the exclusive economic zone, the high seas, and the territorial seas; and that activities authorized by the Secretary will “not unreasonably interfere with other uses of the OCS.” BOEM’s review and determination regarding compliance with subsection 8(p)(4) of the OCSLA, 43 USC 1331 et seq., including as relates to commercial fisheries and for-hire recreational fishing, will be documented as an appendix to BOEM’s ROD for the</p>

Comment No.	Comment	Response
BOEM-2022-0053-0117-0004	As BOEM works to develop the Final EIS we urge the agency to ensure that the Project equitably achieves the maximum beneficial impacts by including robust assessment of whether the Project meets the following standards: Maximizes the creation of quality high-paying union jobs over projects lifetime; Expands domestic manufacturing along robust domestic regional and local supply chains; Delivers community benefits with attention to improving access to disadvantaged communities; Protects fisheries wildlife and marine ecosystems by avoiding minimizing mitigating and monitoring environmental impacts; and utilizing data sharing the best available science and data and adaptive management strategies; and Guided by robust and inclusive stakeholder engagement including labor organizations Tribal nations historically underrepresented or disadvantaged communities, low-wealth communities, communities of color and impacted ocean users.	Projects. BOEM's obligation under NEPA is to use the best available science to analyze the impacts of the Proposed Action and alternatives; provide for public disclosure of assessed impacts and opportunities for public review and comment; and prescribe mitigation measures that will avoid, minimize, or mitigate impacts, where appropriate. The specifics of Equinor's community development initiatives, labor agreements, and terms of supplier agreements are not subject to review as part of the Empire Wind COP. BOEM's authority under the OCSLA only extends to authorization of activities on the OCS. If BOEM's decision is to approve the COP, the terms and conditions of COP approval that are within BOEM's authority and jurisdiction will be defined in the ROD.
BOEM-2022-0053-0117-0013	In the National Environmental Policy Act Congress declared "it is the continuing policy of the Federal Government...to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social economic and other requirements of present and future generations of Americans." To create these conditions it is imperative that BOEM plays a role in ensuring that positive impacts of offshore wind projects are maximized and delivered equitably while using the best available science and data to establish measures to avoid minimize mitigate monitor environmental and wildlife impacts as well as their social implications. To achieve this will require that all offshore wind lease contracts and permitting activities solidify the application of high-road employment practices community benefits agreements and other means to ensure the equitable distribution of benefits from offshore wind projects and environmentally responsible development practices.	
BOEM-2022-0053-0130-0001	RODA and its members have submitted hundreds of comment letters to BOEM and its cooperating federal and state agencies outlining significant concerns associated with offshore wind energy (OSW) development in the Southern New England region where this project is proposed and other areas that are essential to U.S. seafood production and U.S. food security. Unfortunately BOEM continues to conduct environmental review using a piecemeal rather than regional approach.	BOEM's decision for this Proposed Action is to approve, approve with modification, or disapprove Empire's COP for Renewable Energy Lease Number OCS-A 0512. Impacts related to other offshore wind development are analyzed as cumulative impacts based on the planned activities scenario described in EIS Appendix F.
BOEM-2022-0053-0130-	In pursuit of its mission to achieve the best possible outcomes for U.S. commercial fishermen (and a healthy marine environment on which they	Comment acknowledged. The formation of an industry task force or other similar

Comment No.	Comment	Response
0003	depend) RODA has made extensive efforts to communicate directly with OSW developers. In early 2019 we convened the Joint Industry Task Force (Task Force) with the intention of using this collaborative forum to explore compromise approaches that would reduce impacts to fishing while reducing risk to developers. This Task Force no longer exists after the developers declined to renew their agreements as of January 1, 2021. This is a huge loss for the fishing industry as there is no agency action or other forum to mediate issues between these two industries at a regional level. RODA's Executive Committee has suggested that BOEM establish a committee similar to the FLOWW in the UK. We urge BOEM to work closely with us to ensure a suitable opportunity exists to achieve these goals as conflicts will continue to arise so long as BOEM continues to lease public ocean space without accounting for existing industries.	committee to facilitate communications between commercial fishermen and offshore wind developers on a regional level is outside the scope of this project-specific environmental review for the Projects.
BOEM-2022-0053-0130-0026	Sequencing of Site Assessment COP Approval and NEPA Initiation RODA strongly urges BOEM to reconsider the sequencing of the site assessment COP approval and NEPA initiation for OSW projects as the current rushed timeline has resulted in a Proposed Alternative that is unlikely potentially even impossible given technical constraints. If the site assessment was fully complete prior to the COP approval and initiation of the NEPA analyses the Proposed Action would be better informed. Instead the DEIS sets up the analyses poorly as Alternative F is the anticipated true preferred action for the developer. A compression of these different analyses and permitting actions means the public is not adequately informed of the expected project design and again demonstrates why alternatives should be fully analyzed and compared against each other - not solely to the Proposed Action. We strongly urge BOEM to require geological information which may drastically change a project design in light of fisheries impacts be more readily available early on in the process. A rushed process does equal a better process.	As described in COP Appendix T, Empire conducted site-specific geophysical, geotechnical, and benthic surveys across the Lease Area and a large proportion of the submarine export cable siting corridors from March 2018 to November 2018, and additional surveys were completed between spring 2019 and May 2021 to fill data gaps in the submarine export cable siting corridors, while the NOI to prepare an EIS was published on June 24, 2021. Alternative F represents a WTG layout that has been refined based on additional review of the presence of glauconite in the Lease Area and subsequent pile drivability analyses. Refinement of the Lessee's design within the range of the PDE parameters of the COP is consistent with BOEM's use of a PDE approach for completing the environmental review for a COP EIS. The EIS alternatives modify or narrow the design for specific aspects of the PDE. Therefore, the analysis of the action alternatives focuses on impacts of the alternatives that differ from those of the

Comment No.	Comment	Response
BOEM-2022-0053-0140-0020	<p>The DEIS presents serious concerns with foregone conclusions regarding the Analysis of Incomplete or Unavailable Information in Appendix D. The DEIS states:<i>[Italics: When incomplete or unavailable information was identified BOEM considered whether the information was relevant to the assessment of impacts and essential to its analysis of alternatives based upon the resource analyzed. If essential to a reasoned choice among the alternatives]</i> <b>[Bold: BOEM considered whether it was possible to obtain the information and if the cost of obtaining it was exorbitant. If it could not be obtained or if the cost of obtaining it was exorbitant]</b> <i>[Italics: BOEM considered the best available scientific information and applied generally accepted scientific methodologies to inform the analysis.]</i> <i>[Footnote 60: Bureau of Ocean Energy Management. Empire Offshore Wind Draft Environmental Impact Statement Volume II page 101 &amp; 722 November 2022 <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf</a>.]</i> (emphasis added) This in itself is questionable because it is not clear how the framework for “best available scientific information” has been developed to determine impacts at local and regional levels. Also how does BOEM determine “exorbitant” costs for finding the most appropriate and relevant information that will help to minimize adverse impacts?</p>	<p>Proposed Action.</p> <p>In accordance with Section 1502.21 of the CEQ regulations implementing NEPA, Appendix D explains the information that BOEM identified to be incomplete or unavailable for each resource analyzed in the EIS and also explains the reasons that BOEM does not believe that there is incomplete or unavailable information that is essential to a reasoned choice among alternatives.</p>
BOEM-2022-0053-0140-0032	<p>COA also notes that this DEIS is for two distinct projects Empire Wind 1 and Empire Wind 2. Other projects in the region have separate review processes for each project. The agencies reviewing offshore wind projects and Equinor and BP fail to act responsibly by combining two projects into one eliminating the opportunity for a phased-in approach allowing for improvements in technology and measures or efforts to reduce harm.</p>	<p>It is at the Lessee’s discretion whether to propose phased development of the Lease Area with separate COPs for each phase or to include full build-out of the Lease Area in a single COP. BOEM’s decision is to approve, approve with modifications, or disapprove Empire’s COP.</p>
BOEM-2022-0053-0140-0036	<p>Importantly New Jersey’s environmental and economic resources will be impacted by this project yet according to the list of coordinating agencies in the DEIS the New Jersey Department of Environmental Protection (“NJDEP”) is noticeably absent.</p>	<p>As outlined in Appendix A, Table A-1, the State of New Jersey does not have regulatory jurisdiction for permits or approvals required for the Projects and is not participating as a cooperating agency. However, the New Jersey SHPO is participating as a Section 106 consulting party as noted in Table A-2.</p>
BOEM-2022-0053-0140-	<p>While the studies and baseline information on offshore wind impacts is profoundly lacking federal and state officials are fast-tracking processes and</p>	<p>The EIS meets the requirements of NEPA.</p>

Comment No.	Comment	Response
0042	changing regulations to quickly advance offshore wind energy development off the coast of New York and New Jersey and beyond. This is leading to a lack of good government and due diligence to protect public interest and the environment. The federal fast-tracking initiative “Fast 41” created a new governance structure set of procedures and funding authorities to advance the federal environmental review and authorization process for covered infrastructure projects. All of the current proposed offshore wind projects off the NY/NJ coast including Empire Wind 1 and 2 are listed as “FAST-41” projects giving these projects the green light to advance quickly. The federal agreements and initiatives designed to fast-track and streamline large projects essentially make it easier for private companies to control and develop our public resource: the ocean. In short these agreements and initiatives violate the federal government’s obligation to protect offshore resources under the public trust especially in the form of limiting due process. Racing quickly and carelessly through these processes will prove devastating to marine life with serious repercussions for onshore communities as well. In addition at the state and local levels New Jersey passed a law at the state level limiting local government input on the placement of offshore wind infrastructure in their communities.	The Fixing America’s Surface Transportation Act aims to improve the federal environmental review and authorization process for covered infrastructure projects rather than to fast-track reviews. NEPA regulations at 40 CFR 1501.10 provide time limits for NEPA documents to “ensure that agencies conduct NEPA reviews as efficiently and expeditiously as practicable.”
BOEM-2022-0053-0141-0003	there has been a general lack of project information provided to local stakeholders and community members. It is unreasonable to expect an average resident to locate and digest thousands of pages of technical data. Yet this project will be occurring just feet from our doorsteps and most are unaware of the proposed cable routing.	BOEM has worked diligently to provide as much information as is possible, under current regulatory guidance, within the main body of the EIS with supporting or additional information provided in the appendices. In addition, the Lessee’s detailed technical reports that support the COP (such as COP Appendix FF, Onshore Electric and Magnetic Field Assessment) are posted to BOEM’s website for public review. Refer to Section Q.6.23 for responses to specific comments on EMF metrics that were raised by the commenter.
BOEM-2022-0053-0141-0008	I was able to find this information because I knew where to look as a professional planner – yet I still found myself deep in Appendix FF of a supplementary construction plan (MF information was not included within the main body of the DEIS) to find the information I was seeking. Further I had to look to outside studies to find that the metrics utilized within Equinor’s Construction and Operations Plan were misleading and thus potentially harmful to residents.	
BOEM-2022-0053-0150-0001	Biologically, it is a very inaccurate and generic. The EIS and does not explain the reasoning behind the impact determination or explain much of anything. It would be helpful to provide references in the chapter to the reasoning behind impact determination. How can BOEM approve something like this? Did they read it? Number one - why are speaking about animals the Bay of Fundy and Gulf of Maine? Why are migratory birds not mentioned in the wind area, the	Resource-specific impact level definitions are provided at the beginning of the environmental consequences section for each Chapter 3 resource analyzed in the EIS. Direct, indirect, and cumulative impacts on each resource are analyzed within the



Comment No.	Comment	Response
	<p>most basic biologist can understand this. It is obvious this was copied from another EIS. Number two- why is there a focus on Atlantic Shores wind farm when this is about Empire Wind? Number three- why are the details of minimal or no Impacts not explained? There are so many inconsistencies in this EIS. Why are you risking the environment and spread of invasive species by bringing ships from Texas and not providing an invasive species plan or mentioning the species impacted from Texas to the Atlantic? why are you speaking of acoustic studies not related to the project? I do not think this EIS is thought out very well or is project specific. I did enjoy reading the reports in the appendix which I do not believe the information made it into the EIS.</p>	<p>geographic analysis area that is defined at the beginning of the affected environment section for each Chapter 3 resource. The defined analysis area for some resources that migrate long distances (such as birds, bats, marine mammals, and sea turtles) is large and inclusive of the eastern seaboard. The cumulative impact analysis considers the cumulative effect of the Proposed Action in combination with other ongoing and planned activities, which includes analysis of other offshore wind projects such as Atlantic Shores. The EIS explains that Empire anticipates approximately two Project-related vessel trips could originate in the Corpus Christi area, which is a very small contribution to existing vessel traffic utilizing ports in the Corpus Christi area. To manage the page length of the EIS, some information is presented in appendices and incorporated by reference. In addition, the EIS summarizes the findings of the technical reports that are appendices to the Empire Wind COP. The COP and all of the volumes and appendices supporting the COP are incorporated into the EIS by reference and are available at <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan">https://www.boem.gov/renewable-energy/state-activities/empire-wind-construction-and-operations-plan</a>.</p>

**P.6.22 Planned Activities Scenario/Cumulative Impacts**

**Table P.6.22-1 Responses to Comments on Planned Activities Scenario/Cumulative Impacts**

Comment No.	Comment	Response
BOEM-2022-0053-0116-0007	It is important to reiterate that current and future wind projects do not occur separate from one another. Thus any review or analysis must consider the cumulative effects of all wind projects on species and their habitat. It is therefore the responsibility of BOEM to assess cumulative impacts across multiple wind energy projects regionally through all phases of the project and through all life history stages of the various species effected.	The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0130-0004	Additional effort is required from BOEM and Equinor to mitigate project impacts and to adopt a cumulative approach to OSW planning.	Appendix H, <i>Mitigation and Monitoring</i> , identifies all specific mitigation proposed for the Projects, the anticipated enforcing agency for each proposed measure, and reporting requirements where applicable. The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0130-0013	Cumulative Impact Analysis RODA other fishing industry representatives marine scientists fishery management councils the environmental community and others have consistently requested BOEM take a cumulative approach to offshore wind planning and leasing. BOEM is doing the public and the environment a disservice by continuing to review individual projects in isolation despite the large number of projects it is “fast tracking” and the existing (arbitrary) OSW energy production targets. It is difficult to imagine that it would not also	The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions)

Comment No.	Comment	Response
	benefit developers transmission interests and the public for BOEM to clarify its approach to cumulative effects review and at a minimum implement regional planning processes as robust as those it employs for oil and gas leasing.	provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0130-0014	The Supplemental Environmental Impact Statement (SEIS) completed in 2020 for the Vineyard Wind I project was intended to serve as a cumulative impacts analysis for multiple projects in the region. However the SEIS was only incorporated into the record of that project as BOEM used an entirely different—and grossly insufficient—approach for the South Fork project just weeks later. It is unclear what if any approach BOEM plans to use going forward although the new leadership at Department of Interior has made clear that they disapprove of any of the environmental review practices of the last Administration so these are likely to change. Politics must not interfere with scientific integrity or transparency and we request BOEM clarify what document the public should review to understand the cumulative impact of potentially 3000 turbines whose installation it is “streamlining” into the seabed between MA and VA alone. We further request BOEM to provide explicit information as to how it will approach cumulative impacts reviews for this and future projects.	The scope of the EIS, per BOEM’s regulations, is to analyze the COP Empire submitted for Lease Area OCS-A 0512.  The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0130-0015	The need for a cumulative approach is highlighted by the effect the announcement of Hudson North WEA will have on RODA’s collaboration with Equinor. As described above based on direct feedback from the fishing industry in the region Equinor has adjusted its layout design for EW 1 to reduce impacts to fishing. Unfortunately the discussions about nuanced spacing and transit accommodations for Empire Wind are greatly affected by what ultimately occurs in the Hudson North WEA which abuts the southeastern edge of the lease. This heavily transited and fished area is now slated to become a larger contiguous developed area further displacing existing users. Due to the many leases and expansive nature of this new infrastructure every aspect—from biological ecological and physical to navigational and access-related—must be looked at in a cumulative manner.	
BOEM-2022-0053-0130-0016	BOEM as the agency hiring consultants to draft the Environmental Impact Statements for offshore wind projects has implemented an inadequate cumulative impacts strategy. It is unclear how BOEM decides which projects are included in an EIS. For the earliest projects	

Comment No.	Comment	Response
	<p>(Vineyard Wind 1 South Fork and Ocean Wind 1) BOEM's NEPA review focused on a single proposed project with a Power Purchase Agreement (PPA) in place. For Coastal Virginia Offshore Wind-C the EIS will be prepared without the project having a PPA but for Vineyard Wind South the EIS will be prepared while Phase I has a PPA with Connecticut's Public Utilities Regulatory Authority but Phase II does not and ambiguously provides energy to "the northeastern states." [Footnote 9: 86 Fed. Reg. 34782 (June 30 2021).] Here both EW 1 and 2 (both with PPAs) are analyzed together. In summation there appears to be no standard protocol for when BOEM will conduct a project's EIS and inconsistency is increased when analyses are conducted piecemeal for each phase versus across an entire lease area. As the PPAs have in the past determined BOEM's range of alternatives and what fisheries mitigation measures can be considered within the project parameters this leads to significant uncertainty regarding how BOEM will conduct the upcoming NEPA reviews. Moreover the current approach makes it nearly impossible to conduct any cumulative analysis as there is no appropriate time in the federal process to do so.</p>	
<p>BOEM-2022-0053-0130-0017</p>	<p>Although cumulative impacts analyses are needed at the earliest stages of OSW review the ability to predict thorough cumulative effects for each OSW project currently under consideration will necessarily evolve and upfront analysis must be paired with an adaptive management approach as we learn more about the impacts of OSW in the Atlantic region. There are currently only seven turbines in U.S. waters and the scant scientific studies associated with those turbines are insufficient to understand the impacts of full-scale development (especially with the much larger proposed turbines). European waters have had offshore wind turbines for at least a decade however not enough research has been conducted to help inform the potential impacts on the Mid-Atlantic cold pool impacts to spawning changes in hydrodynamics which may affect settlement impacts on protected resources (especially the endangered North Atlantic right whale) changes in cost of electricity impacts of onshore cables costs and resources associated with upgrading current grid infrastructure needed to accommodate this energy source and the true number of well-paying permanent jobs. Substantially more research is</p>	<p>The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.</p> <p>Appendix H, <i>Mitigation and Monitoring</i>, identifies all specific mitigation proposed for the Projects, the anticipated enforcing agency for each proposed measure, and reporting requirements where applicable. Empire and BOEM recognize that monitoring after construction may be necessary. For example, the Lessee's Avian and Bat Post-Construction Monitoring Framework proposes post-construction monitoring. As</p>

Comment No.	Comment	Response
	needed now and in the future.	part of monitoring plans, adaptive management may be required (i.e., new mitigation measures and monitoring may be required by BOEM if impacts deviate substantially from the impact analysis in the EIS).
BOEM-2022-0053-0130-0018	<p>The need for adopting a cumulative approach to OSW planning has been made even more apparent given recent studies and events. In November of 2022 Offshore wind farms are projected to impact primary production and bottom water deoxygenation in the North Sea [Footnote 10: Daewel U. Akhtar N. Christiansen N. et al. Offshore wind farms are projected to impact primary production and bottom water deoxygenation in the North Sea. Commun Earth Environ 3 292 (2022). <a href="https://doi.org/10.1038/s43247-022-00625-0">https://doi.org/10.1038/s43247-022-00625-0</a> (last visited Jan 17 2023)] warned of the very real possibility of dramatic impacts to the marine ecosystem. As the base of the food chain changes in primary production will affect phyto- and zooplankton availability and ultimately impact fish species particularly during their early life stages. Cascading impacts to lower levels of the food web was highlighted in a May 13 2022 letter from NOAA’s Chief of Protected Species to BOEM. [Footnote 11: See <a href="https://newbedfordlight.org/wp-content/uploads/2022/11/UR1-2023-000009_10_17_2022.pdf">https://newbedfordlight.org/wp-content/uploads/2022/11/UR1-2023-000009_10_17_2022.pdf</a> demands application of the precautionary principle. Food web risks must be further investigated to ensure avoidance of potential irreparable changes to our highly productive marine environments.] The potential for inducing significant shifts to ecosystem function demands application of the precautionary principle. Food web risks must be further investigated to ensure avoidance of potential irreparable changes to our highly productive marine environments.</p>	<p>Although future research is needed, current available information suggests that the consequences of hydrodynamic disturbances to marine food webs in the Mid-Atlantic Bight due to the presence of offshore structures are anticipated to be minor, fairly localized, and seasonally variable. The waters of the Mid-Atlantic Bight exhibit strong seasonal stratification patterns. Productivity in the region is high, particularly in the area of the Cold Pool (a large area of cold-bottom water [generally less than 10°C] resulting from the strong seasonal stratification that extends from Cape Hatteras to Georges Bank [Houghton et al. 1982; Miles et al. 2021]). Research on the potential disruptions to seasonal stratification in the Mid-Atlantic Bight, including the Cold Pool, from offshore wind structures is ongoing (BOEM 2021a). A recent review by Miles and others (2021) proposed that offshore foundation effects in the area, where seasonal stratification is strong and tidal currents are weaker, may not be as pronounced as those in Northern Europe (i.e., the North Sea), where seasonal stratification is weaker and tidal currents are stronger and turbulence is greater. Due to these differences in oceanographic characteristics, previous models of impacts on stratification in European waters may be more indicative of impacts on Mid-Atlantic Bight/Cold Pool stratification during spring and fall when stratification is weaker, and structure-induced mixing may not be substantial enough to significantly affect the stronger stratification present in the Mid-Atlantic Bight/Cold Pool during the summer (Miles et al. 2021). Specifically, in the research cited by the commenter (Daewel et al. 2022), modeling demonstrated an increase in phytoplankton (2.4%) and zooplankton</p>

Comment No.	Comment	Response
		<p>(12%) biomass inside and outside of offshore turbine clusters in highly stratified areas, a characteristic of the Mid-Atlantic Bight and Cold Pool. Additionally, in the Daewel et al. (2022) study, modeled dissolved oxygen levels in the southern North Sea only significantly decreased at an area known as the Oyster Grounds, a bathymetric depression that already experiences periods of low DO due to limited exchange with surrounding waters. Decreases in modeled DO levels elsewhere in the southern North Sea were not as pronounced as at the Oyster Grounds, and some areas even showed modeled increases in DO. While sediment organic matter is an important source of food for benthic organisms, an excess of organic carbon can lead to negative impacts on the benthic community. Modeled sediment carbon content increased by 10% at the wind farm locations, but only by 0.2% over the North Sea as a whole. One should note that the natural level of sediment carbon present (which was not stated in Daewel et al. 2022) is important to know when interpreting these results. This is because negative impacts on benthic species richness are likely low at sediment total organic contents less than 10 milligrams per gram, and intermediate at concentrations between 10 and 35 milligrams per gram. Without knowing the baseline levels of sediment organic carbon in the North Sea, one cannot place the results of Daewel et al. (2022) into appropriate context to determine if the modeled percentage increases in sediment organic content would affect benthic marine fauna.</p> <p>With respect to the comment related to “cascading impacts to lower levels of the food web,” the NOAA letter, dated May 13, 2022, “focuses on potential oceanographic impacts driving right whale prey distribution, but also acknowledges increased risks due to increased vessel traffic and noise.” In the letter, the potential disruption of zooplankton aggregations and zooplankton prey through changes in oceanographic</p>



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		<p>processes is discussed; however, “cascading impacts to lower levels of the food web” are not discussed. Some studies have suggested that hydrodynamic alterations due to the presence of WTGs could increase primary productivity in the vicinity of the structures (Carpenter et al. 2016; Schultze et al. 2020). However, such an increase would be highly localized, and the increased productivity may be consumed by filter feeders colonizing the structures (Slavik et al. 2019) rather than leading to increased prey abundance for higher trophic orders. There is no evidence to suggest that the presence of offshore structures in the Mid-Atlantic Bight would cause impactful alterations to the base of marine food webs.</p>
<p>BOEM-2022-0053-0130-0019</p>	<p>Regarding potential impacts to the critically endangered North Atlantic Right Whale The DEIS finds that “disturbance to right whale foraging could have population-level effects on an already endangered and stressed species.” In addition to potential impacts to the NARW a concerning number of whale mortalities have been occurring the last couple of months. As of January 16 at least 8 whales have washed up on beaches along the Atlantic coast in areas where offshore wind survey operations have been taking place. This has caused one legislator to “demand that all offshore wind activity be halted until it is properly determined what the effects of these activities are having on our marine life.” [Footnote 12: Statement made by Congressman Jeff Van Drew on January 13 2023. Available at <a href="https://vandrew.house.gov/media/press-releases/congressman-van-drew-demands-all-offshore-wind-activity-end-immediately-until">https://vandrew.house.gov/media/press-releases/congressman-van-drew-demands-all-offshore-wind-activity-end-immediately-until</a>]</p>	<p>Comment noted. Section 3.15, <i>Marine Mammals</i>, includes an evaluation of impacts on NARW from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives.</p>
<p>BOEM-2022-0053-0130-0020</p>	<p>Lastly since the Notice of Intent to prepare this DEIS in July of 2021 BOEM has taken action on many other relevant activities in the region. There have been multiple DEISs a regional Port Access Route Study an auction for six additional leases in the Bight and publication of several more Draft WEAs (Central Atlantic WEAs). Yet BOEM has not sufficiently evaluated the cumulative impacts of prospective activity in the region. This must be remedied immediately and should be incorporated into all future analyses conducted by BOEM.</p>	<p>The scope of the EIS, per BOEM’s regulations, is to analyze the COP Empire submitted for Lease Area OCS-A 0512.</p> <p>The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate</p>

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		analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0140-0023	Equinor and BP’s consideration and assessment of cumulative impacts in the Draft EIS is deficient. While cumulative impacts are mentioned briefly in sections the Draft EIS does not broadly or specifically consider impacts as they relate to the twenty-four (24) other known projects and offshore wind lease areas in the NY/NJ Bight as they relate to Empire Wind 1 and 2. As such impacts from any and all of these projects will be amplified in the geographic analysis area.	The scope of the EIS, per BOEM’s regulations, is to analyze the COP Empire submitted for Lease Area OCS-A 0512.  The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0140-0025	In general BOEM should utilize an extensive cumulative impact analysis based on the potential harm to sensitive areas in the NY/NJ Bight especially in consideration of the unprecedented footprint for offshore wind energy proposed across the East Coast. During the leasing and planning phases of offshore wind development BOEM only reviews impacts that are “reasonably foreseeable.” [Footnote 65: Vineyard Wind Supplemental Environmental Impact Statement p 1-2.] As a result cumulative effects and extensive precautionary steps have taken a back seat. Even though BOEM expanded the scope of their cumulative impact analysis during the Vineyard Wind programmatic review there could still be cascading effects to vulnerable New Jersey and New York ecosystems wildlife and communities along the Mid-Atlantic Bight.	analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0140-0031	COA is specifically concerned about the location of Empire Wind’s projects the unknown significant environmental impacts of large-scale offshore wind energy development as identified by marine scientists and the cumulative impacts of the numerous massive offshore wind projects in various stages of development in the NY/NJ Bight as well as the East Coast. Given the scope and magnitude of the proposed offshore wind energy infrastructure both on- and offshore it is imperative that each project be environmentally responsible and the cumulative impacts be considered and first avoided then minimized and if unavoidable mitigated. As this new industrial development has been initiated cultivated and promoted proponents – especially state and federal leaders – are committed to moving forward “responsibly.”	The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.

Comment No.	Comment	Response
	<p>However the current scale scope magnitude and speed by which offshore wind energy development is progressing is too much too fast and the DEIS is deficient in assessing cumulative impacts of all the proposed offshore wind projects in the region.</p>	
<p>BOEM-2022-0053-0140-0033</p>	<p>COA is concerned about the scope scale magnitude and speed of the totality of projects and proposals currently moving rapidly forward in the NY/NJ region especially with the dearth of science available about the impacts to the physical environment benthos fisheries mammals birds and bats. BOEM's process is woefully inadequate and fails to fully recognize the massive impact of all this industrialization in the Atlantic Ocean. The ecosystem is interconnected and fluid and all projects in the Atlantic from the North to the South Atlantic Planning Areas will impact marine life and waters that are shared within the ecosystem.</p>	
<p>BOEM-2022-0053-0140-0037</p>	<p>Scientists including federal scientists note there is a lack of information about species as well as impacts of OSW energy development on species. Studies and agency letters underscore that BOEM has not conducted the biological and ecological assessments needed to determine the effects and impacts of the extensive development and information is not yet available. As such the DEIS is deficient and BOEM will be unable to appropriately evaluate individual OSW projects such as Empire Wind 1 and 2 as well as the cumulative effects or harm from all the projects in this region. For example:-A New York State Environmental and Technical Working Group report that is the culmination of over 200 scientists considering the state of science in seven areas (environmental change fisheries and mobile invertebrates bats birds sea turtles marine mammals and benthos) make it clear that there is a lack of comprehensive science to determine the effects and impacts of offshore wind energy.<sup>4</sup> Thus it is premature for EIS' for individual projects including Empire Wind 1 &amp; 2 to be considered and reviewed as well as finalized. Moving forward without the necessary scientific information will mean damage will be done too late to avoid reduce or mitigate the harm to wildlife and the marine ecosystem.</p>	
<p>BOEM-2022-0053-0140-0041</p>	<p>-It is clear the state of knowledge and science on the impacts to the marine ecosystems from one or in this instance a double-wide project is lacking. Knowledge on cumulative impacts and consideration of the</p>	

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	11 currently proposed projects is non-existent.	
BOEM-2022-0053-0143-0019	By environmentally reviewing in the DEIS so many projects and including all of them in "baseline conditions" of the no-action alternative by the sheer numbers of offshore wind projects that are ongoing or planned and scale of the offshore wind program off the eastern U.S. Atlantic this lends the appearance that the effects of any particular one power plant is relatively small because its effect [bold: is framed as the differential impact] of adding just one more plant to the large mix of power plants ongoing or in the planning phases that are going to happen. This conceivably might be okay if the entire offshore wind program were reviewed in a comprehensive programmatic EIS that analyzed in great detail the effects of all the individual projects combined but it has not been. Instead BOEM found that there was no need to analyze in detail the cumulative effects of the entire program on specific taxa species and ecosystems because it does not have detail about individual projects and because it expected that such analysis would be deferred to be conducted at the time when each individual project undergoes an environmental review culminating in an EIS. Thus the cumulative effects of the offshore wind program are never fully evaluated by the agency. This does not fulfill the intent of NEPA's requirement that cumulative effects be evaluated. When the preferred alternative must be selected from among alternatives that include a no-action alternative that has baseline conditions of all the other ongoing and planned projects moving forward only the differential adverse effect (not the cumulative adverse effect) would come into play.	The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0145-0007	The DEIS is incomplete because it fails to assess adequately cumulative impacts including economic impacts. Multiple wind farms are in development off the coasts of New York New Jersey and adjacent states. These offshore wind projects will have both separate and cumulative adverse impacts upon historic properties sites and districts listed or eligible for listing in the National Register of Historic Places. Additionally communities within Empire Wind's Area of Potential Effect and Project Area are expected to experience harm to property values and their local economies which the DEIS ignores.	The Final EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-	In specifically requiring cumulative impacts analyses NEPA and NHPA recognize the significant effect that projects can have on the	Discussion of cumulative impacts on economics is

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0145-0008	surrounding landscape beyond the scope of a single development. This Project and how it is evaluated and permitted will set a precedent for upcoming projects in the area and along the entire Atlantic Coast; therefore it is essential to apply consistent criteria to this project and subsequent future sites. Due to the historic integrity of historic properties within the Project Area and Area of Potential Effect BOEM must establish and implement best practices.	included in Section 3.11, <i>Demographics, Employment and Economics</i> . Discussion of cumulative impacts on historic properties is included in Section 3.10, <i>Cultural Resources</i> , and Appendix N, <i>Finding of Adverse Effect for the Empire Wind Construction and Operations Plan</i> , which cites the <i>Cumulative Historic Resources Visual Effects Analysis for Empire Wind Farm Project</i> report completed in 2022.
BOEM-2022-0053-0145-0009	Finally the DEIS fails to incorporate best practices and minimum guidelines that would apply to all offshore wind developments off the coast of New York and adjacent states. In specifically requiring cumulative impacts analyses NEPA recognizes the significant effect that reasonably foreseeable projects can have on the surrounding landscape beyond the scope of a single development. However BOEM's methodology for assessing cumulative impacts in the DEIS is unclear.	Clarification regarding BOEM's methodology for assessing impacts is provided in Section 1.6 of the EIS. The EIS presents a complete description and analysis of impacts from ongoing activities and trends (i.e., No Action Alternative) and impacts from the Proposed Action and action alternatives. The No Action Alternative provides a current baseline for analysis of impacts from the action alternatives. A separate analysis of the No Action Alternative when combined with future planned activities (i.e., cumulative actions) provides the future baseline as a basis for comparison of the cumulative impacts of the action alternatives.
BOEM-2022-0053-0145-0010	Empire Wind is only one of what will be several offshore wind farms visible from historic properties. The Cumulative Historic Resources Visual Effects Analysis (CHRVEA) makes clear just how significant this development will be. Point O' Woods agrees with the CHRVEA's conclusion that the Project will have adverse effects from visual impacts and that those effects will only be exacerbated by forthcoming projects.[Footnote 2: CHRVEA at 5.] The CHRVEA states that Point O' Woods Historic District can eventually expect over 200 WTGs to impact its viewshed 70% of which are from Empire Wind 1 and 2.[Footnote 3: CHRVEA at 12.]	Comment noted. Discussion of cumulative impacts on historic properties is included in Section 3.10, <i>Cultural Resources</i> , and Appendix N, <i>Finding of Adverse Effect for the Empire Wind Construction and Operations Plan</i> , which cites the <i>Cumulative Historic Resources Visual Effects Analysis for Empire Wind Farm Project</i> report completed in 2022. The EIS includes Point O' Woods Historic District as a historic resource that would be adversely affected in the visual APE for offshore components.

**P.6.23 Project Design Envelope**

**Table P.6.23-1 Responses to Comments on the Project Design Envelope**

Comment No.	Comment	Response
BOEM-2022-0053-0035-0001	So a few of the things that we would really like to talk about is we know that climate change is the number one threat to our ocean and it is decimating it now without a single wind turbine in the water. We need to understand that the ocean is the receptacle as a carbon and heat sink which is suspected to be part of why we are losing some of our fisheries and lobster crops and so we need to definitely make sure that we are taking action to avert the already existing problems that the ocean is facing. So we believe that the best installation would still have included the gravity based foundations I think everybody in the environmental community was in agreement with this and we know it's not on the table anymore but we just want to reiterate one final time that maybe it should be.	Comment acknowledged. The rationale for dismissal of the gravity-based foundation is presented in EIS Table 2-3.
BOEM-2022-0053-0042-0002	When considering substations for Empire Wind Two we urge that BOEM and all other actors to support an option that would best enable replacing the EMF generating station's power. Replacing the gas power plants in Sunset Park and in Nassau County with clean offshore wind power is a tremendous victory for local air quality and a liveable future.	Comment acknowledged. Onshore Substation A and Onshore Substation C are retained in Empire's PDE for EW 2.
BOEM-2022-0053-0130-0027	Project Envelope Information The DEIS fails to provide simple information on the project envelope; turbine size or size range in megawatts is not anywhere in the Volume I or Appendix E: Project Design Envelope and Maximum-Case Scenario of the DEIS. This information needs to be made clear to the public as turbine size is fundamental to the number of turbines that will be used in a project area.	BOEM allows lessees flexibility for selection and purchase of project components by allowing the use of a PDE approach. Under the PDE approach, the lessee may identify a "maximum design scenario" that BOEM then uses to analyzes the impact on each resource in the EIS. Consistent with this PDE approach, Chapter 2 and Appendix E of the EIS identify the maximum WTG specifications for design parameters such as WTG number, height, rotor diameter, diameter of monopile foundation, etc. The WTG PDE parameters specify the size of the WTG but do not specify the MW nameplate capacity of the WTG. Goals for generating capacity of the EW 1 and EW 2 Projects are specified in the purpose and need (Section 1.2).
BOEM-2022-0053-0130-0028	Avoidance is the first step of impact minimization under NEPA. For the fishing industry avoidance is most readily achieved by constructing the fewest turbines as turbines will displace fishing activity. Power agreements often drive the number of turbines a developer will use in a lease area but size also influences how many turbines will be needed. Clearly the developer has an anticipated turbine size they intend to use as the number of turbines and wind farm capacity are stated in Appendix E of the	



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	<p>DEIS. Therefore the turbine size should be easily available in the Executive Summary of the DEIS. Should the developer anticipate using the largest turbines available at the time of construction this should be clearly stated and a range of anticipated turbine size should still be provided.</p>	
<p>BOEM-2022-0053-0130-0038</p>	<p>Cable Routing and Service Vessels in the Bight The locations of the Empire Wind lease and the submarine export cable routes are in a very busy region and are constrained by a number of other maritime considerations (See Figure A). The multiple TSSs anchorage Right Whale speed restrictions existing cables/pipelines wrecks artificial reefs and unexploded ordinances already make navigation in this area difficult. The addition of more vessels during construction and O&amp;M and associated export cables will only add to the complexity. In particular burial of the submarine export cable through the anchorage is concerning as any interaction between anchors and offshore power lines would be extremely dire. While outside our primary expertise we advise BOEM to only approve routes that will minimize potential cable exposure in the final EIS analysis.</p>	<p>Comment noted. As discussed in EIS Section 3.16, <i>Navigation and Vessel Traffic</i>, Empire would conduct a cable routing study (APM 205) to develop submarine export cable routes that avoid or minimize interactions with anchorage areas. Empire would also prepare a CBRA to identify appropriate cable burial depths and identify any needs for additional cable protections (APM 207). Empire would periodically monitor cable burial and protection measures to ensure they remain effective with regular monitoring of protection in the vicinity of areas of existing anchoring (APM 208). Final EIS Appendix H includes a mitigation measure that would require Empire to develop and implement a cable maintenance plan that requires prompt remedial burial of exposed and shallow-buried cable segments, addresses repeat exposures, and establishes a process for identifying when cable burial depths reach unacceptable risk levels.</p>
<p>BOEM-2022-0053-0130-0039</p>	<p>Decommissioning The DEIS fails to include a clear decommissioning plan for the Empire Wind project. While it is BOEM's mandate to remove all foundations from 15 feet below the mudline there is no clear designation of how harm will be quantified and what analyses will be conducted. We strongly encourage BOEM to not be over reliant on "conceptual" decommissioning and require developers to include a full decommissioning plan.</p>	<p>The description of the Proposed Action in Chapter 2 of the EIS includes a description of construction, O&amp;M, and conceptual decommissioning. Prior to implementation of any activities associated with decommissioning, BOEM would require Empire to submit a decommissioning application for technical and environmental review. Upon completion of the technical and environmental reviews, BOEM may approve, approve with conditions, or disapprove the Lessee's decommissioning application. This process would include an opportunity for public comment and consultation with municipal, state, and federal management agencies.</p>
<p>BOEM-2022-0053-0130-</p>	<p>Impact analyses for O&amp;M are based upon a 35-year operational term. Yet the DEIS states that "some installations and components</p>	<p>As explained in Section 2.1.2.2 of the EIS, Empire's lease with BOEM (Lease OCS-A 0512) has an</p>

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0040	<p>may remain fit for continued service after this time.” (DEIS page 2-16) If it is anticipated that installation will remain longer or even permanent analyses in the EIS must reflect these longer time periods. This is noteworthy for other ocean users such as the fishing industry who may be anticipating the re-opening of certain areas to fishing for future generations.</p>	<p>operational term of 25 years that commences on the date of COP approval. Empire would need to request an extension of its operational term from BOEM in order to operate the proposed Projects for 35 years. For the purposes of maximum-case scenario and to ensure NEPA coverage if BOEM grants such an extension, the Draft EIS analyzes a 35-year operational term.</p>
BOEM-2022-0053-0130-0041 and -0042	<p>We are encouraged that a bond is to be held by the U.S. government to cover the costs of decommissioning. BOEM should disclose the bond amount to the public along with the estimated costs of decommissioning to allow the public to consider the sufficiency of the bond and ease or raise any concerns over responsibility for uncovered expenses. Additional information on how the turbines will be disposed of after decommissioning should be provided and analyzed in future documents including the EIS.</p> <p>It also should be made clear to the public that decommissioning does not mean the wind energy area will be restored to its prior condition. It is possible that large amounts of materials required for OSW projects could remain in the ocean e.g. scour protection materials and cables. This would represent the permanent conversion of soft sediment areas to those with hard structure especially for the Empire Wind area which is dominated by soft sediments (DEIS page 3.6-3). The DEIS qualitatively concludes this conversion is a moderate beneficial impact as this is believed to generally create habitat however insufficient discussion of the impacts on species naturally occurring in the area is provided. It is unclear whether this newly created harder habitat will give other species a competitive advantage over species that prefer or require soft bottom for their life cycle. The primary concern regarding cables remaining in the water is the dynamic nature of the seabed – scour protection is required because sediment moves and therefore cables can become uncovered. It is unclear who is responsible for uncovered cables left in the ocean after decommissioning. These cables are a major safety concern for fishing vessels operating mobile bottom tending gear as they can hang-up on cables.</p>	<p>The EIS assesses impacts that could result from construction, O&amp;M, and conceptual decommissioning of the proposed Projects using reliable existing data and resources in accordance with 40 CFR 1502.23.</p> <p>Section 2.1.2.3 of the EIS describes decommissioning activities and that, per BOEM regulations, Empire would be required to remove all cables and clear the seafloor of all obstructions created by the proposed Projects. Empire would need to obtain separate and subsequent approval from BOEM to retire in place any portion of the proposed Projects. Approval of such activities would require compliance under NEPA and other federal statutes and implementing regulations.</p> <p>The conceptual decommissioning plan, as proposed by Empire, is analyzed in the EIS. Prior to implementation of any activities associated with decommissioning, BOEM would require Empire to submit a decommissioning application for technical and environmental review.</p> <p>As noted by the commenter, in accordance with 30 CFR § 585.516, Empire is required to provide BOEM a supplemental bond, a decommissioning bond, or other financial assurance to ensure that Lessee obligations can be fulfilled prior to approval of the COP and prior to authorization to commence construction.</p> <p>Additional information on the effect of converting soft-bottom habitat has been added to Final EIS Section 3.6.5 under the cable emplacement and maintenance and presence of structures IPFs.</p>
BOEM-2022-	COA has repeatedly observed that offshore wind technical	Section 2.3, <i>Non-Routine Activities and Events</i> , of the

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0053-0140-0010	<p>challenges in the USA are different from those in other European countries. One of the biggest challenges that has not been given adequate attention is the occurrence of hurricanes and its increasing frequency and severity along the Atlantic Coast in recent years. The risk of damage from individual hurricanes and nor'easters as well as multiple storms over time is concerning. Wind turbines are vulnerable to hurricanes as the maximum wind speeds in those storms can exceed the design limits of wind turbines. This study showed that all categories of hurricanes will impact wind turbines and impacts are more serious and significant with higher-category hurricanes. The damage caused by Category 3 4 and 5 hurricanes is important for offshore wind development. In the United States 9 of the 14 states on the Atlantic Coast have been struck by a Category 3 or higher hurricane between 1856 and 2008 (Rose et al. 2012). In fact this map by the National Oceanic and Atmospheric Administration (NOAA) shows that container ports along almost the entire East Coast of the United States is a high risk for hurricanes. [Footnote 40: NOAA Map "Risk of Hurricanes for Global Container Ports 2019" as seen 1/17/2023 at <a href="https://porteconomicsmanagement.org/wp-content/uploads/Map-Hurricane-Container-Ports.pdf">https://porteconomicsmanagement.org/wp-content/uploads/Map-Hurricane-Container-Ports.pdf</a>] In particular the port facilities in Brooklyn will be particularly vulnerable to hurricane impacts. It is also important to note that many hurricanes in the Atlantic Ocean follow an offshore path which can place OSW power plants in more direct contact with high winds and waves. In addition ships have less control in the ocean during hurricanes and major storms making accidents more likely especially when factoring the radar shadow effects.</p>	<p>Final EIS describes how WTGs are designed to sufficiently withstand severe storm events and actions that would be taken in the event of a spill or release.</p> <p>The design of WTGs and the OSS includes a specification for a 500-year hurricane event in line with the requirements in IEC61400-3-1 Annex I. The 500-year full population tropical cyclone conditions define the robustness level criteria. An additional increase in water level due to (e.g.) climatic effects is estimated to be 0.3 meter by the end of the operational lifetime of the turbines. This has been included in the design.</p> <p>See discussion under the accidental release IPF in EIS Section 3.21, <i>Water Quality</i>, and Section 3.13, <i>Finfish, Invertebrates, and Essential Fish Habitat</i>, for analysis of potential impacts associated with accidental release of fuel, oil, lubricants, and coolants contained in WTGs and OSS.</p>
BOEM-2022-0053-0140-0011	<p>State and federal agencies including the NYC Office of Emergency Management and NOAA acknowledge the growing threat from these severe hurricane and Nor'easter events. A 2020 whitepaper [Footnote 41: "Quantifying the Impact from Climate Change on U.S. Hurricane Risk" by Roger R. Grenier Ph.D. Peter Sousounis Ph.D. John Schneyer and Dan Raizman 2020. <a href="https://www.air-worldwide.com/siteassets/Publications/White-Papers/documents/air_climatechange_us_hurricane_whitepaper.pdf">https://www.air-worldwide.com/siteassets/Publications/White-Papers/documents/air_climatechange_us_hurricane_whitepaper.pdf</a>] clearly outlines that more intense hurricanes will make landfall and storm surges will be more severe; it suggests that an extreme surge event in</p>	

Comment No.	Comment	Response
	<p>today's climate may be twice as likely to happen 30 years from now. By 2050 low lying areas in NY Boroughs could be affected by severe flooding (Bhargava 2017). The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy recommended that existing models to predict and plan for turbine loading in extreme conditions need to be refined to tackle these challenges. [Footnote 42: U.S. Department of Energy Office of Energy Efficiency and Renewable Energy "Wind Turbines in Extreme Weather: Solutions for Hurricane Resiliency" as seen 1/17/2023 <a href="https://www.energy.gov/eere/articles/wind-turbines-extreme-weather-solutions-hurricane-resiliency">https://www.energy.gov/eere/articles/wind-turbines-extreme-weather-solutions-hurricane-resiliency.</a>] However the proposed action or its alternatives does not adequately address this critical and urgent need and generalizes that impacts are highly unlikely. This claim is far from accurate and needs scientific evidence to support this foregone conclusion. Additionally the DEIS fails to describe a resiliency plan for handling the impacts to structures operation and maintenance activities in section 2.3. [Footnote 43: Bureau of Ocean Energy Management. Empire Offshore Wind Draft Environmental Impact Statement Volume 1 November 2022 page 2-36 page 84/510 <a href="https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf">https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Empire_Wind_DEIS_Vol1.pdf.</a>]</p>	
BOEM-2022-0053-0140-0012	<p>Additionally hurricanes could also result in other incidents including the spillage or release of harmful chemicals that could adversely harm the marine environment which has not been studied in depth. The DEIS generalizes and underplays the economic and environmental consequences of hurricanes in the Geographic Analysis Area and states that:[<i>Italics: Hurricanes that travel along the coastline of the eastern U.S. have the potential to affect the Lease Area with high winds and severe flooding. If severe weather caused a spill or release the actions outlined above would help reduce potential impacts. Severe flooding or coastal erosion could require repairs with impacts associated with repairs being similar to those outlined in Chapter 3 for construction activities. While highly unlikely structural failure of a WTG (i.e. loss of a blade or tower collapse) would result in temporary hazards to navigation for all vessels similar to the construction and installation impacts.</i>] [Footnote 44: Potential Impacts from a Worst Case Discharge from</p>	

Comment No.	Comment	Response
	<p>an United States Offshore Wind Farm by CDR Tim Gunter Office of Marine Environmental Response 2014 International Oil Spill Conference <a href="https://tethys.pnnl.gov/sites/default/files/publications/Gunter%202014.pdf">https://tethys.pnnl.gov/sites/default/files/publications/Gunter%202014.pdf</a>]The DEIS also does not clearly state what simulation tools were used the efficacy of simulations as well as what were the findings. Therefore the DEIS fails to adequately address these issues threats and impacts and thus does not provide measures to avoid reduce or mitigate these serious concerns.</p>	
BOEM-2022-0053-0141-0001	<p>Appendix FF boldly states that reference levels for magnetic field exposure can safely reach up to 2000 mg (or 200 <math>\mu</math>T) and as much as 9040 mg (or 904 <math>\mu</math>T). Not only are these numbers exponentially greater than exposure levels found to have direct links to adverse health effects (see study above) – the use of such numbers for reference levels allows the Construction and Operations Plan to recklessly minimize any of the magnetic field levels generated by the proposed project. As an example although EW 2 can generate a significant magnetic field of 80 mg (8 <math>\mu</math>T) the applicant minimizes that number by stating it is well below the self-selected 2000 mg and 9040 mg reference levels chosen for comparison purposes. This is not a useful comparison and it is being used to mask a potential significant adverse impact. The selected methodology of analyses within Appendix FF (i.e. utilizing a computer program from 1991 and citing reference levels that are clearly out of touch with modern science and medicine) raises serious questions about Equinor’s commitment to public health and safety particularly within the project’s main host community of Long Beach.</p>	<p>The 2,000 milligauss and 9,040 milligauss levels cited in COP Appendix FF are the health-based standards published by the International Commission on Non-ionizing Radiation Protection (ICNIRP 2010) and the International Committee for Electromagnetic Safety (ICES 2019, 2020). These standards are the only international, health-based standards for EMF, and the levels cited in the COP are the most recent published by these organizations; therefore, these are the appropriate health-based standards for comparison.</p> <p>The International Commission on Non-ionizing Radiation Protection standard is formally recognized by the World Health Organization, who states that International Commission on Non-ionizing Radiation Protection limits were developed following reviews of all the peer-reviewed scientific literature, including thermal and non-thermal effects. The standards are based on evaluations of biological effects that have been established to have health consequences. The main conclusion from the World Health Organization reviews is that EMF exposures below the limits recommended in the International Commission on Non-ionizing Radiation Protection international guidelines do not appear to have any known effects. In addition to the standards described above, the New York State Public Service Commission has a limit of 200 milligauss in its policy guidance on magnetic fields from new transmission lines at the edge of proposed rights-of-way (NYPSC 1990). The New York State Public Service Commission</p>

Comment No.	Comment	Response
		<p>magnetic field limit for new transmission lines was not derived from a detailed, comprehensive health risk assessments, as International Commission on Non-ionizing Radiation Protection and International Committee for Electromagnetic Safety standards were; however, the modeling prepared for the Projects indicates the Projects will be in compliance with the New York State Public Service Commission policy guidance for magnetic fields, as well.</p> <p>The laws of physics are timeless and do not change over time; therefore, the date of the model applying these laws is immaterial. The computer modeling used to assess EMF for the Projects was developed by a division of the U.S. Department of Energy and is the industry standard for electric transmission lines. Literature including Chartier and Dickson (1990) and Perrin et al. (1991) have shown that this program accurately predicts measured EMF levels of alternating current transmission lines such as those from the Projects. The computer model has been adopted for transmission lines in regulations, including Florida's Department of Environmental Protection code at 62-814.460 Computation and Measurement Methodology, which requires that "(1) Computations to establish compliance with the standards set forth in Rule 62-814.450, F.A.C., shall be performed by the use of the Bonneville Power Administration (BPA) Corona and Field Effects Program for calculating electric and magnetic fields set forth in paragraphs 62-814.470(1)."</p>
BOEM-2022-0053-0141-0002	<p>The study above clearly shows across nearly 200000 individuals that 0.2- 0.3- and 0.4-<math>\mu</math>T (or 2 3 and 4 mg) of regular exposure increased childhood cancer rates by more than two times and as much as four times. Based upon the modeling provided within Appendix FF these exposure levels would exist at a distance of 25 feet from centerline of EW 2 under both the vertical (3.2 mg at 25 feet away) and horizontal (2.6 mg at 25 feet away) configurations. Though our community has not been provided with the exact location of the proposed cable 25 feet in either direction lands</p>	<p>It is understood that the cited magnetic field exposures associated with increased childhood cancer rates are quoted from the Seomun et al. (2021) review.</p> <p>The statement that Seomun et al. review shows that "0.2- 0.3- and 0.4-<math>\mu</math>T (or 2-3 and 4 mG) of regular exposure increased childhood cancer rates by more than two times and as much as four times" is not correct. Notwithstanding issues with the study outlined in Appendix A, the referenced increase is not "childhood</p>



Comment No.	Comment	Response
	<p>directly on many of the adjacent properties producing a clear adverse impact and potential public health issue. The other cable configurations would produce lower MFs yet still produce troubling numbers near the centerline which is an area frequently used by residents for walking dogs outdoor activities etc.</p>	<p>cancer rates” (e.g., cases per 100,000 per year) but a measure of the statistical association between <i>estimated</i> magnetic-field exposure and childhood leukemia called an odds ratio. As explained by the Center for Disease Control and Prevention, an odds ratio describes the relationship between an exposure and outcome of interest (CDC 2013).</p> <p>Another review, also interpreted as supporting “a clear adverse impact and potential public health issue,” was Maffei (2022), which was cited along with Seomun et al. This conclusion is not supported by either the Seomun or Maffei reviews or the multiple health risk assessments of magnetic fields by national and international health and scientific agencies. (see Appendix A for a listing).</p> <p>Moreover, the cited magnetic field levels of 0.2, 0.3, and 0.4 microtesla (or 2–3 and 4 milligauss) are estimates of time-weighted long-term average magnetic field exposure, not the short-term levels encountered while walking about a neighborhood, which, like most exposures from household appliances, are of short-term duration (Bailey and Wagner 2008).</p>
BOEM-2022-0053-0141-0004	<p>Of the four cable configurations presented it appears that the “Delta” configuration produces by far the lowest magnetic field level with a maximum MF level of 28 mg at the cable centerline compared to 72 mg (Inverted Delta) 80 mg (Horizontal) and 63 mg (Vertical) - see Table 2 of Appendix FF. It is unclear why this construction method was not identified as a preferred design. At a minimum the applicant should commit to the “Delta” arrangement for the cables which seems like a relatively easy and straightforward mitigation measure to minimize a potential impact.</p>	<p>Multiple duct bank configurations were included in the EMF assessment, as different configurations may be needed to address potential site-specific limitations, particularly existing underground infrastructure and infrastructure crossings.</p> <p>Refinements to the design of the duct bank configurations are ongoing. Moreover, differences in magnetic field levels decrease with distance from centerline. As shown in Table 2, at ± 25 feet from the centerline, the calculated magnetic field level for the delta configuration is 1.4 milligauss but the others are quite similar (1.5, 2.6, and 3 milligauss) and are within the range of background levels typically found within homes (USEPA 1992).</p>
BOEM-2022-	Further based on background research of similar types of projects	Empire’s EMF assessment evaluated a minimum target

Comment No.	Comment	Response
0053-0141-0005	which typically place underground cables much deeper than the proposed project's ~1 meter depth and the apparent effect of arranging the majority of cables to be deeper (as with the Delta arrangement) the applicant should also commit to placing the cables deeper underground to further reduce potential MF levels.	<p>burial depth for the onshore export and interconnection cable duct banks of 3 feet (approximately 0.9 meter). This represents a minimum burial depth for the purpose of calculating the highest magnetic fields; the onshore export and interconnection cables may be installed deeper but will not be installed with less than 3 feet/0.9 meter of cover. Moreover, this minimum burial depth is not significantly different from the burial depths proposed and assessed for other similar projects. For example, the South Fork Wind project assessed a burial depth of 20 to 25 inches to the top of the duct bank for the onshore transmission cable (Deepwater Wind South Fork Wind Farm 2018), and the Sunrise Wind project assessed a burial depth of 4 feet (1.2 meters) (Sunrise Wind 2022), only slightly deeper than for the proposed Projects.</p> <p>The feasibility of increasing burial depth for the onshore export and interconnection cable route is subject to a number of technical and environmental constraints, including the presence of existing belowground infrastructure (e.g., other utilities), existing and adjacent aboveground infrastructure, and the extended duration of work activities, which increase impacts related to traffic, noise, roadway closures, and other disruptions. Based on the low levels of magnetic fields expected at the minimum burial depth of 3 feet (0.9 meter), a requirement for deeper burial of the onshore export and interconnection cables is not warranted. Moreover, increasing the burial depth from 1 to 2 meters would reduce magnetic field levels directly above the cable, but at approximately 10 feet or more from the cable centerline, the magnetic field for 1-meter and 2-meter burial depths would be substantially similar. Also see response above to BOEM-2022-0053-0141-0004.</p>
BOEM-2022-0053-0141-0006	Again given how far off the Appendix FF "safe" exposure numbers of 2000 and 9040 mg are from these peer-reviewed medical studies there are serious questions about the validity and thoroughness of the analyses presented in the Construction and	<p>See response above to BOEM-2022-0053-0141-0001, BOEM-2022-0053-0141-0004, and BOEM-2022-0053-0141-0005.</p> <p>As indicated above, the four modeled duct bank</p>

Comment No.	Comment	Response
	<p>Operations Plan. By using these large reference level numbers the applicant is able to state that all cable options are far below reference levels and thus no impact identified. As explained above this is poor methodology and allows the applicant to avoid commitment to the safest construction method and design. Selecting the safest construction method and design (i.e. Delta arrangement and/or deeper burial) would be a simple commitment and should be the bare minimum for future construction.</p>	<p>configurations were potential configurations designed to address belowground site-specific conditions where flexibility to alter the duct bank configuration along the cable route may be required. Refinements to the design of the duct bank configurations are ongoing. Refinements made between the Draft EIS and Final EIS are reflected in the July 2023 revision of COP Appendix FF (Onshore EMF Assessment). Final duct bank design for the entire route, will be provided as part of the New York State Article VII Environmental Management &amp; Construction plans, and will be made publicly available on the Document and Matter Management System. Empire notes that 3 feet (0.9 meter) is assessed as the minimum burial depth for the onshore export and interconnection cables; however, as stated in response to comment BOEM-2022-0053-0141-0005, a requirement for deeper burial is not warranted and introduces additional technical challenges to feasibility within congested roadways, as well as additional construction-related impacts.</p>
<p>BOEM-2022-0053-0141-0007</p>	<p>We received notice of surveying on our block – but no information about the exact position of the proposed cable which cable arrangement would be used (which as explained above each produces a vastly different strength of magnetic field) or how our road and landscaping will be impacted (we have a large landscaped median in the middle of the street that is used for dog walking etc). It is troubling that local residents cannot locate this information – which is essentially bare minimum information that should be provided to any impacted community. While my neighbors are all aware of the offshore wind project very few are aware of the proposed cable routing or potential adverse impacts associated with such a high voltage cable.</p>	<p>Empire recently sent out notices to local residents to inform them of upcoming onshore geotechnical survey work planned to be conducted in the spring and summer of 2023. This geotechnical information, in conjunction with other survey information such as existing utility surveys, is intended to inform the detailed design of the onshore export and interconnection cable route, including aspects such as micrositing of the cable routes within roadways, design of existing utility crossings, and installation details.</p> <p>Empire will require municipal authorizations where the installation of the onshore export and interconnection cables is proposed to be within public rights-of-way under municipal jurisdiction. Empire anticipates that detailed requirements for restoration of those public rights-of-way, including aspects such as restoration of pavement, curbs, and landscaping, will be addressed in consultation with the appropriate municipality as part of</p>

Comment No.	Comment	Response
BOEM-2022-0053-0141-0009	There is very little reasoning or justification as to why this cable would purposefully be routed directly through residential neighborhoods – particularly when a less impactful and more direct route is available along a primary commercial thoroughfare (Long Beach Boulevard) where far fewer residences would be impacted. Similarly a direct routing up Riverside Boulevard would impact far few homes and streets than currently proposed.	that process. As part of the Project design development described in Section 2.0 of Empire’s COP, Empire considered a wide range of public rights-of-way, including many of the north-south roadway corridors in the vicinity of landfalls within the city of Long Beach. Riverside Boulevard and Long Beach Boulevard are both included in Section 2.0. As stated in Section 2.0, a route that continues straight along Riverside Boulevard from EW 2 Cable Landfall A was considered but was eliminated based on feedback from discussions with the City of Long Beach. Routes within the PDE were selected on the basis of constructability and utility congestion, space within public right-of-way, environmental considerations, potential impacts (such as traffic) and stakeholder input.
BOEM-2022-0053-0141-0010	Nor was a route analyzed that would fully utilize local waterways rather than local streets. While this is likely a more costly alternative there is direct water access to the proposed substation across Reynolds Channel (i.e. EW 1 lands directly at the substation – this type of route should be studied for EW 2 as well). At a minimum these alternatives should be presented and studied. Yet none of these alternative routes or designs are discussed studied or analyzed in the Plan – and no justification was provided for the circuitous route through the relatively dense residential neighborhoods of Long Beach.	Empire provided an evaluation of in-water routing directly to Barnum Island (Section 3.3.5) as part of its Alternatives Analysis, which was filed as part of the Empire Wind 2 Application to USACE and included as Appendix O of the Draft EIS.
BOEM-2022-0053-0141-0012	Particularly troubling is the quote attributed to the World Health Organization (WHO) provided within Appendix FF which is entirely dismissive of potential impacts and fails to recognize the ongoing medical and scientific research in this field. This quote is misleading and does not represent WHO’s actual position which classifies MFs as “possibly carcinogenic to humans.”	Empire disagrees that the quotation is inconsistent with the World Health Organization position. The World Health Organization agrees with the International Agency for Research on Cancer classification of magnetic fields as “possibly carcinogenic to humans.” The International Agency for Research on Cancer and World Health Organization classify exposures (going from highest to lowest risk) as carcinogenic, probably carcinogenic, possibly carcinogenic, and not classifiable. These categories are made with an abundance of caution and apply more weight to the possibility an exposure is a carcinogen than it not being one. The classification of “possibly carcinogenic” is

Comment No.	Comment	Response
		<p>based on limited epidemiological evidence and the World Health Organization concludes most importantly, the “evidence for a causal relationship is limited” (WHO 2007:355–356).</p> <p>The acceptance that weak and inconsistent associations (also known as statistical correlations) have been published in the literature is not inconsistent with the conclusion that, together with experimental data, the evidence for causation of health effects by magnetic fields is unconvincing.</p>
BOEM-2022-0053-0143-0035	<p>The DEIS states “BOEM would require these planned submarine power cables to have appropriate shielding and burial depth to minimize potential EMF effects from cable operation” but it does not state what shielding and burial depth BOEM is considering requiring. Lacking a notion of what these requirements will be the impacts cannot be estimated.</p>	<p>Cable burial depth will be established based on the CBRA that will be completed prior to submittal of the cable Fabrication and Installation Report/Facility Design Report.</p>

**P.6.24 Other Public Comments**

**Table P.6.24-1 Responses to Other Public Comments**

Comment No.	Comment	Response
BOEM-2022-0053-0143-0051	It is well known that power generation by wind turbine power plants causes more human deaths per megawatt of energy produced than any other form of power production other than coal. The Bureau has not yet estimated but is required to under NEPA the estimated price of the Empire Wind Plant in workers' human lives. Additionally and required by NEPA other expected excess deaths should be estimated such as excess deaths by interference with aviation radar shipping accidents and from excess suicide from operational infrasound and sound at or near the hearing thresholds (Appendix D – Deaths by Suicide).	BOEM does not concur that offshore wind energy generation would result in excess human deaths due to worker injury or suicide as the commenter suggests. BOEM notes that Attachment 6 to the commenter's letter is not a peer-reviewed scientific journal article and therefore does not represent the best available science and is not included as a source in the Final EIS.
BOEM-2022-0053-0053-0004	We implore BOEM to continue to work with states tribal governments and stakeholders to implement the actions in the two approved Regional Ocean Plans and to continue to update and utilize data on the ocean data portals [Footnote 10: Mid-Atlantic Regional Planning Body. Mid-Atlantic Regional Ocean Action Plan. November 2016. Available at: <a href="http://www.boem.gov/sites/default/files/environmental-stewardship/Mid-Atlantic-Regional-Planning-Body/Mid-Atlantic-Regional-Ocean-Action-Plan.pdf">www.boem.gov/sites/default/files/environmental-stewardship/Mid-Atlantic-Regional-Planning-Body/Mid-Atlantic-Regional-Ocean-Action-Plan.pdf</a> ] [Footnote 11: Northeast Regional Planning Body. Northeast Ocean Plan. December 2016. Available at: <a href="https://neoceanplanning.org/wp-content/uploads/2018/01/Northeast-Ocean-Plan_Full.pdf">https://neoceanplanning.org/wp-content/uploads/2018/01/Northeast-Ocean-Plan_Full.pdf</a> ]. Regional Ocean Plans should continue to be recognized as key planning documents for informing the siting of potential offshore wind projects. The Northeast and Mid-Atlantic ocean plans involved years of data collection and public process coordinated under regional planning bodies. These planning efforts brought together relevant federal agencies states tribal governments fishery management councils stakeholder groups and interested members of the public to develop a	Comment acknowledged. Implementation of regional ocean plans and maintenance of the ocean data portals are outside the scope of this project-level environmental review for the Empire Wind COP.



Comment No.	Comment	Response
	<p>common vision for the future development and conservation of the ocean. A core element of regional ocean planning is the collection and analysis of geospatial information on ecological resources and human uses in the coastal and marine environment. These data sets can be accessed through the regional ocean data portals and are critical resources for BOEM and other agencies as well as permit applicants to consider when evaluating siting of potential renewable energy generation developments. Data portals provide a transparent and common reference for all stakeholders potentially affected by offshore projects.</p>	
<p>BOEM-2022-0053-0053-0002</p>	<p>BOEM should examine the potential for impacts to short-period, long-period, and wind driven waves from these Projects. Modeling of impacts to waves at European offshore wind projects found that waves were insignificantly affected but similar analyses for these Projects should determine whether there are expected impacts to wave height shape peel angle frequency pattern speed and quality.</p>	<p>Predicted hydrodynamic effects on wind-driven waves and currents as well as direct impacts on ocean currents from offshore wind structure foundations are described in Final EIS Section 3.13.3.2 under the presence of structures IPF. Effects on waves have not been specifically modeled for the Empire Wind Projects and BOEM has relied on the best available scientific information to predict hydrodynamic effects around offshore wind energy areas due to the presence of WTG foundations.</p>

## P.7. General Comment Summaries and Responses

### P.7.1 Purpose and Need

**Table P.7-1 General Comments on the Purpose and Need**

Comment Summary	Response
<p>A commenter stated that New York State is not able to achieve its goal of achieving mandates of 70% renewable energy by 2030, carbon-free electricity by 2040, and a net-zero carbon economy by 2050 without also achieving its goal of 9,000 MW of offshore wind energy, and that the only way to see a transition from fossil fuels to renewable energy downstate is by utilizing offshore wind. Another commenter stated that advancement of the Projects is in the declared public interests of the United States and the State of New York and supports achieving federal and state goals for generation of renewable offshore wind energy while spurring jobs and generating economic growth. Commenters stated that it is the policy of the federal government to pursue solutions to the climate crisis as outlined in various executive orders and that it will take a concerted effort from many coastal states to achieve the 30 GW goal of the Biden-Harris Administration.</p>	<p>Comments acknowledged.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0090-0001, BOEM-2022-0053-0090-0002, BOEM-2022-0053-0110-0001, BOEM-2022-0053-0110-0002, BOEM-2022-0053-0117-0007, BOEM-2022-0053-0142-0001</p>	

**P.7.2 Alternatives**

**Table P.7-2 General Comments on the Alternatives**

Comment Summary	Response
Several commenters requested that a pilot study be conducted to identify the benefits and risk of offshore wind through independent scientific review.	BOEM's decision is to approve, approve with modifications, or disapprove Empire's COP. A limited pilot project would not meet the purpose and need to construct, operate, and maintain the 816-MW EW 1 Project and the 1,260-MW EW 2 Project in the Lease Area and would negate Empire's ability to fulfill its contractual commitments with NYSERDA.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0041-0001, BOEM-2022-0053-0045-0001, BOEM-2022-0053-0077-0001, BOEM-2022-0053-0104-0004, BOEM-2022-0053-0108-0001, BOEM-2022-0053-0109-0001, BOEM-2022-0053-0111-0002, BOEM-2022-0053-0115-0001, BOEM-2022-0053-0122-0002, BOEM-2022-0053-0128-0002, BOEM-2022-0053-0129-0002, BOEM-2022-0053-0132-0001, BOEM-2022-0053-0135-0001, BOEM-2022-0053-0138-0001, BOEM-2022-0053-0140-0001, BOEM-2022-0053-0140-0026, BOEM-2022-0053-0170-0001, BOEM-2022-0053-0171-0001, BOEM-2022-0053-0173-0001	

**P.7.3 Air Quality**

**Table P.7-3 General Comments on Air Quality**

Comment Summary	Response
Increases in intermittent wind and solar generation have replaced nuclear power, not fossil fuels, so renewable power has not reduced emissions.	The Independent System Operator dispatches energy sources to meet electricity demand based on the lowest marginal cost per megawatt-hour. The energy sources that would reduce output in response to availability of wind energy may be fossil-fueled, nuclear, or any other source depending on marginal cost at that particular time.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0035-0004	
Comments stated support for predicted Project benefits in reducing emissions of air pollutants and GHGs.	BOEM acknowledges these comments.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0090-0005, BOEM-2022-0053-0090-0006, BOEM-2022-0053-0090-0007, BOEM-2022-0053-0110-0003, BOEM-2022-0053-0117-0011, BOEM-2022-0053-0117-0029, BOEM-2022-0053-0117-0030, BOEM-2022-0053-0118-0009, BOEM-2022-0053-0118-0023,	
Comment stated there are no clear commitments or evidence provided that the Projects will reduce CO <sub>2</sub> emissions.	The predicted CO <sub>2</sub> emission reductions are based on the best available information, scientific and engineering data, and USEPA-approved models.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0140-0029	

**P.7.4 Benthic Resources**

**Table P.7-4 General Comments on Benthic Resources**

Comment Summary	Response
The reviewers suggest using structural ecological design elements (such as EConcrete) for foundation scour and cable protection and cite potential benefits of using such materials, such as the promotion of benthic communities and the chemically balanced composition of the concrete.	BOEM acknowledges these comments and requests for the use of ecological design elements where practicable. If the COP is approved, Empire would select materials for scour and cable protection within the PDE defined in the COP.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0019-0001, BOEM-2022-0053-0046-0002	

**P.7.5 Commercial Fisheries and For-Hire Recreational Fishing**

**Table P.7-5 General Comments on Commercial Fisheries and For-Hire Recreational Fishing**

Comment Summary	Response
Insufficient research has been conducted to evaluate the impacts of offshore wind farms on fish and invertebrates and fisheries, including the impacts of pile-driving noise, sediment plumes, and habitat loss.	The EIS uses the most recent peer-reviewed literature to analyze impacts of the Proposed Action and action alternatives. The EIS makes note of instances where insufficient information exists to develop conclusions (e.g., impacts of noise on invertebrates). The EIS quantifies the radial distance to noise impact thresholds, the areal extent of disturbances to benthic habitat, and the areal extent of soft-bottom habitat loss associated with the Proposed Action. The EIS also quantifies the revenue exposure of fisheries in the Lease Area and concludes that impacts of the Proposed Action would be moderate to major depending on the fishery and fishing vessel.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0030-0001, BOEM-2022-0053-0030-0003	
The reviewers support either Alternative B or a combination of Alternatives B, E, and F.	Between the Draft EIS and Final EIS, Empire and BOEM further assessed the presence of glauconite soils in the Lease Area and the potential constraints that glauconite presents for installation of WTG foundations due to resistance to pile driving. Based on this review, BOEM has determined that selection of Alternatives B and E would no longer meet the purpose and need and therefore these alternatives are not recommended for inclusion in the Preferred Alternative. This update and clarification has been added to the description of Alternatives B, E, and F in Final EIS Sections 2.1.3, 2.1.6, and 2.1.7.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0090-0010, BOEM-2022-0053-0116-0006, BOEM-2022-0053-0116-0009, BOEM-2022-0053-0116-0010, BOEM-2022-0053-0116-0011, BOEM-2022-0053-0116-0012	

Comment Summary	Response
<p>The economic impacts of the Proposed Action on scallop fisheries would be large. The developer has not considered alternatives or provided measures to minimize or mitigate impacts on the scallop fishery. The operation of scallop dredges was inaccurately described in the COP.</p>	<p>As shown on Figure 3.9-19, the Lease Area is intensively fished by the scallop fishery. Mitigation for economic impacts resulting from loss of revenue in the Lease Area would be achieved primarily through a fisheries compensation program whose funding would be based on the revenue exposure levels summarized in Table 3.9-31. As shown in that table, the average annual revenue exposure of the scallop fishery was \$2.1 million, the largest of any FMP fishery by a wide margin. Empire will develop a Fisheries Mitigation Plan, which will provide a detailed description of how the fisheries compensation program would be funded and how compensation would be allocated. The EIS does not provide a description of the fishing gear used to harvest scallops, beyond describing it as a bottom-oriented gear, and does not attempt to characterize the benthic impacts of the scallop fishery.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0103-0007, BOEM-2022-0053-0114-0001, BOEM-2022-0053-0114-0003</p>	
<p>The Final EIS should account for impacts on fisheries and engage fishing industry stakeholders at all possible opportunities.</p>	<p>The Final EIS provides an analysis of impacts on all fisheries that are active in the Project area based on historical data. Empire has conducted outreach and research to support this coexistence with other maritime stakeholders, including and especially fishing industry stakeholders. Empire has documented over 1,000 contacts with fishermen and fishery agencies from within the Mid-Atlantic and southern New England region, with a focus on those who travel or fish in or near the Lease Area and submarine export cable routes. Empire will develop a Fisheries Mitigation Plan that will fully describe Empire’s approach to coexistence and communication with the commercial and recreational fishing communities throughout all stages of the Projects.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0119-0014, BOEM-2022-0053-0142-0012</p>	
<p>Consideration has not been given to alternate locations for the Projects or the cumulative impacts of the Projects along with other offshore wind projects in offshore wind lease areas on the OCS.</p>	<p>BOEM works with federal, state, local, and tribal partners to identify wind energy areas on the Atlantic OCS that appear most suitable for commercial wind energy activities, while presenting the fewest apparent environmental and user conflicts. BOEM’s process for identifying wind energy areas considers all known marine resource uses on the OCS, including the presence of fishing grounds and transit corridors used by the fishing industry. The consideration of locations that minimize user conflicts occurs prior to the sale of lease and therefore precedes the development of the COP and EIS for a project.</p>

Comment Summary	Response
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0114-0008, BOEM-2022-0053-0140-0003	
Fishermen will not be able to fish near the turbines, and the cumulative impact of the turbines from all offshore wind projects will leave no place for fishermen to fish.	BOEM has proposed mitigation for economic impacts resulting from loss of revenue in the Lease Area that would be achieved primarily through a fisheries compensation program whose funding would be based on the revenue exposure levels summarized in Table 3.9-31.  The cumulative impacts of all ongoing and planned offshore wind projects in the Greater Atlantic OCS are analyzed in Section 3.9.3.2. As described in Table 3.9-30, the annual revenue exposure in the WEAs of all offshore wind projects is expected to peak at \$12 million in 2030, which is 0.7 percent of the total annual revenue of all federally permitted vessels in the Greater Atlantic (\$1.8 billion, Table 3.9-2). BOEM acknowledges that placement of wind turbines on the OCS would result in space-use conflicts for some commercial fisheries, but most of the fishing grounds on the OCS will remain accessible.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0095-0002	
The export cables for the Block Island Wind Farm did not remain buried at the landfall locations, thereby resulting in a detrimental impact on the fishing industry.	The export cables would be buried deeper at the landfall location than at offshore portions of the cable corridor, thereby minimizing the likelihood of the cable becoming exposed in the future. For instance, the target depth for the Direct Pipe installation option for EW 2 landfalls is up to 80 feet.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0097-0002	
Commenters urged BOEM to seriously consider the recommendations and advice of NOAA fisheries regarding the impacts analysis including the most appropriate data to use how to consider impacts for data-poor fisheries and the resulting impact conclusions.	BOEM developed the analysis of impacts of the Proposed Action and action alternatives on commercial and recreational fisheries based on NMFS Socioeconomic Information Needs for Offshore Wind Energy Projects in the U.S.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0102-0015	
The marine resources of the New York/New Jersey Bight have substantial economic value. The region's commercial fisheries generate billions of dollars in revenue and support some of the largest fishing ports on the East Coast.	Section 3.9.1.1 provides a description of the value of commercial fisheries in the region.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0140-0013	



**P.7.6 Demographics, Employment, and Economics**

**Table P.7-6 General Comments on Demographics, Employment, and Economics**

Comment Summary	Response
The Projects will have adverse effects such as lower property values and health risks.	The Projects' potential effects on property values are evaluated in Section 3.11. Section 3.12 of the Final EIS discusses the Projects' potential effects on environmental justice populations, including potential health effects.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0009-0001	
The Projects are costly or not cost-effective.	BOEM will balance the Projects' potential environmental as well as social and economic impacts in its decision-making pursuant to NEPA and its implementing regulations.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0027-0003	
The Projects will result in positive economic benefits such as temporary construction jobs at SBMT, which may be filled by local workers, and supply chain investments.	Comment noted. Page 3.11-16 of the Final EIS provides information on Empire's proposed investments in community development and workforce training and readiness funds in New York state.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0040-0002; BOEM-2022-0053-0090-0011; BOEM-2022-0053-0110-0009; BOEM-2022-0053-0110-0021	
The commenter would like to see further investment by Equinor in the supply chain for offshore wind in New York and the U.S., such as in manufacturing.	Page 3.11-16 of the Final EIS provides information on Empire's proposed investments in community development and workforce training and readiness funds in New York state. The Port of Albany is separately developing a tower manufacturing facility to support the offshore wind supply chain as described in Section 3.14.3.2.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0027-0010; BOEM-2022-0053-0043-0003; BOEM-2022-0053-0110-0005; BOEM-2022-0053-0117-0008; BOEM-2022-0053-0117-0009; BOEM-2022-0053-0117-0010	
There is growing demand globally for offshore wind. The Projects will have substantial positive effects on the U.S. offshore wind market.	Comment acknowledged.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0110-0004, BOEM-2022-0053-0110-0006	
The commenter would like to see a commitment to union construction labor, apprenticeships, and pre-apprenticeship programs.	Page 3.11-16 of the Final EIS provides information on Empire's proposed investments in community development and workforce training and readiness funds in New York state. Empire will be introducing the GENext Program that will focus on the next generation of youths, learners, skilled labor, safety training, and diverse small business capacity building entering the offshore wind industry. Empire has had direct engagement with unions. This includes meetings (in-person and virtual) with union leaders from the national and local levels. Empire has been collaborating with suppliers to craft labor agreements for its U.S. renewables offshore wind projects and is working with the local union leadership to discuss

Comment Summary	Response
	a path forward with an intent to share the project labor agreement draft proposal shortly thereafter.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0117-0020	

### P.7.7 Finfish, Invertebrates, and Essential Fish Habitat

**Table P.7-7 General Comments on Finfish, Invertebrates, and Essential Fish Habitat**

Comment Summary	Response
Discussions on potential impacts of offshore wind development are essential considering the diverse fauna that is supported in the Atlantic OCS. While knowledge on potential impacts is growing, it is critical to consider existing knowledge in the Draft EIS despite gaps in baseline information. Discussions on EMFs are particularly important considering their potentially broad impacts on marine fauna. Seasonal shoreward migrations, and other migrations, of fish species along the Hudson Canyon may be particularly vulnerable to EMFs and increased turbidity from development of the Projects.	<p>The Draft EIS in this section discusses potential impacts of existing and future marine development, including future proposed offshore wind development and the Projects. Potential impacts on other marine fauna (e.g., marine mammals, sea turtles) are discussed in other sections of the Draft EIS. This section of the Draft EIS includes discussions on potential impacts on finfish, invertebrates, and EFH from EMF and disturbance to sediments, among other identified impact factors. Shoreward and along-shore migrating fish species are discussed where relevant and based on available science.</p> <p>The discussions in the Draft EIS are based on the best available science to date. Research on marine impacts of offshore wind development will continue to grow and future contributions to the knowledge base are expected. The Draft EIS serves as a relevant review of the existing knowledge for future wind development projects and scientific researchers to consider.</p>
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0053-0009, BOEM-2022-0053-0140-0030, BOEM-2022-0053-0140-0045, BOEM-2022-0053-0140-0052	

### P.7.8 Marine Mammals

**Table P.7-8 General Comments on Marine Mammals**

Comment Summary	Response
Available studies and information on the potential impacts of offshore wind projects, including impacts of operational noise, are inadequate to determine impacts of the Projects.	The impact assessment for the Proposed Action, presented in Section 3.15.5 of the Draft EIS, is based on the best available science and information. Although data gaps exist, the available information is sufficient to support sound scientific judgments to inform decision-making for the Projects, as discussed in Appendix D of the Draft EIS.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0027-0009, BOEM-2022-0053-0140-0021	

Comment Summary	Response
<p>The Projects will result in adverse impacts on marine mammals that BOEM must consider before authorizing the Projects, including interference of WTGs with the migration of whales and whales' natural sense of sonar direction.</p>	<p>The impact assessment for the Proposed Action, presented in Section 3.15.5 of the Draft EIS, included an evaluation of adverse impacts on marine mammals. These impacts were considered in making the effects determinations for marine mammals presented in Section 3.15.5.3 of the Draft EIS.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0041-0002, BOEM-2022-0053-0053-0006, BOEM-2022-0053-0055-0001, BOEM-2022-0053-0067-0001, BOEM-2022-0053-0075-0001, BOEM-2022-0053-0075-0002, BOEM-2022-0053-0112-0001, BOEM-2022-0053-0140-0009, BOEM-2022-0053-0143-0008, BOEM-2022-0053-0143-0009, BOEM-2022-0053-0143-0011</p>	
<p>Adverse impacts from the Proposed Action on marine mammals must be mitigated, particularly the impacts of pile driving. BOEM must analyze—and mandate the use of—methods of noise pollution mitigation through a range of noise-reduction techniques technologies and avoidance measures.</p>	<p>Mitigation measures, as described in Section 3.15.9 of the Final EIS, are recommended for inclusion in the Preferred Alternative. These measures include mitigation for impacts of underwater noise on marine mammals.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0035-0002, BOEM-2022-0053-0053-0005, BOEM-2022-0053-0053-0006, BOEM-2022-0053-0053-0009</p>	
<p>The Projects will result in adverse impacts on critically endangered NARWs.</p>	<p>The impact assessment for the Proposed Action, presented in Section 3.15.5 of the Draft EIS, included an evaluation of adverse impacts on NARWs. These impacts were considered in making the effects determination for mysticetes presented in Section 3.15.5.3 of the Draft EIS. Additionally, as this species is listed under the ESA, impacts on NARW were assessed in the BA for the Projects.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0041-0002, BOEM-2022-0053-0045-0003, BOEM-2022-0053-0075-0003, BOEM-2022-0053-0104-0003, BOEM-2022-0053-0105-0002, BOEM-2022-0053-0106-0001, BOEM-2022-0053-0108-0003, BOEM-2022-0053-0128-0001, BOEM-2022-0053-0129-0001, BOEM-2022-0053-0132-0002, BOEM-2022-0053-0133-0001, BOEM-2022-0053-0143-0010</p>	
<p>Ongoing offshore wind activities off New York and New Jersey are causing the deaths of the whales washing up on the beaches. Such activities need to stop until these deaths are understood.</p>	<p>Ongoing activities off New York and New Jersey are currently limited to HRG surveys. BOEM and NMFS have assessed the potential effects of HRG surveys associated with offshore wind development in the Atlantic. Following a rigorous assessment, NMFS has concluded that these types of surveys are not likely to harm whales or other endangered species. BOEM requires developers to use protective measures, such as protective species observers, exclusion zones, and independent reporting, to avoid whales during these survey activities. Both the Marine Mammal Commission and NJDEP have issued their independent statements on this topic making similar determinations.</p> <p>NMFS is the lead for determining causes of whale strandings and is working with its partnerships to continue to gather data to help determine the</p>

Comment Summary	Response
	<p>cause of death for these mortality events. BOEM will not speculate on the cause of death of these whales.</p> <p>More information regarding offshore wind and whales is provided by NMFS at <a href="https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/frequent-questions-offshore-wind-and-whales">https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/frequent-questions-offshore-wind-and-whales</a> and by BOEM at <a href="https://www.boem.gov/sites/default/files/document/s/renewable-energy/state-activities/Offshore%20Wind%20Activities%20and%20Marine%20Mammal%20Protection_1.pdf">https://www.boem.gov/sites/default/files/document/s/renewable-energy/state-activities/Offshore%20Wind%20Activities%20and%20Marine%20Mammal%20Protection_1.pdf</a>.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0045-0003, BOEM-2022-0053-0052-0001, BOEM-2022-0053-0069-0001, BOEM-2022-0053-0070-0001, BOEM-2022-0053-0083-0001, BOEM-2022-0053-0086-0001, BOEM-2022-0053-0087-0001, BOEM-2022-0053-0091-0001, BOEM-2022-0053-0094-0001, BOEM-2022-0053-0095-0003, BOEM-2022-0053-0095-0005, BOEM-2022-0053-0097-0001, BOEM-2022-0053-0098-0001, BOEM-2022-0053-0105-0002, BOEM-2022-0053-0139-0001, BOEM-2022-0053-0143-0012, BOEM-2022-0053-0181-0001, BOEM-2022-0053-0175</p>	
<p>Additional information on the impact of the Proposed Action on marine mammals is needed.</p>	<p>There is sufficient information, provided in Section 3.15.5 of the Draft EIS, to evaluate adverse effects of the Proposed Action and make impact determinations for marine mammals.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0092-0001, BOEM-2022-0053-0098-0001, BOEM-2022-0053-0128-0001</p>	

**P.7.9 Navigation and Vessel Traffic**

**Table P.7-9 General Comments on Navigation and Vessel Traffic**

Comment Summary	Response
<p>EW 1 power cable routing presents risks in the case of vessel anchoring operations (emergency or routine).</p>	<p>The impact assessment for the Proposed Action, presented in Section 3.16.5 of the Draft EIS, included an evaluation of adverse impacts that could potentially arise from vessel anchoring operations. The EW 1 export cable route that traverses the Gravesend Anchorage Area (Alternative C-1) is outside of the USACE federally designated deep-water anchorage (west of Buoys "A", "B," and "C" on NOAA chart 12402) of Gravesend Bay. Should the EW 1 export cable route be according to Alternative C-2 and traverse the Ambrose Navigation Channel, adverse impacts were considered (i.e., vessels anchoring in an emergency scenario). Empire would conduct a Cable Routing study (APM 205) to develop submarine export cable routes that avoid or minimize interactions with anchorage areas. Empire would also prepare a CBRA to identify appropriate cable burial depths and identify any needs for additional cable protections (APM 207).</p>

Comment Summary	Response
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0100-0003, BOEM-2022-0053-0100-0007	
The Projects will result in adverse navigational hazards in a busy, economically vital commercial port. The Navigational Risk Assessment pre-dates the <i>Northern New York Bight Port Access Route Study: Final Report</i> (December 2021).	The impact assessment for the Proposed Action, presented in Section 3.16.5 of the Draft EIS, included an evaluation of adverse impacts on vessel traffic and navigation. Empire has maintained current on the USCG PARS published over the span of BOEM’s environmental review. The latest COP update, including the NSRA, considers the information published in the <i>Northern New York Bight Port Access Route Study: Final Report</i> (December 2021).
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0100-0001, BOEM-2022-0053-0130-0029, BOEM-2022-0053-0140-0008	

**P.7.10 Recreation and Tourism**

**Table P.7-10 General Comments on Recreation and Tourism**

Comment Summary	Response
One commenter stated that the view of wind projects—even a project much closer to shore than Empire—would not in any way diminish the experience of New York’s shores, and rather the commenter looks forward to having symbols of the energy transition as part of the view. Another commenter stated that wind turbines are being constructed too close to shore, making them visible to beach goers.	Comment acknowledged.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0059-0002, BOEM-2022-0053-0095-0001	

**P.7.11 Sea Turtles**

**Table P.7-11 General Comments on Sea Turtles**

Comment Summary	Response
A commenter expressed concern about adverse effects on threatened and endangered sea turtles, including Kemp’s ridley, leatherback, hawksbill, green, and loggerhead sea turtles.	Impacts of the Proposed Action and action alternatives on sea turtle species were assessed in Section 3.19 of the Draft EIS. Additionally, as all sea turtle species are listed under the ESA, impacts on these species were assessed in the BA for the Projects.
<b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0104-0001	

**P.7.12 Scenic and Visual Resources**

**Table P.7-12 General Comments on Scenic and Visual Resources**

Comment Summary	Response
<p>One commenter stated that all energy infrastructure has a visual impact and that the choice is between seeing a wind turbine over 15 miles offshore or continuing to see fossil-fuel fired power plants, noting that power plants are not only visible but also negatively affect air quality and health in the community.</p>	<p>Comment acknowledged.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0090-0009</p>	

**P.7.13 NEPA/Public Involvement Process**

**Table P.7-13 General Comments on NEPA/Public Involvement Process**

Comment Summary	Response
<p>Commenters stated they believe that the community is unaware of the Projects and called for a more robust engagement strategy that includes town meetings in auditoriums. Commenters noted that hearings for these Projects and hearings for other agencies or projects are all scheduled over the end-of-the-year holidays and conflicted with NEFMC or MAFMC meetings. One commenter requested an extension to the public comment period due to the rapid pace of document development, concurrent project reviews, and scheduling conflicts that make participation difficult. Other commenters requested continued engagement with stakeholders and the public as BOEM's NEPA process continues, stating that as BOEM works toward a Final EIS and ROD there should be a "ramp-up" in opportunities for public participation and discussions with Equinor to ensure that the communities themselves guide decisions on community benefits.</p>	<p>The environmental review of the Empire Wind COP was initiated with issuance of an NOI to Prepare an EIS in the <i>Federal Register</i> on June 24, 2021. Publication of the NOI initiated a 30-day public scoping period during which BOEM conducted three virtual public meetings to solicit feedback and identify issues and potential alternatives for consideration in the EIS. A second public comment period was opened with the issuance of the Notice of Availability for the Draft EIS on November 18, 2022. Due to increasing community transmission rates for COVID-19 leading up to public meetings for the Draft EIS, BOEM made the decision to hold meetings virtually, offering three meetings in December 2022 with options for daytime or evening hours. BOEM acknowledged the timing of the public review period over the end of year, and proactively scheduled a 60-day public comment period for the Empire Wind Draft EIS rather than the minimum 45-day review period. There are no additional public review periods for BOEM's NEPA process; however, Equinor separately conducts stakeholder outreach as described in Volume 1, Section 1.6 and Appendix B of the Empire Wind COP.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0032-0001, BOEM-2022-0053-0035-0005, BOEM-2022-0053-0038-0001, BOEM-2022-0053-0039-0001, BOEM-2022-0053-0040-0003, BOEM-2022-0053-0045-0002, BOEM-2022-0053-0090-0012, BOEM-2022-0053-0090-0013, BOEM-2022-0053-0113-0001, BOEM-2022-0053-0139-0003, BOEM-2022-0053-0143-0003,</p>	



**P.7.14 Planned Activities Scenario/Cumulative Impacts**

**Table P.7-14 General Comments on Planned Activities Scenario/Cumulative Impacts**

Comment Summary	Response
<p>Commenters expressed that the Projects should be assessed in the context of the entire northeast Atlantic’s proposed industrialization and that cumulative impacts should be thoroughly examined.</p>	<p>BOEM’s planned activities scenario as described in Final EIS Appendix F includes planned development of all leased offshore wind lease areas, in addition to other ongoing and planned activities within the geographic analysis area. The planned activities scenario is used to analyze the cumulative impacts of the No Action Alternative, the Proposed Action, and other action alternatives for each Chapter 3 resource.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0031-0001, BOEM-2022-0053-0033-0001, BOEM-2022-0053-0053-0003</p>	

**P.7.15 Project Design Envelope**

**Table P.7-15 General Comments on the Project Design Envelope**

Comment Summary	Response
<p>One commenter expressed support for use of the PDE approach to analyze impacts of the Projects while providing a reasonable degree of flexibility. One commenter suggested that gravity-based foundations should have been retained in the PDE. One commenter expressed support for an EW 2 substation option that would enable replacing the EMF generating station’s power. Another commenter stated that there is excessive cabling through the city of Long Beach and requested the reason for the routing. One commenter stated that the 15-MW turbine is still in a prototype or test phase and questioned how turbine performance could be guaranteed. One commenter expressed an expectation that the safest construction method would be utilized.</p>	<p>Comments acknowledged. A description of Empire’s site selection process is available in Volume 1, Chapter 2 of Empire’s COP available at: <a href="https://www.boem.gov/renewable-energy/state-activities/empire-wind">https://www.boem.gov/renewable-energy/state-activities/empire-wind</a>. Note that Final EIS Figure 2-2 shows all export cable route options that are included within Empire’s PDE; however, not all route options would be used.</p> <p>The Project components and locations presented in Empire’s COP have been selected based on environmental and engineering site characterization studies completed to date, existing information collection and analysis, as well as engagement with regulators and interested parties, and will be refined in the Facility Design Report and Fabrication and Installation Report. The Facility Design Report and Fabrication and Installation Report will be reviewed by BOEM prior to Project construction. In addition, a Certified Verification Agent, approved by BOEM, will conduct an independent assessment and verify that the Project components are fabricated and installed in accordance with the COP and the Fabrication and Installation Report.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0035-0001, BOEM-2022-0053-0042-0002, BOEM-2022-0053-0047-0001, BOEM-2022-0053-0117-0014, BOEM-2022-0053-0140-0028, BOEM-2022-0053-0140-0034, BOEM-2022-0053-0140-0039, BOEM-2022-0053-0141-0011</p>	

**P.7.16 General Support or Opposition**

**Table P.7-16 General Support or Opposition Comments**

Comment Summary	Response
<p>Commenters expressed opposition to the Projects due to visual impacts; potential health risks associated with EMF; adverse impacts on beach use, property values, quality of life, and tourism; potential for accidental releases from turbines; impacts on marine life, benthic and pelagic habitats, and birds; expected space-use conflicts with other ocean uses related to marine traffic, fishing, navigation, and radar; and concern that the reliability and safety of wind energy are unproven. Commenters expressed that data are inadequate regarding how the Projects would affect wildlife and the environment and that a pilot project should be completed to better understand the impacts. Commenters expressed support for the Projects as a means to meet New York State’s climate goals, reduce GHG emissions, and move toward a carbon-free future through the transition to renewable energy. Commenters identified the benefits of the Projects as addressing the impacts of climate change while creating jobs and other economic benefits such as opportunities for job training, workforce development, and community investment. Commenters noted the health benefits associated with reduced reliance on fossil fuels for power generation and reduced air emissions that disproportionately harm communities of color. Commenters in support of the Projects expressed that visibility of WTGs would not have an adverse effect, particularly within an urban environment, and both views and air quality could be improved if power plants reliant on fossil fuels were decommissioned.</p>	<p>Thank you for your comments. More detailed and specific comments were provided on many of these topics and are addressed by topic area in Section P.6 and Section P.7.</p>
<p><b>Submission IDs reviewed for comment summary:</b> BOEM-2022-0053-0003-0001, BOEM-2022-0053-0004-0001, BOEM-2022-0053-0005-0001, BOEM-2022-0053-0006-0001, BOEM-2022-0053-0007-0001, BOEM-2022-0053-0008-0001, BOEM-2022-0053-0009-0002, BOEM-2022-0053-0010-0001, BOEM-2022-0053-0011-0001, BOEM-2022-0053-0012-0001, BOEM-2022-0053-0013-0001, BOEM-2022-0053-0015-0001, BOEM-2022-0053-0021-0001, BOEM-2022-0053-0027-0004, BOEM-2022-0053-0031-0002, BOEM-2022-0053-0033-0002, BOEM-2022-0053-0037-0001, BOEM-2022-0053-0038-0002, BOEM-2022-0053-0042-0001, BOEM-2022-0053-0043-0001, BOEM-2022-0053-0044-0001, BOEM-2022-0053-0045-0003, BOEM-2022-0053-0048-0001, BOEM-2022-0053-0049-0001, BOEM-2022-0053-0051-0001, BOEM-2022-0053-0052-0001, BOEM-2022-0053-0055-0001, BOEM-2022-0053-0056-0001, BOEM-2022-0053-0057-0001, BOEM-2022-0053-0058-0001, BOEM-2022-0053-0059-0001, BOEM-2022-0053-0060-0001, BOEM-2022-0053-0060-0002, BOEM-2022-0053-0061-0001, BOEM-2022-0053-0062-0001, BOEM-2022-0053-0063-0001, BOEM-2022-0053-0064-0001, BOEM-2022-0053-0065-0001, BOEM-2022-0053-0066-0001, BOEM-2022-0053-0067-0001, BOEM-2022-0053-0068-0001, BOEM-2022-0053-0069-0001, BOEM-2022-0053-0071-0001, BOEM-2022-0053-0072-0001, BOEM-2022-0053-0073-0001, BOEM-2022-0053-0074-0001, BOEM-2022-0053-0076-0001, BOEM-2022-0053-0078-0001, BOEM-2022-0053-0079-0001, BOEM-2022-0053-0080-0001, BOEM-2022-0053-0081-0001, BOEM-2022-0053-0082-0001, BOEM-2022-0053-0084-0001, BOEM-2022-0053-0085-0001, BOEM-2022-0053-0087-0001, BOEM-2022-0053-0088-0001, BOEM-2022-0053-0089-0001, BOEM-2022-0053-0090-0003, BOEM-2022-0053-0090-0004, BOEM-2022-0053-0090-0008, BOEM-2022-0053-0093-0001, BOEM-2022-0053-0095-0004, BOEM-2022-0053-0095-0006, BOEM-2022-0053-0096-0001, BOEM-2022-0053-0099-0001, BOEM-2022-0053-0101-0001, BOEM-2022-0053-0104-0002, BOEM-2022-0053-0106-0002, BOEM-2022-0053-0107-0001, BOEM-2022-0053-0108-0002, BOEM-2022-0053-0109-0002, BOEM-2022-0053-0110-0020, BOEM-2022-0053-0111-0001, BOEM-2022-0053-0112-0001, BOEM-2022-0053-0117-0001, BOEM-2022-0053-0123-0002, BOEM-2022-0053-0125-0001, BOEM-2022-0053-0126-0001, BOEM-2022-0053-0127-0001, BOEM-2022-0053-0129-0001, BOEM-2022-0053-0131-0001, BOEM-2022-0053-0133-0002, BOEM-2022-0053-0134-0001, BOEM-2022-0053-0137-0001, BOEM-2022-0053-0138-0002, BOEM-2022-0053-0139-0002, BOEM-2022-0053-0140-0004, BOEM-2022-0053-0140-</p>	

Comment Summary	Response
0026, BOEM-2022-0053-0140-0027, BOEM-2022-0053-0143-0001, BOEM-2022-0053-0143-0005, BOEM-2022-0053-0143-0006, BOEM-2022-0053-0143-0024, BOEM-2022-0053-0143-0025, BOEM-2022-0053-0151-0001, BOEM-2022-0053-0152-0001, BOEM-2022-0053-0153-0001, BOEM-2022-0053-0154-0001, BOEM-2022-0053-0155-0001, BOEM-2022-0053-0158-0001, BOEM-2022-0053-0159-0001, BOEM-2022-0053-0160-0001, BOEM-2022-0053-0161-0001, BOEM-2022-0053-0162-0001, BOEM-2022-0053-0163-0001, BOEM-2022-0053-0164-0001, BOEM-2022-0053-0165-0001, BOEM-2022-0053-0166-0001, BOEM-2022-0053-0167-0001, BOEM-2022-0053-0168-0001, BOEM-2022-0053-0169-0001, BOEM-2022-0053-0172-0001, BOEM-2022-0053-0174-0001, BOEM-2022-0053-0177-0001, BOEM-2022-0053-0178-0001, BOEM-2022-0053-0179-0001, BOEM-2022-0053-0180-0001	

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**P.8. Form Letters**

**P.8.1 Form Letter A**

**Table P.8-1 Form Letter A**

<b>Form Letter A</b>
<p>As a Lido Beach resident I strongly oppose Empire Wind 2 project. While we all need clean energy, it has to be done responsibly. There is no good reason to place the windfarm in front of Long Beach Island and route the cable though this heavily populated barrier island when there is a much bigger uninhabited barrier island right next to it – Jones Beach. Please consider shifting windfarm East and placing it in front of Jones Beach. The cable from the farm should be routed through Jones Beach and then along Wantagh Parkway to any connection point (substation) along Wantagh Parkway or close to it. Please note that routing the cable though Jones Beach will also shorten the marine part of the cable making construction less expensive and less risky (since underwater cables are the hardest to maintain). Please reconsider location of the windfarm and its cable as it currently stands.</p>
<p><b>Response:</b> Evaluating an alternate location for the wind energy facility outside of the Lease Area would constitute a new Proposed Action and would not meet BOEM’s purpose and need to respond to Empire’s proposal and determine whether to approve, approve with modifications, or disapprove the COP to construct, operate and maintain, and decommission a commercial-scale offshore wind energy facility within the Lease Area. BOEM’s regulations require BOEM to analyze Empire’s proposal to build a commercial-scale wind energy facility on the Lease Area.</p>
<p><b>Submission IDs Associated with Form Letter A:</b> BOEM-2022-0053-0009, BOEM-2022-0053-0016, BOEM-2022-0053-0017, BOEM-2022-0053-0018, BOEM-2022-0053-0020, BOEM-2022-0053-0022, BOEM-2022-0053-0023, BOEM-2022-0053-0024, BOEM-2022-0053-0026, BOEM-2022-0053-0028, BOEM-2022-0053-0029, BOEM-2022-0053-0156, BOEM-2022-0053-0157</p>
<p><b>Related Comments:</b> BOEM-2022-0053-0038-0003; BOEM-2022-0053-0047-0001</p>

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## P.9. List of Commenters by Commenter Type and Submission Number

**Table P.9-1 Federal Agencies**

Submission Number	Agency
BOEM-2022-0053-0118	U.S. Environmental Protection Agency
BOEM-2022-0053-0144	U.S. Department of the Interior, National Park Service
BOEM-2022-0053-0148	U.S. Coast Guard
BOEM-2022-0053-0149	National Oceanic and Atmospheric Administration

**Table P.9-2 State Agencies**

Submission Number	Agency
BOEM-2022-0053-0120	New York State Department of Environmental Conservation
BOEM-2022-0053-0121	New York State Agencies
BOEM-2022-0053-0146	New Jersey Department of Environmental Protection

**Table P.9-3 Local Government/Agency**

Submission Number	Government/Agency
BOEM-2022-0053-0116	New Bedford Port Authority

**Table P.9-4 Lessee**

Submission Number	Lessee
BOEM-2022-0053-0136	Empire Offshore Wind LLC

**Table P.9-5 Businesses and Organizations**

Submission Number	Organization
BOEM-2022-0053-0056	Stony Brook University
BOEM-2022-0053-0113	Seafreeze Shoreside and Seafreeze Ltd
BOEM-2022-0053-0117	BlueGreen Alliance
BOEM-2022-0053-0119	New Jersey Offshore Wind Coalition
BOEM-2022-0053-0130	Responsible Offshore Development Alliance
BOEM-2022-0053-0132	Sixth Street Community Center
BOEM-2022-0053-0140	Clean Ocean Action
BOEM-2022-0053-0142	National Wildlife Federation, Natural Resources Defense Council, National Audubon Society, et al.
BOEM-2022-0053-0143	Sea Life Conservation, Save the Whales
BOEM-2022-0053-0145	Cultural Heritage Partners on behalf of Point O'Woods Association

Submission Number	Organization
BOEM-2022-0053-0147	UPRPOSE

**Table P.9-6 Individuals**

Submission Number	Commenter
BOEM-2022-0053-0002	Brian Graham
BOEM-2022-0053-0003	Mike Feldmus
BOEM-2022-0053-0004	Michele Zarrella
BOEM-2022-0053-0005	Alice Platt
BOEM-2022-0053-0006	Earnestine Horn
BOEM-2022-0053-0007	Lisa Tagliarino
BOEM-2022-0053-0008	Kevin Halpin
BOEM-2022-0053-0009	John Del
BOEM-2022-0053-0010	Marie Pulini
BOEM-2022-0053-0011	Mary Grant
BOEM-2022-0053-0012	Alice Platt
BOEM-2022-0053-0013	Debbie Cacamese
BOEM-2022-0053-0015	Billy Kolar
BOEM-2022-0053-0016	Boris Livshiz
BOEM-2022-0053-0017	Maria Livshiz
BOEM-2022-0053-0018	Elena Livshiz
BOEM-2022-0053-0020	Kathryn Merani
BOEM-2022-0053-0021	Debra Perry
BOEM-2022-0053-0022	Jay Kaye
BOEM-2022-0053-0023	David Fagan
BOEM-2022-0053-0024	Jill Sharpe
BOEM-2022-0053-0025	Kevin McCoy
BOEM-2022-0053-0026	Rosemary Kalonaros
BOEM-2022-0053-0028	Linda Bolger
BOEM-2022-0053-0029	J Miller
BOEM-2022-0053-0030	Lawrence Bastianelli
BOEM-2022-0053-0031	Tony Groet
BOEM-2022-0053-0032	Jane Quinton
BOEM-2022-0053-0033	Cindy Zipf
BOEM-2022-0053-0034	Lovinia Reynolds
BOEM-2022-0053-0035	George Povall
BOEM-2022-0053-0036	Elizabeth Marchetti
BOEM-2022-0053-0037	Laurie Aron
BOEM-2022-0053-0038	Christina Kramer
BOEM-2022-0053-0039	James Howard
BOEM-2022-0053-0040	Adrienne Esposito

Submission Number	Commenter
BOEM-2022-0053-0041	Kristen Grazioso
BOEM-2022-0053-0042	Shay O'Reilly
BOEM-2022-0053-0043	Grace Mok
BOEM-2022-0053-0044	Fred Zalcman
BOEM-2022-0053-0045	John Zalcman
BOEM-2022-0053-0046	Ashley Cruz
BOEM-2022-0053-0047	James McFadden
BOEM-2022-0053-0048	Ellen Petraglia
BOEM-2022-0053-0049	Louis Petraglia
BOEM-2022-0053-0051	James Scarcella
BOEM-2022-0053-0052	Sonya Elefante
BOEM-2022-0053-0055	Nicholas Veljacich
BOEM-2022-0053-0057	Patricia Carniglia
BOEM-2022-0053-0058	George Ostrow
BOEM-2022-0053-0059	Sarah Reed
BOEM-2022-0053-0060	Mary Sangree
BOEM-2022-0053-0061	Kathy Malone
BOEM-2022-0053-0062	Teresa Calabrese
BOEM-2022-0053-0063	Abigail Mitchell
BOEM-2022-0053-0064	Marc Schmied
BOEM-2022-0053-0065	Delia Kulukundis
BOEM-2022-0053-0066	Patrick O'Toole
BOEM-2022-0053-0067	Diane Mallett
BOEM-2022-0053-0068	John Chiarella
BOEM-2022-0053-0069	Stephen Aljian
BOEM-2022-0053-0070	Mary Beth Hueter
BOEM-2022-0053-0071	Joanna Boland
BOEM-2022-0053-0072	Matt Smith
BOEM-2022-0053-0073	Betty Lacy
BOEM-2022-0053-0074	Jody Smith
BOEM-2022-0053-0075	Jennifer Maloney
BOEM-2022-0053-0076	Tina Kahl
BOEM-2022-0053-0077	Chris DeGennaro
BOEM-2022-0053-0078	Zachary Ackermann
BOEM-2022-0053-0079	C B
BOEM-2022-0053-0080	Meg Ryan
BOEM-2022-0053-0081	E M
BOEM-2022-0053-0082	Basil Henning
BOEM-2022-0053-0083	Rob Esposito
BOEM-2022-0053-0084	Max Bradbury
BOEM-2022-0053-0085	Matthew Gilson
BOEM-2022-0053-0086	Stephanie Richardson

<b>Submission Number</b>	<b>Commenter</b>
BOEM-2022-0053-0087	Georgia Fickes
BOEM-2022-0053-0088	Joy Chen
BOEM-2022-0053-0089	Lucille Trezoglou
BOEM-2022-0053-0091	Jamie Robbins
BOEM-2022-0053-0092	Kathy Richardson
BOEM-2022-0053-0093	Kevin Dillon
BOEM-2022-0053-0094	Adam Lepore
BOEM-2022-0053-0095	Penelope Campbell
BOEM-2022-0053-0096	Regina Stone
BOEM-2022-0053-0097	Cecelia Pietrusko
BOEM-2022-0053-0098	Rick Martinez
BOEM-2022-0053-0099	Maureen Culmone
BOEM-2022-0053-0101	John Chiarella
BOEM-2022-0053-0104	Judith Canepa
BOEM-2022-0053-0105	Christina Saragiotis
BOEM-2022-0053-0106	William Makofske
BOEM-2022-0053-0107	Edmee Froment
BOEM-2022-0053-0108	Nicola Coddington
BOEM-2022-0053-0109	Nydia Leaf
BOEM-2022-0053-0111	Suzanne Power
BOEM-2022-0053-0112	Jacquelyn Drechsler
BOEM-2022-0053-0115	Elizabeth Soychak
BOEM-2022-0053-0122	Amy Harlib
BOEM-2022-0053-0123	Anthony Mazzocchi
BOEM-2022-0053-0124	PF L
BOEM-2022-0053-0125	Maura Stephens
BOEM-2022-0053-0126	Lesley Krautheim
BOEM-2022-0053-0127	Frank Vicendese
BOEM-2022-0053-0128	Karen Hoover MD ScD
BOEM-2022-0053-0129	Rhetta Barron
BOEM-2022-0053-0131	James Scarcella
BOEM-2022-0053-0133	Alice Zinnes
BOEM-2022-0053-0134	Ashley Pascarella
BOEM-2022-0053-0135	M G
BOEM-2022-0053-0137	Dawn Lippert
BOEM-2022-0053-0138	Tyler Thompson
BOEM-2022-0053-0139	Linda Cohen
BOEM-2022-0053-0141	David Tepper

**Table P.9-7    Anonymous**

Submission Number	Commenter
BOEM-2022-0053-150	Anonymous
BOEM-2022-0053-151	Anonymous
BOEM-2022-0053-152	Anonymous
BOEM-2022-0053-153	Anonymous
BOEM-2022-0053-154	Anonymous
BOEM-2022-0053-155	Anonymous
BOEM-2022-0053-156	Anonymous
BOEM-2022-0053-157	Anonymous
BOEM-2022-0053-158	Anonymous
BOEM-2022-0053-159	Anonymous
BOEM-2022-0053-160	Anonymous
BOEM-2022-0053-161	Anonymous
BOEM-2022-0053-162	Anonymous
BOEM-2022-0053-163	Anonymous
BOEM-2022-0053-164	Anonymous
BOEM-2022-0053-165	Anonymous
BOEM-2022-0053-166	Anonymous
BOEM-2022-0053-167	Anonymous
BOEM-2022-0053-168	Anonymous
BOEM-2022-0053-169	Anonymous
BOEM-2022-0053-170	Anonymous
BOEM-2022-0053-171	Anonymous
BOEM-2022-0053-172	Anonymous
BOEM-2022-0053-173	Anonymous
BOEM-2022-0053-174	Anonymous
BOEM-2022-0053-175	Anonymous
BOEM-2022-0053-176	Anonymous
BOEM-2022-0053-177	Anonymous
BOEM-2022-0053-178	Anonymous
BOEM-2022-0053-179	Anonymous
BOEM-2022-0053-180	Anonymous
BOEM-2022-0053-181	Anonymous

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