Atlantic Shores Offshore Wind

Construction and Operations Plan

Lease Area OCS-A 0499

Cover art by Sandra Daly Art & Design

Volume I: Project Information

Submitted to:

BOEM
Bureau of Ocean Energy Management

Submitted by:

ATLANTIC SHORES offshore wind

Prepared by:

EDR a better environment

Epsilon Associates Inc.

September 2021

CONSTRUCTION AND OPERATIONS PLAN

VOLUME I – PROJECT INFORMATION

Submitted to:
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Executive Summary

Introduction

Atlantic Shores Offshore Wind, LLC (Atlantic Shores) is a 50/50 joint venture between EDF-RE Offshore Development, LLC (a wholly owned subsidiary of EDF Renewables, Inc. [EDF Renewables]) and Shell New Energies US LLC (Shell). Atlantic Shores is submitting this Construction and Operations Plan (COP) to the Bureau of Ocean Energy Management (BOEM) for the development of two offshore wind energy generation projects within the southern portion of Lease Area OCS-A 0499 (the Lease Area).

The purpose of these projects is to develop offshore wind energy generation facilities within the Lease Area to provide clean, renewable energy to the Northeastern U.S. by the mid-to-late 2020s. The projects will help both the U.S. and New Jersey achieve their renewable energy goals, diversify the State's electricity supply, increase electricity reliability, and reduce greenhouse gas (GHG) emissions. The projects will also provide numerous environmental, health, community, and economic benefits, such as the creation of substantial new employment opportunities, including within disadvantaged communities.

In accordance with the New Jersey Offshore Wind Economic Development Act (OWEDA), on June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,510 megawatts (MW)[1] of offshore renewable energy into the State of New Jersey. The project that will be developed under this OREC award, referred to as Project 1, will be owned and operated by Atlantic Shores Offshore Wind Project 1, LLC (Atlantic Shores Project 1 Company). Pursuant to New Jersey Executive Orders #8 and #92, the State will be awarding additional OREC allowances to offshore wind energy projects through a competitive solicitation process every 2 years through 2026. The next competitive solicitation by New Jersey will be initiated in Q3 2022. Atlantic Shores' second project, Project 2, to be owned and operated by Atlantic Shores Offshore Wind Project 2, LLC (Atlantic Shores Project 2 Company), is being developed to support these future New Jersey solicitations. Project 1 and Project 2 are collectively referred to as "the Projects."

Atlantic Shores Offshore Wind, LLC is the owner and an affiliate of Atlantic Shores Project 1 Company and Atlantic Shores Project 2 Company. Accordingly, for ease of reference, the term "Atlantic Shores" is used throughout the COP to refer interchangeably to the Project Companies.

At the time of this COP submission, in accordance with 30 CFR 585.106, 585.107, and 585.409, Atlantic Shores has requested the assignment of the Project 1 and Project 2 development areas within the Lease Area to Atlantic Shores Project 1 Company and Project 2 Company jointly.

[1] The New Jersey Board of Public Utilities awarded a contract to Atlantic Shores for 1,509.6 MW, which solely for convenience is rounded up to 1,510 MW throughout the COP.

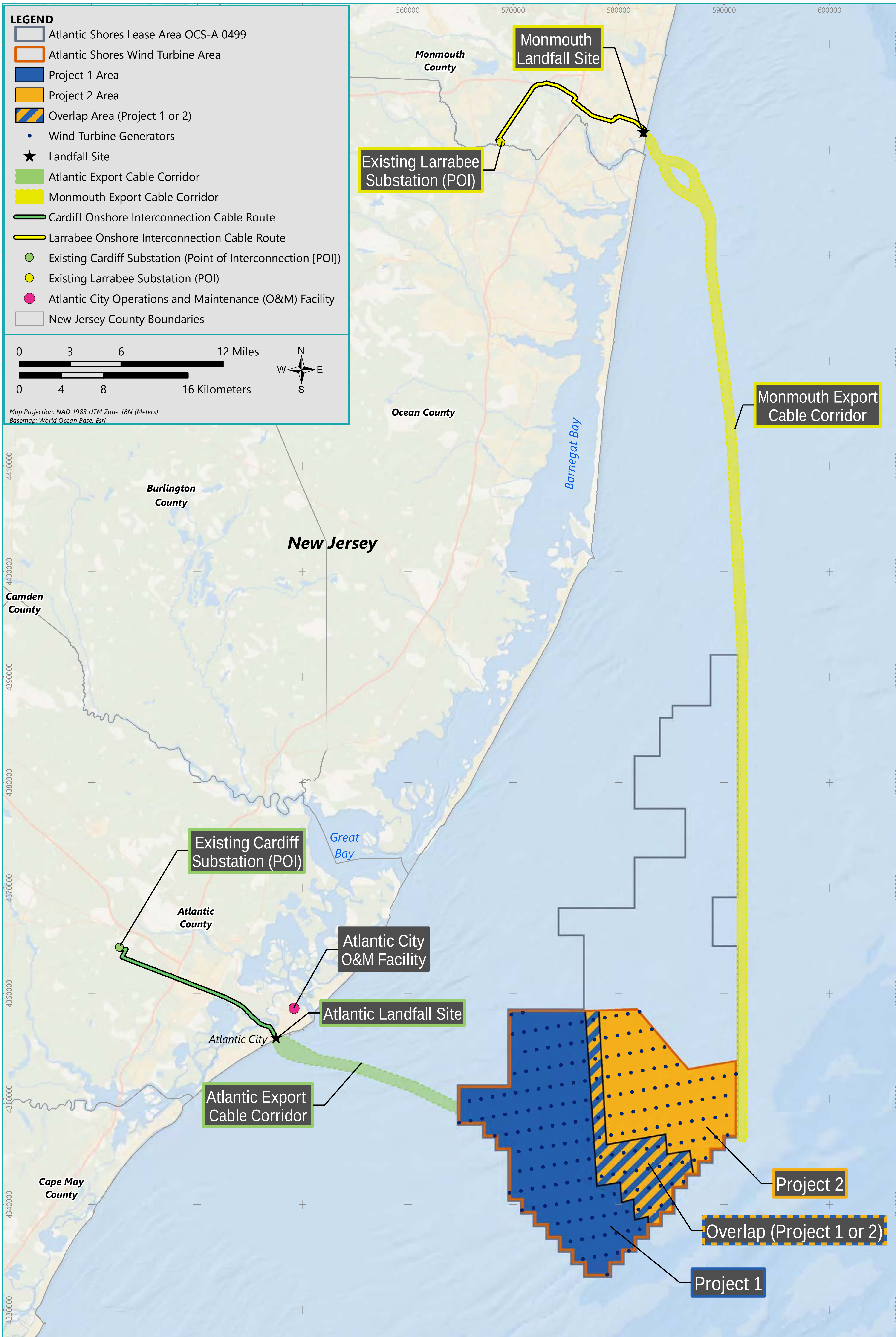
Overview of the Projects

Atlantic Shores' Lease Area is located on the OCS within the New Jersey Wind Energy Area (NJWEA), which was identified by BOEM as suitable for offshore renewable energy development through a multi-year, public environmental review process. The Projects will be located in an approximately 102,124-acre (413.3-square kilometer [km^2]) Wind Turbine Area (WTA) located in the southern portion of the Lease Area (see Figure E-1). Project 1 is located in the western 54,175 acres (219.2 km^2) of the WTA, and Project 2 is located in the eastern 31,847 acres (128.9 km^2) of the WTA, with a 16,102-acre (65.2-km^2) Overlap Area that could be used by either Project 1 or Project 2. Figure E-1 also depicts the boundaries of the Project 1 and Project 2 areas within the WTA.

At its closest point, the WTA is approximately 8.7 miles (mi) (14 kilometers [km]) from the New Jersey shoreline. The WTA will include an array of wind turbine generators (WTGs) and multiple offshore substations (OSSs). A meteorological (met) tower and/or meteorological and oceanographic (metocean) buoys may also be installed in the WTA. The WTA layout is designed to maximize offshore renewable wind energy production while minimizing effects on existing marine uses. The structures will be aligned in a uniform grid with multiple lines of orientation allowing straight transit through the WTA.

Within the WTA, the WTGs and OSSs for Project 1 and Project 2 will be connected by two separate, electrically distinct systems of inter-array cables and/or inter-link cables. Energy from the OSSs will be delivered to shore by export cables that will travel within designed Export Cable Corridors (ECCs) from the WTA through federal and New Jersey state waters to one or two landfall sites on the New Jersey coastline. The Atlantic ECC extends from the western tip of the WTA to the Atlantic Landfall Site in Atlantic City, New Jersey. The Monmouth ECC extends from the eastern corner of the WTA, along the eastern edge of the Lease Area, to the Monmouth Landfall Site in Sea Girt, New Jersey. Both Projects 1 and 2 have the potential to use either ECC and offshore export cables for each may also be co-located within an ECC.

At both the Monmouth and Atlantic Landfall Sites, horizontal directional drilling (HDD) will be employed to minimize impacts to the intertidal and nearshore habitats and ensure stable burial of the cables. From each landfall site, the onshore interconnection cables will travel underground primarily along existing roadways, utility rights-of-way (ROWs), and/or along bike paths to two new onshore substation sites. From the onshore substations, the onshore interconnection cables will continue to existing substations where the Projects will be interconnected into the electrical grid at the Cardiff Substation point of interconnection (POI) in Egg Harbor Township, New Jersey and/or the Larrabee Substation POI in Howell, New Jersey. While both Project 1 and Project 2 will be electrically distinct from one another, the Projects require the ability to interconnect at the two POIs to accommodate the maximum amount of electricity that could be generated by the Projects.



ATLANTIC SHORES offshore wind

Figure E-1

Overview of the Projects

Organization of the COP

This COP has been developed in accordance with 30 CFR Part 585, applicable BOEM and other regulatory guidance, and the stipulations in Atlantic Shores' Lease Agreement OCS-A 0499. This COP is organized into two volumes:

- Volume I provides detailed descriptions of the Projects' offshore and onshore facilities and how Atlantic Shores plans to construct, operate, and decommission those facilities.
- Volume II provides a comprehensive assessment of the Projects' potential effects to physical, biological, visual, cultural, and socioeconomic resources and describes the numerous measures that Atlantic Shores will employ to avoid, minimize, and mitigate those potential effects. Volume II also characterizes the Projects' environmental setting.

While this COP only describes the development of the southern portion of the Lease Area, as assigned to (or pending assignment to) Atlantic Shores Project 1 Company and Atlantic Shores Project 2 Company, Atlantic Shores maintains the right to develop the remainder of the Lease Area, which would be permitted under separate filings.

Project Design Envelope

Atlantic Shores is requesting BOEM's review and authorization of the Projects in accordance with BOEM's (2018) Project Design Envelope (PDE) guidance. The PDE identifies a reasonable range of designs for the proposed Project components and installation techniques. Key elements of the Projects' PDE are included in Table E-1.

Atlantic Shores has sited the Projects' facilities and developed the PDE to maximize renewable energy production, minimize environmental effects, minimize cost to ratepayers, and address stakeholder concerns. The PDE articulates the maximum design scenario for key project components, such as the type and number of WTGs, foundation types, OSS types, cable types, and installation techniques. The PDE provides Atlantic Shores with the necessary flexibility to respond to anticipated advancements in industry technologies and techniques, that even under a maximum scenario will not exceed an unreasonable level of environmental effects.

Table E-1 Key Elements of the PDE

Element	Project Design Element	Total	Project 1	Project 2
WTGs	**Max. Number of WTGs**	200 (inclusive of the 31 WTGs in the Overlap Area)[a]	105-136	64-95
	WTG Layout	Grid layout with ENE/WSW rows and approximately N/S columns, consistent with the predominant flow of traffic		
	Max. rotor diameter	918.6 ft (280.0 m)		
	Max. tip height[b]	1,048.8 ft (319.7 m)		
OSSs	**Max. Number of OSSs**	10 small OSSs, or	5	5
		5 medium OSSs, or	2	3
		4 large OSSs	2	2
	OSS Layout	Positioned along the same ENE/WSW rows as WTGs		
	Min. Distance from Shore	Small OSS: 12 mi (19.3 km)		
		Medium and large OSS: 13.5 mi (21.7 km)		
WTG and OSS Foundations	**Foundation types**			
	Piled	Monopiles or piled jackets		
	Suction bucket	Mono-buckets, suction bucket jackets, or suction bucket tetrahedron bases [c]		
	Gravity	Gravity-base structures (GBS) or gravity-pad tetrahedron bases[c]		
	Max. pile diameter at seabed	Monopile: 49.2 ft (15.0 m)		
	(for piled foundation types)	Piled jacket: 16.4 ft (5.0 m)		
Inter-Array and Inter-Link Cables	**Cable types and voltage**	Inter-array: 66–150 kV high voltage alternating current (HVAC)		
		Inter-link: 66–275 kV HVAC		
	Max. Total Cable Length	Inter-array: 547 mi (880 km)	273.5 mi (440 km)	273.5 mi (440 km)
		Inter-link: 37 mi (60 km)	18.6 mi (30 km)	18.6 mi (30 km)
	Target burial depth range	5 to 6.6 ft (1.5 to 2 m)		

Table E-1 Key Elements of the PDE (Continued)

Element	Project Design Element	Total	Project 1	Project 2
Export Cables	Cable types and voltage	230–275 kV HVAC cables or 320–525 kV high voltage direct current (HVDC) cables		
	Number of ECCs	Two: Atlantic ECC and Monmouth ECC		
	Max. Number of Cables	8 total: HVAC or HVDC export cables		
	Max. Total Cable Length	Atlantic Landfall Site to OSSs: 99.4 mi (160.0 km)		
		Monmouth Landfall Site to OSSs: 341.8 mi (550.0 km)		
	Target burial depth range	5 to 6.6 ft (1.5 to 2 m)		
Met Towers	Max. Number of Met Towers	Total: 1 (permanent)	1	0
Metocean Buoys	Max Number of Metocean Buoys	Total: 4 (Temporary, during construction)	3	1
Landfall Sites	Number of Landfall Sites	Atlantic Landfall Site		
		Monmouth Landfall Site		
	Installation Method	HDD		
Onshore Facilities	Number of Onshore Interconnection Cable Routes	Cardiff Onshore Interconnection Cable Route		
		Larrabee Onshore Interconnection Cable Route		
	Approx. route length	12 mi (19 km) each		
	Onshore interconnection cable types and voltage	230–275 kV HVAC cables installed in underground duct bank;		
		or 320–525 kV HVDC cables installed in underground duct bank		
	Number of Onshore Substations	Total: two (one per POI), each with a preferred and an alternate site		
	Points of Interconnection (POI)	Cardiff POI		
		Larrabee POI		
O&M Facility	Location	New operations and maintenance (O&M) facility proposed in Atlantic City, New Jersey		

Notes: a) The number of WTGs in Project 1, Project 2, and the associated Overlap Area will not exceed 200 WTG locations. For example, if Project 1 includes 105 WTGs (the minimum) then the Overlap Area would be incorporated into Project 2 which would include the remaining 95 WTGs; and conversely if the Overlap Area is incorporated into Project 1 such that it includes 136 WTGs, then Project 2 would be limited to 64 WTGs. Each Project may also use only part of the Overlap Area.
b) All elevations are provided relative to Mean Lower Low Water (MLLW).
c) Tetrahedron base foundations are included in the PDE for WTGs but not OSSs.

Gray highlighting represents no differentiation between the Project Design Elements of Project 1 and Project 2

Construction

To maximize construction synergy and efficiency, the construction schedules for Project 1 and Project 2 assumes the same installation teams and equipment (e.g., vessels) will be used to support the construction of both Projects. This strategy will limit demobilization and remobilization of equipment and crews which will help to reduce construction costs, increase schedule efficiency, and minimize environmental effects (e.g., emissions, vessel transits). This procedure will also provide continuous fabrication in manufacturing facilities to maintain employment and increase productivity. It will also reduce delays in the Federal permitting schedule tied to a Project's Final Investment Decision (FID) and allow Atlantic Shores to secure production slots. This strategy would also result in significant benefits to ratepayers, which is a critical component of state OREC solicitations.

Construction of each Project will begin with the onshore facilities, including the onshore substations and onshore interconnection cables. The onshore interconnection cables will be installed within a buried concrete duct bank. Techniques such as HDD, pipe jacking, or jack-and-bore are anticipated at unique features such as busy roadways, wetlands, and waterbodies to minimize impacts.

Construction of the offshore facilities is expected to begin with installation of the export cables and the foundations. Once the OSS foundations are installed, the OSS topsides and the inter-link cables (if used) can be installed. At each WTG position, after the foundation is installed, the associated inter-array cables and WTG can be installed. Scour protection may be installed at the base of the foundations and cable protection may be installed over a portion of the offshore cables. During commissioning, the WTG and OSS electrical and safety systems will be tested and the OSSs and WTGs will be energized.

Offshore construction may require many different types of vessels, including heavy transport vessels, heavy lift vessels, tugboats and barges, jack-up vessels, cable laying vessels, crew transfer vessels, and service operation vessels. Atlantic Shores may also use helicopters for crew transfer and visual equipment inspections as well as fixed-wing aircraft to support environmental monitoring and mitigation. Atlantic Shores has identified several port facilities in New Jersey, New York, the Mid-Atlantic, and New England that may be used for major construction staging activities for the Projects. In addition, some components, materials, and vessels could come from U.S. Gulf Coast or international ports. Activities at the ports may include component fabrication and assembly, offloading and loading shipments of project components, preparing vessels to tow floating components to the WTA, crew transfer, refueling, and restocking supplies.

Operations and Maintenance

Once installed and commissioned, both Project 1 and Project 2 are designed to operate for up to 30 years.[2] Operations and maintenance (O&M) activities will ensure that the Projects function safely and efficiently. To minimize equipment downtime and maximize energy generation, the Projects will conduct O&M activities through scheduled, predictive, and remotely-controlled activities.

The Projects' facilities are designed to operate autonomously without attendance by technicians. The Projects will be equipped with a supervisory control and data acquisition (SCADA) system, which provides an interface between each Project's facilities and all environmental and condition monitoring sensors and provides detailed performance and system information. The operator will monitor the status, production, and health of the Projects, 24 hours a day. The Projects will be supported by a new O&M facility that Atlantic Shores is proposing to establish in Atlantic City, New Jersey.

Decommissioning

At the end of their operational life, the Projects will be decommissioned. Decommissioning will broadly occur in the reverse order of construction and will be conducted in accordance with the requirements of Atlantic Shores' Lease Agreement, 30 CFR Part 585, and the Decommissioning Application that Atlantic Shores will submit to BOEM prior to decommissioning.

Health, Safety, Security, and Environmental Protection

Health, safety, security, and environmental (HSSE) protection are critical components of all Atlantic Shores' planning and activities. The health and safety of Atlantic Shores' team members, contractors, and the public is a key priority; Atlantic Shores upholds safety as a core value and fosters a culture of "Goal Zero" that focuses on eliminating safety related incidents. Atlantic Shores also prioritizes the responsible integration of the Projects into the New Jersey coastal and marine environment.

Atlantic Shores is committed to full compliance with applicable HSSE regulations and codes throughout the pre-construction, construction, O&M, and decommissioning phases of the Projects. Plans that will be implemented, in accordance with BOEM and other applicable regulations, to ensure HSSE protection throughout the Projects' lifecycles will include project-specific Safety Management Systems (SMS), Oil Spill Response Plans (OSRP), and Spill Prevention, Control, and Countermeasure (SPCC) Plans for the Projects.

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2 Atlantic Shores' Lease Agreement OCS-A 0499 includes a 25-year operating term, which may be extended or otherwise modified in accordance with applicable regulations in 30 CFR Part 585.

Stakeholder Engagement

Atlantic Shores is actively engaged with stakeholders to identify and discuss their interests and concerns regarding the development of the Projects. Since early 2019, Atlantic Shores has conducted hundreds of meetings and working sessions with stakeholders, suppliers, interest groups, and local communities that have an interest in or may be affected by the Projects. Atlantic Shores will continue to host and participate in meetings, community events, informational sessions, open houses, and workshops as well as disseminate information through the Projects' interactive website and social media platforms. As the Projects progress, Atlantic Shores will continue to evolve its stakeholder engagement strategy and its mechanisms for capturing, documenting, and responding to stakeholder feedback to ensure that the outcomes of each interaction are incorporated into the Projects development efforts.

Benefits, Effects, and Environmental Protection Measures

The Projects will provide clean, renewable energy to the Northeastern U.S. By displacing electricity from fossil fuel power plants, the Projects will result in a significant net decrease in harmful air pollutant emissions region-wide. For every megawatt of power generated by the Projects, the Projects are expected to reduce GHG emissions, reported as carbon dioxide equivalents (CO_2e), by approximately 2,625 tons per year. By reducing regional GHG emissions, the Projects can help mitigate additional effects of climate change (e.g., sea level rise, shifts in species' distributions, and increases in energy system costs) that impact both public health and the environment. The Projects will also reduce regional emissions that are linked to increased rates of early death, stroke, heart attacks, and respiratory disorders and contribute to acid rain, ocean acidification, and ground level ozone/smog.

Beyond its environmental and public health benefits, the Projects will provide significant economic and community benefits to the Mid-Atlantic, including the creation of substantial new employment opportunities. The Projects are expected to directly create more than 22,290 full time equivalent (FTE)[3] jobs, indirectly create more than 11,810 FTE jobs, and induce over 14,820 FTE jobs throughout their lifecycles. Atlantic Shores will use local supply chains, increase revenues collected by federal, state, and local governments, and contribute to the establishment of facilities and development of ports that will be instrumental in attracting and supplying future U.S. offshore wind developments to New Jersey.

Atlantic Shores is working to maximize the benefits and minimize the effects of the Projects. Volume II of this COP describes the Projects' environmental setting, assesses the Projects' potential effects to physical, biological, visual, cultural, and socioeconomic resources, and identifies environmental protection measures (EPMs) that could avoid or reduce those potential effects. Environmental resource assessments contained within Volume II combine years of site-specific onshore and offshore surveys, research, and modeling. The Projects' EPMs include studies, assessments, design elements, best management practices (BMPs), and potential mitigation

[3] Based on a 40-hour work week.

measures. These EPMs will evolve through ongoing consultations with appropriate agencies and stakeholders. Taking into account the Projects' EPMs, the recurring and accumulating benefits created by the Projects over their operational lives represent significant cumulative increases in environmental, economic, and social well-being compared to the primarily localized and temporary effects that will be avoided, minimized, and/or mitigated. Overall, Atlantic Shores expects that the Projects' anticipated benefits will significantly outweigh their potential effects.

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List of Acronyms and Abbreviations

ACE	Atlantic City Electric
ACP	American Clean Power Association
ACPARS	Atlantic Ocean Port Access Routing Study
AHTS	Anchor Handling Tug Supply
AIS	Automatic Identification System
ADLS	Aircraft Detection Lighting System
APE	Area of Potential Effect
API	American Petroleum Institute
BMP	best management practice
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CO_2e	carbon dioxide equivalent
COP	Construction and Operations Plan
CTV	crew transfer vessel
CVA	Certified Verification Agent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DAS	distributed acoustic sensing
DCR	Discharge Cleanup and Removal
DLRP	Division of Land Resource Protection
DoD	Department of Defense
DOI	Department of Interior
DP	dynamic positioning
DPCC	Discharge Prevention, Containment, and Countermeasure
DTS	distributed temperature system
EA	Environmental Assessment
ECC	Export Cable Corridor
ECO	Educational and Community Outreach
eNGO	environmental non-governmental organization
EPA	Environmental Protection Agency
EPM	environmental protection measure
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCP	Fisheries Communication Plan
FDR	Facility Design Report
FIR	Fabrication and Installation Report
FIR	Fishing Industry Representative
FLO	Fisheries Liaison Officer
FONSI	Finding of No Significant Impact
FR	Federal Register

List of Acronyms and Abbreviations (Continued)

FTE	full time equivalent
GBS	gravity-base structure
GCT	Global Container Terminal
GHG	greenhouse gases
GIS	geographic information systems
HAT	Highest Astronomical Tide
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HLV	heavy lift vessel
HPO	Historic Preservation Office
HSSE	health, safety, security, and environmental
HTV	heavy transport vessel
HVAC	high voltage alternating current
HVDC	high voltage direct current
IEC	International Electrotechnical Commission
IHA	Incidental Harassment Authorization
ISO	International Organization for Standardization
JCP&L	Jersey Central Power & Light
LED	light-emitting diode
lidar	light detection and ranging
LOA	Letter of Authorization (LOA)
MEC	munitions and explosives of concern
met	meteorological
metocean	meteorological and oceanographic
MLLW	Mean Lower Low Water
MLW	Mean Low Water
MMPA	Marine Mammals Protection Act
MOTBY	Military Ocean Terminal Bayonne
MOU	memorandum of understanding
MRASS	Mariner Radio Activated Sound Signal
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NGTC	National Guard Training Center
NHPA	National Historic Preservation Act
NJWEA	New Jersey Wind Energy Area
NJBIA	New Jersey Business & Industry Association
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation

List of Acronyms and Abbreviations (Continued)

NMFS	National Marine Fisheries Service
NOx	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRDC	Natural Resources Defense Council, Inc.
NSRA	Navigation Safety Risk Assessment
O&M	operations and maintenance
OCS	Outer Continental Shelf
OEM	original equipment manufacturer
OLPD	online partial discharge
OREC	Offshore Renewable Energy Credit
OSHA	Occupational Safety and Health Administration
OSRP	Oil Spill Response Plan
OSS	offshore substation
OWPEBS	Ocean/Wind Power Ecological Baseline Studies
PANYNJ	Port Authority of New York and New Jersey
PATON	Private Aid to Navigation
PDE	Project Design Envelope
PLGR	pre-lay grapnel run
$PM_{2.5}$	fine particulate matter (2.5 microns or smaller)
PNCT	Port Newark Container Terminal
POI	point of interconnection
PVC	polyvinyl chloride
RNA	rotor nacelle assembly
ROD	Record of Decision
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
ROV	remotely-operated vehicle
ROW	right-of-way
RUCOOL	Rutgers University Center for Ocean Observing Leadership
SAP	Site Assessment Plan
SAR	search and rescue
SATV	service accommodation and transfer vessel
SBMT	South Brooklyn Marine Terminal
SCADA	supervisory control and data acquisition
SF_6	sulfur hexafluoride
SMS	Safety Management System
SO_2	sulfur dioxide
SOV	service operation vessel

List of Acronyms and Abbreviations (Continued)

SPCC	Spill Prevention, Control, and Countermeasure
SPMT	self-propelled modular transporters
STATCOM	static synchronous compensator
TBD	to be determined
Call	Call for Information and Nominations
TMP	Traffic Management Plan
TSHD	trailing suction hopper dredge
UPS	uninterruptible power supply
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VHF	very high frequency
VMS	Vessel Monitoring System
WTA	Wind Turbine Area
WTG	wind turbine generator
XLPE	cross-linked polyethylene

Glossary

Term	Definition
The Projects	Atlantic Shores' proposal to develop two offshore wind energy generation projects within the southern portion of Bureau of Ocean Energy Management (BOEM) Lease Area OCS-A 0499 comprised of up to 200 total wind turbine generators (WTGs) and up to 10 offshore substations (OSSs).
Atlantic Shores Project 1 (Project 1)	Project 1 is located in the southwestern portion of Lease Area OCS-A 0499 and consists of 105-136 WTGs and up to five OSSs.
Atlantic Shores Project 2 (Project 2)	Project 2 is located in the southeastern portion of Lease Area OCS-A 0499 and consists of the remaining 64-95 WTGs and up to five OSSs.
Overlap Area	The Overlap Area consists of 31 WTGs that could be included in either Project 1 or Project 2.
Atlantic Shores Offshore Wind, LLC (Atlantic Shores)	Atlantic Shores Offshore Wind, LLC is the owner and an affiliate of Atlantic Shores Project 1 Company and Atlantic Shores Project 2 Company.
Atlantic Shores Offshore Wind Project 1, LLC (Atlantic Shores Project 1 Company)	The owner and operator of Project 1.
Atlantic Shores Offshore Wind Project 2, LLC (Atlantic Shores Project 2 Company)	The owner and operator of Project 2.
Atlantic Shores Project Area (Project Area)	The combined onshore and offshore area where Atlantic Shores' facilities are physically located.
Offshore Project Areas	The offshore area where Atlantic Shores' facilities for the Projects are physically located.
Onshore Project Areas	The onshore area where Atlantic Shores' facilities for the Projects are physically located.
Atlantic Shores Project Region (Project Region)	The larger region surrounding the Atlantic Shores Projects Area. The extent of the Project Region varies by resource.
Offshore Project Region	The broader offshore geographic region that could be affected by Projects' activities. The Offshore Project Region includes the Lease Area.
Onshore Project Region	The broader onshore geographic region that could be affected by Projects' activities, which could include entire towns, communities, counties, etc.

Glossary (Continued)

Term	Definition
Area of Potential Effect (APE)	The APE is defined in 36 CFR §800.16 as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist."
Cable protection	Material (e.g., rock, concrete mattresses, etc.) placed over an offshore cable to prevent damage to the cable.
Construction staging activities	Activities conducted in port such as component fabrication and assembly; offloading and loading shipments of Project components; storing Project components; preparing Project components for installation; and/or preparing vessels to tow floating components to the WTA.
Crew transfer vessel (CTV)	A relatively small vessel used to transfer crew and supplies from port to the Offshore Project Area.
Duct bank	The underground structure that houses onshore interconnection cables and consists of high-density polyethylene (HDPE) or polyvinyl chloride (PVC) conduits encased in concrete.
Export cable	A submarine transmission cable that is buried beneath the seafloor and connects an OSS to a landfall site.
Export Cable Corridor (ECC) Atlantic ECC Monmouth ECC	The area identified for routing the export cables between a landfall site and the WTA. The ECC that travels from the western tip of the WTA westward to the Atlantic Landfall Site. The ECC that travels from the eastern corner of the WTA along the eastern edge of Lease Area OCS-A 0499 to the Monmouth Landfall Site.
Fisheries Communication Plan (FCP)	A plan that defines outreach and engagement with fishing interests throughout the Project's lifecycle.
Foundation	A steel and/or concrete structure that supports a WTG, OSS, or met tower and is affixed to the seabed using piles, suction buckets, or gravity.
Gravity-base structure (GBS)	A type of foundation consisting of a heavy steel-reinforced concrete and/or steel structure that sits on the seabed.
Gravity-pad tetrahedron base	A type of foundation that is comprised of a tetrahedral-shaped (i.e., three-legged pyramidal) frame that rests on the seabed and is secured in place using high weight pads (i.e., gravity pads) below each leg.
Horizontal directional drilling (HDD)	A trenchless cable installation methodology that avoids surface disturbance by drilling a pilot hole, enlarging the pilot hole, then inserting a conduit for future installation of cables.
Inter-array cables	Submarine transmission cables that connect groups of WTGs to an OSS.
Inter-link cable	A submarine transmission cable that may be used to connect OSSs together.

Glossary (Continued)

Term	Definition
Jacket	A type of foundation with three to six legs that are secured to the seafloor using piles or suction buckets at the base of each leg.
Landfall site	A shoreline site where the export cables transition from offshore to onshore.
Atlantic Landfall Site	The shoreline site in Atlantic City, New Jersey where export cables installed in the Atlantic ECC transition onshore.
Monmouth Landfall Site	The shoreline site in Sea Girt, New Jersey (Monmouth County) where export cables installed in the Monmouth ECC transition onshore.
Lease Area OCS-A 0499 (Lease Area)	The entire Lease Area OCS-A 0499 that Atlantic Shores acquired from BOEM.
New Jersey Wind Energy Area (NJWEA)	The area offshore New Jersey identified as suitable for offshore renewable energy development by BOEM through a multi-year, public environmental review process.
Marshalling port	Ports where Project components will be offloaded, stored, pre-assembled, and prepared for load-out.
Meteorological and oceanographic (metocean) buoy	Buoys temporarily installed in the WTA to monitor weather and sea state conditions during construction.
Meteorological (met) tower	A tower permanently installed in the WTA to measure meteorological conditions during construction and operations.
Monopile	A type of foundation consisting of a single steel tube that is driven into the seabed.
Mono-bucket	A type of foundation comprised of a single suction bucket supporting a single steel or concrete tubular structure (similar to a monopile).
Offshore cable system	All offshore transmission cables (inter-array cables, inter-link cables, and export cables).
Offshore facilities	All of the Project’s offshore infrastructure (WTGs, OSSs, offshore cables, etc.).
Offshore substation (OSS)	An OSS located in the WTA containing transformers and other electrical gear, which will serve as a common collection point for power from the WTGs and also serve as the origin for the export cables that deliver power to shore.
Onshore interconnection cable	An onshore transmission cable installed within a buried duct bank that connects a landfall site to an onshore substation and subsequently the onshore substation to a POI.

Glossary (Continued)

Term	Definition
Onshore interconnection cable route	The onshore routes within which the onshore interconnection cables will be installed.
Cardiff Onshore Interconnection Cable Route	The onshore route that connects the Atlantic Landfall Site to the existing Cardiff Substation POI.
Larrabee Onshore Interconnection Cable Route	The onshore route that connects the Monmouth Landfall Site to the existing Larrabee Substation POI.
Onshore facilities	All of the Project's onshore infrastructure (onshore substations, onshore interconnection cables, etc.).
Onshore substation	A landside substation constructed for Atlantic Shores containing transformers and other electrical gear where the onshore interconnection cable voltage will be increased or decreased in preparation for grid interconnection.
Onshore substation site	A parcel of land where an onshore substation may be located.
Operations and maintenance (O&M) facility	A new O&M facility in Atlantic City established by Atlantic Shores to host its O&M personnel, dock vessels, and store equipment, tools, spare parts, and consumables.
Piled jacket	A type of foundation consisting of a steel lattice structure that is fixed to the seabed using piles connected to each leg of the jacket.
Point of interconnection (POI)	An existing substation where the Projects' onshore interconnection cables will interconnect into the electrical grid.
Cardiff POI	An existing substation located in Egg Harbor Township, New Jersey (Atlantic County).
Larrabee POI	An existing substation located in Howell, New Jersey (Monmouth County).
Port facilities	Facilities and infrastructure located within/adjacent to a port that will be used by Atlantic Shores during construction and operations.
Project Design Envelope (PDE)	The PDE identifies a reasonable range of designs for proposed components and installation techniques for the Projects.
Scour protection	Material (e.g., rock, concrete mattresses, etc.) placed around the base of a foundation to protect it from sediment transport/erosion caused by water currents.
Suction bucket jacket	A type of foundation consisting of a steel lattice structure that is fixed to the seabed by suction buckets installed below each leg of the jacket.
Suction bucket tetrahedron base	A type of foundation that is comprised of a tetrahedral-shaped (i.e., three-legged pyramidal) frame that rests on the seabed and is secured to the seafloor using suction buckets.

Glossary (Continued)

Term	Definition
Wind Turbine Area (WTA)	The southern portion of Lease Area OCS-A 0499 that will be developed by Atlantic Shores for offshore wind energy generation as described in this COP.
Service operation vessel (SOV)	A relatively large vessel that offers considerable capacity for personnel and spare parts, allowing for service trips that are several weeks in duration. An SOV includes sleeping quarters for technicians and may include workshop space.
Splice vault	An underground concrete "box" where segments of the onshore interconnection cable are joined together.
Transition piece	A part of the foundation structure that contains a flange for connection to the WTG tower and may include secondary structures such as a boat landing, ladders, a work platform, a crane, and other ancillary components. A transition piece may be installed on top of a monopile, mono-bucket, or GBS foundation.
Transition vault	A type of splice vault located at a landfall site where the export cables are connected to the onshore interconnection cables.
Utility right-of-way (ROW)	Previously disturbed corridors that contain existing electric transmission lines or other utilities.
Wind turbine generator (WTG)	An offshore wind turbine that will generate electricity.

1.0 Introduction

Atlantic Shores Offshore Wind, LLC (Atlantic Shores), is a 50/50 joint venture between EDF-RE Offshore Development, LLC (a wholly owned subsidiary of EDF Renewables, Inc. (EDF Renewables)) and Shell New Energies US LLC (Shell). Atlantic Shores is proposing to develop two offshore wind energy generation projects within the southern portion of Lease Area OCS-A 0499 (the Lease Area). The Lease Area is approximately 183,253 acres (741.6 square kilometers [km^2]) in size and is located on the Outer Continental Shelf (OCS) within the New Jersey Wind Energy Area (NJWEA) (see Figure 1.1-1). The NJWEA was identified as suitable for offshore renewable energy development by the Bureau of Ocean Energy Management (BOEM) through a multi-year, public environmental review process. Through this review process, the NJWEA was sited to exclude areas of high value habitat and conflicting water and air space uses (see Section 1.3.1).

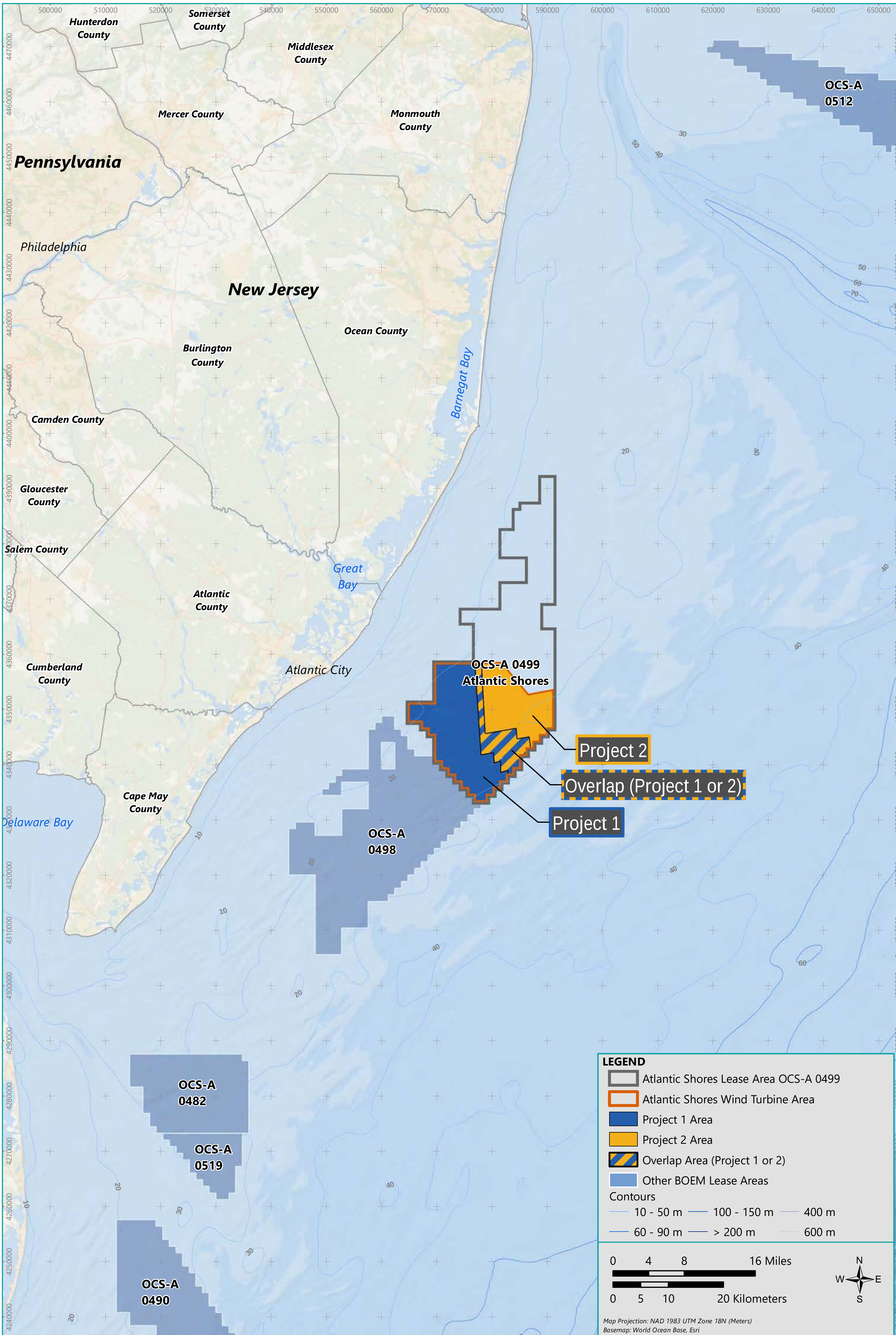
In accordance with the New Jersey Offshore Wind Economic Development Act (OWEDA), on June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,510[4] megawatts (MW) of offshore renewable energy into the State of New Jersey. The project that will be developed under this OREC award, referred to as Project 1, will be owned and operated by Atlantic Shores Offshore Wind Project 1, LLC ("Atlantic Shores Project 1 Company"). Pursuant to New Jersey Executive Orders #8 and #92, the State will be awarding additional OREC allowances to offshore wind energy projects through a competitive solicitation process every 2 years through 2026. Atlantic Shores expects to bid into these future New Jersey offshore wind energy solicitations for subsequent projects. Atlantic Shores' second project, referred to as Project 2, will be owned and operated by Atlantic Shores Offshore Wind Project 2, LLC ("Atlantic Shores Project 2 Company"), is being developed to support these future New Jersey solicitations. Project 1 and Project 2 are collectively referred to as "the Projects."

Atlantic Shores Offshore Wind, LLC is the owner and an affiliate of Atlantic Shores Project 1 Company and Atlantic Shores Project 2 Company. Accordingly, for ease of reference, the term "Atlantic Shores" is used throughout the COP to refer interchangeably to the Project Companies.

At the time of this COP submission, in accordance with 30 CFR 585.106, 585.107, and 585.409, Atlantic Shores has requested the assignment of the Project 1 and Project 2 development areas within the Lease Area to Atlantic Shores Project 1 Company and Project 2 Company jointly.

This Construction and Operations Plan (COP) has been developed in accordance with 30 CFR Part 585 and the stipulations in Atlantic Shores' Lease Agreement OCS-A 0499. Atlantic Shores is requesting BOEM's review and authorization of the Projects in accordance with BOEM's (2018) Project Design Envelope (PDE) guidance. The PDE described in this Volume of the COP provides

4 The New Jersey Board of Public Utilities awarded a contract to Atlantic Shores for 1,509.6 MW, which solely for convenience is rounded up to 1,510 MW throughout the COP.



ATLANTIC SHORES offshore wind

Figure 1.1-1
Atlantic Shores Lease Area OCS-A 0499
Offshore New Jersey

a reasonable range of designs for proposed components and installation techniques that provide Atlantic Shores optimal flexibility to adjust for rapidly-evolving offshore wind technology while providing BOEM with the information required to fulfill its expected role as the lead federal agency under the National Environmental Policy Act (NEPA). The COP will also inform the state and local regulatory processes. While this COP only describes the development of the southern portion of the Lease Area, Atlantic Shores maintains the right to develop the remainder of the Lease Area, which would be permitted under separate filings.

1.1 Overview of the Projects

Atlantic Shores' proposed offshore wind energy generation facilities for Projects 1 and 2 will be located in an approximately 102,124-acre (413.3-km^2) Wind Turbine Area (WTA) located in the southern portion of the Lease Area. Project 1 is located in the western 54,175 acres (219.2 km^2) of the WTA and Project 2 is located in the eastern 31,847 acres (128.9 km^2) of the WTA, with a 16,102-acre (65.2-km^2) Overlap Area that could be used by either Project 1 or Project 2. The Overlap Area is included in the event engineering or technical challenges arise at certain locations in the WTA, to provide flexibility for final selection of a wind turbine generator (WTG) supplier for the Projects (which will determine the final number of WTG positions needed for Project 1 and Project 2), and for environmental or other considerations. All positions in the Overlap Area are intended for development and are required to meet the Projects' purpose and need (see Section 1.2). Figures 1.1-2 and 1.1-3 provide an overview of the WTA, depicting the boundaries for Project 1, Project 2, and the Overlap Area.

In addition to the WTA, the Projects will include two offshore Export Cable Corridors (ECCs) within federal and New Jersey state waters as well as two onshore interconnection cable routes, two onshore substation sites, and a proposed operations and maintenance (O&M) facility in New Jersey. Figure 1.1-2 provides an overview of the Projects (i.e., the WTA, the ECCs, and onshore facilities).

At its closest point, the WTA is approximately 8.7 miles (mi) (14 kilometers [km]) from the New Jersey shoreline. As depicted on the location plat provided as Figure 1.1-2, water depths in the WTA range from 62 to 121 feet (ft) (19 to 37 meters [m]), gradually increasing with distance from shore. Within the WTA, the Projects will include:

- a combined maximum of up to 200 wind turbine generators (WTGs), inclusive of the Overlap Area[5]:
  - Project 1: a minimum of 105 WTGs and up to a maximum of 136 WTGs
  - Project 2: a minimum of 64 WTGs and up to a maximum of 95 WTGs

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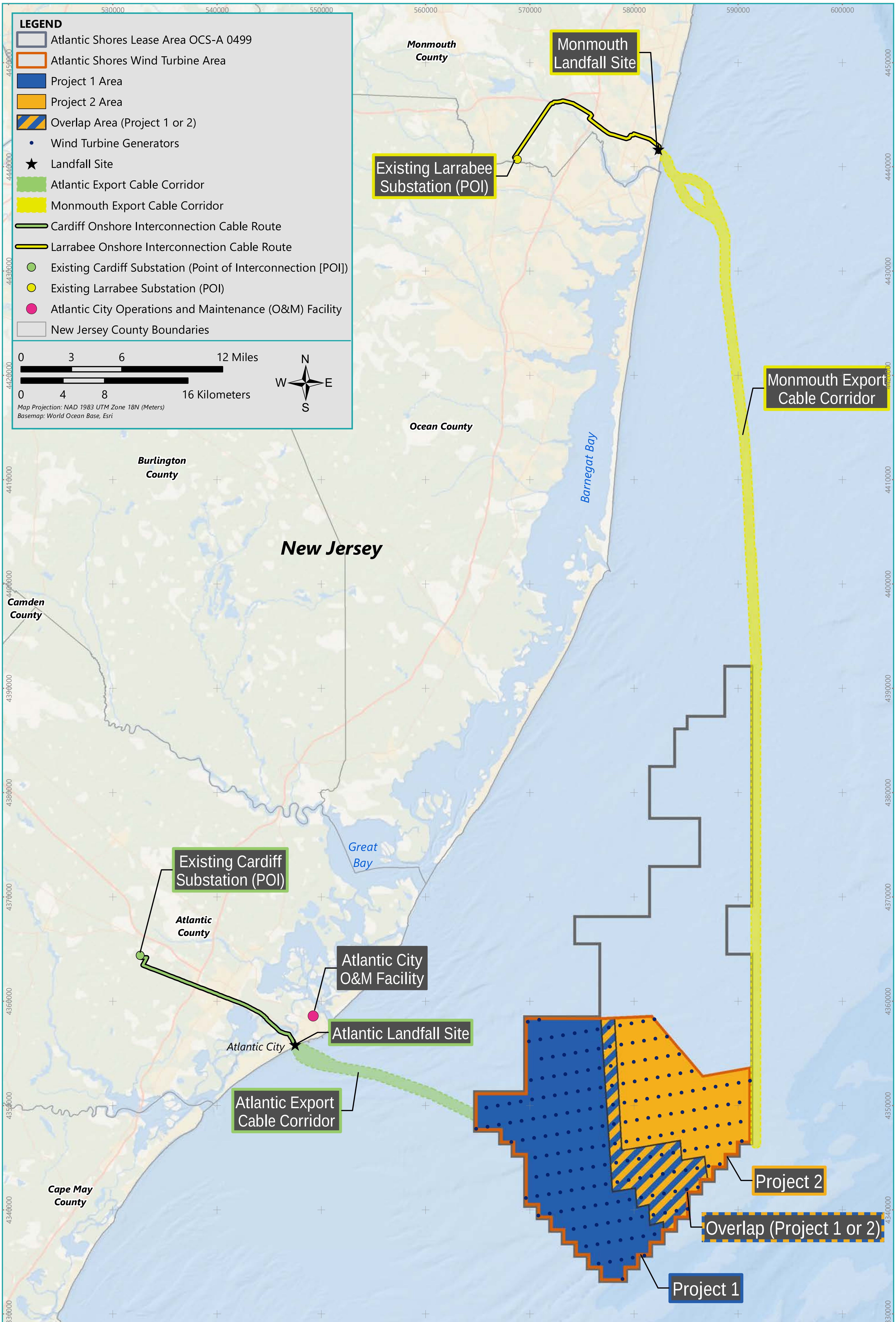
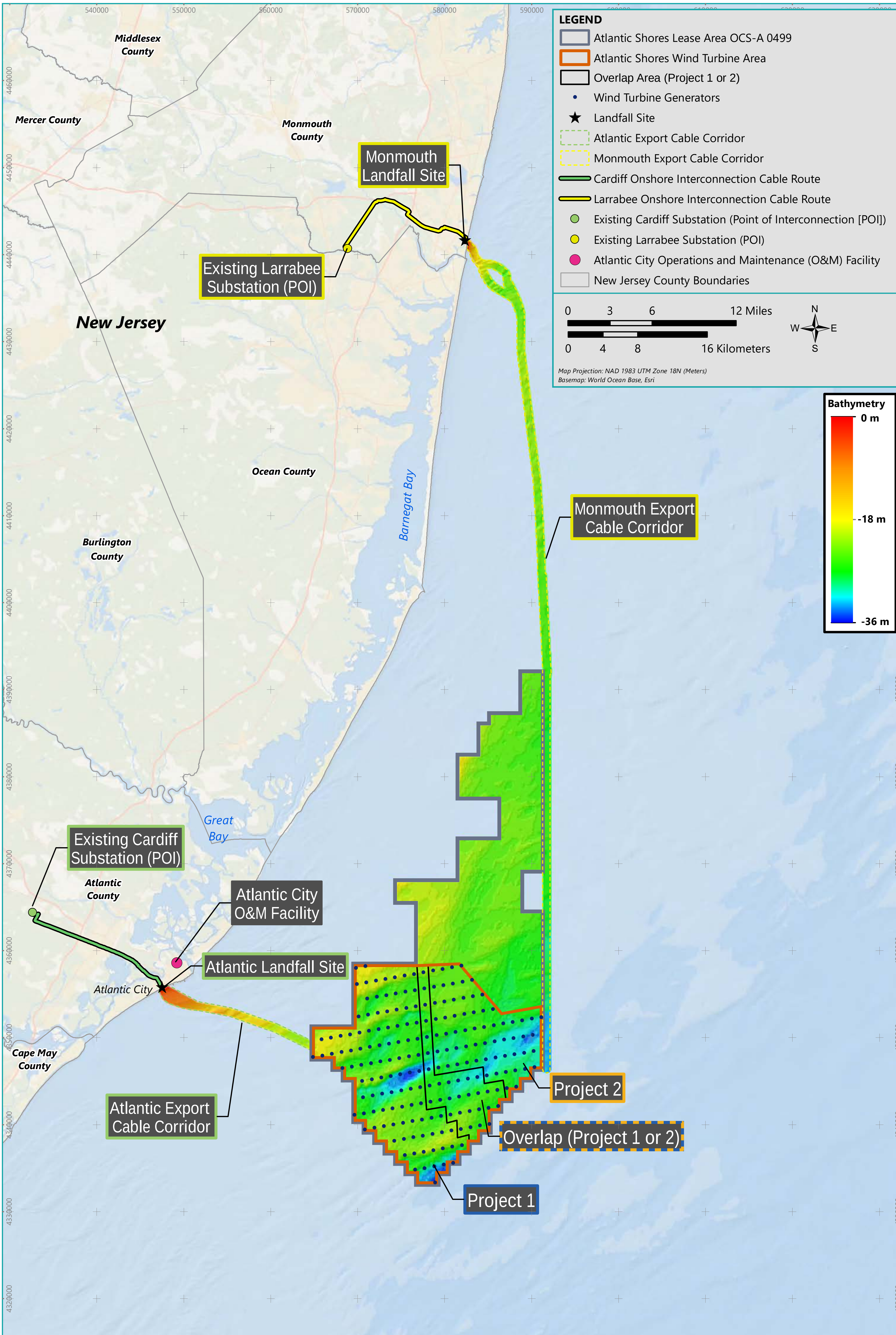
[5] The number of WTGs in Project 1, Project 2, and the associated Overlap Area will not exceed 200 WTG locations. For example, if Project 1 includes 105 WTGs (the minimum) then the Overlap Area would be incorporated into Project 2 which would include the remaining 95 WTGs; and conversely if the Overlap Area is incorporated into Project 1 such that it includes 136 WTGs, then Project 2 would be limited to 64 WTGs. Each Project may also use only part of the Overlap Area.



ATLANTIC SHORES offshore wind

Figure 1.1-2
Overview of the Projects



ATLANTIC SHORES offshore wind

Figure 1.1-3
Bathymetric Overview

- up to 10 offshore substations (OSSs):
  - five for Project 1
  - five for Project 2
- up to one permanent meteorological (met) tower, to be installed during Project 1 construction
- up to four temporary meteorological and oceanographic (metocean) buoys:
  - three for Project 1
  - one for Project 2

The Projects include three options for WTG, OSS, and met tower foundations: piled, suction bucket, or gravity foundations.

Each Project's WTGs and OSSs will be connected by a system of 66 kilovolts (kV) to 150 kV high voltage alternating current (HVAC) inter-array cables. OSSs within the WTA may be connected to each other by 66 kV to 275 kV HVAC inter-link cables.

The Projects' layout is designed to maximize offshore renewable wind energy production while minimizing effects on existing marine uses (see Section 3.1). The WTGs for the Projects will be aligned in a uniform grid with multiple lines of orientation allowing straight transit through the WTA. The primary east-northeast to west-southwest transit corridors through the WTA were selected to align with the predominant flow of vessel traffic; accordingly, WTGs will be placed along east-northeast to west-southwest rows spaced 1.0 nautical mile (nm) (1.9 km) apart to allow for two-way vessel movement (see Figure 1.1-2). The proposed grid also facilitates north to south transit by positioning WTGs along rows in an approximately north to south direction spaced 0.6 nm (1.1 km) apart. The WTG grid will also create diagonal corridors of 0.54 nm (1.0 km) running approximately northwest to southeast as well as diagonal corridors of 0.49 nm (0.9 km) running approximately north-northeast to south-southwest. The OSS positions will be located along the same east-northeast to west-southwest rows as the proposed WTGs, preserving all of the primary east-northeast transit corridors and the majority of the secondary transit corridors (see Section 3.1).

Project 1 and Project 2 will be electrically distinct, and energy from the Projects' OSSs will be delivered to shore via 230 kV to 525 kV HVAC and/or high voltage direct current (HVDC) export cables. Thus, for the combined Projects, a total of up to eight export cables will be installed. The export cables will traverse federal and state waters to deliver energy from the OSSs to landfall sites in New Jersey. The Atlantic ECC travels from the western tip of the WTA westward to the Atlantic Landfall Site in Atlantic City, New Jersey and has a total length of approximately 12 mi (19 km). The approximately 61 mi (98 km) long Monmouth ECC travels from the eastern corner of the WTA along the eastern edge of the Lease Area to the Monmouth Landfall Site in Sea Girt, New Jersey. Water depths along each ECC are shown on Figure 1.1-2. Both Projects 1 and 2 have the potential to use either ECC and offshore export cables for each Project may also be co-located within an ECC.

At the Monmouth and Atlantic Landfall Sites, horizontal directional drilling (HDD) will be employed to support each export cables' offshore-to-onshore transition. The HDD landfall technique has been selected both to ensure stable cable burial along New Jersey's dynamic coast and to avoid nearshore and shoreline impacts. From each landfall site, up to 12 new 230 kV to 525 kV HVAC or HVDC onshore interconnection cables will travel underground primarily along existing roadways, utility rights-of-way (ROW), and/or along bike paths to two new onshore substation sites (one for each onshore point of interconnection [POI]). At the onshore substations, the transmission voltage will be stepped up or stepped down in preparation for interconnection with the electrical grid. Onshore interconnection cables will continue from each of the new onshore substations to proposed POIs where the Projects will be interconnected into the electrical grid at the existing Larrabee Substation in Howell, New Jersey (for the Monmouth Landfall Site) and the existing Cardiff Substation in Egg Harbor Township, New Jersey (for the Atlantic Landfall Site). Due to electrical capacity constraints at the POIs, two POIs are needed to accommodate the maximum amount of electricity that could be generated by the Projects.

During construction and operation of the Projects, Atlantic Shores will use port facilities in New Jersey, New York, the Mid-Atlantic, and/or New England. In addition, some components, materials, and vessels could come from U.S. Gulf Coast or international ports. To support the Projects' operations, Atlantic Shores is also proposing to establish an O&M facility at a port in New Jersey.

Key elements of the PDE are provided in Table 1.1-1.

1.2 Applicant's Purpose and Need

The purpose of the Projects is to develop offshore wind energy generation facilities within BOEM Lease Area OCS-A 0499 to provide clean, renewable energy to the Northeastern U.S. by the mid-to-late 2020s. As described in Section 2.0, the Projects will help both the U.S. and New Jersey achieve their renewable energy goals, diversify the State's electricity supply, increase electricity reliability, and reduce greenhouse gas emissions (GHGs). The Projects will also provide numerous environmental, health, community, and economic benefits and will create substantial new employment opportunities.

Presidential Executive Order 14008 (Tackling the Climate Crisis at Home and Abroad), signed on January 27, 2021, directs the Secretary of the Interior, in consultation with other federal agencies, to review siting and permitting processes to identify steps to double offshore wind energy production by 2030 (see Section 207; White House 2021). The State of New Jersey has also set ambitious renewable energy goals and mandates. New Jersey's Global Warming Response Act of 2007, as amended in 2019, mandates a reduction in the State's GHG emissions to 80% below its 2006 levels by 2050. New Jersey's renewable energy goals also include reaching 7,500 MW of offshore wind energy capacity by 2035, as outlined in the 2020 New Jersey Offshore Wind Strategic Plan, and achieving 100% clean energy by 2050, as described in the 2019 Energy Master Plan (Ramboll 2020; NJDEP 2020).

Table 1.1-1 Key Elements of the PDE

Element	Project Design Element	Total	Project 1	Project 2
WTGs	**Max. Number of WTGs**	200 (inclusive of the 31 WTGs in the Overlap Area)[a]	105-136	64-95
	WTG Layout	Grid layout with ENE/WSW rows and approximately N/S columns, consistent with the predominant flow of traffic		
	Max. rotor diameter	918.6 ft (280.0 m)		
	Max. tip height[b]	1,048.8 ft (319.7 m)		
OSSs	**Max. Number of OSSs**	10 small OSSs, or	5	5
		5 medium OSSs, or	2	3
		4 large OSSs	2	2
	OSS Layout	Positioned along the same ENE/WSW rows as WTGs		
	Min. Distance from Shore	Small OSS: 12 mi (19.3 km)		
		Medium and large OSS: 13.5 mi (21.7 km)		
WTG and OSS Foundations	**Foundation types**			
	Piled	Monopiles or piled jackets		
	Suction bucket	Mono-buckets, suction bucket jackets, or suction bucket tetrahedron bases [c]		
	Gravity	Gravity-base structures (GBS) or gravity-pad tetrahedron bases[c]		
	Max. pile diameter at seabed	Monopile: 49.2 ft (15.0 m)		
	(for piled foundation types)	Piled jacket: 16.4 ft (5.0 m)		
Inter-Array and Inter-Link Cables	**Cable types and voltage**	Inter-array: 66–150 kV high voltage alternating current (HVAC)		
		Inter-link: 66–275 kV HVAC		
	Max. Total Cable Length	Inter-array: 547 mi (880 km)	273.5 mi (440 km)	273.5 mi (440 km)
		Inter-link: 37 mi (60 km)	18.6 mi (30 km)	18.6 mi (30 km)
	Target burial depth range	5 to 6.6 ft (1.5 to 2 m)		

Table 1.1-1 Key Elements of the PDE (Continued)

Element	Project Design Element	Total	Project 1	Project 2
Export Cables	**Cable types and voltage**	230–275 kV HVAC cables or 320–525 kV high voltage direct current (HVDC) cables		
	Number of ECCs	Two: Atlantic ECC and Monmouth ECC		
	Max. Number of Cables	8 total: HVAC or HVDC export cables		
	Max. Total Cable Length	Atlantic Landfall Site to OSSs: 99.4 mi (160.0 km)		
		Monmouth Landfall Site to OSSs: 341.8 mi (550.0 km)		
	Target burial depth range	5 to 6.6 ft (1.5 to 2 m)		
Met Towers	**Max. Number of Met Towers**	Total: 1 (permanent)	1	0
Metocean Buoys	**Max Number of Metocean Buoys**	Total: 4 (Temporary, during construction)	3	1
Landfall Sites	**Number of Landfall Sites**	Atlantic Landfall Site		
		Monmouth Landfall Site		
	Installation Method	HDD		
Onshore Facilities	**Number of Onshore Interconnection Cable Routes**	Cardiff Onshore Interconnection Cable Route		
		Larrabee Onshore Interconnection Cable Route		
	Approx. route length	12 mi (19 km) each		
	Onshore interconnection cable types and voltage	230–275 kV HVAC cables installed in underground duct bank;		
		or 320–525 kV HVDC cables installed in underground duct bank		
	Number of Onshore Substations	Total: two (one per POI), each with a preferred and an alternate site		
	Points of Interconnection (POI)	Cardiff POI		
		Larrabee POI		
O&M Facility	**Location**	New operations and maintenance (O&M) facility proposed in Atlantic City, New Jersey		

Notes: a) The number of WTGs in Project 1, Project 2, and the associated Overlap Area will not exceed 200 WTG locations. For example, if Project 1 includes 105 WTGs (the minimum) then the Overlap Area would be incorporated into Project 2 which would include the remaining 95 WTGs; and conversely if the Overlap Area is incorporated into Project 1 such that it includes 136 WTGs then Project 2 would be limited to 64 WTGs. Each Project may also use only part of the Overlap Area.
b) All elevations are provided relative to Mean Lower Low Water (MLLW).
c) Tetrahedron base foundations are included in the PDE for WTGs but not OSSs.

Gray highlighting represents no differentiation between the Project Design Elements of Project 1 and Project 2

In accordance with New Jersey's renewable energy goals, on June 30, 2021, the NJ BPU awarded the Atlantic Shores Project 1 Company an OREC allowance to deliver approximately 1,510 MW of offshore renewable wind energy from Project 1 into the State of New Jersey. Project 1 will be developed under this OREC award. Pursuant to New Jersey Executive Orders #8 and #92, the State will be awarding additional OREC allowances to offshore wind energy projects through a competitive solicitation process conducted every 2 years through 2026. Project 2 is being developed to support these future New Jersey solicitations.

Currently, a limited number of BOEM offshore renewable wind energy lease areas can support both the U.S.' and New Jersey's ambitious renewable energy goals within the mandated timeframes. Atlantic Shores' Lease Area OCS-A 0499 is one of five lease areas in proximity to New Jersey (see Figure 1.2-1).[6] Of those lease areas, Lease Area OCS-A 0499 contains the largest uncommitted area[7] for renewable energy development to support both the national mandate for offshore wind and the State of New Jersey's ongoing and future renewable energy solicitations. Nearby lease areas—Lease Area OCS-A 0512 and portions of Lease Areas OCS-A 0498 and OCS-A 0519—are already associated with offshore wind projects that have received awards under offshore wind solicitations from the States of New York, New Jersey, and Maryland, respectively. In fact, without Atlantic Shores, it is unlikely that New Jersey's renewable energy targets can be fulfilled within the States' mandated timeframes.[8] More specifically, Project 1 is needed to meet Atlantic Shores Project 1 Company's obligations under its 1,510 MW OREC award and Project 2 is needed to respond to and fulfill the commitments that will be identified through New Jersey's ongoing renewable energy solicitations.

1.3 Leasing History and Regulatory Framework

This section provides a description of the regulatory framework for the Projects, including a history of BOEM's process to designate lease areas for wind energy development offshore New Jersey, and a description of the Projects' permitting process. This section also demonstrates the Projects' consistency with the requirements in Lease Agreement OCS-A 0499 and contains a guide to the location of information required in a COP pursuant to BOEM regulations codified at 30 CFR Part 585.

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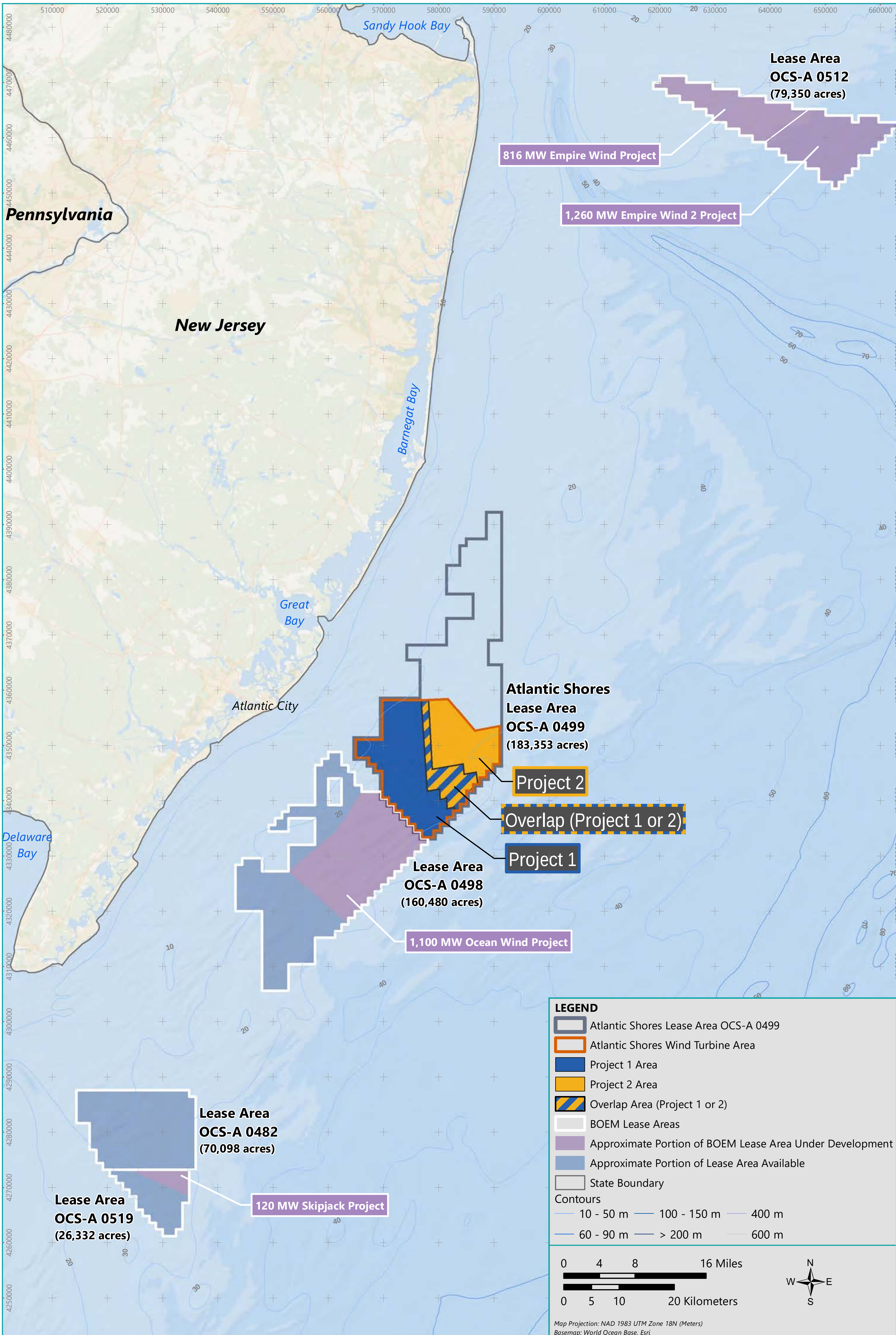
6 The five BOEM lease areas situated proximate to New Jersey are Lease Areas OCS-A 0512, OCS-A 0499, OCS-A 0498, OCS-A 0482, and OCS-A 0519. BOEM has also established four Call Areas in the New York Bight region offshore New York and New Jersey, which are being evaluated for future lease area development. However, any timeframe for establishing those lease areas has not yet been determined.

7 Lease Area OCS-A includes 183,253 acres. Of this total acreage, Project 1 will require a minimum of 54,175 acres, leaving up to 129,078 acres available for future wind energy developments, including Project 2.

8 According to BOEM (2020), the technical capacity of the uncommitted portions of the lease areas offshore New York/New Jersey and Delaware/Maryland is 3,996 MW and 1,908 MW, respectively. Based on this assessment, Lease Area OCS-A 0499 serves a critical role in achieving the New Jersey target of 7,500 MW of offshore wind energy capacity by 2035.



ATLANTIC SHORES offshore wind

Figure 1.2-1

BOEM Lease Areas in Proximity to New Jersey and New York

1.3.1 BOEM's New Jersey Offshore Wind Leasing Program

New Jersey has been planning for commercial-scale offshore wind development since the early 2000s. Early in this planning process, the NJBPU sponsored the 2004 *New Jersey Offshore Wind Energy: Feasibility Study* to investigate the feasibility of utility-scale wind energy development in the waters offshore of New Jersey. This desktop investigation characterized the geophysical, environmental, regulatory, and commercial siting considerations that would need to be addressed in order to develop New Jersey's offshore wind industry. Of the 2,465 square nautical miles (nm^2) studied (from Sandy Hook to Egg Island Point and out to water depths of 100 ft [30 m]), approximately half (1,223 nm^2) was deemed conditionally viable for offshore wind development after excluding areas with insufficient wind resources and conflicting water and air space uses (AREC and AWS 2004).

In 2004, the Governor of New Jersey authorized a State of New Jersey Blue Ribbon Panel on Development of Offshore Wind Turbine Facilities to identify and weigh the costs and benefits of developing offshore wind turbine facilities for New Jersey. The Blue Ribbon Panel's final report, submitted to the Governor in 2006, recommended that New Jersey conduct scientific baseline studies to collect data about the existence, location, and nature of New Jersey's offshore natural resources (see 76 FR 22130).

In response, the New Jersey Department of Environmental Protection (NJDEP) contracted Geo-Marine, Inc. to conduct Ocean/Wind Power Ecological Baseline Studies (OWPEBS) offshore New Jersey. The OWPEBS included 24 months of field studies in 2008 and 2009 to address data gaps on birds, sea turtles, marine mammals, and other natural resources. As part of the OWPEBS, desktop reviews of fish and fisheries resources in the 1,360 nm^2 study area were also conducted (GMI 2020).

The results of the OWPEBS field surveys and desktop analyses were instrumental in identifying suitable areas for siting future wind energy facilities offshore of New Jersey. Specifically, the results of the studies were used to delineate the New Jersey Call Area identified by BOEM in the "Commercial Leasing for Wind Power on the Outer Continental Shelf Offshore New Jersey – Call for Information and Nominations" (the "Call") published on April 20, 2011 (see 76 FR 22130). The purpose of the Call was to determine if competitive interest existed for the development of offshore wind generation facilities offshore New Jersey within the New Jersey Call Area. The New Jersey Call Area was delineated through consultation with the New Jersey Renewable Energy Task Force using the 1,360 nm^2 OWPEBS study area as a starting point. Areas of the OWPEBS study area excluded from the Call Area included (see 76 FR 22130):

- "no build areas" such as shipping lanes, traffic separation schemes, pipelines and cables, artificial reefs, and shipwrecks;
- areas of high avian density (particularly in shoals and within 7 nm of the New Jersey coast);
- areas of high marine mammal and sea turtle density; and
- fishing hotspots for recreational and commercial fishermen.

In addition, the Call gathered comments from interested and affected parties regarding site conditions, resources, or other uses within the area. BOEM received 11 commercial indications of interest to obtain a commercial lease for an offshore wind facility and numerous comments from the public.

In February 2012, BOEM published an Environmental Assessment (EA) and issued a Finding of No Significant Impact (FONSI) for commercial wind lease issuance and site assessment activities on the Atlantic OCS offshore New Jersey, Delaware, Maryland, and Virginia (see 77 FR 5560). As a result of subsequent discussions with the U.S. Coast Guard (USCG), the New Jersey Renewable Energy Task Force, and maritime stakeholders in December 2012, BOEM decided to remove certain OCS Lease Blocks from the area offshore New Jersey studied in the EA to alleviate navigational safety concerns resulting from vessel transits out of New York Harbor (see 79 FR 42361). This revised area constitutes the NJWEA. The NJWEA was divided into two leasing areas: Lease Area OCS-A 0498 and Lease Areas OCS-A 0499.

In September 2015, BOEM announced that it had published a Final Sale Notice for the sale of Lease Areas OCS-A 0498 and OCS-A 0499 (see 80 FR 57862); the competitive lease sale was held on November 9, 2015. U.S. Wind Inc. was the winning bidder for Lease Area OCS-A 0499 (see Figure 1.1-1). In December 2018, the Lease was assigned to EDF Renewables Development, Inc. The Lease was subsequently assigned to Atlantic Shores Offshore Wind, LLC in August 2019.

1.3.2 Permits, Approvals, and Consultations

BOEM has jurisdictional authority under the Outer Continental Shelf Lands Act of 1953, as amended by the Energy Policy Act of 2005, to grant leases, easements, and ROWs for the development of renewable energy on the OCS. BOEM will ensure that all activities conducted on the OCS are carried out in a manner that provides for safety, environmental protection, protection of national security interests, and protection of the rights of others to use the OCS and its resources. A Site Assessment Plan (SAP) and COP are the authorization pathways BOEM uses to review and approve renewable energy site assessment and site development on the OCS, respectively. BOEM will be the lead federal agency for the Projects and will coordinate with other federal agencies participating in consultations and/or issuing permits for the Projects (e.g., Environmental Protection Agency [EPA], National Marine Fisheries Services [NMFS], U.S. Army Corps of Engineers [USACE], Federal Aviation Administration [FAA]).

In reviewing the COP, BOEM must comply with various requirements under NEPA, Clean Air Act, Clean Water Act (CWA), Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act, Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, Marine Mammals Protection Act (MMPA), and National Historic Preservation Act (NHPA). To facilitate BOEM's review under NHPA, a description of the Preliminary Area of Potential Effects (PAPE) is provided in Appendix I-A. BOEM will coordinate and consult with numerous other federal agencies, including NMFS, U.S. Fish and Wildlife Service (USFWS), EPA, the U.S. Department of

Defense (DoD), the USCG, and USACE during the review process. Under the Coastal Zone Management Act (CZMA), BOEM will coordinate with the State of New Jersey to ensure that the Projects are consistent with State-level coastal zone management plans.

Each Project's onshore facilities and portions of the offshore facilities (within state waters extending approximately 3 nm from shore) will be located in the State of New Jersey and are also subject to state and local permitting processes.

Table 1.3-1 lists the anticipated federal, New Jersey, regional (county), and local reviews and permits required for the Projects; the table does not include permits that vessel operators or contractors may need to obtain for purposes that are not specific to construction and operation of the Projects. As appropriate, the Atlantic Shores Project Companies will file for separate applications to enable separate approvals for each Project. The Projects were accepted as a covered project under Title 41 of the Fixing America's Surface Transportation Act (FAST-41) on April 13, 2021, and qualified for inclusion on the FAST-41 Permitting Dashboard. The permitting schedule below reflects the dates posted on the FAST-41 Permitting Dashboard as established by the Federal Permitting Improvement Steering Council (FPISC), which was created under FAST-41 with responsibility for overseeing interagency coordination during a covered project's environmental review and decision making process.

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Projects

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Federal Permits/Approvals[9]					
BOEM	SAP approval	12/6/19	Expected Q1 2021	N/A	N/A
	COP approval/Record of Decision (ROD)	3/25/2021	Expected Q3 2023	3/25/2021	Expected Q3 2023
	NEPA Environmental Review	9/30/2021	Expected Q3 2023	9/30/2021	Expected Q3 2023

[9] The status of Federal permits and approvals can be reviewed at the FAST-41 Permitting Dashboard: https://www.permits.performance.gov/permitting-project/atlantic-shores-project-1

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Projects (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Federal Permits/Approvals[10]					
BOEM	Consultation under Section 7 of the ESA with NMFS and USFWS, coordination with New Jersey under the CZMA, government-to-government tribal consultations, consultation under Section 106 of the NHPA, consultation with DoD, consultation with NMFS under the MMPA, and consultation with NMFS for Essential Fish Habitat	To be initiated by BOEM	Conducted concurrently with NEPA and COP review and approval process	To be initiated by BOEM	Conducted concurrently with NEPA and COP review and approval process
	Facility Design Report (FDR) and Fabrication and Installation Report (FIR)	Expected Q1 2024	Expected Q1 2024	Expected Q1 2024	Expected Q1 2024
EPA[a]	OCS Air Permit	6/1/2022	Expected Q 4 2023	6/1/2022	Expected Q4 2023

10 The status of Federal permits and approvals can be reviewed at the FAST-41 Permitting Dashboard: https://www.permits.performance.gov/permitting-project/atlantic-shores-project-1

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Projects (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Federal Permits/Approvals					
USACE	CWA Section 404 (required for discharge of dredged materials and placement of foundations, scour protection, and cable protection) Rivers and Harbors Act of 1899 Section 10 Individual Permit (required for all offshore structures and dredging activities) Section 103 of the Marine Protection, Research, and Sanctuaries Act (for dredged material disposal, if required)	Joint application submission 10/15/2022	Expected Q4 2023	10/15/2022	Expected Q4 2023
NMFS	Letter of Authorization (LOA) or Incidental Harassment Authorization (IHA)	3/1/2022	Expected Q4 2023	3/1/2022	Expected Q4 2023
USCG	Private Aid to Navigation (PATON) authorization	11/29/2023	Expected Q1 2024	5/29/2024	Expected Q3 2024
FAA	Determination of No Hazard to Air Navigation	3/29/2023 or 9/29/2023 (to avoid expiration)	Expected Q3 2024	3/29/2024	Expected Q1 2025
State Permits/Approvals					
NJBPU	Approval of Petition from electric distribution company for interconnection	To be determined (TBD) - local electric distribution company to file			

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
State Permits/Approvals					
NJDEP, Division of Land Resource Protection (DLRP)	Waterfront Development Individual Permit – Water/Upland Coastal Area Facility Review Act Permit Coastal Wetlands Permit CWA Section 401, State Water Quality Certificate Freshwater Wetlands General or Individual Permit Flood Hazard Area Individual Permit or Verification Dredging-related permits, as applicable Dredged material disposal permits, as applicable	Joint application submission expected Q2 2022	Expected Q2 2023	Joint application submission expected Q2 2022	Expected Q2 2023

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
State Permits/Approvals					
NJDEP, Division of Parks and Forestry, Natural Heritage Program	State Species Consultation	Initiated upon submittal of the NJDEP DLRP application	In conjunction with NJDEP review and approval (expected Q2 2023)	Initiated upon submittal of the NJDEP DLRP application	In conjunction with NJDEP review and approval (expected Q2 2023)
NJDEP, Historic Preservation Office (HPO)	Review Procedures under the New Jersey Register of Historic Places Act	Initiated prior to or upon submittal of the NJDEP DLRP application	In conjunction with NEPA review and NJDEP review and approval (expected Q2 2023)	Initiated prior to or upon submittal of the NJDEP DLRP application	In conjunction with NEPA review and NJDEP review and approval (expected Q2 2023)
	Consultation under Section 106 of the NHPA of 1966	Initiated prior to or upon submittal of the NJDEP DLRP application	In conjunction with NEPA review and NJDEP review and approval (expected Q2 2023)	Initiated prior to or upon submittal of the NJDEP DLRP application	In conjunction with NEPA review and NJDEP review and approval (expected Q2 2023)
NJDEP, Coastal Management Program	Concurrence with Federal Coastal Zone Consistency Determination	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023
New Jersey Pinelands Commission	Application for Development	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
State Permits/Approvals					
NJDEP, Bureau of Tidelands Management , Tidelands Resource Council	Tidelands License, Lease, or Grant	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023
NJDEP, Department of Water Quality Bureau of Nonpoint Pollution Control	NJPDES 5G3 Stormwater General Construction Permit	To be filed within a few months of the start of construction	TBD	To be filed within a few months of the start of construction	TBD
Green Acres	Green Acres Diversion, if required	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023 (highly dependent on when the next State House Commission meeting is held)	Expected Q2 2022 (to be filed in conjunction with the NJDEP DLRP application)	Expected Q2 2023 (highly dependent on when the next State House Commission meeting is held)
NJDEP, Water Allocation and Well Permitting	Water Use (dewatering during construction)		To be filed at least 30 days prior to dewatering activities	TBD	To be filed at least 30 days prior to dewatering activities
New Jersey Department of Transportation (NJDOT), Division of Right of Way and Access Management	Access Permits		Expected Q2 2022	Expected Q2 2023	Expected Q2 2022

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
Atlantic County Department of Regional Planning and Development		Highway Occupancy Permit / Utility Permit	To be filed at least 90 days prior to start of construct-ion activities (expected Q2 2022)	Q4 2023	N/A
Cape Atlantic Conservation District		Soil Erosion Sediment Control	To be filed at least 90 days prior to soil disturbance activities (expected Q2 2022)	Q4 2023	N/A
Township of Egg Harbor		Zoning Permit	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A
		Construction Permit	To be filed at least 90 days prior to soil disturbance activities (Q2 2022)	Q4 2023	N/A
		Certificate of Occupancy	To be filed at least 90 days after construction is complete	TBD	N/A
		Street Opening Permit	To be filed at least 90 days prior to soil disturbance activities (expected Q2 2022)	Q4 2023	N/A

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
		Site Plan Approval	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A
City of Pleasantville		Stormwater Control for Major Development (if required)	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A
		Street Opening Permit	To be filed at least 90 days prior to soil disturbance activities (expected Q2 2022)	Q4 2023	N/A
		Land Use/Zoning Permit	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A
City of Atlantic City		Zoning Permit	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A
		Stormwater Plan Approval	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023	N/A

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
Freehold Soil Conservation District	Soil Erosion Sediment Control	N/A	N/A	To be filed at least 90 days prior to soil disturbance activities (expected Q2 2022)	Q4 2023
Monmouth County Highway Division of Inspections	Road Opening Permit	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	Q4 2023
	Site Plan Approval	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Zoning Permit	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Building Permit	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	Q4 2023

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
	Site Development Stormwater Plan	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
Township of Wall	Major Site Plan Approval	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	TBD
	Site Development Stormwater Plan	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Development/Zoning Permit	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Construction Permit	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	TBD

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
	Tree Removal Plan	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	Q4 2023
	Conditional Permit	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Street Opening Permit	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	Q4 2023
Township of Howell	Division of Land Use and Planning – Land Development Application	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023
	Division of Engineering – Plot Plan Approval	N/A	N/A	To be filed at least 12 months prior to start of construction activities (Q2 2022)	Q4 2023

Table 1.3-1 Required Permits/Approvals for Atlantic Shores Offshore Wind (Continued)

Agency/ Regulatory Authority	Permit/Approval	Project 1 Submission Date	Project 1 Approval/ Completion Date	Project 2 Submission Date	Project 2 Approval/ Completion Date
Local Permits/Approvals					
	Tree Removal Permit	N/A	N/A	To be filed at least 90 days prior to start of construction activities (expected Q2 2022)	Q4 2023

Notes:

Authority to issue the OCS Air Permit currently lies with EPA Region 2, but the State of New Jersey has taken actions towards obtaining delegated authority to issue and enforce OCS air permits. Per 40 CFR §52.11(b), that delegation can occur when New Jersey has demonstrated that the State has adopted the appropriate portions of the regulation into state law, and has adequate authority, resources, and administrative procedures to implement the regulation. New Jersey incorporated 40 CFR Part 55 into the NJDEP regulations (at NJAC 7:27-30) effective May 4, 2020.

1.3.3 Commercial Lease Stipulations and Compliance

Table 1.3-2 demonstrates how Atlantic Shores and the affiliate Project Companies are currently complying with or will comply with the stipulations outlined in Lease Agreement OCS-A 0499.

Table 1.3-2 Compliance with Stipulations in Lease Agreement OCS-A 0499

Stipulation	Compliance
Section 4(a): The Lessee must make all rent payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, unless otherwise specified in Addendum "B".	Atlantic Shores has made and will continue to make all rent payments in accordance with applicable regulations, unless otherwise specified in Addendum "B" of the Lease Agreement.
Section 4(b): The Lessee must make all operating fee payments to the Lessor in accordance with applicable regulations in 30 CFR Part 585, as specified in Addendum "B".	Atlantic Shores will make all operating fee payments in accordance with applicable regulations.

Table 1.3-2 Compliance with Stipulations in Lease Agreement OCS-A 0499 (Continued)

Stipulation	Compliance
Section 5: The Lessee may conduct those activities described in Addendum "A" only in accordance with a SAP or COP approved by the Lessor. The Lessee may not deviate from an approved SAP or COP except as provided in applicable regulations in 30 CFR Part 585.	Atlantic Shores will conduct activities as described in the approved SAP and COP.
Section 7: The Lessee must conduct, and agrees to conduct, all activities in the leased area in accordance with an approved SAP or COP, and with all applicable laws and regulations.	Atlantic Shores will conduct all activities in the leased area in accordance with the approved SAP and COP and all applicable laws and regulations.
Section 10: The Lessee must provide and maintain at all times a surety bond(s) or other form(s) of financial assurance approved by the Lessor in the amount specified in Addendum "B".	Atlantic Shores will provide the necessary financial assurances as described in Section 6.3 of Volume I of this COP.
Section 13: Unless otherwise authorized by the Lessor, pursuant to the applicable regulations in 30 CFR Part 585, the Lessee must remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seafloor of all obstructions created by activities on the leased area, including any project easements within two years following lease termination, whether by expiration, cancellation, contraction, or relinquishment, in accordance with any approved SAP, COP, or approved Decommissioning Application, and applicable regulations in 30 CFR Part 585.	Preliminary decommissioning plans are described in Section 6.2 of Volume I of this COP. Decommissioning will be conducted in accordance with the applicable regulations.

Table 1.3-2 Compliance with Stipulations in Lease Agreement OCS-A 0499 (Continued)

Stipulation	Compliance
Section 14: The Lessee must: (a) Maintain all places of employment for activities authorized under this lease in compliance with occupational safety and health standards and, in addition, free from recognized hazards to employees of the Lessee or of any contractor or subcontractor under this lease; (b) Maintain all operations within the leased area in compliance with regulations in 30 CFR Part 585 and orders from the Lessor and other federal agencies with jurisdiction, intended to protect persons, property and the environment on the OCS; and (c) Provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the Lessor or other federal agency with jurisdiction.	(a) Atlantic Shores has and will continue to maintain all places of employment in compliance with applicable occupational safety and health standards. (b) Atlantic Shores will maintain all operations within the lease area in compliance with applicable regulations. (c) Atlantic Shores will provide any requested documents and records that are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access to the site of Project activities to authorized inspectors.
Section 15: The Lessee must comply with the Department of the Interior's Non-procurement debarment and suspension regulations set forth in 2 CFR Parts 180 and 1400 and must communicate the requirement to comply these regulations to persons with whom it does business related to this lease by including this requirement in all relevant contracts and transactions.	Atlantic Shores will comply with the applicable Department of Interior (DOI) non-procurement debarment and suspension regulations.
Section 16: During the performance of this lease, the Lessee must fully comply with paragraphs (1) through (7) of section 2020 of Executive Order 11246, as amended (reprinted in 41 CFR 60-1.4(a)), and the implementing regulations, which are for the purpose of preventing employment discrimination against persons on the basis of race, color, religion, sex, or national origin.	Atlantic Shores will fully comply with paragraphs (1) through (7) of section 2020 of Executive Order 11246, as amended.
Addendum "B", Section III (Payments): Unless otherwise authorized by the Lessor in accordance with the applicable regulations in 30 CFR Part 585, the Lessee must make payments as described below.	Atlantic Shores will make payments as specified in Addendum "B," Section III.

1.3.4 Guide to Location of Required Information for a COP

This COP, which has been developed in accordance with 30 CFR Part 585 and the stipulations in Atlantic Shores' Lease Agreement OCS-A 0499, is organized in two volumes:

- Volume I provides detailed descriptions of the Projects' offshore and onshore facilities and how the Projects plan to construct, operate, and decommission those facilities.
  - Section 1.0 provides an overview of the Projects and their purpose, describes the regulatory framework under which the Projects will be evaluated, summarizes Atlantic Shores' stakeholder outreach efforts, and details Atlantic Shores' commitment to health, safety, security, and environmental (HSSE) protection.
  - Section 2.0 describes the Projects' economic, community, environmental, and public health benefits.
  - Section 3.0 summarizes Atlantic Shores' siting process and explains how the PDE was developed.
  - Section 4.0 provides a detailed description of the Projects' PDE and proposed construction activities, including an overview of the Projects' construction schedule.
  - Section 5.0 describes Atlantic Shores' O&M activities, including surveys and inspections.
  - Section 6.0 provides the Projects' general decommissioning concept and describes financial assurance.
  - Section 7.0 describes the chemical products used and wastes generated by the Projects.

Volume II provides a comprehensive assessment of the Projects' potential effects to physical, biological, visual, cultural, and socioeconomic resources and describes the numerous measures that Atlantic Shores' will employ to avoid, minimize, and mitigate those potential effects. Volume II also characterizes the Projects' environmental setting.

Table 1.3-3 lists BOEM's requirements for a COP pursuant to 30 CFR Part 585 and the corresponding sections of this COP that provide the responsive information.

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d)

Requirement	Location in COP
30 CFR §585.105(a)	
1) Design your projects and conduct all activities in a manner that ensures safety and will not cause undue harm or damage to natural resources, including their physical, atmospheric, and biological components to the extent practicable; and take measures to prevent unauthorized discharge of pollutants including marine trash and debris into the offshore environment.	Section 1.3.3 of Volume I Section 1.5.2 of Volume I Section 1.5.3 of Volume I Section 3.0 of Volume I Section 4.0 of Volume I Section 5.0 of Volume I Section 6.0 of Volume I Section 7.0 of Volume I Appendix I-D Appendix I-E Section 2.0 of Volume II Section 3.0 of Volume II Section 4.0 of Volume II Section 9.0 of Volume II Appendix II-J Appendix II-L
30 CFR §585.621(a-g)	
a) The projects will conform to all applicable laws, implementing regulations, lease provisions, and stipulations or conditions of the lease.	Section 1.3 of Volume I Section 1.5 of Volume I Section 4.0 of Volume I Section 5.0 of Volume I Section 6.0 of Volume I
b) The projects will be safe.	Section 1.3.3 (Table 1.3-2) of Volume I Section 1.5 of Volume I Appendix I-E Section 9.0 of Volume II
c) The projects will not unreasonably interfere with other uses of the OCS, including those involved with National security or defense.	Section 7.3 of Volume II Section 7.4 of Volume II Section 7.6 of Volume II Section 7.7 of Volume II Section 7.8 of Volume II Appendix II-R Appendix II-S Appendix II-T

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement	Location in COP
30 CFR §585.621(a-g)	
d) The projects will not cause undue harm or damage to natural resources; life (including human and wildlife); property; the marine, coastal, or human environment; or sites, structures, or objects of historical or archaeological significance.	Section 2.0 of Volume II Section 3.0 of Volume II Section 4.0 of Volume II Section 5.0 of Volume II Section 6.0 of Volume II Section 7.0 of Volume II Section 8.0 of Volume II Section 9.0 of Volume II Appendix II-C Appendix II-D Appendix II-E Appendix II-G Appendix II-H Appendix II-J Appendix II-I Appendix II-L Appendix II-M Appendix II-N Appendix II-O Appendix II-P Appendix II-Q Appendix II-S Appendix II-T Appendix II-U
e) The projects will use the best available and safest technology.	Section 1.3.3 of Volume I Section 1.5.2 of Volume I Section 1.5.3 of Volume I Section 3.0 of Volume I Section 4.0 of Volume I Appendix I-E
f) The projects will use best management practices.	Section 2.0 of Volume II Section 3.0 of Volume II Section 4.0 of Volume II Section 5.0 of Volume II Section 6.0 of Volume II Section 7.0 of Volume II Section 9.0 of Volume II

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement	Location in COP
30 CFR §585.621(a-g)	
g) The projects will use properly trained personnel.	Section 1.5.2 of Volume I Section 1.5.3 of Volume I Section 5.0 of Volume I Appendix I-E Section 9.0 of Volume II
30 CFR §585.626(a)	
(1) Shallow Hazards	
(i) Shallow faults;	Appendix II-A
(ii) Gas seeps or shallow gas;	Appendix II-A
(iii) Slump blocks or slump sediments;	Appendix II-A
(iv) Hydrates; or	Appendix II-A
(v) Ice scour of seabed sediments	Appendix II-A
(2) Geological survey relevant to the design and siting of facility	
(i) Seismic activity at your proposed site;	Appendix II-A
(ii) Fault zones;	Appendix II-A
(iii) The possibility and effects of seabed subsidence; and	Appendix II-A
(iv) The extent and geometry of faulting attenuation effects of geological conditions near your site.	Appendix II-A
(3) Biological	
(i) A description of the results of biological surveys used to determine the presence of live bottoms, hard bottoms, and topographic features, and surveys of other marine resources such as fish populations (including migratory populations), marine mammals, sea turtles, and sea birds.	Section 4.0 of Volume II Appendix II-F Appendix II-G Appendix II-J
(4) Geotechnical Survey	
(i) The results of a testing program used to investigate the stratigraphic and engineering properties of the sediment that may affect the foundations or anchoring systems for your facility.	Appendix II-A
(ii) The results of adequate *in situ* testing, boring, and sampling at each foundation location, to examine all important sediment and rock strata to determine its strength classification, deformation properties, and dynamic characteristics.	Appendix II-A

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement		Location in COP
30 CFR §585.626(a)		
(iii)	The results of a minimum of one deep boring (with soil sampling and testing) at each edge of the project areas and within the project areas as needed to determine the vertical and lateral variation in seabed conditions and to provide the relevant geotechnical data required for design.	Appendix II-A
(5) Archaeological Resources		
(i)	A description of the historic and prehistoric archaeological resources, as required by the National Historic Preservation Act (NHPA) (16 U.S.C. 470 et. seq.), as amended.	Section 6.0 of Volume II Appendix II-N Appendix II-O Appendix II-P Appendix II-Q
(6) Overall Site Investigation		
(i)	Scouring of the seabed;	Appendix II-A
(ii)	Hydraulic instability;	Appendix II-A
(iii)	The occurrence of sand waves;	Appendix II-A
(iv)	Instability of slopes at the facility location;	Appendix II-A
(v)	Liquefaction, or possible reduction of sediment strength due to increased pore pressures;	Appendix II-A
(vi)	Degradation of subsea permafrost layers;	Appendix II-A
(vii)	Cyclic loading;	Appendix II-A
(viii)	Lateral loading;	Appendix II-A
(ix)	Dynamic loading;	Appendix II-A
(x)	Settlements and displacements;	Appendix II-A
(xi)	Plastic deformation and formation collapse mechanisms; and	Appendix II-A
(xii)	Sediment reactions on the facility foundations or anchoring systems.	Appendix II-A
30 CFR §585.626(b)		
(1)	Contact information	Section 1.5.1 of Volume I
(2)	Designation of operator, if applicable	Section 1.5.1 of Volume I
(3)	The construction and operation concept	Section 1.1 of Volume I Section 4.0 of Volume I Section 5.0 of Volume I

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement		Location in COP
30 CFR §585.626(b)		
(4)	Commercial lease stipulations and compliance	Section 1.3.3 (Table 1.3-2) in Volume I
(5)	A location plat	Section 1.1 (Figure 1.1-2) of Volume I
(6)	General structural and project design, fabrication, and installation	Section 3.0 of Volume I Section 4.0 of Volume I
(7)	All cables and pipelines, including cables on project easements	Section 1.3.1 of Volume I Section 4.5 of Volume I Section 4.7 of Volume I Section 4.8 of Volume I Section 5.4.4 of Volume I Section 5.4.5 of Volume I Section 5.4.6 of Volume I Section 6.2 of Volume I
(8)	A description of the deployment activities	Section 1.5.3 of Volume I Section 4.0 of Volume I
(9)	A list of solid and liquid wastes generated	Section 7.0 of Volume I
(10)	A listing of chemical products used (if stored volume exceeds Environmental Protection Agency Reportable Quantities)	Section 7.0 of Volume I
(11)	A description of any vessels, vehicles, and aircraft you will use to support your activities	Section 4.10 of Volume I Section 5.6 of Volume I
(12i)	A general description of the operating procedures and systems under normal conditions	Section 5.0 of Volume I
(12ii)	A general description of the operating procedures and systems in the case of accidents or emergencies, including those that are natural or manmade	Section 1.5.3 of Volume I Section 5.4 of Volume I Section 9.0 of Volume II Appendix I-D Appendix I-E
(13)	Decommissioning and site clearance procedures	Section 6.0 of Volume I
(14i)	A listing of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations. The list should contain U.S. Coast Guard, U.S. Army Corps of Engineers, and any authorizations pertaining to energy gathering, transmission or distribution (e.g., interconnection authorizations).	Section 1.3 (Table 1.3-1) of Volume I

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement	Location in COP
30 CFR §585.626(b)	
(14ii) A listing of all Federal, State, and local authorizations, approvals, or permits that are required to conduct the proposed activities, including commercial operations, along with a statement indicating whether you have applied for or obtained such authorization, approval, or permit.	Section 1.3 (Table 1.3-1) of Volume I
(15) Your proposed measures for avoiding, minimizing, reducing, eliminating, and monitoring environmental impacts	Section 2.0 of Volume II Section 3.0 of Volume II Section 4.0 of Volume II Section 5.0 of Volume II Section 6.0 of Volume II Section 7.0 of Volume II
(16) Information you incorporate by reference	Section 8.0 of Volume I Section 10.0 of Volume II
(17) A list of agencies and persons with whom you have communicated, or with whom you will communicate, regarding potential impacts associated with our proposed activities	Section 1.4 of Volume I Appendix I-B
(18) Reference	Section 8.0 of Volume I Section 10.0 of Volume II
(19) Financial assurance	Section 6.3 of Volume I
(20) CVA nominations for reports required in subpart G of this part	Section 1.5.2 of Volume I
(21) Construction schedule	Section 4.1 (Table 4.1-1) of Volume I
(22) Air quality information	Section 3.1 of Volume II Appendix II-C
(23) Other information	Section 1.0 of Volume I Appendix II-B

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement	Location in COP
30 CFR §585.627(a)	
(1) Hazard information	Section 2.1.4 of Volume II Appendix II-A
(2) Water quality	Section 3.2 of Volume II
(3)(i) Benthic communities	Section 4.5 of Volume II Appendix II-G
(3)(ii) Marine mammals	Section 4.7 of Volume II
(3)(iii) Sea turtles	Section 4.8 of Volume II
(3)(iv) Coastal and marine birds	Section 4.3 of Volume II Appendix II-F
(3)(v) Fish and shellfish	Section 4.5 of Volume II Section 4.6 of Volume II Appendix II-G Appendix II-J
(3)(vi) Plankton	Section 4.6 of Volume II
(3)(vii) Seagrasses	Section 4.2 of Volume II Appendix II-E
(3)(viii) Plant life	Section 4.1 of Volume II Section 4.2 of Volume II
(4) Threatened or endangered species	Section 4.0 of Volume II
(5) Sensitive biological resources or habitats	Section 4.0 of Volume II Appendix II-D Appendix II-E Appendix II-G Appendix II-J
(6) Archaeological resources	Section 6.2 of Volume II Section 6.3 of Volume II Appendix II-P Appendix II-Q
(7) Social and economic resources	Section 7.0 of Volume II Appendix II-R

Table 1.3-3 COP Requirements for Commercial Leases Pursuant to 30 CFR §§ 585.105(a), 621(a-g), 626(a) and (b), 627(a-d) (Continued)

Requirement	Location in COP
30 CFR §585.627(a)	
(8) Coastal and marine uses	Section 7.3 of Volume II Section 7.4 of Volume II Section 7.5 of Volume II Section 7.6 of Volume II Section 7.7 of Volume II Appendix II-K Appendix II-R Appendix II-S
(9) Consistency certification	Appendix I-C
(10) Other resources, conditions, and activities	Section 7.8 of Volume II Section 7.9 of Volume II Section 8.0 of Volume II Section 9.0 of Volume I Appendix II-I Appendix II-T Appendix II-U
30 CFR §585.627(b)	
Consistency certification	Appendix I-C
30 CFR §585.627(c)	
Oil spill response plan	Section 1.5.3.2 of Volume I Appendix I-D
30 CFR §585.627(d)	
Safety management system	Section 1.5.3.1 of Volume I Appendix I-E

1.4 Agency and Stakeholder Outreach

1.4.1 Coordination with Agencies, Tribes, and Municipalities

Atlantic Shores proactively engages with federal, state, and local agencies to discuss development of the Lease Area, to present Project-specific details, to collaboratively identify resource issues of concern and mitigation strategies, and to design scientific research and monitoring studies that satisfy all regulatory review requirements. Atlantic Shores meets bi-weekly with key agencies, including BOEM, USCG, and NJDEP, and has collaborated on research activities with other agencies (e.g., the red knot satellite tagging study with USFWS). Meetings held to date between agencies and Atlantic Shores are listed in Appendix I-B.

Atlantic Shores recognizes the importance of ensuring local elected officials are familiar with the Projects and their potential benefits and impacts to their constituents. Atlantic Shores has held meetings with local municipalities and leaders in Atlantic, Monmouth, and Ocean Counties in New Jersey (see Appendix I-B). These meetings with local officials have focused on introducing and soliciting input on PDE elements, the Projects' potential environmental effects, and opportunities aligned with local workforce development.

While engagement with the Narragansett Indian Tribe, the Shinnecock Indian Nation, and the Lenape Tribe of Delaware are required, Atlantic Shores also engages with other federal- and state-recognized tribes, including the Absentee Shawnee Tribe, the Delaware Nation, the Delaware Tribe of Indians, the Mohican Nation Stockbridge–Munsee Band, the Shawnee Tribe, the Nanticoke Lenni-Lenape Tribal Nation, the Ramapough Lenape Nation, the Powhatan Renape Nation, and the Unkechaug Indian Nation. Atlantic Shores uses multiple means of communication (i.e., email, telephone, contacts in other tribes) to engage each tribe and has reached out to BOEM's and NJDEP's tribal liaisons to obtain the most current lists of tribal points of contact. Meetings conducted with tribal representatives to date are listed in Appendix I-B.

In addition to fulfilling regulatory requirements to notify tribes prior to specific milestones, Atlantic Shores has worked to establish early relationships to address tribal concerns. Atlantic Shores' approach to tribal engagement first focused on understanding the histories of the tribes, learning about their traditions, and providing opportunities for tribes to provide input into the Projects. In responding to tribes' request to learn about the Project's activities, Atlantic Shores provided tribal members with a virtual platform to participate in the real-time assessment of deep-sea borings from the Project Area by Qualified Marine Archaeologists.

As the Projects advance, Atlantic Shores will continue to consult with federal, state, and local agencies and municipalities as well as federal and state-recognized tribes.

1.4.2 Stakeholder Outreach

Atlantic Shores is actively engaged with stakeholders to identify and discuss their interests and concerns regarding offshore wind and the development of the Projects. Since early 2019, Atlantic Shores has conducted hundreds of meetings and working sessions with stakeholders, suppliers, interest groups, and local communities that have an interest in or may be affected by the Projects (see Appendix I-B). The community groups and stakeholders that Atlantic Shores is engaged with include:

- **Atlantic County, Ocean County, and Monmouth County residents:** Residents of these counties may live near the Projects' landfall sites, onshore interconnection cable routes, onshore substations, and/or O&M facility. Some residents may have a view of the WTGs.

- **Business groups/associations:** Atlantic Shores has strategically identified business groups and associations that it can join in diverse partnerships. The goals of these partnerships include information sharing, workforce training, and supply chain contacts. As described in Section 2.1, Atlantic Shores is also working to create local employment through collaboration with existing local supply chain partners and by attracting new suppliers to the Northeastern U.S. As part of this effort, Atlantic Shores has signed a first-of-its-kind memorandum of understanding (MOU) with six local unions to help train and employ a productive, safe, skilled, local offshore wind workforce.
- **Environmental non-governmental organizations (eNGOs):** Atlantic Shores has conducted environmental resource and issue-focused meetings with representatives from local, regional, and national eNGOs (e.g., New Jersey Sierra Club, New Jersey Energy Coalition, Clean Water Action, New Jersey Audubon, Surf Rider, National Wildlife Federation, Barnegat Bay Partnership, Conservation Law Foundation, the Natural Resources Defense Council, etc.) to educate them about the Projects and to identify shared objectives, opportunities for collaboration, and topics requiring further discussion. Appendix I-B provides a complete list of meetings between Atlantic Shores and eNGOs.
- **Academia and research/scientific institutes:** Atlantic Shores is coordinating with educational and technical institutions (e.g., Rutgers University, Rowan College, Stockton University) to support cooperative science, engineering, research, and next generation workforce training that may benefit the Projects' development, construction, and operations (see Appendix I-B). These activities also contribute to broader regional research efforts (see Section 2.2). Atlantic Shores has asked more than 52 different institutions to declare their interest in collaboration on academic and educational work in relation to the Projects, of which approximately eight have expressed an interest in doing so to date.
- **Commercial and recreational fishermen and boaters:** Atlantic Shores engages with commercial and recreational boaters and fishermen that are active in and around the Atlantic Shores' Offshore Project Area. To date, Atlantic Shores has held meetings with commercial and recreational fishermen from Belford, Point Pleasant, Barnegat Light, Atlantic City, Cape May, and other ports like Ocean City and Sea Isle City. Atlantic Shores' engagement with fishermen is described further in Section 1.4.2.1.

To engage in productive and effective dialogue with key stakeholders, Atlantic Shores has assembled a Stakeholder Communications Team comprised of Atlantic Shores management, Community Liaison Officers, community relations staff, and government relations staff. All have prior experience working cooperatively within New Jersey coastal communities, allowing Atlantic Shores to better understand the interests and concerns of stakeholder groups.

Atlantic Shores has developed and implemented a wide array of stakeholder engagement tools to establish two-way dialogue with interested parties and to educate people and organizations about Atlantic Shores and more broadly offshore wind. Atlantic Shores engages stakeholders by:

- attending community events and hosting in-person community meetings;
- maintaining an up-to-date and interactive website;

- distributing quarterly newsletters containing Project updates to over 1,000 stakeholders;
- using social media platforms (e.g., Facebook and Twitter) for educational videos, Projects updates, promoting opportunities;
- hosting informational sessions and open houses (in-person and/or virtually);
- participating in and organizing workshops with key local, regional, and national eNGOs; and
- conducting polling and focus groups.

These tools also provide opportunities for people and organizations to express interesting in partnering with Atlantic Shores on workforce, supply chain, port development, or other related activities.

Atlantic Shores' stakeholder engagement strategy creates effective mechanisms for capturing, documenting, and responding to stakeholder feedback to ensure that the outcomes of each interaction can be incorporated into Project development efforts.

1.4.2.1 Fisheries Engagement

Atlantic Shores understands the socioeconomic importance of commercial and recreational fishing to the State of New Jersey and is committed to achieving coexistence with those who fish within the Offshore Project Area. Atlantic Shores has developed a Fisheries Communication Plan (FCP), provided as Appendix II-R, that defines outreach and engagement with fishing interests during all phases of the Projects, from development through decommissioning. To support the execution of the FCP, Atlantic Shores employs a Fisheries Liaison Officer (FLO) and a Recreational Fishing Industry Representative (FIR). An active commercial fisherman, Captain Kevin Wark, is employed as the FLO. Captain Adam Nowalsky is the Recreational FIR. Additional FIRs may be nominated to represent specific fisheries identified within the Lease Area or along the ECCs as the Projects progress or a need is identified.

To facilitate open engagement with the fishing community that is active in and around the Offshore Project Area, Atlantic Shores maintains a "For Mariners" webpage, distributes updates on Atlantic Shores' activities (via an email distribution list, print and online industry publications, local news outlets, etc.), coordinates with the USCG to issue Notices to Mariners, plans to establish a 24-hour phone line, and attends fishing conferences, trade shows, and tournaments. Atlantic Shores will continue to hold and attend meetings with local fishermen, professional associations/organizations representing commercial and recreational fishermen, and local offshore fishing clubs during the lifetime of the Projects. Atlantic Shores will also continue to participate in Fisheries Management Council meetings, university-sponsored activities (e.g., webinars held by Rutgers New Jersey Cooperative Extension), and regional efforts led by BOEM, National Oceanic and Atmospheric Administration (NOAA), and the commercial fishing industry (including the Responsible Offshore Development Alliance [RODA] and the Responsible Offshore Science Alliance [ROSA]).

Additionally, Atlantic Shores is committed to finding ways to integrate both the skills and infrastructure of the local fishing community into the Projects by planning, brainstorming, and executing early economic opportunities. Atlantic Shores is already employing local fishermen and their facilities for scouting and dock-side vessel support. Building on this model, Atlantic Shores is actively pursuing avenues to help fishermen meet Atlantic Shores' HSSE standards for vessels and workforce, so that they can be eligible to apply as contractors to support environmental surveys as well as the Projects' construction and operations activities. In September 2020, Atlantic Shores distributed a formal Request for Interest to identify fishing businesses that had available docks and port real estate that could support Atlantic Shores' construction and operations; Atlantic Shores received strong responses from four local fishing companies, indicating that the fishing industry does find valuable economic opportunities in the offshore wind industry.

Section 7.3 Recreation and Tourism and Section 7.4 Commercial and For-Hire Recreational Fisheries of Volume II as well as the Navigation Safety Risk Assessment (NSRA) provided as Appendix II-S further describe Atlantic Shores' methods to communicate and engage with fisheries.

1.5 Other Project Information

1.5.1 Authorized Representative and Operator

The Project operator for Project 1 is Atlantic Shores Project 1 Company. The Project operator for Project 2 is Atlantic Shores Project 2 Company. The Projects' Authorized Representative is Atlantic Shores' Vice President and Development Director, Jennifer Daniels. Her contact information is provided below:

Jennifer Daniels
Vice President and Development Director
Atlantic Shores Offshore Wind, LLC
1 Dock 72 Way, Floor 7
Brooklyn, NY 11205
858-946-3235
jennifer.daniels@atlanticshoreswind.com

1.5.2 Certified Verification Agent

Pursuant to 30 CFR §§ 585.705-585.714 a third-party Certified Verification Agent (CVA) will be employed by Atlantic Shores to conduct an independent assessment of the design of the Projects' facilities as well as the planned fabrication and installation activities. The CVA will certify to BOEM that the Projects are designed to withstand the site-specific environmental and functional load conditions appropriate for its intended service life. The CVA will also monitor fabrication and installation activities through periodic on-site inspections and certify to BOEM that the Projects are fabricated and installed in accordance with accepted engineering practices, the COP, and each

Projects' Facility Design Report (FDR) and Fabrication and Installation Report (FIR). Atlantic Shores will nominate a CVA(s) for the Projects' FDRs and FIRs in conformance with 30 CFR §585.706(a) and subject to BOEM approval.

1.5.3 Health, Safety, Security, and Environmental Protection

Health, safety, security, and environmental (HSSE) protection are critical components of all Atlantic Shores' planning and activities. The health and safety of Atlantic Shores' team members, contractors, and stakeholders is a key priority; Atlantic Shores upholds safety as a core value and fosters a culture of "Goal Zero" that focuses on eliminating safety related incidents. Atlantic Shores also prioritizes the responsible integration of the Projects into the New Jersey coastal and marine environment.

Atlantic Shores is committed to full compliance with applicable HSSE regulations and codes throughout the pre-construction, construction, O&M, and decommissioning phases of the Projects. The following sections highlight the systems and plans that will be implemented, in accordance with BOEM and other applicable regulations, to ensure HSSE protection throughout the Projects' lifecycle. These plans include the Projects' Safety Management System (SMS), Oil Spill Response Plan (OSRP), and Spill Prevention, Control, and Countermeasure (SPCC) Plan. Volume I of this COP includes a draft OSRP and SMS (Appendices I-C and I-D). These draft plans are representative of the requirements, procedures, and best practices that will be implemented in support of both Projects. Individual plans for Project 1 and Project 2 will be developed for BOEM review and acceptance prior to construction with each Project's FDR and/or FIR. Public safety, public access, and low probably events such as spills are discussed further in Section 9.0 Public Health and Safety of Volume II.

1.5.3.1 Safety Management System

Atlantic Shores has assembled a draft SMS, which is provided as Appendix I-E. The SMS contains Atlantic Shores' overall safety approach and management commitment as well as safety-related policies and procedures that will guide all work on the Projects. The SMS draws upon the extensive experience of Atlantic Shores' team members and its parent companies (EDF Renewables and Shell New Energies US LLC) with executing work on large infrastructure and energy projects, both onshore and offshore, and will incorporate lessons learned as the Projects progress. All Project activities will be conducted in accordance with a project-specific SMS to ensure avoidance or minimization of potential safety-related impacts to anyone on or near the Project's facilities.

The draft SMS provided as Appendix I-E-1 meets BOEM's requirements contained in 30 CFR §585.810 by including a description of:

- how Atlantic Shores will ensure the safety of personnel or anyone on or near the Projects' facilities;
- remote monitoring, control, and shutdown capabilities;

- site-specific emergency response procedures;
- fire suppression equipment;
- procedures for testing the SMS; and
- methods for ensuring Project personnel are properly trained.

The SMS also contains company-specific HSSE policies beyond those prescribed in 30 CFR §585.810, including:

- other applicable HSSE regulations (e.g., Occupational Safety and Health Administration [OSHA] regulations);
- hazard identification and risk management procedures;
- communication protocols;
- qualifications and authority to perform work; and
- safe work procedures to ensure safe access to all systems (e.g., Permit to Work, Lockout/Tagout).

A final SMS specific to Project 1 and 2 will be submitted for BOEM review and acceptance prior to construction with each Project's FDR and/or FIR.

1.5.3.2 Spill Response Plans

Before construction and installation, project-specific OSRPs will be developed and issued to all vessels and offshore contractors working on the Projects. In accordance with 30 CFR §585.627(c) and 30 CFR Part 254, each project-specific OSRP will define spill prevention measures as well as provisions for communication, coordination, containment, removal, and mitigation in the event of an unforeseen incident involving an offshore spill. The OSRPs will also describe training, equipment testing, and periodic drills to prepare for a spill response. A draft OSRP that is representative of the requirements, procedures, and best practices that will implemented in support of Project 1 and 2 has been provided as Appendix I-D. A final project-specific OSRP will be submitted for BOEM review and acceptance prior to construction with each Project's FDR and/or FIR.

In addition to the OSRP, contractors will be required to have plans to immediately contain and stop a spill in accordance with applicable regulations (see Section 7.0). All contractor plans will be reviewed to ensure they comply with the applicable regulations, the requirements of Atlantic Shores and are consistent with each Project's OSRP procedures. Routine training and audits on the content of each Project's OSRP will be conducted on a regular basis to ensure personnel are familiar with plan requirements and are prepared to respond to emergencies, should they occur.

Since the onshore facilities will have more than 1,320 gallons (4,997 liters) of oil in aboveground equipment (see Table 7.0-3 in Section 7.0), project-specific SPCC Plans will also be developed and maintained per 40 CFR Part 112. The project-specific SPCC Plans will identify what oil materials are stored at the onshore facilities, how oil is delivered and transferred, facility spill prevention and control procedures, spill response and notification procedures, inspections, recordkeeping, and reporting requirements. For Project 1 and 2, a Discharge Prevention, Containment, and Countermeasure (DPCC) Plan and a Discharge Cleanup and Removal (DCR) Plan per N.J.A.C. 7:1E will be submitted to the NJDEP. In addition, horizontal directional drilling (HDD) Inadvertent Release Plans for construction activities at the landfall sites will be developed for the Projects.

2.0 Benefits of the Projects

The Projects will provide clean, renewable energy to the Northeastern U.S., which will help the region achieve its renewable energy goals, diversify the region's electricity supply, and increase electricity reliability. The Project will be a meaningful contributor to the region's economy by creating thousands of well-paid jobs in the burgeoning renewable energy sector.

The importance of the renewable energy sector in revitalizing the U.S.' economy is exemplified in Presidential Executive Order 14008 (Tackling the Climate Crisis at Home and Abroad), which describes clean energy jobs as a central pillar of the President's Build Back Better and economic recovery plan and directs the Secretary of the Interior to review siting and permitting processes to identify steps to double offshore wind energy production by 2030 (see Section 207; White House 2021). As described in the Executive Order, the construction, manufacturing, engineering, and skilled-trades jobs needed to build a clean energy economy will bring opportunity to communities "that have suffered as a result of economic shifts and places that have suffered the most from persistent pollution, including low-income rural and urban communities, communities of color, and Native communities."

A significant portion of the Projects' economic and community benefits will be realized in New Jersey. As identified in the New Jersey Offshore Wind Strategic Plan, the development of offshore wind energy, such as the Atlantic Shores' Projects, is critical to addressing climate change and to building the State's clean energy economy (Ramboll 2020). As described by New Jersey Governor Phil Murphy, "Developing New Jersey's offshore wind industry will bring thousands of good-paying jobs and millions of dollars in economic development to our state to aid our economic recovery from COVID-19" (NJBPU 2020).

The Projects' economic, community, environmental, and public health benefits are detailed in the following sections.

2.1 Economic and Community Benefits

The Projects will provide several benefits to the Northeast's economy and communities (particularly within New Jersey) including:

- **Direct job creation:** The Projects are expected to directly create more than 22,290 full time equivalent (FTE)[11] jobs throughout their lifecycle. During the development and construction period, direct jobs will primarily be in construction, manufacturing, professional services (e.g., engineering and general management), transport, and warehousing. During operations and maintenance (O&M) and decommissioning, direct jobs will include jobs in operations and maintenance (e.g., wind turbine generator [WTG] technicians) as well as professional services.

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11 Based on a 40-hour work week.

- **Indirect and induced job creation:** Atlantic Shores estimates that the Projects will create more than 11,810 indirect FTE jobs and over 14,820 induced FTE jobs, for a total of more than 48,920 direct, indirect, and induced FTE jobs. Atlantic Shores intends to procure local suppliers and use local manufacturing facilities to the maximum extent practicable. Atlantic Shores anticipates that hiring local suppliers and manufacturing facilities will provide continued support of existing jobs and potentially create thousands of additional jobs in New Jersey and, more broadly, the Northeastern U.S. Indirect jobs created by the Projects will primarily be in management services, wholesale trade, and transportation, but may also include real estate, finance, insurance, and several other regional industries that will benefit from increased economic activities. The Projects may also support other sectors, such as health care and social assistance, retail trade, and accommodation and food services.
- **Use of local supply chains:** Atlantic Shores has prioritized using local suppliers for a significant amount of development activities, including for survey activities, technical analysis, environmental and economic analysis, and legal services. As the development of the Projects progresses, Atlantic Shores will continue to expand its list of local suppliers. Atlantic Shores has proposals from major suppliers for local manufacturing that would bring hundreds of jobs to New Jersey and, more broadly, the Northeastern U.S. Atlantic Shores is also seeking ways to maximize the use of organized union labor and employers wherever feasible. To demonstrate that commitment, Atlantic Shores has signed a first-of-its kind memorandum of understanding (MOU) with six local unions (UBCJA [Carpenters, Divers, Dock builders and Piledrivers], LIUNA [Laborers], IBEW [Electricians], IUOE [Operating Engineers], Ironworkers, and Union Millwrights) to help train and employ a productive, safe, skilled, local workforce.
- **Revenues, taxes, and fees:** The Projects will increase revenues collected by federal, state, and local governments via personal income taxes, payroll taxes, sales taxes, property taxes, corporate taxes, and other fees (e.g., permit application fees) paid by Atlantic Shores, its contractors, and their employees. Economic activity resulting from the Projects will generate additional revenue throughout the Northeast. Atlantic Shores and its affiliate Project Companies will also make substantial annual rent payments and operating fee payments to the federal government in accordance with its Lease Agreement.
- **Establishment of an O&M facility in the Atlantic City Harbor:** Atlantic Shores is proposing to establish a new O&M facility in Atlantic City to host its O&M personnel, dock vessels, and store equipment, tools, spare parts, and consumables (see Section 5.5). The O&M facility will host long-term jobs in technical services, project planning, data analysis, WTG preventative maintenance and repair, cable and foundation monitoring, and substation maintenance. The O&M facility will also create economic activity for a wide range of subcontractors including shipyards, spare part producers, and vessel and harbor services.

- **Facilitation of future offshore wind and other green developments:** The Projects are anticipated to contribute to the establishment of facilities and development of ports that would be instrumental in attracting and supplying future U.S. offshore wind developments, and positioning talent, expertise, and research and development (R&D) activities within the Northeastern U.S.
- **Workforce development and training:** Atlantic Shores will support workforce initiatives, which will be developed in connection with its proposals submitted in response to offshore wind solicitations. These initiatives will have a strong focus on providing support to minorities, women, veterans, and underserved communities. Workforce development initiatives contained in Atlantic Shores' proposal in response to the New Jersey Offshore Wind Solicitation #2 include initiatives with Rutgers University, Rowan College, the Barnegat Bay Partnership, and the Boys & Girls Club of Atlantic City, as well as workforce training with several manufacturers and suppliers. Additional or alternative initiatives may be developed as part of other procurement processes.
- **Educational and Community Outreach (ECO) Center:** In 2020, Atlantic Shores opened its new ECO Center in partnership with Stockton University in Atlantic City, New Jersey. The ECO Center will serve as an educational hub; the Center will be the primary location for community informational events, including educational visits from local school groups, and act as a resource center for university students. The ECO Center constitutes a major local investment.
- **Fostering innovation, research, and university outreach:** As part of its project development efforts, Atlantic Shores has established robust working relationships with several research organizations and universities, such as Rutgers University and Stockton University, to foster innovative and environmentally responsible approaches to offshore wind development (see Section 1.4.2). Through its participation in the New Jersey Offshore Wind Solicitation #2, Atlantic Shores has committed to numerous initiatives to support research and innovation, including supporting a green hydrogen pilot project and funding clean energy start-ups within the Minority & Women Owned Business Incubator at the Rutgers EcoComplex located in Bordentown, New Jersey. Additional or alternative programs may be developed as part of other procurement processes.
- **Support for women, minorities, and veterans:** Atlantic Shores has developed MOUs with organizations (e.g., Boys & Girls Club of Atlantic City, Helments2Hardhats) to provide opportunities for employment, education, and training to women, minorities, and veterans as the WTA is developed. Atlantic Shores will continue pursuing contracts with women- and minority-owned New Jersey businesses. To build awareness of opportunities in offshore wind, Atlantic Shores is a member of several chambers of commerce supporting minority groups, including the African American Chamber of Commerce, the Statewide Hispanic Chamber of Commerce, and the Chapter of Professional Women in Construction.

- **Tourism and reactional opportunities:** The Projects' offshore facilities may act as artificial reef habitat that attract fish (BOEM 2012) and become popular fishing locations for fishermen. The Projects' offshore facilities may also become tourist attractions (Carr-Harris and Lang 2019; Parsons et al. 2020). See Section 7.3 Recreation and Tourism and Section 7.4 Commercial and For-Hire Recreational Fisheries of Volume II for additional details.

2.2 Environmental and Public Health Benefits

Atlantic Shores is working to maximize the environmental benefits and minimize the environmental impacts of the Projects. The recurring and accumulating benefits created by each Project over its operational life represent significant cumulative increases in environmental quality compared to the localized, temporary construction effects that can be mitigated. Overall, Atlantic Shores expects that the Projects' anticipated benefits will significantly outweigh the potential impacts.

The environmental and public health benefits provided by the Projects include:

- **Reductions in greenhouse gas (GHG) and criteria air pollutant emissions:** The Projects will result in a significant net decrease in harmful air pollutant emissions region-wide by displacing electricity from fossil fuel power plants. For every megawatt of power generated, the Projects are expected to reduce GHG emissions, reported as carbon dioxide equivalents (CO_2e), by approximately 2,625 tons per year (tpy).[12] For Project 1, which has a nameplate capacity of 1,510 megawatts (MW),[13] the reduction in GHG emissions regionally is estimated to be approximately 3.9 million tons annually, or the equivalent of removing about 777,000 cars from the road. Per megawatt, the Projects are expected to reduce nitrogen oxide (NOx) emissions by 1.43 tpy, sulfur dioxide (SO_2) emissions by 1.69 tpy, and fine particulate matter ($PM_{2.5}$) emissions by 0.10 tpy. The Projects will also reduce regional emissions of other pollutants typically emitted by fossil fuel power plants such as mercury, carbon monoxide, methane, and nitrous oxide. The Projects' avoided air emission estimates are further discussed in Section 3.1 Air Quality of Volume II.
- **Air quality benefits and avoided public health costs:** By reducing regional emissions, the Projects are expected to improve air quality thereby reducing the harmful effects of air pollutants such as NOx, SO_2, and $PM_{2.5}$, which are linked to increased rates of early death, stroke, heart attacks, exacerbation of asthma, and respiratory disorders as well as increased

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12 Avoided air emissions estimates are based on the latest-available non-baseload output emission rates for the Reliability First Corporation (RFC) East subregion as published by the Environmental Protection Agency (EPA 2020), assuming a 50% capacity factor and 4% transmission losses for the Projects.

13 An ~1,500 megawatt (MW) project is a reasonable representation of a mid-sized project that could be developed within the WTA.

absenteeism at school and work. The Projects will also reduce emissions that contribute to acid rain, ocean acidification, and ground level ozone/smog, which can damage sensitive ecosystems and other resources.

- **Climate benefits:** Climate change, which is strongly associated with GHG emissions from fossil-fuel combustion and industrial practices, has been identified as possibly the greatest public health threat of the 21st century (WHO 2021). The impacts of climate change on the environment and human health include sea level rise and population displacement, property damage from floods, shifts in species' distributions worldwide, changes in agricultural productivity, increases in energy system costs (e.g., air conditioning costs), and impacts to water security, food security, and nutrition. By reducing reliance on fossil fuel-derived electricity that generates GHGs, the Projects can help to mitigate additional climate change damages that impact both public health and the environment.
- **Environmental research and monitoring programs:** As described in Section 4.1.2, environmental monitoring surveys will be conducted to support the assessment of the Projects' potential effects and, more broadly, to inform agency, stakeholder, and public understanding of the potential benefits and impacts of offshore wind project development. Atlantic Shores' will conduct fisheries studies (see Appendix II-K) and benthic habitat monitoring (see Appendix II-H). Additional environmental studies and monitoring programs supported by Atlantic Shores to date include:
  - **Study on red knot migratory patterns:** Atlantic Shores has partnered with Dr. Larry Niles of the New Jersey-based Wildlife Restoration Partnerships, the New Jersey Audubon Society, the U.S. Fish and Wildlife Service (USFWS), and professional wildlife research organizations Normandeau Associates and Biodiversity Research Institute to research the movement of threatened red knots off the coast of New Jersey during their southbound and northbound migration.
  - **Climate, storm, and wildlife research:** Atlantic Shores has collaborated with the Rutgers University Center for Ocean Observing Leadership (RUCOOL) and the Rutgers University Marine Field Station to install a wind light detection and ranging (lidar) instrument in Tuckerton, New Jersey. The lidar will be in place for the next several years to collect real-time weather observations. This information will contribute to Rutgers' research on sea breezes and coastal storms, as well as future research initiatives conducted by RUCOOL and Atlantic Shores.

    Atlantic Shores also expects to participate in regional monitoring initiatives and coordinate with research organizations and universities to develop additional environmental study programs. Atlantic Shores provides funding and scientific expertise sharing to the Responsible Offshore Science Alliance (ROSA), where Atlantic Shores serves on the Board and Advisory Committee. Atlantic Shores and its parent companies are also early adopters and funders of the Regional Wildlife Science Entity, the parallel organization to ROSA that covers regional bird, mammal, and sea turtle science.

- **Addition of hard substrate and structures offshore:** The Projects are expected to produce ecological benefits by providing new, diverse habitat for structure-oriented species (e.g., black sea bass, tautog, cunner). The offshore facilities (i.e., foundations, scour protection, and cable protection) will create new, hard substrate that provide shelter and feeding opportunities as well as spawning and nursery grounds in an area that is largely comprised of flat, sandy habitat (ICF 2020). For example, Leonhard et al. (2011) studied fish assemblages one year before and eight years after the construction of the Horns Rev Wind Farm in the North Sea and observed an increase in species diversity close to WTGs, specifically in reef fishes (Leonhard et al. 2011). See Sections 4.5.2.5 and 4.6.2.6 of Volume II for further discussion of the Projects' ecological benefits to benthic and shellfish resources as well as finfish and invertebrates.

3.0 Evolution of the Project Design Envelope

Atlantic Shores is requesting review and authorization of the Projects using a Project Design Envelope (PDE) approach as outlined in the Bureau of Ocean Energy Management's (BOEM's) (2018) draft PDE guidance. The Projects' PDE is summarized in Section 1.1 and more completely described in Section 4.0. This section summarizes Atlantic Shores' siting process and explains how the PDE was developed.

The Projects' PDE includes a reasonable range of designs for proposed components (e.g., foundations, wind turbine generator (WTGs), export cables, onshore elements) and installation techniques (e.g., use of anchored, jack-up, or dynamic positioning [DP] vessels). Identifying a range of design parameters and installation methods allows BOEM to analyze the maximum impacts that could occur from the Projects while providing Atlantic Shores with the flexibility to optimize the Projects within the approved PDE during later stages of the development process. The PDE will enable Atlantic Shores to employ the best available technology, which often outpaces the permitting process, to maximize renewable energy production, minimize adverse environmental effects, address stakeholder concerns, and minimize cost to ratepayers. In developing the PDE, Atlantic Shores focused on ensuring that all components and systems included in the PDE:

- provide safety of structures, equipment, personnel, the public, and the environment;
- comply with all federal, state, and local regulations, permit requirements, and Lease Agreement stipulations;
- have sufficient strength to withstand operational and environmental loads, extreme events (including hurricanes), and accidental events;
- have adequate durability against environmental conditions over the asset's life;
- optimize energy yield of the Lease Area;
- maintain high reliability;
- enable ease of offshore handling, transport, installation, testing, commissioning, operations, maintenance, repairs, decommissioning, and dismantling;
- consider all phases of fabrication, transport, installation, operations, and decommissioning;
- optimize the use of resources and technology to reduce initial and lifetime costs;
- allow the use of local services, suppliers, and labor to the maximum extent possible; and
- avoid or minimize impacts to the public and the environment.

This section describes how key Project attributes were developed in accordance with these principles, including the Projects' layout, onshore and offshore routing, foundation types, and WTG dimensions.

3.1 Development of the WTA Layout

The Wind Turbine Area (WTA) is located in the southern portion of Lease Area OCS-A 0499. Atlantic Shores considered the following criteria to develop the layout of the Projects' WTGs and offshore substations (OSSs) in the WTA:

- **Technical considerations:** Wind resources at the WTA and the power production potential of different layouts were assessed.
- **Existing uses and sensitive areas:** Existing vessel traffic patterns and feedback from agencies and stakeholders (including the U.S. Coast Guard [USCG] and commercial and recreational fishermen) were considered. Layout orientations that minimize impacts to existing marine uses are preferred. Layouts that minimize visual impacts by locating OSSs farther from shore are also preferred.

Based on these criteria, with a specific focus on minimizing effects to existing marine uses, the WTGs for both Projects will be aligned in a uniform grid with multiple lines of orientation allowing straight transit through the WTA. The primary east-northeast to west-southwest transit corridors were selected to align with the predominant flow of vessel traffic; accordingly, WTGs will be placed along east-northeast to west-southwest rows spaced 1.0 nautical mile (nm) (1.9 kilometers [km]) apart to allow for two-way vessel movement (see Figure 3.1-1). The proposed grid also facilitates north to south transit by positioning WTGs along rows in an approximately north to south direction[14] spaced 0.6 nm (1.1 km) apart. The WTG grid will also create diagonal corridors of 0.54 nm (1.0 km) running approximately northwest to southeast as well as diagonal corridors of 0.49 nm (0.9 km) running approximately north-northeast to south-southwest (see Figure 3.1-1).

The OSSs for the Projects will be placed to preserve all of the primary transit corridors and the majority of the secondary corridors. Specifically, the OSS positions for the Projects will also be located along the same east-northeast to west-southwest rows as the WTGs, preserving all of the primary east-northeast transit corridors. The OSSs may be placed between WTGs in the north to south direction (see Figure 3.1-2); however, Atlantic Shores will only position the OSSs in up to three north to south rows to preserve most of the north to south transit corridors. Figure 3.1-2 illustrates how Atlantic Shores has identified up to three areas within the WTA where OSSs may be located; within each of these three areas, any OSSs will be placed within a single north to south row. The three areas where OSSs may be placed include a setback from the shoreline to minimize visual impacts: small OSSs will be placed no closer than 12 miles (mi) (19.3 km) from shore and medium or large OSSs will be placed no closer than 13.5 mi (21.7 km) from shore (OSS sizes are described in Section 4.4).

[14] The north to south rows are oriented at 357 degrees true north.

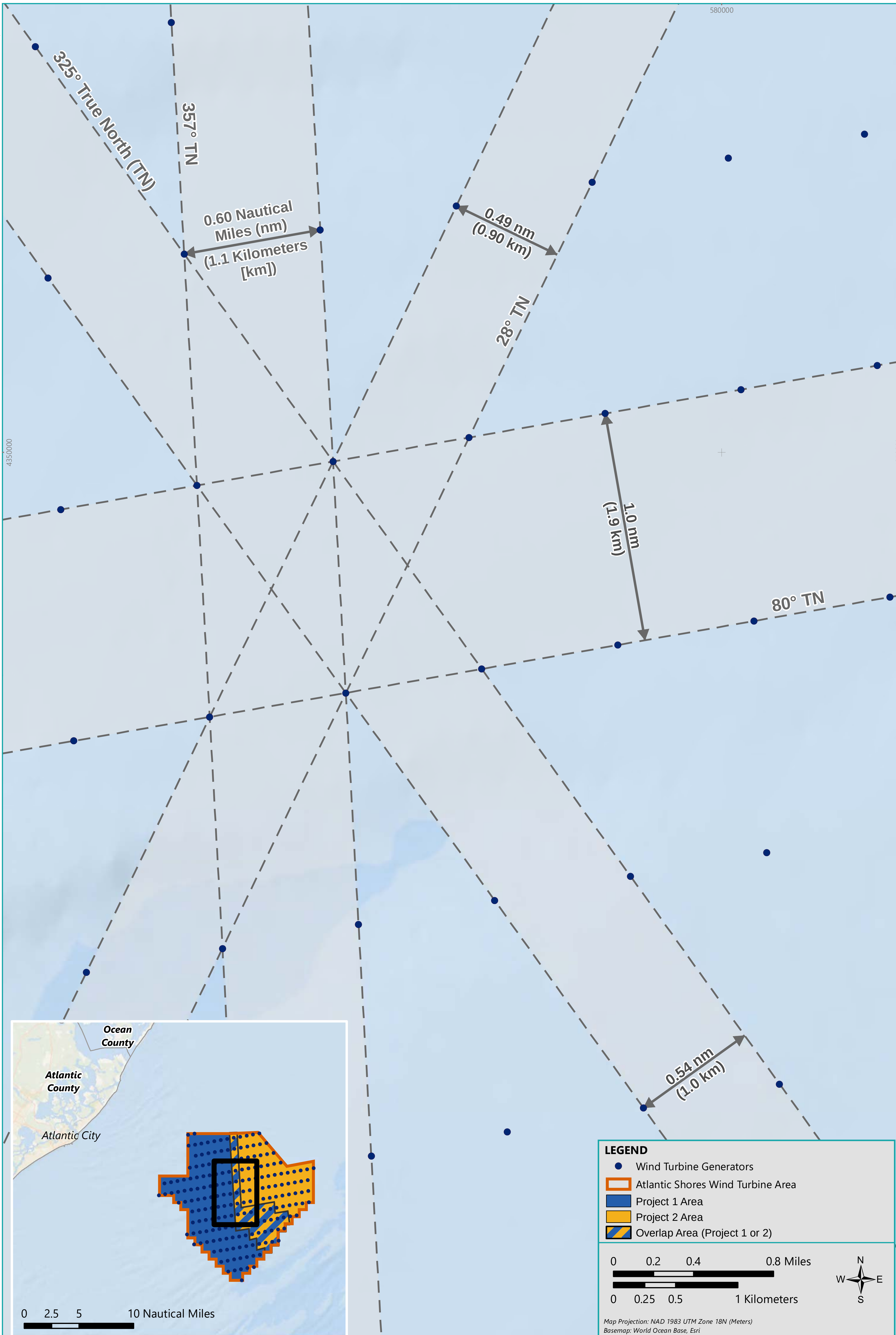

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Figure 3.1-1
WTA Layout

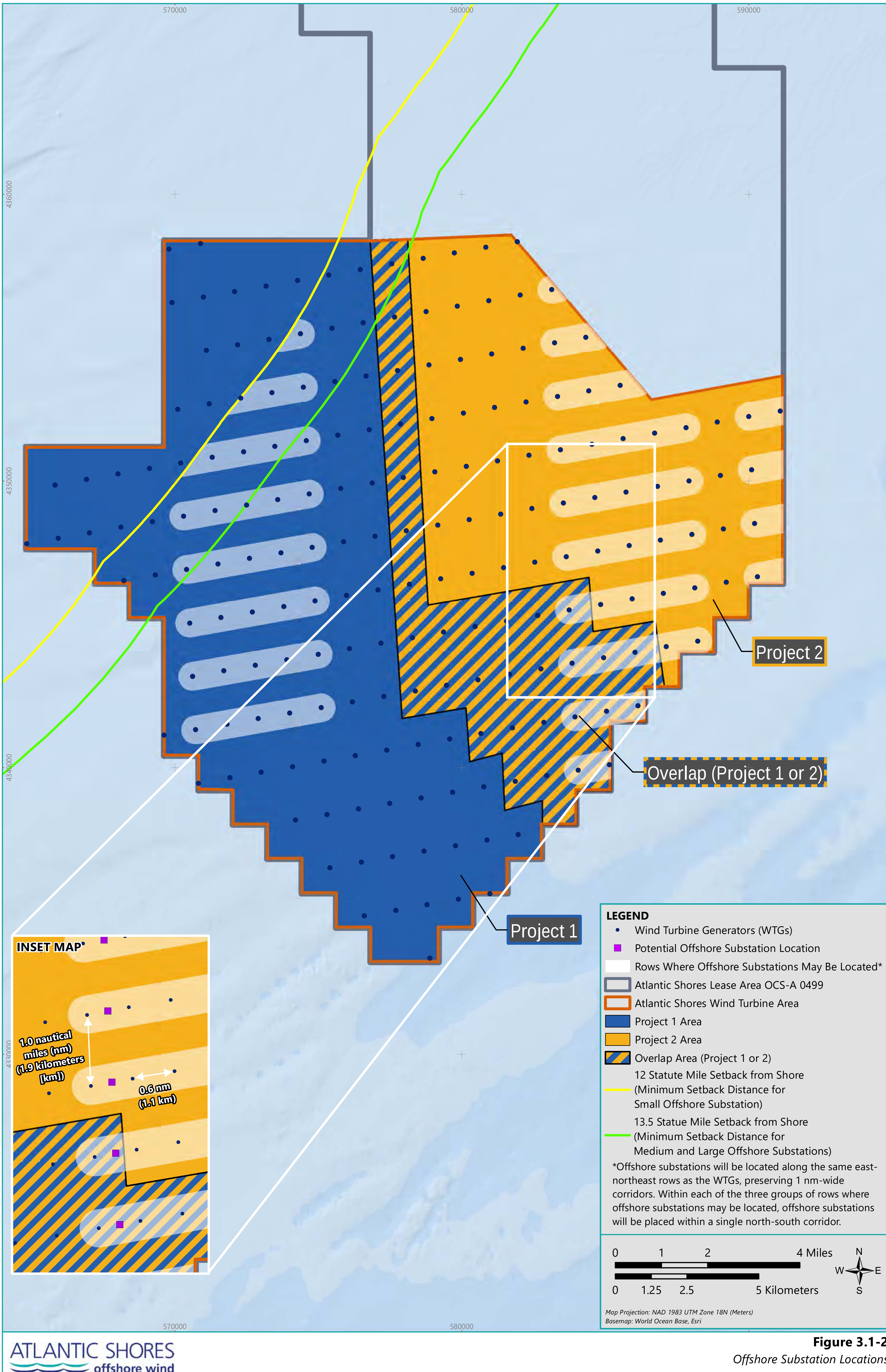

Figure 3.1-2
Offshore Substation Locations

The WTA layout was specifically configured to consider commercial fishing patterns, particularly for the surf clam/quahog dredging fleet, which is the predominant commercial fishery within the WTA (see Section 7.4 Commercial Fisheries and For-Hire Recreational Fishing of Volume II). While the primary direction of fishing vessel traffic varies somewhat across the Lease Area (a northeast to southwest heading is more frequent in the northern portion of the Lease Area whereas a southeast to northwest heading is more common farther south), commercial fishermen and USCG have indicated a preference for a uniform layout across the entire Lease Area to facilitate navigation. A standard and uniform grid pattern is also preferred by USCG to facilitate search and rescue (SAR) missions in the WTA. Thus, the layout of the WTA will be consistent with the layout of the entire Lease Area.

An independent study was conducted by Last Tow LLC on behalf of representatives of the New Jersey surf clam industry to provide Oceanside Marine (a clam fishing fleet based in Atlantic City) and LaMonica Fine Foods (a seafood processor in Millville, New Jersey) with a better understanding of fishing vessel traffic characteristics within the Lease Area (Azavea 2020). Based on 2008-2019 Vessel Monitoring System (VMS) data for several surf clam/quahog fishing vessels that operate in the Lease Area, the study found that a significant majority of fishing vessel traffic (towing and transiting) had headings between east to west and east-northeast to west-southwest (with an average heading of 80 degrees from true north). This finding was supported by the analysis of three years (2017-2019) of Automatic Identification System (AIS) data included in the Projects' Navigation Safety Risk Assessment (NSRA) (see Table C.11 in Appendix II-S), which showed that 46% of fishing vessels transit the Lease Area along tracks that range in orientation between east to west and northeast to southwest. The remaining fishing vessel traffic (approximately 34%) and a significant proportion of the recreational vessel traffic transit north to south; this traffic will be accommodated by the approximately north to south corridors.

Atlantic Shores anticipates that larger commercial vessels (e.g., cargo, tanker, passenger, and tug-barge vessels), which have dominant north to south transit headings, will route around the WTA and not through it. The additional time required to travel around versus through the WTA was estimated to be on the order of 15 to 20 minutes. This re-routing of commercial traffic is clearly recognized in the recent Atlantic Ocean Port Access Routing Study (ACPARS) performed by the USCG in 2016, which has led into an Advanced Notice of Proposed Rulemaking (USCG 2020b) with the identification of a deep draft fairway to the east of the WTA, termed the St. Lucie to New York Fairway, and a proposed Tow Tug Extension Lane to the west of the WTA. However, the WTA will not be closed to commercial vessel traffic. Should commercial vessels choose to transit the WTA, based on USCG recommended guidelines for corridor spacing (USCG 2020a), the 0.6-nm-wide (1.1-km-wide) approximately north to south transit corridors are expected to facilitate commercial vessel traffic for vessels up to 87 to 144 feet (ft) (27 to 44 meters [m]) in length.[15] See the NSRA provided as Appendix II-S for further discussion of the layout's potential effects on maritime navigation and USCG SAR activities.

Atlantic Shores evaluated and eliminated the possibility of using the same layout proposed by the Ocean Wind Project in Lease Area OCS-A 0498, which abuts the WTA to the southwest, based on recommendations of the USCG and commercial fishing industry. As shown on Figure 3.1-3, the predominant direction of vessel traffic varies considerably between Lease Area OCS-A 0499 and Lease Area OCS-A 0498. Atlantic Shores presented the option of a layout that is consistent with Ocean Wind to the USCG on March 31, 2020, and the USCG recommended that Atlantic Shores align its layout with the predominant direction of vessel traffic within its Lease Area rather than align with Ocean Wind. Atlantic Shores also met with commercial fishermen on April 16, 2020, to discuss the potential layout. Representatives from the surf clam industry (which is the highest revenue fishery within the WTA) provided feedback that a proposed layout with east-northeast rows was best for their transiting and towing activities.

3.2 Onshore Facility Siting

While both Project 1 and Project 2 will be electrically distinct from one another, the Projects require the ability to interconnect at two POIs to accommodate the maximum amount of electricity that could be generated by the Projects. Therefore, the Projects require two POIs and, consequently, two onshore interconnection cable routes and two landfall sites. To identify the locations of the Projects' onshore facilities, Atlantic Shores conducted an onshore routing assessment through an inter-related process that identified options for landfall sites and onshore interconnection cable routes to existing POIs. Identification of landfall sites and onshore interconnection cable routes in New Jersey is constrained by the density of development along the shorelines and built infrastructure inland. This siting must also account for the area required for horizontal directional drilling (HDD) staging areas as well as the physical dimensions required to install an underground transition vault that connects the export cables and the onshore interconnection cables.

3.2.1 Points of Interconnection

Five potential POIs within New Jersey (see Table 3.2-1) were identified based on their proximity to the coastline and their environmental and technical attributes (e.g., substation voltage, potential for expansion, upgrades required to accommodate the Projects' interconnection). These five POIs were used to evaluate potential onshore interconnection cable routes from the landfall sites to the POIs.

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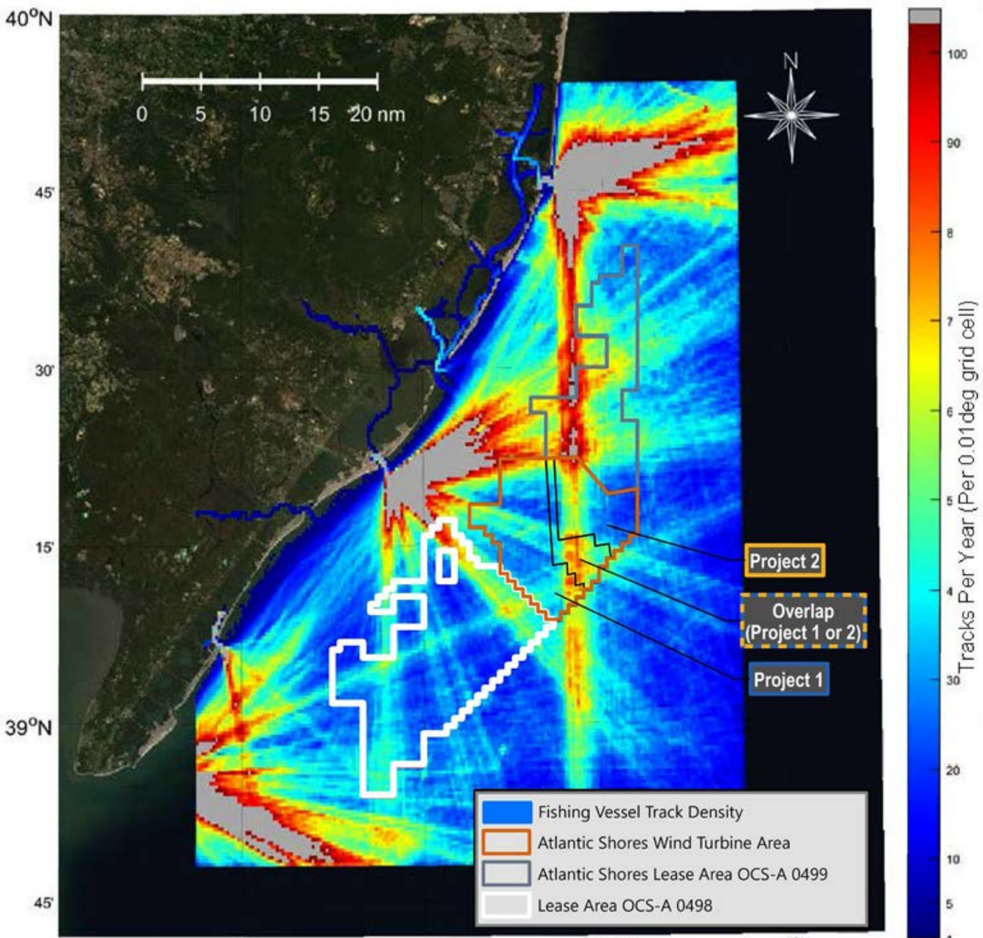
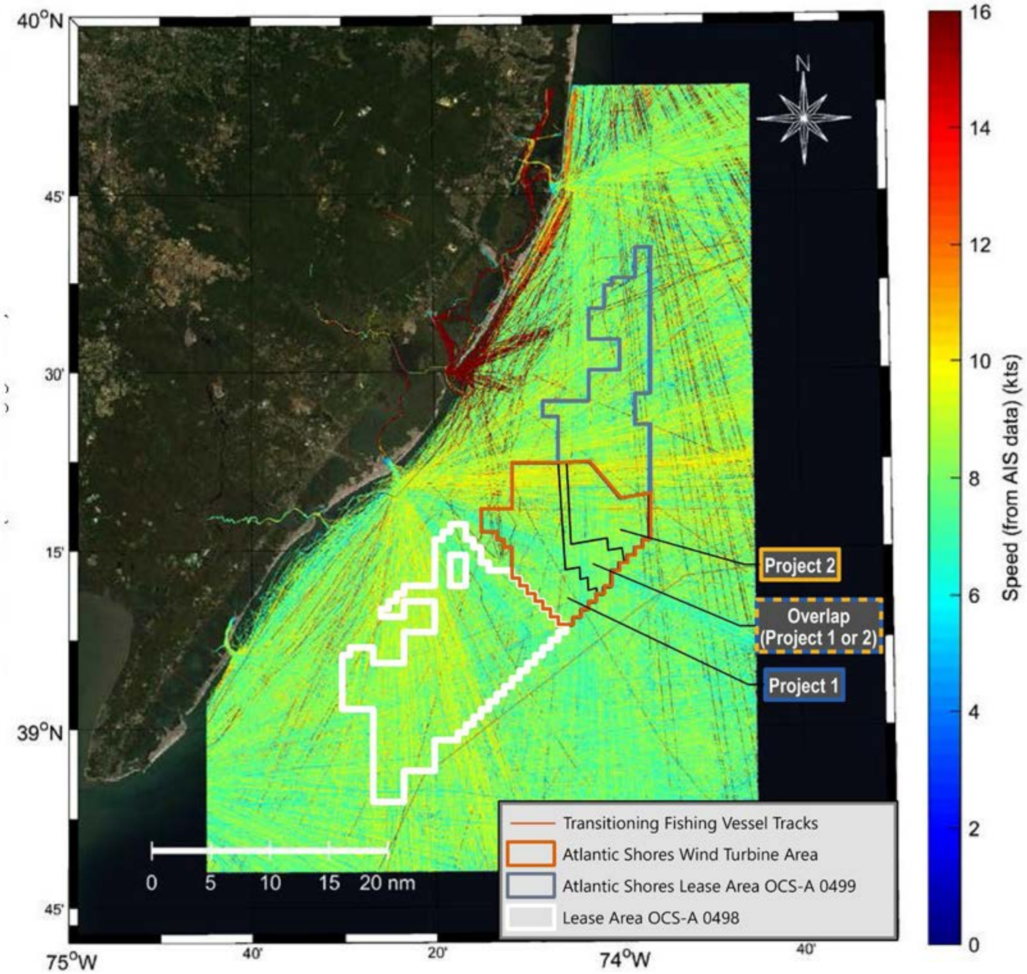
[15] The corridor spacing guidelines include two navigation paths that are each four vessel lengths wide, two collision avoidance zones that are each 1.5 vessel lengths wide, two safety margins that are each six vessel lengths wide, and a 164 ft (50 m) or 820 ft (250 m) safety zone around each WTG. See Section 8.1 of the NSRA in Appendix II-S for further discussion of allowable transit corridor widths.



AIS Fishing Vessel Traffic Density (2017-2019)



AIS Transiting Fishing Vessel Tracks (2017-2019)

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Figure 3.1-3

Automatic Identification System (AIS) Fishing Vessel Traffic Offshore New Jersey

Table 3.2-1 Potential Points of Interconnection

Potential POIs	County
Larrabee	Monmouth
Cardiff	Atlantic
Lewis	Atlantic
Oyster Creek	Ocean
BL England	Cape May

3.2.2 Landfall Sites

Atlantic Shores conducted a siting evaluation of potential landfall sites that was largely based on parcel size, surrounding land use, and proximity to established linear development corridors (e.g., roadway and utility right-of-way [ROW]) that could serve as an onshore interconnection cable route. The specific siting criteria used to identify potential landfall sites included the following:

- **Technical considerations:**
  - The landfall sites require adequate open space onshore and in proximity to the coastline to accommodate the underground transition vaults and required HDD staging areas.
  - Landfall sites with offshore water depths that are deep enough to accommodate a cable laying vessel at the offshore HDD entrance/exit point are preferred.
- **Site characteristics:** The Projects require areas that are either undeveloped or consist of surface development (i.e., parking lots), without conflicting subsurface infrastructure.
- **Existing uses and sensitive areas:** Preferred landfall sites are not located proximate to residential communities and other sensitive receptors such as wildlife management areas, state parks, and other protected open spaces, which make up most of the open land along the New Jersey coast.

Based on these criteria, aerial photographs of the coastline were manually analyzed to determine candidate landfall sites. A total of 10 potential landfall sites were initially identified, as presented in Table 3.2-2 and shown on Figure 3.2-1.

Table 3.2-2 Landfall Sites

Landfall Site	Potential POI	Approximate Size	Latitude	Longitude
Wesley Lake	Larrabee	<1 acre (<0.004 [square kilometer] km^2)	40.218344	-74.004783
Monmouth	Larrabee, Oyster Creek	164 acres (0.66 km^2)	40.121597	-74.033785
Island Beach State Park	Larrabee, Oyster Creek	2,200 acres (8.9 km^2)	39.904109	-74.081359
Abbott Avenue	Larrabee, Oyster Creek	2 acres (0.008 km^2)	39.543841	-74.255182
Jeffrey Avenue	Larrabee, Oyster Creek	<1 acre (<0.004 km^2)	39.539932	-74.259552
Roosevelt Avenue	Larrabee, Oyster Creek	3 acres (0.01 km^2)	39.534552	-74.262262
North Atlantic City	Cardiff, Lewis	<1 acre (<0.004 km^2)	39.364038	-74.413007
Bader Airfield	Cardiff, Lewis	143 acres (0.58 km^2)	39.359757	-74.455573
Atlantic	Cardiff, Lewis	2 acres (0.008 km^2)	39.351952	-74.450009
Corson's Inlet	BL England	42 acres (0.17 km^2)	39.216859	-74.642799

3.2.3 Onshore Interconnection Routes

From each landfall site, Atlantic Shores conducted an iterative onshore interconnection cable routing assessment to each of the five POIs. The routing assessment was supported by aerial photography, publicly available Geographic Information Systems (GIS) environmental data, and baseline windshield surveys. Based on this routing analysis, 16 preliminary onshore interconnection cable routes were identified as shown in Figure 3.2-1.

A set of environmental and feasibility criteria were identified and weighted to establish and evaluate each onshore interconnection cable route. Route ranking was based on the following criteria:

- **Technical considerations:**
  - Shorter route lengths are preferred to reduce overall potential impacts and installation costs.
  - A lower number of hard route angles requiring a dead-end or corner transmission structure is preferred since hard route angles are more challenging and costly to construct.
- **Site characteristics:** Routes utilizing established ROWs for larger highways, state routes, existing transmission lines, or railroads are preferred because of the widespread development along the coast that prevents the establishment of a new ROW.

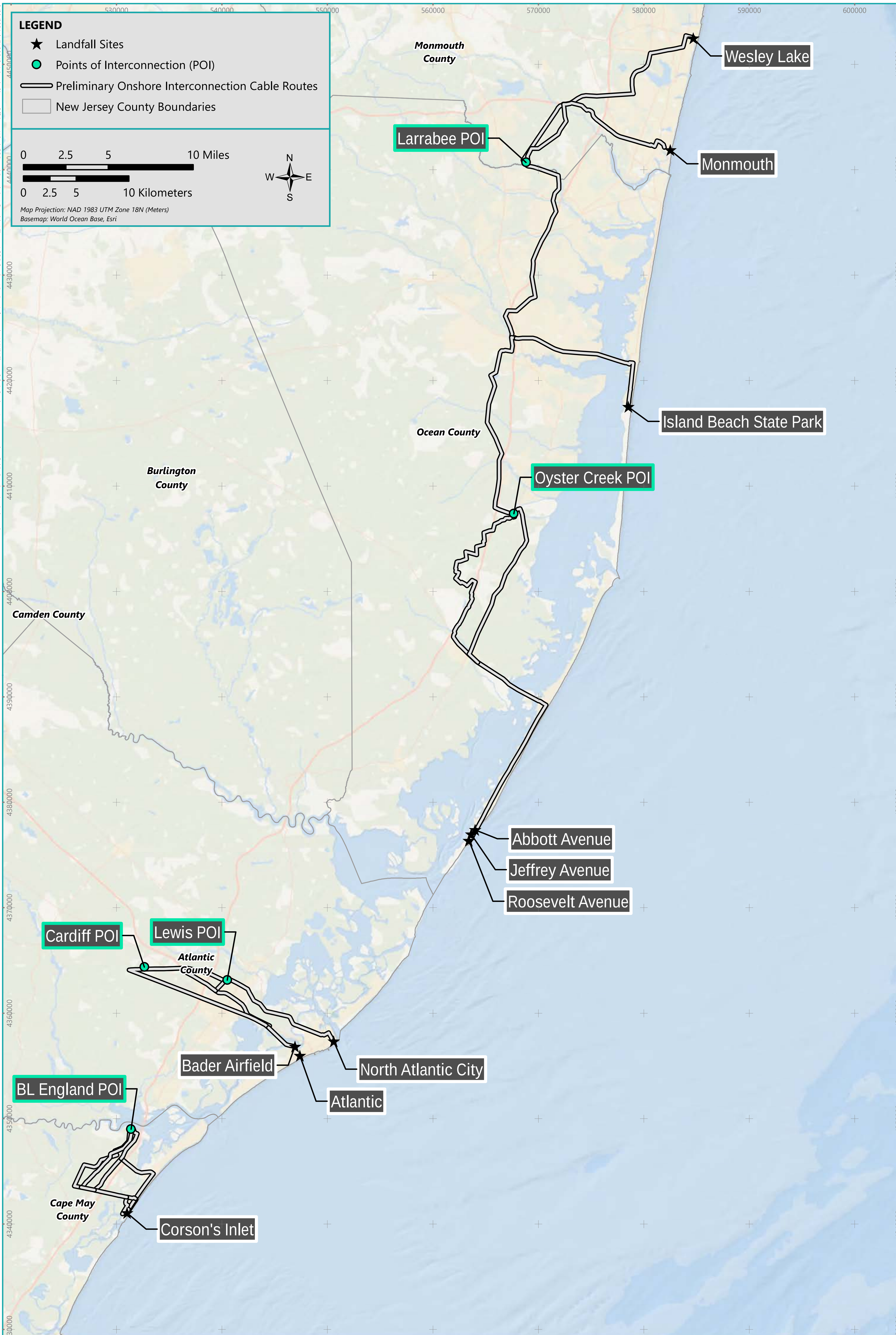

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Figure 3.2-1

Onshore Interconnection Cable Routing Analysis

- **Existing uses and sensitive areas:**
  - Routes that avoid or minimize the distance of the onshore interconnection cable route in or within proximity to residential neighborhoods are preferred to reduce temporary, construction-related noise impacts.
  - Routes that minimize impacts to mapped threatened and endangered species habitat, tidelands, and wetlands are preferred.

3.2.4 Preferred Onshore Interconnection

Based on this evaluation, landfall sites and onshore interconnection cable routes to the Cardiff and Larrabee POIs are preferred. Each provides suitable landfall sites and shorter, more direct routes that utilize existing linear infrastructure with established ROWs and that avoid or minimize impacts to residential and natural areas when compared with other alternatives. Given that multiple routes to both Cardiff and Larrabee POIs were identified, the onshore interconnection cable routes were further analyzed by conducting windshield surveys. Atlantic Shores selected the Monmouth and Atlantic Landfall Sites and the corresponding Larrabee and Cardiff Onshore Interconnection Cable Routes for inclusion in the PDE based on observations made during the windshield surveys, engineering considerations, real estate requirements, and consultation with the New Jersey Department of Environmental Protection (NJDEP) (see Figure 3.2-2).

3.3 Export Cable Routing

Atlantic Shores identified nine preliminary export cable routes from the Lease Area boundary[16] to the 10 landfall sites as shown in Figure 3.3-1. The preliminary export cable routes were refined using publicly available data to map routes with the lowest risk for potential conflict with export cable installation. Data sources and criteria used in this analysis included the following:

- **Technical considerations:** The physical attributes of a cable route, such as cable bending radius, length, and distance to installation hazards, were considered in the evaluation of each route.
- **Site characteristics:**
  - Water depth maps were used to confirm feasibility for cable installation tools and to identify any areas of steep slopes, which are not preferred due to expected installation constraints.

[16] Atlantic Shores identified preliminary export cable routes that terminated at the Lease Area boundary. Once preferred export cable routes were identified, they were extended to the WTA boundary.

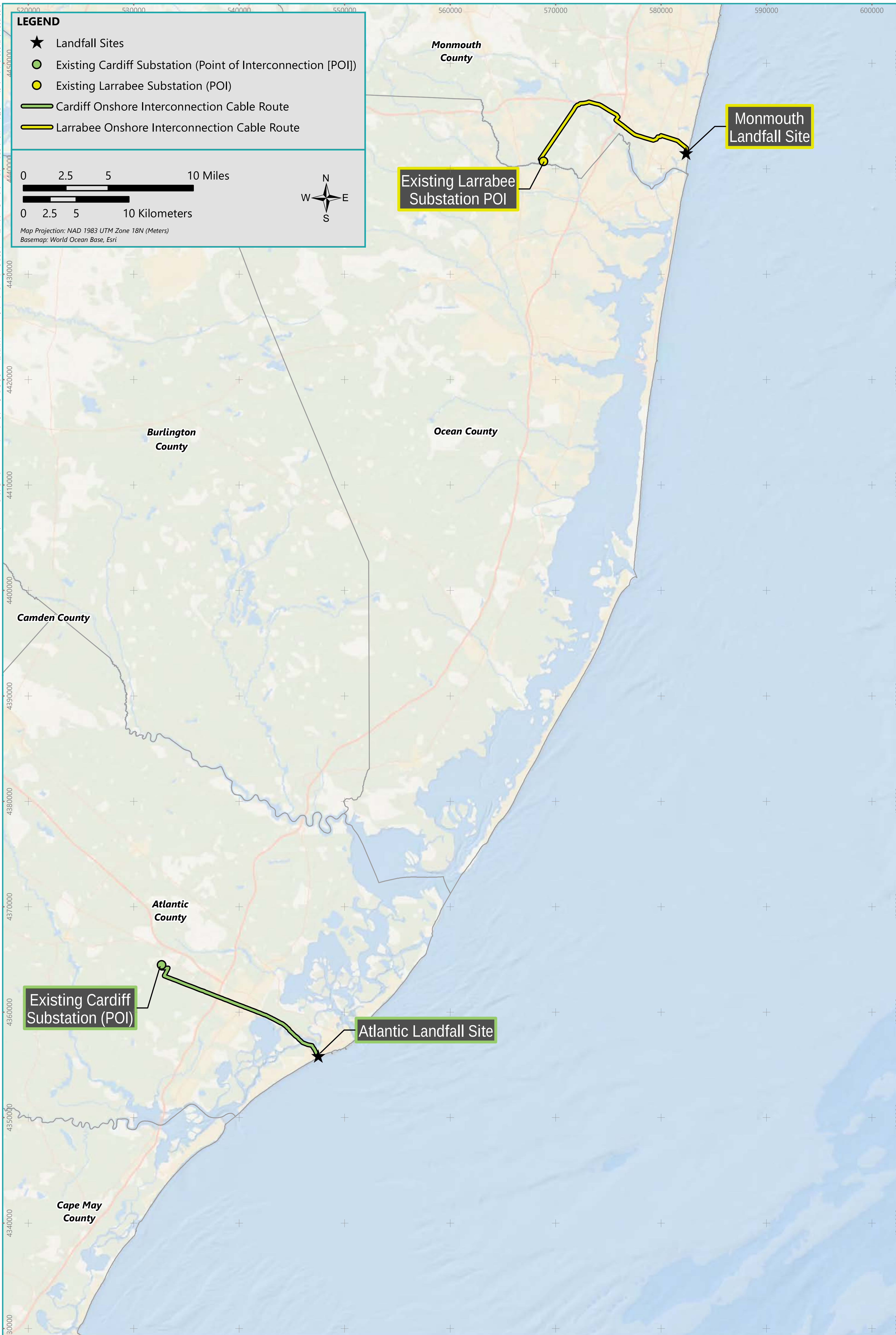

Figure 3.2-2

Preferred Onshore Interconnection Cable Routes

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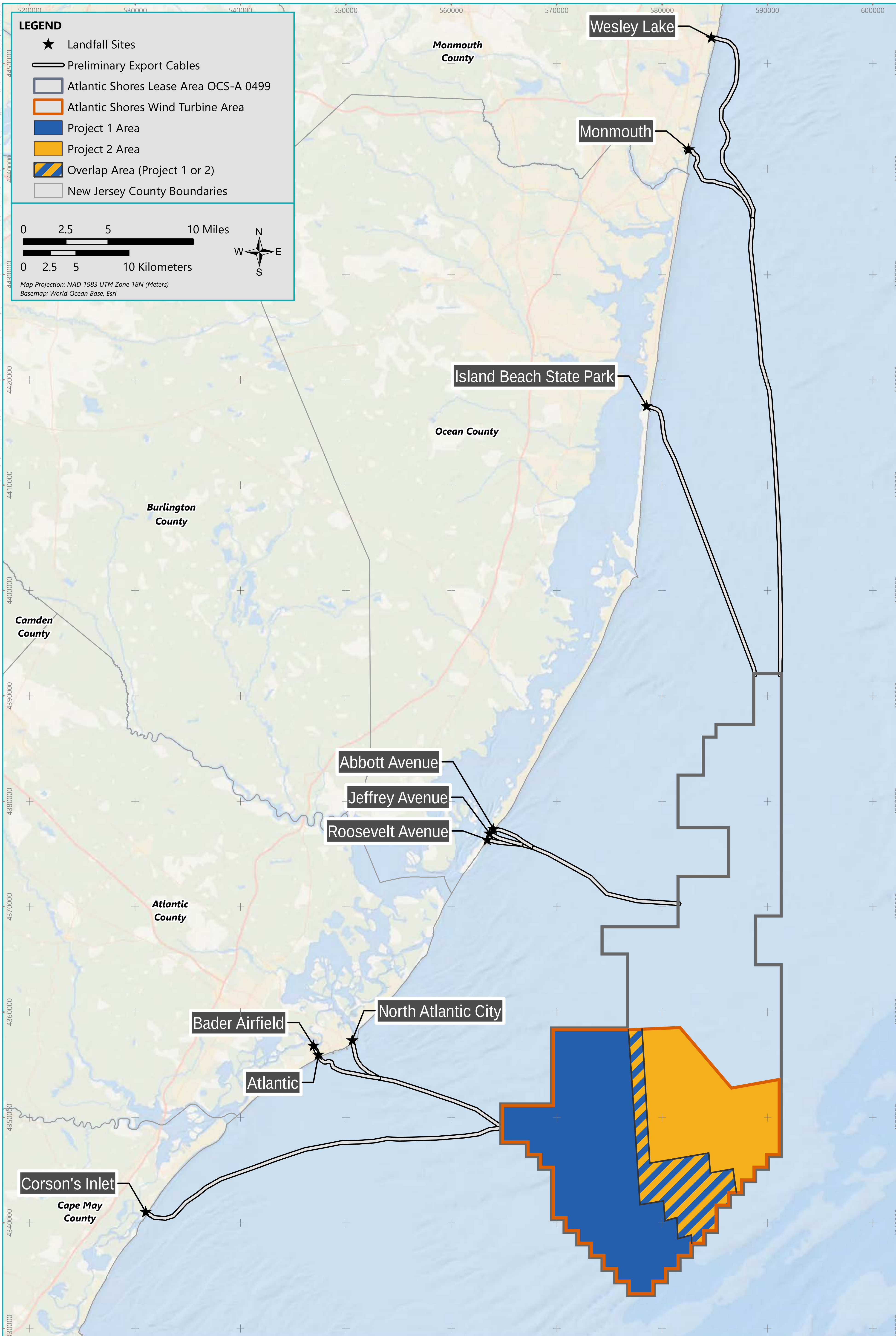

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Figure 3.3-1

Export Cable Routing Analysis

- Publicly identified surficial and shallow geological characteristics were used to confirm feasibility for cable installation tools and to assess whether mobile sediments were present; areas of mobile sediments are not preferred because they may pose a risk of over-burial or exposure of the cable. Sandy sediments are preferred over rocky, stiff, or very fine sediments to ensure cable burial to a sufficient depth.

- **Existing uses and sensitive areas**:
  - Cable routes that avoid mapped shipwrecks are preferred to reduce impacts to cultural resources and potential installation challenges.
  - Cable routes that avoid navigation channels or cross such channels as close to perpendicular as possible to minimize the crossing distance are preferred.
  - Cable routes that avoid or minimize impacts to sensitive habitats for fish and other marine wildlife, such as artificial and natural reefs and other known critical habitat locations, are preferred.
  - Cable routes that avoid or minimize the number of crossings of mapped offshore cables and pipelines, or known future offshore cables, are preferred. If a crossing is required, a route that allows the crossing to be as close to perpendicular as possible (to minimize the crossing distance) is preferred.
- **Hazards:**
  - Cable routes were selected to avoid known hazards, including rock outcrops, submerged infrastructure, and other structures or objects that present a hazard to vessel navigation.
  - Cable routes were selected to avoid mapped munitions and explosives of concern (MEC) (e.g., bombs, bullets, shells, grenades, mines, etc.) and military areas given safety considerations.
  - Cable routes were selected to avoid dredged material disposal areas and dumping grounds given the potential for cable installation constraints and the presence of contaminated sediments.

The preliminary export cable routes incorporated the above criteria to the maximum extent practicable. Atlantic Shores also considered the shortest technically feasible corridor length to minimize electrical line losses, the cost and complexity of cable installation, and environmental impacts associated with cable installation. Ultimately, the above assessment identified feasible export cable routes to both the Atlantic and Monmouth Landfall Sites, as shown on Figure 3.3-2. The export cable routes to the Atlantic and Monmouth Landfall Sites are preferred because they connect to the preferred landfall sites and POIs identified in Section 3.2.4.

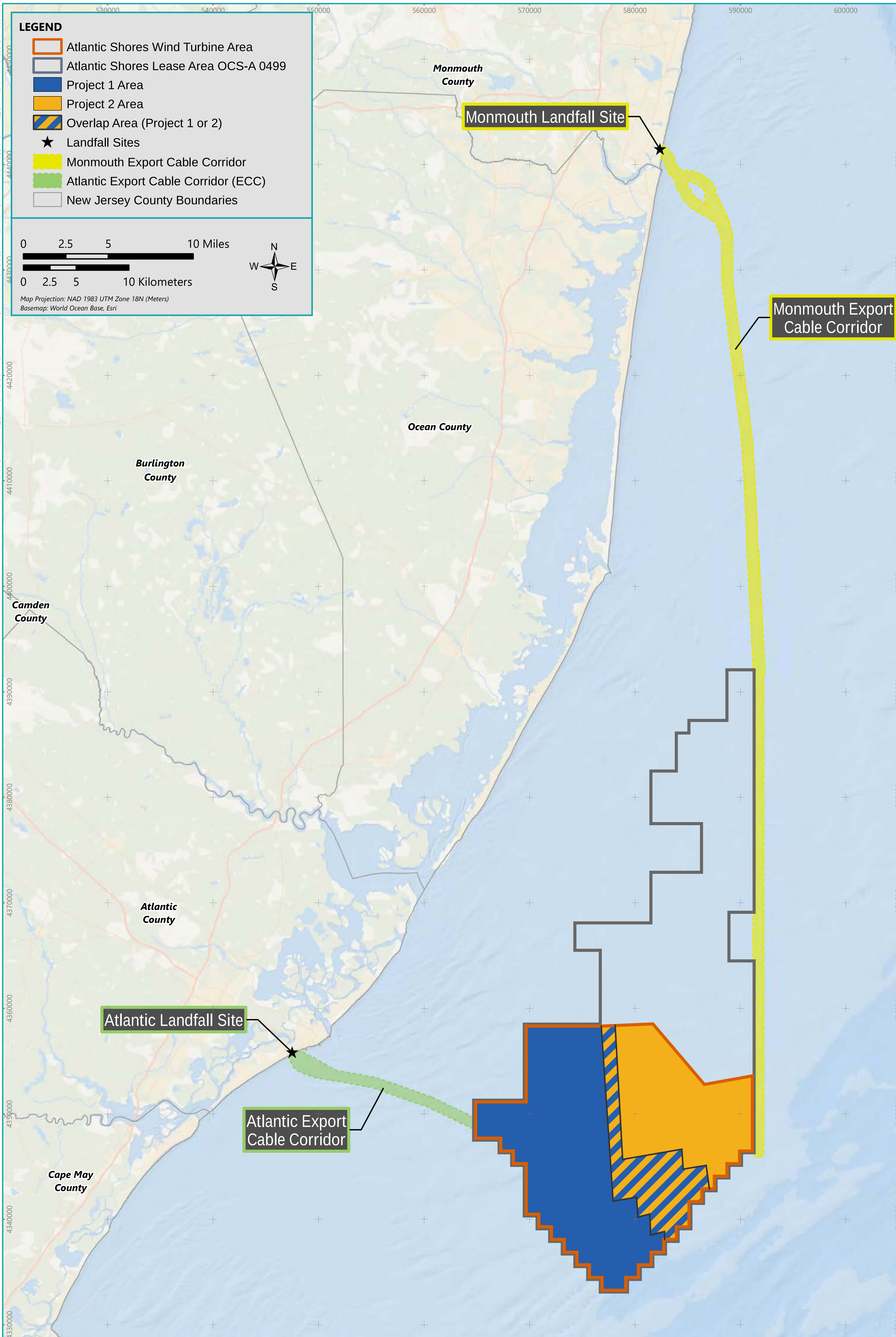

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Figure 3.3-2

Preferred Offshore Export Cable Routes

The export cable routes to the Monmouth and Atlantic Landfall Sites, as shown on Figure 3.3-2, were further refined and developed into the Monmouth and Atlantic Export Cable Corridors (ECCs). The width of each ECC ranges from approximately 3,300 to 4,200 ft (1,000 to 1,280 m) for all of the Monmouth ECC and most of the Atlantic ECC, though the Atlantic ECC widens to approximately 5,900 ft (1,800 m) near the Atlantic Landfall Site (see Figure 1.1-2 and Section 4.5.2.1). Atlantic Shores is defining this corridor width to provide flexibility in the early stages of the geophysical and geotechnical evaluation of each ECC. Such an approach is consistent with recommended best practices for cable spacing at a project's initial permitting phase (such as DNV GL [2016]). Maintaining this corridor width allows Atlantic Shores to optimize final cable alignments within the corridor to avoid resources, such as shipwrecks and sensitive habitats, to the greatest extent possible. This width also provides adequate space for cable installation vessels and any associated anchoring lines (i.e., to ensure any anchoring occurs within the surveyed corridor), particularly near the landfall sites where anchoring may be required.

Specific cable alignments within the ECCs will be optimized pending ongoing analysis of geophysical and geotechnical data as part of the cable route engineering process. Once the cable route engineering process has sufficiently progressed, Atlantic Shores will formally request offshore cable easement(s) from BOEM. In order to provide the minimum required spacing between the four export cables in each ECC (see Section 4.5.2.1) and to allow adequate room for potential future cable repairs, Atlantic Shores anticipates requiring an easement within each ECC that is wider than the 200 ft (61 m) width listed in 30 CFR §§ 585.507(1) and 585.628(g). Atlantic Shores will coordinate with BOEM on the easement request.

3.4 Foundation Type Selection

Atlantic Shores is considering fixed foundation types for both the WTGs and the OSSs. An extensive evaluation of all viable foundation types was undertaken. This evaluation of foundation types considered the following:

- **Technical and logistical considerations**:
    - Each potential foundation's ability to support the sizes of the OSS topsides and WTGs included within the PDE was assessed.
    - Construction logistics for each potential foundation type were reviewed to evaluate the feasibility of each foundation type, including the availability of suitable ports within reasonable proximity to the WTA.
    - Each potential foundation's market availability was assessed.
- **Site characteristics:** Seafloor conditions, sediment characteristics, meteorological and oceanographic (metocean) conditions, and water depths within the WTA were used to evaluate the suitability of potential foundation types for the site.

Based on this analysis, Atlantic Shores determined that piled, suction bucket, and gravity foundations are all suitable to include in the PDE (see Sections 4.2 and 4.4). Any fixed foundation designs that are not technically mature or are not expected to be commercially available in time for the Projects' expected development schedules were omitted from further evaluation. It should be noted that floating foundations were not considered because water depths in the WTA are too shallow for those options to be technically and economically viable.

To determine the sizing of the foundations, a combination of industry benchmarking and engineering studies was conducted using multiple WTG sizes and site-specific data for the WTA (e.g., metocean criteria and preliminary sediment profiles).

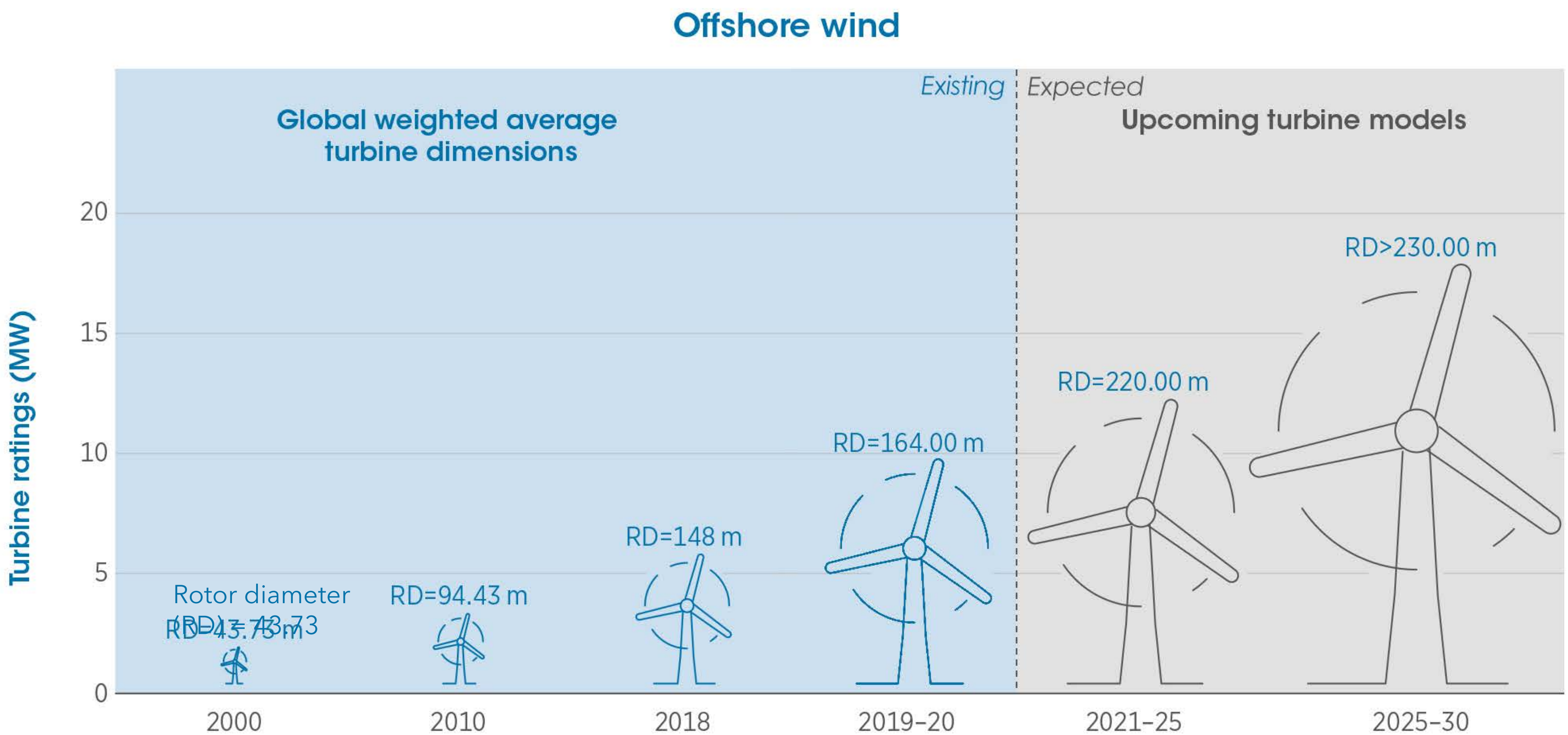
Overall, the WTA is suited for a range of foundation types due to its shallow water depths, favorable geotechnical and geophysical conditions (see Section 2.0 Environmental Setting of Volume II), and proximity to local ports and industry (see Section 4.10.3). All concepts identified in the PDE are technically feasible and sized to capture the potential development scenarios.

3.5 WTG Dimension Selection

Atlantic Shores conducted a market assessment to identify WTGs anticipated to be commercially available within the Projects' expected development schedules. To perform this evaluation, Atlantic Shores worked with three global leading suppliers to assess historic and projected market trends. As part of assessing the potential WTGs that may be available, Atlantic Shores also considered the following key criteria:

- **Technical considerations:** The Projects require high reliability and sufficient energy yield.
- **Site characteristics:** The Projects require WTGs that are suitable for the expected metocean conditions at the WTA, including severe weather events such as hurricanes.

The WTG dimensions included in the PDE are indicative of the maximum dimensions of WTGs anticipated to be commercially available within the Projects' expected development schedules. As shown on Figure 3.5-1, WTG sizes are increasing significantly every few years. Within the last decade (2010-2020), rotor diameters have nearly doubled—increasing from an average of 295 ft (90 m) to an average of 538 ft (164 m). The rapid pace of increasing WTG size is apparent in the first few existing and planned projects in the U.S. The Block Island Wind Farm completed installation in 2016 and includes five, 6 megawatt (MW) WTGs (Green City Times 2020). The Coastal Virginia Offshore Wind project completed installation four years later in 2020 and includes two, 6 MW WTGs (Windfair 2020). The Vineyard Wind 1 project expects to complete installation by the end of 2023 and includes 13 MW WTGs (Vineyard Wind 2020). Such increases in WTG sizes are expected to continue into the next decade and beyond, especially as more offshore wind projects are announced and constructed. Given current trends, smaller turbines (such as 10 to 12 MW WTGs) are expected to be phased out from commercial use by the Projects' expected development timeframe.



Source: Adapted from IRENA 2019

Source: GE Renewable Energy, 2018; IRENA, 2019c, 2016b; MHI Vestas, 2018.

Figure 3.5-1

Wind Turbine Generator Size Projections

The PDE for WTGs includes the maximum rotor diameter and rotor area, blade tip height, and hub height for WTGs that may be commercially available, as well as a minimum blade tip clearance that may occur, but it is not expected that the extreme range of the PDE for each component would be used in any selected WTG. Ultimately, the use of a PDE allows Atlantic Shores to define a range of dimensions for WTGs expected to be commercially available within the Projects' development schedule so that Atlantic Shores has the flexibility to utilize available technology at the time of construction without permitting delays.

4.0 Project Design and Construction Activities

This section provides a detailed description of the Projects' facilities (see Figure 1.1-2), which have been selected for the Project Design Envelope (PDE) based on the siting and design evolution process outlined in Section 3.0. This section also outlines the Projects' construction sequence and schedule along with a detailed description of the design of each major component of the Projects (e.g., wind turbine generator [WTGs], offshore substations [OSSs], offshore cables, onshore facilities) and the process for construction and installation.

4.1 Infrastructure Overview and Schedule

4.1.1 Project Design Envelope Overview

The Projects include the following elements:

- Up to 200 WTGs, each with a maximum rotor diameter of approximately 919 feet (ft) (280 meters [m]), will be installed on three main foundation types (piled, suction bucket, and gravity foundations) (see Sections 4.2 and 4.3).
- A combined maximum of up to 200 wind turbine generators (WTGs) inclusive of the Overlap Area[17]:
    - Project 1: a minimum of 105 WTGs to a maximum of 136 WTGs.
    - Project 2: a minimum of 64 WTGs to a maximum of 95 WTGs.
- Up to 10 small offshore substations (OSSs), up to five medium OSSs, or up to four large OSSs will serve as common collection points for power from the WTGs and also serve as the origin for the export cables that deliver power to shore (see Section 4.4).
    - Project 1: up to five small OSSs, two medium OSSs, or two large OSSs.
    - Project 2: up to five small OSSs, three medium OSSs, or two large OSSs.
- Up to 547 miles (mi) (880 kilometers [km]) of high voltage alternating current (HVAC) inter-array cables will connect strings of WTGs to a shared OSS (see Section 4.5).
    - Project 1: up to 273.5 mi (440 km) of HVAC inter-array cables.
    - Project 2: up to 273.5 mi (440 km) of HVAC inter-array cables.

[17] The number of WTGs in Project 1, Project 2, and the associated Overlap Area will not exceed 200 WTG locations. For example, if Project 1 includes 105 WTGs (the minimum) then the Overlap Area would be incorporated into Project 2 which would include the remaining 95 WTGs; and conversely if the Overlap Area is incorporated into Project 1 such that it includes 136 WTGs, then Project 2 would be limited to 64 WTGs. Each Project may also use only part of the Overlap Area.

- Up to 37 mi (60 km) of HVAC inter-link cables may be used to connect OSSs to each other (see Section 4.5).
  - Project 1: up to 18.6 mi (30 km) of HVAC inter-link cables connecting to OSSs.
  - Project 2: up to 18.6 mi (30 km) of HVAC inter-link cables connecting to OSSs.
- Up to eight total HVAC and/or HVDC export cables will be installed in two offshore Export Cable Corridors (ECCs), the Atlantic ECC and the Monmouth ECC, that are each approximately 3,300 to 4,200 ft (1,000 to 1,280 m) wide (see Section 4.5).
  - The length per cable is approximately 25 mi (40 km) in the Atlantic ECC.
  - The length per cable is approximately 85 mi (138 km) in the Monmouth ECC.
- Up to one permanent meteorological (met) tower and up to four temporary meteorological and oceanographic (metocean) buoys may be installed within the Wind Turbine Area (WTA) (see Section 4.6).
  - Project 1: one permanent met tower and up to three temporary metocean buoys
  - Project 2: up to one temporary metocean buoy
- The Projects will utilize either or both of two onshore interconnection cable routes, which will each contain up to 12 onshore interconnection cables that are installed within buried concrete duct banks (see Sections 4.7 and 4.8).
  - The Cardiff Onshore Interconnection Cable Route is approximately 12 mi (19 km).
  - The Larrabee Onshore Interconnection Cable Route is approximately 12 mi (19 km).
- The Projects will utilize either or both of two onshore substation sites (one for each point of interconnection [POI]); the substations will step-up or step-down the onshore interconnection cable voltage in preparation for grid interconnection (see Section 4.9).
- The Cardiff POI is located in Atlantic County, New Jersey, and the Larrabee POI is located in Monmouth County, New Jersey.
- A proposed new operations and maintenance (O&M) facility in Atlantic City, New Jersey will support the Projects' operations (see Section 5.5).
- Existing port facilities in New Jersey, New York, the Mid-Atlantic, New England, the U.S. Gulf Coast, and/or overseas will be used to support the Projects' construction and operations (see Sections 4.10.3 and 5.5).

4.1.2 Project Construction Process and Schedules

The proposed construction schedule is shown in Table 4.1-1. To maximize construction synergy and efficiency, the construction schedules for Project 1 and Project 2 assumes the same installation teams and equipment (e.g., vessels) will be used to support the construction of both Projects. This strategy will limit demobilization and remobilization of equipment and crews which will help to reduce construction costs, increase schedule efficiency, and minimize environmental effects (e.g., emissions, vessel transits). This procedure will also provide continuous fabrication in manufacturing facilities to maintain employment and increase productivity. It will also reduce delays in the Federal permitting schedule tied to a Project's Final Investment Decision (FID) and allow Atlantic Shores to secure production slots. This strategy would also result in significant benefits to ratepayers, which is a critical component of state OREC solicitations.

Table 4.1-1 Anticipated Construction Schedule

Activity	Duration[a]	Expected Timeframe[b]	Project 1 Start Date	Project 2 Start Date
Onshore Interconnection Cable Installation	9 - 12 months	2024 - 2025	Q1-2024	Q1-2024
Onshore Substation Construction	18 - 24 months	2024 - 2026	Q1-2025	Q1-2025
Export Cable Installation	6-9 months	2025	Q2-2025	Q3-2025
OSS Installation and Commissioning	5-7 months	2025 - 2026	Q2-2026	Q2-2026
WTG Foundation Installation[c]	10 months	2026 – 2027	Q1-2026	Q1-2026[c]
Inter-Array Cable Installation	14 months	2026 - 2027	Q2-2026	Q3-2026[d]
WTG Installation and Commissioning	17 months	2026 - 2027	Q2-2026	Q1-2027[d]

Notes:

a) These durations assume continuous foundation structure installation without consideration for seasonal pauses or weather delays; anticipated seasonal pauses are reflected in the expected timeframe.

b) The expected timeframe is indicative of the most probable duration for each activity; the timeframe could shift and/or extend depending on the start of fabrication, fabrication methods, and installation methods selected.

c) The expected timeframe depends on the foundation type. If piled foundations are utilized, pile-driving will follow a proposed schedule from May to December to minimize risk to North Atlantic Right Whale. No simultaneous pile driving is proposed.

d) The expected timeframe is dependent on the completion of the preceding Project 1 activities (i.e., Project 1 inter-array cable installation and WTG installation) and the Project 2 foundation installation schedule.

As shown in Figure 4.1-1, construction of each Project will initiate with the onshore facilities, including the onshore substations and onshore interconnection cables. The onshore facilities for each Project will be constructed first so that power from the electrical grid can be used to energize, commission, and maintain each Project's offshore facilities (e.g., the OSSs and WTGs) as soon as possible after their installation. Construction of the offshore facilities is expected to begin with installation of the export cables and the WTG and OSS foundations (including scour protection). Once the OSS foundations are installed, the topsides can be installed and commissioned, and the inter-link cables (if used) can be installed. At each WTG position, after the foundation is installed, the associated inter-array cables and WTGs can be installed (if WTGs are not installed onto gravity-base structure [GBS] foundations at port). Given the number of WTG and OSS positions, there is expected to be considerable overlap in the various equipment installation periods. Installation of the Projects' onshore and offshore facilities may occur over a period of up to 3 years (to accommodate weather and/or seasonal work restrictions); offshore construction is expected to last approximately 2 years.

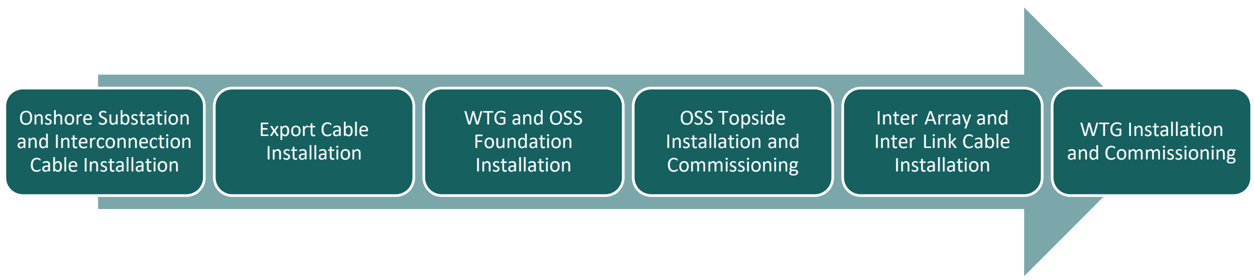


Figure 4.1-1 General Project Construction Sequence

High resolution geophysical and geotechnical surveys will be conducted to verify site conditions prior to offshore construction and geophysical surveys will be conducted post-construction to ensure proper installation of the components of each Project. Geophysical survey equipment may include side-scan sonar, multibeam echo-sounder, magnetometers, gradiometers, and sub-bottom profilers. Based on the results of a munitions and explosives of concern (MEC) desktop study (see Appendix II-A) and based on final facility siting and engineering design, the Projects may also elect to include a MEC study as part of the Projects' pre-construction geophysical survey campaign. Geotechnical surveys to inform the final design and engineering of each Projects' offshore facilities may include vibracores, cone penetrometer tests, and deep borings. Geotechnical surveys will only be performed in areas that are surveyed and cleared for cultural resources.

Environmental monitoring surveys will be conducted pre-construction, during construction, and post-construction to support the assessment of the Projects' potential effects. The environmental monitoring survey plans are being developed in consultation with federal, state, and local agencies, non-governmental organizations, and other relevant stakeholders and may be conducted as part of regional monitoring initiatives. These surveys and plans are identified and discussed further in Volume II.

Before starting any onshore work, the Project Companies will each coordinate as appropriate with municipalities and work to inform members of the public regarding onshore construction locations and schedules (see Section 1.4). Prior to performing any offshore work, The Projects will adhere to its Fisheries Communication Plan (FCP) (see Appendix II-R) and will reach out to its fishing industry contacts to avoid and minimize interactions with fishing vessels and fishing gear. Each Project Company will coordinate with the U.S. Coast Guard (USCG) to issue Notices to Mariners to inform fishermen and other mariners of the Projects' activities.

4.2 Wind Turbine Generator Foundations

The WTG foundations will provide a robust, stable, and level base for the WTG towers. The foundations will also provide personnel access (via boat landings, ladders, and work platforms), contain aids to navigation in accordance with USCG and the Bureau of Ocean Energy Management (BOEM) requirements (see Section 5.3), include a crane for transferring materials and equipment, and house electrical equipment. The PDE includes three categories of WTG foundations that may be affixed to the seabed using piles, suction buckets, or gravity:

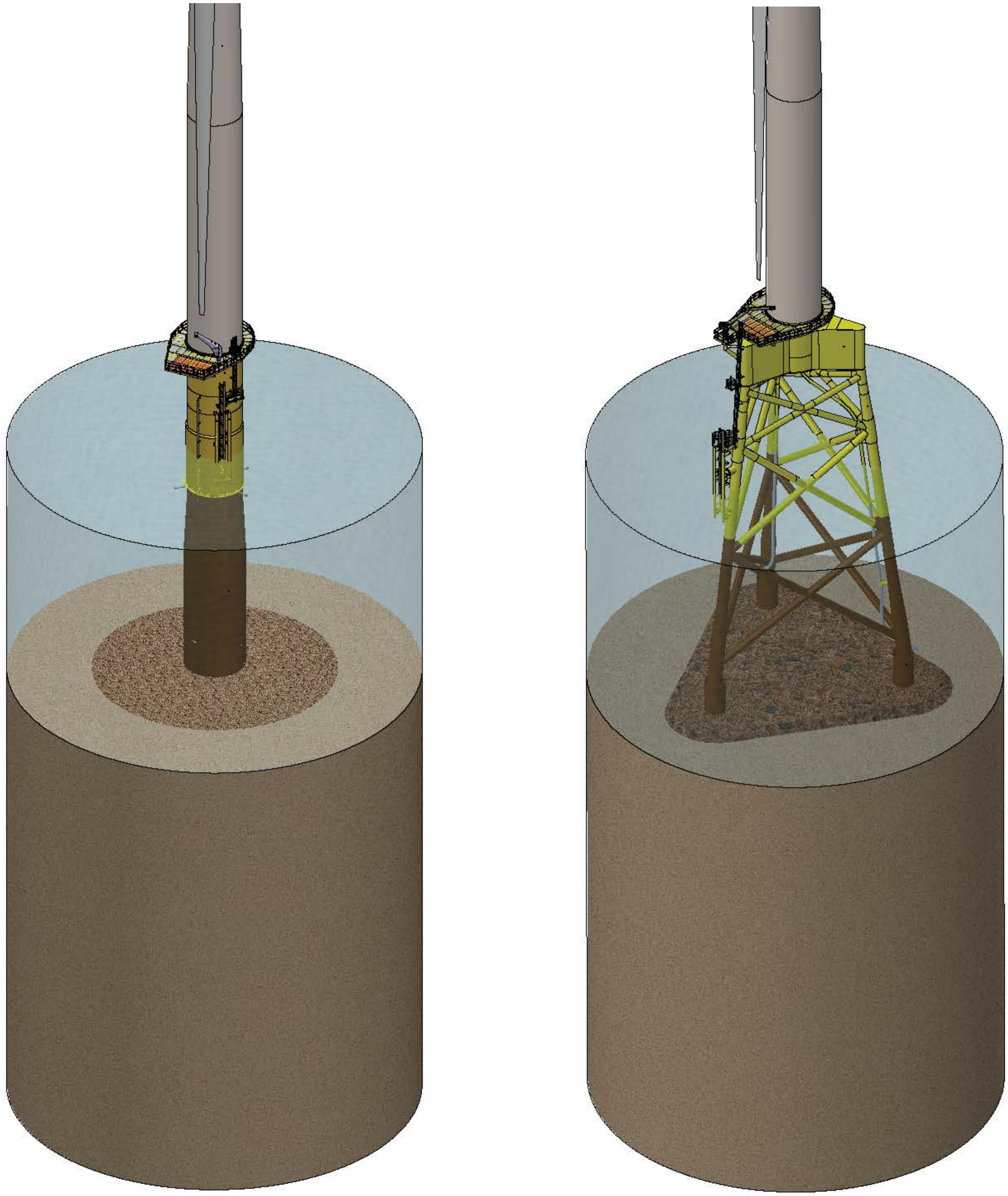
1. **Piled foundations:** monopiles or piled jackets;
2. **Suction bucket foundations:** mono-buckets, suction bucket jackets, or suction bucket tetrahedron bases; and
3. **Gravity foundations:** GBS or gravity-pad tetrahedron bases.

The following sections describe each WTG foundation type, and the foundation installation processes for each type.

4.2.1 Piled Foundations

The PDE for the Projects includes two sub-types of piled foundations. The PDE of dimensions for each foundation sub-type is provided in Table 4.2-1 (see Section 4.2.6).

- **Monopiles:** Monopile foundations, which are driven into the seabed, typically consist of a single steel tube composed of several sections of rolled steel plates that are welded together. A transition piece may be mounted on top of the monopile (see Figure 4.2-1). Alternatively, the monopile length may be extended to the interface with the WTG tower; this is referred to as an "extended monopile." The transition piece or the top of the



Monopile **Piled Jacket**

Figure 4.2-1
Piled Foundations

extended monopile contains a flange for connection to the WTG tower and may include secondary structures such as a boat landing, ladders, a work platform, a crane, and other ancillary components. If a transition piece is used, it will be secured to the monopile via bolts, grout, a slip joint, and/or other mechanical joint connections. The monopile's top diameter and transition piece's bottom diameter are sized based on site-specific environmental and functional loads. The upper outer diameter of the transition piece is identical to the WTG tower's bottom diameter.

- **Piled jackets:** Piled jacket foundations are steel lattice structures comprised of tubular steel members and welded joints that are fixed to the seabed using piles connected to each leg of the jacket (see Figure 4.2-1). Piled jacket foundations may include three or four legs. Typically, piles are hollow steel cylinders that are driven into the seabed. The top of the jacket foundation contains a flange for connection to the WTG tower as well as secondary structures such as a boat landing, ladders, a work platform, a crane, and other ancillary components.

The Projects' monopiles or piled jacket components may be fabricated either in the U.S. or overseas and will be delivered either directly to the WTA or to a marshalling port for final assembly and staging. If storage at a marshalling port is required, equipment such as crawler cranes or self-propelled modular transporters (SPMTs) will be used to unload and transport foundations within the marshalling port. Depending on the location of fabrication and any subsequent staging activities, foundation components may be transported to the marshalling port or WTA by heavy transport vessels (HTVs), ocean-going barges, jack-up feeder vessels, or smaller feeder barges towed by local tugboats (see Figure 4.2-2 and Section 4.10.1).

Monopile and piled jacket design and installation methods may require seabed preparation prior to installation (see Section 4.2.4). Scour protection may be required and would be installed at the base of the monopiles or piled jackets (see Section 4.2.5).

At the WTA, piled foundations will be installed using one or two jack-up vessels or heavy-lift vessels (HLVs) using dynamic positioning (DP) or anchoring. At each foundation location, a crane on the installation vessel will lift the monopile or each piled jacket component from the transportation vessel into a vertical position and lower it to the seabed (see Figure 4.2-2).

Jacket foundations may have either pre-installed piles or post-installed piles. If pre-installed, a template will be used to properly position the piles so they can be driven into the seabed before the jacket arrives at the WTA. The jacket will then be lifted by a vessel crane and set directly onto the installed piles. If post-installed, a vessel crane will lift the jacket foundation and place it on the seabed, after which pin piles will be driven through the jacket's pile sleeves to secure it in place. Mud mats may be used for piled jackets during installation to support the jacket during piling.

Pile Driving of a Monopile

Transition Piece Installation from a Jack-Up Vessel

Monopile Transport via Tugboat and Barge

Pile Driving of a Jacket Pile

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Figure 4.2-2

Piled Foundation Transportation and Installation

Once the monopile or jacket pin pile is lowered to the seabed, the weight of the pile itself will cause the pile to sink a distance into the seabed (but not to target penetration depth). With the pile resting on the seabed, the crane will release the pile and place a hydraulic hammer atop the pile in preparation for pile-driving. The maximum expected hammer size for installation of monopiles is up to 4,400 kilojoules (kJ) whereas the maximum expected hammer size for jacket pin piles is 2,500 kJ. It is anticipated that it will take a maximum of 7 to 9 hours to drive one monopile and that a maximum of 2 monopiles could be driven per day per vessel spread assuming no daylight restrictions (see the PDE in Section 4.2.6). For jackets, it is expected that the maximum installation rate will enable installation of all pin piles for a single jacket foundation (i.e., three or four piles) per day. A description of measures to mitigate underwater noise while pile-driving is provided in Section 4.7.2 of Volume II.

During pile driving, a gripper frame may be used to stabilize the foundation for piling. A vibratory pile driver may also be used at the beginning of pile driving to support embedment of the pile until it is stable enough for pile driving.

While not anticipated, drilling for pile installation may be required if pile driving encounters refusal (e.g., due to bedrock or a large boulder). This operation involves placing a rotary drilling unit on top of the pile to drill out material from the internal diameter of the pile so pile driving can continue. Material drilled out of the inner diameter of the pile is expected to be deposited adjacent to any scour protection[18] and may be transferred into the pile after the operation is complete to provide additional stability. The pile may also be filled with sand, grout, or concrete.

Following installation of a monopile, a vessels' crane will lift the transition piece (if used) onto the monopile, and the joint will be secured with grout, bolts, a slip joint, other mechanical joint, or a combination of these methods. If used, grout will be mixed onboard a vessel and pumped into the transition piece above a high-strength rubber grout seal to avoid leakage.

For jacket foundations, once the pin piles are driven to their target depths, the installation vessel will ensure the foundation is level and the piles will be fixed in place with grout. Grout will fill each pile sleeve, but the procedure will be monitored to ensure that grout does not spill over the sleeve. For both monopile and jacket foundations, proper grouting procedures will be utilized to minimize any overflow.

Any anchoring or jacking-up during WTG foundation installation will always occur within surveyed areas of the WTA. The PDE of seabed disturbance for monopile and piled jacket foundation installation is described in Table 4.2-1.

[18] Any drilled material deposition adjacent to scour protection will occur within the maximum seabed disturbance footprint presented in Section 4.11.

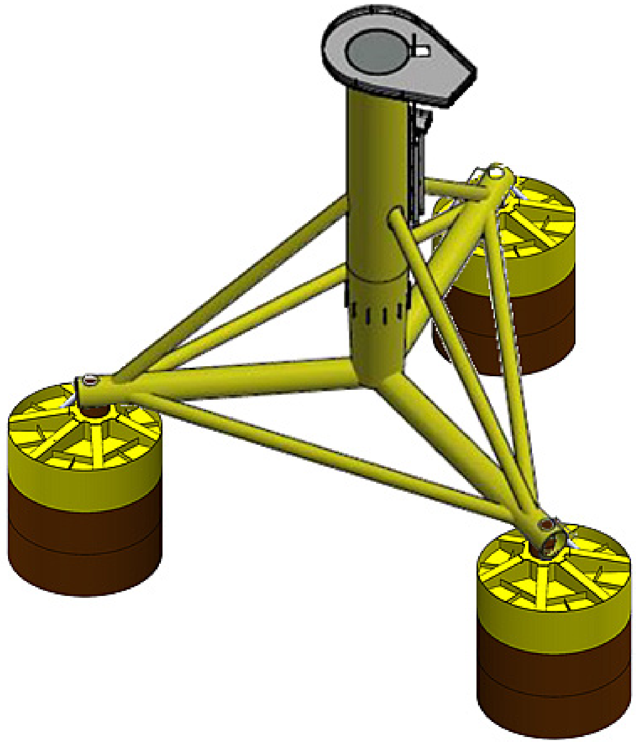
4.2.2 Suction Bucket Foundations

The PDE includes three variations of suction bucket foundations. The PDE of dimensions for each foundation variation is provided in Table 4.2-1 (see Section 4.2.6).

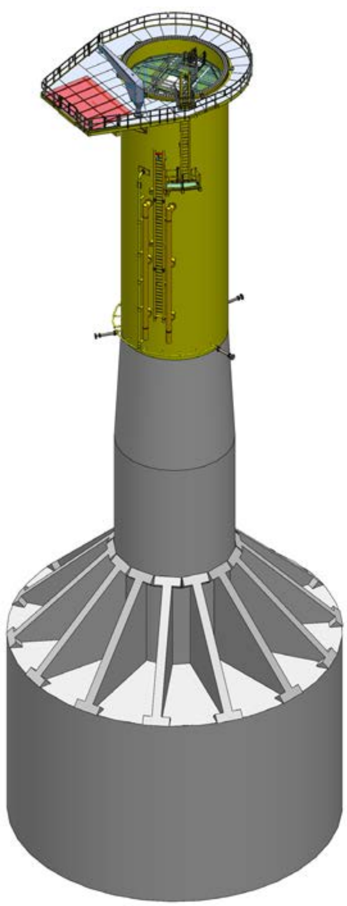
- **Mono-buckets:** A mono-bucket consists of a single suction bucket supporting a single steel or concrete tubular structure (similar to a monopile) upon which the WTG is mounted. The suction bucket is typically a hollow steel cylinder that is capped at the upper end; the open end of the bucket faces downward into the seabed (see Figure 4.2-3). A transition piece may be mounted on top of the mono-bucket (similar to the monopile foundation type described in Section 4.2.1).
- **Suction bucket jackets:** Suction bucket jacket foundations are steel lattice structures comprised of tubular steel members and welded joints that are fixed to the seabed by suction buckets installed below each leg of the jacket (see Figure 4.2-3). The suction bucket jacket may have three or four legs. Similar to piled jacket foundations, the top of the jacket foundation contains a flange for connection to the WTG tower as well as secondary structures such as a boat landing, ladders, a work platform, a crane, and other ancillary components.
- **Suction bucket tetrahedron bases:** A suction bucket tetrahedron base foundation is a tetrahedral-shaped (i.e., three-legged pyramidal) frame that rests on the seabed and is secured to the seafloor using suction buckets (see Figure 4.2-3). This foundation design has a maximum of three contact points with the seabed, and a suction bucket is located at each contact point. Like jacket foundations, the tetrahedron base foundation contains a flange for connection to the WTG tower as well as secondary structures (e.g., a boat landing, ladders, a work platform, and a crane).

The Projects' suction bucket foundations may be fabricated either in the U.S. or overseas and will be delivered either directly to the WTA or to a marshalling port for final assembly and staging. If storage at a marshalling port is required, equipment such as crawler cranes or SPMTs will be used to unload and transport foundations within the marshalling port. Depending on the location of fabrication and any subsequent staging activities, foundation components may be transported to the marshalling port or WTA by HTVs, ocean-going barges, jack-up feeder vessels, or smaller feeder barges towed by local tugboats (see Section 4.10.1). Mono-bucket and suction bucket tetrahedron base designs may also enable wet transport (i.e., floating the foundations) to the WTA.

The majority of suction bucket foundations are not expected to require any seabed preparation although seabed preparation may be necessary where the seabed is not sufficiently level. Seabed preparation methods are discussed in Section 4.2.4. Suction bucket foundations may require scour protection (see Section 4.2.5).



Suction Bucket Tetrahedron Base



Mono-Bucket

Suction Bucket Jacket

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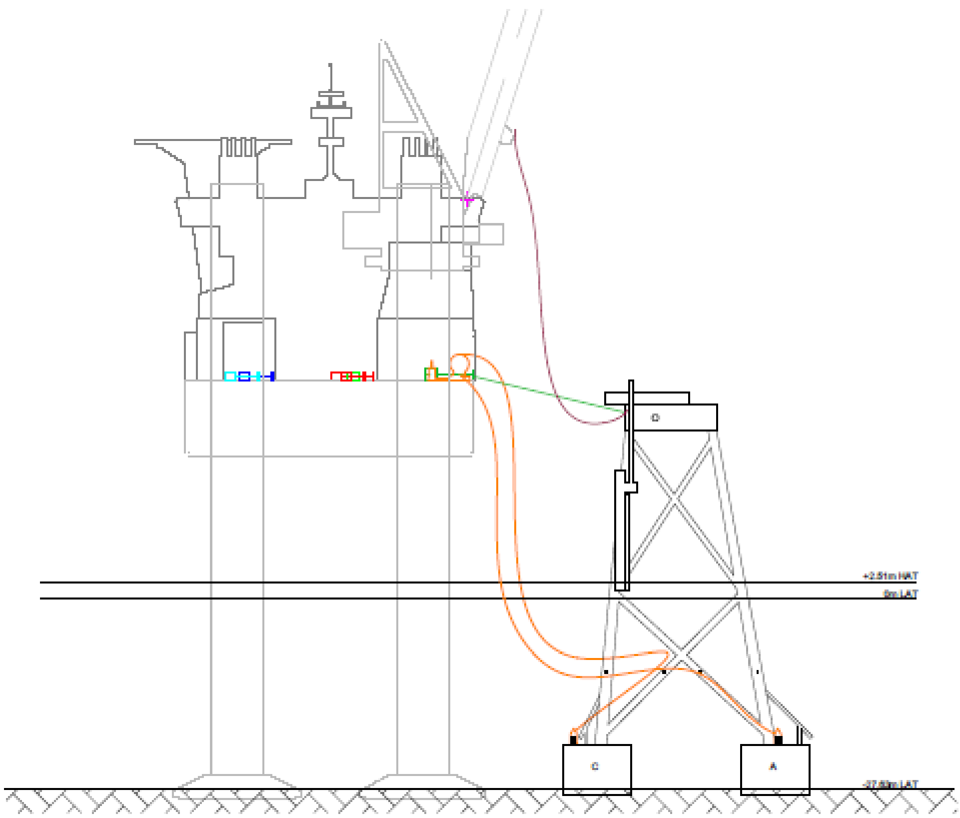
Figure 4.2-3
Suction Bucket Foundations

Lowering of Suction Bucket Foundation using Jack-Up Vessel Crane



Embedding Suction Buckets by Pumping Out Water

Suction bucket foundation installation can be completed with one or two HLVs (using anchoring or DP) or jack-up vessels (see Figure 4.2-4). After a crane lifts the suction bucket foundation from the transport vessel and places it on the seabed (or, for certain suction bucket tetrahedron bases, once the foundation is sunk to the seabed after being floated out to the WTA), the weight of the structure will cause partial penetration of the buckets into the seabed.

After the foundation is in place, the tops of each suction bucket are sealed, and pumps are used to remove water from each bucket to create a negative pressure differential that embeds the bucket into the seabed. Instrumentation within the pump infrastructure will monitor the progress of installation. Real-time monitoring will also ensure the foundation remains vertical, with the pumping speed for each suction bucket controlled individually. The pump will either be pre-installed on top of the suction bucket before it is lowered to the seabed or attached by a remotely-operated vehicle (ROV) after the suction bucket is placed on the seabed. The seawater that is then pumped out of the suction bucket will be discharged at the pump's location. The flow rate of discharged water is relatively low, and no disturbance to the seabed is expected to result from discharge of the water. Once the foundation is fully embedded, the pumps will be removed. The space inside the suction bucket (between the bucket lid and sediment inside the bucket) may be backfilled with a cement grout, if determined necessary.

Suction bucket foundations do not require a hammer or drill for installation. Thus, the process of installing a suction bucket foundation is nearly noise-free and the foundation has the potential to be completely removed upon decommissioning.

The entire installation process for a mono-bucket, including lifting the foundation onto the seabed, self-penetration, pumping out water, retrieving the pumps, and grouting the buckets is expected to take less than approximately 7 to 9 hours per foundation. After a mono-bucket foundation is installed, a transition piece (if separate) may be installed by a vessel's crane and secured with bolts, grout, a slip joint, other mechanical joint, or a combination of these methods. The entire installation process for a suction bucket jacket or suction bucket tetrahedron base foundation should be completed within 15 hours.

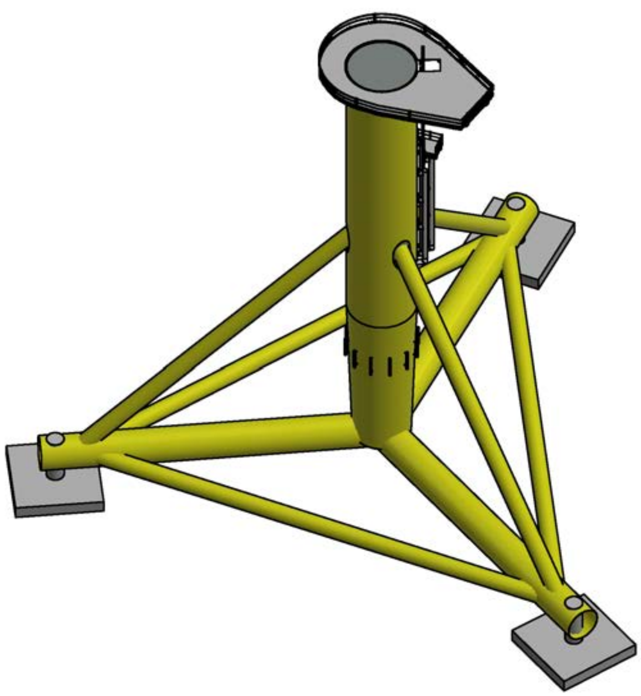
The PDE of seabed disturbance for suction bucket foundations is described in Section 4.2.6. Installation activities will always occur within surveyed areas of the WTA.

4.2.3 Gravity Foundations

A gravity foundation is stable simply by virtue of its weight and design and requires no piles or suction buckets. Gravity foundations vary in shape and are generally larger at seabed level than piled or suction bucket foundations to provide support and stability for the structure. Two sub-types of gravity foundations are included in the PDE. The PDE for each foundation sub-type is provided in Table 4.2-1 (see Section 4.2.6).

- **Gravity-base structures:** A GBS is a heavy steel-reinforced concrete and/or steel structure that sits on the seabed (see Figure 4.2-5). The GBS foundation's concrete base may be

Gravity-Base Structures (GBS)



Gravity-Pad Tetrahedron Base

filled with additional ballast material. Ballast material for GBS foundations will likely be sourced from the US, Canada, or Europe and will consist of seawater, sand, gravel, or other crushed minerals or stones. As mentioned in Section 4.5.3.2, some portion of the dredged sand from sand bedform removal may also be used for ballast in GBS foundations if those foundations are selected for the Projects. Above the concrete base, there is a column made of concrete or steel that supports the WTG tower. A transition piece may be mounted on top of the GBS foundation (similar to the monopile foundation type described in Section 4.2.1).

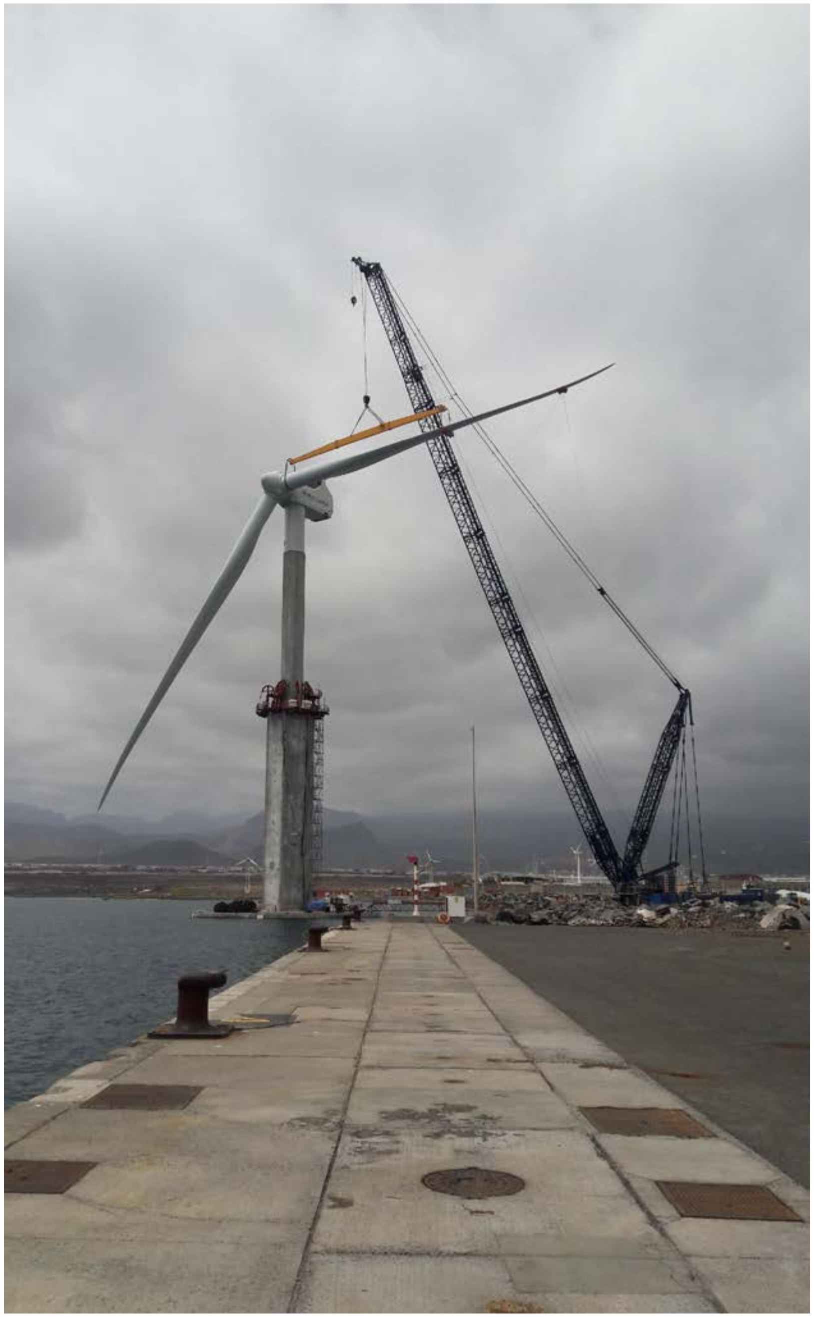
- **Gravity-pad tetrahedron bases:** Gravity-pad tetrahedron bases are similar to the suction bucket tetrahedron bases but are secured in place using high weight pads (i.e., gravity pads) below each leg (see Figure 4.2-5). Similar to piled jacket, suction bucket jacket, and suction bucket tetrahedron base foundations, the top of the foundation contains a flange for connection to the WTG tower as well as secondary structures such as a boat landing, ladders, a work platform, a crane, and other ancillary components.

Gravity foundations will be constructed in the U.S. at an onshore location adjacent to a waterway in proximity to the WTA. The gravity foundation may be built entirely onshore or relocated to the adjacent waterway during construction to facilitate subsequent construction activities (see Figure 4.2-6). For example, the vertical foundation sections, transition piece, and secondary components may be installed by quayside cranes while the foundation is temporarily located in the waterway adjacent to the quay. The completed or partially constructed gravity foundation will be transferred to the water through a dry dock, ballasted barge, or other heavy lift methods.

GBS designs may allow for the WTG to be installed on the foundation at port (see Figure 4.2-6). Certain designs make use of a telescoping tower that is retracted within the foundation column until the GBS is installed at the WTA. After the WTG tower is installed onto the foundation, the nacelle and blades will be lifted quayside and attached to the tower section. If the WTG is integrated onto the GBS at the port, a purpose-built installation and transportation aid may be secured to the GBS to stabilize the foundation during the remaining assembly and transport to the WTA (see Figure 4.2-7).

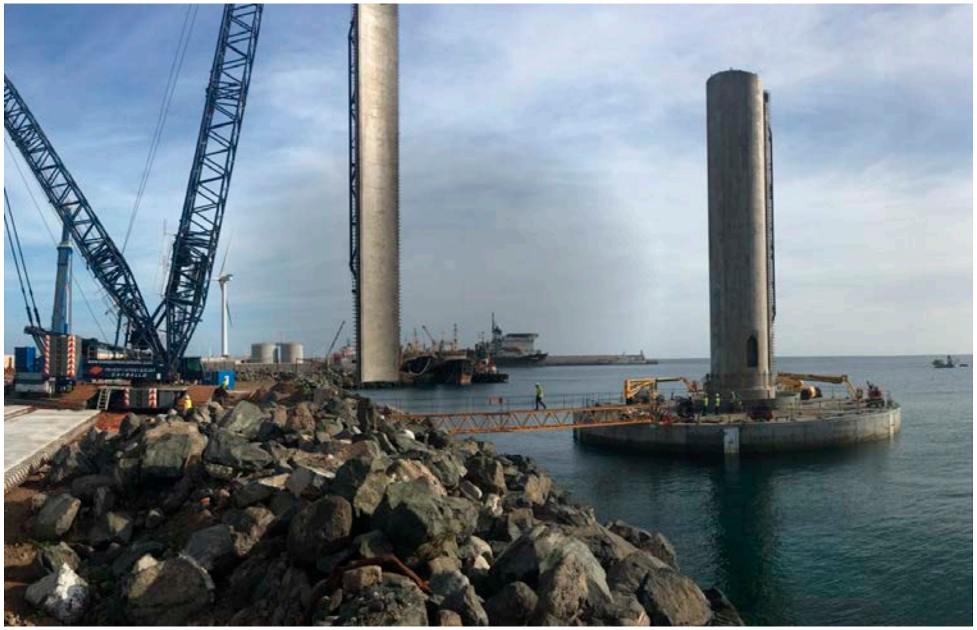
Depending on the construction and installation strategy, once the gravity foundations are totally or partially completed, and in order to release the construction area for subsequent foundation production, the foundations can be temporarily stored onshore or in a designated wet storage area (either adjacent to the quayside or in a designated waterway anchorage area established by the foundation supplier). When a suitable window for installations opens, the units will be refloated and transported to the WTA for installation or to the quayside for remaining assembly activities.

For gravity foundations, seabed preparation in the WTA may be needed prior to installation to ensure full contact between the foundation’s base and the seafloor so that the foundation remains vertical, and its weight is uniformly distributed. Seabed preparation may be followed by the installation of a gravel pad. Section 4.2.4 provides more details on seabed preparation for gravity foundations. Gravity foundations may also require scour protection (see Section 4.2.5).



WTG Installation onto a Gravity Foundation in Port

Gravity Foundation Transport via Tugboats



Gravity Foundation Construction in Port

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Figure 4.2-6

Gravity Foundation Transportation and Installation

ATLANTIC SHORES offshore wind

Figure 4.2-7
Installation and Transportation Aid

Gravity foundations could either be transported to the WTA onboard a large-capacity barge or floated to the WTA using multiple tugboats. If transported to the WTA onboard a large-capacity barge, an HLV's crane will lift the foundation and place it on the seabed. If floated to the WTA, the foundation may be transported by tugboats directly to the WTA from the supplier's fabrication location or the foundation may first be transported by the supplier on a semisubmersible barge to a sheltered offshore location before being lowered into the water, connected to tugboats, and pulled to the WTA. When the floating foundation arrives at the WTA, the foundation will be lowered to the seabed by increasing ballast. Once the foundation is at its final position on the seabed, the tugboats are disconnected, and the purpose-built installation and transportation aid (if used) is removed.

After the foundation is in place on the seabed, any additional ballast material (if needed) will be pumped into the foundation's interior by a dedicated vessel to provide additional stability. For concepts that do not involve quayside installation of the transition piece or WTG, the transition piece and WTG will then be installed. If a telescoping gravity foundation design is employed, the telescopic portion of the foundation is jacked up by lifting equipment arranged around the foundation's service platform. After the telescopic portion of the foundation is fully extended and secured, the lifting equipment is removed from the structure.

With a single installation spread, it is anticipated that one gravity foundation will be installed per day. The PDE of seabed disturbance for gravity foundation installation is described in Table 4.2-1.

4.2.4 Seabed Preparation

In general, foundations will be positioned or sized to avoid or reduce seabed preparation where possible.

As described in Sections 4.2.1 through 4.2.3, foundations, particularly gravity foundations, may require some seabed preparation. Seabed preparation involves removing the uppermost sediment layer to establish a level surface, remove any surficial sediments that are too weak to support the planned structure, and enable full contact between the foundation's base and the seafloor. This is necessary to ensure that the foundation remains vertical, and its weight is uniformly distributed. For gravity foundations it may take three to four days to prepare the seabed prior to installation.

Piled and suction bucket foundations are not expected to require seabed preparation unless the seabed is not sufficiently level (e.g., where large sand bedforms are present). Where this occurs, the seabed may need to be prepared prior to pile-driving or suction bucket installation. The maximum dimensions of seabed preparation that could be required for each foundation type is provided in Table 4.2-1.

Seabed preparation could be accomplished using:

- **Trailing suction hopper dredge (TSHD):** TSHD uses suction pipes to collect sediment in the hopper of the vessel, thus leveling the seabed (see Section 4.5.3.2 for additional details).
- **Jetting/controlled flow excavation:** This method involves directing columns of water at the seabed to excavate sediments and push them aside (see Section 4.5.3.2 for additional details).
- **A backhoe/dipper:** A backhoe/dipper is a mechanical method of removing high points on the seabed to level the sediments in preparation for foundation installation.

For gravity foundations, a gravel pad may be installed after completing seabed preparation. The gravel pad is expected to consist of one or more layer(s) of coarse-grained material. The gravel pads may be comprised of a filter layer (i.e., a layer of finer material) and an armor layer (i.e., a layer of coarser material). Installation of the gravel pad typically consists of the following steps:

1. lowering of a steel frame, if needed, to set the boundaries for the gravel pad;
2. leveling the surface of the area within the steel frame;
3. filling the volume inside the steel frame with coarse-grained material;
4. levelling the gravel pad; and
5. compacting the gravel pad and possibly injecting the pad with grout.

Seabed preparation and installation of the gravel pad will likely be performed by a DP fallpipe vessel.

4.2.5 Scour Protection

Scour protection may be installed at the base of each foundation to protect it from sediment transport/erosion caused by water currents. The presence of foundations can create locally higher currents around the structures, which scour protection can withstand.

The PDE includes six types of scour protection:

1. **Rock placement:** up to three layers of rock, with the lower layer(s) consisting of smaller rock and the upper armor layer consisting of larger rock;
2. **Rock bags:** a rock-filled filter unit enclosed by polyester mesh that is non-corrosive, rot-proof, and weather-resistant with proven 30-year durability;
3. **Grout- or sand-filled bags:** bags filled with grout or sand and lowered into place by the installation vessel cranes;
4. **Concrete mattresses:** high-strength concrete blocks cast around a mesh (e.g., ultra-violet stabilized polypropylene rope) that holds the blocks in a flexible covering;

5. **Ballast-filled mattresses:** a folded mattress filled with ballast material (i.e., a sand/water/bentonite mixture or similar) that is lowered to the seabed and unfolded at the base of the foundation; and/or
6. **Frond mattresses:** buoyant fronds approximately 3 ft (1 m) high, which are designed to replicate how natural seaweed reduces water velocity locally, are densely built into a mattress, and are deployed either directly onto the seabed or attached to the structure.

Scour protection consisting of freely-laid rock will likely be installed by a fallpipe vessel, which uses a pipe that extends to just above the seafloor to deposit rock contained in the vessel's hopper in a controlled manner. Concrete mattresses, rock bags, grout- or sand-filled bags, and frond mattresses will likely be deployed by a vessel's crane.

All scour protection options considered for the Projects were screened for technical and economic suitability. The need for and selected type(s) of scour protection will be determined by the final design of the foundations and ongoing agency consultations. The PDE of scour protection dimensions for each foundation type under consideration is defined in Table 4.2-1. Scour protection may occur in any shape and size up to the maximum footprint provided in Table 4.2-1, including the possibility of no scour protection.

4.2.6 Project Design Envelope for the WTG Foundations

The PDE of WTG foundation parameters is provided in Table 4.2-1 below.

Table 4.2-1 PDE of WTG Foundations Dimensions and Seabed Disturbance

Concept	Piled		Suction Bucket			Gravity	
	Monopile	Piled Jacket	Mono-Bucket	Suction Bucket Jacket	Suction Bucket Tetrahedron Base	Gravity-Pad Tetrahedron Base	GBS
Foundation Structure							
Max. pile, suction bucket, gravity-base, or gravity-pad diameter at seabed	49.2 ft (15.0 m)	16.4 ft (5.0 m)	114.8 ft (35.0 m)	49.2 ft (15.0 m)	52.5 ft (16.0 m)	36.1 ft x 36.1 ft (11.0 m x 11.0 m)	180.5 ft (55.0 m)
Max. # of legs/discrete contact points with seabed	1	4	1	4	3	3	1
Max. depth of penetration below seabed	With scour protection: 196.9 ft (60.0 m) Without: 262.5 ft (80.0 m)	229.7 ft (70.0 m)	114.8 ft (35.0 m)	65.6 ft (20.0 m)	65.6 ft (20.0 m)	9.8 ft (3.0 m)	9.8 ft (3.0 m)
Monopile/jacket pile/bucket length	With scour protection: 344.5 ft (105.0 m) Without: 410.1 ft (125.0 m)	249.3 ft (76.0 m)	147.6 ft (45.0 m)	82.0 ft (25.0 m)	82.0 ft (25.0 m)	N/A	N/A
Max. distance between adjacent legs at seabed	N/A	131.2 ft (40.0 m)	N/A	131.2 ft (40.0 m)	131.2 ft (40.0 m)	246.1 ft (75.0 m)	N/A
Max. foundation diameter/leg spacing at Mean Sea Level (MSL)	39.4 ft (12.0 m)	98.4 ft (30.0 m)	39.4 ft (12.0 m)	98.4 ft (30.0 m)	39.4 ft (12.0 m)	39.4 ft (12.0 m)	39.4 ft (12.0 m)
Max. total foundation footprint contacting seabed per foundation[a]	1,902.0 square feet (ft^2) (176.7 square meters [m^2])	845.0 ft^2 (78.5 m^2)	10,356.0 ft^2 (962.1 m^2)	7,609.0 ft^2 (706.9 m^2)	6,492.8 ft^2 (603.2 m^2)	3,907.3 ft^2 (363.0 m^2)	25,572.9 ft^2 (2,375.8 m^2)
Seabed Disturbance							
Permanent Seabed Disturbance							
Max. representative[b] outer diameter/size of scour protection	269.0 ft (82.0 m) per foundation	98.4 ft (30.0 m) per leg	295.3 ft (90.0 m) per foundation	334.6 ft x 334.6 ft (102.0 m x 102.0 m) per foundation	347.8 ft x 328.1 ft (106.0 m x 100.0 m) per foundation	98.4 ft x 98.4 ft (30.0 m x 30.0 m) per leg	272.3 ft (83.0 m) per foundation
Max. thickness of scour protection	8.2 ft (2.5 m)	6.6 ft (2.0 m)	6.6 ft (2.0 m)	6.6 ft (2.0 m)	6.6 ft (2.0 m)	4.9 ft (1.5 m)	4.6 ft (1.4 m)
Est. volume of scour protection per foundation	314,300.5 ft^3 (8,900.0 m^3)	125,720.2 ft^3 (3,560.0 m^3)	413,181.6 ft^3 (11,700.0 m^3)	600,543.6 ft^3 (17,005.5 m^3)	461,477.9 ft^3 (13,067.6 m^3)	123,795.6 ft^3 (3,505.5 m^3)	151,786.0 ft^3 (4,298.1 m^3)
Max. total permanent footprint per foundation (foundation + scour protection + mud mats [post-piled jackets only])	**56,844.3 ft^2 (5,281.0 m^2)**	**30,434.2 ft^2 (2,827.4 m^2)**	**111,987.6ft^2 (6,361.7 m^2)**	**111,987.6 ft^2 (10,404.0 m^2)**	**92,870.9 ft^2 (8,628.0 m^2)**	**29,062.6 ft^2 (2,700.0 m^2)**	**58,239.2 ft^2 (5,410.6 m^2)**

Table 4.2-1 PDE of WTG Foundations Dimensions and Seabed Disturbance (Continued)

Concept	Piled		Suction Bucket			Gravity	
	Monopile	Piled Jacket	Mono-Bucket	Suction Bucket Jacket	Suction Bucket Tetrahedron Base	Gravity-Pad Tetrahedron Base	GBS
Seabed Disturbance							
Temporary Seabed Disturbance During Construction							
Max. dimensions of seabed preparation per foundation	269.0 ft x 269.0 ft (82.0 m x 82.0 m)	229.7 ft x 229.7 ft (70.0 m x 70.0 m)	295.3 ft x 295.3 ft (90.0 m x 90.0 m)	334.6 ft x 334.6 ft (102.0 m x 102.0 m)	347.8 ft x 328.1 ft (106.0 m x 100.0 m)	311.7 ft x 344.5 ft (95.0 m x 105.0 m)	272.3 ft x 272.3 ft (83.0 m x 83.0 m)
Max. depth seabed preparation[c]	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Max. area of seabed preparation per foundation	72,376.5 ft^2 (6,724.0 m^2)	52,743.2 ft^2 (4,900.0 m^2)	87,187.7 ft^2 (8,100.0 m^2)	111,987.6 ft^2 (10,404.0 m^2)	92,871.0 ft^2 (8,628.0 m^2)	81,133.0 ft^2 (7,537.5 m^2)	74,152.6 ft^2 (6,889.0 m^2)
Avg. volume of seabed preparation per foundation[d]	125,258.1 ft^3 (3,546.9 m^3)	91,279.7 ft^3 (2,584.8 m^3)	150,890.9 ft^3 (4,272.8 m^3)	193,811.0 ft^3 (5,488.1 m^3)	160,726.7 ft^3 (4,551.3 m^3)	133,436.1 ft^3 (3,778.5 m^3)	128,331.9 ft^3 (3,634.0 m^3)
Max. disturbance due to jack-up or anchored vessels per foundation[e]	58,125.1 ft^2 (5,400.0 m^2)	47,361.2 ft^2 (4,400.0 m^2)	58,125.1 ft^2 (5,400.0 m^2)	47,361.2 ft^2 (4,400.0 m^2)	47,361.2 ft^2 (4,400.0 m^2)	0.0 ft^2 (0.0 m^2)	10,763.9 ft^2 (1,000.0 m^2)
Max. total temporary seabed disturbance beyond permanent footprint per foundation	**73,657.2 ft^2 (6,843.0 m^2)**	**69,670.1 ft^2 (6,472.6 m^2)**	**76,835.7 ft^2 (7,138.3 m^2)**	**47,361.2 ft^2 (4,400.0 m^2)**	**47,361.2 ft^2 (4,400.0 m^2)**	**52,070.4 ft^2 (4,837.5 m^2)**	**26,677.2ft^2 (2,478.4 m^2)**
Total Temporary and Permanent Seabed Disturbance During Construction							
Max. total area of seabed disturbance per foundation	**130,501.5 ft^2 (12,124.0 m^2)**	**100,104.3 ft^2 (9,300.0 m^2)**	**145,312.4 ft^2 (13,500.0 m^2)**	**159,348.8 ft^2 (14,804.0 m^2)**	**140,232.1 ft^2 (13,028.0 m^2)**	**81,132.9 ft^2 (7,537.5 m^2)**	**84,916.4 ft^2 (7,889.0 m^2)**
Installation Timeframe							
Approx. max. duration to drive one pile	7-9 hours	3-4 hours	N/A	N/A	N/A	N/A	N/A
Max. # of piles driven per day	2	4	N/A	N/A	N/A	N/A	N/A

Notes:

a) The footprint of any mud mats (if used) would overlap with the footprint of scour protection and are included in the "Max. total permanent footprint" rather than the "Total foundation footprint contacting seabed."

b) Scour protection may occur in any shape and size up to the maximum footprint provided, including the possibility of no scour protection.

c) In the worst-case situation, in a limited number of foundation positions, up to 19.7 ft (6 m) of seabed leveling could be required. Piled and suction bucket foundations are not expected to require seabed preparation unless the seabed is not sufficiently level).

d) The maximum total volume of seabed preparation for the WTG foundations will not exceed the average volume for an individual foundation multiplied by 200 foundations.

e) Foundation installation using jack-up vessels is expected to involve one main installation jack-up vessel with a maximum disturbance of 10,763.9 ft^2 (1,000.0 m^2) (four legs, each disturbing 2,691.0 ft^2 [250.0 m^2]) and one feeder-jack-up vessel with a maximum disturbance of 4,869.5 m^2 (452.4 m^2) (four legs, each disturbing 1,217.4 ft^2 [113.1 m^2]) at each position. Although less likely, if an anchored HLV is used, foundation installation is expected to involve one anchored HLV with a maximum disturbance of 47,361.2 ft^2 (4,400 m^2) (four anchors, each with a disturbance of 1,076.4 ft^2 [100.0 m^2] for the anchor itself plus 10,763.9 ft^2 [1,000.0 m^2] for the mooring system) at each position; the feeder barge(s) would moor to the HLV and cause no additional disturbance. If transition pieces are installed in a separate campaign, another jack-up vessel with a maximum disturbance of 10,763.9 ft^2 (1,000.0 m^2) may be used. The scenario resulting in the greatest seafloor disturbance for each foundation type is assumed in the table above. Additional emergency anchoring or jacking-up may be required.

4.3 Wind Turbine Generators

4.3.1 WTG Design

The Projects' WTGs are expected to follow the traditional offshore WTG design comprised of a three-bladed rotor nacelle assembly (RNA) mounted on a tower structure affixed to a foundation. The rotor will drive a variable speed electric generator. Depending on the model of WTG selected, the drivetrain may include a gearbox to increase the rotational speed of the generator. The WTG will sense the direction of the wind using integrated sensors and will automatically turn into the wind by activating the yaw system. The WTG will also adjust the blades continuously during operation to maximize power production and maintain safe operating limits. The drivetrain, electric generator, yaw system, control system, and power electronics are enclosed in a nacelle, which provides protection from the weather as well as lightning protection.

The WTG power system (i.e., the power converter, transformers, and switchgear) converts the voltage and frequency of the power produced by the WTG's generator to the inter-array cables' voltage (66 to 150 kilovolts [kV]) and electrical grid's frequency, reduces harmonics, and provides reactive power control. The power converter and transformer may be located in the nacelle or inside the WTG tower. The switchgear and inter-array cable terminations may be located inside the WTG tower or inside the top of the WTG foundation. All power system components are protected according to best practices and industry standards.

The WTG control and protection system monitors environmental and operational parameters to keep equipment within design limits. Heating and cooling systems regulate the temperature of each component and lubrication systems keep components corrosion-free and rotating smoothly. The control and protection system monitors the WTG and protects equipment and personnel by providing automatic shutdown and alarms. The system also includes fire detection, overheating, overpower, and overspeed protection.

All WTGs in the Projects will be connected to the central supervisory control and data acquisition (SCADA) system for remote monitoring and control (discussed in greater detail in Section 5.1). The SCADA system allows remote operators to track the operation and performance of all Project assets from a single system, to store long-term data, and to access short-term high-resolution data for fault troubleshooting. It also allows functions such as remote testing, software updates, parameter updates, and WTG shut down for maintenance or at the request of grid operators, regulators, or search and rescue (SAR) teams. Individual WTGs can be controlled manually from within the nacelle or tower base for commissioning and maintenance activities.

The WTG can be accessed for commissioning and maintenance from the platform on the WTG foundation via a locked door in the tower base. WTGs are equipped with an elevator, ladders, and other access routes that enable the movement of maintenance personnel, small equipment, and small spare parts inside the tower and RNA. A helihoist platform on top of the nacelle can be used for technician access and for evacuation. To facilitate maintenance, the WTGs will be equipped with auxiliary cranes in the nacelle and on the external working platform.

An uninterruptible power supply (UPS) will power the control and protection system in case of a grid outage to enable safe shut down of the WTG and saving operational data. Additional back-up power systems (e.g., WTG self-power feature, portable generators, and/or battery systems) may be utilized to provide power for commissioning or for storm protection in the event of a longer-term grid outage.

All WTG components will be designed to comply with relevant health, safety, security, and environmental protection (HSSE) standards and regulations. During construction and operation, the WTGs (and their foundations) will be lit and marked in accordance with Federal Aviation Administration (FAA), USCG, and BOEM guidelines to aid safe navigation within the WTA. Lighting and marking of the WTGs during the operations period is discussed in Section 5.3.

The PDE of WTG dimensions is provided in Table 4.3-1 and illustrated in Figure 4.3-1. The WTG dimensions are indicative of the maximum dimensions of WTGs anticipated to be commercially available within the Projects' expected development schedule (see Section 3.5). The PDE of WTG dimensions provides Atlantic Shores with flexibility in WTG choice, which is necessary to ensure that anticipated advancements in available WTG technology can be incorporated into the Projects' final design.

Table 4.3-1 PDE of WTG Dimensions

WTG Dimension	Input
Max. Rotor Diameter	918.6 ft (280.0 m)
Max. Tip Height	
Relative to MLLW	1,048.8 ft (319.7 m)
Relative to MSL	1,046.6 ft (319.0 m)
Relative to HAT	1,043.0 ft (317.9 m)
Max. Top of Nacelle Height	
Relative to MLLW	605.9 ft (184.7 m)
Relative to MSL	603.7 ft (184.0 m)
Relative to HAT	600.1 ft (182.9 m)
Max. Hub Height	
Relative to MLLW	576.4 ft (175.7 m)
Relative to MSL	574.2 ft (175.0 m)
Relative to HAT	570.5 ft (173.9 m)
Min. Tip Clearance (air gap)	
Relative to MLLW	78.0 ft (23.8 m)
Relative to MSL	75.8 ft (23.1 m)
Relative to HAT	72.2 ft (22.0 m)

Table 4.3-1 PDE of WTG Dimensions (Continued)

WTG Dimension	Input
Max. Nacelle Dimensions (length x width x height)	82.0 ft x 52.5 ft x 39.4 ft (25.0 m x 16.0 m x 12.0 m)
Max. Blade Length	452.8 ft (138.0 m)
Max. Blade Chord	32.8 ft (10.0 m)
Max. Tower Diameter	
Top	27.9 ft (8.5 m)
Bottom	32.8 ft (10.0 m)

Notes: MLLW = Mean Lower Low Water; MSL = Mean Sea Level; HAT = Highest Astronomical Tide

The WTGs will be designed according to site-specific conditions, including winter storms, hurricanes, and tropical storms, based on industry standards such as American Clean Power Association (ACP), International Electrotechnical Commission (IEC), American Petroleum Institute (API), and International Organization for Standardization (ISO) standards. These site conditions and standards will be detailed in the design basis and verified by the independent CVA as part of the Facility Design Report (FDR) and the Fabrication and Installation Report (FIR). The WTG design is suitable for offshore wind sites with reference wind speeds of 111.8 to 127.5 miles per hour (mph) (50 to 57 meters per second [m/s]) over a 10-minute average and 50-year extreme gusts of 156.6 to178.5 mph (70 to 79.8 m/s) over a 3-second average for type certification.[19] A site-specific assessment of the WTGs will be performed for the Projects. The WTGs are expected to produce power at wind speeds between approximately 9.8 and 101 feet per second (ft/s) (3 and 31 m/s), although the WTGs' exact environmental operating conditions will depend on vendor and WTG model. WTGs will automatically shut down in wind speeds above the WTGs' maximum operational limit.

4.3.2 WTG Installation

WTG components are expected to be manufactured in the U.S. or overseas and shipped, if needed, to a U.S. marshalling port. At the marshalling port, WTG components will be offloaded, stored, pre-assembled, and prepared for load-out. The WTG components (i.e., blades, nacelles, and towers) will be delivered in suitable transport and lifting frames to facilitate loading, offloading, storage, and installation. The components will be offloaded using shore-based equipment (e.g., cranes and SPMTs) and will be inspected for damage before being transported from quayside to storage. Storage will ensure a constant supply of WTGs to the assembly location or the WTA.

[19] Type certificates are issued by an accredited certification body to independently verify that a WTG (or other renewable energy equipment) is designed and manufactured in accordance with all applicable requirements/standards.

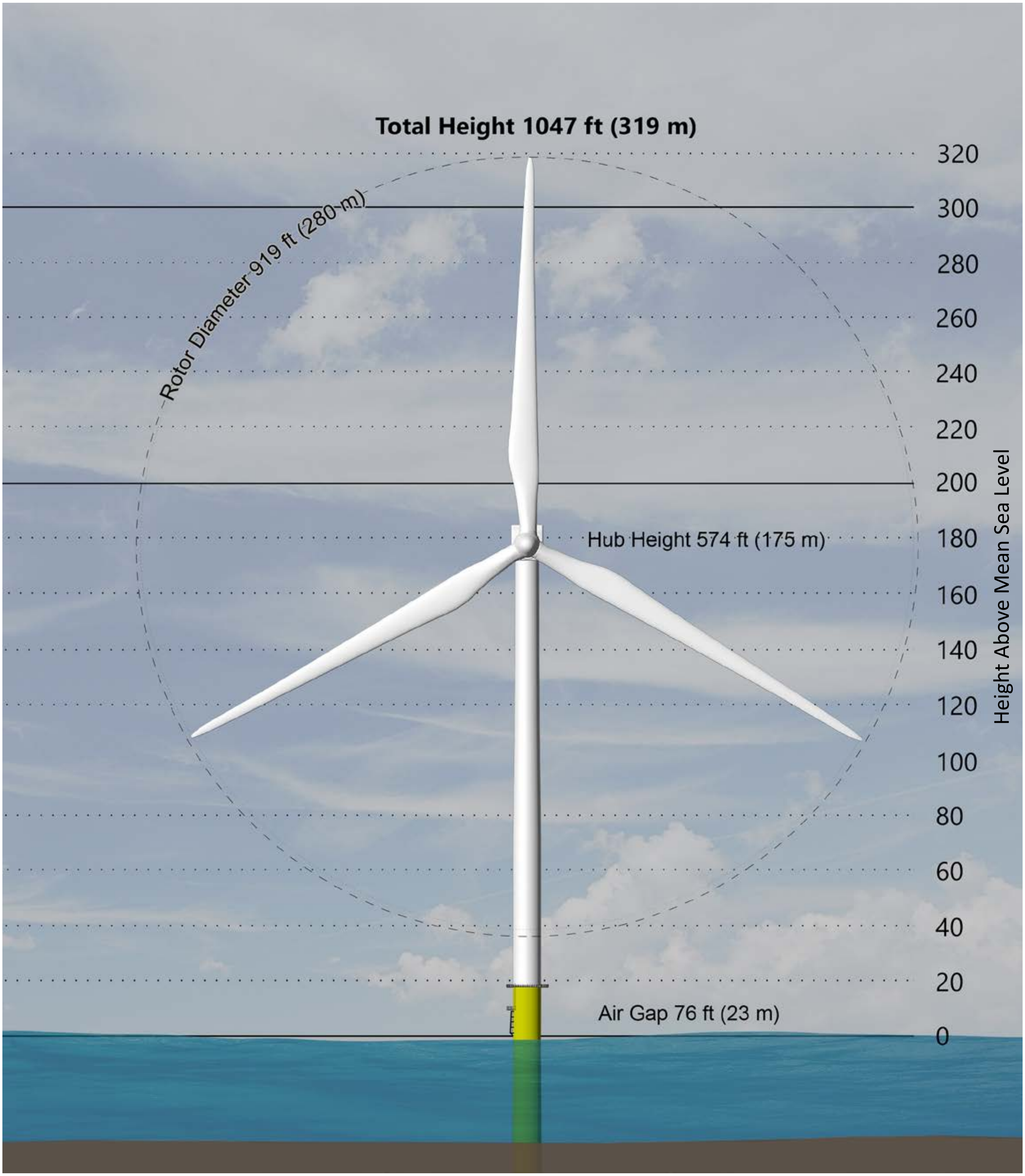

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Figure 4.3-1
Wind Turbine Generator PDE

The WTG components may be pre-assembled at the marshaling port. Pre-assembly of WTG tower sections may include assembling the complete or partial tower structure (assuming the port does not have an air draft restriction). To complete this operation, a heavy-lift crane lifts the bottom tower section into a vertical position, and the tower section is secured to a temporary foundation near the quayside. Remaining tower sections are then stacked on top and secured, after which internal elements are installed and may be pre-commissioned. Towers are inspected prior to loading onto vessels for installation. Pre-assembly of the nacelle may include mounting of minor equipment and external structures. Prior to load-out, the nacelle is inspected. Blades are typically transported and stored in racks and minimal pre-assembly is required.

Offshore installation of WTGs is expected to involve a jack-up WTG installation vessel assisted by feeder barges or jack-up feeder vessels. The jack-up WTG installation vessel will be equipped with a crane to lift WTG components from the feeder barges/vessel onto the foundation (see Figure 4.3-2). Seafloor impacts from jack-up vessels used during WTG installation are provided in Table 4.3-2.

As described in Section 4.2.3, gravity foundations could enable full assembly of the WTG onto the foundation at port with subsequent towing to the WTA. With this approach, the gravity foundation is placed on a semisubmersible barge or temporarily set on the bottom at quayside. A shore-based crane lifts the tower sections onto the foundation where they are secured. Towers are inspected prior to assembly. The RNA is then assembled onto the top tower section, after which blades are assembled onto the hub. The entire assembly is then towed to a wet storage location or to the WTA for installation.

Table 4.3-2 Maximum Seabed Disturbance from WTG Installation

Installation Activity	PDE
Max. area of seafloor disturbance per jack-up WTG installation vessel	10,763.9 ft^2 (1000.0 m^2) (four legs, each disturbing 2,691.0 ft^2 [250.0 m^2])
Max. area of seafloor disturbance per jack-up feeder vessel	4,869.5 ft^2 (452.4 m^2) (four legs, each disturbing 1,217.4 ft^2 [113.1 m^2])
Max. # of times vessels jack-up per WTG	1 time for the jack-up WTG installation vessel & 1 time for the jack-up feeder vessel
Max. area of seafloor disturbance from jack-ups per WTG	**15,633.4 ft^2 (1,452.4 m^2)**

4.3.3 WTG Commissioning

Following installation, the WTGs will be energized from the grid through the inter-array cables or with a temporary power supply. Then, the commissioning process will prepare WTGs for operation. The purpose of commissioning is to test electrical connections, safety and control functions of the

Transport of WTG Components via Jack-Up Vessel

Installation of WTG Component using Jack-Up Vessel Crane

WTG (e.g., emergency stop, auto restart, etc.), and the communication between the WTG and the SCADA system. It is likely that installed WTGs will undergo commissioning and testing while other WTGs are still being installed. Once commissioning is completed, a test run (i.e., trial operation) is carried out (typically for 240 hours) to demonstrate that the WTG performs as expected and is reliable. During commissioning and testing, personnel may be transported to and from WTGs via service operation vessels (SOVs), crew transfer vessels (CTVs), and/or helicopters.

4.4 Offshore Substations

The Projects will include one or more OSSs that serve as common collection points for power from the WTGs and also serve as the origin for the export cables that deliver power to shore. Atlantic Shores is considering three sizes of OSS. Depending on the final OSS design, there will be up to 10 small OSSs, up to five medium OSSs, or up to four large OSSs in the Projects combined. There will be up to five small OSSs, two medium OSSs, or two large OSSs for Project 1; and up to five small OSSs, three medium OSSs, or two large OSSs for Project 2.

OSSs will be located along the same east-northeast to west-southwest rows as the WTGs; small OSSs will be located no closer than 12 miles (mi) (19.3 km) from shore whereas medium and large OSSs will be located at least 13.5 mi (21.7 km) from shore. Potential OSS locations for both Projects are shown on Figure 3.1-2 and the OSS layout is described further in Section 3.1. OSS foundations are described in Section 4.4.1, while topside structures are described in Section 4.4.2. Scour protection, which may be installed around OSS foundations, and seabed preparation are described in Section 4.4.3.

4.4.1 OSS Foundation Design and Installation

Similar to the WTG foundations, the PDE includes three categories of OSS foundations that may be affixed to the seabed using piles, suction buckets, or gravity. The type of OSS foundation used depends on the size of the OSS itself (see Table 4.4-1).

Table 4.4-1 OSS Foundation Types

Foundation Types		Small OSS	Medium OSS	Large OSS
Piled	Monopile	●		
	Piled Jacket	●	●	●
Suction Bucket	Mono-Bucket	●		
	Suction Bucket Jacket	●	●	●
Gravity	GBS	●	●	●

These foundation types are similar to those under consideration for the WTGs, although tetrahedron base foundations are not included in the OSS foundation PDE. Each foundation type and the various foundation installation methods are described in Section 4.2. For the OSSs, the GBS foundations includes a multi-leg option as shown in Figure 4.4-1.

There could be up to 10 small OSSs. For these OSS, the PDE for each foundation type is identical to the PDE for the WTG foundations provided in Table 4.2-1. The PDE of foundation dimensions for the medium and large OSSs is defined in Table 4.4-2.

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Figure 4.4-1
Multi-Leg Gravity-Base Structure (GBS) Foundation

Table 4.4-2 PDE of OSS Foundation Dimensions and Seabed Disturbance

Foundation Concept	Medium OSS			Large OSS		
	Piled Jacket	Suction Bucket Jacket	GBS	Piled Jacket	Suction Bucket Jacket	GBS
Foundation Structure						
Max. # of foundations	5	5	5	4	4	4
Max. pile, suction bucket, or gravity-base diameter at seabed	Pile diameter: 16.4 ft (5.0 m) Including piling template: 49.2 ft (15.0 m)	49.2 ft (15.0 m)	262.5 x 65.6 ft (80.0 m x 20.0 m)	Pile diameter: 16.4 ft (5.0 m) Including piling template: 65.6 ft (20.0 m)	49.2 ft (15.0 m)	393.7 ft x 98.4 ft (120.0 x 30.0 m)
Max. # of legs/discrete contact points with seabed	6 legs (up to two pin piles per leg)	6	2	8 legs (up to 3 pin piles per leg)	8	2
Max. depth of penetration below seabed	229.7 ft (70.0 m)	82.0 ft (25.0 m)	9.8 ft (3.0 m)	229.7 ft (70.0 m)	82.0 ft (25.0 m)	9.8 ft (3.0 m)
Max. jacket pile/bucket length	295.3 ft (90.0 m)	98.4 ft (30.0 m)	N/A	295.3 ft (90.0 m)	98.4 ft (30.0 m)	N/A
Max. distance between adjacent legs at seabed	196.9 ft (60.0 m)	196.9 ft (60.0 m)	180.4 ft (55.0 m)	164.0 ft (50.0 m)	164.0 ft (50.0 m)	229.7 ft (70.0 m)
Max. foundation size/leg spacing at MSL	393.7 ft x 196.9 ft (120.0 m x 60.0 m)	393.7 ft x 196.9 ft (120.0 m x 60.0 m)	262.5 ft x 246.1 ft (80.0 m x 75.0 m)	492.1 ft x 328.1 ft (150.0 x 100.0 m)	492.1 ft x 328.1 ft (150.0 m x 100.0 m)	393.7 ft x 328.1 ft (120.0 m x 100.0 m)
Max. total foundation footprint contacting seabed per foundation[a]	11,413.0 ft^2 (1,060.3 m^2)	11,413.0 ft^2 (1,060.3 m^2)	34,444.5 ft^2 (3,200.0 m^2)	27,052.9 ft^2 (2,513.3 m^2)	15,216.9 ft^2 (1,413.7 m^2)	77,500.2 ft^2 (7,200.0 m^2)
Seabed Disturbance						
Permanent Seabed Disturbance						
Max. representative[b] outer diameter/size of scour protection	131.2 ft (40.0 m) per leg	196.9 ft (60.0 m) per leg	393.7 ft x 377.3 ft (120.0 m x 115.0 m) per foundation	147.6 ft (45.0 m) per leg	695.5 ft x 203.4 ft (212.0 m x 62.0 m) per row of four legs	524.9 ft x 459.3 ft (160.0 m x 140.0 m) per foundation
Max. thickness of scour protection	6.6 ft (2.0 m)	6.6 ft (2.0 m)	5 ft (1.5 m)	6.6 ft (2.0 m)	6.6 ft (2.0 m)	5 ft (1.5 m)
Est. volume of scour protection per foundation	380,427.2 ft^3 (10,772.5 m^3)	885,903.7 ft^3 (25,086.0 m^3)	731,013.6 ft^3 (20,700.0 m^3)	666,998.7 ft^3 (18,887.3 m^3)	1,485,370.2 ft^3 (42,061.0 m^3)	1,186,572.8 ft^3 (33,600.0 m^3)
Max. total permanent footprint per foundation (foundation + scour protection + mud mats [post-piled jackets only])	**81,157.9 ft^2 (7,539.8 m^2)**	**182,605.3 ft^2 (16,964.6 m^2)**	**148,541.8 ft^2 (13,800.0 m^2)**	**136,953.9 ft^2 (12,723.5 m^2)**	**282,961.4 ft^2 (26,288.0 m^2)**	**241,111.4 ft^2 (22,400.0 m^2)**

Table 4.4-2 PDE of OSS Foundation Dimensions and Seabed Disturbance (Continued)

Foundation Concept	Medium OSS			Large OSS		
	Piled Jacket	**Suction Bucket Jacket**	**GBS**	**Piled Jacket**	**Suction Bucket Jacket**	**GBS**
Seabed Disturbance						
Temporary Seabed Disturbance During Construction						
Max. dimensions of seabed preparation per foundation	524.9 ft x 328.1 ft (160.0 m x 100.0 m)	590.6 ft x 393.7 ft (180.0 m x 120.0 m)	442.9 ft x 393.7 ft (135.0 m x 120.0 m)	639.8 ft x 475.7 ft (195.0 m x 145.0 m)	695.5 ft x 531.5 ft (212.0 m x 162.0 m)	557.7 ft x 524.9 ft (170.0 m x 160.0 m)
Max. depth of seabed preparation[c]	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Max. area of seabed preparation per foundation	172,222.6 ft^2 (16,000.0 m^2)	232,500.5 ft^2 (21,600.0 m^2)	174,375.4 ft^2 (16,200.0 m^2)	304,349.6 ft^2 (28,275.0 m^2)	369,675.7 ft^2 (34,344.0 m^2)	292,778.4 ft^{t2} (27,200.0 m^2)
Avg. volume of seabed preparation per foundation[d]	565,034.7 ft^3 (16,000.0 m^3)	762,796.8 ft^3 (21,600.0 m^3)	572,097.6 ft^3 (16,200.0 m^3)	998,522.2 ft^3 (28,275.0 m^3)	1,212,846.9 ft^3 (34,344.0 m^3)	960,558.9 ft^3 (27,200.0 m^3)
Max. area of disturbance due to jack-up or anchored vessels per foundation[e]	47,361.2 ft^2 (4,400 m^2)	47,361.2 ft^2 (4,400 m^2)	0.0 ft^2 (0.0 m^2)	47,361.2 ft^2 (4,400 m^2)	47,361.2 ft^2 (4,400 m^2)	0.0 ft^2 (0.0 m^2)
Max. total temporary seabed disturbance beyond permanent footprint per foundation	**138,425.7 ft^2 (12,860.2 m^2)**	**97,256.1 ft^2 (9,035.4 m^2)**	**25,833.4 ft^2 (2,400.0 m^2)**	**214,756.5 ft^2 (19,951.5 m^2)**	**134,075.1 ft^2 (12,456.0 m^2)**	**51,666.7 ft^2 (4,800.0 m^2)**
Total Temporary and Permanent Seabed Disturbance During Construction						
Max. total area of seabed disturbance per foundation	**219,583.6 ft^2 (20,400.0 m^2)**	**279,861.4 ft^2 (26,000.0 m^2)**	**174,375.2 ft^2 (16,200.0 m^2)**	**351,710.4 ft^2 (32,675.0 m^2)**	**417,036.5 ft^2 (38,744.0 m^2)**	**292,778.1 ft^2 (27,200.0 m^2)**
Installation Timeframe						
Approx. max. duration to drive one pile	3-4 hours	N/A	N/A	3-4 hours	N/A	N/A
Max. # of piles driven per day	4	N/A	N/A	4	N/A	N/A

Notes:

a) The footprint of any mud mats (if used) are included in the "Max. total permanent footprint" rather than the "Total foundation footprint contacting seabed."

b) Scour protection may occur in any shape and size up to the maximum footprint provided above, including the possibility of no scour protection.

c) In the worst case situation, in a limited number of foundation positions, up to 19.7 ft (6 m) of seabed leveling could be required. Piled and suction bucket foundations are not expected to require seabed preparation unless the seabed is not sufficiently level.

d) The maximum total volume of seabed preparation for the OSS foundations will not exceed the average volume for an individual foundation multiplied by the maximum number of foundations.

e) OSS foundation installation using jack-up vessels is expected to involve one main installation jack-up vessel with a maximum disturbance of 10,763.9 ft^2 (1000.0 m^2) (four legs, each disturbing 2,691.0 ft^2 [250.0 m^2]) and one feeder-jack-up vessel with a maximum disturbance of 4,869.5 m^2 (452.4 m^2) (four legs, each disturbing 1,217.4 ft^2 [113.1 m^2]) at each position. If an anchored HLV is used, foundation installation is expected to involve one anchored HLV with a maximum disturbance of 47,361.2 ft^2 (4,400 m^2) (four anchors, each with a disturbance of 1,076.4 ft^2 [100.0 m^2] for the anchor itself plus 10,763.9 ft^2 [1,000.0 m^2] for the mooring system) at each position. Any feeder barge(s) would moor to the HLV and cause no additional disturbance. The scenario resulting in the greatest seafloor disturbance for each OSS type is assumed in the table above. Additional emergency anchoring or jacking-up may be required.

4.4.2 Topside Design, Installation, and Commissioning

Power generated by the WTGs will be transmitted to the OSSs via 66 kV to 150 kV inter-array cables, which will connect to circuit breakers and transformers located within the OSS topsides. These transformers will increase the voltage level to the export cable voltage (230 kV to 525 kV). From the OSSs, the export cables will transmit electricity to shore. Additional information about the offshore cables is included in Section 4.5.

The PDE of OSS topside parameters is provided in Table 4.4-3.

Table 4.4-3 PDE of OSS Topside Dimensions

Topside Parameter	Small OSS	Medium OSS	Large OSS
Max. # of OSSs	10	5	4
Max. Width	114.8 ft (35.0 m)	147.6 ft (45.0 m)	164.0 ft (50.0 m)
Max. Length	131.2 ft (40.0 m)	213.3 ft (65.0 m)	295.3 ft (90.0 m)
Max. Height above Foundation Interface	98.4 ft (30.0 m)	114.8 ft (35.0 m)	131.2 ft (40.0 m)
Max. Height of Topside above MLLW	174.8 ft (53.3 m)	191.2 ft (58.3 m)	207.6 ft (63.3 m)

The OSSs will be designed according to site-specific conditions, including winter storms, hurricanes, and tropical storms, based on industry standards such as ACP, IEC, API, and ISO standards.

Although the precise electrical equipment contained in the OSS topsides will be determined as the engineering design advances, each OSS will contain power transformers, which will vary in size depending on the type of OSS (HVAC or HVAC/HVDC) and electrical capacity. The OSS topsides are also expected to include:

- switchgear
- transformers
- control and communications equipment
- shunt reactors
- fire detection and firefighting equipment (e.g., inert gas and/or water/foam systems)
- cranes
- safety equipment (e.g., life rafts or boats, lifejackets)
- freshwater storage
- clean water wash system

- UPS system and associated batteries
- backup diesel generator
- diesel fuel storage
- utility pumps for systems such as freshwater, diesel fuel, and cooling.
- oil containment

Lightning masts or air terminals will be installed on OSS topsides to protect electrical equipment and personnel. Heating, ventilation, and air conditioning systems will be installed in the OSS to regulate equipment temperatures.

During construction and operation, the OSSs will be lighted and marked in accordance with FAA, USCG, and BOEM guidelines to aid safe navigation within the WTA. Lighting and marking of the OSSs during the operations period are discussed in Section 5.3. Atlantic Shores does not currently anticipate installing helicopter pads on the OSSs, though this feature may be added depending on the O&M strategy employed (see Section 5.6). If a helicopter pad is included, it will be designed to support a USCG helicopter and appropriate lighting, and marking will be included as required.

The OSS topsides are expected to be fabricated outside of the U.S. and transported directly to the WTA on the installation vessel, a HTV, or ocean-going barge. Although unlikely, if an OSS is staged at a U.S. port prior to installation, shore-based equipment such as crawler cranes and SPMTs would unload the OSS topside and transport it to port storage. Then, the OSS topside would be loaded onto a vessel to be transported to the WTA for installation. Once at the WTA, the OSS topsides are expected to be lifted from the transport vessel onto the OSS foundation using a crane on a jack-up vessel or HLV using either DP or anchors (see Figure 4.4-2).

Alternatively, the OSS topsides may be pulled by tugboats and floated to the WTA, after which the topsides would be ballasted down over an installed OSS foundation or jack-up legs integrated into the topside would lower to the seabed and raise the topside to its target elevation.

After the OSS topside is secured to its foundation, the OSS will be commissioned. During commissioning, the electrical and safety systems on the OSS will be tested and the OSS will be energized. A jack-up vessel or floating vessel may be used to provide accommodations for the personnel commissioning the OSSs. Any seabed disturbance from vessels used during installation and commissioning of the OSS topsides will occur within surveyed areas of the WTA. The PDE of seabed disturbance for OSS topside installation and commissioning is described in Table 4.4-4.

Table 4.4-4 Maximum Seabed Disturbance from OSS Topside Installation and Commissioning

Installation Activity	PDE
Max. area of seafloor disturbance for OSS topside installation	47,361.2 ft^2 (4,400.0 m^2) per OSS (assumes one HLV with four anchors, each with a disturbance of 11,840.3 ft^2 [1,100.0 m^2] for the anchor and mooring system)[a]
Max. area of seafloor disturbance for OSS commissioning	10,763.9 ft^2 (1,000.0 m^2) per OSS (assumes one jack-up vessel with four legs, each with a disturbance of 2,691.0 ft^2 [250.0 m^2])
Max. Total Seabed Disturbance from Anchors/Jack-Up Vessels During OSS Topside Installation and Commissioning	**58,125.1 ft^2 (5,400.0 m^2) per OSS**

Note:

a) Alternatively, the topsides could be installed by a HLV operating on DP (i.e., with no seafloor disturbance) or a jack-up vessel with a maximum seafloor disturbance of 10,763.9 ft^2 (1,000.0 m^2).

4.4.3 Seabed Preparation and Scour Protection

As with WTG foundations, OSS foundations (particularly gravity foundations), may require seabed preparation (i.e., removing the uppermost sediment layer beneath the foundation). Gravity foundations are also expected to require gravity pads. Methods to complete seabed preparation are described in Section 4.2.4. The maximum dimensions of seabed preparation that could be required for each OSS foundation type is provided in Table 4.4-2.

Scour protection may be installed at the base of each OSS foundation to protect it from sediment transport/erosion caused by water currents. The different types of scour protection that could be placed around OSS foundations are the same as for WTG foundations and are described in Section 4.2.5. Dimensions of OSS foundation scour protection are included in Table 4.4-2.

Lifting of Offshore Substation Topside Using Vessel Crane

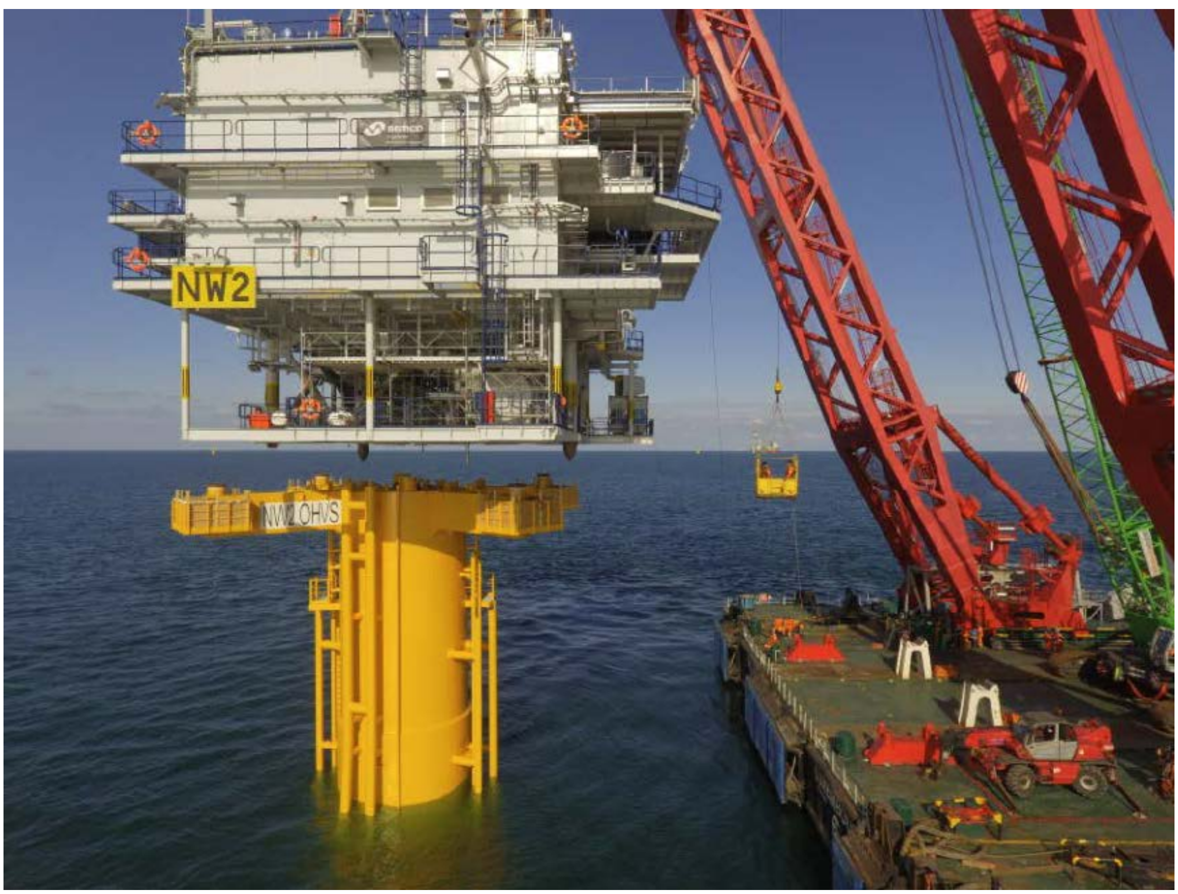


Figure 4.4-2
Offshore Substation Installation

4.5 Offshore Cables

The Projects will include electrically distinct offshore export, inter-array, and possibly inter-link cables (the "offshore cables"). Up to eight export cables will be installed to deliver electricity from the OSSs to the landfall sites. The export cables from each Project have the potential to utilize either ECC or be co-located in the same ECC. Both Project 1 and 2 also include electrically distinct inter-array cables to connect strings of WTGs to an OSS, and may include inter-link cables to connect OSSs to each other.

4.5.1 Offshore Cable Design

4.5.1.1 Export Cables

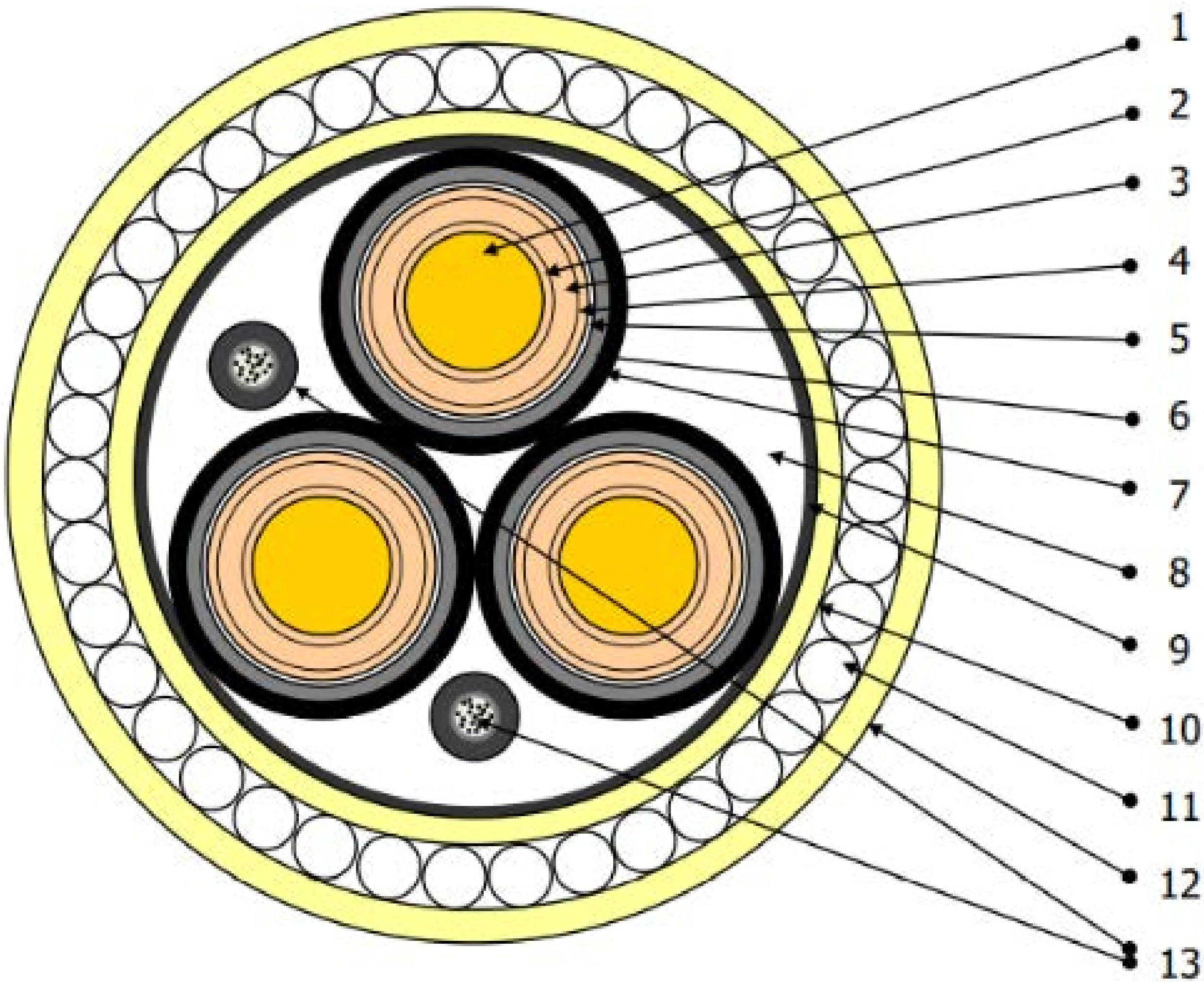
The Projects will each include HVAC export cables or HVDC export cables (bundled together). Both Projects 1 and 2 have the potential to use either ECC and may also be co-located within the same ECC. If HVAC cables are used, the voltage will be between 230 kV and 275 kV; if HVDC cables are used, a higher voltage between 320 kV and 525 kV will be used.

HVAC cables are expected to have three stranded-core conductors made of aluminum or copper that are encapsulated in a cross-linked polyethylene (XLPE) insulation system, a metallic screen, and a core jacket. The three power cores are bundled together and protected by an armor layer. All cables will contain fiber optics between the cores for communication and monitoring purposes. See Figure 4.5-1 for a schematic of a typical HVAC export cable. The HVAC export cables will have a maximum outer diameter of approximately 12.6 inches (in) (320 millimeters [mm]).

HVDC cables are expected to have single-core stranded conductors made of aluminum or copper each encapsulated in an XLPE insulation system, a metallic screen, a core jacket, and protected by an armor layer (see Figure 4.5-2). Each HVDC circuit is composed of two HVDC cables. The two HDVC cables and external fiber optic cables would be bundled together and installed simultaneously. The HVDC export cables will have a maximum width of approximately 14.2 in (360 mm).

The export cable design will likely include a distributed temperature system (DTS) and may include other monitoring systems such as distributed acoustic sensing (DAS) system or online partial discharge (OLPD) monitoring to constantly assess the status of offshore cables and detect anomalous conditions, insufficient or excess cable depth, or potential damage (see Section 5.1 for additional details).

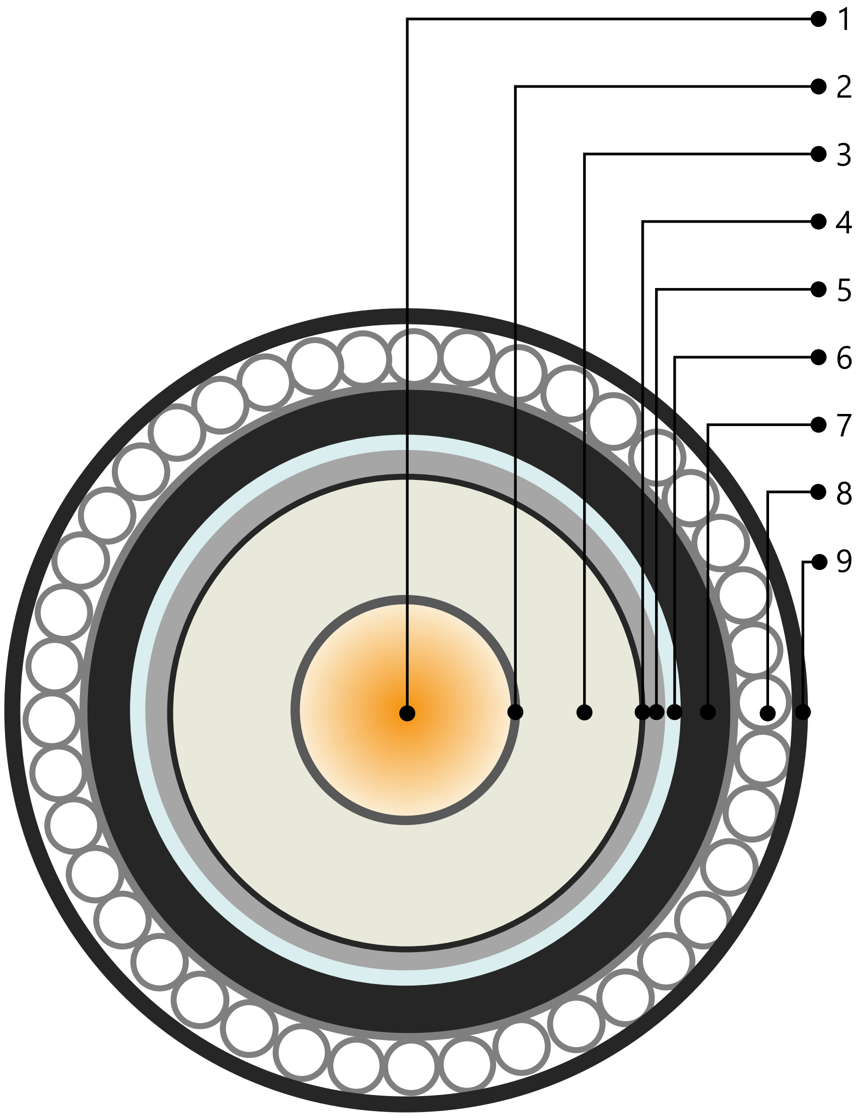
The target burial depth of the export cables will be 5 to 6.6 ft (1.5 to 2 m). Section 4.5.4 contains a description of offshore cable installation techniques. The total maximum seafloor impacts for Project 1, Project 2, and both Projects combined are presented in Section 4.5.10.



Label	Description
1	Conductor
2	Conductor screen
3	Insulation
4	Insulation screen
5	Water blocking layer
6	Metallic sheath
7	Anti-corrosion sheath
8	Filler
9	Binder tape
10	Armor bedding
11	Wire armor
12	Serving
13	Fiber Optic Cables

Figure 4.5-1
High Voltage Alternating Current (HVAC) Export Cable Schematic

Individual HVDC Cable



Label	Description	Material
1	Conductor	Copper or Aluminum
2	Conductor screen	Extruded semi conductive compound
3	Insulation	XLPE
4	Insulation screen	Extruded semi conductive compound
5	Metallic sheath	Lead alloy / Semi conducting swelling tape to prevent longitudinal water penetration
6	Core sheath	Semi conducting polyethylene
7	Armor bedding	Non-conductive tapes
8	Armor	Galvanized steel wires
9	Outer serving	Polypropylene yarns

Bundled HVDC Cables

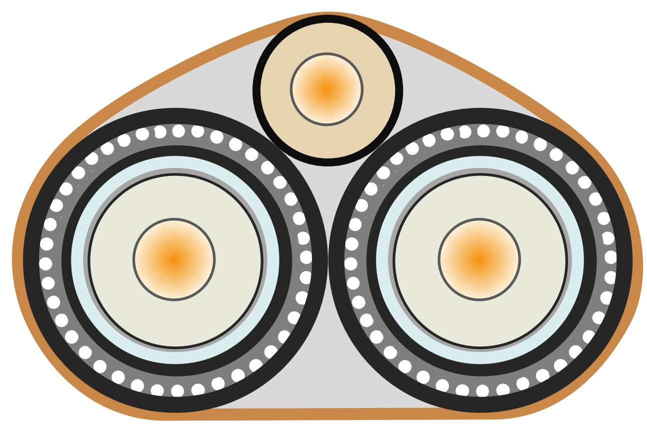


Figure 4.5-2

High Voltage Direct Current (HVDC) Export Cable Schematic

4.5.1.2 Inter-Array and Inter-Link Cables

Project 1 and Project 2 will have electrically distinct inter-array and inter-link cables. The HVAC inter-array cables will have a voltage between 66 and 150 kV and a maximum outer diameter of 8.5 in (215 mm). The HVAC inter-link cables, if used, will have a voltage between 66 and 275 kV and a maximum outer diameter of 12.6 in (320 mm).

Each inter-array and inter-link cable is expected to have three stranded-core conductors made of aluminum or copper, each encapsulated in an XLPE insulation system, a metallic screen, and a core jacket (see Figure 4.5-3). The three power cores are bundled together and protected by an armor layer. All cables will contain optical fibers embedded between the cores for communication and monitoring purposes. The cable design will limit water propagation along the cable core in case of cable damage. Similar to the export cables, the inter-array and inter-link cables may include monitoring systems such as DAS, DTS, or OLPD.

The target burial depth of the inter-array and inter-link cables will be 5 to 6.6 ft (1.5 to 2 m). Section 4.5.4 contains a description of offshore cable installation techniques. The total maximum seafloor impacts for Project 1, Project 2, and both Projects combined are presented in Section 4.5.10.

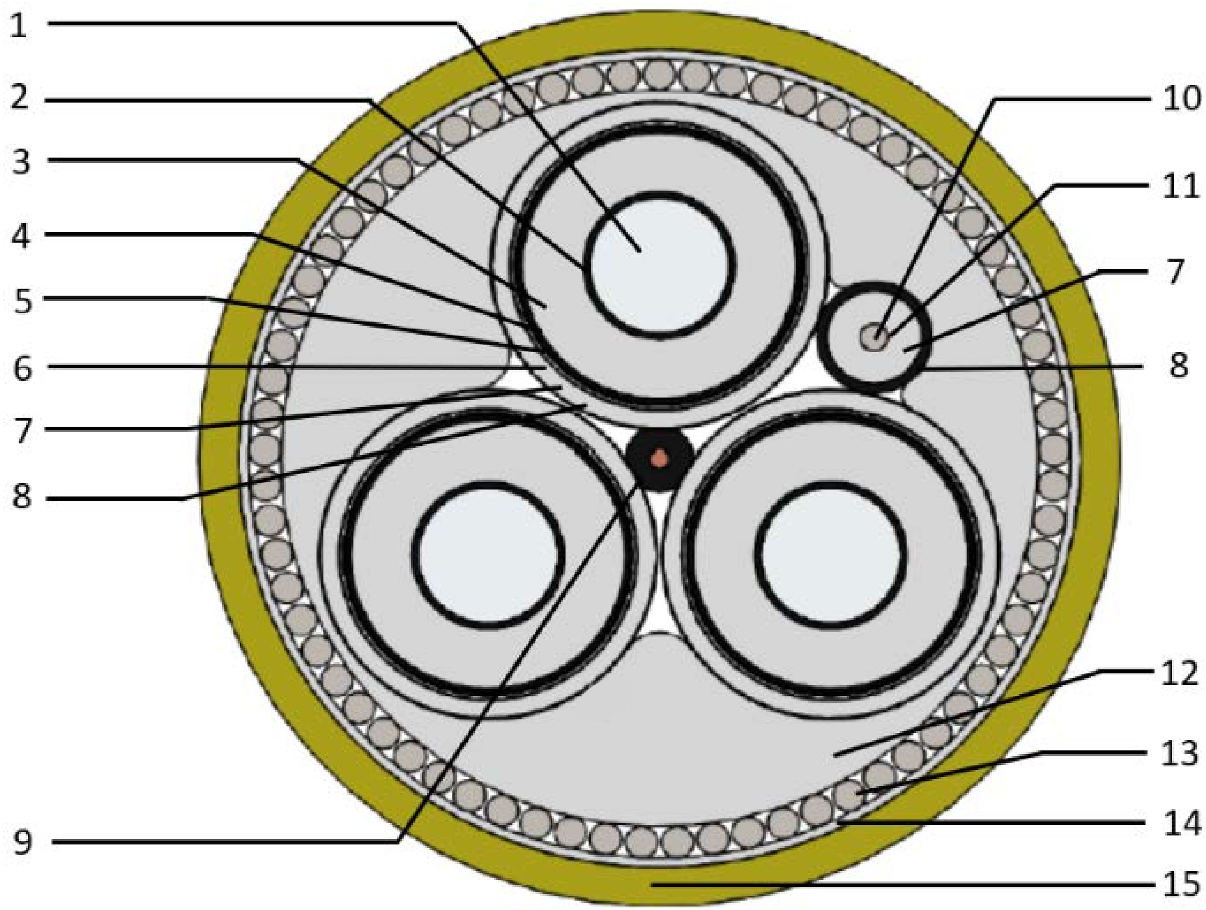
4.5.2 Offshore Cable Routes

4.5.2.1 Export Cable Corridors

The export cables will be installed within the Atlantic ECC and/or the Monmouth ECC (see Figure 4.5-4 and 4.5-5, respectively). The width of each ECC corresponds to the width of the marine survey corridors and ranges from approximately 3,300 to 4,200 ft (1,000 to 1,280 m) for all of the Monmouth ECC and most of the Atlantic ECC, though the Atlantic ECC widens to approximately 5,900 ft (1,800 m) near the Atlantic Landfall Site. The width of each ECC is needed to accommodate up to four export cables, as well as the associated cable installation vessel activities, and allows for avoidance of resources such as shipwrecks and sensitive habitats (see Section 3.3). Variations in width at the landfall sites are needed to accommodate the construction vessel activities necessary to support the landfall of each export cable via horizontal directional drilling (HDD).

A minimum separation distance of approximately 330 ft (100 m) is planned between the HVAC export cables installed within each ECC. The cables will typically be separated by 410 to 820 ft (125 to 250 m), depending on route constraints and water depths. This separation distance, which provides flexibility for routing and installation as well as for future cable repairs (if needed), may be adjusted pending ongoing evaluation and site conditions.

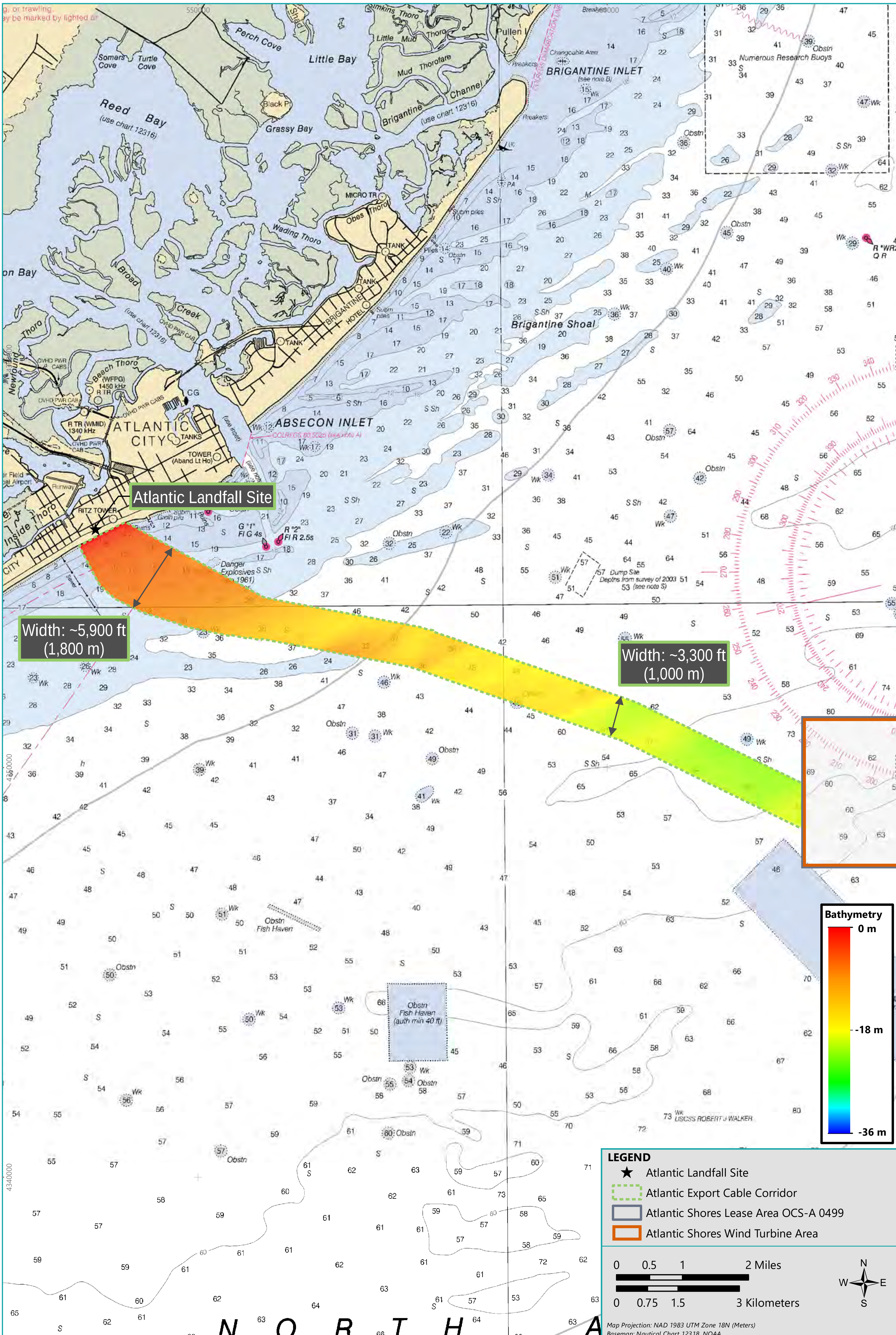
The ECC from the WTA boundary to the Atlantic Landfall Site is approximately 12 mi (19 km). The maximum length of each export cable from the Atlantic Landfall Site to an OSS is approximately 25 mi (40 km), including the length of the export cable within the WTA and contingency for micro-



Label	Description
1	Conductor
2	Conductor screen
3	XLPE insulation
4	Insulation screen
5	Water blocking tape
6	Aluminum tube
7	HDPE Sheath
8	Semi-conducting skin
9	Drain wire & semi-conducting sheath
10	Optical fibers in gel
11	Stainless steel tube
12	Filling
13	Steel wire armor
14	Binding tape
15	PE outer sheath

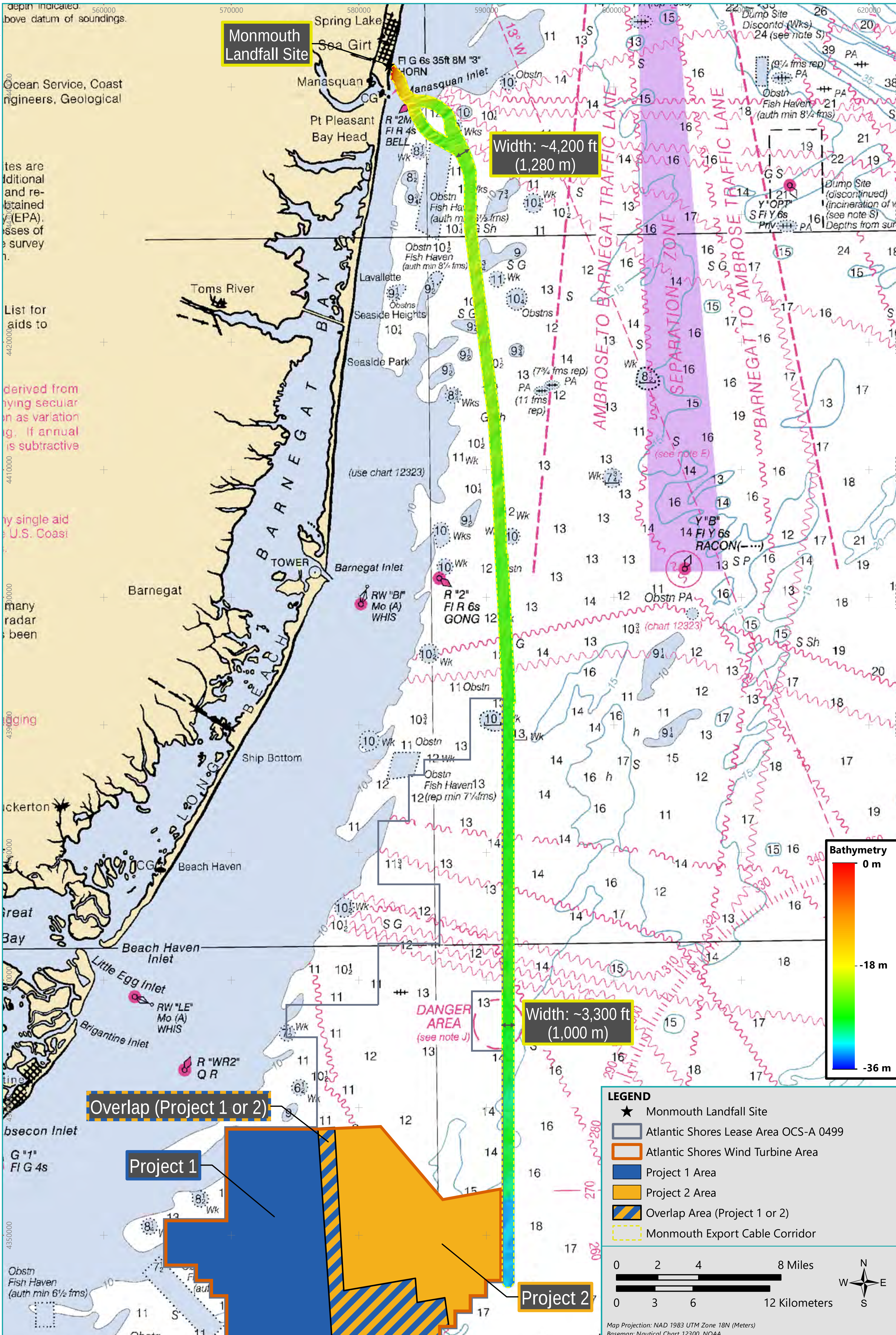
Figure 4.5-3

Inter-Array and Inter-Link Cable Schematic



ATLANTIC SHORES offshore wind

Figure 4.5-4
Atlantic Export Cable Corridor (ECC)



ATLANTIC SHORES offshore wind

Figure 4.5-5
Monmouth Export Cable Corridor (ECC)

siting. The ECC from the WTA boundary to the Monmouth Landfall Site is approximately 61 mi (98 km). Each export cable from the Monmouth Landfall Site to an OSS has a maximum length of approximately 85 mi (138 km) when accounting for the length of the export cable within the WTA and contingency for micro-siting. If four export cables are installed in each ECC (for a total of eight export cables), the total maximum export cable length will be 441 mi (710 km). Neither ECC crosses established navigation channels.

4.5.2.2 Inter-Array and Inter-Link Cable Routes

The electrically distinct inter-array cables and inter-link cables (if used) for each Project will be installed within surveyed corridors in the WTA where full archaeological and geological assessments will have been completed. Atlantic Shores will engineer potential inter-array and inter-link cable layouts based on the results of surveys conducted in 2021. For both Projects, Atlantic Shores anticipates that up to 547 mi (880 km) of inter-array cables and up to approximately 37 mi (60 km) of inter-link cables may be needed. Project 1 and Project 2 will each have a maximum of 273.5 mi (440 km) of inter-array cables and up to approximately 18.6 mi (30 km) of inter-link cables.

4.5.3 Pre-Installation Activities

Activities that will be conducted prior to cable installation include sand bedform clearing, relocation of boulders, a pre-lay grapnel run, and a pre-lay survey.

4.5.3.1 Boulder Relocation

Boulder relocation may be required prior to cable installation in limited areas along the final export cable alignments within the ECCs. If required, this will likely be executed by subsea grab, since the presence of boulders is expected to be minimal and this method allows for minimal seabed impact (impact will be limited to a boulder's original footprint and its final, relocated footprint).

If more boulders than expected are encountered, a displacement plow could be selected for clearing the area. This plow is anticipated to clear an approximately 33-ft-wide (10-m-wide) corridor for up to 10% of each export cable. A displacement plow is a simple and robust Y-shaped design configured with a boulder board attached. This plow, which is towed along the seabed by a vessel, displaces boulders along a clearance path as it passes along the seabed surface. The plow will normally be ballasted to only clear boulders (to a depth of up 31 in [800 mm]) to avoid creating a deep depression in the seabed. The maximum area of seabed disturbance from boulder relocation is provided in Section 4.5.10.

4.5.3.2 Sand Bedform Removal

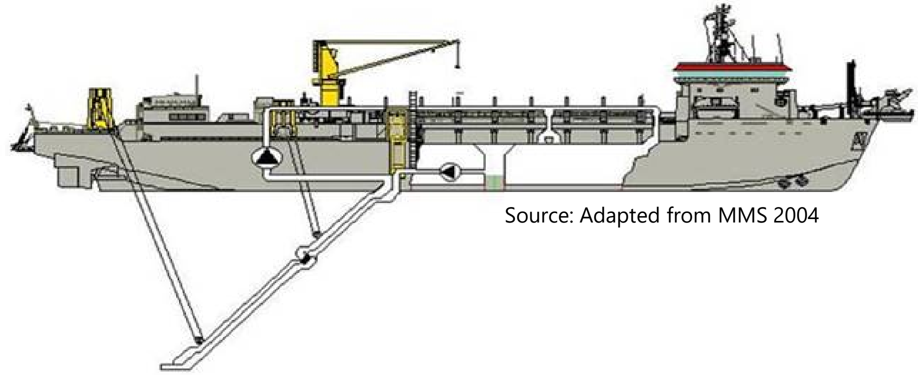
The expected presence of mobile sand bedforms (i.e., ripples, megaripples, and sand waves) within the ECCs and WTA may necessitate the removal of the tops of some sand bedforms prior to offshore cable installation to ensure the cables can be installed within stable seabed. Sand bedform removal will be limited only to the extent required to achieve adequate cable burial depth. Project engineers estimate that up to 20% of the export cable routes, 10% of the inter-array cable routes, and 20% of the inter-link cable routes may require sand bedform removal. The maximum dredge areas and volumes are provided in Section 4.5.10.

Sand bedform removal is expected to be completed with one or more of the following typical methodologies (see Figure 4.5-6):

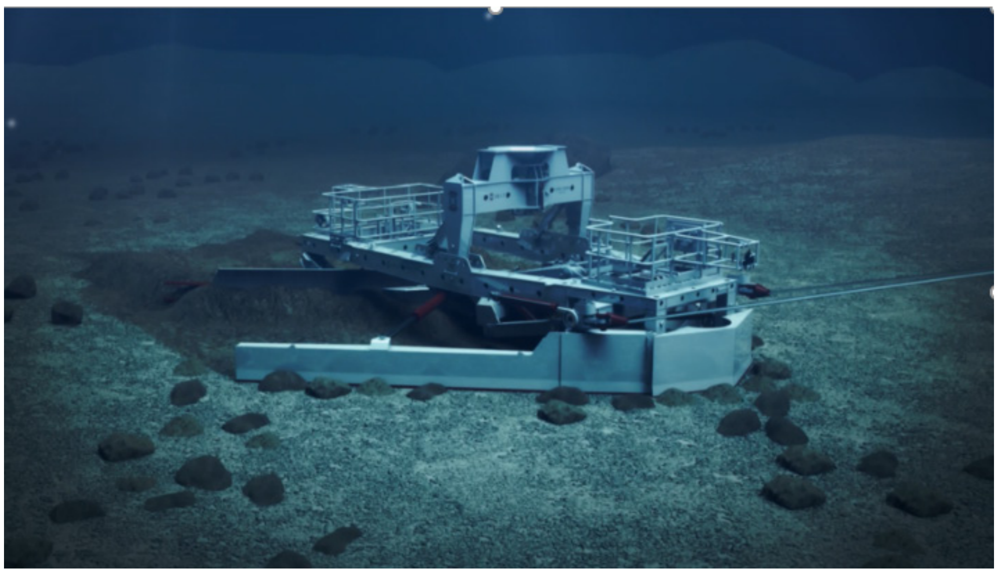
- **Trailing suction hopper dredge (TSHD):** In this dredging method, one or two suction pipes, each equipped with a trailing drag head, descend from the side of the dredging vessel to the seabed. Each drag head is fitted with nozzles that direct high-pressure water at the seabed to loosen seabed material. Due to lower pressure in the pipe, the loosened material is sucked up and discharged into the vessel's hopper. Once collected, dredged materials can be discharged via the bottom doors of the vessel or a pipe that releases dredged material lower in the water column. The collected material will be disposed of within surveyed areas exhibiting sand bedforms, avoiding hard-bottom areas and allowing the volume to be winnowed away by normal currents and tidal actions. Some portion of the dredged sand may also be used for ballast in GBS foundations if those foundations are selected for the Projects. Alternatively, if required, the removed material could be transported a short distance to an agreed-upon disposal site outside the Lease Area.
- **Controlled flow excavation:** Controlled flow excavators are equipped with rotating propellers capable of producing high-volume water columns which, when directed at the seabed, rapidly excavate sediments. The tool can be gyroscopically stabilized and deployed either from a crane or A-frame on the cable installation vessel. Controlled flow excavation may also be used for repairs or removal of cables in soft soils such as silt or loose/medium sand.
- **Route clearance plow:** A route clearance plow pushes sand aside, clearing the way for cable installation. Similar to the use of controlled flow excavation, use of a route clearance plow does not involve collecting sand from the seabed; rather, removed sand is cast aside adjacent to the cable alignments.

In addition to these typical methodologies, two additional specialty methods may be used in limited areas:

- **Cutterhead dredging:** This type of dredging is similar to TSHD but is used in hard or rocky seabed conditions. The method employs a cutterhead, which is similar to a large drill, that breaks up the seabed and loosens it for suction dredging. Given the harder substrate, the rate of production is slower than with a TSHD. Cutterhead dredging is not expected within the WTA, but could be required if rocky seabed is encountered along the ECCs.



Trailing Suction Hopper Dredge



Route Clearance Plow

Controlled Flow Excavation

Figure 4.5-6
Sand Bedform Removal Methodologies

- **Backhoe dredging:** This type of dredging is more likely to be used in shallow, nearshore areas where only a small amount of material may need to be removed. The backhoe dredging equipment operates in the same way as an onshore backhoe excavator but is mounted on a small barge either with or without stabilizing spud legs. Underwater works are typically monitored using either multibeam or blue-view cameras attached to the vessel. Material extracted in the backhoe may be sidecast or it could be deposited in either a hopper on the barge or on a separate hopper vessel before proper disposal.

4.5.3.3 Pre-lay Grapnel Run

Within approximately two months prior to cable installation, Atlantic Shores will perform a pre-lay grapnel run to clear the final cable alignments of human-made obstructions/debris such as discarded fishing wires, nets, or ropes. To complete the pre-lay grapnel run, a vessel will tow an approximately 3.3 ft-wide (1 m-wide) grapnel train consisting of a series of hooks designed to snag debris (see Figure 4.5-7). Measuring tension on the grapnel train towing rope will indicate whether debris is caught on the hooks. Atlantic Shores expects to make three passes with the grapnel train along each cable alignment. The first pass will likely be placed on the centerline of the cable alignment and the remaining two passes will occur parallel to and slightly offset from the centerline (within approximately 25 ft [7.5 m] to each side). The pre-lay grapnel runs will impact the seafloor to a maximum depth of 1.6 ft (0.5 m), subject to prevailing sediment conditions. The total area of seabed disturbance from the pre-lay grapnel runs is provided in Section 4.5.10.

4.5.3.4 Pre-lay Surveys

Atlantic Shores will perform pre-lay surveys along the final planned cable alignments shortly before cable installation to confirm seabed morphology and bathymetry before the start of cable-laying operations and to detect any objects that may affect the future infrastructure. These surveys will consist of multibeam echo-sounder surveys in a corridor at least 65 ft (20 m) wide centered on the cable alignments, with the total width of the survey encompassing the entire area of seabed to be disturbed by cable installation activities.

4.5.4 Cable Installation

The export cables, the inter-array cables, and any inter-link cables will be transported to the WTA or ECCs via one of two methods: direct or marshalled. Since the cables will likely be manufactured outside the U.S., the direct method of delivery is expected to involve a cable installation vessel being loaded at the factory or port and sailing to the Offshore Project Area to complete the cable installation. In this scenario, it is possible that the same vessel will sail back to its origin, obtain the next load of cable, and return to the WTA or ECC to complete the installation; alternatively, a second cable installation vessel could sail from the origin.

The marshalled method would have a similar first step consisting of a cable installation vessel sailing from its origin to the Offshore Project Area to install the first batch of cable. Meanwhile, a subsequent batch of cable would be loaded onto a freighter that would sail to a U.S. port where

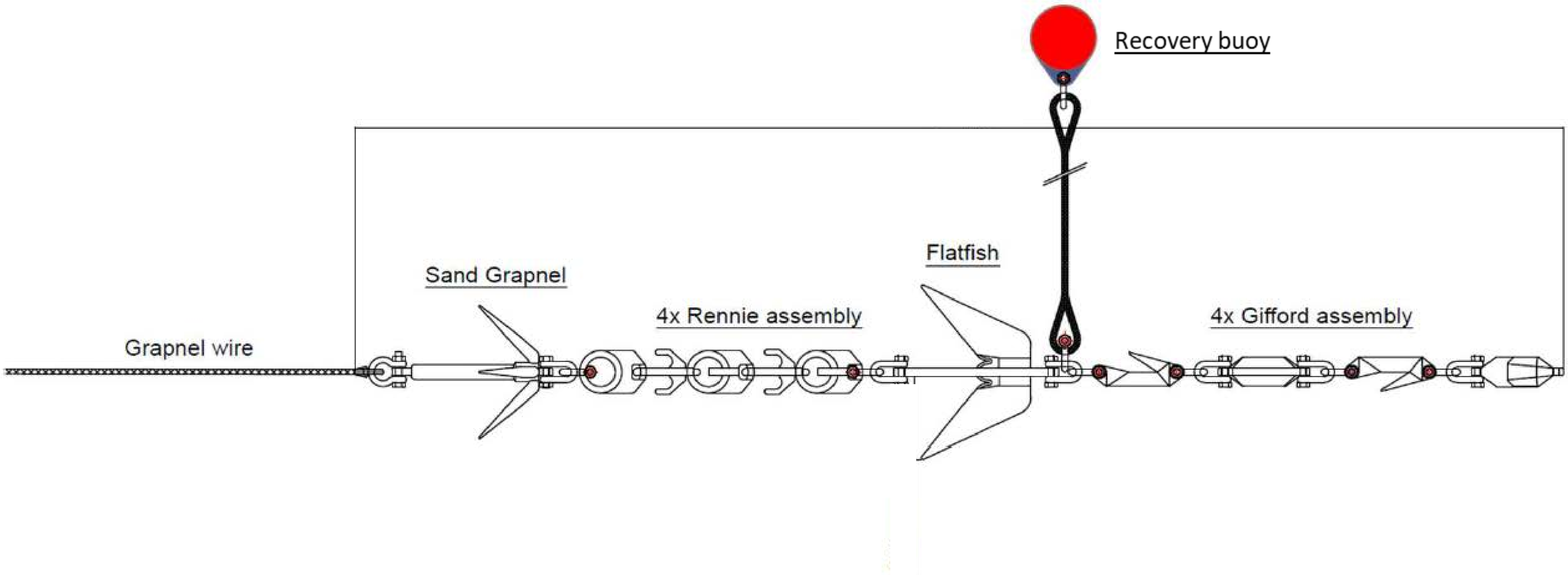


Figure 4.5-7
Representative Pre-Lay Grapnel Train Schematic

the cable would be spooled onto a carousel located onshore and stored quayside. Alternatively, the cables can be transported on pre-wound drums that are unloaded and transported into quayside storage using heavy lift cranes or SPMTs. After the first batch of cable is installed, the installation vessel would load the remaining batches from the U.S. port and install them in the Offshore Project Area. Inter-array and inter-link cables are lighter and easier to handle than the export cables, making staging at a U.S. port prior to installation more likely.

Three common methods may be used to lay and bury the export cables, inter-array cables, and/or inter-link cables:

- **Simultaneous lay and burial:** This is a combined process where the cable will be directly guided from the cable installation vessel through the burial tool and laid into the seabed. This approach will provide immediate protection of the cable following installation but is slower than laying cable with other methods depending on the tool employed (see the description of each tool below for installation speeds). Atlantic Shores expects to use simultaneous lay and burial to install the export cables**.**
- **Post-lay burial:** This process involves temporarily laying the cable onto the seabed followed by a subsequent, separate burial operation. With post-lay burial, the cables lie unprotected on the seabed between the laying and post-lay burial campaigns. Post-lay burial is especially appropriate for inter-array cables where the cables are buried close to WTG or OSS foundations and are relatively short lengths. Cable-laying without simultaneous burial could proceed at a rate of 985 to 1,970 ft per hour (300 to 600 m per hour). Post-lay burial can proceed at a faster burial rate than simultaneous lay and burial (see the description of each tool below for installation speeds) and is appropriate for the sediment types in the WTA. In particular, post-lay burial is expected to be used for the inter-array and inter-link cables because it allows them to be buried to their target depth closer to the foundations and facilitates performing multiple passes with the burial tool (where needed), hence minimizing the need for cable protection. Post-lay burial also results in a shorter duration of burial, thus minimizing the duration of cable installation impacts. Post-lay burial is not proposed as a primary installation technique for the export cables due to the longer lengths of export cables compared to the inter-array cables that would remain exposed, which would temporarily preclude other marine uses from the ECCs.
- **Pre-lay trenching:** This process involves excavating a trench prior to cable installation. The trench must remain clear before the cable is laid into the trench. Once the cable is laid, the trench is backfilled with spoils from the previous excavation. For the offshore cables, this technique is only expected to be used in limited circumstances where deeper cable burial (greater than the target depth of 5 to 6.6 ft [1.5 to 2 m]) may be required or firmer ground (such as clays or dense sands) is encountered.

Atlantic Shores is carefully evaluating available cable installation tools to select techniques that are appropriate for the site and that maximize the likelihood of achieving the target cable burial depth of 5 to 6.6 ft (1.5 to 2 m). The selection of equipment best suited for the task is an iterative process that involves reviewing seabed conditions, cable properties, laying and burying combinations, burial tool systems, and anticipated performance. As shown on Figure 4.5-8, the three primary cable installation tools proposed are:

- **Jet trenching:** Water jetting systems can be used for simultaneous lay and burial or post-lay burial in soft soils such as silt or loose/medium sand. The tool's jetting legs contain numerous nozzles that produce water jets that create a fluidized channel of seabed sediment into which the cable sinks. The tool may be towed by the installation vessel, or it may be a "free-flying" ROV (i.e., neutrally buoyant and self-propelled on a tether). Jet trenching creates a trench approximately 1.3 to 3.3 ft (0.4 to 1.0 m) wide and operates at a burial rate of approximately 820 to 1,150 ft per hour (250 to 350 m per hour).
- **Plowing/jet plowing:** Typically used for simultaneous lay and burial, a plow's share cuts into the seabed, opening a trench to the required burial depth and holding it open with the side walls of the share. As the plow advances, the cable passes through the tool and falls into the open trench at the desired burial depth. Some plows are equipped with jetting nozzles in the share to increase performance. Plowing creates a trench approximately 1.6 ft (0.5 m) wide and operates at a burial rate of approximately 330 to 650 ft per hour (100 to 200 m per hour).
- **Mechanical trenching:** Mechanical cutting trenchers can be used for pre-lay trenching, simultaneous lay and bury, and post-lay burial operations in firmer ground such as clays or dense sands. This type of tool can be equipped with a jetting sword (using water jets) or excavation chain (with mechanical teeth) that cuts a narrow trench into the seabed. For simultaneous lay and bury operations, the cable passes through or over the tool, and as the trench is formed, a depressor directs the cable (within tolerances) into the trench. Mechanical cutting creates a trench approximately 2.1 ft (0.6 m) wide and operates at a burial rate of approximately 490 to 820 ft per hour (150 to 250 m per hour).

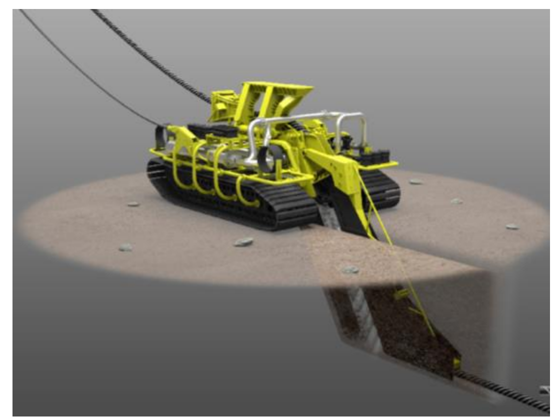
Cable installation is anticipated to create a trench with a maximum depth of approximately 10 ft (3 m) and a maximum width of up to approximately 3.3 ft (1 m). In addition to the direct trench impact, the installation tool's two skids or tracks (each approximately 6.6 ft [2 m] wide) could result in surficial seabed impacts. An anchored cable laying vessel may be used in shallow portions of the ECCs; no anchoring is expected in the WTA (see Section 4.5.10).

Most of the export, inter-array, and inter-link cables are expected to be installed using jet trenching (either simultaneous lay and burial or post-lay burial) or jet plowing, with limited areas of mechanical trenching. It is estimated that 80-90% of the offshore cables could be installed with a single pass of the cable installation tool. However, in limited areas expected to be more challenging for cable burial (along up to 10-20% of the export, inter-array, and inter-link cable routes), an additional one to three passes of the cable installation tool may be required to further lower the cable to its target burial depth.

Representative Cable Laying Vessels

Jet Plow

Jet Trencher



Mechanical Trencher

Figure 4.5-8
Offshore Cable Installation

Additionally, for the export cables, an additional pass of the cable installation tool prior to installing the cable (known as pre-pass jetting) may be performed along up to 5% of the cable alignments to loosen sediments and increase the probability of successful burial. Geophysical and geotechnical surveys performed in 2020 will confirm the most likely locations where pre-pass jetting may be performed for the offshore cables. Finally, for export cable installation in shallow water, a shallow-water barge with tensioners to tow a plow may be used for simultaneous lay-and-bury.

To install an inter-array cable, a cable-laying vessel will first pull the end of an inter-array cable into a WTG or OSS foundation, then lay the cable along the route to the next WTG, where the second cable end will be pulled into the WTG or OSS foundation. The vessel will repeat the process until all WTGs in a string are connected to a single OSS. If post-lay burial is used, a cable burial vessel will then progress along the laid strings of inter-array cables, burying them to target depth. If simultaneous lay and burial is used, the cables will be installed to the target depth in a single operation. If inter-link cables are included in the Projects' final design, the same process will apply to inter-link cables, except these cables will connect OSSs to one another rather than to strings of WTGs.

4.5.5 Export Cable Jointing

Given the length of the export cables, it is expected that they will be installed in one or more segments and that cable jointing offshore will be required. For either HVAC or HVDC export cables, a single joint per cable is anticipated for the Atlantic ECC. The longer route to the Monmouth Landfall Site could require up to four joints per cable.

After the installation of each export cable segment and prior to jointing, the end of the cable segment will be left on the seabed and held in temporary wet storage. In this case, temporary cable protection (e.g., concrete mattresses) may be placed over the cable end to avoid damage prior to splicing. To complete a joint, the end of a previously-laid cable will be brought onboard a jointing vessel (this could be a cable-laying vessel, jack-up vessel, or other specialized vessel) and into a jointing room. The end of the next cable to be installed will also be brought into the jointing room. There, the two ends will be joined together in a process that can take multiple days. Since jointing is a delicate operation, and because it occurs with the end of one cable extending up from the seabed and onboard the vessel, the operation requires several consecutive days of good weather. After a joint is complete, the vessel lowers the joint to the seabed, either in an omega shape or aligned with the previously-laid cable (i.e., an in-line joint), and the joint will be buried. If the joint is not too wide, it could be buried with a jet trencher; alternatively, controlled flow excavation could be used to cover the joint. If burial is not possible or practical due to sediment conditions, cable protection could be placed on top of the joint (see Section 4.5.7).

4.5.6 Cable Pull-In and Commissioning

As described in Section 4.5.4, the inter-array cables and any inter-link cables will be pulled into the WTG and OSS foundations as they are installed. Depending on the final construction schedule, the ends of each export cable may be temporarily wet-stored (during which the cable ends are expected to be covered with cable protection) or directly pulled into the OSS.

Cable pull-in to a WTG or OSS foundation will be initiated by recovering a messenger wire from the foundation and bringing it to the cable laying vessel where the messenger wire will be connected to the end of the offshore cable. A winch on the foundation will then pull the cable (via the messenger wire) through the foundation's steel or composite j-shaped tube (j-tube), which is used to guide the cable into the foundation, and into the OSS topside or WTG tower/transition piece.

Where each cable approaches a foundation, the cable will likely be protected by a cable entry protection system intended to reduce fatigue and mechanical loads as the cables transition above the seabed and into the foundation (see Figure 4.5-9). This system may consist of different composite materials and/or cast-iron half-shells with suitable corrosion protection. It is most likely that the cable entry protection system will be attached to the cable prior to its placement on the seabed. If scour protection is used, the cable entry protection system would largely lie above the scour protection and may extend up to 19.7 ft (6.0 m) beyond the scour protection before transitioning beneath the seabed.

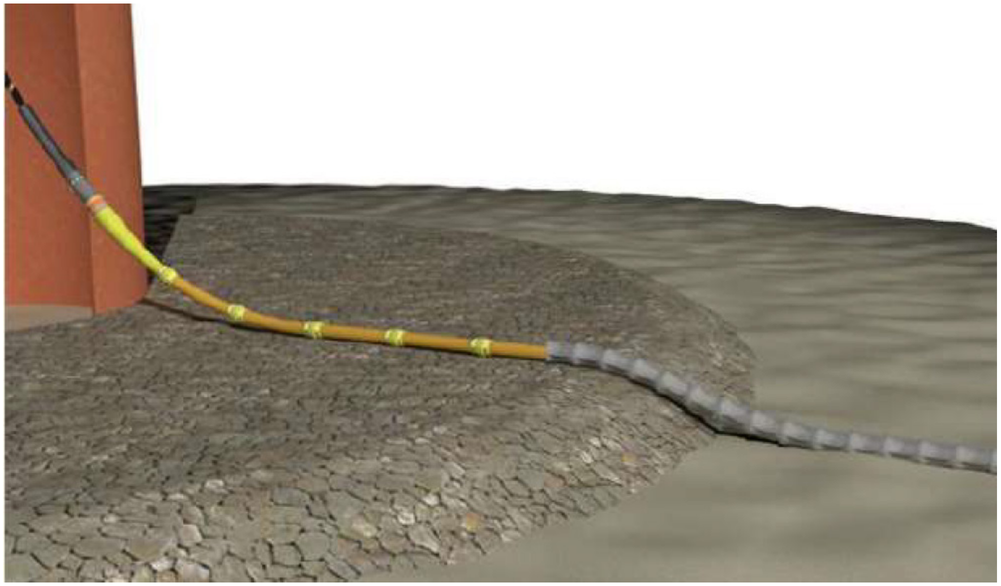
Once inside the foundation, the cable will be stripped to expose power cores and fiber optic cables in preparation for termination at the OSS or WTG. After termination is complete, the cables will be tested and commissioned prior to being energized.

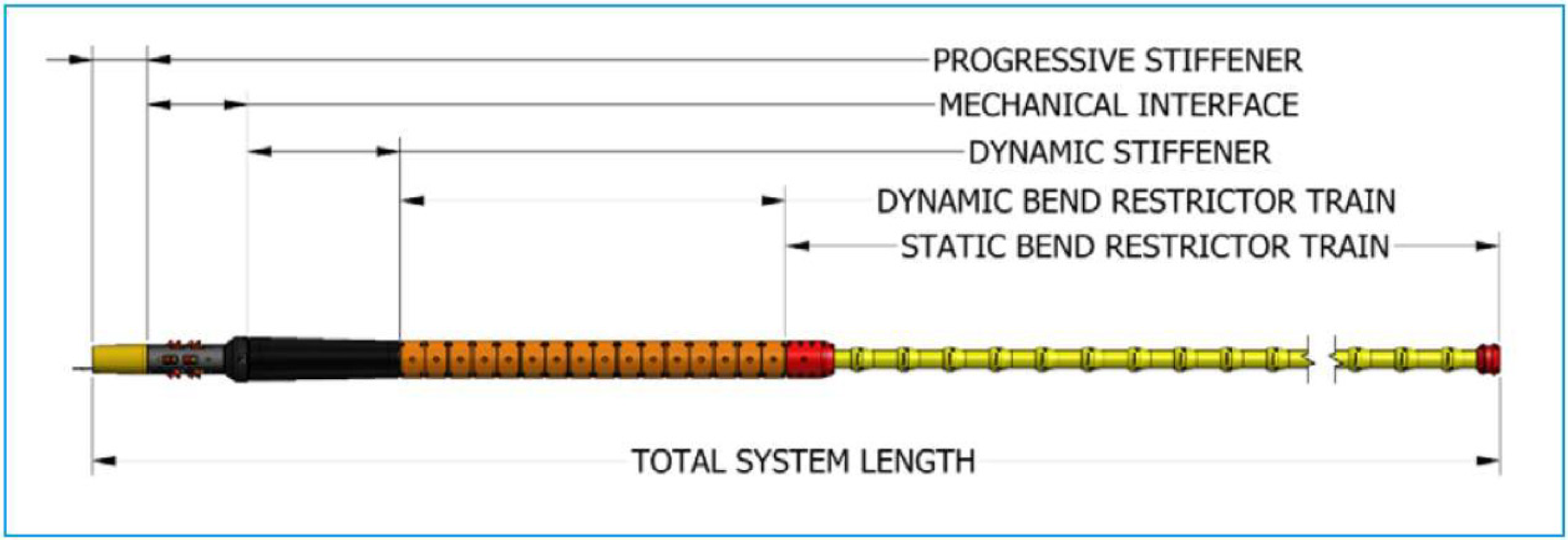
4.5.7 Cable Protection

Cable protection may be necessary if sufficient burial depth cannot be achieved (e.g., due to sediment properties or a cable joint). Cable protection may also be required to support the crossing of existing marine infrastructure such as submarine cables or pipelines (see Section 4.5.8). While Atlantic Shores will work to minimize the amount of cable protection required, it is conservatively assumed that up to 10% of the export cables, inter-array cables, and inter-link cables may require cable protection where sufficient burial depth is not achieved. The maximum dimensions of cable protection and area of seabed disturbance are provided in Section 4.5.10.

Atlantic Shores is considering the use of five types of cable protection:

1. **Rock placement:** up to three layers of rock, with the lower layer(s) consisting of smaller rock and the upper armor layer consisting of larger rock;
2. **Concrete mattresses:** high-strength concrete blocks cast around a mesh (e.g., ultra-violet stabilized polypropylene rope) that holds the blocks in a flexible covering that settles over the contours of a cable;





ATLANTIC SHORES offshore wind

Figure 4.5-9
Representative Cable Entry Protection System

3. **Rock bags:** a rock-filled filter unit enclosed by polyester mesh that is non-corrosive, rot-proof, and weather-resistant with proven 30-year durability;
4. **Grout-filled bags:** woven fabric filled with grout that is placed under the cables to provide support or over the cables to provide protection; and
5. **Half-shell pipes:** composite materials or cast iron fixed around a cable to provide mechanical protection.

One or more of these types of cable protection may be used. Cable protection consisting of freely-laid rock can be installed by a fallpipe vessel, a vessel's crane, or side dumping from a vessel. If freely-laid rock is used, the fallpipe installation method, which is the most accurate technique, will be used wherever possible. Concrete mattresses, rock bags, and grout-filled bags will likely be deployed by a vessel's crane. Hall-shell pipes are expected to be installed around the cable on board the cable laying vessel prior to installing the cable.

4.5.8 Cable Crossings

The ECCs will cross existing marine infrastructure, including submarine cables (see Figure 4.5-10). The Monmouth ECC could have up to 15 crossings that each export cable will need to complete, while the Atlantic ECC could have up to four crossings for each export cable.[20] It is also estimated that up to 10 inter-array cable crossings and up to two inter-link cable crossings may be required.

Any cable crossing will be carefully surveyed and, if the cable is still active, Atlantic Shores will develop a crossing agreement with its owner. At each crossing, before installing the Atlantic Shores cable, the area around the crossing will be cleared of any marine debris. Depending on the status of the existing cable and its location, such as burial depth and substrate characteristics, cable protection may be placed between the existing cable and Atlantic Shores' overlying cable. However, if sufficient vertical distance exists, such protection may be avoided. It is likely that the presence of an existing cable will prevent Atlantic Shores' cable from being buried to its target burial depth. In this case, cable protection may be required on top of the proposed cable at the crossing location. Following installation of the proposed cables, the cable crossing will be surveyed again.

Atlantic Shores is considering the same five types of cable protection at infrastructure crossings as described in Section 4.5.7. The dimensions of cable protection at infrastructure crossings are provided in Section 4.5.10.

If an existing cable is inactive, it will be cut and removed prior to installing Atlantic Shore's cables. Removal of the inactive cables will enable burial of Atlantic Shore's cables and avoid the need for cable protection. Where removal is not feasible, standard cable crossing techniques will be employed, which may require cable protection.

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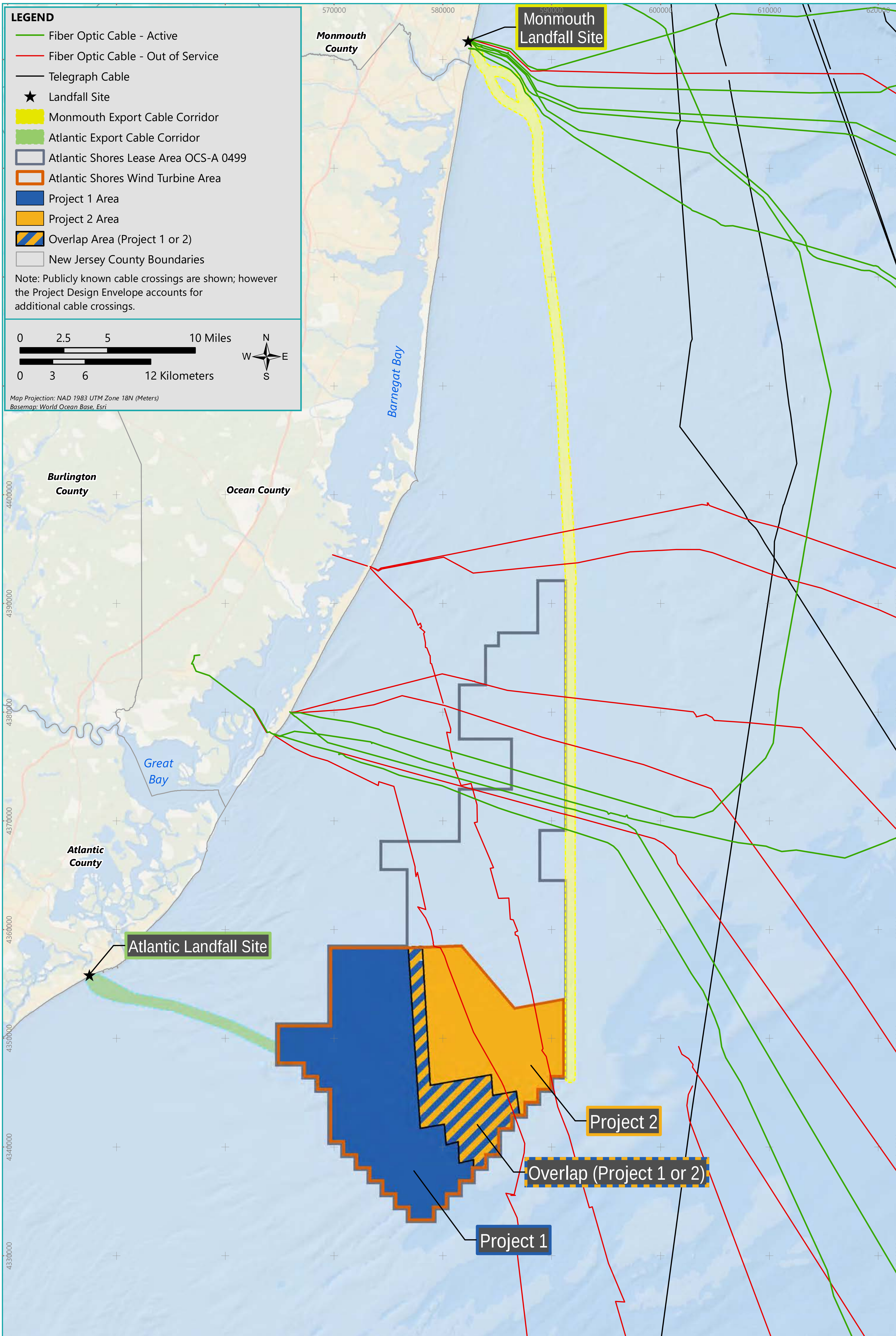
[20] The maximum number of cable crossings for each ECC accounts for the possibility that other offshore cables may be installed prior to the start of Projects' construction.



ATLANTIC SHORES offshore wind

Figure 4.5-10
Cable Crossings

4.5.9 Post-Construction Surveys

The precise location and burial depth of each cable will be monitored in real-time during installation activities. As-built plans will be provided to National Oceanic and Atmospheric Administration (NOAA) so the cables can be included on nautical charts; this will enable mariners to access information on the cables' locations. Following installation, Atlantic Shores will perform a post-construction survey along the cables. Monitoring of the offshore cables during O&M is further described in Section 5.1.

4.5.10 Summary of Area of Potential Seabed Disturbance

4.5.10.1 Export Cables

As described in the preceding sections, up to eight HVAC or HVDC export cables [the HVDC cables are bundled and installed together]) could be installed within the two ECCs. The maximum length per offshore export cable is approximately 25 mi (40 km) to the Atlantic Landfall Site and 85 mi (138 km) to the Monmouth Landfall Site. Both Projects 1 and 2 have the potential to use either ECC and may also be co-located within an ECC.

The maximum potential seabed disturbance from export cable installation is provided in Table 4.5-1. Given that a portion of the export cables will be installed within the WTA (from the WTA boundary to OSSs), Table 4.5-1 provides the maximum area of potential seabed disturbance for the export cables within the WTA as well as the ECCs.,.

Table 4.5-1 Maximum Seabed Disturbance from Export Cable Installation

Installation Activity Characteristics (Maximum)	Atlantic Landfall Site to OSS	Monmouth Landfall Site to OSS
Max. length per export cable	24.9 mi (40.0 km)	85.4 mi (137.5 km)
Max. total length of export cables	99.4 mi (160.0 km)	341.8 mi (550.0 km)
Maximum Temporary Disturbance from Export Cable Installation		
Cable Installation Trench and Skid/Track		
Max. depth of cable trench	9.8 ft (3.0 m)	9.8 ft (3.0 m)
Max. width of cable trench	3.3 ft (1.0 m)	3.3 ft (1.0 m)
Max. width of additional skid/track disturbance	13.1 ft (4.0 m)	13.1 ft (4.0 m)
Max. area of cable trench and skid/track disturbance	0.31 square mile (mi^2) (0.80 square kilometer [km^2])	1.06 mi^2 (2.75 km^2)
Pre-Pass Jetting and Multiple Burial Passes (along limited length of the cable routes)		
Max. total length of cable requiring pre-pass jetting	5.0 mi (8.0 km)	17.1 mi (27.5 km)
Max. total length of cable requiring multiple burial passes	9.9 mi (16.0 km)	68.4 mi (110.0 km)
Max. area of additional disturbance from pre-pass jetting and subsequent passes of the cable installation tool	None	None

Table 4.5-1 Maximum Seabed Disturbance from Export Cable Installation (Continued)

Installation Activity Characteristics (Maximum)	Atlantic Landfall Site to OSS	Monmouth Landfall Site to OSS
Pre-Lay Grapnel Run (along entire cable routes)		
Max. depth of pre-lay grapnel run (PLGR)	1.6 ft (0.5 m)	1.6 ft (0.5 m)
Max. width of PLGR (total for 3 passes)	9.8 ft (3.0 m)	9.8 ft (3.0 m)
Max. area of additional disturbance from PLGR (for 2 passes beyond cable trench and skids/tracks)	0.12 mi^2 (0.32 km^2)	0.42 mi^2 (1.10 km^2)
Boulder Relocation (along limited length of the cable routes)		
Max. total length of boulder relocation	9.9 mi (16.0 km)	34.2 mi (55.0 km)
Max. width of displacement plow	32.8 ft (10.0 m)	32.8 ft (10.0 m)
Max. depth of displacement plow	2.6 ft (0.8 m)	2.6 ft (0.8 m)
Max. area of additional disturbance from boulder relocation (beyond cable trench, skids/tracks, and PLGR)	0.02 mi^2 (0.05 km^2)	0.06 mi^2 (0.17 km^2)
Sand Bedform Removal (along limited length of the cable routes)		
Max. total length of cables requiring sand bedform removal	19.9 mi (32.0 km)	68.4 mi (110.0 km)
Max. width of sand bedform removal Top of trench Bottom of trench	 98.4 ft (30.0 m) 49.2 ft (15.0 m)	 98.4 ft (30.0 m) 49.2 ft (15 m)
Typical depth of sand bedform removal	3.3 ft (1.0 m)	3.3 ft (1.0 m)
Max. depth of sand bedform removal	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Max. volume of sand bedforms removed[a]	941,724 cubic yards (yd^3) (720,000 m^3)	3,237,176 yd^3 (2,475,000 m^3)
Max. area of additional disturbance from sand bedform removal (beyond cable trench, skids/tracks, and PLGR)	0.28 mi^2 (0.74 km^2)	0.98 mi^2 (2.53 km^2)
Anchoring/Jacking-Up		
Max. total length of cables requiring anchoring	14.9 mi (24.0 km)	5.0 mi (8.0 km)
Max. area of disturbance from anchoring during cable installation[b]	0.41 mi^2 (1.06 km^2)	0.14 mi^2 (0.35 km^2)
Max. area of disturbance from jacking-up during cable splicing and HDD at the landfall sites[c]	0.0003 mi^2 (0.0008 km^2)	0.0007 mi^2 (0.0017 km^2)
Maximum Temporary Disturbance from Export Cable Installation		
Total Temporary Disturbance from Export Cable Installation		
Total max. area of temporary seafloor disturbance due to export cable installation[d]	1.10 mi^2 (2.85 km^2)	2.51 mi^2 (6.51 km^2)
Portion of temporary disturbance within WTA[e]	0.27 mi^2 (0.71 km^2)	0.25 mi^2 (0.65 km^2)
Portion of temporary disturbance within ECC[f]	0.83 mi^2 (2.14 km^2)	2.26 mi^2 (5.86 km^2)

Table 4.5-1 Maximum Seabed Disturbance from Export Cable Installation (Continued)

Installation Activity Characteristics (Maximum)	Atlantic Landfall Site to OSS	Monmouth Landfall Site to OSS
Maximum Permanent Disturbance from Export Cable Installation		
Cable Entry Projection System		
Max. # of export cable approaches to OSS	4	4
Max. length of cable entry protection system beyond scour protection[g]	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Max. diameter of cable entry protection system	2.0 ft (0.6 m)	2.0 ft (0.6 m)
Cable Protection for Infrastructure Crossings		
Max. # of cable crossings	16	60
Max. area of cable protection per crossing	43,055.6 ft^2 (4,000.0 m^2)	43,055.6 ft^2 (4,000.0 m^2)
Max. thickness of cable protection at crossings	5.6 ft (1.7 m)	5.6 ft (1.7 m)
Cable Protection for Insufficient Burial Depth (along limited length of the cables)		
Max. length of cable protection	9.9 mi (16.0 km)	34.2 mi (55.0 km)
Max. width of cable protection	41.0 ft (12.5 m)	41.0 ft (12.5 m)
Max. thickness of cable protection	4.6 ft (1.4 m)	4.6 ft (1.4 m)
Total Permanent Disturbance from Export Cable Installation		
Total max. area of permanent seafloor disturbance for export cables	0.10 mi^2 (0.26 km^2)	0.36 mi^2 (0.93 km^2)
Portion of permanent disturbance within WTA	0.04 mi^2 (0.11 km^2)	0.04 mi^2 (0.10 km^2)
Portion of permanent disturbance within ECC	0.06 mi^2 (0.16 km^2)	0.32 mi^2 (0.83 km^2)
Total Temporary and Permanent Seafloor Disturbance		
Total max. area of temporary and permanent seafloor disturbance from export cable installation	**1.20 mi^2 (3.11 km^2)**	**2.87 mi^2 (7.44 km^2)**
Portion of total seafloor disturbance within WTA	**0.48 mi^2 (1.24 km^2)**	**0.31 mi^2 (0.79 km^2)**
Portion of total seafloor disturbance within ECC	**0.72 mi^2 (1.87 km^2)**	**2.57 mi^2 (6.65 km^2)**

Notes:

a) Maximum sand bedform removal volumes are calculated based on the typical depth of sand bedform removal.

b) Assumes an eight-point anchor spread with each anchor disturbing 11,840 ft^2 (1,100 m^2) (i.e., 1,076 ft^2 [100 m^2] for the anchor itself plus 10,764 ft^2 [1,000.0 m^2] for the mooring system), giving a total disturbance area of 94,722.3 ft^2 (8,800.0 m^2) each time the vessel repositions its anchors (assumed every 656.2 ft [200.0 m]).

c) Assumes one jack-up vessel disturbing 845.4 ft^2 (78.5 m^2) (based on a four-legged jack-up with each leg disturbing 211.3 ft^2 [19.6 m^2]) per cable joint plus one jack-up for HDD operations per HDD conduit.

d) To avoid double counting impacts, excludes the area of temporary disturbance that would be covered by cable protection.

e) Based on an export cable length within the WTA of 10.1 mi (16.3 km) per cable for the route from the Atlantic Landfall Site and 9.3 mi (15.0 km) per cable for the for the route from the Monmouth Landfall Site. No boulder relocation or anchoring is anticipated to occur within the WTA.
f) Based on an export cable length within the 0.254 of 14.8 mi (23.8 km) per cable and within the Monmouth ECC of 76.1 mi (122.5 km). All potential disturbance from boulder relocation and anchoring is assumed to occur in the ECCs.
g) The area of disturbance from the cable entry protection system where it lays above the scour protection is accounted for in the PDE of OSS foundation parameters (see Table 4.4-2 in Section 4.4).

4.5.10.2 Inter-Array and Inter-Link Cables

Atlantic Shores anticipates that up to 547 mi (880 km) of inter-array cables may be required, while up to approximately 37 mi (60 km) of inter-link cables may be needed. Project 1 and Project 2 will each have a maximum of 273.5 mi (440 km) of inter-array cables and up to approximately 18.6 mi (30 km) of inter-link cables. The maximum potential seabed disturbance from installation of inter-array and inter-link cables is provided in Table 4.5-2.

Table 4.5-2 Maximum Seabed Disturbance from Inter-Array and Inter-Link Cable Installation

Installation Activity Characteristics (Maximum)	Project 1		Project 2	
	Inter-Array Cables	Inter-Link Cables	Inter-Array Cables	Inter-Link Cables
Max. total length of cable	273.4 mi (440.0 km)	18.6 mi (30.0 km)	273.4 mi (440.0 km	18.6 mi (30.0 km)
Maximum Temporary Disturbance from Cable Installation				
Cable Installation Trench and Skid/Track				
Max. depth of cable trench	9.8 ft (3.0 m)	9.8 ft (3.0 m)	9.8 ft (3.0 m)	9.8 ft (3.0 m)
Max. width of cable trench	3.3 ft (1.0 m)	3.3 ft (1.0 m)	3.3 ft (1.0 m)	3.3 ft (1.0 m)
Max. width of additional skid/track disturbance	13.1 ft (4.0 m)	13.1 ft (4.0 m)	13.1 ft (4.0 m)	13.1 ft (4.0 m)
Max. area of cable trench and skid/track disturbance	0.85 mi^2 (2.20 km^2)	0.06 mi^2 (0.15 km^2)	0.85 mi^2 (2.20 km^2)	0.06 mi^2 (0.15 km^2)
Multiple Burial Passes (along limited length of the cables)				
Max. total length of cable requiring multiple burial passes	54.7 mi (88.0 km)	3.7 mi (6.0 km)	54.7 mi (88.0 km)	3.7 mi (6.0 km)
Max. area of additional disturbance from subsequent passes of the cable installation tool	None	None	None	None
Pre-Lay Grapnel Run (along entire cable)				
Max. depth of PLGR	1.6 ft (0.5 m)	1.6 ft (0.5 m)	1.6 ft (0.5 m)	1.6 ft (0.5 m)
Max. width of PLGR (total for 3 passes)	9.8 ft (3.0 m)	9.8 ft (3.0 m)	9.8 ft (3.0 m)	9.8 ft (3.0 m)
Max. area of additional disturbance from PLGR (for 2 passes beyond cable trench and skids/tracks)	0.34 mi^2 (0.88 km^2)	0.02 mi^2 (0.06 km^2)	0.34 mi^2 (0.88 km^2)	0.02 mi^2 (0.06 km^2)

Table 4.5-2 Maximum Seabed Disturbance from Inter-Array and Inter-Link Cable Installation (Continued)

Installation Activity Characteristics (Maximum)	Project 1		Project 2	
	Inter-Array Cables	Inter-Link Cables	Inter-Array Cables	Inter-Link Cables
Sand Bedform Removal (along limited length of the cables)				
Max. total length of cables requiring sand bedform removal	27.3 mi (44.0 km)	3.7 mi (6.0 km)	27.3 mi (44.0 km)	3.7 mi (6.0 km)
Sand Bedform Removal (along limited length of the cables)				
Max. width of sand bedform removal Top of trench Bottom of trench	98.4 ft (30.0 m) 49.2 ft (15.0 m)	98.4 ft (30.0 m) 49.2 ft (15 m)	98.4 ft (30.0 m) 49.2 ft (15.0 m)	98.4 ft (30.0 m) 49.2 ft (15 m)
Typical depth of sand bedform removal	3.3 ft (1.0 m)	3.3 ft (1.0 m)	3.3 ft (1.0 m)	3.3 ft (1.0 m)
Max. depth of sand bedform removal	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Sand Bedform Removal (along limited length of the cables)				
Max. volume of sand bedforms removed[a]	1,294,871 yd^3 (990,000 m^3)	176,573 yd^3 (135,000 m^3)	1,294,871 yd^3 (990,000 m^3)	176,573 yd^3 (135,000 m^3)
Max. area of additional disturbance from sand bedform removal (beyond cable trench, skids/tracks, and PLGR)	0.39 mi^2 (1.01 km^2)	0.05 mi^2 (0.14 km^2)	0.39 mi^2 (1.01 km^2)	0.05 mi^2 (0.14 km^2)
Total Temporary Disturbance from Cable Installation				
Total max. area of temporary seafloor disturbance due to cable installation[b]	1.46 mi^2 (3.78 km^2)	0.13 mi^2 (0.33 km^2)	1.46 mi^2 (3.78 km^2)	0.13 mi^2 (0.33 km^2)
Maximum Permanent Disturbance from Cable Installation				
Cable Entry Projection System				
Max. # of cable approaches to WTGs and OSSs	282 (136 WTGs and 5 OSSs with 2 approaches)	4	200	4 (95 WTGs and 5 OSSs with 2 approaches)
Max. length of cable entry protection system beyond scour protection[c]	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)	19.7 ft (6.0 m)
Max. diameter of cable entry protection system	2.0 ft (0.6 m)	2.0 ft (0.6 m)	2.0 ft (0.6 m)	2.0 ft (0.6 m)
Cable Protection for Infrastructure Crossings				
Max. # of cable crossings	5	1	5	1
Max. area of cable protection per crossing	43,055.6 ft^2 (4,000.0 m^2)	43,055.6 ft^2 (4,000.0 m^2)	43,055.6 ft^2 (4,000.0 m^2)	43,055.6 ft^2 (4,000.0 m^2)
Max. thickness of cable protection at crossings	5.6 ft (1.7 m)	5.6 ft (1.7 m)	5.6 ft (1.7 m)	5.6 ft (1.7 m)

Table 4.5-2 Maximum Seabed Disturbance from Inter-Array and Inter-Link Cable Installation (Continued)

Installation Activity Characteristics (Maximum)	Project 1		Project 2	
	Inter-Array Cables	Inter-Link Cables	Inter-Array Cables	Inter-Link Cables
Cable Protection for Insufficient Burial Depth (along limited length of the cables)				
Max. length of cable protection	27.3 mi (44.0 km)	1.9 mi (3.0 km)	27.3 mi (44.0 km)	1.9 mi (3.0 km)
Max. width of cable protection	41.0 ft (12.5 m)	41.0 ft (12.5 m)	41.0 ft (12.5 m)	41.0 ft (12.5 m)
Max. thickness of cable protection	4.6 ft (1.4 m)	4.6 ft (1.4 m)	4.6 ft (1.4 m)	4.6 ft (1.4 m)
Total Permanent Disturbance from Cable Installation				
Total max. area of permanent seafloor disturbance for inter-array and inter-link cables	0.22 mi^2 (0.57 km^2)	0.02 mi^2 (0.04 km^2)	0.22 mi^2 (0.57 km^2)	0.02 mi^2 (0.04 km^2)
Total Temporary and Permanent Seafloor Disturbance				
Total max. area of temporary and permanent seafloor disturbance from inter-array and inter-link cable installation	**1.68 mi^2 (4.35 km^2)**	**0.14 mi^2 (0.37 km^2)**	**1.68 mi^2 (4.35 km^2)**	**0.14 mi^2 (0.37 km^2)**

Notes:

a) Maximum sand bedform removal volumes are calculated based on the typical depth of sand bedform removal.

b) To avoid double counting impacts, excludes the area of temporary disturbance that would be covered by cable protection.

c) The area of disturbance from the cable entry protection system where it lays above the scour protection is accounted for in the PDE of WTG and OSS foundation parameters (see Table 4.2-1 in Section 4.2 and Table 4.4-2 in Section 4.4).

4.6 Meteorological Tower and Metocean Buoys

4.6.1 Permanent Met Tower

A single permanent meteorological (met) tower may be installed within the WTA during construction of Project 1. Up to 4 locations for the met tower, all located within Project 1, are under consideration (see Figure 4.6-1). The foundation options for the met tower include all options under consideration for WTG foundations and the construction methodologies are assumed to be the same as those for WTG foundations (see Section 4.2). There is sufficient conservatism in the total estimates of seafloor disturbance from WTG foundation installation to account for the impacts from the met tower's installation (see Section 4.11).

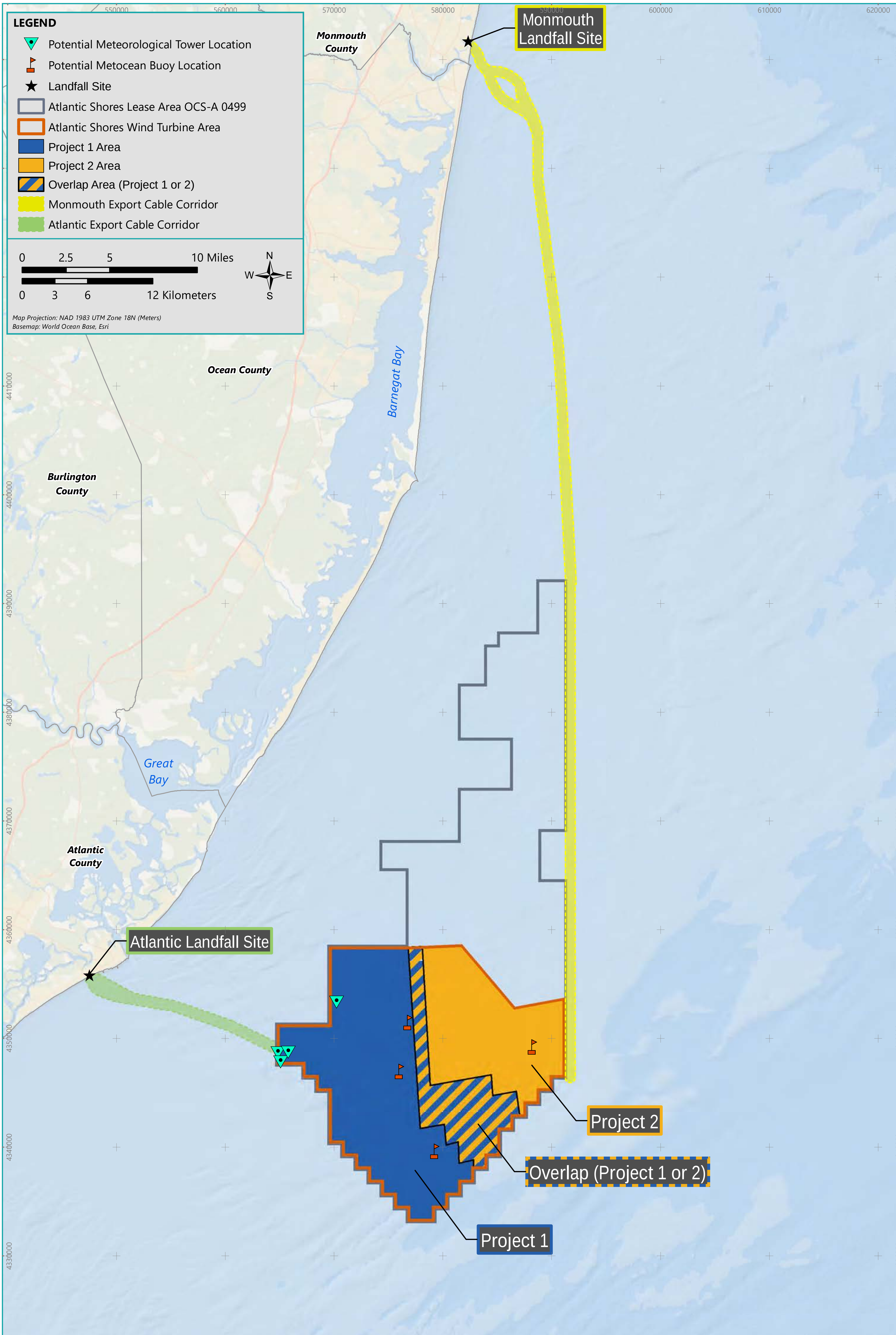


Figure 4.6-1

Potential Met Tower and Metocean Buoy Locations

The maximum height of the met tower will not exceed 16.5 ft (5 m) above the hub height of the largest WTG installed. Therefore, it is conservative to assume the maximum height of the met tower will be 590.6 ft (180 m) above MSL. The met tower itself is expected to be composed of square lattice consisting of tubular steel. It will be equipped with a deck estimated to be approximately 50 ft by 50 ft (15 m by 15 m) mounted at approximately the same elevation as the interface between the WTGs and their foundations. A schematic of a representative met tower is provided as Figure 4.6-2.

4.6.2 Temporary Metocean Buoys

In addition to the met tower, up to four temporary meteorological and oceanographic (metocean) buoys may be installed and kept in place during construction to monitor weather and sea state conditions: three in Project 1 and one in Project 2. The metocean buoys are expected to be anchored to the seafloor using a steel chain connected to a steel chain weight on the seafloor. An additional bottom weight associated with a water level sensor may also be connected to the buoys' mooring system. The maximum area of temporary seafloor disturbance from each buoy's anchor (including anchor sweep) is anticipated to be approximately 0.005 mi^2 (0.013 km^2), with a maximum depth of disturbance of 3.3 ft (1.0 m). The potential locations for the metocean buoys are shown on Figure 4.6-1 and an indicative schematic of a metocean buoy is provided as Figure 4.6-3. The buoys will be decommissioned in accordance with 30 CFR Part 585, Subpart I at the end of Project construction.

4.7 Landfall Sites

The offshore-to-onshore transition between export cables within the ECC to onshore interconnection cables will occur at two landfall sites.

As shown on Figure 1.1-2, the southernmost ECC (the Atlantic ECC) leads to the Atlantic Landfall Site, from which onshore interconnection cables will connect to the Cardiff point of interconnection (POI). The Atlantic Landfall Site is located near the end of Sovereign Avenue within Atlantic City in Atlantic County, New Jersey (see Figure 4.8-1). It is anticipated that the underground transition vaults (one per export cable) will be located at the eastern terminus of Sovereign Avenue under a parking area adjacent to the Atlantic City Boardwalk.

The northernmost ECC (the Monmouth ECC) leads to the Monmouth Landfall Site, from which onshore interconnection cables will connect to the Larrabee POI. As shown in Figure 4.8-2, the Monmouth Landfall Site is located within the Borough of Sea Girt in Monmouth County, New Jersey at the Army National Guard Training Center (NGTC). The underground transition vaults (one per export cable) will be located in the southeast corner of the NGTC in a previously disturbed area.

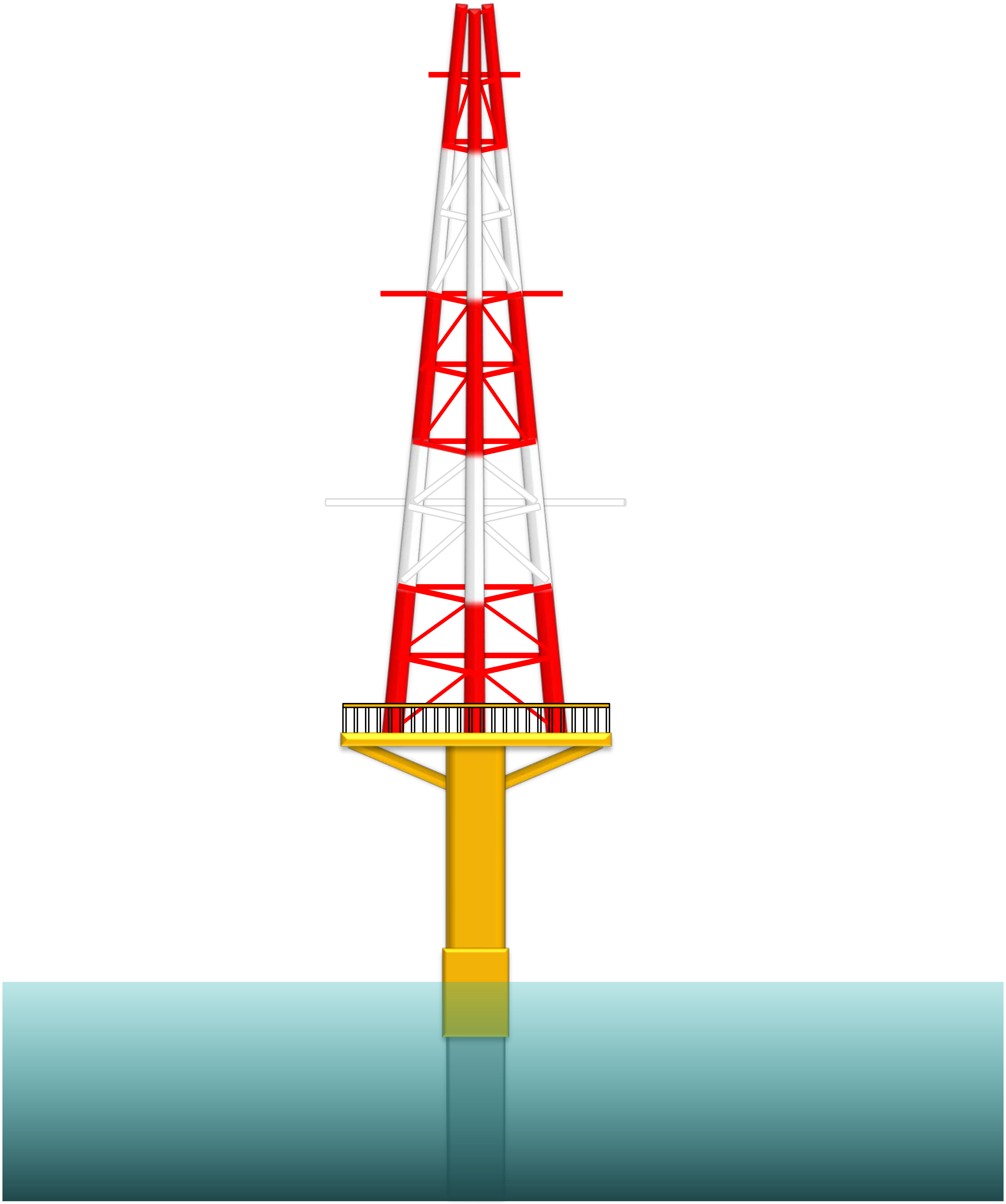


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Figure 4.6-2
Representative Met Tower Schematic

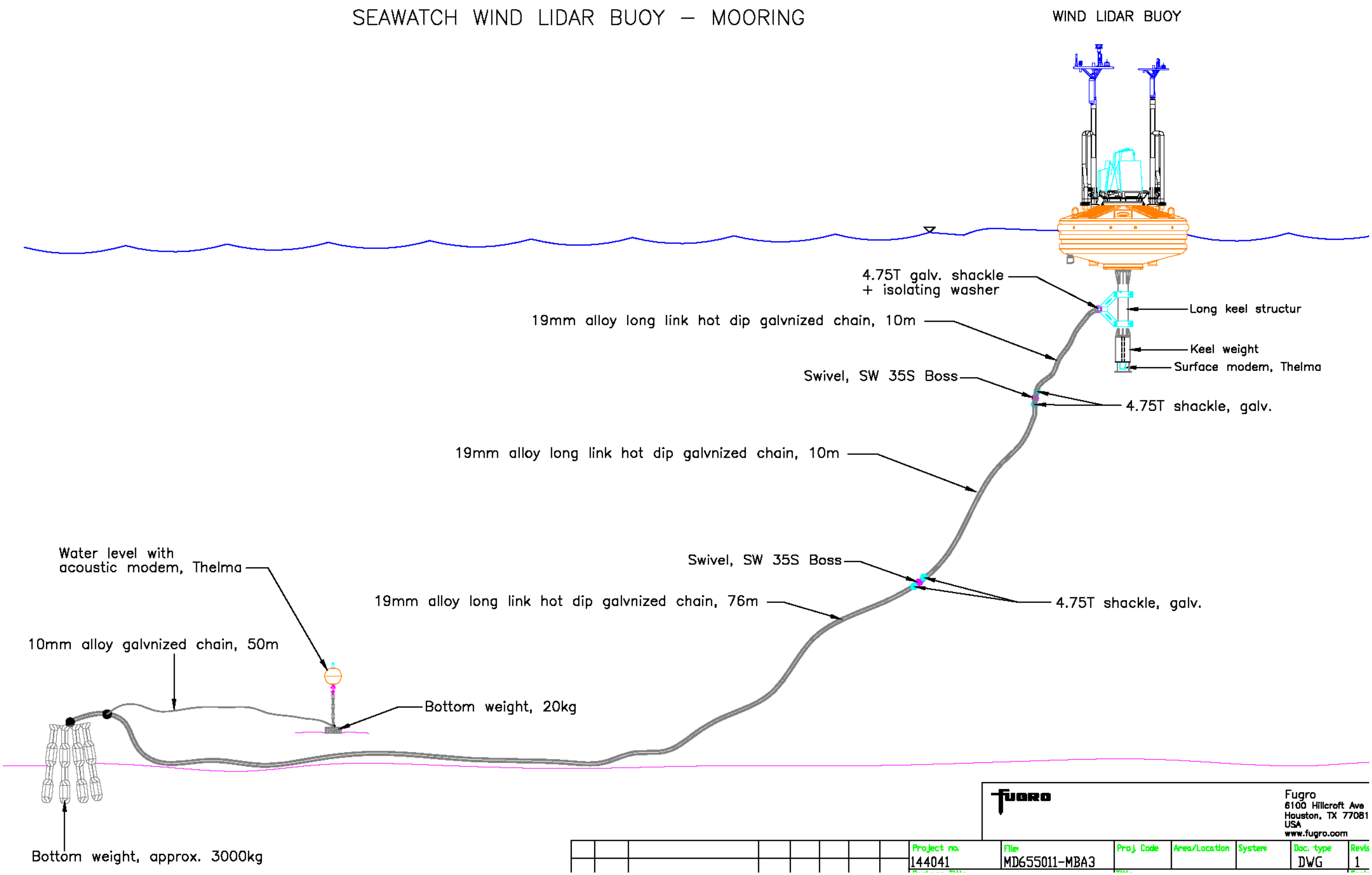

Figure 4.6-3

Representative Metocean Buoy Schematic

4.7.1 Landfall Site Construction Activities

The offshore-to-onshore transition is proposed to be accomplished using HDD, a trenchless method that will avoid nearshore impacts as well as impacts directly along the shoreline. HDD, in comparison to trenching, also results in a deeper burial depth for cables in the nearshore environment, facilitating sufficient burial over the life of the Projects and decreasing the likelihood that cables will become exposed over time.

An HDD bore will be completed for each of the export cables coming ashore, so each cable will be contained within its own HDD conduit. Up to two additional spare HDD conduits may be installed at each landfall site for a total of six HDD conduits at each landfall site. To support HDD activities, Atlantic Shores will establish an onshore staging area at each landfall site.

Engineering for the HDD trajectories at each landfall site is currently underway. Final design of the landfall site HDDs will be provided as part of the Project's Facility Design Report (FDR) and Fabrication and Installation Report (FIR). At both sites, HDD will either be initiated or exit landward of the beach to avoid impacts to the beach. At the Atlantic Landfall Site, the HDD trajectory for each of the cables is expected to be approximately 1,969 ft (600 m) long. At the Monmouth Landfall Site, the HDD trajectory for each of the cables is expected to be approximately 3,281 ft (1,000 m) long. At each landfall site, the depth of HDD is approximately 16 to 131 ft (5 to 40 m) below the seabed.

The landfall site HDD will consist of the following steps:

1. **Excavation of entrance pit and exit pit:** Onshore, each HDD path will originate or terminate in an excavated pit that is approximately 10 ft by 13 ft (3 m by 4 m) located at the landfall site's onshore staging area. The excavated pit will also serve to contain drilling fluid. This fluid is a slurry of bentonite (an inert, non-toxic clay) and water that lubricates the drill head and extracts excavated material from the bore hole. At the offshore HDD entrance/exit location, a shallow area of up to approximately 66 ft by 33 ft (20 m by 10 m) will be excavated. A backhoe dredge may be required to complete the excavation and a cofferdam (or similar method) of approximately the same size as the excavated pit may be utilized. The need for a cofferdam (or similar) will depend on the results of marine surveys conducted near the landfall sites, the depth of burial, and the direction of HDD. A temporary offshore platform (i.e., jack-up barge) may be needed to support the HDD drilling rig; the seabed disturbance from jacking-up during HDD activities is included in Table 4.5-1.
2. **Drilling of pilot hole:** An approximately 12.4-in (315-mm) pilot hole will be drilled between the pit at the onshore staging area and the offshore HDD exit/entrance pit in an arcing fashion beneath the shoreline and nearshore zone. If HDD is initiated onshore, when the pilot hole exits the seabed, the contractor may use water to carry drill cuttings

back to the approach pit rather than drilling fluids in order to avoid release of clay to the water column (even though bentonite is a natural substance that poses little to no risk to the marine environment).

3. **Reaming and conduit insertion:** The drill will be equipped with a larger cutter head that will enlarge the pilot hole in preparation for insertion of a high-density polyethylene (HDPE) or polyvinyl chloride (PVC) conduit. The same drill head can pull the plastic HDD conduit through the enlarged bore hole.
4. **Cable insertion:** Following installation of the conduit, the export cable will be inserted into the opening at the seabed and pulled through the conduit towards shore. A cofferdam (or similar method) may be used during insertion of the cable. If used, Atlantic Shores anticipates that the cofferdam will be approximately 98.4 ft by 26.2 ft (30 m by 8 m). Once the export cables are installed into the HDD conduit, the end of the conduit exposed on the seabed will then be fully buried, possibly by divers using hand-jets.
5. **Disposal of drill cuttings:** Drilling the HDD trajectory will produce a mixture of drill cuttings from the bore hole, water, and bentonite clay (used to lubricate and cool the drill bit). This mixture will be collected on-site and filtered to separate solids from fluids, which will enable reuse of the drilling fluid. Drill cuttings and excess drill fluids are typically classified as clean fill material, and it is anticipated they will be disposed of at an appropriate upland facility such as a local landfill, a gravel pit, or other facility permitted to take such material.
6. **Pull-back to transition vaults:** Cables installed through the HDD conduit will be pulled into onshore transition vaults, where they will be split into separate onshore cables. The transition vaults at the landfall site will be approximately 11.5 ft wide by 46 ft long by 14.8 ft deep (3.5 m wide by 14 m long by 4.5 m deep). It is anticipated that the transition vaults will also include fiber optic splice boxes.
7. **Site restoration:** The onshore HDD staging areas will be restored to be consistent with existing conditions, while the transition vaults will be entirely underground except for at-grade manhole covers.

Based on local permit requirements, Atlantic Shores expects that onshore construction will be seasonally restricted to occur outside of the period from Memorial Day to Labor Day. The HDD construction schedule will be developed in accordance with municipal noise ordinances. Certain activities, such as conduit pull-in, cannot stop once they are started, so work may need to continue into the night or occur on the weekend. Atlantic Shores will coordinate with municipal officials to finalize the onshore construction schedule and hours.

4.8 Onshore Interconnection Cables and Points of Interconnection

From the Monmouth Landfall Site and Atlantic Landfall Site, onshore interconnection cables will travel underground primarily along existing roadways, utility right-of-way (ROW), and/or along bike paths to proposed onshore substations described in Section 4.9. Easements and ROW for private parcels will be acquired where necessary. From the proposed onshore substations, the onshore interconnection cables will continue to the proposed POIs at the existing Larrabee Substation and existing Cardiff Substation for interconnection to the electrical grid.

4.8.1 Cardiff Onshore Interconnection Cable Route

The Cardiff Onshore Interconnection Cable Route is an approximately 12 mi (19 km) underground transmission route that largely uses existing linear infrastructure corridors to connect the Atlantic Landfall Site to the existing Cardiff Substation POI (see Figure 4.8-1). See Section 4.7 for a description of the Atlantic Landfall Site.

From the Atlantic Landfall Site, the Cardiff Onshore Interconnection Cable Route continues northwest under Sovereign Avenue through urban residential and commercial areas via open trenching to the western end of the roadway at the intracoastal waterway. HDD is expected to be used to cross the waterway to Bader Airfield, and again from Bader Airfield under Turtle Gut and Great Thoroughfares to the mainland. The route will then run parallel to U.S. Route 40 for approximately 1.5 mi (2.4 km) where the route will transition into a railroad ROW that contains an existing 69 kV Atlantic City Electric (ACE) transmission line. The route continues northwest along this corridor for approximately 4.5 mi (7.2 km) through the Town of Pleasantville to just west of the Garden State Parkway near the Shore Mall. Both the preferred and alternative sites for the Projects' proposed onshore substation are located just west of the Garden State Parkway crossing and are described in Section 4.9. At this point the railroad ROW transitions to the Atlantic County Bikeway East and the route follows this ROW for approximately 3.0 mi to English Creek Road. The route then turns north along English Creek Road for 0.5 mi (0.8 km) to the existing ACE 230 kV transmission ROW which the route follows for 0.3 mi (0.5 km) to the Cardiff Substation POI.

The Cardiff Substation POI is owned by ACE and is operated at 230 kV. Modifications to the POI will be required to accommodate the interconnection of the Projects. The scope of the required modifications will be determined upon completion of the Facilities Study Report by ACE and the Pennsylvania-New Jersey-Maryland Interconnection (PJM), which is expected to be available in spring 2022. The scope of modifications at the POI may range from expanding the existing substation by adding additional breaker bay(s) to upgrading the existing high voltage section of the substation to a breaker and a half configuration. ACE will be responsible for the design and construction of the required upgrades on the existing electrical grid, including the upgrades at Cardiff Substation.

To support construction of the Cardiff Onshore Interconnection Cable Route, the Project Companies will develop a Traffic Management Plan (TMP) to avoid and minimize traffic impacts and will adhere to seasonal construction restrictions near the shoreline (see Section 4.8.3). The use of specialty installation techniques, most likely either HDD or pipe jacking (see Section 4.8.3), will also be used to avoid and minimize traffic impacts, particularly at the following locations:

- Cloverleaf at the Atlantic City High School;
- a former railroad tunnel crossing the Garden State Parkway; and
- the Route 40 crossing.

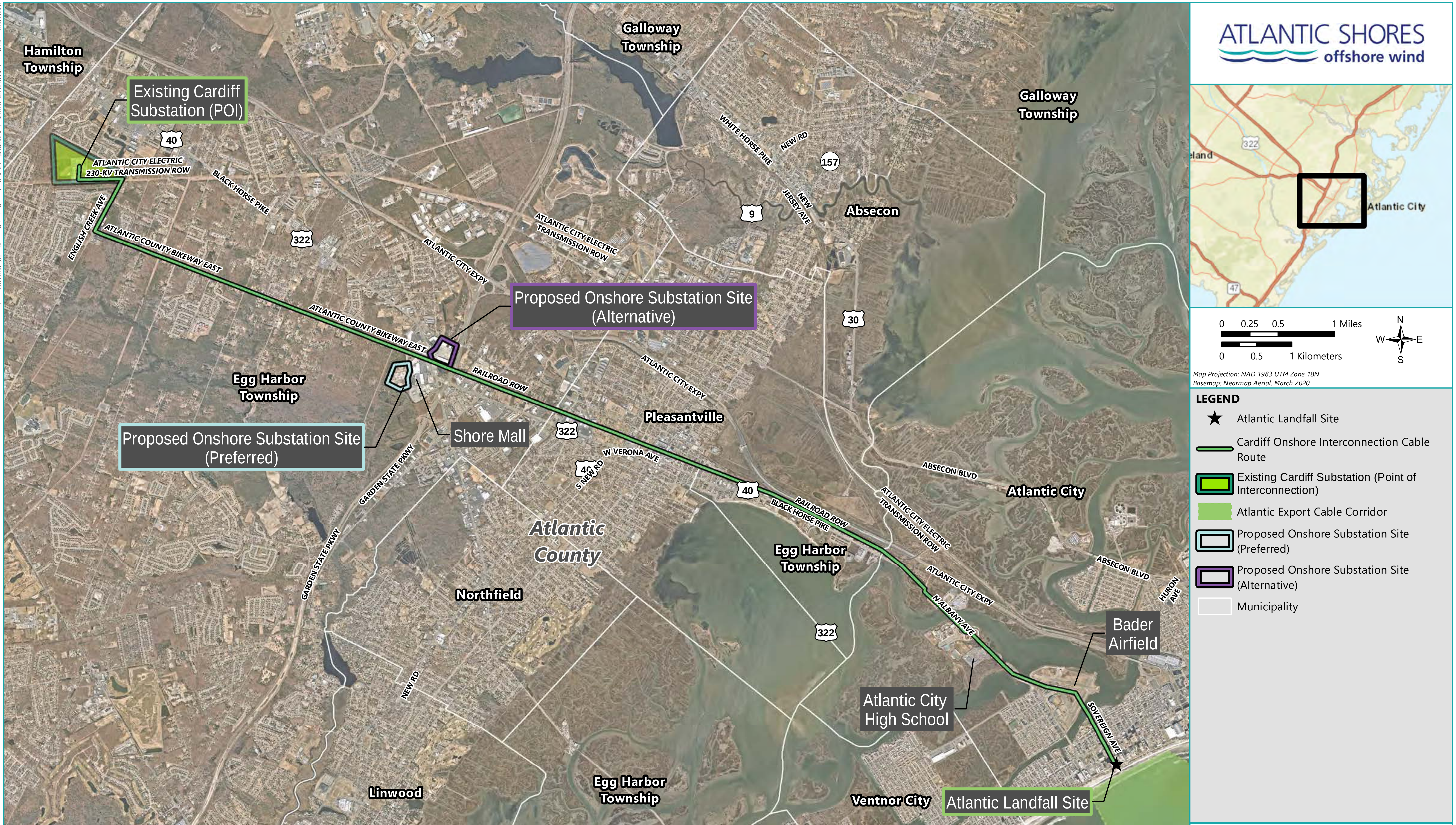

Figure 4.8-1
Atlantic Landfall Site, Cardiff Onshore Interconnection Cable Route, and Onshore Substation Sites Atlantic County, New Jersey

8/20/2021 | G:\Projects2\NJ\5665\2021\Task_1\MXD\Fig 4.8-1_Onshore_Project_Route_Cardiff_20210819.mxd

The Cardiff Onshore Interconnection Cable Route also includes a number of wetlands and waterway crossings. Techniques such as HDD or jack-and-bore methodologies are expected to be used to avoid impacts to these resources (see Section 4.1 Wetlands and Waterbodies of Volume II). HDD, jack-and-bore, and pipe jacking methodologies are described in Section 4.8.3.

4.8.2 Larrabee Onshore Interconnection Cable Route

The Larrabee Onshore Interconnection Cable Route is an approximately 12 mi (19 km) underground transmission route that largely uses existing linear infrastructure corridors to connect the Monmouth Landfall Site to the existing Larrabee Substation POI (see Figure 4.8-2). See Section 4.7 for a description of the Monmouth Landfall Site.

From the Monmouth Landfall Site, the Larrabee Onshore Interconnection Cable Route continues west along Sea Girt Avenue through suburban residential areas to a shopping center at the corner of Route 35 and Sea Girt Avenue, approximately 1.5 mi (2.4 km). The route then turns southwest along the southern edge of the shopping center and runs south along the Route 35 ROW to a currently vacant shopping center. The route then turns northwest and follows the Edgar Felix Memorial Bikeway for approximately 2.5 mi (4.0 km) to Hospital Road. The route then follows Hospital Road to the northeast to Atlantic Avenue (County Route 524). The route travels west along County Route 524 for approximately 2 mi (3.2 km) to the I-195 ROW. The route then runs along the New Jersey Department of Transportation (NJDOT) ROW for approximately 0.75 mi (1.2 km) to the County Route 547/I-195 interchange. From this point, the route turns south and follows County Route 547 approximately 4 mi (6.4 km) to the Larrabee Substation POI.

The Larrabee Substation POI is owned by Jersey Central Power & Light (JCP&L) and is operated at 230 kV. Modifications to the POI will be required to accommodate the interconnection of the Projects. The scope of the required modifications will be determined upon completion of the Facilities Study Report by the JCP&L and PJM, which is expected to be available in fall 2021. The scope of modifications is expected to include upgrading the existing substation by adding additional breaker bay(s). JCP&L will be responsible for the design and construction of the required upgrades on the existing electrical grid, including the upgrades at Larrabee Substation.

To support construction of the Larrabee Onshore Interconnection Cable Route, the Atlantic Shores Project Companies will develop a TMP to avoid and minimize traffic impacts and will adhere to seasonal construction restrictions near the coast. The use of specialty installation techniques, most likely either HDD or pipe jacking (see Section 4.8.3), will also avoid and minimize traffic impacts, particularly at the following locations:

- the Seashore New Jersey Transit Line crossing;
- the Route 34 overpass (while on the bike path);
- the Intersection of Lakewood-Allenwood Road and County Road 524; and
- the Garden State Parkway crossing.

Figure 4.8-2

Monmouth Landfall Site, Larrabee Onshore Interconnection Cable Route, and Onshore Substation Sites Monmouth County, New Jersey

The Larrabee Onshore Interconnection Cable Route also includes a number of wetlands and waterway crossings. Techniques such as HDD or jack-and-bore methodologies, which are described in Section 4.8.3, are expected to be used to avoid impacts to these resources (see Section 4.1 Wetlands and Waterbodies of Volume II).

4.8.3 Cable Design and Construction Activities

Either HVAC or HVDC technology will be used for the Projects' onshore transmission. HVAC cables will involve three single-core cables per circuit, with cables having a water-tight design suitable for installation within a duct bank. If HVAC technology is utilized, each route could contain up to four circuits, for a total of up to 12 onshore interconnection cables and four fiber optic cables. Voltage of these onshore HVAC cables will be between 230 to 275 kV. HVDC cables will involve two single-core cables per cable circuit. If HVDC technology is utilized, each route will contain one circuit consisting of two 320 to 525 kV onshore interconnection cables and up to two fiber optic cables.

Regardless of the type of cable, the onshore interconnection cables will be contained within a buried concrete duct bank, with individual cables residing in conduits composed of HDPE or PVC. The duct bank will be up to 13.1 ft (4.0 m) wide and 8.2 ft (2.5 m) deep. Onshore interconnection cables will typically require splices every 1,640 to 3,280 ft (500 to 1,000 m). At each splice location, a concrete splice vault will be installed. Typical dimensions of a splice vault will be up to 8 ft (2.5 m) wide, 26 ft (8 m) long, and 5 ft (1.5 m) deep.

Installation of the concrete duct bank for onshore interconnection cables will typically be accomplished via open trenching, although some specialty techniques are anticipated at unique features such as busy roadways, wetlands, and waterbodies. During typical open trenching for installation of the onshore interconnection cables, the trench will be up to 14.8 ft (4.5 m) wide by 11.5 ft (3.5 m) deep. For the splice vaults (where required), the trench will be up to 12 ft (3.7 m) wide and 9 ft (2.7 m) deep. Typical cover over the buried duct bank (e.g., along roadway ROWs) will be approximately 3 ft (0.9 m), though maximum coverage over the top of the cable conduits could be up to 30 ft (9 m) in some specialty installation scenarios.

Specialty installation techniques are trenchless techniques that avoid surface disturbance and hence can avoid impacts to busy roadways, wetlands, waterbodies, or existing developments or features. These specialty techniques primarily include:

- **Horizontal directional drilling:** HDD is typically used to cross beneath relatively wide features such as interstate highways and waterbodies. As described in the context of the offshore-to-onshore transition (see Section 4.7.1), HDD commonly involves drilling a hole in an arc under the surface feature, then enlarging that hole and pulling either a large PVC or HDPE casing or several smaller PVC or HDPE conduits (in a bundle) back through the bore hole.

- **Pipe jacking:** In this method, a casing pipe originating in a jacking shaft is driven through the soil by powerful hydraulic jacks to excavate a tunnel that leads to a receiving shaft on the opposite side of the obstacle being avoided on the surface. This method results in a flexible, structural, watertight, and finished conduit for the installation of cables.
- **Jack-and-bore:** This trenchless crossing technique is used to install a casing beneath the surface feature being avoided. Relative to HDD, jack-and-bore is typically used for shorter crossings (less than approximately 200 ft [61 m]), such as those under streams or highways. A jack-and-bore is performed by excavating a bore pit and a receiving pit, located on opposite sides of the obstacle. Drilling and jacking activities are initiated from the bore pit, while the steel or concrete casing is driven into the receiving pit. As a borehole is drilled, the casing is pushed into the borehole. After the casing is in place, it is cleaned, and then smaller HDPE or PVC conduits are installed inside the casing.

Locations where these specialty techniques may be utilized are described in Sections 4.8.1 and 4.8.2.

Onshore construction hours will adhere to local noise ordinances. While Atlantic Shores is not anticipating significant nighttime work, any nighttime work deemed necessary will be coordinated with the local authorities. The Atlantic Shores Project Companies will develop a TMP to avoid and minimize traffic- and transportation-related impacts during construction. The TMP will be reviewed and approved by the NJDOT for the I-195 corridor and will also pertain to County and local roads. Best management practices (BMPs) for the TMP are expected to include traffic control measures such as signage, police details, lane closures, and detours, among others.

Atlantic Shores is proposing to adhere to seasonal construction restrictions for certain portions of the onshore interconnection cable routes to avoid impacts during peak usage. For the Cardiff Onshore Interconnection Cable Route between the Atlantic Landfall Site and Pleasantville, no onshore construction will occur during the summer (generally from Memorial Day to Labor Day), subject to ongoing coordination with local authorities. Aside from busy summer traffic, these roads also function as a coastal evacuation route so this seasonal restriction will avoid any interference with that important function. For the Larrabee Onshore Interconnection Cable Route, no summer construction will occur from the Monmouth Landfall Site, west of the Garden State Parkway, to where the route exits the bike path near Allaire State Park at Hospital Road (subject to ongoing coordination with local authorities). This restriction will minimize traffic and recreational disruptions.

Construction laydown areas have not yet been identified, but Atlantic Shores anticipates they will either be paved areas or will be locations already utilized for similar activities. As such, construction laydown is not expected to require new ground disturbance.

4.9 Onshore Substations

The Projects will require two onshore substations (one for each onshore POI). At each onshore substation, transmission voltage will be stepped up or stepped down in preparation for interconnection to the electrical grid at either the existing Cardiff Substation or Larrabee Substation. As shown on Figure 4.8-1 and Figure 4.8-2, as part of the PDE, Atlantic Shores has identified a preferred and an alternative onshore substation site along each of the Cardiff and Larrabee Onshore Interconnection Cable Routes.

From the proposed Cardiff onshore substation, onshore interconnection cables will continue to the existing Cardiff Substation POI in Egg Harbor Township. From the proposed Larrabee onshore substation, onshore interconnection cables will continue to the existing Larrabee Substation in Howell.

4.9.1 Description of Onshore Substation Sites

Two substation sites along the Cardiff Onshore Interconnection Cable Route are included in the PDE. The preferred onshore substation site is located on Shore Mall Road in Egg Harbor Township (see Figure 4.9-1). The site currently consists of a commercial shopping center, which has been partially demolished. The preferred onshore substation is proposed to be constructed within a 22-acre (0.09-km^2) portion of the parking lot west of the existing shopping center. The alternative onshore substation site is also located within a commercial shopping center that is situated immediately east of U.S. Route 40 and west of the Garden State Parkway in Egg Harbor Township (see Figure 4.9-1). The onshore substation on this alternative site would also be constructed within a portion of the parking lot.

Two onshore substation sites along the Larrabee Onshore Interconnection Cable Route are included in the PDE. The preferred onshore substation site is located at the corner of County Road 547 (Lakewood Farmingdale Road) and Randolph Road in Howell Township and is adjacent to the Larrabee POI property to the north (see Figure 4.9-2). The site is currently used for an active mulching business. The alternative onshore substation site is located along County Road 547 in Howell Township and is adjacent to the Larrabee POI property to the west (see Figure 4.9-2). This alternative site consists of a junk yard, mixed forest, and transmission line ROW.

None of the potential onshore substation sites are within a designated floodplain or other flood hazard area or contain wetland resources. The onshore substation sites are all zoned for commercial and/or industrial uses and are therefore appropriate sites for the onshore substation.

4.9.2 Onshore Substation Design and Construction

The onshore substations may use either an air-insulated switchgear design or a gas-insulated switchgear design pending the substations' final detailed design. The substation design and specific equipment will depend on whether the onshore interconnection cables are HVAC or

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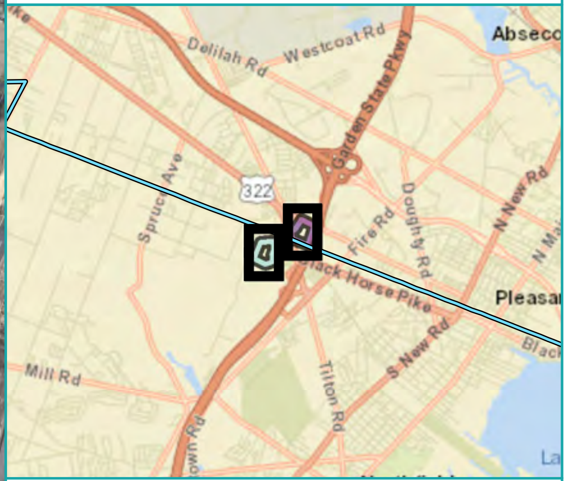

0 75 150 300 Feet

0 40 80 Meters

N W E S

Map Projection: NAD 1983 UTM Zone 18N
Basemap: Nearmap Aerial, March 2020

LEGEND

- Preferred Onshore Substation Site for the Cardiff Onshore Interconnection Cable Route
- Alternative Onshore Substation Site for the Cardiff Onshore Interconnection Cable Route
- Cardiff Onshore Interconnection Cable Route

Figure 4.9-1

Onshore Substation Sites for the Cardiff Onshore Interconnection Cable Route

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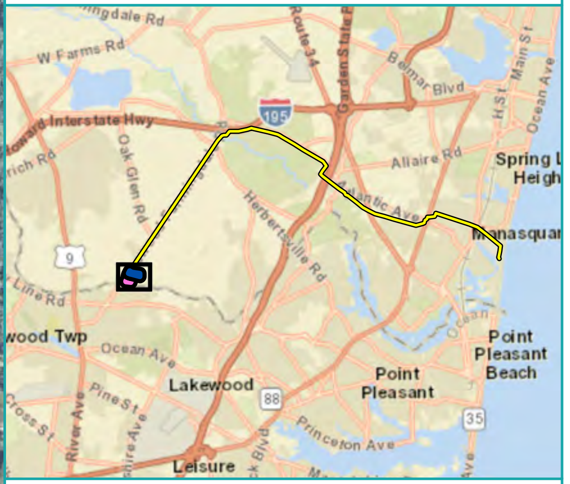

0 75 150 300 Feet

0 40 80 Meters

N E S W

Map Projection: NAD 1983 UTM Zone 18N

Basemap: Nearmap Aerial, July 2020

LEGEND

- Preferred Onshore Substation Site for the Larrabee Onshore Interconnection Cable Route
- Alternative Onshore Substation Site for the Larrabee Onshore Interconnection Cable Route
- Larrabee Onshore Interconnection Cable Route
- Municipality
- County

Figure 4.9-2

Onshore Substation Sites for the Larrabee Onshore Interconnection Cable Route

HVDC. If HVAC, each onshore substation will include up to four power transformers, static synchronous compensators (STATCOMs), shunt reactors, service station transformers, harmonic filter banks, and a substation control building. If HVDC, each onshore substation will include one transformer arranged in three single-phase transformers and a control building.

Full-volume containment will be provided for major oil-containing equipment such as oil-filled transformers and reactors (as required by applicable industry standards) and could be comprised of individual containment systems (pits) or a central collection system with a pump. Any oil containment system will be sized to contain the oil in a single piece of equipment plus rainwater, melted snow, or washdown sized in accordance with applicable industry standards. Indoor lead-acid batteries for use on the 125 volts direct current (VDC) control system will also be outfitted with spill containment and absorbent mats.

Construction activities for each onshore substation will include:

- surveying;
- land clearing and rough grading and fencing;
- trenching and excavation (for ground grid, equipment foundations, and cable and conduit trenches/duct banks);
- installation of equipment foundations;
- installation of substation equipment;
- wiring and connections;
- final grading;
- commissioning;
- energization; and
- system testing.

Regardless of which potential onshore substation sites are utilized, the parcel may be disturbed during clearing and grading. Some trees may also require removal. Estimates of grading and tree clearing areas are provided in Table 4.9-1.

Table 4.9-1 Onshore Substation Parcel Dimensions

Dimension	Cardiff Onshore Substation		Larrabee Onshore Substation	
	Preferred Site	Alternate Site	Preferred Site	Alternate Site
Parcel Size	38.5 acres ($0.156\ km^2$)	23.9 acres ($0.097\ km^2$)	10.2 acres ($0.041\ km^2$)	14.6 acres ($0.059\ km^2$)
Area of Ground Disturbance	21.6 acres ($0.087\ km^2$)	23.9 acres ($0.097\ km^2$)	10.2 acres ($0.041\ km^2$)	14.6 acres ($0.059\ km^2$)
Area of Tree Clearing	Less than 0.25 acres ($0.001\ km^2$)	0.0 acres ($0.0\ km^2$)	3.0 acres ($0.012\ km^2$)	4.0 acres ($0.016\ km^2$)

A crane may be used to erect equipment and poles, to set major substation equipment (e.g., transformers, reactors, STATCOMs, harmonic filters, buswork, switchgear, breakers, switches, pre-fabricated buildings) onto foundations, and to move construction equipment (e.g., storage containers, offices, welders, generators, cable reels, cable pullers) around the site.

General substation lighting will be manually engaged on an as-needed basis if examination of equipment occurs at night. The expected use of general substation lighting will be daily during construction, start-up, and commissioning, and about three times a year during normal operations. Light fixtures will be light-emitting diode (LED) floodlights mounted on dedicated poles or lightning masts (likely 40 to 50 ft [12 to 15 m] high) to illuminate the general substation area. Illumination levels are expected to be no more than 22 lux (2 foot-candle [fc]). Any nighttime lighting for repairs or detailed inspections would be on an as-needed basis. This should be infrequent.

In addition to general substation lighting, one photocell-controlled pole-mounted LED streetlight-style fixture will be placed at the entrance gate. The fixture will be hooded to minimize glare and off-site spillover. Light fixtures will also be placed at entrance doors to the substation control building and other buildings. These fixtures will be wall-mounted and equipped with hoods to direct and limit the illumination. Atlantic Shores will coordinate with local officials to ensure the lighting scheme complies with any applicable municipal requirements.

During construction, a job-site safety program will be implemented to prevent public access to the construction site. Once the onshore substation is operational, a security plan will control site access by employing fencing (with earth grounding), screening barriers, camera systems, signage, and physical barriers. Existing vegetative buffers will be enhanced (only native vegetative species will be used) and setback, landscaping, buffering, screening, and/or lighting will be provided along exposed sides of the site. Atlantic Shores expects to coordinate with local authorities regarding the use of vegetative buffers at the onshore substations. A stormwater management system will be designed for the onshore substation sites and will include low-impact development (LID) strategies (e.g., grass water quality swales to capture and convey site runoff, deep sump catch basin(s) to pretreat surface runoff, etc.) designed to capture, treat, and recharge stormwater runoff.

4.10 Proposed Construction Vessels, Vehicles, and Aircraft

The following discussion summarizes the vessels, vehicles, and aircraft expected to be used during offshore and onshore construction. Vessels, vehicles, and aircraft intended for use O&M activities are described in Section 5.6.

4.10.1 Offshore Construction

Construction of the offshore portion of the Projects will require use of many different types of vessels. Some of these vessels are typical ocean-going vessels, while others are purpose-built to perform specific tasks related to construction of offshore wind and/or buried cable installation. Alongside these vessels, helicopters are sometimes used for crew transfer operations and may also be used for visual inspection of equipment while vessels continue with installation activities. Atlantic Shores may also use fixed-wing aircraft to support environmental monitoring and mitigation.

Offshore construction will be divided into different campaigns including foundation installation, scour protection installation, OSS installation, WTG installation, inter-array cable installation, inter-link cable installation (if needed), and export cable installation. While performing construction tasks, vessels may anchor, jack-up, or maintain their position using DP systems. DP systems use a continually-adjusting propulsion system to keep the vessel steady in a single location. Jack-up vessels have legs that lower into the seabed and brace the vessel as it elevates above sea level, where it can safely perform operations in a stable, elevated position.

Atlantic Shores has not yet selected the specific vessels that will carry out construction activities. For the purposes of this Construction and Operations Plan (COP), representative vessel types are presented rather than specific vessels, and vessel specifications such as length, width, and speed are based on typical ranges for each type of vessel. Because the number of vessels and the number of vessel trips depend on the specific vessels used, estimates were generated using sample vessels and preliminary Project plans. Currently anticipated vessel types are shown in Table 4.10-1.

Currently, maximum estimates for the total number of vessels required for any single offshore construction activity range from two vessels for scour protection installation to up to 16 vessels for OSS installation. For export cable installation, it is currently estimated that up to six vessels could be operating at once. Across the Projects, if all construction activities were occurring concurrently (which is unlikely), a total of 51 vessels could be present at any one time.

Table 4.10-1 Representative Offshore Construction Vessels

Role	Vessel Type	Count	Approx. Length	Approx. Width	Approx. Operational Speed (knots)
Foundation Installation					
Foundation Installation	Bulk Carrier	1	722-755 ft (220-230 m)	66-82 ft (20-25 m)	10
	Medium heavy Lift Vessel	1	591-722 ft (180-220 m)	131-164 ft (40-50 m)	10
	Jack-Up Vessel	1	591-607 ft (180 – 185 m)	197 ft (60 m)	10
Bubble Curtain Support Vessel	Tugboat	1	230-246 ft (70 – 75 m)	49-66 ft (15 – 20 m)	10
Transport Barge	Barge	2-3	394-410 ft (120 – 125 m)	98-115 ft (30 – 35 m)	3-10
Towing Tugboat	Tugboat	2-6	98-115 ft (30 – 35 m)	33-49 ft (10 – 15 m)	3-10
Support Vessel	Service Operation Vessel	1	295-344 ft (90 – 105 m)	49-66 ft (15 – 20 m)	10
Crew Transfer and Noise Monitoring	CTV	1	82-98 ft (25 – 30 m)	30-33 ft (9 – 10 m)	29

Table 4.10-1 Representative Offshore Construction Vessels (Continued)

Role	Vessel Type	Count	Approx. Length	Approx. Width	Approx. Operational Speed (knots)
OSS Installation					
OSS Installation	Large Heavy Lift Vessel	1	640-656 ft (195 – 200 m)	279-295 ft (85 – 90 m)	10
	Medium Heavy Lift Vessel	1	591-722 ft (180 – 220 m)	131-164 ft (40-50 m)	10
Bubble Curtain Support Vessel	Tugboat	1	230-246 ft (70 – 75 m)	49-66 ft (15 – 20 m)	10
Transport Barge	Barge	4	394-410 ft (120 – 125 m)	98-115 ft (30 – 35 m)	10
Towing Tugboat	Tugboat	4	98-115 ft (30 – 35 m)	33-49 ft (10 – 15 m)	10
Assistance Tugboat	Tugboat	2	230-246 ft (70 – 75 m)	49-66 ft (15 – 20 m)	10
Crew Transfer and Noise Monitoring	CTV	1	82-98 ft (25 – 30 m)	30-33 ft (9 – 10 m)	29
Scour Protection					
Scour Protection Installation	Fall Pipe Vessel	1	623-640 ft (190 – 195 m)	131-148 ft (40 – 45 m)	10
Dredging	Dredger	1	640-656 ft (195 – 200 m)	131-148 ft (40 – 45 m)	10

Table 4.10-1 Representative Offshore Construction Vessels (Continued)

Role	Vessel Type	Count	Approx. Length	Approx. Width	Approx. Operational Speed (knots)
WTG Installation					
WTG Installation	Jack-Up Vessel	1	591-607 ft (180 – 185 m)	197 ft (60 m)	10
Towing Tugboat	Towing Tugboat	2	98-115 ft (30 – 35 m)	33-49 ft (10 – 15 m)	10
Feeder Vessel	Jack-Up Feeder	2	407-410 ft (124-125 m)	128-131 ft (39-40 m)	10
	Barge	2-3	394-410 ft (120 – 125 m)	98-115 ft (30 – 35 m)	10
	Harbor Tugboat	1	98-115 ft (30 – 35 m)	33-49 ft (10 – 15 m)	10
WTG Commissioning and Crew Transfer	Service Operation Vessel	1	295-344 ft (90 – 105 m)	49-66 ft (15 – 20 m)	10
	CTV	1	82-98 ft (25 – 30 m)	30-33 ft (9 – 10 m)	29
Inter-Array Cable Installation					
Cable Installation	Cable Installation Vessel	1	246-541 ft (75 – 165 m)	82-115 ft (25 – 35 m)	10
Support Vessel	Service Operation Vessel	1	295-344 ft (90 – 105 m)	49-66 ft (15 – 20 m)	10

Table 4.10-1 Representative Offshore Construction Vessels (Continued)

Role	Vessel Type	Count	Approx. Length	Approx. Width	Approx. Operational Speed (knots)
Inter-Array Cable Installation					
Cable Burial Vessel	Cable Installation Vessel	1	246-541 ft (75 – 165 m)	82-115 ft (25 – 35 m)	10
Dredging	Dredger	1	640-656 ft (195 – 200 m)	131-148 ft (40 – 45 m)	10
Anchor Handling Tug Supply (AHTS) Vessel	AHTS	2	246-262 ft (75 – 80 m)	49-66 ft (15 – 20 m)	10
Rock Dumping Vessel	Fall Pipe Vessel	1	623-640 ft (190 – 195 m)	131-148 ft (40 – 45 m)	10
Export Cable Installation					
Cable Installation	Cable Installation Vessel	1	246-541 ft (75 – 165 m)	82-115 ft (25 – 35 m)	10
Support & Jointing Vessel	Support Vessel	1	312-328 ft (95 – 100 m)	66 ft (20 m)	10
Dredging	Dredger	1	640-656 ft (195 – 200 m)	131-148 ft (40 – 45 m)	10
AHTS Vessel	AHTS	1	246-262 ft (75 – 80 m)	49-66 ft (15 – 20 m)	10
Rock Dumping Vessel	Fall Pipe Vessel	1	640-656 ft (195 – 200 m)	131-148 ft (40 – 45 m)	10

Table 4.10-1 Representative Offshore Construction Vessels (Continued)

Role	Vessel Type	Count	Approx. Length	Approx. Width	Approx. Operational Speed (knots)
Fuel Bunkering					
Towing Tugboat	Towing Tugboat	1	98-115 ft (30 – 35 m)	33-49 ft (10 – 15 m)	10
Transport Barge	Barge	1	394-410 ft (120 – 125 m)	98-115 ft (30 – 35 m)	10

4.10.2 Onshore Construction

Onshore construction can be broken into two key activities: construction of the onshore substation and installation of the onshore interconnection cables/duct bank. Onshore construction will be performed using standard construction equipment typical for onshore infrastructure projects such as the installation of new transmission lines.

Onshore substation construction will resemble typical construction at a power plant or mainland substation. Onshore construction equipment can be expected to include excavators, concrete trucks, forklifts, trenchers, loaders, and backhoes. Typical grading equipment will be used for any clearing and grading needed at the onshore substation site. Onshore substation equipment is expected to be delivered by large trucks and may include oversized-load deliveries. Installation of substation equipment could also require the use of cranes and other support vehicles.

Installation of the onshore interconnection cables and concrete duct bank will require the use of typical construction equipment such as dump trucks, front-end loaders, concrete trucks, and excavators. Cable installation will also require construction vehicles that are more specifically designed for cable management such as winches and cable reel trucks.

4.10.3 Construction Port Facilities and Staging Areas

Atlantic Shores has identified several port facilities in New Jersey, New York, the Mid-Atlantic, and New England that may be used for major construction staging activities for the Projects. In addition, some components, materials, and vessels could come from U.S. Gulf Coast or international ports.

Construction ports will be utilized for the following functions:

- crew transfers;
- component fabrication and assembly;
- receiving and offloading shipments of Project components;
- storing Project components;
- preparing Project components for installation;
- loading Project components onto installation vessels or other suitable vessels for delivery to the Offshore Project Area for installation; and/or
- preparing vessels to tow floating components to the WTA.

A list of U.S. ports considered for temporary use during major construction staging activities is provided in Table 4.10-2 and depicted on Figure 4.10-1; it is likely that only some of the ports identified will be utilized for the Projects' construction.

Table 4.10-2 Ports that May be Used During Construction of the Projects

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New Jersey Ports						
New Jersey Wind Port	Lower Alloways Creek, New Jersey	New Jersey plans to develop the New Jersey Wind Port as a marshaling and manufacturing site for offshore wind projects. Phase 1 of port construction is targeted to start in 2021, and New Jersey anticipates the port will become available in 2023 with a 30-acre (0.12-km^2) marshaling area, 25-acre (0.10-km^2) manufacturing site, and heavy-lift wharf. Phase 2 of port construction is targeted to start in 2023. As part of Phase 2, more than 160 acres (0.65 km^2) of additional marshaling and manufacturing space with additional berths and room for Tier 2 suppliers is expected to become available in 2024-2026 (State of New Jersey 2020).	• Includes full tower assembly	•	• For piled, suction bucket, and gravity foundations	•
Port of Paulsboro	Paulsboro, New Jersey	The Paulsboro Marine Terminal comprises 200 acres (0.81 km^2) on the Delaware River. Its available berth is approximately 850 ft (260 m) in length, with a water depth of approximately 40 ft (12 m) at Mean Low Water (MLW). The port is currently being developed for staging and manufacturing monopiles. The existing 850-foot-long (260-m-long) quayside is currently fully utilized, but an additional 1,500-ft (457-m) quayside is under construction and will have a bearing capacity of 1,500 pounds per square foot (psf) (73 ton/m^2). Construction is expected to be completed in 2021 (South Jersey Port Corporation 2020).	•	• For smaller OSS types	• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New Jersey Ports						
Port Newark Container Terminal (PNCT)	Elizabeth, New Jersey	PNCT occupies 272 acres (1.1km^2) in the Port Authority of New York and New Jersey (PANYNJ) and currently handles containerized cargo. PNCT has secured a long-term lease agreement with the PANYNJ through 2050. The port has a navigable depth of approximately 50 ft (15 m) in Newark Bay. The port has invested in increasing its container volume capacity and crane handling capacity (PNCT 2020).	•	• For smaller OSS types	• For piled and gravity foundations	•
Repauno Port & Rail Terminal	Greenwich Township, New Jersey	Repauno Port & Rail Terminal (Repauno) is a 1,600-acre (6.47-km^2) site along the Delaware River in Greenwich Township, New Jersey. Formerly the site of a DuPont manufacturing facility, the site is currently being redeveloped into a multi-use port facility for energy products, roll-on/roll-off, project cargo, bulk cargo, warehousing, and logistics. The port features a new multi-purpose dock with an approximately 40-ft (12-m) draft capable of handling a wide variety of products.	•	• For smaller OSS types	• For piled and gravity foundations	•
Military Ocean Terminal at Bayonne (MOTBY)	Bayonne, New Jersey	The MOTBY is located on a 427-acre (1.73-km^2), approximately two-mile-long (3.22-km-long) manmade peninsula that extends into upper New York Harbor. Dredged fill materials were used to create the peninsula in 1939. The MOTBY is currently an active port and shipyard with portions of the site being redeveloped for residential and commercial use and warehousing.	•	• For smaller OSS types	• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New York Ports						
Port of Albany	Albany, New York	The 343-acre (1.39-km^2) Port of Albany features deep-water facilities and wharfs on both sides of the Hudson River, including 4,200 ft (1,280 m) of wharf on the Albany side of the river and 1,200 ft (366 m) on the Rensselaer side of the river. The undeveloped portion of the Port of Albany at Beacon Island may be used to support offshore wind development activities. The developed portion of the Port is used for bulk and break bulk, heavy lift/project cargo, offshore wind development activities, and other various functions (Port of Albany 2019).	•		• For piled and gravity foundations	•
Port of Coeymans Marine Terminal	Coeymans, New York	The 400-acre (1.6-km^2) Port of Coeymans Marine Terminal is a privately-owned port located on the Hudson River approximately 10 mi (16 km) south of Albany and 100 mi (160 km) north of New York City. The inlet channel associated with the terminal has approximately 3,260 ft (994 m) of water frontage (COWI North America 2017; Port of Coeymans 2020). The Port serves a variety of projects such as bridge assembly and construction and is the resource and disaster recovery hub of the Northeast.	•		• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New York Ports						
Red Hook Container Terminal	Brooklyn, New York	Red Hook Container Terminal in Brooklyn, New York encompasses approximately 148 acres (0.60 km^2), with approximately 70 acres (0.28 km^2) currently available for development activities. The site currently operates as a bulk and container terminal and shares its south end with a cruise terminal. The terminal includes approximately 1,900 ft (580 m) of water frontage and minimum wharf lengths of approximately 700 ft (212 m) and 600 ft (183 m) at berth (COWI North America 2017).	•	• For smaller OSS types	• For piled and gravity foundations	•
Brooklyn Navy Yard	Brooklyn, New York	The Brooklyn Navy Yard is an industrial park that encompasses 300 acres (1.21 km^2) of land along the waterfront in Brooklyn, New York that includes manufacturers, producers, offices, and amenities and is also under development. Approximately 20 acres (0.08 km^2) within the industrial park may be used to support offshore wind development (BNYDC 2020).			• For piled and gravity foundations	•
South Brooklyn Marine Terminal (SBMT)	Brooklyn, New York	The SBMT encompasses approximately 88 acres (0.76 km^2) of land with approximately 9,400 ft (2,860 m) of waterfront frontage in the PANYNJ. The SBMT has undergone an extensive renovation and currently offers a myriad of services including tug and barge, dry bulk and break bulk stevedoring, maritime freight transload	•	• For smaller OSS types	• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New York Ports						
South Brooklyn Marine Terminal (SBMT) (Continued)	Brooklyn, New York	to and from truck and rail, lay-berthing and dockside repair of industrial and commercial vessels, and other industrial maritime dependent uses. The port is proposed to be upgraded to support staging, installation, and maintenance of offshore wind farms (Kassel 2020).				
Port Ivory	Staten Island, New York	Port Ivory is approximately 64 acres (0.26 km^2) of land owned by the PANYNJ located along the Arthur Kill Channel in the northwestern corner of Staten Island, New York. The site can be accessed by the New York Container Terminal rail line, I-278 highway, or by barge along the Arthur Kill Channel. The waterfront is currently undeveloped (COWI North America 2019).	•	• For smaller OSS types	• For piled and gravity foundations	•
Howland Hook Marine Terminal (GCT New York)	Staten Island, New York	Howland Hook Marine Terminal, owned by New York City and leased to PANYNJ/Global Container Terminals (GCT), is a full-service container and cargo terminal comprising 187 acres (0.76 km^2) on the west side of Staten Island, New York (GCT c2020). The terminal has approximately 3,200 ft (972 m) of water frontage and a minimum wharf length of approximately 2,500 ft (767 m) (COWI North America 2017).	•	• For smaller OSS types	• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
New York Ports						
Arthur Kill Terminal	Staten Island, New York	The Arthur Kill Terminal is a proposed 32-acre (0.13-km^2) port facility in Staten Island, New York that will be developed for offshore wind facility staging and assembly. The terminal will feature strong bearing capacity for WTGs, on-site warehouse storage for equipment, and an approximately 1,300-ft (396-m) quayside designed for simultaneous vessel berthing (Atlantic Offshore Terminals c2020). The facility may be operational by 2023.	• Includes full tower assembly	•	• For piled, suction bucket, and gravity foundations	•
Delaware Ports						
Port of Wilmington	Wilmington, Delaware	The 308-acre (1.25-km^2) Port of Wilmington is a full-service deep-water port and marine terminal located at the confluence of the Delaware and Christina Rivers. The port operates as an auto and container port. The port has identified 60 acres (0.26 km^2) for offshore wind use and includes approximately 3,500 ft (1,067 m) of deep-water berths (GT USA 2020).	•	• For smaller OSS types	• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
Maryland Ports						
Tradepoint Atlantic Terminal	Sparrow's Point, Maryland	Tradepoint Atlantic terminal (formerly Sparrow's Point Terminal) occupies 3,300 acres (13.35 km^2) and operates as a logistics and maritime development port. Deep-water frontage includes channel depths ranging from approximately 36 to 42 ft (11 to 13 m), with plans to deepen channel depths to approximately 40 to 50 ft (12 to 15 m). The terminal has two active vessel berths, including a 2,200-ft (670-m) berth, and a 1,150-ft (350-m) finger pier (Tradepoint Atlantic 2020).	•	• For smaller OSS types	• For piled and gravity foundations	•
Virginia Ports						
Portsmouth Marine Terminal	Portsmouth, Virginia	Portsmouth Marine Terminal occupies 287 acres (1.2 km^2) on the west bank of the Elizabeth River in Portsmouth, Virginia. The terminal is operated by CSX Intermodal Terminals, Inc. and serves both domestic and international freight. It currently handles containers, breakbulk, and roll-on/roll-off cargo. The facilities include approximately 3,540 ft (1,079 m) of wharf and three berths (Virginia Port Authority 2020).	• Includes full tower assembly	•	• For piled, suction bucket, and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
Massachusetts Ports						
New Bedford Marine Commerce Terminal	New Bedford, Massachusetts	The 30-acre (0.12-km^2) New Bedford Marine Commerce Terminal was purpose-built for offshore wind staging and marshaling. The port is owned and operated by the Massachusetts Clean Energy Center and is located in a highly protected industrial harbor on the northwest side of Buzzards Bay. The port has full load-bearing capacity for large crawler cranes and a modern heavy-lift quayside built specifically for offshore wind load-out and load-in and marshalling. A moderate-sized warehouse building onsite can be used (Port of New Bedford 2018).	• Includes full tower assembly		• For piled Foundations	•
Brayton Point	Somerset, Massachusetts	The Brayton Point Commerce center is located on the site of the former coal-fired Brayton Point Power Plant in Somerset, Massachusetts on the Commonwealth's south coast. It is the largest available waterfront property in southeastern Massachusetts with an approximately 700-ft (213-m) quayside and a water depth of 34 ft (10 m). In December 2018, Brayton Point was purchased by Commercial Development Company, Inc. via affiliate Brayton Point LLC. The 300-acre (1.2-km^2) site is being converted to a logistical port and support center for offshore wind operations. The port will be capable of component manufacturing, staging operations, and maintenance for offshore wind and other related sectors (Brayton Point 2019).			• For piled and gravity foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
Rhode Island Ports						
Port of Davisville	North Kingstown, Rhode Island	The Port of Davisville is located in a sheltered harbor in North Kingstown, Rhode Island. It offers five terminals, approximately 4,500 ft (1,372 m) of berthing space at two 1,200 ft- long (366-m-long) piers, a bulkhead, on-dock rail, and 58 acres (0.23 km^2) of laydown and terminal storage. It currently operates as a major auto port and frozen seafood port. In addition, a crew transfer vessel engineered to service offshore wind projects is based at Quonset.	•		• For piled and gravity foundations	•
Connecticut Ports						
Port of Bridgeport	Bridgeport, Connecticut	The Port of Bridgeport was acquired by Seaview Bridgeport LLC from Bridgeport Port Authority in 2017. Bridgeport Port Authority plans to restore the site as a shipyard. The port is located in proximity to Interstate 95 and Connecticut Routes 8 & 25 (Connecticut Port Authority 2019).	• Including full tower assembly	•	• For piled, suction bucket, and gravity foundations	•
Specialty Ports						
Brewer	Brewer, Maine	This 42-acre (0.17-km^2) site in Brewer, Maine has a module yard facility that has been used for fabrication of various oil and gas infrastructure.	•	• For smaller OSS types	• For piled and gravity Foundations	•

Table 4.10-2 Ports that May be Used During Construction of the Projects (Continued)

Port	Location	Description	Staging/Pre-Assembly Activities that May Occur			
			WTG	OSS	Foundation	Offshore Cables
Specialty Ports						
Ingleside	Ingleside, Texas	Jackets, topsides, onshore and offshore modules, living quarters, subsea kits, piles, and tendons are fabricated at this 500-acre (2-km^2) manufacturing site. The site also houses the world's largest offshore lifter that is 550 ft (167 m) tall and can lift 13,000 tons.		•	• For piled, suction bucket, and gravity foundations	
Houma	Houma, Louisiana	Located on the Houma Navigation Canal 30 mi (48 km) from the Gulf of Mexico, the site has 12,720 ft (3,877 m) of water frontage and 283 acres (1.15 km^2) of undeveloped land that is available for expansion. The site fabricates complex steel structures, modules, and marine vessels for the oil and gas industries.		•	• For piled, suction bucket, and gravity foundations	
Columbus Street Terminal	Charleston, South Carolina	Columbus Street Terminal is owned by the South Carolina Ports Authority and primarily handles roll-on/roll-off, breakbulk, and project cargo. It has 3,500 ft (762 m) of berth and a depth of 45 ft (14 m) with unlimited air draft.	• Including full tower assembly	•	• For piled, suction bucket, and gravity foundations	•

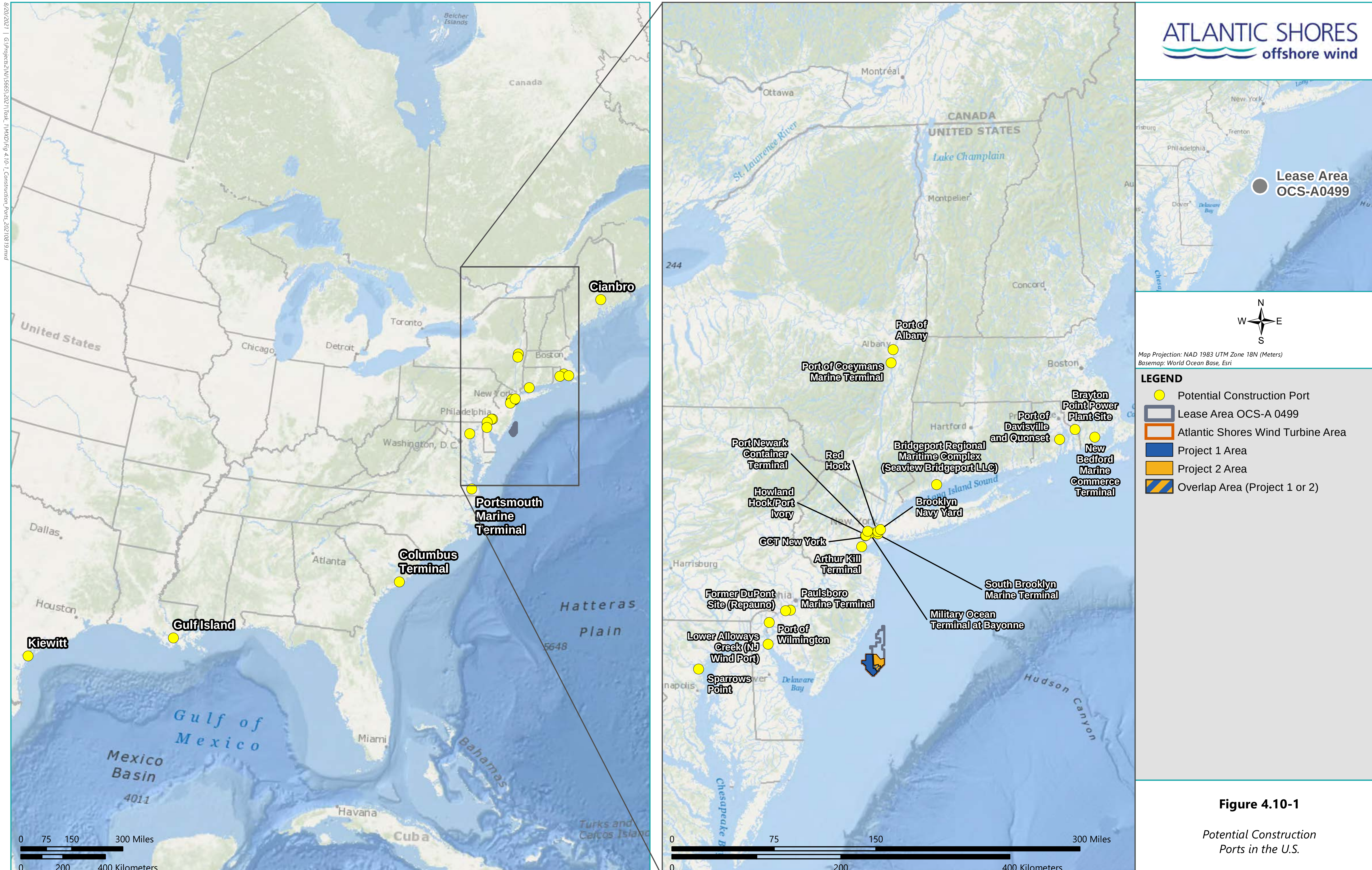

Figure 4.10-1

Potential Construction Ports in the U.S.

Other industrial ports not identified in Table 4.10-2 may be utilized for limited, basic activities associated with marine construction in general rather than offshore wind specifically. These activities may include, but are not limited to, refueling (although some refueling is expected to occur offshore), restocking supplies, and sourcing parts for repairs.

All port facilities being considered to support the Projects' construction are located within industrial waterfront areas with existing marine industrial infrastructure or where such infrastructure is proposed for development within the required Projects' timeframe. Some port requirements specifically pertaining to offshore wind construction projects include:

- high load-bearing ground and deck capacity, especially quayside;
- adequate vessel berthing parameters, including depth of berths to accommodate large installation vessels; and
- suitable laydown and fabrication space, which may require grading and resurfacing.

Atlantic Shores will not implement any port improvements but may contribute financial support to a port's redevelopment as part of a multi-developer economic incentive package. Any port development will occur independent of the Projects, including any permitting or approvals that the port facility owner/lessor may need to obtain. If structures, vessels, and/or cranes more than 200 ft (61 m) high are required to accommodate construction, necessary approvals from the Federal Aviation Administration (FAA) will be obtained.

Identifying a wide range of construction ports is important because many port entities have plans to upgrade or further develop port facilities in support of the burgeoning offshore wind industry. It is essential for the Projects to have the ability to utilize the most appropriate port facilities for construction given uncertainties regarding which planned port upgrades will be completed within the Projects'' development schedule and projected demand for the port facilities by other offshore wind developers. It is likely that only some of the ports identified in Table 4.10-2 will be utilized for the Projects' construction; the ports ultimately selected for use will depend on the status of port upgrades and final construction logistics planning.

4.11 Summary of Maximum Design Scenario and Seafloor Disturbance

This section describes how the PDE described in Sections 4.1 through 4.9 was used to define the maximum design scenario for the resource assessments in Volume II. Potential effects to resources were evaluated using the maximum potential build-out of the Projects:

- The maximum onshore build-out of **the Projects** is defined as construction at two landfall sites (Monmouth and Atlantic Landfall Sites), installation of onshore interconnection cables within two onshore interconnection cable routes (the Larrabee and Cardiff Onshore Interconnection Cable Routes), and construction of two new onshore substations (one each for the Larrabee and Cardiff POIs).

- The maximum onshore build-out of **Project 1** is defined as construction at either or both landfall sites (Monmouth or Atlantic Landfall Site), installation of onshore interconnection cables within either or both onshore interconnection cable routes (the Larrabee or Cardiff Onshore Interconnection Cable Routes), and construction of either or both new onshore substations (either the Larrabee or Cardiff POI).
- The maximum onshore build-out of **Project 2** is defined as construction at either or both landfall sites (Monmouth or Atlantic Landfall Site), installation of onshore interconnection cables within either or both onshore interconnection cable routes (the Larrabee or Cardiff Onshore Interconnection Cable Routes), and construction of either or both new onshore substations (either the Larrabee or Cardiff POI).

- The maximum offshore build-out of **the Projects** is defined as installation of up to 200 WTGs, 10 small OSSs,[21] one permanent met tower, four temporary metocean buoys, eight offshore export cables (with a maximum total length of 441 mi [710 km]), 547 mi (880 km) of inter-array cables, and 37 mi (60 km) of inter-link cables, along with associated scour and cable protection.
  - The maximum offshore build-out of **Project 1** is installation of up to 136 WTGs (assumes Project 1 uses all available positions in the Overlap Area), 5 small OSSs, one permanent met tower, three temporary metocean buoys, four offshore export cables (with a maximum total length of 341.8 mi [550.0 km]), 273.5 mi (440 km) of inter-array cables, and 18.6 mi (30 km) of inter-link cables, along with associated scour and cable protection.
  - The maximum offshore build-out of **Project 2** is installation of up to 95 WTGs (assumes Project 2 uses all available positions in the Overlap Area), 5 small OSSs, one temporary metocean buoy, four offshore export cables (with a maximum total length of 341.8 mi [550.0 km]), 273.5 mi (440 km) of inter-array cables, and 18.6 mi (30 km) of inter-link cables, along with associated scour and cable protection.

In addition to using the maximum onshore or offshore build-out of the Projects, each specific resource section in Volume II further describes if there are any additional aspects of the PDE used to define the maximum design scenario for that resource (such as if all 200 WTGs are assumed to use a particular foundation type).

The maximum area of total permanent and temporary seabed disturbance in the WTA and ECCs from construction of the Projects is provided in Table 4.11-1. The maximum area of total permanent and temporary seabed disturbance for Project 1 and 2 individually is provided in Tables 4.11-2 and 4.11-3, respectively. The "Basis of Calculation" column describes which option included within the PDE was used to calculate the maximum potential seabed disturbance.

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[21] Alternatively, for some resources, the maximum design scenario considers four large OSSs.

Table 4.11-1 Maximum Total Seabed Disturbance for the Projects

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
WTG Foundation Installation (Including Scour Protection)	0.80 mi^2 (2.08 km^2)	0.55 mi^2 (1.43 km^2)	1.14 mi^2 (2.96 km^2)	• **For permanent disturbance:** 200 suction bucket jacket foundations with a total permanent footprint (foundation + scour protection) of 111,987.6 ft^2 (10,404.0 m^2) each. • **For additional temporary disturbance:** 200 mono-bucket foundations with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) each. • **For total disturbance:** 200 suction bucket jacket foundations with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) each. See Table 4.2-1 in Section 4.2.
WTG Installation and Commissioning	N/A (Included in WTG foundation footprint)	0.11 mi^2 (0.29 km^2)	0.11 mi^2 (0.29 km^2)	200 WTGs installed with 10,763.9 ft^2 (1000.0 m^2) of disturbance from one jack-up WTG installation vessel and 4,869.5 ft^2 (452.4 m^2) of disturbance from one jack-up feeder vessel at each WTG position. See Table 4.3-2 in Section 4.3.
OSS Foundation Installation (Including Scour Protection), Topside Installation, and Commissioning	0.04 mi^2 (0.11 km^2)	0.05 mi^2 (0.13 km^2)	0.08 mi^2 (0.20 km^2)	• **For permanent disturbance:** Four large OSSs using suction bucket jacket foundations, with a total permanent footprint (foundation + scour protection) of 282,961.4 ft^2 (26,288.0 m^2) each. • **For additional temporary disturbance:** Ten small OSSs using mono-bucket foundations, each with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. • **For total disturbance:** Ten small OSSs using suction bucket jacket foundations, each with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. See Table 4.2-1 in Section 4.2 and Tables 4.4-1, 4.4-2, and 4.4-4 in Section 4.4.

Table 4.11-1 Maximum Total Seabed Disturbance for the Projects (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Export Cable Installation (Including HDD and Cable Protection)				
Atlantic Landfall Site to OSS	0.10 mi^2 (0.26 km^2)	1.10 mi^2 (2.85 km^2)	1.20 mi^2 (3.11 km^2)	Installation of four HVAC export cables with a total length of 99.4 mi (160.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Monmouth Landfall Site to OSS	0.36 mi^2 (0.93 km^2)	2.52 mi^2 (6.51 km^2)	2.87 mi^2 (7.44 km^2)	Installation of four HVAC export cables with a total length of 341.8 mi (550.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Inter-Array Cable Installation (Including Cable Protection)	0.44 mi^2 (1.14 km^2)	2.92 mi^2 (7.57 km^2)	3.36 mi^2 (8.71 km^2)	Installation of 546.8 mi (880.0 km) of inter-array cables. See Table 4.5-2 in Section 4.5.
Inter-Link Cable Installation (Including Cable Protection)	0.03 mi2 (0.08 km2)	0.25 mi2 (0.65 km2)	0.28 mi2 (0.74 km2)	Installation of 37.3 mi (60.0 km) of inter-link cables. See Table 4.5-2 in Section 4.5.
Met Tower Installation (Including Scour Protection)	N/A	N/A	N/A	There is sufficient conservatism in the total estimates of permanent and temporary seafloor disturbance from WTG foundation installation to account for the impacts from the met tower's installation. See Section 4.6.1.
Metocean Buoy Installation	N/A	0.02 mi2 (0.05 km2)	0.02 mi2 (0.05 km2)	Installation of four temporary metocean buoys with a total temporary seafloor disturbance of 0.005 mi2 (0.013 km2) each. See Section 4.6.2.

Table 4.11-1 Maximum Total Seabed Disturbance for the Projects (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Max. Total Seabed Disturbance in the WTA	1.40 mi^2 (3.62 km^2)	4.43 mi^2 (11.48 km^2)	5.79 mi^2 (15.0 km^2)	Combined seabed disturbance from WTG foundation installation, WTG installation and commissioning, OSS installation and commissioning, met tower installation, metocean buoy installation, inter-array and inter-link cable installation, and installation of the portion of the export cables within the WTA (see Table 4.5-1 in Section 4.5).
Max. Total Seabed Disturbance in the ECCs	0.38 mi^2 (0.98 km^2)	3.09 mi^2 (8.00 km^2)	3.29 mi^2 (8.52 km^2)	Combined seabed disturbance from the installation of four export cables within the Atlantic ECC and four export cables in the Monmouth ECC from the landfall sites to the boundary of the WTA (see Table 4.5-1 in Section 4.5).

Note:

a) For WTG, OSS, and met tower foundations, the foundation type with the maximum footprint is not the same as the type with the maximum area of additional seabed disturbance. Thus, the sum of the maximum area of permanent disturbance and additional temporary disturbance does not equal the total seabed disturbance.

Table 4.11-2 Maximum Total Seabed Disturbance for Project 1

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
WTG Foundation Installation (Including Scour Protection)	0.55 mi^2 (1.41 km^2)	0.37 mi^2 (0.97 km^2)	0.78 mi^2 (2.01 km^2)	• **For permanent disturbance:** 136 suction bucket jacket foundations with a total permanent footprint (foundation + scour protection) of 111,987.6 ft^2 (10,404.0 m^2) each. • **For additional temporary disturbance:** 136 mono-bucket foundations with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) each. • **For total disturbance:** 136 suction bucket jacket foundations with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) each. See Table 4.2-1 in Section 4.2.
WTG Installation and Commissioning	N/A (Included in WTG foundation footprint)	0.08 mi^2 (0.20 km^2)	0.08 mi^2 (0.20 km^2)	136 WTGs installed with 10,763.9 ft^2 (1000.0 m^2) of disturbance from one jack-up WTG installation vessel and 4,869.5 ft^2 (452.4 m^2) of disturbance from one jack-up feeder vessel at each WTG position. See Table 4.3-2 in Section 4.3.
OSS Foundation Installation (Including Scour Protection), Topside Installation, and Commissioning	0.02 mi^2 (0.05 km^2)	0.02 mi^2 (0.06 km^2)	0.04 mi^2 (0.10 km^2)	• **For permanent disturbance:** Two large OSSs using suction bucket jacket foundations, with a total permanent footprint (foundation + scour protection) of 282,961.4 ft^2 (26,288.0 m^2) each. • **For additional temporary disturbance:** Five small OSSs using mono-bucket foundations, each with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. • **For total disturbance:** Five small OSSs using suction bucket jacket foundations, each with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. See Table 4.2-1 in Section 4.2 and Tables 4.4-1, 4.4-2, and 4.4-4 in Section 4.4.

Table 4.11-2 Maximum Total Seabed Disturbance for Project 1 (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Export Cable Installation (Including HDD and Cable Protection)				Project 1 will use the Atlantic ECC **or** the Monmouth ECC, so seafloor disturbances are presented for both.
Atlantic Landfall Site to OSS **or**	0.10 mi^2 (0.26 km^2)	1.10 mi^2 (2.85 km^2)	1.20 mi^2 (3.11 km^2)	Installation of four HVAC export cables with a total length of 99.4 mi (160.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Monmouth Landfall Site to OSS	0.36 mi^2 (0.93 km^2)	2.52 mi^2 (6.51 km^2)	2.87 mi^2 (7.44 km^2)	Installation of four HVAC export cables with a total length of 341.8 mi (550.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Inter-Array Cable Installation (Including Cable Protection)	0.22 mi^2 (0.57 km^2)	1.46 mi^2 (3.78 km^2)	1.68 mi^2 (4.35 km^2)	Installation of 273.4 mi (440.0 km) of inter-array cables. See Table 4.5-2 in Section 4.5.
Inter-Link Cable Installation (Including Cable Protection)	0.02 mi^2 (0.04 km^2)	0.13 mi^2 (0.33 km^2)	0.14 mi^2 (0.37 km^2)	Installation of 18.6 mi (30.0 km) of inter-link cables. See Table 4.5-2 in Section 4.5.
Met Tower Installation (Including Scour Protection)	N/A	N/A	N/A	There is sufficient conservatism in the total estimates of permanent and temporary seafloor disturbance from WTG foundation installation to account for the impacts from the met tower's installation. See Section 4.6.1.
Metocean Buoy Installation	N/A	0.02 mi^2 (0.04 km^2)	0.02 mi^2 (0.04 km^2)	Installation of three temporary metocean buoys with a total temporary seafloor disturbance of 0.005 mi2 (0.013 km2) each. See Section 4.6.2.

Table 4.11-2 Maximum Total Seabed Disturbance for Project 1 (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Max. Total Seabed Disturbance in the WTA	0.84 mi^2 (2.18 km^2)	2.33 mi^2 (6.03 km^2)	3.04 mi^2 (7.87 km^2)	Combined seabed disturbance from WTG foundation installation, WTG installation and commissioning, OSS installation and commissioning, met tower installation, metocean buoy installation, inter-array and inter-link cable installation, and installation of the portion of the export cables within the WTA (see Table 4.5-1 in Section 4.5).
Max. Total Seabed Disturbance in the ECCs	0.32 mi^2 (0.83 km^2)	2.26 mi^2 (5.86 km^2)	2.57 mi^2 (6.65 km^2)	While Project 1 could use either the Atlantic or Monmouth ECC, assumes seabed disturbance from the installation of four export cables within the Monmouth ECC from the landfall sites to the boundary of the WTA (see Table 4.5-1 in Section 4.5).

Note:

a) For WTG, OSS, and met tower foundations, the foundation type with the maximum footprint is not the same as the type with the maximum area of additional seabed disturbance. Thus, the sum of the maximum area of permanent disturbance and additional temporary disturbance does not equal the total seabed disturbance.

Table 4.11-3 Maximum Total Seabed Disturbance for Project 2

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
WTG Foundation Installation (Including Scour Protection)	0.38 mi^2 (0.99 km^2)	0.26 mi^2 (0.68 km^2)	0.54 mi^2 (1.41 km^2)	• **For permanent disturbance:** 95 suction bucket jacket foundations with a total permanent footprint (foundation + scour protection) of 111,987.6 ft^2 (10,404.0 m^2) each. • **For additional temporary disturbance:** 95 mono-bucket foundations with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) each. • **For total disturbance:** 95 suction bucket jacket foundations with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) each. See Table 4.2-1 in Section 4.2.
WTG Installation and Commissioning	N/A (Included in WTG foundation footprint)	0.05 mi^2 (0.14 km^2)	0.05 mi^2 (0.14 km^2)	95 WTGs installed with 10,763.9 ft^2 (1000.0 m^2) of disturbance from one jack-up WTG installation vessel and 4,869.5 ft^2 (452.4 m^2) of disturbance from one jack-up feeder vessel at each WTG position. See Table 4.3-2 in Section 4.3.
OSS Foundation Installation (Including Scour Protection), Topside Installation, and Commissioning	0.02 mi^2 (0.05 km^2)	0.02 mi^2 (0.06 km^2)	0.04 mi^2 (0.10 km^2)	• **For permanent disturbance:** Two large OSSs using suction bucket jacket foundations, with a total permanent footprint (foundation + scour protection) of 282,961.4 ft^2 (26,288.0 m^2) each. • **For additional temporary disturbance:** Five small OSSs using mono-bucket foundations, each with an additional seabed disturbance of 76,835.7 ft^2 (7,138.3 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. • **For total disturbance:** Five small OSSs using suction bucket jacket foundations, each with a total seabed disturbance of 159,348.8 ft^2 (14,804.0 m^2) for foundation installation and 58,125.1 ft^2 (5,400.0 m^2) for topside installation and commissioning. See Table 4.2-1 in Section 4.2 and Tables 4.4-1, 4.4-2, and 4.4-4 in Section 4.4.

Table 4.11-3 Maximum Total Seabed Disturbance for Project 2 (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Export Cable Installation (Including HDD and Cable Protection)				Project 2 will use the Atlantic ECC **or** the Monmouth ECC, so seafloor disturbances are presented for both.
Atlantic Landfall Site to OSS **or**	0.10 mi^2 (0.26 km^2)	1.10 mi^2 (2.85 km^2)	1.20 mi^2 (3.11 km^2)	Installation of four HVAC export cables with a total length of 99.4 mi (160.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Monmouth Landfall Site to OSS	0.36 mi^2 (0.93 km^2)	2.52 mi^2 (6.51 km^2)	2.87 mi^2 (7.44 km^2)	Installation of four HVAC export cables with a total length of 341.8 mi (550.0 km) for all four cables, along with six 2,153-ft^2 (200-m^2) HDD pits and four 2,583 ft^2 (240-m^2) cofferdams at the landfall site. See Table 4.5-1 in Section 4.5 and Section 4.7.1.
Inter-Array Cable Installation (Including Cable Protection)	0.22 mi^2 (0.57 km^2)	1.46 mi^2 (3.78 km^2)	1.68 mi^2 (4.35 km^2)	Installation of 273.4 mi (440.0 km) of inter-array cables. See Table 4.5-2 in Section 4.5.
Inter-Link Cable Installation (Including Cable Protection)	0.02 mi^2 (0.04 km^2)	0.13 mi^2 (0.33 km^2)	0.14 mi^2 (0.37 km^2)	Installation of 18.6 mi (30.0 km) of inter-link cables. See Table 4.5-2 in Section 4.5.
Metocean Buoy Installation	N/A	0.005 mi^2 (0.013 km^2)	0.005 mi^2 (0.0013 km^2)	Installation of one temporary metocean buoys with a total temporary seafloor disturbance of 0.005 mi^2 (0.013 km^2) each. See Section 4.6.2.

Table 4.11-3 Maximum Total Seabed Disturbance for Project 2 (Continued)

Installation Activity	Maximum Area of Seafloor Disturbance			Basis of Calculation
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
Max. Total Seabed Disturbance in the WTA	0.68 mi^2 (1.75 km^2)	2.18 mi^2 (5.66 km^2)	2.77 mi^2 (7.17 km^2)	Combined seabed disturbance from WTG foundation installation, WTG installation and commissioning, OSS installation and commissioning, metocean buoy installation, inter-array and inter-link cable installation, and installation of the portion of the export cables within the WTA (see Table 4.5-1 in Section 4.5).
Max. Total Seabed Disturbance in the ECCs	0.32 mi^2 (0.83 km^2)	2.26 mi^2 (5.86 km^2)	2.57 mi^2 (6.65 km^2)	While Project 2 could use either the Atlantic or Monmouth ECC, assumes seabed disturbance from the installation of four export cables within the Monmouth ECC from the landfall sites to the boundary of the WTA (see Table 4.5-1 in Section 4.5).

Note:

b) For WTG and OSS foundations, the foundation type with the maximum footprint is not the same as the type with the maximum area of additional seabed disturbance. Thus, the sum of the maximum area of permanent disturbance and additional temporary disturbance does not equal the total seabed disturbance.

5.0 Operations and Maintenance

Once commissioned, the Projects are designed to operate for up to 30 years.[22] Operations and maintenance (O&M) activities will ensure the Projects function safely and efficiently. To minimize equipment downtime and maximize energy generation, the Projects will conduct O&M activities through scheduled, predictive, and remotely-controlled activities. O&M activities will be performed by experienced, well-trained personnel.

The health and safety of people and the environment are at the forefront of planning and execution for all O&M activities (see Section 1.5.3). The Atlantic Shores Project Companies will reinforce this priority by ensuring that personnel comply with all applicable health, safety, security, and environmental (HSSE) laws and regulations and by developing and refining O&M procedures through an iterative process that incorporates knowledge gained throughout the Projects' operations and from other offshore wind projects.

The Projects'' O&M strategy builds upon the following guiding principles:

- health and safety;
- environmental protection;
- compliance with regulations;
- maximum availability and energy output of wind farm;
- efficiency of resources and personnel to minimize costs; and
- continuous improvement of operational processes.

The Projects incorporate these guiding principles into all aspects of its operational planning and execution. In addition, Atlantic Shores requires its subcontractors to follow these guiding principles.

5.1 Monitoring and Control Systems

Monitoring systems are vital tools for recording and maintaining data, performing quality assurance, and monitoring asset performance.

All Projects' facilities, including the wind turbine generators (WTGs) and offshore substations (OSSs), are designed to operate autonomously without on-site attendance by technicians. The Projects will be equipped with a supervisory control and data acquisition (SCADA) system to interface between the WTG controllers, OSSs, onshore substations, and all environmental and condition monitoring sensors and to provide detailed performance and system information.

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22 Atlantic Shores' Lease Agreement OCS-A 0499 includes a 25 year operating term, which may be extended or otherwise modified in accordance with applicable regulations in 30 CFR Part 585.

Monitored parameters may include temperature, vibration, status, current, and voltage amongst others. The SCADA system is configured to provide notifications of any alarms or warnings from Project components.

The SCADA system is remotely accessible to the Projects' operator through a remote control center. The SCADA system also provides remote control of the Projects' equipment, allowing the operator to override automatic operations, remotely reset the Projects' systems, adjust control parameters, and shut down equipment for maintenance or at the request of grid operators, regulators, or search and rescue (SAR) (e.g., shut down of WTGs upon the U.S. Coast Guard's [USCG's] request). The operator will monitor the status, production, and health of the Projects 24 hours per day. Performance and fault statistics will be stored and analyzed for long-term trends as well as changes in performance of individual components.

Data from the SCADA system will be primarily transmitted through the fiber optics that are included in the offshore cables, but the SCADA system will incorporate redundancies, such as multiple network connections (e.g., a combination of radio, satellite, and/or wireless network technology) to ensure constant control of Projects' assets.

The condition monitoring systems of various subsystems are centralized into the SCADA system so that this data can be used to identify underperformance issues and major equipment failures before they occur. Proactive utilization of real-time data and monitoring techniques will reduce downtime, repair costs, production losses, and enable root cause analyses to limit similar failures across the Projects. Examples of condition monitoring systems include structural strain monitoring, cable distributed temperature system (DTS), and WTG bearing vibration.

The export cables are expected to include a DTS to constantly monitor the cables' temperature at points along their length to help identify anomalous conditions (i.e., potential changes in cable burial depth) that may require maintenance and/or corrective action. The inter-array cables and inter-link cables (if used) may also use DTS. Other monitoring systems, such as a distributed acoustic sensing (DAS) system and/or online partial discharge (OLPD) monitoring, can also be used to constantly assess the status of the offshore cables. A DAS system employs the fiber optics within the cables to detect noises that could result from anomalous conditions such as insufficient cable depth, vibrations, and potential damage. An OLPD monitoring system can identify the presence and location of insulation damage that can eventually lead to cable failures.

5.2 Communication Systems

In addition to the SCADA system, the Projects will likely utilize a number of additional communication systems to manage overall operations. Examples of such systems include, but are not limited to:

- weather monitoring and forecasting to maximize efficient working hours, safe transfers, and appropriate weather windows;

- vessel tracking and sea surveillance to avoid and minimize potential interactions with marine mammals, fishing vessels, and recreational boaters;
- radio and cellular networks for voice and data communications offshore and onshore; and
- personnel/people tracking for efficient and safe planning.

Offshore communication is typically supported by existing infrastructure, such as wireless network technology or typical marine and aviation communications channels that can be assisted by mounting marine very high frequency (VHF) radio antennas and wireless antennas on the OSSs. Data transfer from offshore Project components is enabled through wireless communication (e.g., Wi-Fi, WiMax protocols, or wireless network technology) and can be supported by fiber optic cables that are bundled with the offshore cables.

As with control systems, offshore wind communications systems will incorporate redundancies, such as multiple network connections.

5.3 Lighting and Marking

The WTGs, OSSs, meteorological (met) tower, and their associated foundations will be equipped with marine navigation lighting and marking in accordance with USCG and the Bureau of Ocean Energy Management (BOEM) guidance. To aid mariners navigating within and near the Wind Turbine Area (WTA), each WTG, OSS, and met tower position will be maintained as a Private Aid to Navigation (PATON). Based on USCG District 5 Local Notice to Mariner 45/20, Atlantic Shores expects to include unique alphanumeric identification on each WTG and/or foundation, yellow flashing lights on each foundation that are visible in all directions, and Mariner Radio Activated Sound Signals (MRASS) on select foundations. It is anticipated that the marine navigation lights on structures along the perimeter of the WTA will be visible at a range of 3 or 5 nautical miles (nm) (depending on the structure's location), whereas lights on interior structures will be visible at a range of 2 nm. Automatic Identification System (AIS) will be used to mark each WTG, OSS, and met tower position (virtually or using physical transponders). Atlantic Shores will work with the USCG and BOEM to determine the appropriate marine lighting and marking schemes for the proposed offshore facilities, including the number, location, and type of AIS transponders. Additional information on marine navigation lighting and marking can be found in the Navigation Safety Risk Assessment (NSRA) (see Appendix II-S).

All WTGs and the met tower will contain aviation obstruction lights in accordance with Federal Aviation Administration (FAA) and/or BOEM guidance to aid aircraft operating in the WTA. Based on current guidance in FAA Advisory Circular 70/7460-1M, the aviation obstruction lighting system on the WTGs will include red flashing lights on the nacelle and, if the WTG exceeds 699 feet (ft) (213.36 meters [m]), an additional level of flashing red lights on the tower. The lights will be arranged so that they are visible by a pilot approaching from any direction. In accordance with Advisory Circular 70/7460-1M, the color of the WTGs will be no lighter than RAL 9010 (Pure White) and no darker than RAL 7035 (Light Grey). If the height of the OSSs exceeds 200 ft (61 m) above Mean Sea Level (MSL) or any obstruction standard contained in 14 CFR Part 77, the OSSs will include an aviation obstruction lighting system in compliance with FAA and/or BOEM requirements. Atlantic Shores is considering use of an Aircraft Detection Lighting System (ADLS), subject to FAA and BOEM approval, which could substantially reduce the amount of time that the aviation obstruction lights are actually illuminated. An ADLS automatically activates all aviation obstruction lights when aircraft approach the WTA; at all other times, the lights are off.

Other temporary lighting (e.g., helicopter hoist status lights) may be utilized on the WTGs for safety purposes when necessary. Similarly, some outdoor OSS lighting (in addition to any required aviation or marine navigation lighting) will be necessary for maintenance that may occur at night. Atlantic Shores anticipates using controls to ensure that outdoor OSS lighting will be illuminated only when the OSS is manned. When unmanned, general outdoor lighting will be off.

5.4 Operations, Maintenance, and Inspections

A comprehensive O&M Plan for the Projects will be developed, which will include plans for scheduled and un-scheduled inspections and maintenance activities to keep the Projects operating with optimum reliability and performance throughout the design life. A risk-based maintenance approach will be used to balance long-term operating costs with the Projects' performance.

Scheduled maintenance is performed on a fixed, predetermined schedule (e.g., annually) and may consist of remote monitoring, inspections, testing, replacement of consumables, and preventive maintenance. As part of the scheduled maintenance, self-inspections will be conducted in accordance with 30 CFR §§ 585.824 and 585.825. Scheduled maintenance of offshore facilities will be performed during non-winter months when accessibility is highest. The frequency of inspections, tests, and maintenance will be based on industry standards and best practices.

Unscheduled maintenance is performed in response to a sensor alarm or fault indicating a component malfunction or to an event that causes accidental damage. Unscheduled maintenance may involve inspections, troubleshooting, and corrective maintenance, and may occur at any time of the year. Atlantic Shores will conduct a post-event inspection after an event that causes damage to a structure (e.g., a ship allision) or after a storm during which measured environmental conditions exceeded specified conditions (e.g., a hurricane or significant storm event).

All maintenance activities will follow the procedures outlined in each Project's Safety Management System (SMS) (see Section 1.5.3.1). Maintenance activities will only be performed after appropriate preparatory actions have been taken according to the O&M Plan, including risk assessment and method statement development, marine traffic coordination, and checking that communication and remote monitoring and control systems are functional. Atlantic Shores will document and record all maintenance activities according to the O&M Plan.

The Atlantic Shores Project Companies will provide access to and accommodate BOEM or its qualified third-party inspectors for the purposes of conducting inspections or reviewing maintenance records according to 30 CFR §§ 585.820-585.823.

5.4.1 WTGs

Scheduled Maintenance

Scheduled maintenance of WTGs includes regularly scheduled inspections and routine maintenance of mechanical and electrical components. Most scheduled maintenance and associated crew transfer will be performed using crew transfer vessels (CTVs), service operation vessels (SOVs), and/or helicopters (see Section 5.6). The types and frequency of inspections and maintenance activities are based on detailed original equipment manufacturer (OEM) specifications. Annual maintenance campaigns are dedicated to general upkeep (e.g., bolt tensioning, crack and coating inspection, safety equipment inspection, cleaning, high-voltage component service, and blade inspection) and replacement of consumable components (e.g., lubrication, oil changes).

Preventative maintenance (e.g., planned replacement of components such as motors and brakes) occurs less frequently (every 5 to 10 years) but is also regularly scheduled.

Unscheduled Maintenance

Unscheduled inspections and minor repairs, such as replacement of small components, can be performed via the regular maintenance vessels. Replacement of large components (e.g., blades, generators, gearboxes, and large bearings) or structural repair may require support vessels, such as jack-up vessels with cranes, as well as larger teams of technicians.

5.4.2 OSS Topsides

Scheduled Maintenance

OSSs undergo annual maintenance to both medium-voltage and high-voltage systems, auxiliary systems, and safety systems as well as topside structural inspections. Portions of the topsides may require the reapplication of corrosion-resistant coating. Diesel generators located on the OSSs will also require routine maintenance and refueling.

Unscheduled Maintenance

Corrective maintenance for OSS topside infrastructure includes minor structural repairs discovered during inspections, electrical repairs discovered either during inspections or through operational faults, and relatively rare movable part overhauls. Replacement of major components (e.g., transformers) is expected to occur infrequently and will likely require support vessels similar to those required for WTG major component replacement activities.

5.4.3 Foundations and Scour Protection

Scheduled Maintenance

WTG, OSS, and met tower foundations will be inspected both above and underwater at regular intervals to check their condition including checking for corrosion, cracking, and marine growth (see Table 5.4-1). Scheduled maintenance of foundations will also include safety inspections and testing, coating touch up, preventative maintenance of cranes, electrical equipment, and auxiliary equipment, and removal of marine growth.

Unscheduled Maintenance

Unscheduled maintenance will be conducted for minor component repair/replacement if damage to a foundation occurs (e.g., due to an accidental event or conditions that exceed the foundation's design loads). Corrective actions will be taken if any issues with scour protection are discovered.

5.4.4 Offshore Cables

Scheduled Maintenance

As described in Section 5.1, the offshore cables may be continuously monitored using DTS, a DAS system, and/or OLPD monitoring. In addition, cable surveys will be performed at regular intervals to identify any issues associated with potential scour and depth of burial. Annual surveys will be performed for the first few years of operation, and provided no abnormal conditions are detected during those initial surveys, less frequent surveys will continue for the life of the Projects. Cable terminations and hang-offs will be inspected and maintained during scheduled maintenance of foundations, OSS, or WTGs.

Unscheduled Maintenance

In the unlikely event that a cable becomes exposed, the issue will be addressed by reburying the cable and/or applying cable protection. Vessels supporting these procedures will typically be of the same type as those used during construction (see Section 4.10.1). Atlantic Shores will store spare cable at an O&M facility, a dedicated warehouse, or with the cable supplier to expedite the repair process in the unlikely event that the Projects experience a cable failure.

5.4.5 Onshore Substations and Onshore Interconnection Cables

Scheduled Maintenance

Electrical systems at the onshore substations such as transformers, switchgear, harmonic filters, reactive power equipment, revenue meters, protection and control systems, and auxiliary services will be regularly monitored. Scheduled maintenance of the onshore interconnection cables will also be performed; any necessary maintenance will be accessed through manholes and completed within the installed transmission infrastructure.

Unscheduled Maintenance

Unscheduled inspections and minor repairs, such as troubleshooting, testing, and replacement of small components, can be performed *in situ*. Manlifts and small cranes may be used to work on elevated equipment. For larger pieces of equipment (e.g., transformers, reactors, major static synchronous compensator (STATCOM) components, breakers, or structure equipment) that require in-shop service or replacement, heavy duty construction equipment, such as cranes similar in size to those used during construction, may be used to aid in removal and replacement. Although unlikely, if a section of onshore interconnection cable fails, cable pulling equipment would be needed.

5.4.6 Representative Inspection and Maintenance Schedule

A representative schedule of the Projects' inspection and maintenance activities is presented in Table 5.4-1. This schedule provides an overview of the estimated frequency of inspection and maintenance activities; it is expected that this schedule will be updated during the detailed design process.

Table 5.4-1 Schedule of Planned Preventive Maintenance Activities

Project Component	Activity	Frequency
WTG	Inspections	Annual
	Maintenance of mechanical, electrical, structural, and safety systems	Annual
	Retrofits/upgrade	As needed
	Gearbox oil change	2-3 times over lifespan, as needed
	Major preventative maintenance	5, 7, or 10-year intervals
OSS	Inspections	Annual
	Maintenance of medium-voltage and high-voltage systems, auxiliary systems, and safety systems	Annual
	Diesel generator refueling	As needed
Foundation	Above water inspection	Annual
	Below water inspection	20% of positions per year (may be modified based on site and design risk assessment)
	Maintenance of structural, auxiliary, and safety systems	Annual

Table 5.4-1 Schedule of Planned Preventive Maintenance Activities (Continued)

Project Component	Activity	Frequency
Offshore Cables (Export, Inter-Array, and Inter-Link)	Survey	Annually during the first few years of operations and at less frequent intervals thereafter (may be modified based on site and design risk assessment)
	Electrical tests	Every 5 years
Onshore Substation	Inspection	Annual
	Maintenance of medium-voltage and high-voltage systems, auxiliary systems, and safety systems	Annual
Onshore Interconnection Cables	Visual and thermographic inspections of cables and terminations inside vaults	Annual
	Electrical tests	Every 5 years

5.5 O&M Facility and Ports

Once operational, the Project will be supported by a new O&M facility that Atlantic Shores is proposing to establish in Atlantic City, New Jersey (see Figure 1.1-2). The O&M facility will be used solely by Atlantic Shores as the primary location for O&M operations including material storage, day-to-day management of inspection and maintenance activities, vehicle parking, marine coordination, vessel docking, and dispatching of technicians. The O&M facility will be designed to provide a safe and efficient operational flow of activities and equipment, and will consist of the following:

- office space, including a server/IT room to house the Project’s critical IT infrastructure, and a control room for surveillance and coordination of offshore activities and Project operations;
- warehouse space, including full-height access for deliveries and equipment storage, a temperature and humidity-controlled electrical storage room, and a lifting facility;
- harbor area and quayside, including but not limited to vessel mooring, unloading capabilities, a crane, berthing area, and emergency spill response equipment; and
- outdoor area and parking, including storage space for spare parts and materials.

To establish the O&M facility, Atlantic Shores intends to purchase and develop a shoreside parcel in Atlantic City that was formerly used for vessel docking or other port activities. Construction of the O&M facility is expected to involve the construction of a new building and associated parking lot, repairs to any existing bulkheads/docks, installation of new dock facilities, and limited marine dredging. The potential effects from construction of the O&M facility will be provided in the 2021 COP supplement. The O&M facility developed at the shoreside parcel in Atlantic City may also be supported with the use of existing warehouse or office space within an industrial, commercial, and/or waterfront area.

Atlantic Shores will likely establish a long-term CTV base at the O&M facility in Atlantic City. If Atlantic Shores employs an SOV-based O&M strategy, those SOVs would likely be operated out of existing ports such as Lower Alloways Creek Township, the Port of New Jersey/New York, or another industrial port identified in Table 4.10-2 that has suitable water depths to support an SOV.

Atlantic Shores may use other ports listed in Table 4.10-2 to support O&M activities such as some crew transfer, bunkering,[23] spare part storage, and load-out of spares to vessels. In addition, routine port activities such as refueling and supply replenishment may occur outside of the ports identified in Table 4.10-2. While it is anticipated that the ports listed in Table 4.10-2 can support the Project's needs, it is possible that if significant non-routine maintenance is needed for the Project, it could require unplanned use of another U.S. or international port.

Lastly, the O&M facility and vessels used for the Projects may also be integrated with those of other Atlantic Shores projects, depending on the timing of those developments. A shared operational strategy will realize efficiencies and is expected to reduce environmental impacts during O&M by reducing overall vessel usage within Lease Area OCS-A 0499.

5.6 Proposed Vessels, Vehicles, and Aircraft

A combination of CTVs, SOVs, other smaller vessels, and helicopters may be used to access infrastructure in the WTA. The vessels are likely to be dispatched from the quayside at the O&M facility or other supporting O&M ports. The logistical approach will aim to share facilities and vessels, where possible, to maximize efficiency and minimize the environmental impact of transporting personnel, materials, and tools. In addition to CTVs, SOVs, and smaller vessels, the Projects may also use jack-up, heavy-lift, or other larger support vessels on an infrequent basis for large component replacement. If the characteristics of the O&M facility's port are unsuitable for the types of vessels required to complete the repair or for the quayside logistics required to manage larger components, a nearby port will be used (see Section 5.5). In addition, Atlantic Shores may use fixed-wing aircraft to support environmental monitoring and mitigation.

[23] Some refueling could also occur offshore. All options described in this paragraph would be conducted in accordance with applicable Jones Act requirements and other applicable law.

Atlantic Shores may utilize a CTV-based logistical approach due to the proximity of the WTA to the O&M facility in Atlantic City and the O&M facility's port characteristics (e.g., water depths). CTVs enable faster, more practical transport of personnel and equipment to the Projects' offshore facilities than SOVs when the transit distance is relatively short (see Figure 5.6-1 for a representative photo of a CTV). CTVs may transit daily between the CTV base and WTA. Helicopters can be used when rapid-response O&M activities are needed or when poor weather limits the use of CTVs. Helicopters would be based within reasonable distance of the Projects at a general aviation airport.

SOVs are relatively large vessels that offer considerable capacity for personnel and spare parts, allowing for service trips that are several weeks in duration (see Figure 5.6-1). SOVs include sleeping quarters for technicians and may include workshop space. SOVs are capable of transferring technicians to WTGs and OSSs through use of gangways. Typically, an SOV is equipped with a dynamic positioning (DP) system, lifting and winch capacity, and may support a helipad. SOVs are only limited by the need to return to port to restock fuel, food, and spare parts but are typically used in conjunction with smaller daughter crafts/workboats or CTVs to enable quick transport of personnel or supplies between the vessel and port or offshore assets. An SOV-based O&M strategy may also rely upon helicopters to shuttle technicians and equipment within the WTA.

In addition to CTVs, SOVs, and helicopters, other vessels and vehicles may be used to support O&M activities over the lifetime of the Projects:

- Although CTVs and SOVs are the most common vessels around which O&M logistical approaches are designed, an alternative approach employs a service accommodation and transfer vessel (SATV), which is larger than a CTV and supports week-long service campaigns.
- Larger support vessels (e.g., jack-up vessels) may be used infrequently to perform some routine maintenance activities, periodic corrective maintenance, and significant repairs (if needed). These vessels are similar to vessels used during construction.
- Survey vessels may be required for subsea inspection campaigns.
- Cable laying vessels may support cable repair campaigns.
- Other monitoring and inspection needs may be met by unmanned aerial vehicles, remotely-operated vehicles (ROVs), or underwater drones.

Example Crew Transfer Vessel (CTV)

Example Service Operation Vessel (SOV)

ATLANTIC SHORES offshore wind

Figure 5.6-1
Crew Transfer Vessel (CTV) and Service Operation Vessel (SOV) Examples

- Various land-based vehicles, including trucks and heavy equipment machinery, may be utilized during the operations phase. Heavy equipment use during O&M will be more infrequent than during construction and would typically be needed to address occasional unplanned failures. The O&M facility and any potential warehouses will likely use electric forklifts and flatbed trucks to transport components. The Projects may also purchase one or more small trucks or sports utility vehicles for shared staff use.

Approximately 5 to 11 vessels are expected to operate in the Offshore Project Area at any given time during normal O&M activities, though additional vessels (a maximum of up to 22 vessels) may be required in other maintenance or repair scenarios. Depending on whether SOVs or CTVs are primarily used, Atlantic Shores estimates that approximately 550 to 2,050 vessel round trips to the Offshore Project Area will occur annually during the Projects' operations, which is an average of two to six vessel trips per day. These vessel trips may be supplemented by helicopters to assist in personnel transport. The actual level of vessel activity during O&M will depend on the specific maintenance needs that develop as well as the final design of the offshore facilities.

6.0 Decommissioning

Decommissioning will broadly occur in the reverse order of construction and will be conducted in accordance with the applicable requirements discussed in Section 6.1.

6.1 Decommissioning Requirements

The Atlantic Shores Project Companies will follow the decommissioning requirements stated in Section 13, "Removal of Property and Restoration of the Leased Area on Termination of Lease," of the December 4, 2018 Lease Agreement for Lease Area OCS-A 0499. Pursuant to the applicable regulations in 30 CFR §585.902, and unless otherwise authorized by the Bureau of Ocean Energy Management (BOEM) under 30 CFR §585.909, Atlantic Shores Project Companies will be required to remove or decommission all facilities, projects, cables, pipelines, and obstructions and clear the seabed of all obstructions created by activities on the leased area, including any project easements(s). Removal or decommissioning activities must be completed within two years after lease termination (whether by expiration, cancellation, contraction, or relinquishment) in accordance with an approved Site Assessment Plan (SAP), Construction and Operations Plan (COP), or approved Decommissioning Application and applicable regulations in 30 CFR Part 585. Per 30 CFR §585.910(a), all offshore facilities must be removed to 15 feet (ft) (4.5 meters [m]) below the mudline, unless otherwise authorized by BOEM.

Atlantic Shores Project Companies will submit a Decommissioning Application to BOEM prior to decommissioning any Projects' facilities. BOEM's process for reviewing and approving this plan will include consultations with municipal, state, and federal agencies, other stakeholders, and the public.

6.2 Decommissioning Activities

The anticipated decommissioning process for each Project component is described in the following sections. Vessels used to complete offshore decommissioning activities will likely resemble those used during installation and could include jack-up vessels, heavy-lift vessels, and support vessels such as tugboats and crew transfer vessels (CTVs) (see Section 4.10.1). For onshore decommissioning activities, equipment will likely include truck-mounted winches, cable reels, and cable reel transport trucks.

When possible, the Projects' components removed during decommissioning will be recycled (e.g., steel foundation components). However, some materials may have no scrap value or capability to be recycled (e.g., fiberglass wind turbine generator [WTG] components); these materials would be broken down and disposed of at an approved onshore solid waste facility.

After the Projects' offshore facilities are removed, Atlantic Shores Project Companies will verify site clearance in accordance with 30 CFR §585.910(b).

6.2.1 WTGs

WTG components will be drained of any fluids and chemicals according to the established operations and maintenance (O&M) procedures and the Oil Spill Response Plan (OSRP) (see Section 1.5.3.2), which will be collected and properly disposed of or recycled. Before removing the WTGs, inter-array cables will be disconnected. WTG components will then be disassembled and removed from their foundations, shipped to shore, and recycled or scrapped. Removing the WTG blades, rotor, nacelle, and tower will involve the use of vessels with cranes that are similar to those utilized for installation and assembly.

6.2.2 Offshore Substations

Similar to WTGs, before offshore substation (OSS) decommissioning activities commence, any export cables, inter-array cables, and inter-link cables will be disconnected from the OSS. The OSS topsides will then be disassembled and removed from their foundations using cranes, shipped to shore, and recycled or scrapped. In accordance with the OSRP, OSS equipment will be drained of any fluids and chemicals, which will be collected and then properly disposed of or recycled. Any sulfur hexafluoride (SF_6) in gas-insulated switchgear will be carefully removed for reuse.

6.2.3 WTG and OSS Foundations

The procedures used for decommissioning the WTG and OSS foundations will depend on the type of foundation:

- **Piled foundations:** These foundation types will be cut below the mudline and will be completely removed above that cut. To facilitate cutting, any sediment within the piles will be suctioned out and collected; after foundation removal, any collected sediment will be placed in the depression left after removal using a vacuum pump and diver or remotely-operated vehicle (ROV)-assisted hoses to minimize turbidity. Cutting steel foundations will likely be accomplished with underwater acetylene cutting torches, mechanical cutting, and/or a high-pressure water jet. Once cut, a crane will lift the foundation onto a vessel for transport to port; a foundation may be cut into multiple sections for ease of transport.
- **Suction bucket foundations:** Injecting water into the suction buckets will essentially reverse the installation process, pushing them back out of the seabed sediment and enabling complete removal of these foundations.
- **Gravity foundations:** Ballast within the foundations will be removed and the foundations will be floated away from the installation site. If it is not possible to re-float the gravity foundation, it will be disassembled on-site, and all components will be removed.

It is possible that, pending environmental assessment and regulatory approval, some foundations may be left in place as artificial reefs. In addition, scour protection around foundations may be removed or left in place pending future environmental assessment. If it is determined that scour protection needs to be removed, it will be excavated with a dredging vessel or removed by vessel's crane and transported to port for reuse or disposal.

6.2.4 Offshore Cables

Export cables, inter-array cables, and inter-link cables (if present) will either be retired in place or removed from the seabed. The decision regarding whether to remove these cables and any overlying cable protection will be made based on future environmental assessments and consultations with federal, state, and municipal resource agencies. For example, if cable protection is functioning as reef habitat, it may be less disruptive and more beneficial to leave such structure undisturbed on the seabed.

If it is determined that offshore cables should be removed from the seabed, any overlying cable protection will need to be removed first, then the cables will be extracted from the seabed. Where these cables are buried in dense sediments, it may be necessary to fluidize overlying sediments before extracting the cables. Cables freed from the seabed will be coiled onto reels or cut into manageable lengths and transported to port for recycling.

6.2.5 Met Tower

Similar to WTGs and OSS topsides, the meteorological (met) tower will be disassembled and removed from its foundation using cranes, shipped to shore, and recycled or scrapped. Decommissioning of the met tower's foundation will follow the steps outlined in Section 6.2.3.

6.2.6 Onshore Facilities

Depending largely on future consultations with state and municipal agencies, onshore facilities (e.g., onshore substations and buried duct banks) will either be retired in place or reused for other purposes. For example, because removing buried concrete duct banks would require excavations similar to those involved with installation, leaving these conduits in place for other infrastructure could be less disruptive and beneficial. Even if duct banks are left in place for future use, the onshore cables will likely be removed from the conduits and recycled accordingly.

6.3 Financial Assurance for Decommissioning

Financial assurance for the Project will be provided in accordance with the terms and conditions required by BOEM in the Lease Agreement for Lease Area OCS-A 0499 and applicable requirements under 30 CFR Part 585, Subpart E.

7.0 Chemical Products and Solid and Liquid Wastes

Construction and operations and maintenance (O&M) activities will generate some quantity of solid and liquid wastes. Wastes and chemical products can be categorized as either hazardous or non-hazardous. Hazardous waste can include, but is not limited to, waste oils and oily materials (e.g., grease tubes, oily rags, oil filters), lead-acid batteries, aerosol cans, paints, varnishes, cleaners, solvents, and adhesives.

The Projects' solid and liquid wastes will be treated, released, stored, and/or disposed of in accordance with applicable federal, state, and local regulations. Vessels may discharge some liquid wastes (e.g., domestic water, uncontaminated bilge water and ballast water, treated deck drainage and sumps, and uncontaminated fresh or seawater from vessel air conditioning). Other waste, such as sewage, solid waste or chemicals, solvents, oils and, greases from equipment, vessels or facilities will be stored and properly disposed of onshore or incinerated offshore. All vessels for the Projects will comply with the U.S. Coast Guard's (USCG's) waste and ballast water management regulations found at 33 CFR Part 151 and USCG's oil and hazardous material pollution prevention regulations found at 33 CFR Part 155, among other regulations. Project vessels covered under the Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System (NPDES) Vessel General Permit (VGP) are also subject to the effluent limits in Section 2 of the VGP, which incorporate numerous regulations including, but not limited to, 40 CFR Part 110, 40 CFR Part 116, 40 CFR Part 117, and 33 CFR 151.10. Atlantic Shores will also require offshore contractors to participate in a marine trash and debris prevention training program.

All onshore waste likely to cause environmental harm will be stored in containers placed in designated, secure, and bermed locations away from depressions and drainage lines that carry surface water until collected by the selected waste contractor. Spill kits will be provided at all locations where hazardous materials are held to control foreseeable spills, and protocols will be in place to minimize the chance of such spills (see Section 1.5.3.2). Waste required to be removed for use away from storage areas will be kept in portable bunds (temporary spill berms), and waste oils will be recycled where appropriate.

Table 7.0-1 through Table 7.0-3 provide examples of potential chemical products to be used on the wind turbine generators (WTGs) and offshore substations (OSSs) as well as at the onshore substations. As each Project's design and planning progress, a detailed chemical and waste management plan will be developed. This plan will describe waste streams, storage and handling, and plans for proper disposal, recovery, recycling, or reuse. Atlantic Shores currently anticipates that chemical products for the WTGs, OSSs, and onshore substations will be included in the equipment at the time of installation. During O&M, chemical transfer will occur during certain activities, such as oil changes or replenishing fuel for emergency generators. As described in Section 1.5.3.2, spill response plans for the Projects' onshore and offshore facilities will be developed that outline spill prevention measures as well as provisions for containment, removal, and mitigation of spills.

Table 7.0-1 List of Potential Chemical Products Used for WTGs

Component	Description	Approximate Quantity per WTG		Approximate Total Quantity for Project 1 and Project 2 (200 WTGs)	
		Gallons	Liters	Gallons	Liters
Emergency generator fuel	Diesel fuel	400	1,514	80,000	302,833
Hydraulic systems	Hydraulic fluid	350	1,325	70,000	264,979
Yaw/pitch system grease	Grease	150	568	30,000	113,562
Drive rain, yaw, pitch system	Gear and bearing lubricating oil	500	1,893	100,000	378,541
Gearbox	Gear and bearing lubricating oil	581	2,199	116,200	439,865
Transformer	Biodegradable dielectric insulating fluid/synthetic ester oil	1,800	6,814	360,000	1,362,748
Hydraulic accumulators	Nitrogen	21,134	80,000	4,226,753	16,000,000
Equipment cooling system	Water/glycol	400	1,514	80,000	302,833
Passive tower damper system	Water/glycol	3,700	14,006	740,000	2,801,205
Component	**Description**	**Pounds**	**Kilograms**	**Pounds**	**Kilograms**
Switchgear	Electrical insulator/arc suppressor	243	110	48,502	22,000

Table 7.0-2 List of Potential Chemical Products Used for OSSs

Component	Description	Approximate Quantity per Small OSS		Approximate Quantity per Medium OSS		Approximate Quantity per Large OSS	
		Gallons	Liters	Gallons	Liters	Gallons	Liters
Diesel fuel storage	Diesel fuel	7,500	28,391	12,000	45,425	20,000	75,708
Diesel engines	Internal motor lubrication	5	19	10	38	15	57
Main power transformers, earthing transformers	Biodegradable dielectric insulating fluid, mineral oil, or synthetic ester oil	26,000	98,421	78,000	295,262	130,000	492,104
Reactors	Biodegradable dielectric insulating fluid, mineral oil, or synthetic ester oil	11,000	41,640	33,000	124,919	55,000	208,198
Uninterruptible power supply (UPS) batteries	Electrolyte inside lead/acid batteries or valve-regulated lead acid battery	250	946	400	1,514	400	1,514
Fire suppressant for electrical equipment without oil	Firefighting	676	2,560	1,014	3,840	1,353	5,120
Firefighting aid	Aqueous film-forming foam and water mixtures at 3% by volume	3,500	13,249	4,000	15,142	5,000	18,927
Diesel engine cooling	Water/glycol	30	114	50	189	50	189
Equipment Cooling System	Water/glycol	1,000	3,785	2,000	7,571	3,000	11,356
Component	**Description**	**Pounds**	**Kilograms**	**Pounds**	**Kilograms**	**Pounds**	**Kilograms**
Switchgear	Electrical insulator/arc suppressor	3,307	1,500	9,480	4,300	9,480	4,300
Air conditioning/ condensers	Refrigerant	198	90	397	180	794	360

Table 7.0-3 List of Potential Chemical Products Used for Onshore Substations

Component	Description	Approximate Quantity per Onshore Substation	
		Gallons	Liters
Diesel fuel storage	Diesel fuel	1,500	5,678
Diesel engines	Internal motor lubrication	10	38
Main power transformers, earthing transformers	Biodegradable dielectric insulating fluid, mineral oil, or synthetic ester oil	162,500	615,129
Reactors	Biodegradable dielectric insulating fluid, mineral oil, or synthetic ester oil	110,000	416,395
UPS batteries	Electrolyte inside lead/acid batteries or valve-regulated lead acid battery	400	1,514
Diesel engine cooling	Water/glycol	25	95
Equipment cooling system	Water/glycol	1,250	4,732
Component	**Description**	**Pounds**	**Kilograms**
Switchgear	Electrical insulator/arc suppressor	11,023	5,000
Air conditioning/ condensers	Refrigerant	794	360

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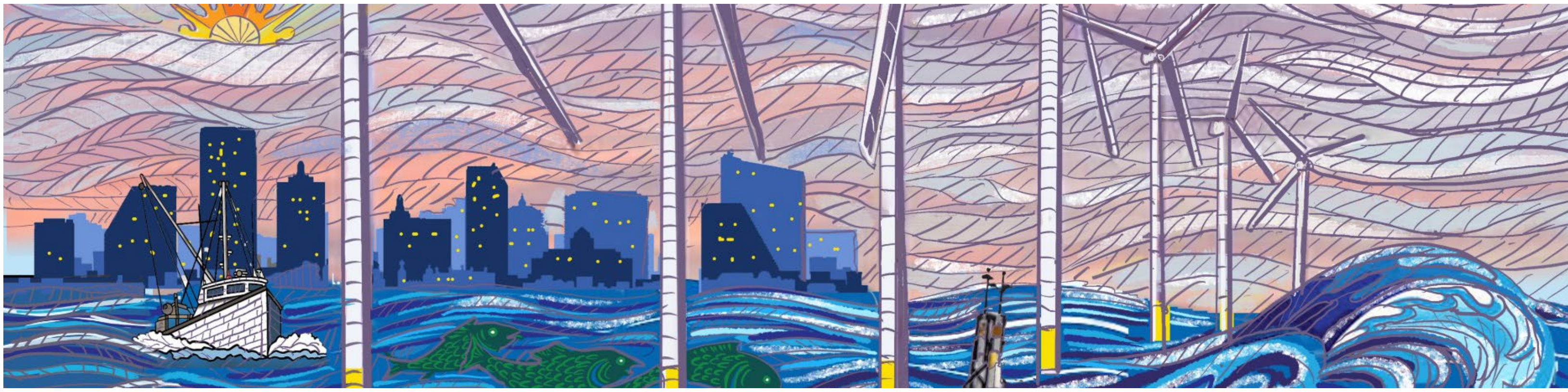


Appendix I-A

Preliminary Area of Potential Effects (PAPE) Memorandum

Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.

EDR

Memorandum

To: Bureau of Ocean Energy Management

From: Patrick Heaton, Dan Forrest, Andrew Roblee, Joseph Kwiatek (EDR)
On behalf of Atlantic Shores Offshore Wind, LLC

Date: September 17, 2021

Reference: Atlantic Shores Offshore Wind
Preliminary Area of Potential Effects (PAPE) to Support Review of the Project under Section 106 of the National Historic Preservation Act

Introduction

Atlantic Shores Offshore Wind, LLC (Atlantic Shores) is a 50/50 joint venture between EDF-RE Offshore Development, LLC (a wholly owned subsidiary of EDF Renewables, Inc. [EDF Renewables]) and Shell New Energies US, LLC (Shell). Atlantic Shores is proposing to develop two offshore wind energy generation projects within the southern portion of Lease Area OCS-A 0499 (the Lease Area), which is more fully described in Volume I (Project Information) of the Construction and Operations Plan (COP) for the Projects (EDR, 2021). Collectively, these two offshore wind energy generation projects are referred to herein as "the Projects".

The Bureau of Ocean Energy Management (BOEM) is the lead federal agency responsible for reviewing the Projects' potential environmental impacts. Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies (in this instance, BOEM) to consider the potential effect of their undertakings (i.e., the review and approval of the Projects) on historic properties. For the purposes of Section 106 review, historic properties are defined to include districts, buildings, structures, objects, or sites that are listed or eligible for listing in the National Register of Historic Places (NRHP) or which have been designated as National Historic Landmarks (NHLs). Specific to the Projects, potentially affected historic properties can include above ground historic properties – including Traditional Cultural Properties (TCPs), terrestrial archaeological resources, and marine archaeological resources.

Per 30 CFR Part 585 (BOEM, 2020), Sections 106 and 110 of the NHPA, as well as the National Environmental Policy Act (NEPA), an effect on a historic property occurs when an activity or action alters, directly or indirectly, any of the characteristics of the historic property that qualified it for inclusion in the NRHP. To facilitate BOEM's Section 106 review, Atlantic Shores has prepared this memorandum to describe and illustrate the Preliminary Area of Potential Effects (or PAPE) for the Projects. The PAPE includes all locations where construction or operation of the proposed Projects has the potential to affect historic properties. The information used to define the PAPE herein is summarized from and references the Project Design Envelope (PDE) described in Volume I of the COP (EDR, 2021). According to BOEM, "A PDE approach is a permitting approach that allows a project proponent the option to submit a reasonable range of design parameters within its permit application, allows a permitting agency to then analyze the maximum impacts that could occur from the range of design parameters, and may result in the approval of a project that is constructed within that range" (BOEM 2018). The PDE approach allows Atlantic Shores design flexibility and an ability to respond to advancements in industry technologies and techniques.

Based on review of BOEM's *Guidelines for Providing Archaeological and Historic Property Information Pursuant to 30 CFR Part 585* (BOEM, 2020), Atlantic Shores has proposed the PAPE to include the following geographic areas:

- the viewshed from which renewable energy structures, whether located offshore or onshore, would be visible, constituting the viewshed portion of the PAPE; and
- the depth and breadth of terrestrial areas potentially impacted by any ground-disturbing activities, constituting the terrestrial archaeological resources portion of the PAPE; and
- the depth and breadth of the seabed potentially impacted by any bottom-disturbing activities, constituting the marine archaeological resources portion of the PAPE; and
- any temporary or permanent construction or staging areas, both onshore and offshore, which may fall into any of the above portions of the PAPE.

Effects are only assessed to historic properties within the PAPE for the Projects. This includes reasonably foreseeable effects caused by the Projects that may occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5(a)(1)). The following sections describe the PAPEs for potential visual effects, physical effects to above ground historic properties and terrestrial archaeological resources, and physical effects to marine archaeological resources.

The final Area of Potential Effects (APE) will be formally determined by BOEM as part of the Section 106 consultation process. The process for identifying and evaluating effects on historic properties resulting from the construction and operation of the Project will involve consultation with BOEM, the New Jersey Historic Preservation Office (NJHPO), Tribal Historic Preservation Officers (THPOs), and other consulting parties with a demonstrated interest in the historic properties (e.g., historic preservation organizations).

Preliminary Area of Potential Effects for Visual Effects

The Projects' potential visual effects on above ground historic properties and TCPs would be a change (resulting from the introduction of offshore or onshore facilities) in the aboveground historic property's visual setting. BOEM defines the APE for visual effects as the geographic areas from which the offshore and onshore Project components could be seen. Onshore components (e.g., onshore substations and O&M facilities) have a viewshed radius of 1 mile around the facility. The onshore interconnection cables will be located underground and therefore there is no visual PAPE associated with those facilities. Offshore components (e.g., wind turbine generators [WTGs] and offshore substations [OSSs]) have a viewshed radius of 40 miles from the Wind Turbine Area (WTA), which represents the maximum envelope within which WTGs and OSSs will be sited. The 1-mile and 40-mile radiuses represent the maximum limit of theoretical visibility for each respective Project component considering the size of the proposed facilities, earth curvature, atmospheric clarity, and human visual acuity. Where sufficient design parameters and/or specific facility locations or options are available, the PAPE for viewshed resources has been refined through GIS viewshed analysis to exclude areas with obstructed views.

Components of the proposed Projects that will be visible and therefore could have a visual effect on aboveground historic properties and TCPs include WTGs, OSSs, onshore substations, and the operations and maintenance (O&M) facility. Anticipated Project design details relevant to evaluating the Projects' visual effects, including the anticipated height and physical description of renewable energy facilities, are summarized in Table 1.

Table 1. Proposed Project Components

<table>
<tr><td rowspan="4">WTGs</td><td colspan="3">Max. number of WTGs (Total: 200)</td><td colspan="2">Project 1: 105-136
Project 2: 64-95</td></tr>
<tr><td colspan="3">WTG layout</td><td colspan="2">Grid layout with ENE/WSW rows and approximately N/S columns, consistent with the predominant flow of marine traffic</td></tr>
<tr><td colspan="3">Max. rotor diameter</td><td colspan="2">918.6 ft (280.0 m)</td></tr>
<tr><td colspan="3">Max. height of WTGs</td><td colspan="2">1,048.8 ft (319.7 m)</td></tr>
<tr><td rowspan="4">OSSs</td><td colspan="3">Max. number of OSSs
(Total: 10 small OSS, 5 medium OSSs, or 4 large OSSs)</td><td colspan="2">Project 1: 5 small, 2 medium, and 2 large OSSs
Project 2: 5 small, 3 medium, and 2 large OSSs</td></tr>
<tr><td colspan="3">OSS Dimensions</td><td colspan="2">Small:
131 ft (40m) x 115 ft (35m) x 98 ft (30m)
Medium:
213 ft (65m) x 148 ft (45m) x 115ft (35m)
Large:
295 ft (90m) x 164 ft (50m) x 131 ft (40m)</td></tr>
<tr><td colspan="3">OSS Layout</td><td colspan="2">Positioned along the same ENE/WSW rows as WTGs</td></tr>
<tr><td colspan="3">Min. distance from shore</td><td colspan="2">Small OSS: 12 mi (19.3 km)
Medium and large OSS: 13.5 mi (21.7 km)</td></tr>
<tr><td rowspan="5">Onshore Facilities: two (one per POI)</td><td>POI</td><td colspan="2">Cardiff Onshore Substation</td><td colspan="2">Larrabee Onshore Substation</td></tr>
<tr><td>Site Alternative</td><td>Preferred Site</td><td>Alternative Site</td><td>Preferred Site</td><td>Alternative Site</td></tr>
<tr><td>Parcel size</td><td>38.5 acres (0.156 km^2)</td><td>23.9 acres (0.097 km^2)</td><td>10.2 acres (0.041 km^2)</td><td>14.6 acres (0.059 km^2)</td></tr>
<tr><td>Substation area:</td><td colspan="4">630 ft (192m) x 921 ft (281m)</td></tr>
<tr><td>Max height</td><td colspan="2">Tallest structures will be lightning masts not to exceed 80 feet (24.4 m)</td><td colspan="2">Tallest structures will be lightning masts not to exceed 125 feet (38.1 m)</td></tr>
<tr><td rowspan="3">O&M Facility</td><td colspan="3">Location</td><td colspan="2">New operations and maintenance (O&M) facility at a site to be determined in Atlantic City, New Jersey</td></tr>
<tr><td colspan="3">Facility size</td><td colspan="2">Anticipated to require an area not exceeding 2 acres (0.008 km^2)</td></tr>
<tr><td colspan="3">O&M Facility height</td><td colspan="2">New building with a total structure height anticipated no to exceed 60 feet (18.3m) in height</td></tr>
</table>

The PAPE for aboveground historic properties and TCPs includes those areas that could have potential visibility of the WTGs, OSS, onshore substations, and O&M facilities, as determined by viewshed analysis. The viewshed analysis is based upon a highly detailed digital surface model (DSM) generated from lidar data that includes the elevations of land features, buildings, trees, and other objects large enough to be resolved by lidar technology. The visual PAPEs for the offshore and onshore components of the Projects include:

- **Offshore Facilities Visual PAPE**: In accordance with BOEM guidance (BOEM 2020), the areas from which renewable energy structures could be visible (or viewshed) was established as the Offshore Facilities PAPE. The lidar-based viewshed analysis of potential WTG and OSS visibility, or Offshore Facilities Visual PAPE, identifies those areas with potential visibility of the Projects located within 40 miles of the WTA (Figure 1). A 40-mile viewshed radius around the proposed WTG and OSS locations was established as the maximum limits of theoretical visibility for the Projects based on the maximum height of Project components, their location, curvature of the earth, atmospheric conditions, and human visual acuity. This includes a small area that is greater than 40 miles from the WTA, which was incorporated for evaluation of potential visual impact to Cape May The Offshore Facilities Visual PAPE includes approximately 288.3 square miles (746.8 sq. km) of the land areas within 40 miles of the WTA. The Projects will only be visible from approximately 12.5 percent of the onshore areas within this 40-mile area because of screening provided by topography, vegetation, buildings, and structures. Potential visibility to the WTGs and OSSs from onshore locations is largely restricted to the ocean shoreline, salt marshes and bays backing the barrier islands, inland along wetlands and waterways connecting to Great Bay and Great Egg Harbor Bay, and areas cleared for agricultural purposes or large residential lots.

- **Onshore Facilities Visual PAPE**: The Onshore Facilities Visual PAPE includes all areas within 1 mile (1.6 km) of the proposed facilities with potential visibility (based on a viewshed analysis) of the Cardiff preferred and alternative substation sites (Figures 2 and 3), Larrabee preferred and alternative substation sites (Figures 4 and 5), and O&M facility (Figure 6). Regarding the O&M facility, as described in Section 5.5 of Volume I of the COP (EDR, 2021), the Applicant is selecting a location for a proposed O&M facility. It is anticipated that this facility will be located on a parcel within the "O&M Facility PAPE for physical effects" depicted on Figure 6. The PAPE for visual effects for the O&M facility includes a 1-mile area around this envelope and it is anticipated that this will be further refined based on the location and design of the O&M facility. A 1-mile area for each of these facilities is considered the maximum limit within which aboveground historic properties could be subject to adverse visual effects given size of the proposed facilities and the screening provided by existing topography, building/structures and/or adjacent developed areas, and vegetation. The PAPE for visual effects for each of these areas will be refined based on viewshed analysis pending further siting and design details for these facilities.

Atlantic Shores recognizes that Traditional Cultural Properties (TCPs) associated with Native American communities may be present within the PAPEs, and such properties would potentially be sensitive to visual impacts from Project construction, operations and maintenance activities, or decommissioning. Although Atlantic Shores has not identified TCPs within the Offshore Facilities Visual PAPE, we recognize that government-to-government consultations between BOEM and tribes under Section 106 of the NHPA may be necessary to identify such properties and to inform BOEM's consideration of potential visual effects to any extant TCPs.

Preliminary Area of Potential Effects for Physical Effects to Above Ground Historic Properties and Terrestrial Archaeological Resources

This section describes onshore Project components that have the potential to result in physical effects to above ground historic properties and/or require ground disturbance that has the potential to impact terrestrial archaeological resources. To support the assessment of potential physical effects to historic properties and terrestrial archaeological resources within the Onshore Project Area Atlantic Shores established a PAPE for physical effects to historic properties and terrestrial archaeological which incorporates all areas of onshore ground disturbing Project activity, or other construction activities that could result in demolition or alteration of existing buildings or other built features.

The Projects overall PAPE for physical effects consists of three distinct PAPEs associated with the Project's proposed Onshore Interconnection Cable Routes and the O&M Facility. The PAPEs for physical effects for the Cardiff and Larrabee onshore interconnection routes include the export cable landfall locations, the export cable routes, the preferred and alternative substation locations, and the points of interconnect (POI). These PAPEs are further described below based on the current PDE and are anticipated to be refined as design of the Projects progresses:

- **Cardiff Physical Effects PAPE:** The Cardiff Physical Effects PAPE includes an approximately 12-mi (19-km) 20-foot-wide (ft) (6-meter [m]) corridor within which the underground, onshore interconnection cable will be installed. This corridor will connect the 2.03-ac (0.82-ha) Atlantic Landfall Location to a 21.6-acre (ac) (8.7-hectare [ha]) preferred or 23.9-ac (9.7-ha) alternative onshore substation locations, and the Cardiff POI (Figure 7). Pending further design, the Cardiff Physical Effects PAPE sections associated with the onshore substation facilities would be refined.

Ground disturbance at the export cable Atlantic Landfall Site will include the excavation of a Horizontal Directional Drilling (HDD) exit pit and installation of onshore transition vaults, within which the offshore export cable will be split into separate onshore cables. The transition vaults within the exit pit measure approximately 14.8 ft (4.5 m) deep with 2.0-ft (0.61-m) thick walls, resulting in a maximum vertical depth of disturbance of 16.8 ft (5.12 m) at the landfall location (Table 2).

Installation of the onshore interconnection cables will typically be accomplished via open trenching to a depth of up to 11.5 ft (3.5 m), which is the maximum vertical effect along most of the onshore interconnection cable corridor. Some specialty trenchless techniques (i.e., HDD, pipe jacking, and/or jack-and-bore) that avoid surface disturbance will be used to avoid impacts to busy roadways, wetlands, waterbodies, or existing developments or features and could result in disturbance up to 30 ft (9m) below ground surface (Table 2).

Construction activities resulting in ground disturbance at the preferred and alternative substation locations may include land and tree clearing, grading, fencing, trenching and excavation, landscaping/planting, and installation of equipment foundations. The maximum vertical effect of these activities is anticipated to be approximately 60 ft (18.3 m) in depth. The maximum horizontal and vertical effects of these activities are the Cardiff Physical Effects PAPE.

- **Larrabee Physical Effects PAPE:** The Larrabee Physical Effects PAPE includes an approximately 12-mi (19-km) 20-ft-wide (6-m) corridor within which the underground, onshore interconnection cable will be sited. The corridor extends from the 3.54-ac (1.43-ha) Monmouth Landfall Site to a 10.2-ac (4.1-ha) preferred or 14.6-ac (5.9-ha) alternative onshore substation locations, and the Larrabee POI (Figure 8). Pending further design, the Larrabee PAPE sections associated with the onshore substation facilities would be refined.

  The descriptions of ground disturbance and the maximum vertical effects for the landfall site, onshore interconnection cables, and the preferred and alternative substation locations from the Cardiff Physical Effects PAPE, above, apply to the corresponding components in the Larrabee Physical Effects PAPE. The maximum horizontal and vertical effects of these activities are the Larrabee Physical Effects PAPE.

- **O&M Facility PAPE**: Atlantic Shores is selecting a location for a proposed O&M facility. It is anticipated that this facility will be located on a parcel within the “O&M Facility PAPE for physical effects” depicted on Figure 6. Atlantic Shores plans to purchase and develop a parcel within this envelope. Anticipated construction activities that may result in ground disturbance include a new building and associated parking lot, repairs to any existing bulkheads/docks, installation of new dock facilities, and limited marine dredging. Pending selection of an appropriate site, the proposed O&M facility is not anticipated to require an area greater than 2 acres in size. The potential depth of ground disturbance needed to construct the O&M facility will be refined as part of Project design but may extend up to 60 feet (18.3m) in depth if pilings or comparable features are required.

The onshore interconnection facilities and the O&M facility are depicted on Figures 7 and 8, tabulated in Table 2, and summarized below.

Table 2. Summary of PAPEs for Physical Effects

Project Component	Maximum Horizontal Effect	Maximum Vertical Effect
Cardiff Facilities		
Atlantic Landfall Site	2.03 acres (0.008 km^2)	16.8 ft (5.12m)
Interconnection Cable Corridor (Total Length 12-mi [19-km])	20 ft (6 m)	Open Trenching 11.5 ft (3.5 m) Specialty Installation 30 ft (9 m)
Preferred Substation	21.6 acres (0.087 km^2)′	60 ft (18.3 m)
Alternative Substation	23.9 acres (0.97 km^2)	60 ft (18.3 m)
Larrabee Facilities		
Monmouth Landfall Site	3.54 acres (0.014 km^2)	16.8 ft (5.12m)
Interconnection Cable Corridor (Total Length 12-mi [19-km])	20 ft (6 m)	Open Trenching 11.5 ft (3.5 m) Specialty Installation 30 ft (9 m)
Preferred Substation	10.2 (0.041 km^2)	60 ft (18.3 m)
Alternative Substation	14.6 (0.059 km^2)	60 ft (18.3 m)
O&M Facility	1.22 acres (0.005 km^2)	Up to 60 ft (18.3m) of vertical disturbance if pilings are similar construction methods are required. The vertical PAPE for the O&M facility will be refined pending further design details.

Marine Physical Effects PAPE

The Marine Physical Effects PAPE is defined as the combination of the approximately 102,139-acre (413.3 km^2) WTA and both proposed ECCs (including the 5,362-acre [21.7 km^2] Atlantic ECC and the 26,509-acre [95.1 km^2] Monmouth ECC) (Figure 9). Construction activities are expected to affect a small percentage of the seabed encompassed by the Marine Physical Effects PAPE, which includes the locations of the following specific facilities:

- WTG foundations: the PAPE represents the maximum disturbance associated with the PDE for WTG foundations. The PDE for WTG foundations includes piled, suction bucket, and gravity foundations, as described in Section 4.2 of COP Volume I (EDR, 2021).
- OSS foundations: the PAPE represents the maximum disturbance associated with the PDE for OSS foundations. The PDE for OSS foundations includes piled, suction bucket, and gravity foundations, as described in Section 4.4 of COP Volume I (EDR, 2021).
- Offshore cables: the PAPE represents the maximum disturbance associated with the PDE for offshore cables. The PDE includes export, inter-array, and interlink cables, as described in Section 4.5 of COP Volume I (EDR, 2021).
- Meteorological (Met) towers and buoys: the PAPE represents the maximum disturbance associated with the PDE for met towers and buoys, as described in Section 4.6 of COP Volume I (EDR, 2021).
- Vessel anchoring and jack-up vessels: As described in Section 4.10 of COP Volume I, vessel anchoring and jack-up vessels are minimally intrusive to the seabed and the depth of disturbance for these activities range from 3.3 to 16.4 ft (1 to 5 m). These activities are anticipated to occur within the rows and corridors defined for installation of the WTGs and cables (as described in Section 4.2 and 4.5, respectively, in the COP Volume I).

The Marine Physical Effects PAPE includes all areas where these activities could occur. The components of the Projects that have the potential to cause permanent or temporary disturbance to the seabed are described in Section 4.11 of Volume I of the COP (EDR, 2021) and summarized in Table 3.

Table 3. Summary of Seabed Disturbance within the Marine Physical Effects PAPE

Installation Activity	Maximum Area of Seafloor Disturbance			Maximum Depth of Potential Seafloor Disturbance
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
WTG Foundation Installation	0.80 mi^2 (2.08 km^2)	0.55 mi^2	1.14 mi^2	262.5 ft (80m) for monopile foundations without scour protection (see Table 4.2-1 in COP Volume I).
WTG Installation and Commissioning	N/A (Included in WTG foundation footprint)	0.11 mi^2	0.11 mi^2	Depth of disturbance for jack up vessels and anchoring range from 3.3 to 16.4 ft (1 to 5 m).
OSS Foundation Installation	0.04 mi^2 (0.11 km^2)	0.05 mi^2	0.08 mi^2	229.7 ft (70m) for piled jacket foundations (see Table 4.4-2 in COP Volume I).
Export Cable Installation				The target burial depth for the export cables will be 5 to 6.6 ft (1.5 to 2 m). Cable installation is anticipated to require a trench with a maximum depth of approximately 10 ft (3 m) and a maximum width of up to approximately 3.3 ft (1 m).
Atlantic Landfall Site to OSS	0.10 mi^2 (0.26 km^2)	1.10 mi^2	1.20 mi^2 (3.11 km^2)	
Monmouth Landfall Site to OSS	0.36 mi^2 (0.93 km^2)	2.52 mi^2	2.87 mi^2 (7.44 km^2)	
Inter-Array Cable Installation (Including Cable Protection)	0.44 mi^2 (1.14 km^2)	2.92 mi^2	3.36 mi^2 (8.71 km^2)	The target burial depth of the inter-array and interlink cables will be 5 to 6.6 ft (1.5 to 2 m). Cable installation is anticipated to create a trench with a maximum depth of approximately 10 ft (3 m) and a maximum width of up to approximately 3.3 ft (1 m).
Interlink Cable Installation (Including Cable Protection)	0.03 mi2 (0.08 km2)	0.25 mi2	0.28 mi2	Installation of 37.3 mi (60.0 km) of interlink cables. The target burial depth of the inter-array and interlink cables will be 5 to 6.6 ft (1.5 to 2 m). Cable installation is anticipated to create a trench with a maximum depth of approximately 10 ft (3 m) and a maximum width of up to approximately 3.3 ft (1 m).
Met Tower Installation	N/A	N/A	N/A	There is sufficient conservatism in the total estimates of permanent and temporary seafloor disturbance from WTG foundation installation to account

Installation Activity	Maximum Area of Seafloor Disturbance			Maximum Depth of Potential Seafloor Disturbance
	Permanent Disturbance	Additional Temporary Disturbance	Total[a]	
(Including Scour Protection)				for the impacts from the met tower's installation.
Metocean Buoy Installation	N/A	0.02 mi2	0.02 mi2	The maximum area of temporary seafloor disturbance from each buoy's anchor (including anchor sweep) is anticipated to be approximately 0.005 mi^2 (0.013 km^2), with a maximum depth of disturbance of 3.3 ft (1.0 m).
Max. Total Seabed Disturbance in the WTA	1.40 mi^2 (3.62 km^2)	4.43 mi^2	5.79 mi^2	The depth of seabed disturbance for project components is variable but the maximum depths of anticipated disturbance for components is summarized in this table.
Max. Total Seabed Disturbance in the ECCs	0.38 mi^2 (0.98 km^2)	3.09 mi^2	3.29 mi^2	The depth of seabed disturbance for project components is variable but the maximum depths of anticipated disturbance for components is summarized in this table.

Note:

a) For WTG, OSS, and met tower foundations, the foundation type with the maximum footprint is not the same as the type with the maximum area of additional seabed disturbance. Thus, the sum of the maximum area of permanent disturbance and additional temporary disturbance does not equal the total seabed disturbance.

Anticipated Refinement of the PAPE

As noted previously herein, the PAPE includes all locations where construction or operation of the proposed Projects has the potential to affect historic properties. The information used to define the PAPE herein is summarized from and references the PDE described in Volume I of the COP (EDR, 2021). According to BOEM, "A PDE approach is a permitting approach that allows a project proponent the option to submit a reasonable range of design parameters within its permit application, allows a permitting agency to then analyze the maximum impacts that could occur from the range of design parameters, and may result in the approval of a project that is constructed within that range" (BOEM 2018). The PDE approach allows Atlantic Shores design flexibility and an ability to respond to advancements in industry technologies and techniques.

The final APE will be formally determined by BOEM as part of the Section 106 consultation process. The process for identifying and evaluating effects on historic properties resulting from the construction and operation of the Project will involve consultation with BOEM, the NJHPO, THPOs, and other consulting parties with a demonstrated interest in the historic properties (e.g., historic preservation organizations).

Attachments:

Figure 1. Offshore Facilities Visual PAPE
Figure 2. Onshore Facilities Visual PAPE - Cardiff Preferred Substation
Figure 3. Onshore Facilities Visual PAPE - Cardiff Alternative Substation
Figure 4. Onshore Facilities Visual PAPE - Larrabee Preferred Substation
Figure 5. Onshore Facilities Visual PAPE - Larrabee Alternative Substation
Figure 6. O&M Facility PAPE
Figure 7. Cardiff Physical Effects PAPE
Figure 8. Larrabee Physical Effects PAPE
Figure 9. Marine Physical Effects PAPE

References Cites:

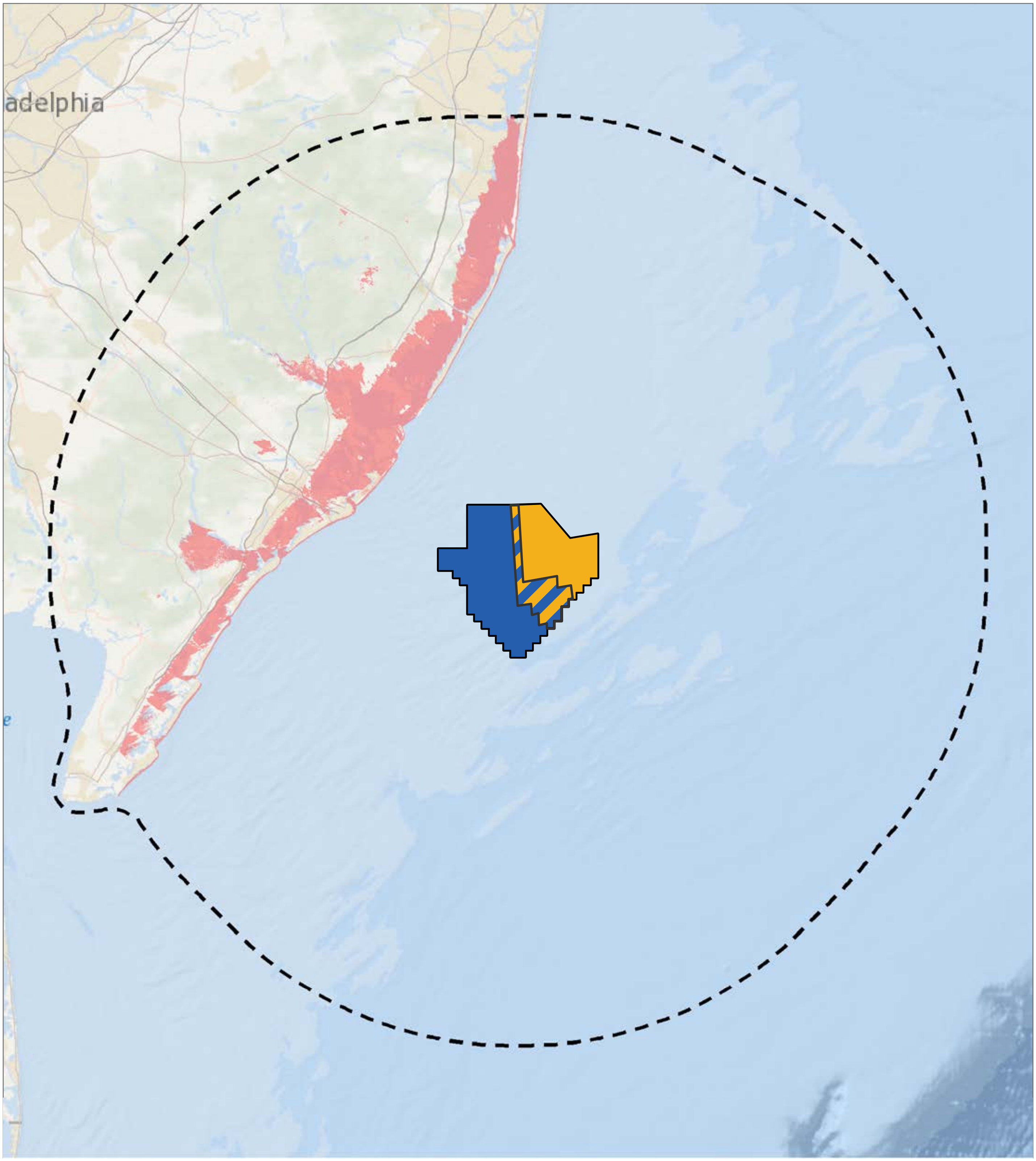
Bureau of Ocean Energy Management (BOEM). 2020. *Guidelines for Providing Archaeological and Historical Property Information Pursuant to 30 CFR Part 585*. United States Department of the Interior. Washington, D.C.

Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. (EDR). 2021. *Construction and Operations Plan for Atlantic Shores Offshore Wind, Volume I (Draft for BOEM review)*. Prepared for Atlantic Shores Offshore Wind, LLC. August 2021. Syracuse, NY.

New Jersey State Historic Preservation Office (NJHPO). 2008a. *Standards for Architectural Survey Reports*. New Jersey Administrative Code. New Jersey Department of Environmental Protection. Trenton, NJ. Effective February 2, 2008. Available at https://www.nj.gov/dep/hpo/2protection/register_historic_places09_29_08.pdf. Accessed September 2020.

NJHPO. 2008b. Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources.

Figure 1. Offshore Facilities Visual PAPE



Altanitc Shores Offshore Wind

Lease Area OCS-A 0499

Offshore New Jersey

- 40-Mile Viewshed Radius
- Project 1 Area
- Project 2 Area
- Overlap Area (Project 1 or 2)
- Preliminary Area of Potential Effects (PAPE)
- Wind Turbine Area (WTA)

0 2.5 5 10

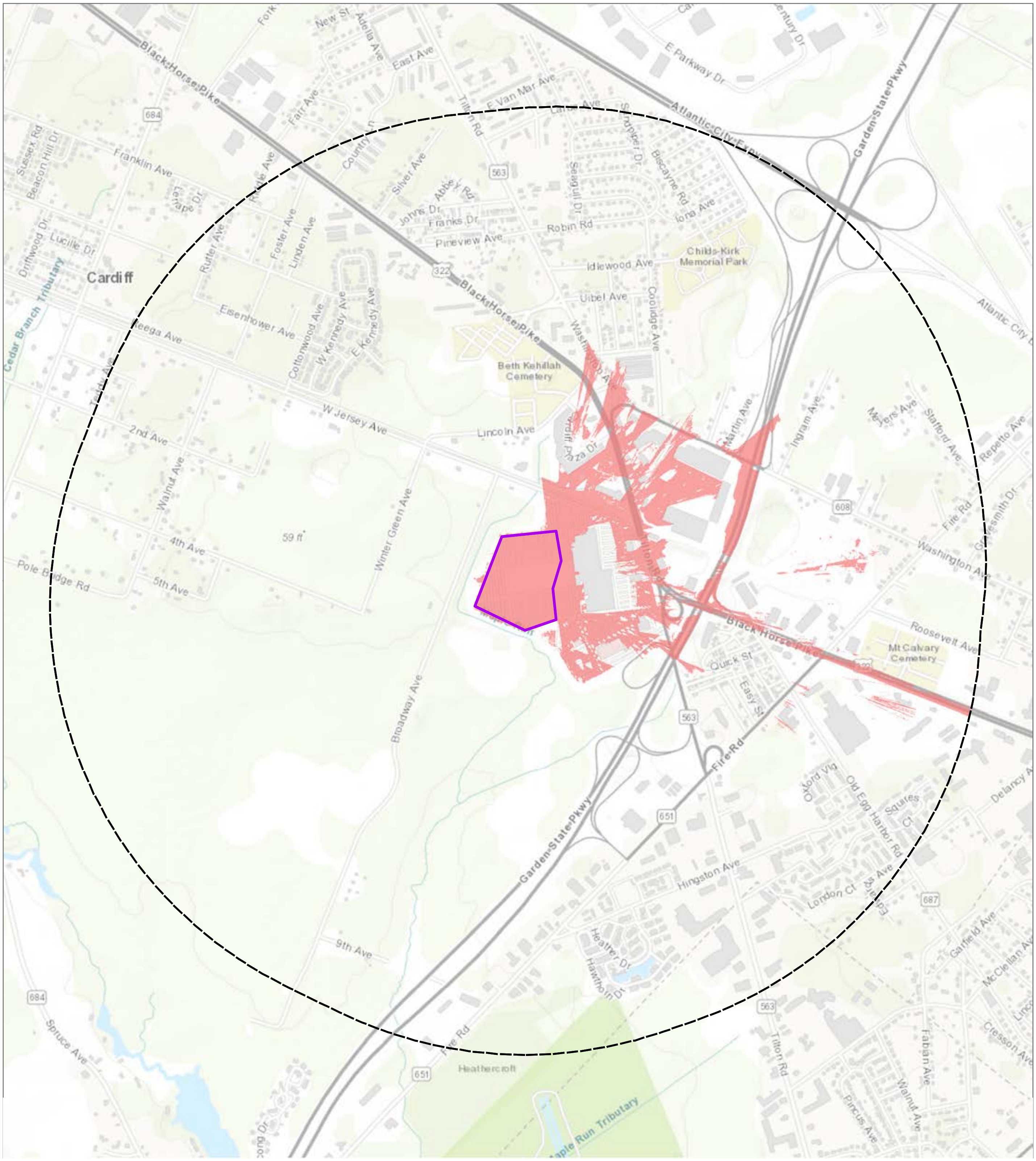
Miles

EDR

Prepared September 17, 2021

Basemap: Esri ArcGIS Online "World Ocean Base" map service.

Figure 2. Onshore Facilities Visual PAPE - Cardiff Preferred Substation



Atlantic Shores Offshore Wind

Egg Harbor Township, Atlantic County, New Jersey

1-Mile Viewshed Radius

Proposed Substation Site

Onshore Facilities Visual PAPE - Cardiff Preferred Substation

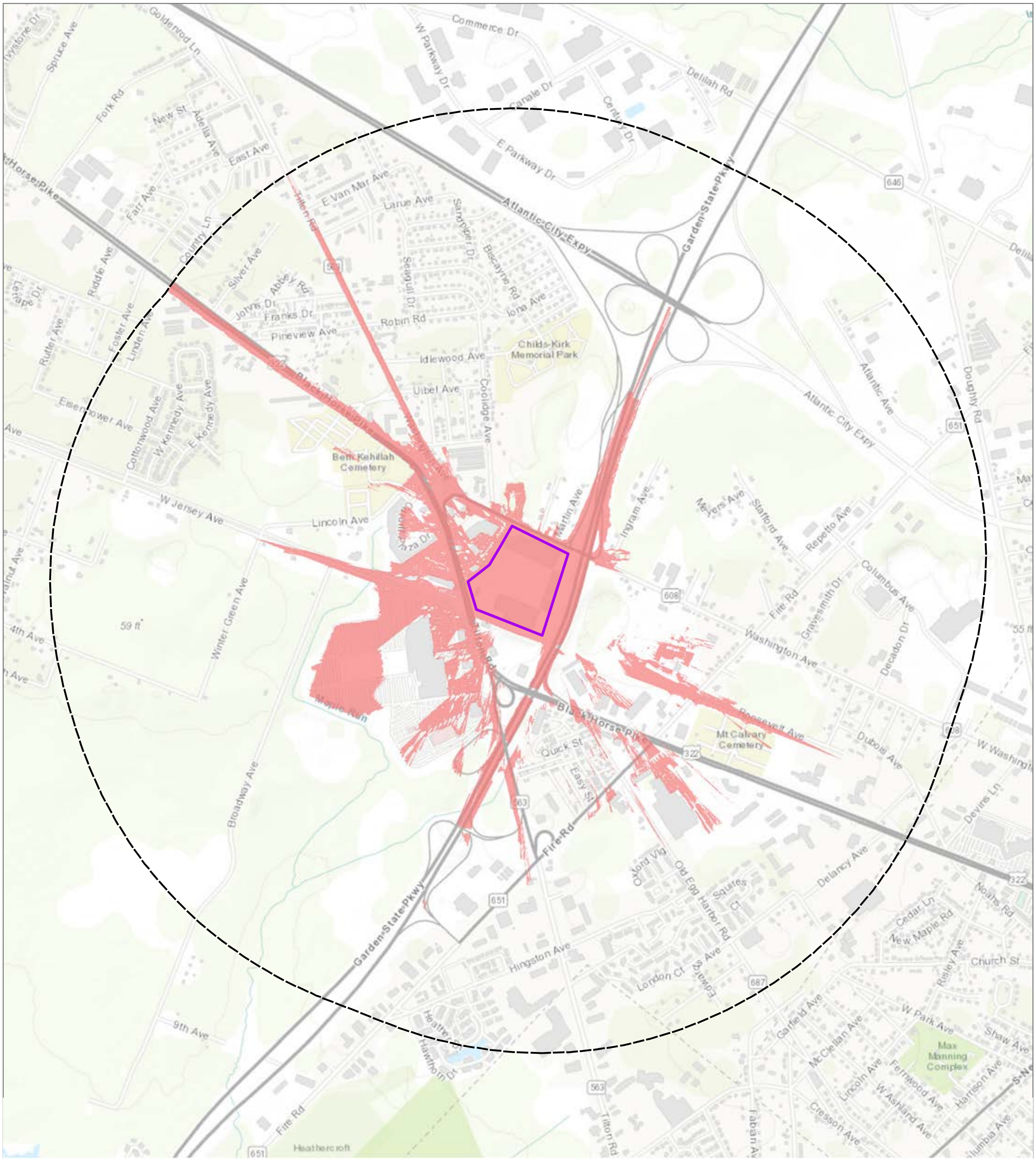
0 500 1,000 2,000
Feet

Prepared September 16, 2021

Basemap: Esri ArcGIS Online "World Topographic Map" map service.

EDR

Figure 3. Onshore Facilities Visual PAPE - Cardiff Alternative Substation



Atlantic Shores Offshore Wind

Egg Harbor Township, Atlantic County, New Jersey

1-Mile Viewshed Radius

Proposed Substation Site

Onshore Facilities Visual PAPE - Cardiff Alternative Substation

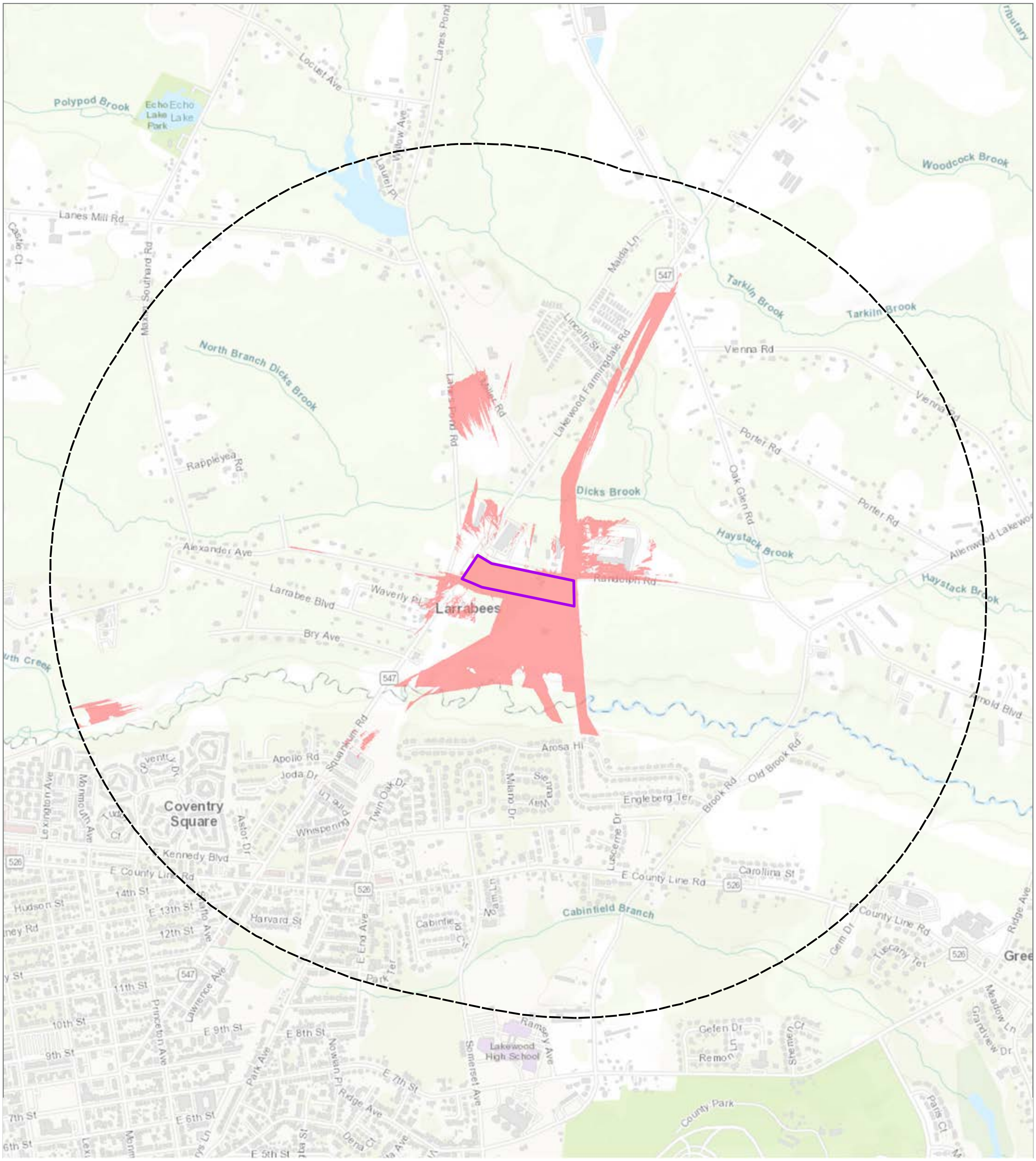
0 500 1,000 2,000
Feet

EDR

Prepared September 16, 2021

Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 4. Onshore Facilities Visual PAPE - Larrabee Preferred Substation



Atlantic Shores Offshore Wind

Howell Township, Atlantic County, New Jersey

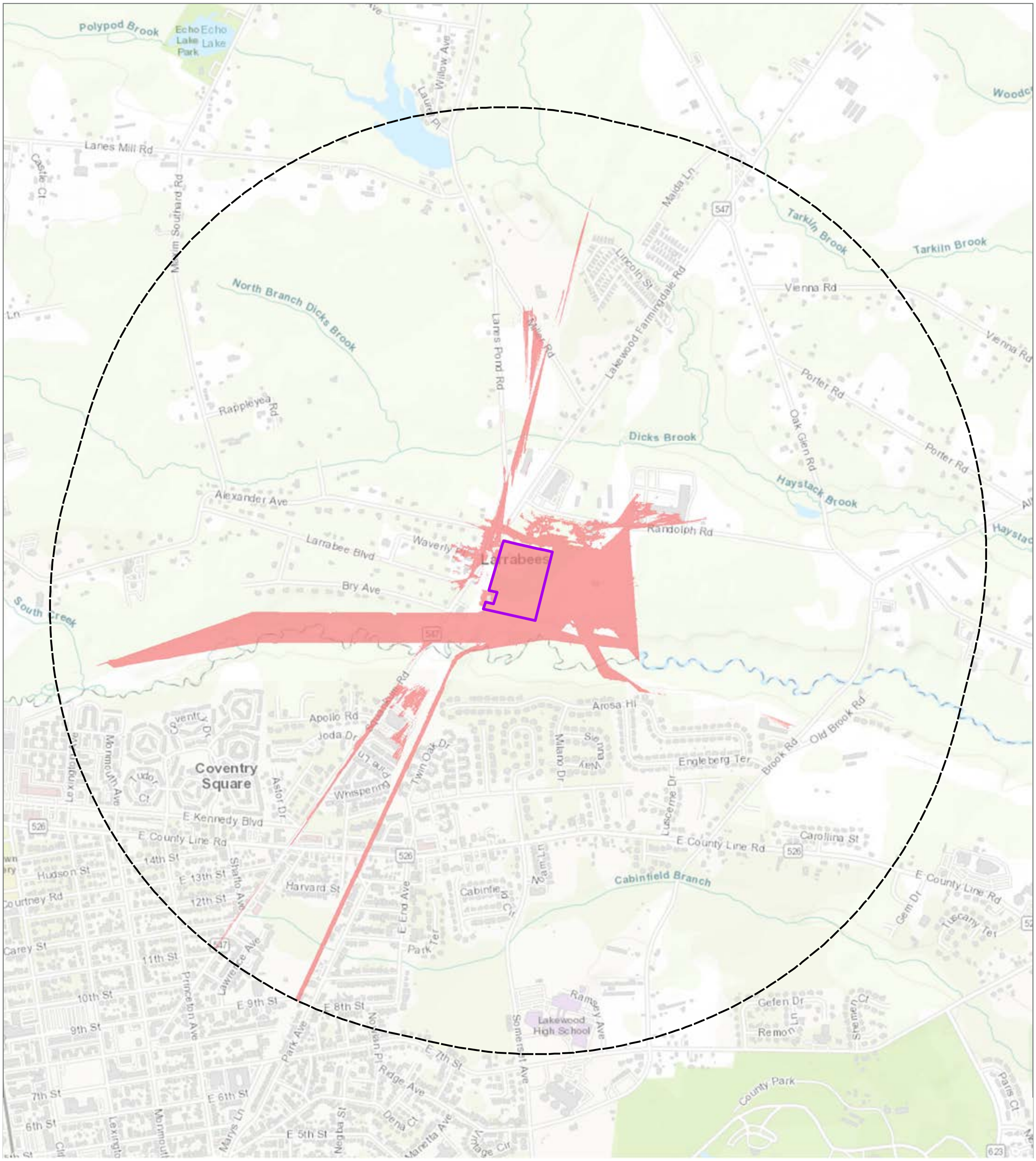
- 1-Mile Viewshed Radius
- Proposed Substation
- Onshore Facilities Visual PAPE - Larrabee Preferred Substation

0 500 1,000 2,000
Feet

EDR

Prepared September 16, 2021
Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 5. Onshore Facilities Visual PAPE - Larrabee Alternative Substation



Atlantic Shores Offshore Wind

Howell Township, Atlantic County, New Jersey

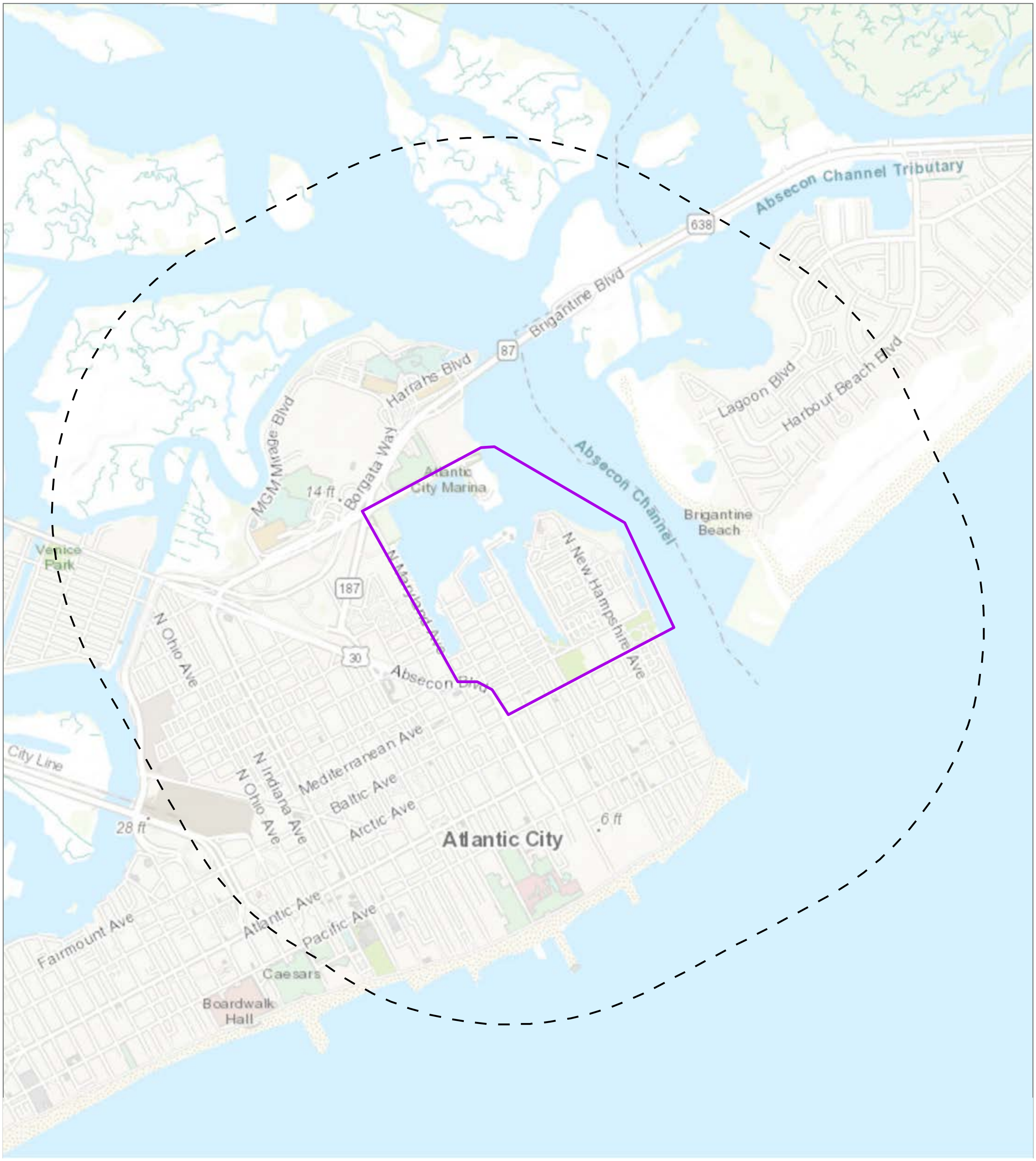
- 1-Mile Viewshed Radius
- Proposed Substation Site
- Onshore Facilities Visual PAPE - Larrabee Alternative Substation

0 500 1,000 2,000
Feet

EDR

Prepared September 16, 2021
Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 6. O&M Facility PAPE



Atlantic Shores Offshore Wind

Atlantic City, Atlantic County, New Jersey

O&M Facility PAPE for Physical Effects

O&M Facility PAPE for Visual effects

0 500 1,000 2,000

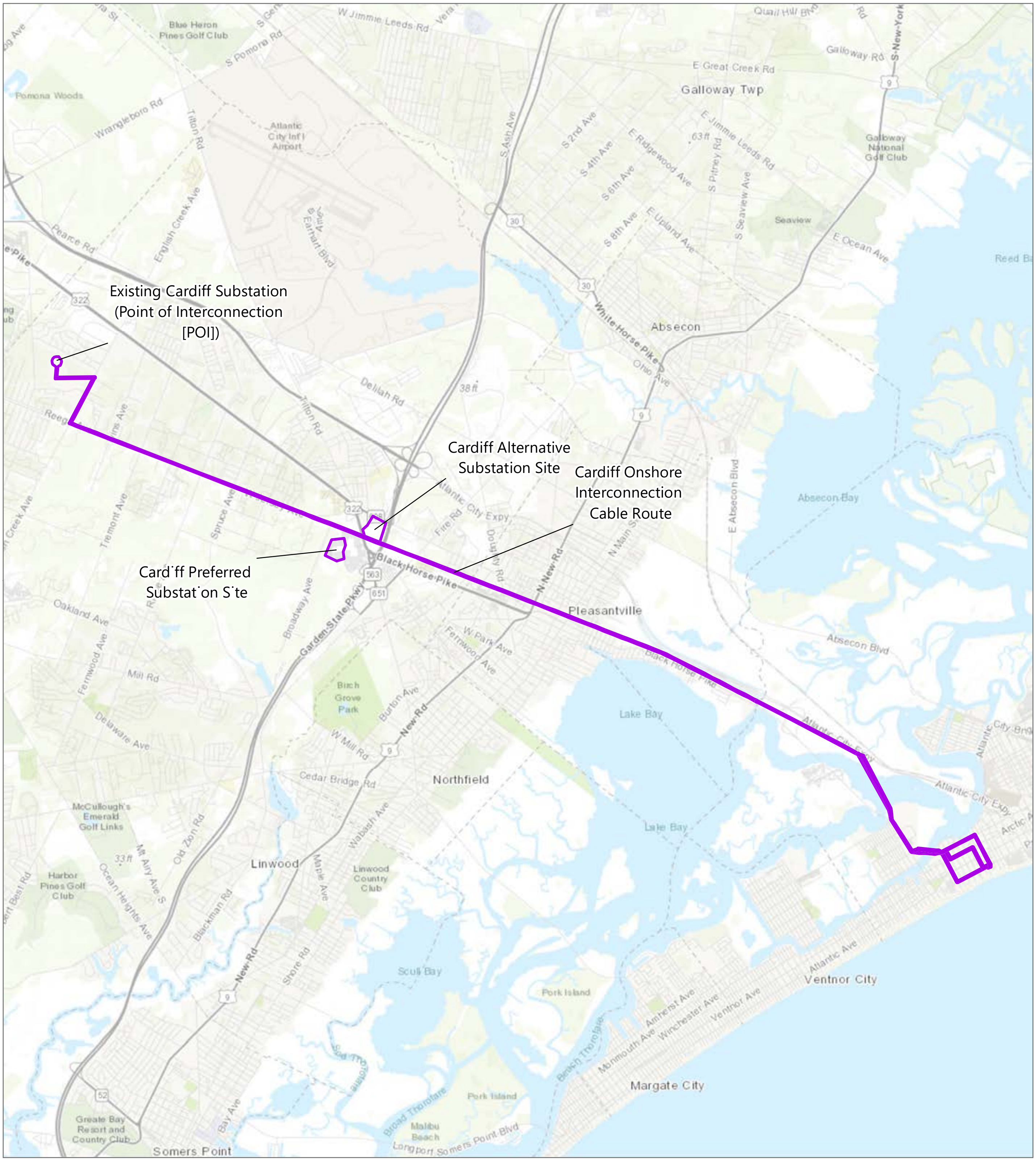
Feet

EDR

Prepared September 17, 2021

Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 7. Cardiff Physical Effects PAPE



Atlantic Shores Offshore Wind

Atlantic County, New Jersey

Cardiff Physical Effects PAPE

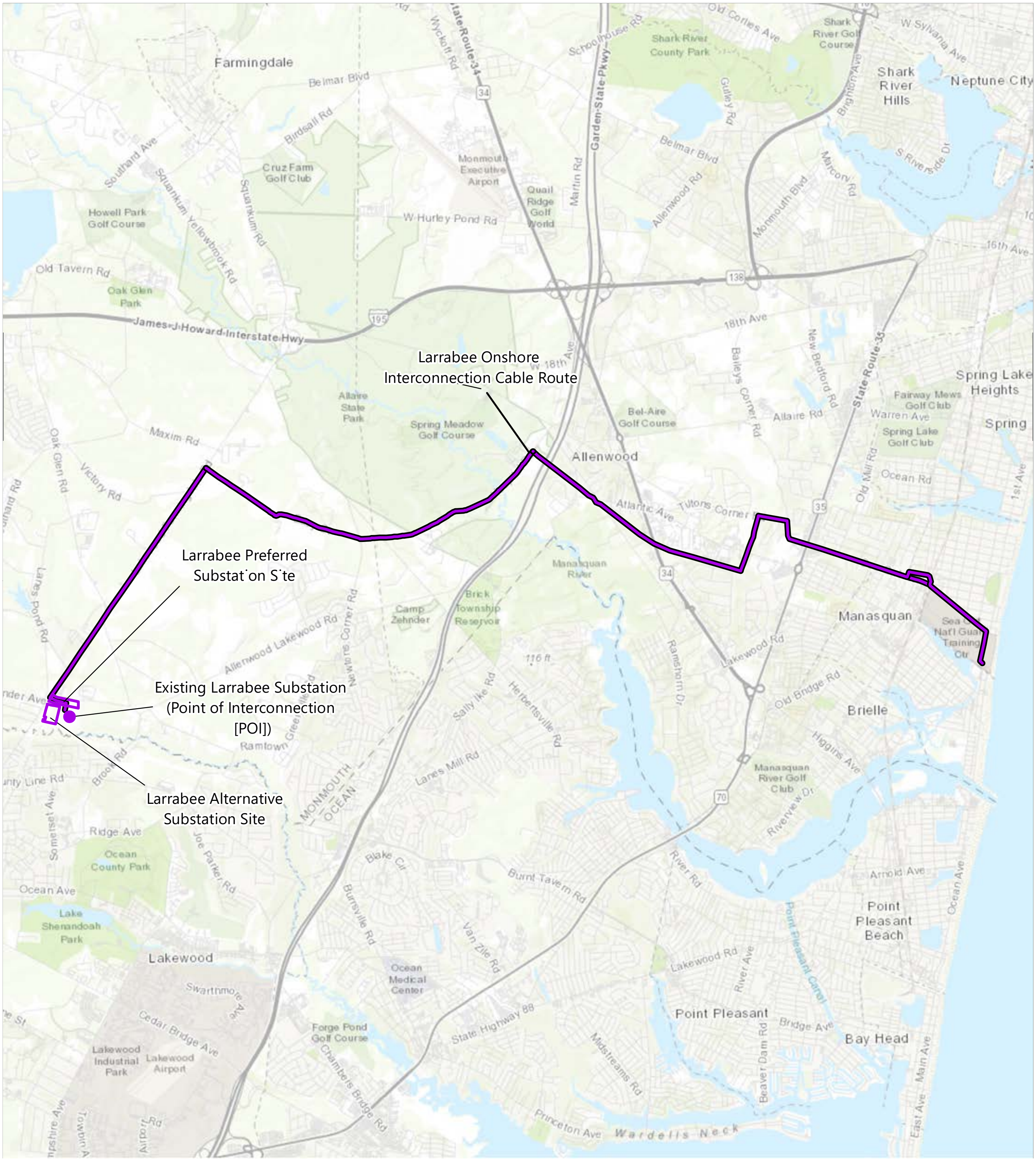
0 0.5 1 2
Miles

EDR

Prepared September 16, 2021

Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 8. Larrabee Physical Effects PAPE



Atlantic Shores Offshore Wind

Monmouth County, New Jersey

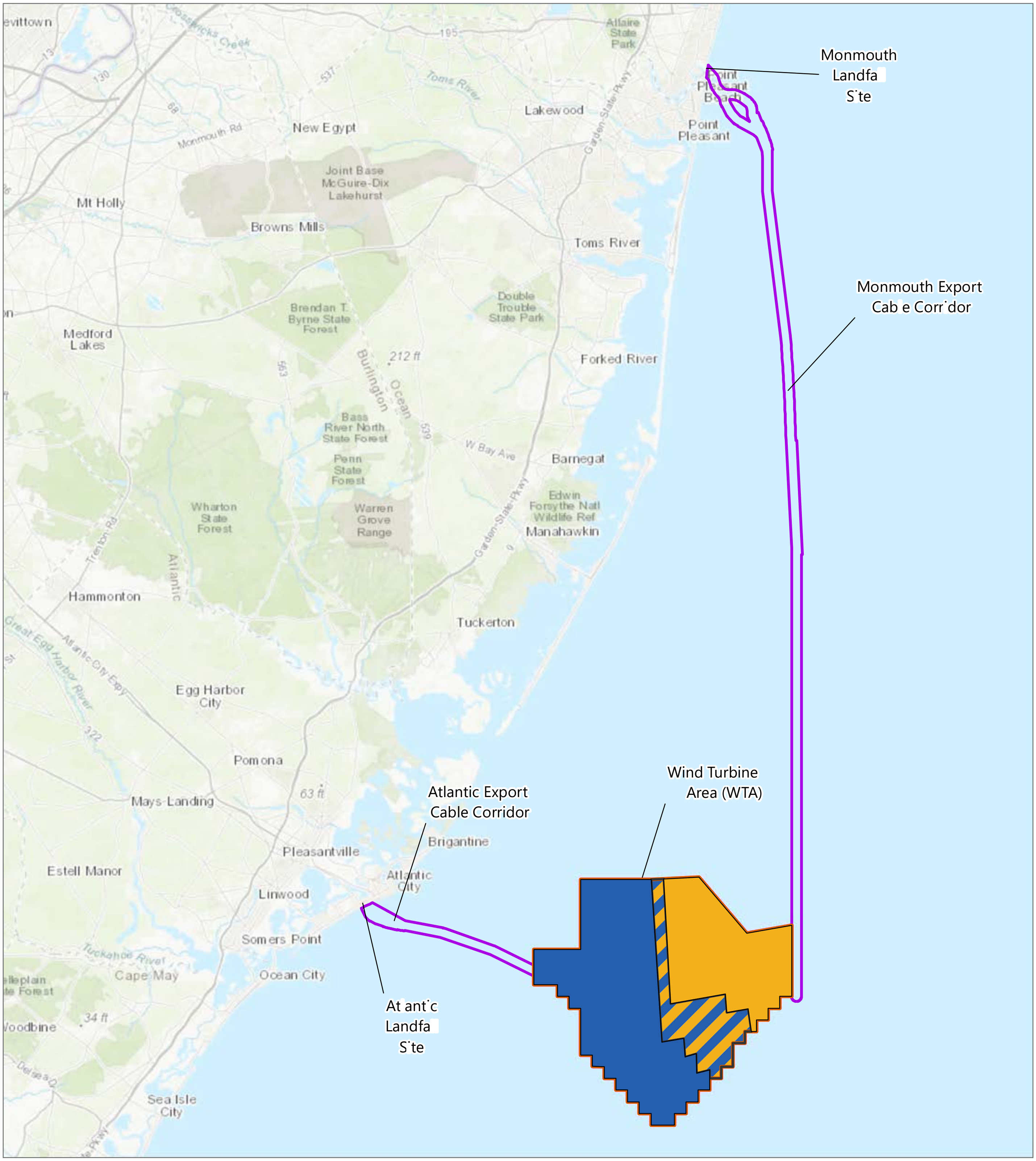
Larrabee Physical Effects PAPE

0 0.5 1 2
Miles

EDR

Prepared September 16, 2021
Basemap: Esri ArcGIS Online "World Topographic Map" map service.

Figure 9. Marine Physical Effects PAPE



Atlantic Shores Offshore Wind

Lease Area OCS-A 0499

Offshore New Jersey

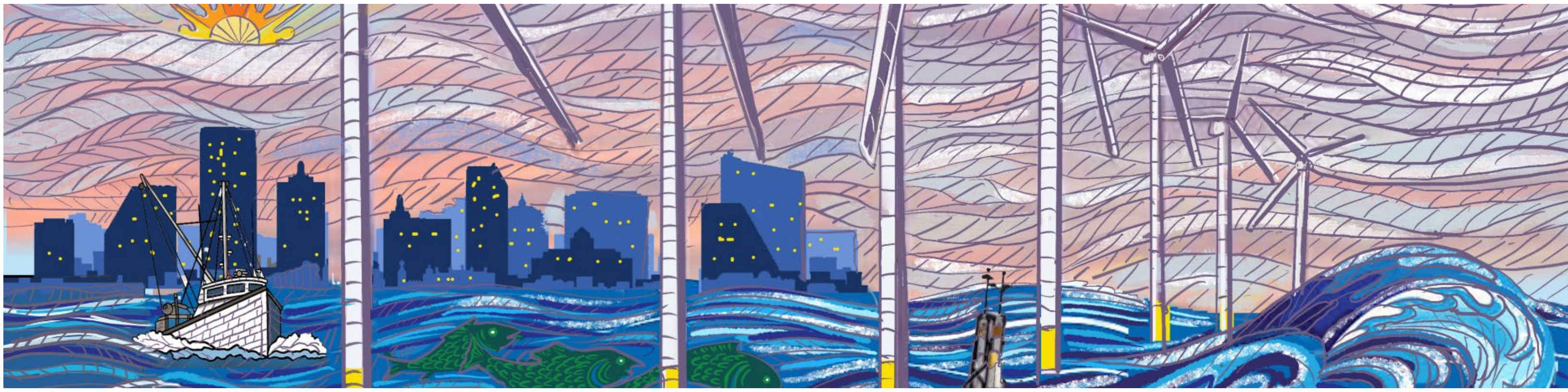
- Project 1 Area
- Project 2 Area
- Overlap Area (Project 1 or 2)
- Marine Physical Effects PAPE

0 2.5 5 10 Miles

EDR

Prepared September 17, 2021

Basemap: Esri ArcGIS Online "World Topographic Map" map service.



Appendix I-B

Stakeholder Engagement

Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.

Meetings with Agencies, Tribes, and Municipalities

Table A-1 provides a list of meetings that Atlantic Shores has held with federal, state, and local agencies, federal and state-recognized tribes, and municipalities as of January 2021. Atlantic Shores will continue to consult with agencies, municipalities, and tribes as the Project advances.

Table A-1 Coordination with Agencies, Tribes, and Municipalities

Meeting Date	Entity	Purpose/Topic
2019		
March 2019	Bureau of Ocean Energy Management (BOEM)	Introductory meeting
March 2019	National Marine Fisheries Service (NMFS)	Introductory meeting
April 2019	New Jersey General Assembly	Introductory meetings
April 2019	U.S. Congress	Introductory meeting
April 2019	New Jersey State Senate	Introductory meeting
April 2019	Atlantic County	Introductory meeting
April 2019	New Jersey Senator Chris Brown	Introductory meeting
April 2019	New Jersey General Assembly	Introductory meeting
May 2019	Ocean County Freeholder Director	Introductory meeting
May 2019	New Jersey General Assembly	Further introductory meetings
May 2019	Ocean County Administrator	Introductory meeting
May 2019	Ocean County Engineer	Introductory meeting
May 2019	Director Ocean County Business Development & Tourism Ocean County Tourism Advisory Council	Introductory meeting
May 2019	Ocean County Director, Depart. of Planning/Solid Waste Management	Introductory meeting
May 2019	Atlantic City Mayor	Introductory meeting
May 2019	Atlantic City Council	Introductory meeting
May 2019	Department of Defense – Navy and Marine Corps	Introductory meeting
May 2019	New Jersey Senate Republican Office	Introductory meeting
July 2019	New Jersey Governor's Office	Introductory meeting and status updates
July 2019	New Jersey Division of Rate Counsel	Introductory meeting
July 2019	New Jersey Department of Environmental Protection (NJDEP)	Introductory meeting
July 2019	New Jersey Division of Rate Counsel	Introductory meeting and status updates

Table A-1 Coordination with Agencies, Tribes, and Municipalities (Continued)

Meeting Date	Entity	Purpose/Topic
2019		
September 2019	New Jersey Board of Public Utilities (NJBPU)	Introductory meeting and status updates
October 2019	U.S. Army Corps of Engineers (USACE), Philadelphia District, Regulatory Branch	Introduction to FLIDAR meeting
October 2019	New Jersey State Senate	Introductory meeting and status updates
October 2019	NJBPU	Status update
November 2019	League of Municipalities	Introductory meeting and status updates
November 2019	New Jersey Governor's Office	League of Conservation Voters reception
December 2019	BOEM	Schedule of activities
December 2019	BOEM	Geophysical pre-survey meeting
December 2019	NJBPU	Meeting with General Counsel
December 2019	Federal Permitting Improvement Steering Committee	Introductory meeting
December 2019	New Jersey Governor's Office	Status updates
December 2019	NJDEP	Points of interconnection (POIs) and rights-of-way (ROWs)
2020		
January to November 2020	BOEM	24 bi-weekly status update meetings
January 2020	NJDEP	POIs
February 2020	Casino Reinvestment Development Authority	Introductory meeting and POIs
February 2020	Tribal Representatives[a]	Geophysical pre-survey meeting
February 2020	Tribal Representatives[a]	Geophysical pre-survey meeting
March 1 2020	Ocean County	Introductory meeting
March 1 2020	New York Department of Environmental Conservation	Export cable routes
March 1 2020	NJBPU	Status updates
March 1 2020	NJDEP	Schedule coordination
March 1 2020	U.S. Coast Guard (USCG)	Layout of wind turbine generators
April 2020	BOEM	Lease development strategy
April 2020	BOEM and NMFS	Benthic survey plan
April 2020	New York Department of Public Service	Introduction and POIs/ROWs

Table A-1 Coordination with Agencies, Tribes, and Municipalities (Continued)

Meeting Date	Entity	Purpose/Topic
2020		
April 2020	New Jersey Department of Labor	Local labor
May 2020	Department of Treasury	Introductory meeting
May 2020	BOEM and U.S. Fish and Wildlife Service (USFWS)	Avian surveys including for red knots and piping plover
May 2020	BOEM	Visual assessment protocol
May 2020	BOEM and NMFS	Marine mammals and vessel speed restrictions
May 2020	BOEM and USCG	Layout, navigation safety, and search and rescue (SAR)
May 2020	U.S. Congress	Multiple introductory meetings
May 2020	Tribal Representatives[a]	Geotechnical pre-survey meeting
June to November 2020	USCG	7 bi-weekly status update meetings
June 2020	New Jersey Governor's Office – Legal Counsel	Status updates
June 2020	BOEM and NMFS	Site Assessment Plan
June 2020	Monmouth County	Discussion with Assemblymen
June 2020	USCG SAR Pilots	Search and rescue
July 2020	Tribal Representatives[b]	Geotechnical culture cores
July 2020	U.S. Congress	Subcommittee on Select Revenue Measures Subcommittee, House Ways and Means Committee
July 2020	Ocean, Atlantic, and Monmouth Counties	Introductory meetings with political officials
July 2020	NJDEP	Navigation safety
July 2020	New Jersey Department of Transportation (NJDOT)	Introductory meeting with NJDOT leadership
July 2020	NJBPU	Meetings with NJBPU leadership
August 2020	U.S. Congress	Introductory meetings with Senate staff
August 2020	New Jersey Department of Military and Veterans Affairs	Introductory meeting
August 2020	NJDEP and USFWS	Avian surveys
August 2020	NJDEP	Visual impact assessment and cultural resources
August 2020	Ocean and Monmouth Counties	Meetings with political officials
August 2020	NJDEP	Geotech sampling

Table A-1 Coordination with Agencies, Tribes, and Municipalities (Continued)

Meeting Date	Entity	Purpose/Topic
2020		
September 2020	U.S. Congress	Introductory meetings with Congressional staff
September 2020	BOEM	Project Design Envelope (PDE)
September 2020	Monmouth County	Meetings with political officials
September 2020	NJDEP and NMFS	Fisheries monitoring plan
September 2020	NJDEP	PDE
October 2020	Monmouth and Ocean Counties	Further introductory meetings and status updates
October 2020	USCG	Search and rescue operations
October 2020	BOEM, USFWS, NJDEP, NMFS, Environmental Protection Agency (EPA), USACE, National Park Service, USCG	PDE
October 2020	NMFS and New Jersey environmental non-governmental organization (eNGO)	Marine mammal and sea turtle monitoring
October 2020	U.S. Congress	Meeting with Congressional staff
October 2020	DoD – Clearinghouse, Air Force, Navy, and Marine Corps	Status update
October 2020	BOEM	National Historic Preservation Act (NHPA) Section 106
October 2020	BOEM	Essential Fish Habitat
December 2020	BOEM	NHPA Section 106
2021		
January 2021	BOEM	Status updates
January 2021	USCG	Status updates
January 2021	NJDEP	Status updates
January 2021	BOEM	Geophysical and geotechnical survey plan

Notes:

a) Invitees were the Narragansett Indian Tribe, the Shinnecock Indian Nation, and the Lenape Tribe of Delaware.

b) Invitees were the Narragansett Indian Tribe, the Shinnecock Indian Nation, the Lenape Tribe of Delaware, the Delaware Nation, Oklahoma, the Delaware Tribe of Indians, the Absentee Shawnee Tribe of Indians of Oklahoma, the Mohican Nation Stockbridge–Munsee Band, the Shawnee Tribe, the Stockbridge Munsee Community, New York, the Nanticoke Lenni-Lenape Tribal Nation, Ramapough Lenape Nation, the Powhatan Renape Nation, and the Unkechaug Indian Nation.

Meetings with Other Stakeholders

Atlantic Shores is actively engaged with stakeholders to identify and discuss their interests and concerns regarding offshore wind and the development of the Project. Table A-2 provides a list of meetings that Atlantic Shores has held with stakeholders, including business groups/associations, environmental non-governmental organizations (eNGOs), academia and research/scientific institutes, commercial and recreational fishermen and boaters, and nearby residents, as of February 2021.

Table A-2 Stakeholder Meetings

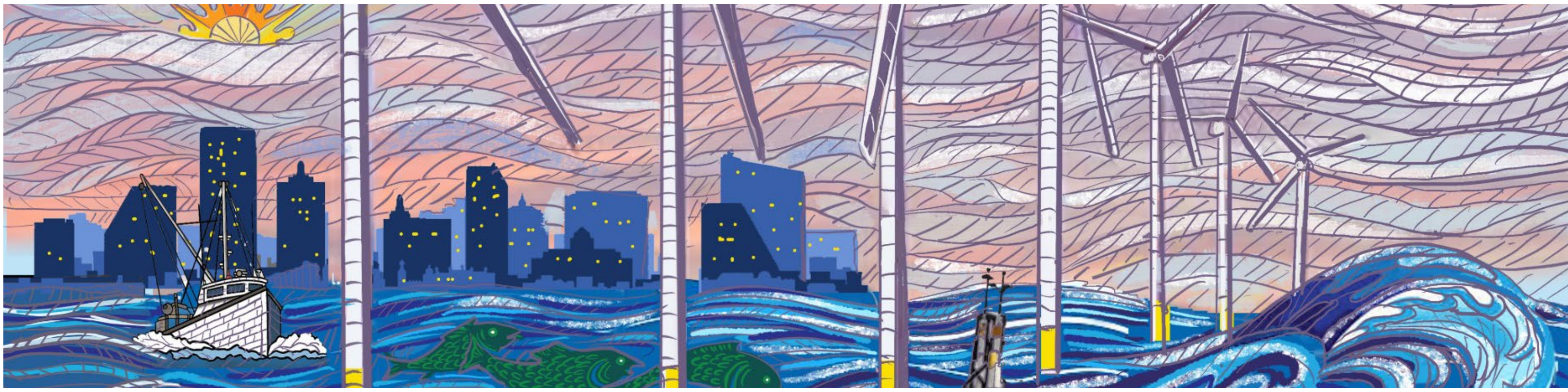
Date	Entity	Purpose/Topic
2019		
April 2019	Atlantic County Economic Alliance	Introductory meeting
May 2019	Atlantic City Chamber	Introductory meeting
May 2019	New Jersey Sierra Club	Introductory meeting
May 2019	Rutgers University	Partnership opportunity
September 2019	New Jersey Energy Coalition	Introductory meeting
September 2019	Clean Water Action	Introductory meeting
October 2019	South Jersey Chamber of Commerce	Introductory meeting
October 2019	AC Devco	Introductory meeting
November 2019	Rutgers University	Partnership opportunity
November 2019	Ocean County Outreach Community Liaison Interview	Interview for Community Liaison
November 2019	Stockton University Hughes Center Honors	Event
December 2019	New Jersey Chamber of Commerce	Introductory meeting
December 2019	Rowan University	Potential research
2020		
January 2020	New Jersey Business & Industry Association (NJBIA)	Introductory meeting
January 2020	Stockton University	Introductory meeting
April 2020	Surf clam companies	Coordination discussion
May 2020	Rutgers University	Information session
May 2020	New Jersey Conservation Foundation	Introductory meeting
May 2020	New Jersey League of Conservation Voters	Introductory meeting
May 2020	Environment New Jersey	Introductory meeting
May 2020	New Jersey Sierra Club	Introductory meeting

Table A-2 Stakeholder Meetings (Continued)

Date	Entity	Purpose/Topic
2020		
May 2020	Natural Resources Defense Council, Inc. (NRDC)	Introductory meeting
May 2020	New Jersey Audubon	Introductory meeting
May 2020	National Wildlife Federation	Introductory meeting
May 2020	New Jersey Bay Keeper	Introductory meeting
May 2020	Clean Water Action	Introductory meeting
May 2020	New Jersey Energy Foundation	Introductory meeting
May 2020	New Jersey National Wildlife Federation	Introductory meeting
May 2020	American Littoral Society	Introductory meeting
May 2020	Surf Rider	Introductory meeting
May 2020	NRDC	Marine mammal monitoring
May 2020	Environmental Defense Fund	Introductory meeting
May 2020	Clean Ocean Action	Introductory meeting
August 2020	New Jersey Department of Military and Veterans Affairs	Introductory meeting
August 2020	Wildlife Conservation Society	Introductory meeting
September 2020	Clean Water Action	Introductory meeting
September 2020	Surf clam companies	Coordination discussion
September 2020	NRDC	Marine mammal monitoring
September 2020	Stockton University	Renting office space
October 2020	Clean Ocean Action	Partnership opportunity
October 2020	NMFS and New Jersey eNGO	Marine mammal monitoring
October 2020	Rutgers University	Research/partnership opportunity
October 2020	Rutgers ECO Complex	Research/partnership opportunity
October 2020	Atlantic City Boys and Girls Club	Partnership opportunity
October 2020	Barnegat Bay Partnership	Partnership opportunity
November 2020	Clean Ocean Action	Partnership opportunity
December 2020	Reclam the Bay	Partnership opportunity
December 2020	Jersey Conservation Foundation	Introductory meeting
December 2020	Stockton University	ECO Center ribbon cutting

Table A-2 Stakeholder Meetings (Continued)

Date	Entity	Purpose/Topic
2021		
January 2021	Recreational Fisheries Workshop	Introductory meeting/Q&A
January 2021	Jingoli Competitive Edge Program	Partnership opportunity
January 2021	Ocean County Joint Tax Payers Association	Information session
January 2021	Barnegat Bay Partnership	Information session
February 2021	Jingoli Competitive Edge Program	Partnership opportunity
February 2021	Atlantic County Liaison Interviews	Hiring Atlantic County Liaison



Appendix I-C

Coastal Zone Management Consistency

Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.

Coastal Zone Management Consistency

Atlantic Shores Offshore Wind

Prepared for:

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March 2021; Amended September 2021

Coastal Zone Management Consistency

The federal Coastal Zone Management Act (CZMA) was enacted by the United States Congress in 1972 (16 §§U.S. Code 1451-1464) and is intended to protect coastal resources with an established goal to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." The coastal zone is defined as "the coastal waters (including lands therein and thereunder) and adjacent shorelands (including waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches." The Coastal Zone Reauthorization Act Amendments of 1990 further strengthened the act by requiring state programs to better focus on the control of land use activities and cumulative effects of regulated activities within the coastal zones. The CZMA is implemented nationally, and on a state-by-state basis, to maintain consistency with enforceable policies of a state's federally approved Coastal Zone Management Program (CZMP) or Coastal Resource Management Program (CRMP). The combination of the CZMP and the regulations set forth at 15 Code of Federal Regulation (CFR) Part 930, subparts D, E, or F enables states with approved CZMPs to lead and authorize the coastal zone consistency review for listed activities within the regulated coastal zone or geographic location description (GLD). These states review projects within the coastal zone that are either federally funded, require a federal license or permit, or include any activity that is directly carried out by a federal agency to determine if the proposed project is consistent with the approved CZMA.

In cases where an activity is partly located within the coastal zone and partly located outside the coastal zone there are two scenarios for determining state CZMA jurisdiction:

1. When the coastal zone boundary bisects the activity, where the activity is physically connected across the coastal zone boundary (e.g., wind energy generating facility that is located in both state and Federal waters).
2. When part of the project is located in the coastal zone, and another part of the activity is located outside the coastal zone and is wholly separate, physically, from the part of the activity located in the coastal zone (e.g., a wind energy generating facility that is entirely outside of the coastal zone with an export cable bisected by the coastal zone).

In each of these scenarios, CZM and federal consistency review is treated differently.

In the first case, activities under 15 CFR part 930, subparts D, E, or F that are located in the coastal zone and continues, physically, across the coastal zone boundary is considered an activity that is in the coastal zone. If the activity requires a federal authorization that is listed in a state's management program, then the entire project is subject to a state's consistency review. The part of the activity that is located outside the coastal zone would not have to be located in a GLD, or be granted unlisted activity review, in order for the state to review the activity.

In the second case, activities under 15 CFR part 930, subparts D or E are listed in a state's management program, but part of the activity is located outside the coastal zone or GLD, and is separate, physically, from the part of the activity located within the coastal zone. In this case, the part of the activity that is outside the coastal zone is subject to federal consistency review, if it is an "associated facility" as defined in 15 CFR 930.11(d), where a proposed facility is a part of the federal activity that is used, in full or in major part, to meet the needs of a federal action and without which the federal action, as proposed, could not be conducted.

This distinction between the two scenarios is made because parts of projects that occur outside the coastal zone (or a GLD):

- may not have a reasonable potential to impact the coastal area;
- are not integral parts of the activity located in the coastal zone; or
- may be authorized by another Federal agency under another federal statute.

In cases where the activity can be separated, § 930.53(a) would apply, and the state would have to seek review of the part of the activity located outside the coastal zone or a GLD as an unlisted activity under § 930.54. Based on this description, the Project is categorized in the second scenario where the export cable component is bisected by the coastal zone boundary and the wind energy generating facility is separate and wholly outside of the coastal zone.

The Project export cable activities are located within, and just outside of, New Jersey's designated coastal zone and will require an authorization and issuance of an Individual Permit by the U.S. Army Corps of Engineers (USACE) through Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (15 CFR Part 930, Subpart D) which will require a federal consistency review under the CZMA (16 USC 1456), §307(c)(3)(A) and 15 CFR Part 930. Federal actions relating to the wind farm portion of the Project that require Bureau of Ocean Energy Management (BOEM) approval of the Construction and Operations Plan (COP) through 15 CFR Part 930, Subpart E requires a federal consistency certification be made by Atlantic Shores for the portion of the Project located outside of New Jersey's Coastal Zone. New Jersey Department of Environmental Protection (NJDEP) can also petition for inclusion in the review process as an unlisted activity since New Jersey does not have a GLD that covers the Project Area, or Atlantic Shores can voluntarily include New Jersey in the process for federal consistency review of the wind energy generating facility portion of the project. Atlantic Shores intends to voluntarily submit the Federal Consistency to NJDEP for review and certification.

The State of New Jersey administers their federally-approved CZMP through the NJDEP Coastal Management Program. The CZMP has a defined boundary and NJDEP has developed a set of enforceable policies to evaluate projects within the coastal zone as defined in the New Jersey Coastal Zone Management (CZM) rules by N.J.A.C. 7:7, 7:7E (July 18, 1994; amended February 20, 2020). These policies address issues of location, use, and resources and provide for a balance between economic development and coastal resources protection. The NJDEP reviews permit applications that address the enforceable policies under the federally-approved CZMP and ultimately makes decisions for the location, uses and, delegation of resources for projects.

The New Jersey CZMP is outlined in the Coastal Zone Management Rules (N.J.A.C. 7:7) which establish the requirements for review of development applications under the Coastal Area Facility Review Act, N.J.S.A. 13:19-1 et. seq. (CAFRA permits), the Wetlands Act of 1970 N.J.S.A. 13:9A-1 et. seq. (coastal wetland permits), and the Waterfront Development Law N.J.S.A. 12:5-3 (waterfront development permits). The Coastal Zone Management Rules are also used in the review of water quality certificates subject to Section 401 of the Federal Clean Water Act and Federal Consistency Determinations.

The Coastal Zone Management Rules are divided into 29 subchapters. Subchapters 1 through 8 and 17 through 29 apply only to the New Jersey CAFRA, coastal wetlands, and waterfront development permits. Subchapters 9 through 16 address the specific policies that are applicable to all state permits and Water Quality Certificate and Federal Consistency Determination reviews. These subchapters are as follows:

- Subchapter 9: Special Areas – Special Areas within the Coastal Zone that have been identified as valuable resources and are included in this subchapter for additional regulation or special management rules. These Special Areas are either naturally valuable, hazardous, important for human use, sensitive, or require special management.

- Subchapter 10: Standards for Beach and Dune Activities – This subchapter applies to routine beach maintenance, emergency post-storm beach restoration, dune creation and maintenance and the construction of boardwalks.

- Subchapter 11: Standards for Conducting and Reporting the Results of an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment and/or Endangered Species – This subchapter outlines the standards for conducting threatened and/or endangered species habitat impact assessment and species habitat evaluation and discusses the standards for reporting results of these assessments.

- Subchapter 12: General Water Areas – This subchapter outlines requirements set forth for general water areas defined as those "which are located below either the spring high water line or the normal water level of non-tidal water that are subject to this Subchapter."

- Subchapter 13: Requirements for Impervious Surface Cover and Vegetative Cover for General Land Areas and Certain Special Areas – This subchapter represents requirements for impervious surface/vegetative cover in general land areas as they relate to regulated areas in waterfront development areas.

- Subchapter 14: General Location Rules – This subchapter involves rules of location of development and how they relate to secondary impacts.

- Subchapter 15: Use Rules – This subchapter discusses coastal engineering measures and how they relate to major land use categories.

- Subchapter 16: Resource Rules – This subchapter relates coastal engineering measures and methods to a variety of resources outlined in the subchapter.

Table 1 provides a summary of the enforceable program policies and management rules under New Jersey's CZMP and provides a brief assessment of the Project's consistency with the CZMP's purpose. A citation to specific COP sections is also provided where the necessary data and information required under 15 CFR § 930.58 is presented and analysis discussed to support the policy applicability assessment.

Table 1: Atlantic Shores New Jersey State Coastal Zone Management Program Consistency Review - Coastal Zone Management N.J.A.C. 7:7

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
Subchapter 9: Special Areas See 7:7-9.1 for the Purpose and scope for Special Areas			
7:7-9.2 Shellfish Habitat	The Offshore Facilities are consistent with this policy because impacts to shellfish habitat from Project construction and operation activities have been avoided or minimized to the greatest extent practicable.	This policy is not applicable because there is no known shellfish habitat within the vicinity of the Onshore Facilities. Additionally, impacts to water areas that may contain shellfish habitat will be avoided through construction techniques such as horizontal direction drilling (HDD).	Volume I: Section 4.5, Section 4.7, Section 4.8 and Section 4.9 Volume II: Section 4.5 and Section 7.4
7:7-9.3 Surf Clam Areas	The Offshore Facilities are consistent with this policy because export cables will be installed using low impact installation techniques that limit substrate disturbance and sediment suspension, minimizing potential impacts to surface clam areas. Additionally, HDD will be used to install the export cable from the landfall sites to a point in the ocean beyond the toe-of-slope of the beach avoiding surf clam areas. Furthermore, the Project is consistent with the national interest in developing diversified forms of renewable energy generation to serve the anticipated increase in demand for electric power within the electric markets that will be served by the Project.	This policy is not applicable because surf clam areas are not located within proximity to the Onshore Facilities.	Volume I: Section 4.5, Section 4.7, Section 4.8 and Section 4.9 Volume II: Section 4.5 and Section 7.4
7:7-9.4 Prime Fishing Areas	The Offshore Facilities are consistent with this policy because the offshore export cable routes have been routed to avoid impacts Prime Fishing Areas as identified on New Jersey's Specific Sport Ocean Fishing Grounds map. Additionally, installation will involve low impact techniques that will limit substrate disturbance and sediment suspension further minimizing potential impacts to Prime Fishing Areas.	The Onshore Facilities are consistent with this policy because the onshore interconnection cable routes have been routed to avoid impacts to waterbodies by using HDD to install the cable under these resources which are potential prime fishing areas.	Volume I: Section 4.5, Section 4.7, Section 4.8 and Section 4.9 Volume II: Section 4.1, Section 4.2, Section 4.6, Section 7.3, Section 7.4
7:7-9.5 Migratory Fish Pathways	The Offshore Facilities are consistent with this policy because the offshore export cable routes have been routed to avoid or minimize impacts to sensitive habitats including migratory fish pathways. Additionally, Project facilities will be installed below the ocean bottom and an impede migratory fish pathways.	The Onshore Facilities are consistent with this policy because all onshore development will avoid impacts to tidal waters and rivers by crossing via HDD. This will avoid potential interference with migratory fish pathways.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.6
7:7-9.6 Submerged Vegetation Habitat	This policy is not applicable because submerged aquatic vegetation does not occur within proximity to the Offshore Facilities.	The Onshore Facilities are consistent with this policy because potential direct impacts to all waterbodies will be avoided during construction by HDD, which will also avoid potential impact to submerged vegetation habitat. The Project will also be constructed according to an approved Soil Erosion Sediment Control plan to minimize potential sedimentation of the adjacent waters.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 3.2, Section 4.1, and Section 4.2

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-9.7 Navigation Channels	The Offshore Facilities are consistent with this policy because the installation and/or existence of the offshore export cable routes will not impact navigation channels.	The Onshore Facilities are consistent with this policy because the landfall locations are not located within or adjacent to navigation channels. The onshore interconnection cable routes will cross navigation channels; however, the cables will be placed underneath channels using construction techniques such as HDD.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 7.3 and Section 7.6
7:7-9.8 Canals	This policy is not applicable because the offshore areas of the Project do not contain canals.	This policy is not applicable as the onshore facility areas of the Project do not contain canals.	Not Applicable
7:7-9.9 Inlets	This policy is not applicable because the offshore areas of the Project do not contain inlets.	This policy is not applicable because the onshore facilities are not located within or adjacent to any inlets.	Not Applicable
7:7-9.10 Marina Moorings	This policy is not applicable because there are no marinas located proximate to the offshore facilities.	This policy is not applicable because there are no marinas located proximate to the onshore facilities.	Not Applicable
7:7-9.11 Ports	The Offshore Facilities are consistent with this policy because construction, operation, and maintenance of the Offshore Facilities will not adversely affect or interfere with port uses.	The Onshore Facilities are consistent with this policy because construction, operation, and maintenance of the Onshore Facilities will not adversely affect or interfere with port uses.	Volume I: Section 4.5, Section 4.7, and Section 4.8, Section 5.4, and Section 5.6 Volume II: Section 7.5, Section 7.6, and Section 7.9
7:7-9.12 Submerged Infrastructure Routes	The Offshore Facilities are consistent with this policy because the export cables will be buried in the sea floor to protect this infrastructure. Export cable crossings of existing infrastructure will be conducted in a manner as to minimize the likelihood of damage or breakage.	The Onshore Facilities are consistent with this policy because the onshore interconnection cables will cross tidal and nontidal waterbodies via HDD to protect these resources. There is no existing infrastructure known to occur within the onshore waterbodies, but any infrastructure that occurs will be crossed in a manner that will minimize the likelihood of damage or breakage.	Volume I: Section 4.5, Section 4.8, and Section 4.9 Volume II: Section 7.5
7:7-9.13 Shipwreck and Artificial Reef Habitats	The Offshore Facilities are consistent with this policy because the offshore export cables have been routed to avoid shipwrecks and artificial reef habitats.	This policy does not apply because there are no shipwrecks or artificial reefs within the onshore portion of this Project.	Volume I: Section 4.5 Volume II: Section 4.6 and Section 6.3
7:7-9.14 Wet Borrow Pits	This policy does not apply because there are no borrow pits within the Atlantic Ocean.	This policy does not apply because wet borrow pits are not located within or proximate to the Onshore Facilities.	Volume I: Section 1.1 Volume II: Section 4.1
7:7-9.15 Intertidal and Subtidal Shallows	The Offshore Facilities are consistent with this policy because HDD installation of the export cable from beyond the toe-of-slope of the beach to the landfall site will avoid impacts to intertidal or subtidal shallows.	The Onshore Facilities are consistent with this policy because the portions of the onshore interconnection cable that will occur within these areas will be installed via HDD to avoid impacts to the natural substrate bottom of intertidal and subtidal shallows.	Volume I: Section 4.5, Section 4.8, and Section 4.9 Volume II: Section 4.1
7:7-9.16 Dunes	The Offshore Facilities are consistent with this policy because the export cable will be installed using HDD to avoid any impacts to dunes.	The Onshore Facilities are consistent with this policy because all Project components have been sited and routed to avoid dune areas.	Volume I: Section 4.5, Section 4.8, and Section 4.9 Volume II: Section 2.1, Section 4.1, and Section 4.2

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-9.17 Overwash Areas	The Offshore Facilities are consistent with this policy because any development associated with the offshore export cables will not cause adverse, long-term impacts to the natural functioning of the beach and dune system. The installation method used to landfall the export cables as it relates to beach and dune systems will be via HDD which will avoid impacts.	The Onshore Facilities are consistent with this policy because none of the Project components are located within an overwash area.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 2.1
7:7-9.18 Coastal High Hazard Areas	This policy is not applicable because the Offshore Facilities are not located within a Coastal High Hazard Area and is not a residential or commercial development.	This policy is not applicable because the Onshore Facilities are not residential or commercial development and will occur entirely underground near the coast.	Volume I: Section 4.0, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 2.2
7:7-9.19 Erosion Hazard Areas	The Offshore Facilities are consistent with this policy because all development is occurring on the sea floor and the export cable will be installed via HDD from the landfall site to beyond the toe-of-slope of the beach to avoid potential erosion hazard areas.	This policy does not apply because the Onshore Facilities are not located in any erosion hazard areas.	Volume I: Section 4.0, Section 4.5 Volume II: Section 2.2
7:7-9.20 Barrier Island Corridor	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed via HDD to avoid any loss vegetative cover and will not result in additional impervious surfaces.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/non-vegetated areas and therefore will not result in the loss of additional vegetative cover or result in additional impervious surfaces.	Volume I: Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 7.5
7:7-9.21 Bay Islands	This policy does not apply because the Offshore Facilities are not located on any bay islands.	This policy does not apply because the Onshore Facilities are not located within bay islands.	Not Applicable
7:7-9.22 Beaches	The Offshore Facilities are consistent with this policy because the export cable will be installed via HDD from the landfall location to a point beyond the toe-of-slope of the beach, thereby avoiding impacts.	This policy does not apply to the Onshore Facilities because none of the components are located on a beach.	Volume I: Section 4.5, Section 4.7,Section 4.8, and Section 4.9 Volume II: Section 2.2
7:7-9.23 Filled Water's Edge	This policy does not apply to the Offshore Facilities because they are not located within or adjacent to any filled water's edge areas.	The Onshore Facilities are consistent with this policy because all wetlands and waterbodies and associated filled water's edge areas will be avoided by installing the onshore interconnection cables using HDD.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.1, Section 4.2
7:7-9.24 Existing Lagoon Edges	This policy does not apply to the Offshore Facilities because they are not located within or adjacent to any existing lagoon edges.	The Onshore Facilities are consistent with this policy because the onshore interconnection cable will be installed underground within existing roadway, railroad, and utility line rights-of-way. Upon construction completion, these areas will be stabilized and returned to preconstruction contours and elevations.	Volume I: Section 4.7 and Section 4.8 Volume II: Section 4.1
7:7-9.25 Flood Hazard Areas	This policy does not apply to the Offshore Facilities because these facilities do not involve any habitable buildings or construction of railroads, roadways, bridges and/or culverts.	The Onshore Facilities are consistent with this policy because all Project components within flood hazard areas will be installed underground and will comply with the requirements for impervious cover and vegetative cover under N.J.A.C. 7:13.	Volume I: Section 1.3.2 Volume II: Section 2.2

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-9.26 Riparian Zones	This policy does not apply to the Offshore Facilities because there are no riparian zones proximate to offshore export cable.	The Onshore Facilities are consistent with this policy because riparian zones and riparian zone buffers will be avoided by installing the onshore interconnection cables via HDD and all other components are not located within or adjacent to riparian zones.	Volume I: Section 1.3.2, Section 4.0, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 4.1
7:7-9.27 Wetlands	This policy does not apply to the Offshore Facilities because there are no wetlands in the offshore portion of this Project.	The Onshore Facilities are consistent with this policy because wetlands will be avoided. The onshore interconnection cables will be installed under all wetland areas using HDD. All other facility components are located outside of wetland boundaries.	Volume I: Section 1.3.2, Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 4.1
7:7-9.28 Wetlands Buffers	This policy does not apply to the Offshore Facilities because there are no wetland buffers in the offshore portion of this Project.	The Onshore Facilities are consistent with this policy because impacts to wetland buffers will be minimized via HDD installation of the onshore interconnection cables. All other facility components are located outside of wetland buffer areas.	Volume I: Section 1.3.2, Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 4.1
7:7-9.29 Coastal Bluffs	This policy does not apply to the Offshore Facilities because there are no coastal bluffs present in the offshore portion of the Project.	This policy does not apply to the Onshore Facilities because there are no coastal bluffs present in the onshore portion of the Project.	Not Applicable
7:7-9.30 Intermittent Stream Corridors	This policy does not apply to the Offshore Facilities because there are no intermittent stream corridors present in the Atlantic Ocean.	The Onshore Facilities are consistent with this policy because any intermittent stream corridors will be avoided by installing the onshore interconnection cables using HDD.	Volume I: Section 1.3.2, Section 4.7, and Section 4.8 Volume II: Section 4.1 and Section 4.2
7:7-9.31 Farmland Conservation Areas	This policy does not apply to the Offshore Facilities because there are no Farmland Conservation Areas present.	This policy does not apply to the Onshore Facilities because there are no Farmland Conservation Areas present.	Not Applicable
7:7-9.32 Steep Slopes	This policy does not apply because there are no steep slopes proximate to the Offshore Facilities.	This policy does not apply because there are no steep slopes proximate to the Offshore Facilities.	Not Applicable
7:7-9.33 Dry Borrow Pits	This policy does not apply because there are no dry borrow pits proximate to the Offshore Facilities.	The Onshore Facilities comply with this policy because any dry borrow pits that may be needed for onshore construction will not be located in a prohibited area, will not interfere with local groundwater flow, and will not be filled or graded with prohibited materials.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 2.1 and Section 2.2
7:7-9.34 Historic and Archaeological Resources	The Offshore Facilities are consistent with this policy because the export cable has been routed to avoid potential offshore archaeological resource areas to the maximum extent practicable.	The Onshore Facilities are consistent with this policy because the landfall locations, interconnection cable routes, and proposed substations are all located within previously disturbed areas and therefore will not interfere with archeological discoveries or established sites.	Volume I: Section 4.1, Section 4.5, section 4.7, and Section 4.8 Volume II: Section 6.1, Section 6.2, and Section 6.3
7:7-9.35 Specimen Trees	This policy does not apply because there are no specimen trees proximate to the Offshore Facilities.	This policy does not apply because there are no specimen trees proximate to the Onshore Facilities.	Not Applicable

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-9.36 Endangered or Threatened Wildlife or Plant Species Habitats	The Offshore Facilities are consistent with this policy because the Project construction and routine operations and maintenance phases will implement best management practices and mitigation measures to minimize potential impacts to marine threatened and endangered species.	The Onshore Facilities are consistent with this policy because terrestrial threatened and endangered species habitat will be avoided to the maximum extent practicable. Additional BMPs will be implemented to further reduce potential impact to the protected species and/or associated habitat.	Volume I: Section 4.1, 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.2, Section 4.3, Section 4.4, Section 4.6, Section 4.7, Section 4.8, and Section 4.9
7:7-9.37 Critical Wildlife Habitat	This policy does not apply because critical wildlife is not proximate to the Offshore Facilities.	The Onshore Facilities are consistent with this policy because the Project components are located within existing developed/disturbed areas which will avoid impact to any critical wildlife habitat that occurs within the vicinity of the Project.	Volume I: Section 4.1, Section 4.7, and Section 4.8 Volume II: Section 4.2, Section 4.3, Section 4.4, Section 4.6, Section 4.7, Section 4.8, and Section 4.9
7:7-9.38 Public Open Space	This policy is not applicable because there are no areas of public open space within the Offshore Facilities locations.	The Onshore Facilities comply with this policy because any portion of the Project that falls within public spaces will not adversely affect those open spaces. The majority of Project activities are taking place within pre-existing, paved roadways and other rights-of-way. After the facilities are in operation, they will not interfere with public spaces because all facilities, except the onshore substations, will be located underground.	Volume I: Section 4.1, 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.2, Section 5.0, Section 7.3, and Section 7.5
7:7-9.39 Special Hazard Areas	This policy is not applicable because there are no special hazard areas present within the Offshore Facilities of the Project.	This policy is not applicable because there are no special hazard areas present within the Onshore Facilities of the Project.	Not Applicable
7:7-9.40 Excluded Federal Lands	This policy is not applicable because the Offshore Facilities will not be located on excluded federal lands as listed in the NJ Coastal Management Program, Final Environmental Impact Statement (August 1980).	This policy is not applicable because the Onshore facilities will not be located on any excluded federal lands as listed in the NJ Coastal management Program, Final Environmental Impact Statement (August 1980).	Not Applicable
7:7-9.41 Special Urban Areas	The Offshore Facilities are consistent with this policy because the export cable and overall Project will be a net benefit to the regional economy.	The Onshore Facilities are consistent with this policy because the overall Project will be a net benefit to the region.	Volume I, Section 2.2 and Section 4.0, Volume II. Section 7.0
7:7-9.42 Pinelands National Reserve and Pinelands Protection Area	This policy is not applicable because the Offshore Facilities are not located within the Pinelands National Reserve or the Pinelands Protection Area.	The Onshore Facilities comply with this policy because all Project components within the Pinelands are located in development management areas which are outside of the protection areas. In addition, these components are being constructed within previously disturbed areas and are using best management practices to minimize impacts.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.1 and Section 4.2
7:7-9.43 Meadowlands District	This policy does not apply to the Offshore Facilities because they are not located within the Meadowlands District.	This policy does not apply to the Onshore Facilities because they are not located within the Meadowlands District.	Not Applicable
7:7-9.44 Wild and Scenic River Corridors	This policy is not applicable because there are no wild and scenic river corridors present within proximity to the Offshore Facilities.	This policy is not applicable because there are no wild and scenic river corridors present within proximity to the Onshore Facilities.	Not Applicable

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-9.45 Geodetic Control Reference Marks	This policy is not applicable to the Offshore Facilities because there are no geodetic control reference marks within this portion of the Project.	The Onshore Facilities will be consistent with this policy. Although no geodetic control reference marks are not known to occur, if any are located, they will not be disturbed.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8
7:7-9.46 Hudson River Waterfront Area	This policy does not apply because the Offshore Facilities are not located within the Hudson River Waterfront Area.	This policy does not apply because the Onshore Facilities are not located within the Hudson River Waterfront Area.	Not Applicable
7:7-9.77 Atlantic City	This policy does not apply because the Offshore Facilities do not affect any restricted or conditional types of development outlined within the policy.	The Onshore Facilities are consistent with this policy because this Project does not include casino, pier, boardwalk, awning or signage development and the types of development occurring will have minimal impacts to the current city conditions.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8
7:7-9.48 Lands and Waters Subject to Public Trust Rights	The Offshore Facilities are consistent with this policy because the Project will not interfere with public trust rights to tidal waterways and their shores.	The Onshore Facilities are consistent with this policy because the Project will not interfere with public trust rights to tidal waterways and their shores.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 7.5, Section 7.6, and Section 7.9
7:7-9.49 Dredged Material Management Areas	This policy does not apply because the Offshore Facilities are not located within a dredged material management area.	This policy does not apply because the Onshore Facilities are not located within a dredged material management area.	Not Applicable
Subchapter 10: Standards for Beach and Dune Activities See 7:7-10.1 for the Purpose and scope for Standards for Beach and Dune Activities			
7:7-10.2 Standards Applicable to Routine Beach Maintenance	This policy does not apply to the Offshore Facilities because the export cable will be installed under the beach area. Beach maintenance is not proposed as part of the project.	This policy does not apply to the Onshore Facilities because none of the facilities are located in a beach area and beach maintenance is not proposed as part of this project.	Not Applicable
7:7-10.3 Standards Applicable to Emergency Post-Storm Beach Restoration	This Policy does not apply to the Offshore Facilities because the project does not involve emergency post-storm beach restoration.	This policy does not apply to the Onshore Facilities because none of the facilities are located in a beach area and the Project does not involve beach maintenance.	Not Applicable
7:7-10.4 Standards Applicable to Dune Creation and Maintenance	This policy does not apply to the Offshore Facilities because the project does not involve the creation and/or maintenance of dunes.	This policy does not apply to the Onshore Facilities because none of the facilities are located in a dune area and the Project does not involves the creation and/or maintenance of dunes.	Not Applicable
7:7-10.5 Standards Applicable to the Construction of Boardwalks	This policy does not apply to the Offshore Facilities because the project does not involve the construction of boardwalks.	This policy does not apply to the Onshore Facilities because the Project does not involve the construction of boardwalks.	Not Applicable
Subchapter 11: Standards for Conducting and Reporting the Results of an Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment and/or Endangered or Threatened Wildlife Species Habitat Evaluation See 7:7-11.1 for the Purpose and scope for conducting and reporting Threatened & Endangered species impact assessment and/or habitat evaluation			
7:7-11.2 Standards for Conducting Endangered or Threatened Wildlife or Plant Species Habitat Impact Assessment	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and filing of permit applications for the Project.	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and filing of permit applications for the overall Project, if species-specific impact assessments are necessary.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.6 and Section 4.9

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-11.3 Standards for Conducting Endangered or Threatened Wildlife Species Habitat Evaluation	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and permit applications for the overall Project.	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and filing of permit applications for the overall Project if species-specific impact assessments are necessary.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.6 and Section 4.9
7:7-11.4 Standards for Reporting the Results of Impact Assessment and Habitat Evaluation	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and permit applications for the overall Project.	This policy describes the standards for conducting an Endangered or Threatened Wildlife/Plant Species Habitat Impact Assessment. Specified standards will be applicable at the time of coordination and filing of permit applications for the overall Project if species-specific impact assessments are necessary.	Volume I: Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.6 and Section 4.9
Subchapter 12: General Water Areas See 7:7-12.1 for the Purpose and scope for General Water Areas			
7:7-12.2 Shellfish Aquaculture	This policy does not apply to Offshore Facilities because shellfish aquaculture is not included as part of the Project.	This policy does not apply to Onshore Facilities because shellfish aquaculture is not included as part of the Project.	Not Applicable
7:7-12.3 Boat Ramps	This policy does not apply to Offshore Facilities because construction of boat ramps is not included as part of the Project.	This policy does not apply to Onshore Facilities because construction of boat ramps is not included as part of the Project.	Not Applicable
7:7-12.4 Docks and Piers for Cargo and Commercial Fisheries	This policy does not apply to Offshore Facilities because construction of docks and/or piers for cargo and commercial fisheries is not included as part of the Project.	This policy does not apply to Onshore Facilities because construction of docks and/or piers for cargo and commercial fisheries is not included as part of the Project.	Not Applicable
7:7-12.5 Recreational Docks and Piers	This policy does not apply to Offshore Facilities because construction of recreational docks and/or piers is not included as part of the Project.	This policy does not apply to Onshore Facilities because construction of recreational docks and/or piers is not included as part of the Project.	Not Applicable
7:7-12.6 Maintenance Dredging	This policy does not apply to Offshore Facilities because maintenance dredging is not included as part of the Project.	This policy does not apply to Onshore Facilities because maintenance dredging is not included as part of the Project.	Not Applicable
7:7-12.7 New Dredging	This policy does not apply to Offshore Facilities because new dredging is not included as part of the Project.	This policy does not apply to Onshore Facilities because new dredging is not included as part of the Project.	Not Applicable
7:7-12.8 Environmental Dredging	This policy does not apply to Offshore Facilities because environmental dredging is not included as part of the Project.	This policy does not apply to Onshore Facilities because environmental dredging is not included as part of the Project.	Not Applicable
7:7-12.9 Dredged Material Disposal	This policy does not apply to Offshore Facilities because disposal of dredged material is not included as part of the Project.	This policy does not apply to Onshore Facilities because disposal of dredged material is not included as part of this Project.	Not Applicable
7:7-12.10 Solid Waste or Sludge Dumping	The Offshore Facilities are consistent with this policy because all solid or liquid wastes will be treated, stored, and/or disposed of in accordance with applicable federal, state and local regulations.	The Onshore Facilities are consistent with this policy because all solid or liquid wastes will be treated, stored, and/or disposed of in accordance with applicable federal, state and local regulations.	Volume I: Section 4.4, Section 4.6, and Section 4.8 Volume II: Section 9.0

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-12.11 Filling	This policy does not apply to Offshore Facilities because filling is not included as part of this Project.	This policy does not apply to Onshore Facilities because filling is not included as part of this Project.	Not Applicable
7:7-12.12 Mooring	This policy does not apply to Offshore Facilities because mooring is not included as part of this Project.	This policy does not apply to Onshore Facilities because mooring is not included as part of this Project.	Not Applicable
7:7-12.13 Sand and Gravel Mining	This policy does not apply to Offshore Facilities because sand and gravel mining are not included as part of this Project.	This policy does not apply to Onshore Facilities because sand and gravel mining are not included as part of this Project.	Not Applicable
7:7-12.14 Bridges	This policy does not apply to Offshore Facilities because construction of bridges is not included as part of this Project.	This policy does not apply to Onshore Facilities because construction of bridges is not included as part of this Project.	Not Applicable
7:7-12.15 Submerged Pipelines	This policy does not apply to Offshore Facilities because submerged pipelines are not included as part of this Project.	This policy does not apply to Onshore Facilities because submerged pipelines are not included as part of this Project.	Not Applicable
7:7-12.16 Overhead Transmission Lines	This policy does not apply to Offshore Facilities because overhead transmission lines are not included as part of this Project.	This policy does not apply to Onshore Facilities because overhead transmission lines are not included as part of this Project.	Not Applicable
7:7-12.17 Dams and Impoundments	This policy does not apply to Offshore Facilities because dams and impoundments are not included as part of this Project.	This policy does not apply to Onshore Facilities because dams and impoundments are not included as part of this Project.	Not Applicable
7:7-12.18 Outfalls and Intakes	This policy does not apply to Offshore Facilities because installation of outfalls and intakes are not included as part of this Project.	This policy does not apply to Onshore Facilities because installation of outfalls and intakes are not included as part of this Project.	Not Applicable
7:7-12-19 Realignment of Water Areas	This policy does not apply to Offshore Facilities because the realignment of water areas is not included as part of this Project.	This policy does not apply to Onshore Facilities because the realignment of water areas is not included as part of this Project.	Not Applicable
7:7-12.20 Vertical Wake or Wave Attenuation Structures	This policy does not apply to Offshore Facilities because the installation of vertical wake or wave attenuation structures is not included as part of this Project.	This policy does not apply to Onshore Facilities because the installation of vertical wake or wave attenuation structures is not included as part of this Project.	Not Applicable
7:7-12.21 Submerged Cables	This Policy does not apply to Offshore Facilities because the installation of submerged telecommunication cables is not included as part of this Project.	This policy does not apply to Onshore Facilities because the installation of submerged telecommunication cables is not included as part of this Project.	Not Applicable
7:7-12.22 Artificial Reefs	This policy does not apply to Offshore Facilities because the installation of artificial reefs is not included as part of this Project.	This policy does not apply to Onshore Facilities because the installation of artificial reefs is not included as part of this Project.	Not Applicable
7:7-12.23 Living Shorelines	This policy does not apply to Offshore Facilities because the installation of living shorelines is not included as part of this Project.	This policy does not apply to Onshore Facilities because the installation of living shorelines is not included as part of this Project.	Not Applicable

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-12.24 Miscellaneous Uses	The Offshore Facilities will be consistent with this policy because specified standards will be applicable at the time of coordination and filing of permit applications for the overall Project.	The Onshore Facilities will be consistent with this policy because specified standards will be applicable at the time of coordination and filing of permit applications for the overall Project.	Volume I: Section 4.2 and Section 4.4
Subchapter 13: Requirements for Impervious Cover and Vegetative Cover for General Land Areas and Certain Special Areas See 7:7-13.1 for the Purpose and scope for Requirements for Impervious Cover and Vegetative Cover for General Land Areas and Certain Special Areas			
7:7-13.3 Impervious Cover Requirements that Apply to Sites in the Upland Waterfront Development and CAFRA Areas	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed and maintained underground via HDD and therefore will not result in an increase of impervious cover.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/paved areas and therefore will not result in an increase of impervious cover.	Volume I, Section 4.1, Section 4.5, Section 4.7 and Section 4.8 Volume II: Section 7.5
7:7-13.4 Vegetative Cover Requirements that Apply to Sites in the Upland Waterfront Development and CAFRA Areas	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed and maintained underground via HDD and therefore will not result in the loss of vegetative cover.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/non-vegetated areas and therefore will not result in the loss of vegetative cover.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.2
7:7-13.5 Determining if a Site is Forested or Unforested	This policy does not apply to the offshore facilities as they will not be located on a forested site.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed areas that are non-forested.	Volume I: Section 4.4, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 4.2 and Section 7.5
7:7-13.6 Upland Waterfront Development Area Regions and Growth Ratings	The Offshore Facilities are consistent with this policy because the export cable will be installed in a region that is assigned a development growth rating and will have minimal impacts to groundwater quality.	The Onshore Facilities are consistent with this policy because they will be located in regions that are already largely developed and are assigned a development growth rating and will have minimal impacts to groundwater quality.	Volume I: Section 4.4 Volume II: Section 3.2 and Section 7.5
7:7-13.7 Determining the Environmental Sensitivity of a Site in the Upland Waterfront Development Area	The Offshore Facilities are consistent with this policy because the cable will be installed via HDD within largely urban locations which will minimize potential adverse impacts to groundwater. Additionally, the location of the Offshore Facilities should be in a low environmental sensitivity area.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in previously developed/disturbed areas which should be ranked as low environmental sensitivity. Therefore, further development will have minimal impacts to groundwater quality.	Volume I: Section 4.4 Volume II: Section 3.2 and Section 7.5
7:7-13.8 Determining the Development Potential of a Site in the Upland Waterfront Development Area	The Offshore Facilities do not satisfy the definitions of development type of this policy and therefore, the development potential cannot be determined. However, the Offshore Facilities are consistent with this policy because the proposed Project is not located within an Upland Waterfront Development Area and will not result in a violation of the Clean Water Act or other similar State laws, rules and regulations.	The Onshore Facilities do not satisfy the definitions of development type of this policy and therefore, the development potential cannot be determined. However, the Onshore Facilities are consistent with this policy because the proposed Project will not result in a violation of the Clean Water Act or other similar State laws, rules and regulations	Volume I: Section 4.4 Volume II: Section 7.5
7:7-13.9 Determining the Development Potential for a Residential or Minor Commercial Development Site in the Upland Waterfront Development Area	This policy does not apply to the Offshore Facilities because the Project does not meet the definition of a residential or minor commercial development site.	This policy does not apply to the Onshore Facilities because the Project does not meet the definition of a residential or minor commercial development site.	Not Applicable

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-13.10 Determining the Development Potential for a Major Commercial or Industrial Development Site in the Upland Waterfront Development Area	This policy does not apply to the Offshore Facilities because the Project does not meet the definition of a major commercial or industrial development site.	This policy does not apply to the Onshore Facilities because the Project does not meet the definition of a major commercial or industrial development site.	Volume I: Section 4.4 Volume II: Section 7.5
7:7-13.11 Determining the Development Potential for a Campground Development Site in the Upland Waterfront Development Area	This policy does not apply to the Offshore Facilities because they do not satisfy the definition of a Campground Development Site.	This policy does not apply to the Onshore Facilities because they do not satisfy the definition of a Campground Development Site.	Not Applicable
7:7-13.12 Determining the Development Intensity of a Site in the Upland Waterfront Development Area	This policy does not apply to the Offshore Facilities because the development intensity is undetermined; however, the facilities are located in intensely developed areas.	This policy does not apply to the Offshore Facilities because the development intensity is undetermined; however, the facilities are located in intensely developed areas.	Volume I: Section 4.4 Volume II: Section 3.2 and Section 7.5
7:7-13.13 Impervious Cover Limits for a Site in the Upland Waterfront Development Area	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed and maintained underground via HDD and therefore will not result in the increase of impervious cover.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/paved areas and therefore will not result in an increase of impervious cover.	Volume I, Section 4.1, Section 4.5, Section 4.7 and Section 4.8 Volume II. Section 7.5
7:7-13.14 Vegetative Cover Percentages for a Site in the Upland Waterfront Development Area	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed and maintained underground via HDD and therefore will not result in the loss of vegetative cover.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/non-vegetated areas and therefore will not result in the loss of vegetative cover.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.2
7:7-13.15 Coastal Planning Areas in the CAFRA Area	This policy does not apply to Offshore Facilities because components will either be outside of the CAFRA Area or installed and maintained underground.	The Onshore Facilities are consistent with this policy because Project components will be installed within areas that are already developed or disturbed.	Volume I: Section 4.1, Section 4.2, Section 4.4 and Section 4.6 Volume II: Section 4.1 and Section 4.2
7:7-13.16 Boundaries for Coastal Planning Areas, CAFRA centers, CAFRA cores, and CAFRA nodes; non-mainland Coastal Centers	This policy does not apply to Offshore Facilities because the Project does not propose to alter boundaries for coastal planning areas, CAFRA centers, CAFRA cores, CAFRA nodes or non-mainland coastal centers.	This policy does not apply to Onshore Facilities because the Project does not propose to alter boundaries for coastal planning areas, CAFRA centers, CAFRA cores, CAFRA nodes or non-mainland coastal centers.	Not Applicable
7:7-13.17 Impervious Cover Limits for a Site in the CAFRA Area	The Offshore Facilities are consistent with this policy because the offshore export cable will be installed and maintained underground via HDD and therefore will not result in an increase in impervious cover.	The Onshore Facilities are consistent with this policy because they will be installed and maintained underground in already disturbed/paved areas and therefore will not result in an increase in impervious cover.	Volume I, Section 4.1, Section 4.5, Section 4.7 and Section 4.8 Volume II. Section 7.5
7:7-13.18 Vegetative Cover Percentage for a Site in the CAFRA Area	This policy does not apply for the Offshore Facilities because there are no forested areas.	The Onshore Facilities are consistent with this policy because the locations of the Project components are located in CAFRA urban center which does not require preservation or planting of trees as part of a project. Additionally, the Project components are	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.2

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
		located in areas that are already developed and/or disturbed and do not have any vegetation (forest) cover.	
7:7-13.19 Mainland Coastal Centers	This policy does not apply to the Offshore Facilities as the boundaries of Mainland Coastal Centers do not extend into the Atlantic Ocean.	The Onshore Facilities are consistent with this policy because the limit of impervious surfaces will not exceed the threshold outlined in the policies set forth in N.J.A.C. 7:7-13.17 and 13.18. Additionally, the majority of the Project components will be installed underground within previously developed/disturbed rights-of-way which will not increase the amount of impervious surface.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 7.5
Subchapter 14: General Location Rules See 7:7-14.1 for the Purpose and scope for General Location Rules			
7:7-14.1 Rule on Location of Linear Development	The Offshore Facilities are consistent with this policy because the export cable will not result in a permanent or long-term loss of unique or irreplaceable areas.	The Onshore Facilities are consistent with this policy because the onshore interconnection cable is located almost entirely within develop/disturbed road, highway, railroad, utility line, and pedestrian/bike lane rights-of-way and will not result in a permanent or long-term loss of unique or irreplaceable areas.	Volume I: Section 3.0, Section 4.5, Section 4.7, Section 4.8, and Section 4.9
7:7-14.2 Basic Location Rule	The Offshore Facilities are consistent with this policy because the development and use of the Offshore Facilities will not impact wellbeing of public health, safety, or welfare, or that of the natural environment. This Project is also of national interest.	The Onshore Facilities comply with this policy because the installation and operation of the facilities will not impact wellbeing of public health, safety, or welfare, or that of the natural environment. This Project is also consistent with the national interest in developing diversified forms of renewable energy generation to serve the anticipated increase in demand for electric power within the electric markets that will be served by the Project.	Volume I: Section 1.2, Section 1.3, Section 1.5, and Section 2.0
7:7-14.3 Secondary Impacts	The Offshore Facilities are consistent with this policy because it is not anticipated that this Project will induce further development. As a result, secondary impacts resulting from further development is anticipated to be minimal.	The Onshore Facilities are consistent with this policy because it is not anticipated that this Project will induce further development. As a result, secondary impacts resulting from further development is anticipated to be minimal.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8
Subchapter 15: Use Rules See 7:7-15.1 for the Purpose and scope for Use Rules			
7:7-15.2 Housing	This policy does not apply to Offshore Facilities because the development of housing is not included as part of this Project.	This policy does not apply to Onshore Facilities because the development of housing is not included as part of this Project.	Not Applicable
7:7-15.3 Resort/Recreational	This policy does not apply to Offshore Facilities because the development of recreational areas is not included as part of this Project.	This policy does not apply to Onshore Facilities because the development of recreational areas is not included as part of this Project.	Not Applicable

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
7:7-15.4 Energy Facility	The Offshore Facilities are consistent with this policy because standards for siting of new energy facilities, including associated development activities have been met.	The Onshore Facilities are consistent with this policy because standards for siting of new energy facilities, including associated development activities have been met.	Volume I: Section 4.1, Section 4.2, Section 4.4, and Section 4.6 Volume II: Section 3.2, Section 4.0, Section 5.0, Section 6.0, and Section 7.0
7:7-15.5 Transportation	This policy does not apply to Offshore Facilities because the development of roads, public transportation, bicycle and/or foot paths, or parking facilities is not proposed as part of this Project.	This policy does not apply to Onshore Facilities because the development of roads, public transportation, bicycle and/or foot paths, or parking facilities is not proposed as part of this Project	Not Applicable
7:7-15.6 Public Facility	This policy does not apply to Offshore Facilities because the Project is private and therefore not a public facility.	This policy does not apply to Onshore Facilities because the Project is private and therefore not a public facility.	Not Applicable
7:7-15.7 Industry	This policy does not apply to the Offshore Facilities this component does not meet the definition of industrial uses.	This policy does not apply to the Onshore Facilities this component does not meet the definition of industrial uses.	Not Applicable
7:7-15.8 Mining	This policy does not apply to Offshore Facilities because the Project does not propose new or expanded mining operations.	This policy does not apply to Onshore Facilities because the Project does not propose new or expanded mining operations.	Not Applicable
7:7-15.9 Port	This policy does not apply to Offshore Facilities because the Project does not propose new or expanded port development or uses.	This policy does not apply to Onshore Facilities because the Project does not propose new or expanded port development or uses.	Not Applicable
7:7-15.10 Commercial Facility	This policy does not apply to Offshore Facilities because the Project does not propose the construction of hotels/motels, retail trade/service establishments or convention centers/arenas.	This policy does not apply to Onshore Facilities because the Project does not propose the construction of hotels/motels, retail trade/service establishments or convention centers/arenas.	Not Applicable
7:7-15.11 Coastal Engineering	This policy does not apply to Offshore Facilities because the Project does not propose coastal engineering activities.	This policy does not apply to Onshore Facilities because the Project does not propose coastal engineering activities.	Not Applicable
7:7-15.12 Dredged Material Placement on Land	This policy does not apply to Offshore Facilities because the Project does not propose the placement of dredged material on land.	This policy does not apply to Onshore Facilities because the Project does not propose the placement of dredged material on land.	Not Applicable
7:7-15.13 National Defense Facilities	This policy does not apply to Offshore Facilities because the Project does not propose the construction of a national defense facility.	This policy does not apply to Onshore Facilities because the Project does not propose the construction of a national defense facility.	Not Applicable
7:7-15.14 High-Rise Structures	This policy does not apply to Offshore Facilities because the Project does not propose the construction of high-rise structures as defined by 7:7-15.14.	This policy does not apply to Onshore Facilities because the Project does not propose the construction of high-rise structures.	Not Applicable
Subchapter 16: Resource Rules See 7:7-16.1 for the Purpose and scope for Resource Rules			
7:7-16.2 Marine Fish and Fisheries	The Offshore Facilities are consistent with this policy because the construction of the offshore export cables will be constructed in a way that minimizes impacts to marine fish and fisheries in the Atlantic	The Onshore Facilities are consistent with this policy because crossing of waterbodies by the onshore interconnection cables will be installed via HDD to avoid impacts to these areas which	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8

Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
	Ocean. Also, these facilities further comply with this policy as it is a permitted coastal activity within this policy.	will avoid potential impacts to estuarine fish and fisheries in the back bay communities of New Jersey. Also, these facilities further comply with this policy as it is a conditionally acceptable coastal activity within this policy.	Volume II: Section 4.2, Section 4.6, and Section 7.4
7:7-16.3 Water Quality	The Offshore Facilities are consistent with this policy because all development associated with this portion of the Project will not violate the Federal Clean Water Act or State laws, rules, and regulations. Also, the Project will adhere to all permit conditions that address water quality protection.	The Onshore Facilities are consistent with this policy because all development associated with this portion of the Project will not violate the Federal Clean Water Act or State laws, rules, and regulations. Also, the Project will adhere to all permit conditions that address water quality protection.	Volume I: Section 1.3, Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 3.2 and Section 4.1
7:7-16.4 Surface Water Use	This policy does not apply because the Offshore Facilities do not require the use of surface water.	This policy does not apply because the Onshore facilities do not require the use of surface water.	Not Applicable
7:7-16.5 Groundwater Use	This policy does not apply because the Offshore Facilities do not require the use of ground water withdrawal.	This policy does not apply because the Onshore Facilities do not require the use of ground water withdrawal.	Not Applicable
7:7-16.6 Stormwater Management	The Offshore Facilities satisfies the definition of a "major development" as per N.J.A.C. 7:8-1.2 and will be consistent with this policy.	The Onshore Facilities satisfies the definition of a "major development" as per N.J.A.C. 7:8-1.2 and will be consistent with this policy.	Volume I: Section 1.3, Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9
7:7-16.7 Vegetation	The Offshore Facilities are consistent with this policy because the export cable will be installed via HDD avoiding any impact to vegetation.	The Onshore Facilities are consistent with this policy because the Project will not result in any significant loss or disturbance to vegetation.	Volume I: Section 4.1, Section 4.5, Section 4.7, and Section 4.8 Volume II: Section 4.1 and Section 4.2
7:7-16.8 Air Quality	The Offshore Facilities are consistent with this policy because the offshore export cables and their installation will conform to all applicable State and Federal regulations, standards and guidelines regarding air quality.	The Onshore Facilities are consistent with this policy because the offshore export cables and their installation will conform to all applicable State and Federal regulations, standards and guidelines regarding air quality.	Volume I: Section 1.3, Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 3.1
7:7-16.9 Public Access	This policy does not apply to the Offshore Facilities because the Project will not alter or otherwise adversely affect public access.	This policy does not apply to the Onshore Facilities because the Project will not alter or otherwise adversely affect public access.	Not Applicable
7:7-16.10 Scenic Resources and Design	The Offshore Facilities are consistent with this policy because the export cables are buried under the seafloor and beach and will not impact scenic resources.	The Onshore Facilities are consistent with this policy because all Project components within the coastal zone will be underground which will not impact scenic resources.	Volume I: Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 5.0
7:7-16.11 Buffers and Compatibility of Uses	The Offshore Facilities are consistent with this policy because the export cables are entirely underground and will not need natural or manmade buffers between areas or uses.	The Onshore Facilities are consistent with this policy because all Project components within the coastal zone will be underground and will not need natural or manmade buffers between areas or uses.	Volume I: Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 4.1
7:7-16.12 Traffic	The Offshore Facilities are consistent with this policy because the Project will not permanently impact vehicles, pedestrians or vessels.	The Onshore Facilities are consistent with this policy because the Project will not permanently impact vehicles, pedestrians or	Volume I: Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9

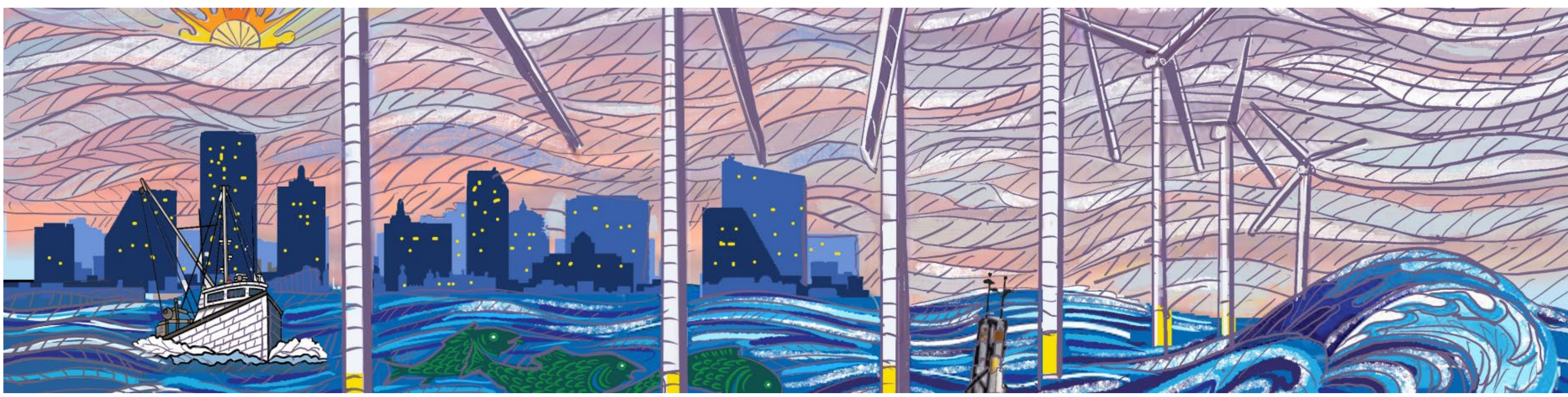
Policy/Requirement	Response to Policy for Atlantic Shores Offshore Facilities [1]	Response to Policy for Atlantic Shores Onshore Facilities [2]	COP Section Reference
	Traffic will be temporarily impacted during construction but will be the minimum necessary to satisfy safety and/or regulatory requirements.	vessels. Traffic will be temporarily impacted during construction but will be the minimum necessary to satisfy safety and/or regulatory requirements.	Volume II: Section 7.5, Section 7.6, Section 7.8, and Section 7.9
7:7-16.13 Subsurface Sewage Disposal Systems	This policy does not apply to the Offshore Facilities as no subsurface sewage disposal systems are proposed as a part of this Project.	This policy does not apply to the Onshore Facilities as no subsurface sewage disposal systems are proposed as a part of this Project.	Not Applicable
7:7-16.14 Solid and Hazardous Waste	The Offshore Facilities are consistent with this policy because the anticipated type of solid waste generated in connection with the Project does not include prohibited types listed within this policy. All disposal of Offshore Facility waste will conform with all applicable State and Federal regulations.	The Onshore Facilities are consistent with this policy because the anticipated type of solid waste generated in connection with the Project does not include prohibited types listed within this policy. All disposal of Offshore Facility waste will conform with all applicable State and Federal regulations.	Volume I: Section 4.1, Section 4.5, Section 4.7, Section 4.8, and Section 4.9 Volume II: Section 9.0

[1] The offshore facilities include the export cable corridor from the New Jersey State Waters limit (3 nautical miles from shore) to the Atlantic and Monmouth Landfall Sites.

[2] The onshore facilities include all of the onshore Project components within the NJDEP defined coastal zone which includes the Atlantic and Monmouth Landfall Sites, transition vaults, and onshore interconnection cables. Onshore substations and POI substations are not located in the coastal zone.

REFERENCES CITED

N.J.A.C. 7:7 Coastal Zone Management Rules. NJDEP. February 20, 2020. https://www.nj.gov/dep/rules/rules/njac7_7.pdf. Date accessed: February 9, 2021.



Appendix I-D

Draft Oil Spill Response Plan (OSRP)

Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.

<u>DRAFT</u>

OIL SPILL RESPONSE PLAN

For

ATLANTIC SHORES OFFSHORE WIND, LLC

March 2021

A Response Plan Cover Sheet, presenting basic information regarding Atlantic Shores Offshore Wind, LLC is provided below:

Response Plan Cover Sheet

<table>
<tr><td>Owner/operator of facility:</td><td colspan="5">Atlantic Shores Offshore Wind, LLC</td></tr>
<tr><td>Facility name:</td><td colspan="5">Atlantic Shores</td></tr>
<tr><td>Facility mailing address:</td><td colspan="5">One Dock 72 Way, Brooklyn, NY 11205</td></tr>
<tr><td>Facility phone number:</td><td>858-946-3235</td><td>Latitude:</td><td colspan="3">°N 39.361336774</td></tr>
<tr><td>SIC code:</td><td>TBD</td><td>Longitude:</td><td colspan="3">°W 74.053319796</td></tr>
<tr><td colspan="6">Dun and Bradstreet number: TBD</td></tr>
<tr><td>Largest oil storage capacity (gals):</td><td>130,000 per 1,200 Megawatt Offshore Substation [MW OSS] (power transformer, 2 units)</td><td>Maximum oil storage capacity (gals):</td><td colspan="3">205,015 (per large OSS)</td></tr>
<tr><td>Capacity of aboveground oil storage tanks:</td><td>20,000 per large OSS (day tanks and storage tank)</td><td>Worst case oil discharge amount (gals):</td><td colspan="3">205,015 (per large OSS)</td></tr>
<tr><td colspan="2"></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Applicability of Substantial Harm Criteria:</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?</td><td>YES</td><td>X</td><td>NO</td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="2">Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and, within any storage area, does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation?</td><td>YES</td><td></td><td>NO</td><td>X</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="2">Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?</td><td>YES</td><td></td><td>NO</td><td>X</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="2">Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance such that a discharge from the facility would shut down a public drinking water intake?</td><td>YES</td><td></td><td>NO</td><td>X</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="2">Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than or equal to 10,000 gallons within the last 5 years?</td><td>YES</td><td></td><td>NO</td><td>X</td></tr>
</table>

Management Certification

This plan was developed to prevent and/or control the spills of oil. Atlantic Shores Offshore Wind, LLC herein commits the necessary resources to fully prepare and implement this plan and obtain through contract the necessary private personnel and equipment to respond, to the maximum extent practicable, to a worst-case discharge or substantial threat of such a discharge.

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and that based on my inquiry of those individuals responsible for obtaining information, I believe that the submitted information is true, accurate and complete.

Signature:	______________________	Title:	______________________
Name:	______________________	Date:	______________________

Plan Distribution

Plan Number	Plan Holder	Location
1	Atlantic Shores Facility Office * Primary onshore location where the OSRP is kept with all associated records of its testing and implementation	Atlantic Shores Offshore Wind, LLC One Dock 72 Way Brooklyn, NY 11205
2	Qualified Individual	Atlantic Shores Offshore Wind, LLC One Dock 72 Way Brooklyn, NY 11205
3	Alternate Qualified Individual	Atlantic Shores Offshore Wind LLC 1 Beacon Street, 15th Floor Boston, MA 02108
4	Operations Center	TBD
5	Bureau of Safety and Environmental Enforcement (BSEE) Supervisor – Oil Spill Preparedness Division Gulf of Mexico Region OSP Section – GE 921	BSEE Oil Spill Preparedness Division Gulf of Mexico Region OSP Section – GE 921 1201 Elmwood Park Boulevard New Orleans, LA 70123-2394
6	Bureau of Ocean Energy Management (BOEM) Atlantic OCS Region	BOEM Atlantic OCS Region 1201 Elmwood Park Boulevard New Orleans, LA 70123-2394

Plan Number	Plan Holder	Location
7	EPA Region 1 (New England)	EPA Region 1 Emergency Planning and Response Branch 5 Post Office Square Suite 100 (OSRR02-2) Boston, MA 02114-2023
8	EPA Region 2 (New York and New Jersey)	EPA Region 2 Emergency Planning and Response Branch Ted Weiss Federal Building, 290 Broadway New York, NY 10007
9	EPA Region 3 (Pennsylvania, Delaware, Maryland, West Virginia, District of Columbia, and Virginia)	EPA Region 3 Emergency Planning and Response Branch 1650 Arch Street Philadelphia, PA 19103
10	USCG First Coast Guard District (D1)	USCG D1 408 Atlantic Avenue Boston, MA 02110
11	USCG Fifth Coast Guard District (D5)	USCG D5 431 Crawford Street Portsmouth, VA 23704
12	USCG Sector Delaware Bay	USCG Sector Delaware Bay 1 Washington Ave Philadelphia, PA 19147
13	USCG Sector New York	USCG Sector New York 212 Coast Guard Drive Staten Island, NY 10305
14	USCG Sector Long Island Sound	USCG Sector Long Island Sound 120 Woodward Avenue New Haven, CT 06512
15	New Jersey Department of Environmental Protection (NJDEP)	NJDEP 401 E State Street Trenton, NJ 08608

30 CFR 254.30(a): Biennial OSRP Review

Date	Name of Reviewer &Title	Signature

30 CFR 254.30(b): Revision Record

Revision Number	Revision Date	Pages and/or Sections Affected	Description of Revision
		All	Initial release

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List of Acronyms

ACP	Area Contingency Plan
APE	Area of Potential Effect
AQI	Alternate Qualified Individual
bbls	Barrels
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
COP	Construction and Operations Plan
COTP	Captain Of The Port
CFR	Code of Federal Regulations
CTV	Crew Transfer Vessels
DOI	Department of the Interior
ECC	Export Cable Corridors
ERMA	Environmental Response Management Application
EPA	Environmental Protection Agency
ERT	Emergency Response Team
ESI	Environmental Sensitivity Index
FOSC	Federal On-Scene Coordinator
gals	Gallons
GBS	Gravity Based Structure
GRP	Geographic Response Plan
GRS	Geographic Response Strategy
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICS	Incident Command System
IMT	Incident Management Team
MW	Megawatt
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
NJOEM	New Jersey Office of Emergency Management
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
OCS	Outer Continental Shelf
OFW	Offshore Floating Wind
O&M	Operation and Maintenance
OSHA	Occupational Safety & Health Administration

OSPD	Oil Spill Preparedness Division
OSRO	Oil Spill Removal Organization
OSRP	Oil Spill Response Plan
OSRV	Oil Spill Recovery Vessel
OSS	Offshore Substation
PDE	Project Design Envelope
PPE	Personal Protective Equipment
QI	Qualified Individual
RCP	Regional Contingency Plan
RRT	Regional Response Team
SHPO	State Historical Preservation Office
SOSC	State On Scene Coordinator
SOV	Service Operations Vessels
SPCC	Spill Prevention, Control, and Countermeasures
TBD	To Be Determined
UC	Unified Command
USCG	United States Coast Guard
Vol	Volume
WTA	Wind Turbine Area
WTG	Wind Turbine Generators

1. Plan Introduction Elements

1.1 Purpose and Scope of Plan Coverage

This Oil Spill Response Plan (OSRP) covers the offshore wind energy generation project (the Project) within the southern portion of Lease Area OCS-A 0499 (the Lease Area). The OSRP provides clear notification and activation procedures and identifies shore-based resources to respond to an oil spill or the substantial threat of an oil discharge from any Wind Turbine Generator (WTG) and Offshore Substation (OSS) at Atlantic Shores. This current OSRP is a draft plan because of the Project Design Envelope (PDE) approach that Atlantic Shores is taking. Once the project is approved, the OSRP will be finalized for Bureau of Safety and Environmental Enforcement (BSEE) and Bureau of Ocean Energy Management (BOEM) review and approval prior to construction. This OSRP focuses on planning for an oil spill response in the offshore environment. A Spill Prevention Control and Countermeasures (SPCC) Plan will be developed to detail the plan for a potential oil spill response from the onshore facilities and activities.

Atlantic Shores, a 50/50 joint venture between EDF Renewables North America and Shell New Energies US LLC, is proposing to develop an offshore wind energy generation project (the Project) within the southern portion of Lease Area OCS-A 0499, which has been designated by BOEM for wind energy development. The Project also includes offshore export cables (export cables) within federal and New Jersey state waters, onshore interconnection cables and onshore substations within New Jersey, and operations and maintenance (O&M) facilities in New Jersey. The Project is being permitted using a PDE which provides a reasonable range of designs for proposed components (e.g., foundations, WTGs, OSS, export cables, onshore elements).

Lease Area OCS-A 0499 is located on the Outer Continental Shelf (OCS) within the New Jersey Wind Energy Area. Atlantic Shores' proposed offshore wind energy generation facility will be located in an approximately 102,055-acre (413-km2) Wind Turbine Area (WTA) located in the southern portion of the Lease Area. Figures of the Lease Area can be found in Annex 1. At its closest point, the WTA is approximately 8.7 miles (mi) from the New Jersey shoreline. Within the WTA, the Project will include up to 200 wind turbine generators (WTGs) and up to 10 offshore substations (OSSs). The WTGs and OSSs will be connected by a system of 66 kV to 150 kV inter-array cables. OSSs within the WTA will be connected by 66 kV to 275 kV inter-link cables.

The WTGs will be aligned in a uniform grid with multiple lines of orientation allowing straight transit corridors through the WTA. The oil sources in the WTGs potentially include emergency generator oil, hydraulic fluid, grease, gear and bearing lubricating oil, and transformer oil with a maximum volume of approximately 3,781 gallons per WTG. The total potential oil quantity for 200 WTGs is 756,200 gallons.

Atlantic Shores is considering three sizes of OSS. Depending on the final OSS design, there will be up to 10 small OSSs, up to five medium OSSs, or up to four large OSSs. Small OSSs will be located no closer than 12 miles (19.3 km) from shore whereas medium and large OSSs will be located at least 13.5 mi (21.7 km) from shore. The worst-case oil discharge is conservatively assessed as a catastrophic release of all oil contents from a large OSS located closest to shore. Oil sources in the OSSs include main power transformers, auxiliary/earthing transformers, reactors, diesel storage tanks, and diesel engines. Oil sources presented in this document are associated with the large OSS. The oil sources associated with one large OSS are approximately 205,015 gallons.

- All fluids used on these offshore structures are contained on the structure. Each fluid source has drip trays, pans or other devices to collect any leaks. Each pan or tray has a drain system leading to a collection tank. This design will act to prevent most possible incidents at the WTA.

The WTA is located in the OCS, as defined by 30 CFR 254.6 and Section 2 of the Submerged Lands Act (43 U.S.C. 1301). Therefore, this plan is written in accordance with the requirements of 30 CFR Part 254, Subpart B, Oil Spill Response Plans for Outer Continental Shelf Facilities. In accordance with 30 CFR 254, the OSRP demonstrates that Atlantic Shores can respond effectively in the unlikely event that oil is discharged in the WTA. The State of New Jersey does not require planning and response submittals for review and approval with regards to offshore oil.

The purpose of this OSRP is to provide a written procedure for directing a plan of action in the event of a discharge of oil in the WTA. The discharge may be the result of a spill, accident, natural disaster, or civilian threat. This OSRP adopts procedures to allow for a uniform plan of action that will assist in a systematic and orderly manner of response to any oil discharge incident. This plan of action will minimize confusion and indecision, prevent extensive damage or injury to personnel, and minimize exposure to the public and the environment. Routine training and exercises regarding the content of this plan will provide the confidence needed for personnel to perform their assigned duties if such an event occurs. Designated Qualified Individual (QI) and Alternate Qualified Individuals (AQI) are considered Emergency Coordinators. In addition, a Spill Response Coordinator and alternate Spill Response Coordinator will be identified to lead any spill response effort. Personnel, through the use of this OSRP, will utilize all resources necessary to bring any discharge under control. In order to prepare for such control, all personnel will be well-trained and knowledgeable as to their various roles during a release.

A Regulatory Compliance and Cross-Reference Matrix is included in this OSRP as Annex 6 clearly showing how this plan covers all regulatory requirements of 30 CFR §254.

The OSRP was prepared considering the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR §300), the Region 2 Regional Response Team (RRT) Regional Contingency Plan (RCP), and the Delaware Bay Area Contingency Plan (ACP).

- The RRT2 RCP is available at https://www.nrt.org/sites/47/files/Final%20R2%20RCP%20Revised%20December%202020.pdf

- The Delaware Bay ACP is available at https://homeport.uscg.mil/Lists/Content/Attachments/2887/Delaware%20Bay%20ACP%20-%202019.1.pdf.

The location of the Atlantic Shores WTA offshore of Atlantic City, New Jersey is within the Delaware Bay ACP Planning Area and under the U.S. Coast Guard (USCG) Federal On-Scene Coordinator (FOSC) at Sector Delaware Bay. This location is unique for oil spill response regulations and federal oversight. It is within the Region 2 RRT and the Environmental Protection Agency (EPA) Region 2, both based in New York and covering the states of New York and New Jersey. However, for USCG Area of Responsibility, this area of New Jersey is under jurisdiction of Sector Delaware Bay based in Philadelphia, Pennsylvania and regionally under the Fifth Coast Guard District based in Portsmouth, Virginia. Figure 1-1 shows the relation of the Lease Area to these regulatory areas. The locations of the USCG Districts can be seen in Figure 1-2.

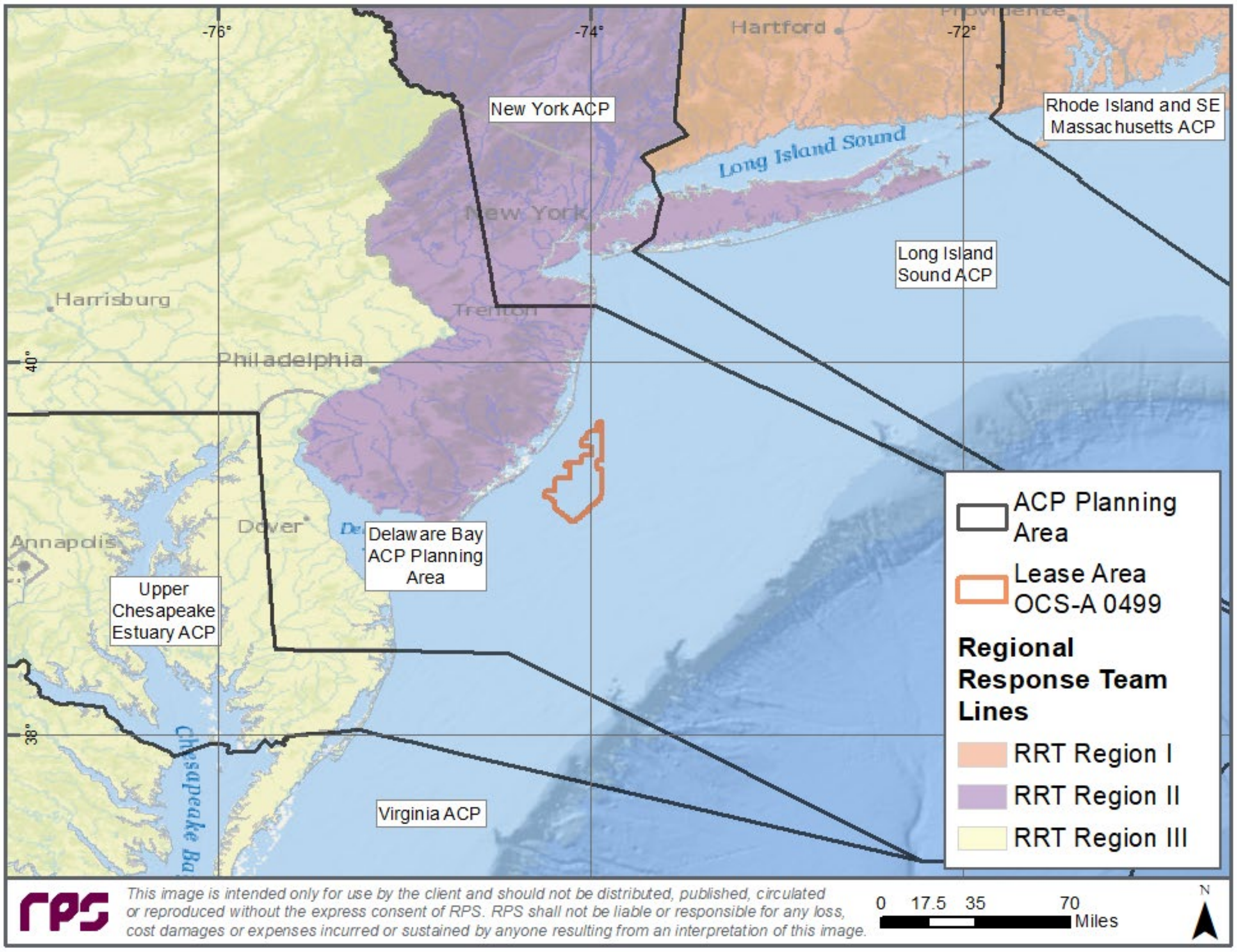

Figure 1-1. Atlantic Shores Lease Area in relation to federal regulatory areas.

Figure 1-2. Location of USCG Districts and Areas (from www.boatharbors.com).

Although unlikely, an oil spill from Atlantic Shores could potentially impact the states of Pennsylvania, Delaware, Connecticut, Rhode Island, or Massachusetts. A trajectory analysis will be performed as part of the Project's Facility Design Report (FDR) and Fabrication and Installation Report (FIR) in accordance with 30 CFR 585.701 and 702 to determine if these areas could be impacted. These areas are covered by the Region 3 RRT for Pennsylvania and Delaware to the south and the Region 1 RRT for New England to the north. During an incident that impacts more than one region, a lead RRT would be agreed upon to provide guidance. For a response impacting these additional areas, the FOSCs from the appropriate Coast Guard Sector could be involved in the response with the USCG Sector Delaware Bay FOSC as the lead.

The OSRP is consistent with the RCPs and ACPs in that it provides a method and process for communication, coordination, containment, removal, and mitigation of pollution and other emergencies. The preparation of this plan utilized the detailed information provided in the Region 2 RCP and the Delaware Bay ACP. The specific guidelines presented in this plan were carefully thought out, prepared in accordance with safe practices, and are intended to prepare personnel to respond to oil spills and other environmental emergencies. Atlantic Shores commits to the necessary resources to implement this plan.

Specifically, this OSRP:

- Identifies the QIs or Person in Charge with full authority to implement this response plan;
- Requires immediate communication with the appropriate federal, state, and local officials, and entities/persons providing personnel and equipment;
- Identifies and ensures by contract or other means the availability of personnel and equipment necessary to remove a worst-case discharge and mitigate or prevent a substantial threat of such a discharge; noting the specific Oil Spill Removal Organization (OSRO); and
- Describes training, equipment testing, periodic unannounced drills, and response actions.

1.2 Regulatory Applicability

The NCP, RRT 2 RCP, and the Delaware Bay ACP were reviewed, and this plan was written to comply with all federal, state, and local oil spill response regulations.

1.3 General Facility Information

The WTA is located on property in the OCS in the southern portion of BOEM Lease Area OCS-A 0499 approximately 8.7 miles from the New Jersey shoreline at its closest point. A figure of the WTA is located in Annex 1, Figure A1. The mailing address for Atlantic Shores is One Dock 72 Way, Brooklyn, NY 11205.

The Project consists of WTGs, OSSs, and associated foundations; inter-array and inter-link cables; and export cables. Oil sources in the WTGs may include emergency generator oil, hydraulic fluid, grease, gear and bearing lubricating oil, and transformer oil with maximum volume of approximately 3,781 gallons (90 bbls) per WTG and 756,200 gallons (18,005 bbls) for the 200 WTGs in the WTA. Oil sources in the OSSs may include main power transformers, auxiliary/earthing transformers, reactors, diesel storage tanks, and diesel engines. Oil sources presented in this document are associated with the large OSS. The oil sources associated with one large OSS total approximately 205,015 gallons (4,881 bbls) with a maximum of 820,060 gallons (19,525 bbls) for four large OSSs.

Table 1-1 provides general information for the Project as it pertains to planning for potential oil spills. Annexes 1, 3, and 7 provide discussion of facility operations in greater detail regarding equipment description, drainage, secondary containment, and emergency planning scenarios.

Table 1-1. Facility Summary Information

Facility Owner	Atlantic Shores Offshore Wind, LLC
Facility Name	Atlantic Shores
Facility Mailing Address	One Dock 72 Way, Brooklyn, NY 11205
Facility Qualified Individual	TBD
Facility Phone Number	858-946-3235
E-mail Address	info@atlanticshoreswind.com
Latitude	°N 39.361336774
Longitude	°W 74.053319796
SIC Code	TBD
Wind Turbine Generators (WTGs)	• Up to 200 WTGs in the WTA • Largest oil source in the WTGs is the 66-kilovolt transformer: 1,800 gallons per WTG • Total oil storage is 3,781 gallons per WTG • WTGs are equipped with secondary containment which is sized according with the largest container.
Offshore Sub Stations (OSSs): Diesel Fuel Storage Tank	• Up to 10 small or 4 large OSS in the WTA • 20,000 gallons per large OSS
OSS: Diesel Engines	• Up to 10 small, 5 medium, or 4 large OSS in the WTA • Internal motor lubrication oil in the diesel engines is 15 gallons per large OSS
OSS: Transformers	• OSS will have power transformers and auxiliary/earthing transformers containing 130,000 gallons of oil per large OSS. These transformers are the largest oil source in each OSS. • Total oil storage is 205,015 gallons per large OSS
OSS: Reactors	• Reactors: 55,000 gallons per large OSS
Materials Stored / Oil Storage Start-Up Date	See Annex 7 / 2025
Worst-Case Discharge Volume[1]	205,015 gallons per large OSS
Maximum Most Probable Discharge Volume (United States Coast Guard [USCG]) [2]	20,502 gallons per large OSS
Average Most Probable Discharge Volume (USCG) [2]	2,050 gallons per large OSS
Oil Spill Removal Organization (OSRO)	To Be Determined (TBD)

Notes:

1. The BSEE/BOEM "Oil Spill Response Plan (OSRP) for Offshore Wind Facilities Discussion Handout" provided guidance on worst-case discharge volume for an offshore wind facility.
2. Definitions in 33 CFR 155.1020 are based on percentage of cargo from a vessel during oil transfer operation. These same percentages were used here.

1.4 Operations at Atlantic Shores

During the Installation, Operations, and Decommissioning phases, the project will use crew transfer vessels (CTVs) and/or service operations vessels (SOVs). In addition to CTVs and SOVs, other vessels may be used to support O&M activities over the lifetime of the Project:

- Helicopters may offer support services for multiple O&M strategies.

- Large support vessels (e.g. jack-up vessels) may be required for service activities requiring crane access, including major component replacement (MCR), some routine maintenance activities, and periodic corrective maintenance.

- Survey vessels would be required for cable and foundation inspection campaigns and cable repair vessels would support cable repair campaigns.

- Other monitoring and inspection needs may be met by Unmanned Aerial Vehicles (UAV), Remotely Operated Vehicles (ROV), or underwater drones.

Oil spills from these vessels, vehicles, and aircraft could also occur in the area. Notifications, assessments, and response operations for these incidents would follow the same general structure of this plan. The non-tank vessels of 400 GT or larger on site will also maintain their own Shipboard Oil Pollution Emergency Plan (SOPEP) and Vessel Response Plan (VRP) under international and national regulations, respectively, to manage an oil spill response from these vessels.

The categories of oil and chemical spills that may potentially be associated with Atlantic Shores include:

- Spills from wind facility components caused by damage from external environmental forces (natural events), including earthquakes, tsunamis, and storms (hurricanes);
- Spills caused by fires and explosions in facility structures;
- Spills resulting from structural or equipment failures in facility structures;
- Spills resulting from operations (refueling, maintenance);
- Spills caused by intentional damage (vandalism, terrorism, war);
- Spills from wind facility components due to vessel allisions with wind facility structures;
- Spills from vessels due to vessel allisions with wind facility structures; and
- Spills from vessels resulting from vessel collisions and groundings attributable to presence of the facility.

1.5 Plan Review and Revision

In accordance with 30 CFR §254.30, the OSRP will be reviewed at least every two years from its effective date. It is important to note that this plan is a living document that will be updated as project details change. Documentation of this review will be provided in the Review Table presented at the front of this OSRP. If the review does not result in modifications to the OSRP, the Chief of the BSEE Oil Spill Preparedness Division (Chief, OSPD) will be notified in writing that there are no changes.

The OSRP will be modified and submitted to the Chief, OSPD for approval within 15 days when the following occurs:

- A change occurs which significantly reduces response capabilities;
- A significant change occurs in the worst-case discharge scenario or in the type of oil being handled, stored, or transported at the facility;

- A change in the name(s) or capabilities of the OSROs cited in the OSRP;
- A significant change to the ACP(s) for the region; or
- The Chief, OSPD requires that Atlantic Shores resubmit the OSRP.

2. Emergency Response Action Plan

2.1 Oil Spill Detection, Notifications, and Initial Response

Detection of a spill or emergency is the first step in a response. There are several methods by which an emergency situation at Atlantic Shores may be discovered including the following:

- Automated equipment monitoring system alarm
- Discovered by company personnel during scheduled or unscheduled maintenance; or
- Reported by private citizens or by public officials.

In every case, it is important to collect accurate information and immediately notify the On-Duty Supervisor and any affected area personnel. Initial response will take place as indicated in Table 2-1 Initial Response Actions Checklist. The Initial Notification Data Sheet Form (Annex 4**)** will be completed by the On-Duty Supervisor while discussing the incident when it is initially reported by the person detecting the spill/discharge. Information not immediately known may be added to the form as it becomes available.

The On-Duty Supervisor will notify the QI or AQI upon receiving notification of an emergency event. The QI, AQI, or designee will make notifications as discussed in Section 2.2 to federal, state, and local agencies (Figure 2-1 and Table 2-3) immediately and shall assure that all required documentation is kept.

When making the initial notifications to the On-Duty Supervisor and affected personnel, one should attempt to provide the following information:

- Name of caller and callback number;
- Exact location (i.e. structure number and latitude and longitude coordinates) and nature of the incident (e.g., fire, oil spill);
- Time of incident;
- Name and quantity of material(s) involved, or to the extent known;
- The extent of personal injuries, damage and/or fire, if any;
- The possible hazards to human health, or the environment, outside the facility;
- Body of water or area affected;
- Quantity in water (size and color of slick or sheen) or amount released to the land or atmosphere;
- Present weather conditions–wind speed and direction, movement of slick or sheen, current/tide;
- Potential for fire; and
- Action being taken to control the discharge

A log should be maintained which documents the history of the events and communications that occur during the response (see Annex 4). It is important to remember that the log may become instrumental in legal proceedings, therefore:

- Record only facts, do not speculate.
- Do not criticize the efforts and/or methods of other people/operations.
- Do not speculate on the cause of the spill.
- If an error is made in an entry, do not erase; draw a line through it, add the correct entry above or below it and initial the change.
- Always evaluate safety throughout the response actions.
-

Table 2-1. Initial Response Checklist

Action	Comments
First Person on Scene	
Take personal protective measures and/or distance.	
Identify and control source, if possible (identify damaged equipment, deploy alternate containment or absorbent material). Eliminate ignition sources.	
Notify the On-Duty Supervisor.	
Notify the affected personnel of the incident.	
Warn personnel in the area and enforce safety and security measures.	
If possible, implement countermeasures to control the emergency. If personal health and safety is not assured, do not attempt to reenter the emergency site.	
Designate a Staging Area where the Emergency Response personnel and equipment can safely report to without becoming directly exposed to the emergency release (until QI arrives).	
On-Duty Supervisor	
Activate local alarms and evacuate non-essential personnel.	
Notify QI.	
Initiate defensive countermeasures and safety systems to control the emergency (booms, sorbent material, loose dirt, sandbags, or other available materials). Eliminate ignition sources.	
Initiate Emergency Response notification system.	
Dispatch response resources as needed.	
Monitor and or facilitate emergency communications until QI arrives.	
Keep the public a safe distance from the spill.	
Qualified Individual (QI) or Designee	
Notify federal, state and local agencies and other external stakeholders.	
Establish On-Scene Command and an Incident Command Post.	
Assess situation and classify incident.	
Determine extent and movement of the spill	
Identify sensitive areas and determine protection priorities.	

Action	Comments
Request response resources from Oil Spill Removal Organization (OSRO) and Spill Management Team	
Establish Isolation Zones (Hot, Warm, Cold) and Direct On-Scene Response Operations.	
Keep the public a safe distance from the spill.	
Form Unified Command with the USCG FOSC and State On Scene Coordinator (SOSC). Direct operations until relieved by Incident Management Team's Incident Commander, Owner's Representative, or the incident response is complete.	

2.2 Notifications

2.2.1 When to Notify

When there is a discharge of oil, or substantial threat of a discharge of oil, or a sheen observed in or outside the WTA, the following notifications must be made:

2.2.2 Internal Notifications

The individual discovering the spill will call the On-Duty Supervisor immediately and report initial facts about the incident. The On-Duty Supervisor will record the facts (see forms in Annex 4) and immediately (within 15 minutes) notify the QI. Table 2-2 lists the QIs and their 24-hour contact information. The QI or designated alternate on duty will be available 24-hours per day and capable of arriving to the Atlantic Shores WTA in a reasonable amount of time after contacting (typically within one hour). A Spill Response Coordinator and Alternate Spill Response Coordinator will also be available to assist in the oil spill response effort. The Spill Response Coordinators will be members of a Spill Management Team (SMT) that will be available to mobilize to the incident 24 hours a day, 7 days a week. This SMT will staff an incident response organization set up in a standard National Incident Management System Incident Command System organization with appropriate positions activated, as needed. A Spill Response Operating Team will also be available on a 24-hour basis to deploy and operate spill-response equipment at the WTA.

Other than the Spill Response Operating Team, these Atlantic Shores response personnel will manage any incident from the O&M facility which will act as a spill-response operations center and will include provisions for primary and alternate communications systems available for use in coordinating and directing spill-response operations.

Table 2-2. Internal Atlantic Shores Notifications

Name	Position	Cell	Email
TBD	Qualified Individual, Atlantic Shores		
Person B	Alternate Qualified Individual	(XXX) XXX-XXXX	XXX@XXX.com
Person C	Spill Response Coordinator	(XXX) XXX-XXXX	XXX@XXX.com
Person D	Alternate Spill Response Coordinator	(XXX) XXX-XXXX	XXX@XXX.com
Persons E-Z	Other Spill Management Team Members		

2.2.3 External Notifications

- Any person or organization responsible for an oil spill is required to notify the federal government when the amount reaches a federally-determined limit. This federally-determined limit is based on the “Discharge of Oil” regulation. The Discharge of Oil regulation is more commonly known as the "sheen rule” and requires notifications of:
- Discharges that cause a sheen or discoloration on the surface of a body of water;
- Discharges that violate applicable water quality standards; and
- Discharges that cause a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines.

Anyone who discovers an oil spill meeting any of the above criteria must contact the National Response Center (NRC) at (800) 424-8802 as soon as knowledgeable of the spill. Notifying the NRC meets all federal reporting requirements, including USCG, the Bureau of Safety and Environmental Enforcement (BSEE), and the Bureau of Ocean Energy Management (BOEM). Atlantic Shores will provide the following information, if it is known:

- Name, location, organization, and telephone number
- Name and address of the party responsible for the incident; or name of the carrier or vessel, the railcar/truck number, or other identifying information
- Date and time of the incident
- Location of the incident
- Source and cause of the spill
- Types of material(s) spilled
- Quantity of materials spilled
- Medium (e.g., land, water) affected by spill
- Danger or threat posed by the spill
- Number and types of injuries or fatalities (if any)
- Weather conditions at the incident location
- Whether an evacuation has occurred
- Other agencies notified or about to be notified
- Any other information that may help emergency personnel respond to the incident

State of New Jersey Notifications and Response

In addition to federal notifications, Atlantic Shores will immediately complete all required state notifications.

New Jersey Law requires that discharges of hazardous materials be immediately reported to the New Jersey Department of Environmental Protection (NJDEP) HOTLINE 1-877-WARNDEP / 1-877-927-6337. Generally, emergency responders are deployed immediately upon a credible report of medium or major oil spills anywhere and minor spills in pristine waters

For a worst-case discharge, NJDEP, the New Jersey Office of Emergency Management (NJOEM), and the NJ State Police Marine Bureau and/or the Division of Criminal Justice will likely respond physically to the scene.

The following information must be reported to NJDEP for the discharge of any hazardous substance (which by New Jersey Law included any petroleum products):

- The name, title, affiliation, address and telephone number of the person reporting the discharge;
- The location of the discharge, including the name of the water body, location of the discharge with reference to a fixed point or points, and a description of the area which the discharge may reach;
- The common name of the hazardous substance(s) discharged;
- An estimate of the quantity of each hazardous substance discharged, including best estimates if the quantities are unknown;
- The date and time at which the discharge began, and whether the discharge is continuing, intermittent or terminated;
- The actions such person proposes to take to contain, clean up and remove the hazardous substance(s) discharged; and
- The name and address of any person responsible for the discharge.

Atlantic Shores will also notify the New Jersey Historic Preservation Office (HPO) in the event sensitive historic and prehistoric resources could be impacted by the spill. The HPO will evaluate areas where response actions are to be conducted for potential impact to historic and culturally sensitive sites.

Additional Notifications

The QI, AQI, or designee will make all initial and follow-up federal, state, and local agency notifications. Atlantic Shores will use forms provided in Annex 4 to document details of notifications and ensure accurate information is being passed along. Although notification to NRC completes ALL federal agency notification requirements, Atlantic Shores will follow-up directly with the appropriate agencies as needed. Specific phone numbers for initial federal, state, and local response agencies are included in Table 2-3. Although not required by regulations, courtesy calls can be placed directly to local offices of federal agencies in order to establish lines of communication, if desired. A complete list of phone numbers for agencies, resources, and stakeholders who may need to be contacted during a particular incident are provided in Annex 2.

The Atlantic Shores-contracted OSRO will be notified immediately following any oil spill that cannot be contained on the OSS or WTG. They may initially be placed on standby as more details are being gathered about the spill, or they may be immediately activated to the scene.

There are a number of other contacts that will be made if required, and they may include:

- Emergency Medical Personnel;
- Occupational Safety & Health Administration (OSHA); and
- Wildlife rehabilitation personnel.
- Table 2-3 lists initial emergency notifications. Annex 2 provides a complete list of potential response resources, trustees, and federal, state, and local agencies.

Table 2-3. Initial Agency Notifications

Agency	Phone	Requirements for Notifications
Federal Agencies		
National Response Center (NRC)	**(800) 424-8802 (serves to notify all federal agencies)**	**Immediate notification is required for all discharges of oil sufficient to produce a sheen on the surface of a body of water of the United States.**
USCG Sector Delaware Bay	215-271-4800	Atlantic Shores' notification to the NRC completes all federal agency notifications. Atlantic Shores will notify USCG Sector Delaware Bay directly to provide additional information.
BSEE Atlantic OCS Region	504-736-0557	Pursuant to 30 CFR 250.187(d) and 30 CFR 254.46(b), Atlantic Shores will notify BSEE without delay for a spill that is one (1) barrel or more or, if the volume is unknown, is thought to be one barrel (1) or more.
BOEM Atlantic OCS Region	1-800-200-4853	Atlantic Shores will directly notify BOEM for a spill on the OCS.
State Agencies		
New Jersey Department of Environmental Protection (NJDEP)	**1-877-WARNDEP / 1-877-927-6337**	**Immediately after a discharge commences, any person or persons responsible for a discharge who knows or reasonably should know of the discharge, shall immediately notify the Department. In the event that the 877 number is inoperable, any person or persons responsible for a discharge shall immediately notify the State Police at 609-882-2000**
Local Authorities		
Atlantic City Fire Department	609-347-5590	Notify the local fire department for any incident at Atlantic Shores to expedite local response resources to the scene.
USCG Station Atlantic City	609-344-6594	NRC will notify the Coast Guard. However, local contact for updating information can assist the federal response. USCG Station Atlantic City can respond for Search and Rescue on board Coast Guard small boats.
USCG Air Station Atlantic City	609-677-2000	NRC will notify the Coast Guard. However, local contact for updating information can assist the federal response. USCG Air Station Atlantic City can provide aviation resources.
OSRO		
TBD		
Contact information for additional agencies or services that may become involved in an incident is provided in Annex 2.		

2.3 Establishment of a Unified Command

The QI at the facility will initially be the Incident Commander during any spill. As the incident escalates, personnel from the facility, particularly the Spill Response Coordinator and/or Alternate Spill Response Coordinator, as well as federal, state, and local agencies will augment the response forming a Unified Command (UC) managed by an interagency Incident Management Team (IMT). The National Incident Management System (NIMS) will be used by the facility, in concert with OSROs and federal, state, and local agencies. An outline of the ICS structure can be found in Annex 3. Because the use of NIMS ICS is mandated for all levels of government by Homeland Security Presidential Directive 5 (HSPD-5), Atlantic Shores will ensure that this flexible system is implemented in the event of an incident.

The designated QI or AQI for Atlantic Shores is English-speaking, located in the United States, available on a 24-hour basis, familiar with implementation of this response plan, and trained in the responsibilities under the plan. The QI and designated AQI have full written authority to implement this response plan, including:

- Activating and engaging in contracting with identified OSROs,
- Acting as a liaison with the pre-designated FOSC and SOSC; and
- Obligating, either directly or through prearranged contracts, funds required to carry out all necessary or directed response activities.

2.3.1 General Spill Mitigation

The Atlantic Shores facility will be designed to ensure that any temporary connections transporting oily substances (e.g., between diesel storage container and emergency generator) are made using off-shore certified dry-break connectors and placed above a drip tray. A simple oil spillage kit, allowing to mitigate small, local spillage during maintenance, will be part of the delivery. in the WTGs and OSSs are designed to have a secondary containment system, which will be sized according to the largest container.

- While the above design parameters will act to prevent spills, incidents can still occur. In case of an oil discharge or other marine casualty, the highest priority is always the safety of the personnel. The mitigation procedures included in this section provide general guidance in responding to a casualty or oil spill and are supplements to the advisements contained in the Project Operations Manual. There is no substitute for training of the Spill Response Operating Team and onboard drills on all emergency procedures to mitigate the casualty or environmental impact.
- All fluids used on the offshore structures are contained on the structure. Each fluid source has drip trays, pans or other devices to collect any leaks. Each pan or tray has a drain system leading to a collection tank.

2.3.2 Preliminary Assessment

After initial response is taken to secure the source of the spill, and notifications are made to the required agencies, further spill containment, recovery, and disposal operations can begin. It is important to first identify the magnitude of the problem and resources threatened. The QI or designee will:

1. Classify the type and size of spill.
2. Determine chemical and physical properties of spilled material for potential hazards (see Annex 10, Material Safety Data Sheets).

3. Obtain on-scene weather forecast such as wind speed, wind direction, and tide schedules (12, 24, 48, and 72-hour).
4. Track oil movement or projected movement. Consider need for overflights.
5. Continuously assess human health and environmental concerns.
6. Determine extent of contamination and resources threatened (i.e., waterways, wildlife areas, economic areas).
7. Start chronological log of the incident.

As part of this Preliminary Assessment, Atlantic Shores will classify the incident to quickly categorize the appropriate level of response, notifications, and resources which may be necessary to mitigate the emergency. The incident will be categorized based upon the nature of the incident, degree of containment and isolation, materials involved or size of the spill, and any other additional information provided by the person reporting the spill. Incident levels may be upgraded or downgraded from the initial determination as further information is determined or the situation changes. The Incident Classification levels are presented in Figure 2-1. A Level One incident will require only the mobilization of Atlantic Shores personnel.

Level One – Minimal danger to life and property and the environment. Project personnel are capable of responding to the incident. The problem is limited to the immediate work area or release site and spills are generally less than 42 gallons.

Level Two – Serious situation or moderate danger to life, property, and the environment. The problem is currently limited to the WTA, but it does have the potential for either involving additional exposures or migrating offsite. The incident could involve a large spill of oil, a fire, or a loss of electrical power.

Level Three – Crisis situation or extreme danger to life, property, and the environment. The problem cannot be brought under control, goes beyond the WTA, and/or can impact public health and safety, and the environment, or a large geographic area for an indefinite period of time. Such incidents include a vessel fire or release of oil in a volume that can impact surrounding areas.

Figure 2-1 Guidelines for Determining Incident Classification

Based on the preliminary assessment, additional cleanup personnel and equipment will be dispatched to the site and deployed to control and contain the spill.

2.3.3 Establishment of Objectives and Priorities

Emergency conditions will be managed in a controlled manner, and oil spill response operations will be conducted with the following objectives:

1. Provide for the safety and security of responders and maximize the protection of public health and welfare.
2. Initiate actions to stop or control the source, and minimize the total volume released.
3. Determine oil fate and trajectories.
4. Contain, treat, and recover spilled materials from the water's surface
5. Conduct an assessment and initiate shoreline cleanup efforts.
6. Identify and protect environmentally sensitive areas, including wildlife, habitats, and historic properties. Develop strategies for protection and conduct pre-impact shoreline debris removal.
7. Identify threatened species and prepare to recover and rehabilitate injured wildlife.
8. Investigate and apply alternative technologies to support response efforts where feasible.
9. Establish and continue enforcement of safety and security zones.
10. Manage a coordinated interagency response effort that reflects the composition of the UC.
11. Inform the public, stakeholders, and the media of response activities.

During a major oil spill, resource, time, and various response constraints may limit the amount of areas that can be immediately protected. Every attempt will be made to prevent impacts to areas surrounding a spill site.

2.3.4 Implementation of Tactical Plan

The general procedures for implementation of a tactical plan are likely to include:

- Maximize protection of response personnel.
- Deploy containment resources, and, if appropriate, divert spill to a suitable collection points that are accessible and create the least impact to surrounding areas.
- Maximize on-water containment and recovery operations.
- Protect sensitive areas.
- Handle wastes to minimize secondary environmental impacts.

Atlantic Shores will establish contractual agreements with an OSRO to conduct oil spill response operations. The Spill Response Operating Team will use containment equipment available at the site to surround or divert the spill until the OSRO arrives on scene. If the spill is large enough to require a UC and Incident Management Team, the Incident Action Planning cycle will begin and will establish incident objectives, strategies, and tactics. The UC would likely be made up of the USCG FOSC, the NJDEP SOSC, and the Atlantic Shores Incident Commander. For small spills, the QI will manage the incident. Although not expected, if the spill is large enough to impact multiple USCG FOSC/Captain of the Port (COTP) Zones and RRT Regions, a lead FOSC and RRT will be determined.

2.4 Oil Spill Response Strategies

2.4.1 Operating Environments

Offshore

The initial response to mitigate/contain a spill offshore is to utilize large OSRVs or other advancing skimming systems to recover the oil before it reaches the shoreline. Oil discharged offshore is generally distributed by the wind. In addition, wave action causes emulsification of the oil, decreasing the recoverable amount and increasing the area of contamination. If the oil does reach the shoreline, GRSs from the ACP will be utilized to protect environmentally sensitive sites.

The WTA is located in the OCS. Water depths in the area range from 19 to 37 meters. However, oils stored in the WTGs and OSSs have a specific gravity of less than 1.0 and would float on the surface of the water. Therefore, feasible mechanical response methods include skimming, booming, and improvised barriers.

Banks

The nearest land mass to the WTGs and OSSs is the New Jersey shoreline, which is located approximately 8.7 miles west of Atlantic Shores. Due to the close proximity of the WTA to the shoreline, it is possible that a discharge of oil would impact the terrain alongside the bed of a river, creek, or stream. A trajectory analysis will be performed as part of the Project’s FDR and FIR to determine if these resources could be impacted.

Bays

Silver Bay, Barnegat Bay, Manahawkin Bay, Great Bay, Reeds Bay, Absecon Bay, Lakes Bay, Great Egg Harbor Bay, and Ludlam Bay are located along the New Jersey coastline with access to the Atlantic Ocean. It is anticipated that a discharge e of oil from a WTG or OSS could reach these bodies of water. A trajectory analysis will be performed as part of the Project's FDR and FIR to determine if these resources could be impacted.

Atlantic Shore will ensure that swift response actions are implemented in order to protect the many bays along the coastline of New Jersey. These bays present environmentally sensitive areas which are critical to protect. The bottom sediments close to shore can be soft and muddy, and the surrounding land can include wetlands and marshes. Floating vegetation can be common. Atlantic Shores will deploy booms to prevent oil from entering the bays. If oil does enter any bays, response measures will be implemented to contain the oil to a small area.

2.4.2 Resources at Risk

Tribal Lands

Atlantic Shores is committed to tribal coordination and already coordinated with tribal nations in the area of the WTA. The tribal nations with whom Atlantic Shores is already coordinating include:

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- Absentee-Shawnee Tribe of Indians of Oklahoma
- Delaware Nation, Oklahoma
- Delaware Tribe of Indians
- Mohican Nation Stockbridge – Munsee Band
- Narragansett Indian Tribe
- Shinnecock Indian Nation
- Stockbridge Munsee Community of New York
- Nanticoke Lenni-Lenape Tribal Nation
- Ramapough Lenape Indian Nation of New Jersey
- Powhatan Renape Nation
- Unkechaug Indian Nation
- Lenape Indian Tribe of Delaware

Wildlife

Several National Wildlife Refuges located in New Jersey, Delaware, and New York could be impacted by a spill from Atlantic Shores. These refuges include Cape May, Edwin B. Forsythe, and Supawna Meadows in New Jersey, Prime Hook and Bombay Hook in Delaware, and Lido Beach, Seatuck, and Wartheim on Long Island, New York. Figure 2-3 shows the location of the National Wildlife Refuges located closest to the Lease Area. The primary National Wildlife Refuge of concern is the Edwin B. Forsythe area, due to its proximity to the WTA.

Because it is illegal to possess wildlife in New Jersey without a permit, Atlantic Shores will ensure any injured, orphaned, or ill wildlife are taken directly to a permitted wildlife rehabilitator. Permitted wildlife rehabilitators by county can be found at https://www.state.nj.us/dep/fgw/pdf/rehab_list.pdf

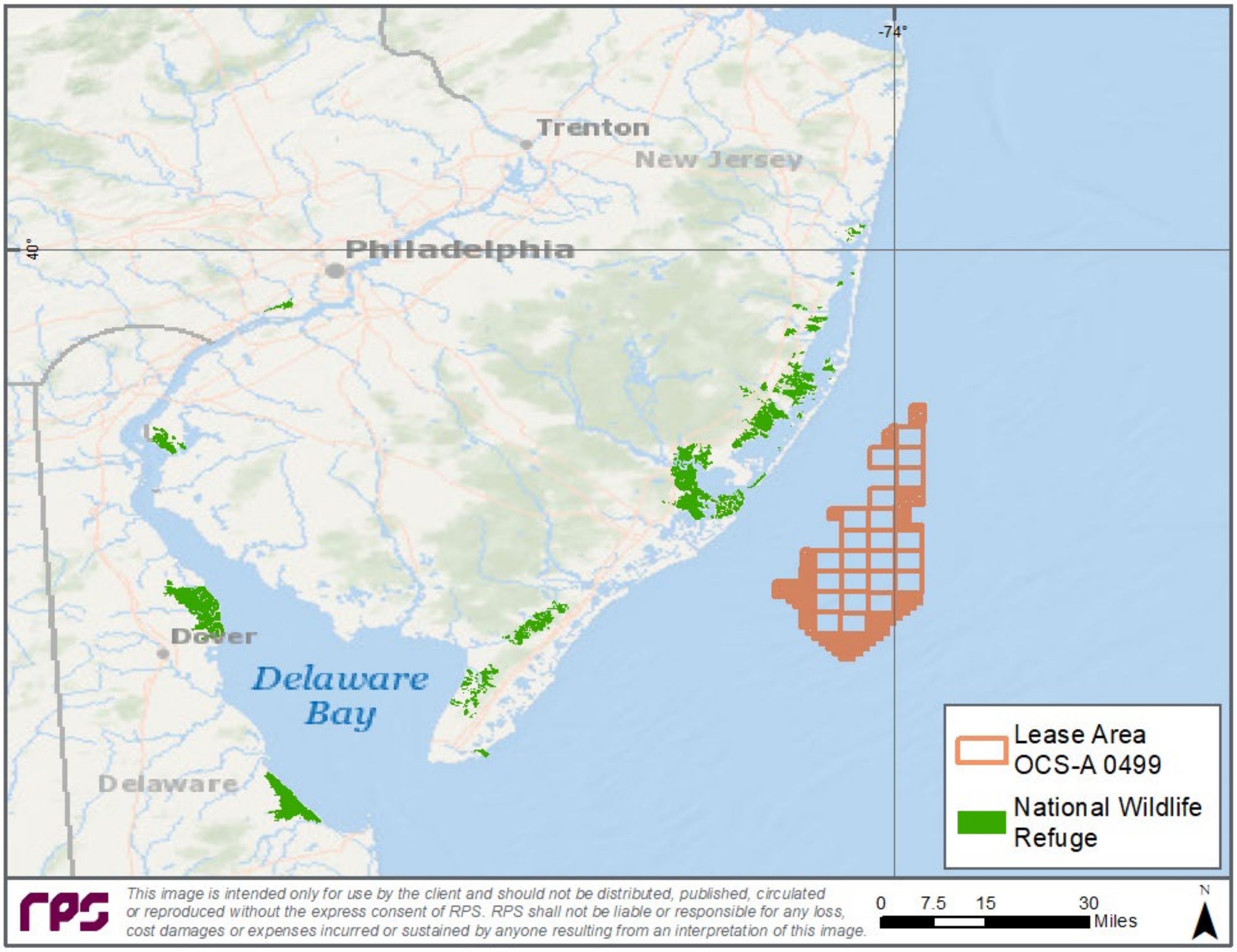


Figure 2-2. National Wildlife Refuges in relation to the Atlantic Shores Lease Area.

Sensitive Sites

Sensitive sites exist in the area that could be impacted by a spill from the Atlantic Shores Project. These sites include environmental, historical, cultural, and socioeconomic areas. Environmental Sensitivity Index maps, available from the National Oceanic & Atmospheric Administration (NOAA), provide a summary of coastal resources that are at risk if an oil spill occurs in the area. The maps are available in pdf format at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html.

GRSs, developed by the Area Committee, are booming strategies to protect these sensitive areas. These strategies can be viewed on the NOAA Environmental Response Management Application (ERMA at https://response.restoration.noaa.gov/atlantic-erma). Atlantic Shores will ensure these strategies are implemented in the Incident Action Plan (IAP).

2.4.3 Containment and Mechanical Recovery Methods

The objective of the initial phase of the containment procedure is to prevent the spread of the spill, especially on water, and confine it to as small an area as possible. The containment goals are to prevent liquid or vapors from reaching a possible ignition source (i.e., boat engines, electrical equipment) and any environmentally sensitive area (i.e., water, wetland, wildlife management area). The primary methods to be used in containing a discharge would be sorbents or containment boom. It will likely be necessary to use many different methods to respond to a spill.

Atlantic Shores will use sorbents to remove minor on-water spills on the WTGs and OSS. For larger spills, Atlantic Shores will use mechanical recovery as the first response measure following an oil spill. These operations will include removing oil using advancing and stationary recovery systems. Oil Spill Recovery Vessels (OSRVs) will be mobilized by the OSRO to remove fresh oil from the water's surface. Adequate storage for recovered oily water will be available to ensure skimming operations can continue. Storage on-board vessels, as well as storage bladders and tanks, may be used in order to extend the recovery operations. In order to protect shorelines from any oil, booming strategies from the Delaware Bay ACP GRS will be employed to divert, deflect, and exclude oil from impacting particularly sensitive areas. The GRS booming strategies developed by the Delaware Bay Area Committee are shown in Figure 2-2.

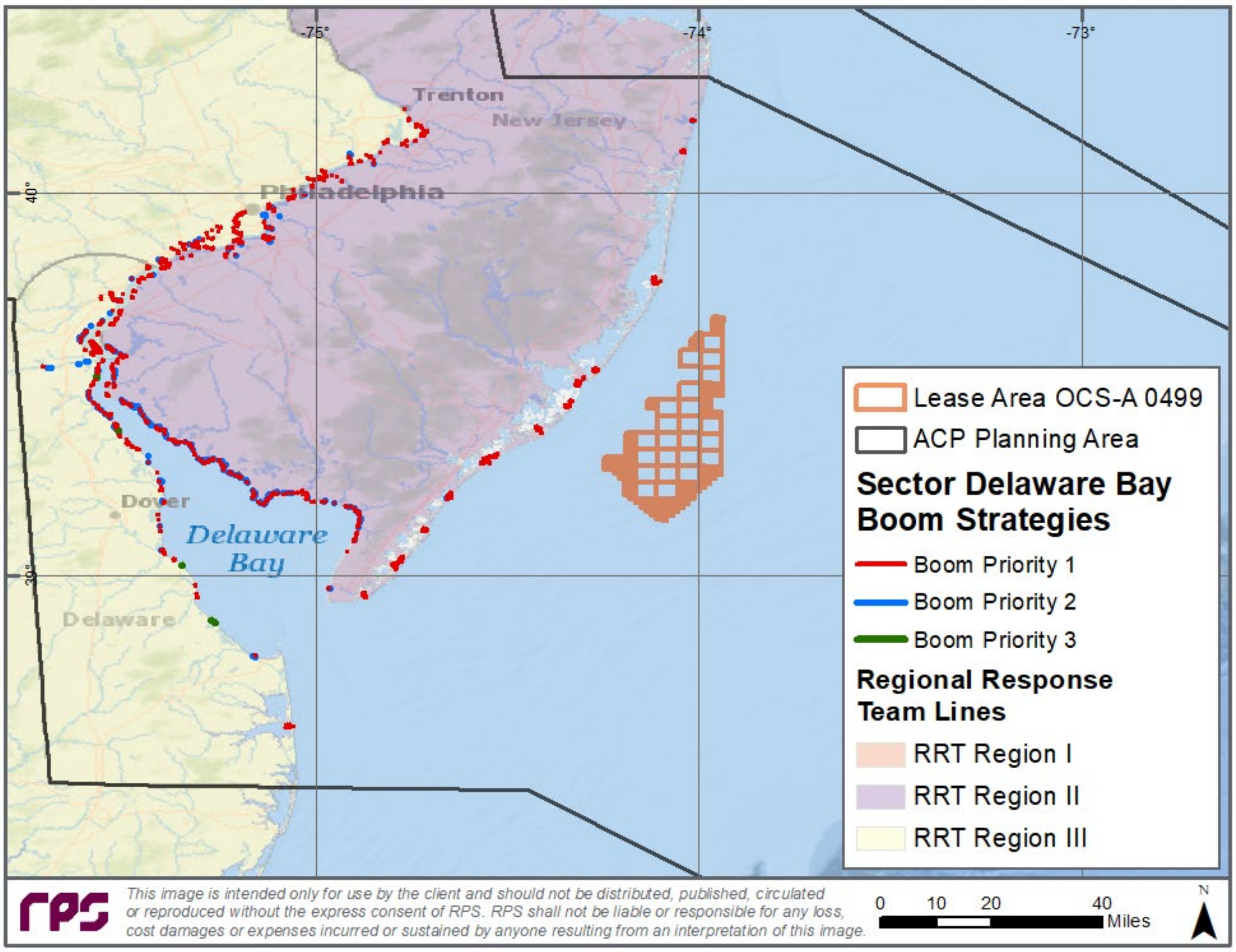


Figure 2-3. Delaware Bay Area Committee Booming Strategies from the GRS.

A summary of the booming techniques for both aquatic and onshore scenarios described in the Delaware Bay ACP GRS is provided in Table 2-4.

Table 2-4. Booming Techniques

Type of Boom	Use of Boom
Containment Booming	• Boom is deployed around free oil. • Boom may be anchored or left to move with the oil.
Diversion Booming	• Boom is deployed at an angle to the approaching oil. • Oil is diverted to a less sensitive area. • Diverted oil may cause heavy oil contamination to the shoreline downwind and down current. • Anchor points may cause minor disturbances to the environment.
Exclusion Booming	• Boom deployed to protect a sensitive area by preventing oil from entering that area

Waste Disposal and Oil Recovery

Oil spill cleanup from recovery operations will involve the handling of recovered oil and oiled materials. The different types of wastes generated during response operations require different disposal methods. Waste will be separated by material type for temporary storage prior to transport to an approved recovery or treatment/storage/disposal facility.

These materials will be directed to a state-approved reclamation/disposal site. Normally, the waste generated from a recovery operation will be classified as a non-Resource Conservation & Recovery Act state regulated waste. New Jersey classifies used or unused waste oil that is not otherwise Resource Conservation & Recovery Act hazardous waste as a Class D regulated recyclable material. In rare instances, where it is suspected that extraneous substances were introduced into a spill, it is appropriate to test the recovered oil for hazardous waste characteristics (ignitability, reactivity, corrosivity, and toxicity).

Because decanting is vital to the efficiency of mechanical recovery of spilled oil by allowing maximum use of limited storage capacity and thereby increasing recovery operations, Atlantic Shores will request approval. Approval will be obtained from federal and state agencies before any decanting is used.

Recovered oil may be transferred to portable tanks. It is important to ensure temporary storage devices are of sufficient size to allow continued operations.

Oily debris collected requires specific handling. Contaminated materials will be placed in leak proof, sealable containers, such as drums or roll-off boxes, and transported to appropriate facilities for processing, recycling, or disposal.

In the unlikely case that oil reaches the shoreline, clean sand and shoreline materials can be separated from oiled materials and returned to the shoreline. Not only is this cost effective from an operations perspective, it also provides an efficient means of returning clean, excavated material back to the shoreline as a restorative measure.

2.4.4 Use of Dispersants

Although it is unlikely that dispersants will be required for a spill from the facility, Atlantic Shores will consider the use of dispersants in any appropriate scenario as an effective means to quickly remove oil from the water's surface and disperse it into the water column.. If the UC determines that dispersants could be an effective countermeasure, the use of dispersants will be requested from the RRT.

The Region 2 RRT developed a Memorandum of Understanding (MOU) for pre-approval of chemical countermeasures in different areas of the Region. Atlantic Shores is located in Zone 2, which is defined as waters under the jurisdiction of the COTP of Delaware Bay that lie between 0.5 nm and 3 nm from the Territorial Sea Baseline along the coast of New Jersey. In Zone 2, the FOSC has advance approval to use chemical countermeasures listed in the NCP Product Schedule on a trial basis.

In 1995, the MOU extended the southern boundary of preauthorization from the northern boundary of the Delaware Bay COTP to the boundary between Federal Region 2 and Federal Region 3. This extended area added the WTA to this pre-authorization policy.

The trial application will, however, not take place if threatened or endangered species are known to be present. The trial application, should it be deemed appropriate, will be performed on a portion of the spill covered by less than 1,000 gallons to determine the product's efficacy on the specific oil under the current set of environmental and meteorological conditions. The quantity of chemical countermeasures utilized should not exceed 110 gallons. The trial application may begin prior to the initial request to the RCP concurrence network for operational use of the chemical countermeasures on a greater portion of the spill. This initial application will be supervised by a trained observer and be reported as qualitative observation (pass/fail).

For operational use in Zone 2, the FOSC will follow the "RRT OSC Dispersant Decision Process" shown in Figure 2-4 which includes the concurrence of USCG, EPA, and the affected state(s), and consultation of DOI and NOAA. The information obtained during the decision process will be provided to these agencies. This initial notification will include, but is not limited to, the following information to the extent available:

- Type and amount of oil discharged;
- Area affected;
- The projected area of impact of the oil if not dispersed Reasons why chemical agent has been selected;
- Type of chemical agent to be used;
- Application rate and method of application; and
- On-scene weather.

The UC will only consider chemical countermeasures included in the NCP Product Schedule.

The UC would decide whether to pursue use of dispersants from the RRT following the trial application process. Figure 2-4 shows the pre-approval zones designated under this policy. If the use of dispersants is approved, the dispersant will be applied by vessel or by aircraft. When an OSRO is contracted, Atlantic Shores will update details on this Dispersant Plan to include an inventory and location of the dispersants that will be used on the oils handled, stored, or transported; a summary of toxicity data for the dispersants; a description and location of the application equipment required and an estimate of time to begin application after approval is obtained; and the vessel and aerial application procedures.

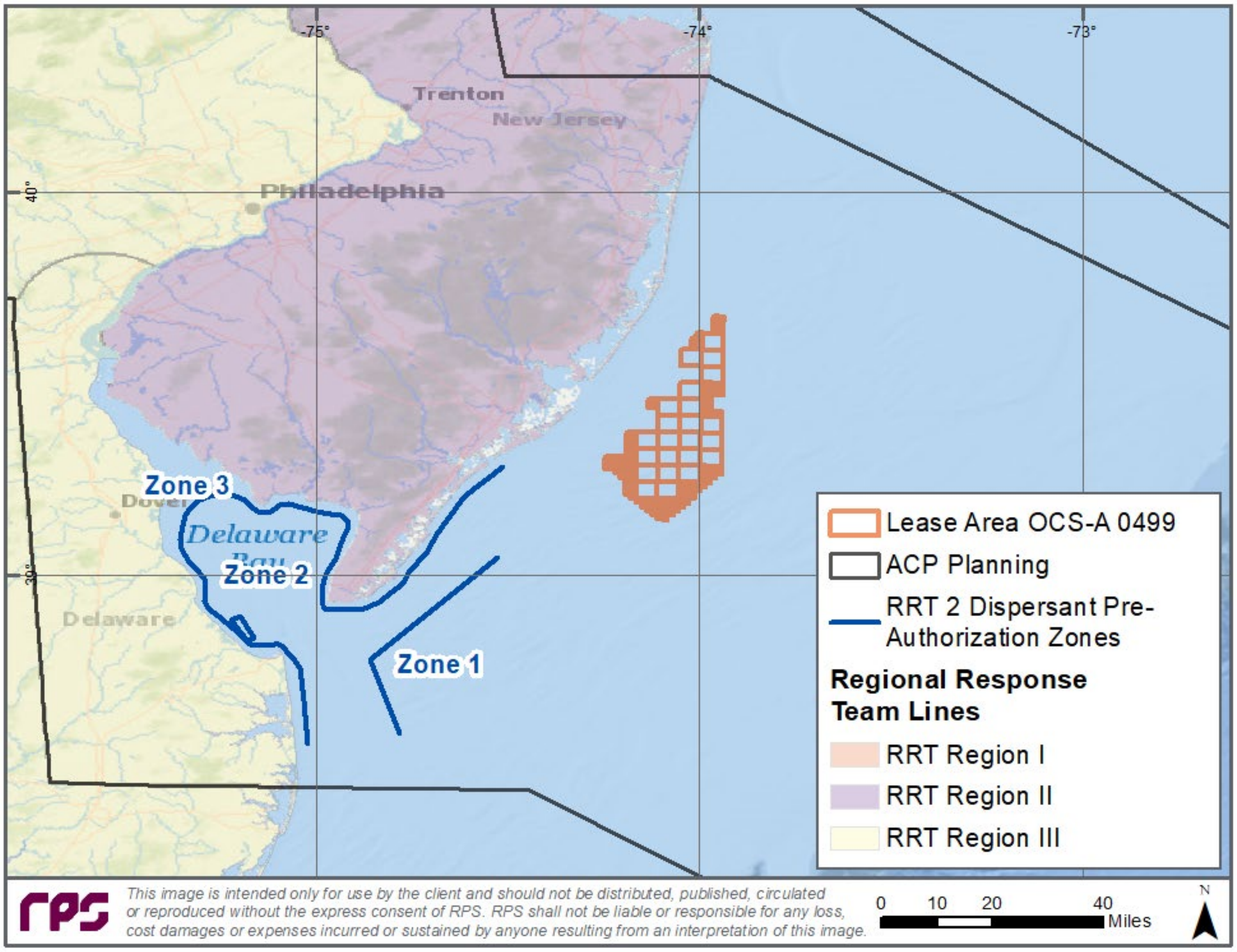


Figure 2-4. RRT 2 Dispersant Pre-Authorization Zones.

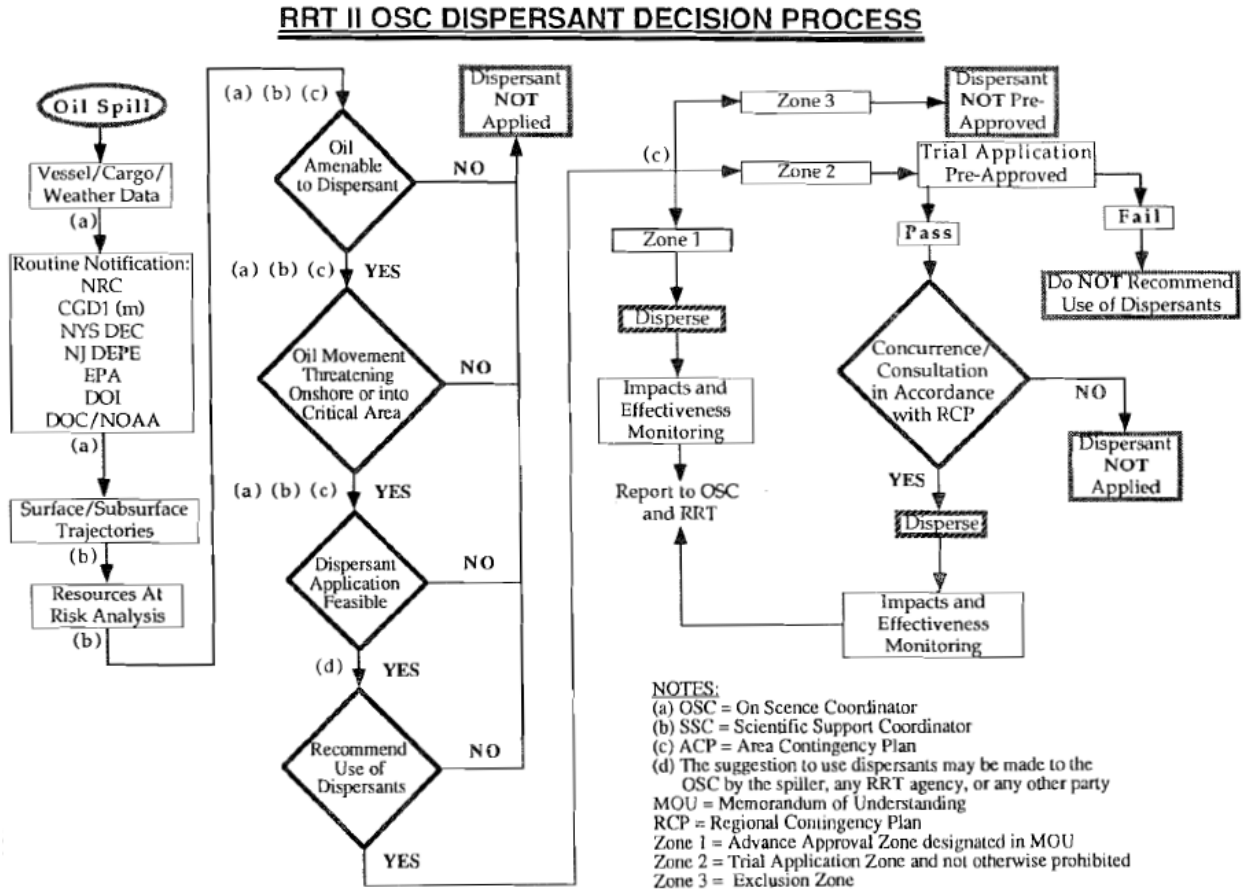


Figure 2-5. OSC Dispersant Decision Process from the RRT 2 RCP.

2.4.5 Use of In-Situ Burning

Although it is unlikely that in-situ burning will be required for a spill from the facility, Atlantic Shores will consider the use of in-situ burning in any appropriate scenario as another response countermeasure that can be employed to remove the oil from the water surface. A controlled burn reduces the oil on the water's surface by releasing the particles into the atmosphere. Spilled oil is contained within fire boom and ignited using an ignition source. The spilled oil must be approximately 2-3 mm thick in order to burn.

From the American Petroleum Institute, in-situ burning offers a practical method to remove large quantities of oil from the water very quickly. However, there are many limiting factors that should be considered before a burn is conducted. Physical limitations, such as wind speed, wave height, thickness of the oil, oil type, how weathered the oil is, and how emulsified the oil is, will limit the ability to conduct an in-situ burn operation. Environmental impacts that must be considered are human exposure to smoke, monitoring requirements, accessibility to the impacted site, and recovery of burned/unburned product and residue.

As with dispersant use, the use of in-situ burning can provide a means of oil removal when mechanical recovery cannot be effective or timely. The Governor of the State of New Jersey designated the Commissioner of NJDEP with the authority and responsibility to approve for the use of in-situ burning.

The Region 2 RRT developed an MOU for pre-approval of in-situ burning in certain areas of Region 2. Atlantic Shores is located in Zone A where open water in-situ burning is authorized. Zone "A" is defined as waters under the jurisdiction of RRT 2 that lie 6 nautical miles (nm) and seaward of the Territorial Sea Baseline (as defined in 30 CFR 2.05-10) along the coast of New Jersey (north of the demarcation between Federal Region 2 and Region 3). Within Zone "A", the decision to use in-situ burning rests solely with the OSC. No further concurrence or consultation on the part of the OSC is required with EPA, NOAA, DOI, or the state of New Jersey. However, if threatened or endangered species are present in the burn area, then the trustee agency must be consulted prior to initiating burning operations.

The USCG will immediately notify EPA, NOAA, DOI, and the state of New Jersey of a decision to conduct burning within the "A" zone via each agency's respective RRT representative. In the case of a spill at Atlantic Shores, the UC would decide whether to use in-situ burning as a response countermeasure. Figure 2-6 shows the pre-authorization zones for in-situ burning in Region 2.

When an OSRO is contracted, Atlantic Shores will update details on this In-Situ Burning Plan to include a description of in-situ burn equipment, including its availability, location, and owner, a description of the in-situ burning procedures, including ignition, and safety guidelines.

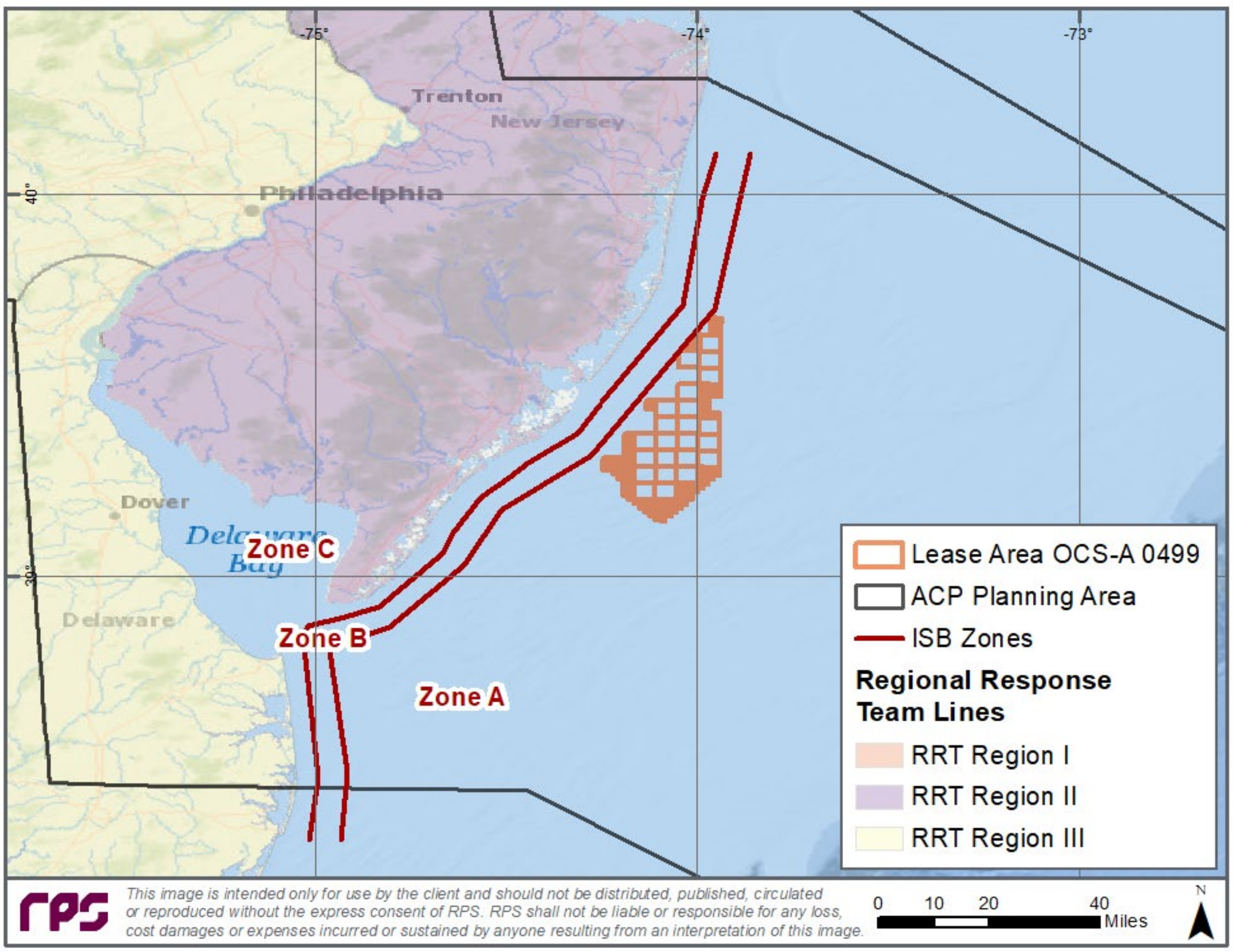


Figure 2-6. RRT 2 In-Situ Burning Pre-Authorization Zones.

2.5 Potential Failure Scenarios

The Project is being developed and permitted using a PDE concept. The PDE allows Atlantic Shores to properly define and bracket the characteristics of the facility for the purposes of environmental review and permitting while maintaining a reasonable degree of flexibility with respect to selection and purchase of key components. Potential failure scenarios will be dependent on the final project to be constructed and operated. However, general mitigation procedures for the facility overall are defined and included in Annex 3. This Annex will be updated prior to construction and will be submitted for approval to BSEE.

2.6 Procedures for Mobilization of Resources

A major consideration during a spill is the organization and direction of the transportation of manpower, equipment, and materials used in response operations. The QI will work with local authorities (e.g., state police) to establish land routes to expedite the movement of personnel, equipment, materials, and supplies to an established Staging Area and waste products from the Staging Area. The Staging Area is an ICS facility used as a forward operations location to mobilize response resources to the spill site. A Staging Area Manager will be responsible for managing the Staging Area and will utilize status boards to coordinate all equipment, personnel, and materials mobilized to the spill site. Equipment will first be mobilized from the OSRO warehouse to the Staging Area. The Staging Area Manager will direct response equipment to the appropriate Branch/Division/Group/Task Force/Strike Team. The O&M facility may or may not act as the Staging Area location depending on the location of the spill response. Multiple Staging Areas will be established, if necessary, depending on the complexities of the spill response.

Once the Project is installed, tested, and commissioned, the offshore wind facility will enter a 30-year operating phase. In support of operations and the necessary maintenance activities, Atlantic Shores will establish management and administrative team offices, a control room, and O&M facilities. Details regarding spill response materials, services, equipment, and response vessels are not finalized at this time. Atlantic Shores will retain a third-party OSRO that is licensed as a hazardous waste transporter and can provide emergency response services and cleanups of oil and/or hazardous material (OHM) spills. Response times for mobilization of OSRO resources will be dependent on the location of the OSRO.

2.7 Sustained Actions

The WTGs and OSSs are equipped with secondary containment, which reduce the potential need for a sustained action. Sustained action is a term regularly used in oil spill response to capture the ongoing response once the initial emergency response phase is complete. This phase includes establishing an incident management organization, procuring response and support resources, implementing security measures at the ICS facilities, establishing oil waste decontamination and disposal procedures, and initiating public relations outreach.

The UC will manage response operations 24-hours a day, seven days a week, until the operation is complete. The Atlantic Shores' IMT will cascade in to support response operations when necessary. Once the initial emergency stage of the spill situation transitions to the sustained action stage, the response management structure will also transition to prolonged mitigation and/or recovery action strategies.

Most incidents would be handled by a few individuals without implementing an extensive response management system and would not continue into this sustained action phase.

2.8 Termination and Follow-Up Actions

Cleanup will be conducted as thoroughly as possible, but will be terminated when, in the opinion of the FOSC and the QI/Atlantic Shores Incident Commander:

- There is no recoverable oil in the water;
- Further removal actions would cause more environmental harm than the remaining oil;
- Cleanup measures would be excessive in view of their insignificant contribution to minimizing a threat to the public health, welfare, or the environment; and
- Actions required to repair unavoidable damage resulting from removal activities are complete.

Once the determination is made that the response can be terminated, certain regulations may become effective once the "emergency" is declared over. Orderly demobilization of response resources will need to occur. Follow-up actions, such as accident investigation, response critique, plan review, and written follow-up reports, will be conducted.

The Atlantic Shores IMT Planning Section will develop a Demobilization Plan to ensure that an orderly, safe, and cost-effective demobilization of personnel and equipment is accomplished.

General considerations for the Demobilization Plan include ensuring that comprehensive check-out procedures are developed, that a process for equipment return is included, and that all personnel return to their home location safely.

Resources will be demobilized in accordance with priorities and procedures set by the UC/Incident Command. As the response transitions from the emergency response phase to a planned recovery effort, the demobilization of incident resources must be conducted in an efficient and safe manner and shall not interfere with ongoing incident operations.

The UC/Incident Commander will approve the demobilization of critical resources identified by command staff prior to demobilization from the incident. Those resources will be identified daily in the daily operational period planning cycle. All releases from the incident will be initiated in the Planning Section, Demobilization Unit after UC/Incident Commander approval.

In accordance with 30 CFR 254.56(b), Atlantic Shores will file a written follow-up report for any spill from the facility of 1 barrel or more to the Chief, OSPD within 15 days after the spillage is secured. All reports will include the cause, location, volume, and remedial action taken. Reports of spills of more than 50 barrels will include information on the sea state, meteorological conditions, and the size and appearance of the slick. Atlantic Shores will provide additional information to the BSEE Regional Supervisor if it is determined that an analysis of the response is necessary.

3. Drills, Exercises, and Training

Facility response training, Incident Command System (ICS) training, personnel response training, drills/exercises, and spill prevention meetings in this section comply with the requirements of 30 CFR 254.41. Per 30 CFR 254.41(d), training certificates and training attendance records will be maintained in a designated location for at least two years. Atlantic Shores will maintain documentation of training in the Brooklyn, New York office. Training records will be made available to any authorized BSEE representative upon request. The Emergency Response Critique forms used to document inspections, drills and training are included in Annex 5.

3.1 Drills and Exercises

Per 30 CFR 254.42(a), the entire OSRP will be exercised at least once every three years. However, to satisfy this requirement, separate exercises may be conducted over a three-year period. Exercises will simulate conditions in the area of operations, including seasonal weather variations, to the extent practicable. In addition, exercises will cover a range of scenarios, such as spills of a short duration and limited volume and the worst-case discharge scenario.

A schedule of exercises will be determined by management in accordance with 30 CFR §254.42(b). The Chief, BSEE Oil Spill Preparedness Division (OSPD) may require a change in the frequency of required exercises. Actual training exercises will be coordinated with the Oil Spill Removal Organization (OSRO). Response training programs will comply with the Preparedness for Response Exercise Program (PREP) and the USCG/EPA training guidelines for oil spill response. In Annex 5,Table A5-1 includes a list of regular personnel training exercises, and Tables A5-2, A5-3, and A5-4 present Drill/Exercise Documentation Forms associated with the training exercises.

The Chief, OSPD and BOEM must be notified at least 30 days prior to the following exercises: annual incident management team tabletop exercise; annual deployment exercise of response equipment identified in the OSRP that is staged at onshore locations; and semi-annual deployment exercise of any response equipment which the BSEE Regional Supervisor requires Atlantic Shores to maintain at the facility or on dedicated vessels. The annual IMT tabletop exercise will include the actual notification to the National Response Center (NRC), BSEE Regional Supervisor, BOEM, and the OSRO, to determine availability and response times. Each call that is made will begin with the statement “This is a drill”.

As detailed in this annex, several types of drills are conducted as part of the drill program as follows:

- Notification drills to test communications procedures will be conducted monthly.
- QI notification drills will be conducted at least quarterly to verify that the QI can be reached in an emergency situation to perform required duties.
- The spill management team will participate in a table-top drill annually. This table-top drill will be included in other drills as often as possible.
- Unannounced annual notification drills will be performed. These drills will be conducted with BOEM and OSRO participation. These annual drills will simulate a response action and conveyance of key information between the QI, BOEM, and the BSEE OSPD.
- Every effort will be made to cooperate in local drills requested by regulatory agencies and neighbors.
- Spill removal organizations under contract will be drilled at least annually.

- Full-scale exercises will be conducted every four years and will involve federal, state, and local government agencies, including BSEE, BOEM, and USCG.

The annual notification drill will be an opportunity for the QI, BOEM, and OSPD to simulate an incident command post setting that is capable of supporting response efforts (e.g., deployment of personnel and equipment, tracking containment efforts, taking samples, shoreline cleanup, etc.) for a variety of spill scenarios. Prior to the drill, the size and scope of the drill will be defined and will be structured with various levels of complexity to test events ranging from implementation of specific components of the OSRP to full implementation of the plan.

Facility spill response drills are comprehensive and designed to improve response actions at the level of the first responder. A tabletop planning session is held prior to the drill, with a limited number of supervisory personnel informed of the drill.

Drills are conducted to enable personnel who will act as initial responders during an actual spill to become familiar with response equipment. During spill drills, the techniques of pulling and placing boom such as for diversion, deflection, and containment are practiced. Drills are also conducted to allow personnel to become familiar with climatic conditions, such as the interactions of wind, tide, and wave actions and their effect on oil movement. In spill drills, consideration is given to sensitive areas which may be affected and need protection.

As part of the drill process, a critique is held following the drill. All personnel who participate in the drill, including observers, also participate in the critique. The purpose of this is to review the drill for procedures which worked well and procedures which did not work well. Each individual has an opportunity to provide for input. Recommendations are submitted to management.

Annually, at least one of the exercises listed in Annex 5, Table A5-1 must be unannounced. Unannounced means the personnel participating in the exercise must not be advised in advance, of the exact date, time, and scenario of the exercise. The staff from Atlantic Shores will also participate in unannounced exercises as directed by the lead federal agency. The objectives of the unannounced exercises will be to test notifications and equipment deployment for response to the average most probable discharge. After Atlantic Shores personnel successfully complete a Government-Initiated Unannounced Exercise (GIUE), they will not be required to participate in another one for at least 36 months from the date of the exercise.

Atlantic Shores personnel will also participate in exercises of the Area Contingency Plan (ACP) as directed by the USCG Federal On-Scene Coordinator (FOSC). As part of the National PREP, the USCG Sector Delaware Bay FOSC will either direct a government-led PREP exercise where Atlantic Shores could participate as the Responsible Party, or Atlantic Shores could lead the exercise design and facilitation effort for an industry-led PREP exercise. These exercises are typically full-scale exercises involving both an Incident Command Post element exercising the IMT and a field deployment element where spill response equipment is actually deployed. Area exercises test the ACP and are required on a quadrennial schedule. In either a government-led or industry-led PREP exercise, Atlantic Shores would be a main player on the Exercise Design Team along with the USCG, New Jersey Department of Environmental Protection (NJDEP), and other federal, state, and local stakeholders.

An Exercise Drill Log will be developed and maintained by the Training Department at Atlantic Shores to record all drills and exercises completed at the facility. Exercise documentation will include type of exercise, date and time of exercise, description of exercise, objectives met, and lessons learned. An example training log form is presented in Annex 5, Table A5-2. Records of these activities will be maintained for a period of three years, as per 30 CFR 254.42(e).

Credit for any of the above drills and exercises may be taken by Atlantic Shores if an actual incident occurs, and records of the incident will be maintained to show evidence of complying with any of the above drill or exercise requirements.

3.2 Planned Training

Planned training sessions are held for staff and operations personnel on an annual basis to gain an understanding of the OSRP process. The intent of these sessions is to keep personnel informed of their obligation to respond to all emergencies, to prevent pollution incidents, to improve spill control and response techniques, and to gain a comprehensive understanding of the ICS and their responsibilities on the IMT. These briefings highlight and describe known spill events or failures, malfunctioning components, and recently developed precautionary measures to prevent spills.

Members of the spill response operating team who are responsible for operating response equipment will attend hands-on training classes at least annually. This training will include the deployment and operation of all response equipment. Supervisors of the team will receive this training and will also be trained annually on directing the deployment.

All field personnel and members of the spill response management team or IMT, including the Spill Response Coordinator and alternate Spill Response Coordinators, will receive annual training on their duties. This training will include:

- The proper procedures for the reporting of spills, including procedures for contacting the QI on a 24-hour basis.

- Locations, intended use, deployment strategies, and operational and logistical requirements of response equipment. They will also review procedures on how and where to place facility containment/recovery materials depending on where the spill occurs and various seasonal conditions. Personnel will be informed that detergents or other surfactants are prohibited from being used on an oil spill in the water and that dispersants may only be used with the approval of the RRT.

- Oil spill trajectory analysis and predicting spill movement.

- Other responsibilities of the IMT, including ICS procedures and roles.

The QI, Spill Response Coordinator, and alternate Spill Response Coordinators will receive specific training to ensure they are sufficiently trained to perform their duties.

Records of all training activities are maintained for at least two years following completion of training. The facility will maintain records for each individual as long as these individuals are assigned duties in this plan. Individuals will sign documentation when participating in training classes or exercises. A sample training log is included in this OSRP in Annex 5, Table A5-5.

3.3 Training Documentation and Record Maintenance

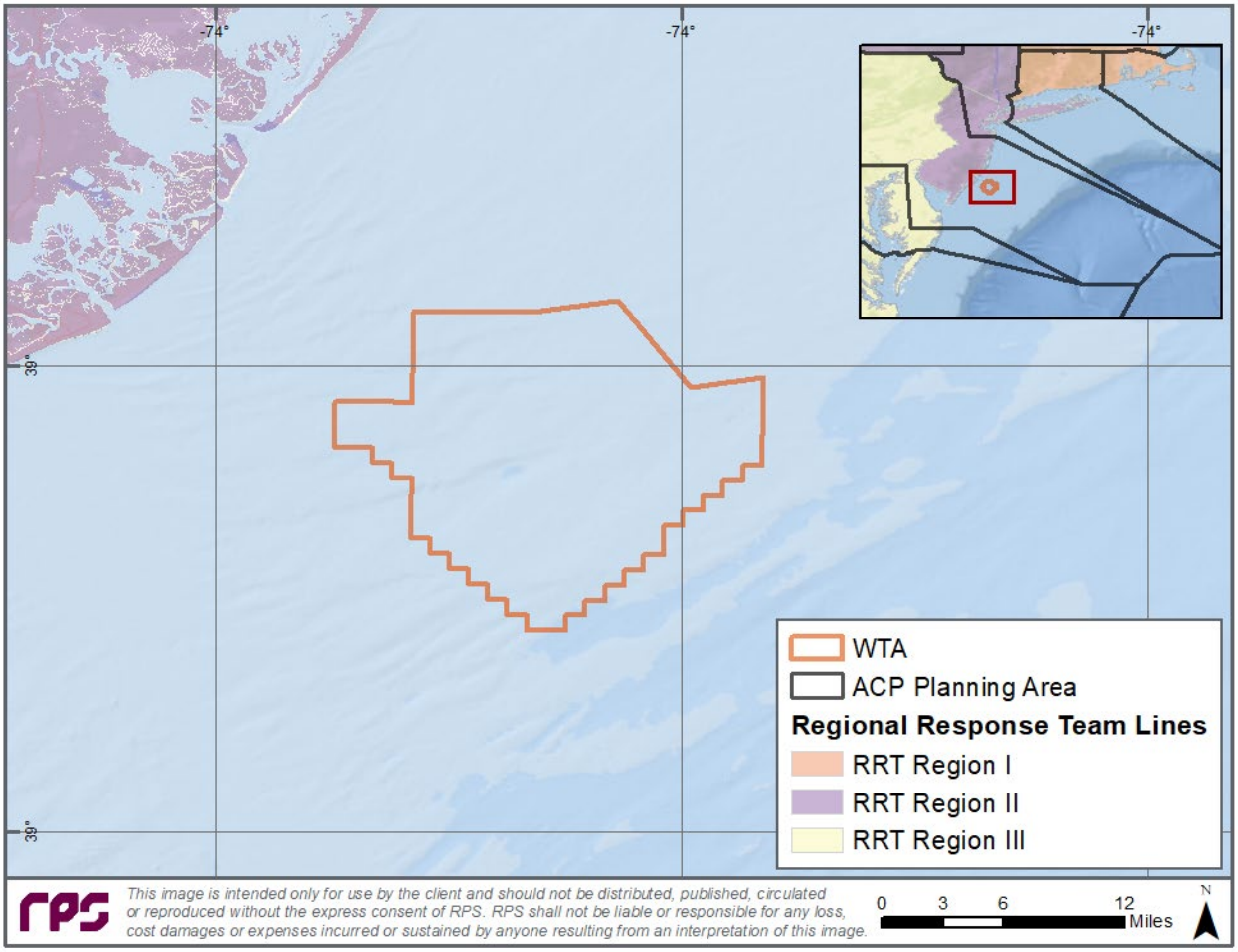
Spill response personnel training records will be maintained at the Atlantic Shores office in Brooklyn, New York. Records will be maintained at this location for two years and will include:

- Documentation of annual training associated with the OSRP as provided to the QI, Alternate QI, Spill Response Coordinator, alternate Spill Response Coordinator, IMT members, and other facility personnel,

- Records of personnel training in accordance with OSHA, 29 CFR §1910.120 regulations,
- Records of training provided for response contractor personnel will be maintained at the respective contractor's office and will be verified by facility personnel on-site, and
- Logs of volunteer workers (if applicable) and activities performed.

Annex 1 – Facility Diagrams

Figure A1: Atlantic Shores Wind Turbine Area (WTA)



Annex 2 – External Agency, Resources, and Trustees Directory

Table A2-1External Agencies, Resources, and Trustees Directory

Agency	Location	Telephone
Government Agencies		
National Response Center	2703 Martin Luther King Jr. Avenue SE Washington, D.C. 20593	800-424-8802 (24 hour)
US Coast Guard Sector Delaware Bay	1 Washington Avenue Philadelphia, PA 19147	215-271-4800
US Coast Guard Station Atlantic City	900 Beach Thorofare Atlantic City, NJ 08401	609-344-6594
EPA Region 2	Ted Weiss Federal Building 290 Broadway New York, NY 10007	877-251-4575
OSHA (fatality or 3 or more employees sent to hospital)	200 Constitution Avenue Washington, D.C. 20210	800-321-6742
New Jersey Department of Environmental Protection (NJDEP)	762 Stage Road Tuckerton, NJ 08087	877-WARNDEP or 609-296-1114
New Jersey Office of Emergency Management (NJOEM)	New Jersey State Police Division Headquarters P.O. Box 7068 West Trenton, NJ 08628	609-882-4201
New Jersey State Emergency Operations Center (State EOC, when activated)	New Jersey State Police Division Headquarters P.O. Box 7068 West Trenton, NJ 08628	609-882-4201
New Jersey State Historical Preservation Office (SHPO) – when historical or cultural resources are threatened by a spill	501 East State Street Station Plaza, Building 5, 4th Floor Trenton, NJ	609-984-0176
USCG Classified Oil Spill Removal Organizations (OSRO)		
Atlantic Shores has not formalized a contract with an OSRO at this time. However, plans are in place to contract with Marine Spill Response Corporation (MSRC).		
Weather		
National Oceanic & Atmospheric Administration (NOAA) National Weather Service	732 Woodlane Road Mount Holly, NJ 08060	609-261-6600 http://www.weather.gov/phi/
NOAA Weather Radio Atlantic City, NJ	Philadelphia/Mt Holly, NJ	Call sign: KHB38 VHF: 162.400
NOAA National Data Buoy Center	http://www.ndbc.noaa.gov/maps/Northeast.shtml	
Atlantic City Airport (ACY)	https://www.sjta.com/acairport	
Aviation Resources		
Atlantic Shores did not select aviation resources at this time. New Jersey charter operators include Ultimate Jetcharters, LLC (330-620-9400, aircraft located in Teterboro, NJ and Atlantic City, NJ) and East Coast Flight Services, Inc. (800-554-0550)		
Marine Resources		
New Jersey State Police Marine Services Bureau		609-882-2000
Seastreak Ferry	2 First Avenue Atlantic Highlands, NJ 07716	800-262-8743
Cape May Ferry	1200 Lincoln Boulevard North Cape May, NJ 08204	800-643-3779

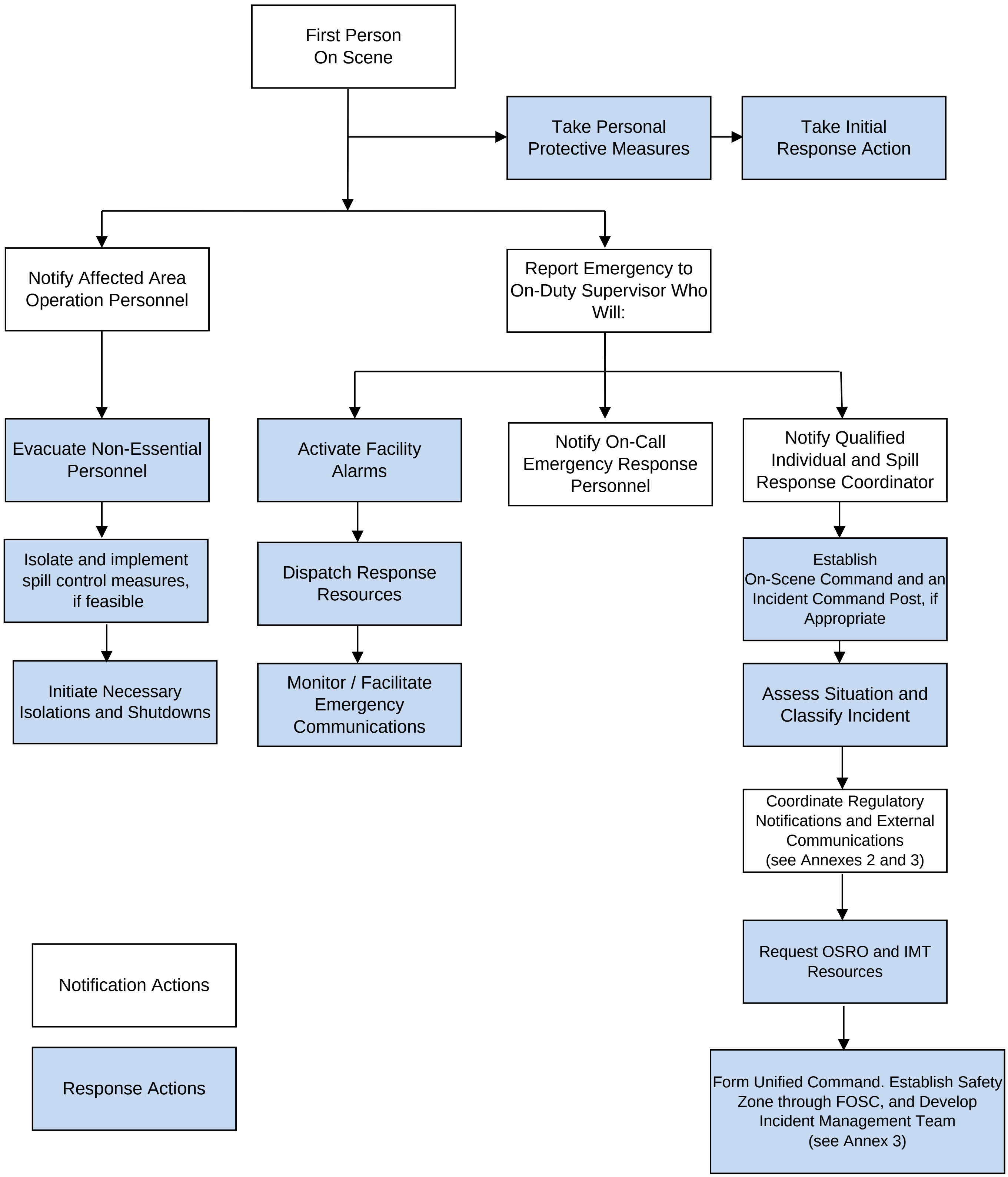
Agency	Location	Telephone
Lewes Ferry	43 Cape Henlopen Drive Lewes, DE 19958	800-643-3779
Regulatory Agencies for Wildlife		
US Fish and Wildlife Service Northeast Region	300 Westgate Center Drive Hadley, MA 01035	413-253-8200
US Fish and Wildlife Service New Jersey Field Office	4 E. Jimmie Leeds Road, Suite 4 Galloway, NJ 08205	609-646-9310 or 609-383-3938
New Jersey Division of Fish and Wildlife	RR 9 360 Port Republic, NJ 08241	609-748-2050
Other Wildlife Resources		
Avian Wildlife Center (for reporting injured wildlife)		973-702-1957
Cape May National Wildlife Refuge	24 Kimbles Beach Road Cape May Court House, NJ 08210	609-463-0994
Edwin B. Forsythe National Wildlife Refuge	P.O. Box 72 Oceanville, NJ 08231	609-652-1665
Supawna Meadows National Wildlife Refuge	199 Lighthouse Road Pennsville, NJ 08070	609-463-0994
Prime Hook National Wildlife Refuge	11978 Turkle Pond Rd Milton, DE 19968	302-684-8419
Bombay Hook National Wildlife Refuge	2591 Whitehall Neck Road Smyrna, DE 19977	302-653-9345
Lido Beach National Wildlife Refuge (longislandrefuges@fws.gov)	340 Smith Road Shirley, NY 11967	631-286-0485
Seatuck National Wildlife Refuge (longislandrefuges@fws.gov)	340 Smith Road Shirley, NY 11967	631-286-0485
Wartheim National Wildlife Refuge (longislandrefuges@fws.gov)	340 Smith Road Shirley, NY 11967	631-286-0485
NOAA National Marine Fisheries Services New Jersey	232 U.S. 9 Marnora, NJ 080223	609-390-8303
National Audubon Society	New York, NY	212-979-3196
New Jersey Association of Wildlife Rehabilitators (NJAWR)	141-1 Route 130 S, Suite 243 Cinnaminson, NJ 08077	908-730-8300
Wildlife Aid (Atlantic County)	155 Asbury Road Egg Harbor Township, NJ 08234	609-927-0538
Garden State Wildlife Center (Monmouth County)	P.O. Box 424 Howell, NJ 07731	732-908-2345
Toms River Avian Care (Ocean County)	1916 Kenilworth Court Toms River, NJ 08753	732-255-9270
Licensed Wildlife Rehabilitation Providers		
The State of New Jersey maintains a list of licensed wildlife rehabilitators at: https://www.state.nj.us/dep/fgw/pdf/rehab_list.pdf		
Medical Facilities		
AtlantiCare Regional Medical Center, Atlantic City Campus	1925 Pacific Avenue Atlantic City, NJ 08401	609-345-4000
AtlantiCare HealthPlex	1401 Atlantic Avenue Atlantic City, NJ 08401	609-345-4000
Shore Medical Center	100 Medical Center Way Somers Point, NJ 08244	609-653-3500

Agency	Location	Telephone
Ambulances		
Exceptional Medical Transport	2318 Atlantic Avenue Atlantic City, NJ 08401	609-344-6165
Egg Harbor Township Emergency Medical Services	3125 Fire Road Egg Harbor Township, NJ 08234	609-383-0003
AtlantiCare Canale Station	8 Canale Drive Egg Harbor Township, NJ 08234	609-646-3620
Absecon Emergency Medical Services	435 W Absecon Boulevard Absecon, NJ 08201	609-645-1493
Emergency Flight Services		
Angels Medical Transport (Air lift)	300 N Georgia Avenue Atlantic City, NJ 08401	609-449-8453
Coast Guard Air Station Atlantic City (Medevac)	FAA Technical Center, Bldg 350 Atlantic City International Airport Egg Harbor Township, NJ 08234	609-677-2000
Fire Aid (911)		
Atlantic City Fire Department	2715 Atlantic Avenue Atlantic City, NJ 08401	609-347-5590
Ocean City Fire Department	550 Asbury Avenue Ocean City, NJ 08226	609-525-9182
Sea Isle City Fire Department	233 John F. Kennedy Boulevard Sea Isle City, NJ 08243	609-263-4311
Wildwood Fire Department	4400 New Jersey Avenue Wildwood, NJ 08260	609-846-2060
Cape May Fire Department	712 Franklin Street Cape May, NJ 08204	609-884-9512
Egg Harbor Township Fire Department	3515 Bargaintown Road Egg Harbor Township, NJ 08234	609-926-4070
Police Aid (911)		
Atlantic City Police Department	2715 Atlantic Avenue Atlantic City, NJ 08401	609-347-5300
Atlantic County Sheriff	1201 Bacharach Boulevard Atlantic City, NJ 08401	609-909-7200
Ocean County Sheriff	120 Hooper Avenue Toms River, NJ 08753	732-929-2044
Monmouth County Sheriff	2500 Kozloski Road Freehold, NJ 07728	732-431-6400
New Jersey State Police	1200 N Rhode Island Avenue Atlantic City, NJ 08401	609-441-3586
New Jersey Department of Law and Public Safety	800 Carranza Road Tabernacle, NJ 08088	609-268-1440
US Marshals Services	402 E State Street Trenton, NJ 08608	609-989-2069
Federal Bureau of Investigation	1601 New Road #201 Northfield, NJ 08225	609-677-6400
Local Government and Agencies		
Nanticoke Lenni Lenape Indians	18 E Commerce Street Bridgeton, NJ 083012	856-455-6910

Agency	Location	Telephone
Atlantic County Division of Public Health	201 Shore Road Northfield, NK 08225	609-645-5935
Atlantic City Public Health	1301 Bacharach Boulevard #403 Atlantic City, NJ 08401	609-347-5663
Greater Atlantic City Chamber of Commerce	12 Virginia Avenue Atlantic City, NJ 08401	609-345-4524
Ocean County Health Department	175 Sunset Avenue Toms River, NJ 08755	732-341-9700
Cape May County Health Department	6 Moore Road Cape May Court House, NJ 08210	609-465-1187
Cape May County Chamber of Commerce	13 Crest Haven Road Cape May Court House, NJ 08210	609-465-7181
Other Industrial Facilities in Local Area		
Not Applicable		

Annex 3 – Response Management System

Figure A3-1 Initial Response Flowchart



Annex 4 – Incident and Other Documentation Forms

Incident Documentation

The Qualified Individual (QI) will coordinate documentation during and following the incident, in conjunction with federal, state, and local officials. Forms to assist in documentation and presentation of consistent notification information are presented at the end of this Annex for use during an incident. These include:

- Initial Notification;
- Agency Call Back for Information;
- Chronological Log of Incident; and
- Incident Report.

Atlantic Shores personnel may use these forms or may simply collect the same information to be saved electronically. The Project records, including incident records, will be digital and accessible via database.

As an alternative, or in addition to these forms, the National Incident Management System (NIMS) Incident Command System (ICS) Forms noted below may also be used. These can be accessed online at: https://www.fema.gov/media-library/assets/documents/103505. Any response where a UC is formed will use the ICS forms for all incident management activities and Incident Action Plan preparation.

Table A4-1 NIMS ICS Forms

ICS Form No.	Description
IAP	Cover Sheet Incident Action Plan
201	Incident Briefing
202	Incident Objectives
203	Organization Assignment List
204	Assignment List
204a	Assignment List Attachment
205	Incident Communications Plan
206	Medical Plan
207	Incident Organization Chart
208	Site Safety Plan
209	Incident Status Summary
210	Resource Status Change
211	Incident Check-In List
213	General Message
213-RR	Resource Request
214	Unit Log
215	Operational Planning Worksheet
215a	IAP Safety Analysis Form
218	Support Vehicle/Equipment Inventory
219	Resource Status Card (T-Cards)
220	Air Operations Summary
221	Demobilization Checkout
224	Crew Performance Rating
225	Incident Personnel Performance Rating
230	Daily Meeting Schedule
232	Resources at Risk Summary

ICS Form No.	Description
232a	ACP Site Index
233	Incident Open Action Tracker
234	Work Analysis Matrix
235	Facility Needs Assessment

The post-incident investigation will begin after the source of the incident is secured and repaired, and the facility is declared safe by the QI. The QI will take the following steps during a post-accident investigation:

- Obtain all data, information, and reports pertaining to the incident.
- Interview in person, or by telephone, each person knowledgeable of the incident.
- Review the response of operations personnel to see if procedures and training were adequate or if changes are warranted.
- Evaluate other potentially dangerous situations which could have occurred, and if the response of personnel and safety systems would have accommodated those situations had they occurred.
- Prepare recommendations as appropriate for changes to:
    - o Design of facility;
    - o Operating procedures;
    - o Training;
    - o Communications; and
    - o Emergency response plans and procedures.
- The QI will prepare and issue a written report to all supervisors with any changes deemed appropriate.

The QI will prepare a post-incident report. This report will contain an account of the incident, including proof that Atlantic Shores met its legal notification requirements for any given incident (i.e. signed record of initial notifications and certified copies of written follow-up reports submitted after a response).

Examples of routine equipment and maintenance checklists/logs are also provided. These include:

- Response Equipment Inspection Log;
- Secondary Containment Checklist and Inspection Form;
- Tank Inspection Form; and
- Maintenance Log.

Form A4-10 Initial Notification Data Sheet

Date:	Time:
INCIDENT DESCRIPTION	
Reporters Name:	Position:
Reporters Phone Number:	Address:
Company:	
Latitude:	Longitude:
Date of Incident:	Time of Incident:
Spill/Incident Location:	Source and/or Cause of spill/incident:
Material spilled and total volume:	Vessel Name and Number (if applicable):
Is the material spilled in water?	Is the source secured?
Weather conditions:	Precipitation?
Incident Description:	
Name of Incident Commander:	Where is the Incident Command Post (directions)?
RESPONSE ACTIONS	
Actions taken to correct, control or mitigate incident:	
Number of injuries:	Number of deaths:
Were there evacuations?	Number of evacuated:
Areas affected:	Damage estimate:
Any other information about impacted medium:	
CALLER NOTIFICATIONS	
National Response Center (NRC): 800-424-8802	NJDEP
NRC Incident Assigned Number:	Other Agencies Notified: ☐ USCG ☐ EPA ☐ OSHA ☐ USFWS ☐ NMFS
Other Information Not Recorded Elsewhere:	

Note: Do Not Delay Notifications Pending Collection of All Information. Notify NRC immediately.

Form A4-11 Agency Call Back Information

Incident Number: ____________

Document all information that agencies request.

Date:	**Time:**
Agency:	**Person Contacted:**
Reason for Call Back:	
Document all dialogue with agency below:	

Form A4-12 Chronological Log of Events

Incident No.___________

Document all events chronologically.

Date/Time	Record of Event

Form A4-13 Incident Report

Incident No. ___________

Reviewed by:	**Final Date:**
□ Attach Initial Notification Form for basic data, update as incident progresses.	
Incident Duration (dates and time):	Type and Location of Incident:
Categorical Level of Incident and what portions of response team were assembled? Identify all leader positions and names.	Does the incident create a potential compliance issue? If yes, describe.
Material discharged:	Final discharged volume:
Were there any abnormal operating conditions immediately before the emergency? If yes, describe.	Were there any equipment problems or changes immediately before the emergency? If yes, describe.
Description of impacts:	Were all impacts cleaned up to the satisfaction of regulatory agencies?
Type and volume of waste generated (attach waste tracking log if applicable):	How and where was waste disposed or recovered?

<table>
<tr><td colspan="2">Were all spilled materials recovered? If not, describe what was not recovered and why.</td></tr>
<tr><td colspan="2">Provide description of cleanup methods utilized:</td></tr>
<tr><td colspan="2">Describe decontamination procedures and include pieces of equipment decontaminated:</td></tr>
<tr><td>Has stock of emergency equipment been replenished to pre-incident conditions?</td><td>Date demobilization was completed:</td></tr>
<tr><td colspan="2">Describe what worked and did not work during incident:</td></tr>
<tr><td colspan="2">Recommendations for improvement:</td></tr>
</table>

Form A4-14 Response Equipment Inspection Log

Incident No. ___________

Inspector	Date	Equipment	Comments

Form A4-15 Secondary Containment Checklist and Inspection Form

Incident No. ___________

Area(s) Inspected:	Date/Time:	Inspected By:
Inspection Item	**Acceptable (Y/N)**	**Comments/Corrective Action**
Level of precipitation in containment		
Presence of spilled or leaked material		
Operational status of drainage valves		
Debris		
Location/status of pipes, inlets, drainage		
Cracks		
Discoloration		
Corrosion		
Valve conditions		

Form A4-16 Annual Checklist and Inspection Form

Incident No. ___________

- This form is currently a draft. It will be finalized before the Project is complete. All oil-containing equipment will be listed here at that time as items to be inspected annually.

Tank(s) Inspected:	**Date/Time:**	**Inspected By:**
Inspection Item	**Acceptable (Y/N)**	**Comments/Corrective Action**

Inspect for the following:

- **Support structure is in good condition (no corrosion or damage)**
- **External shell structure is in good condition (no corrosion or damage)**
- **Drip pans are in place (if applicable)**
- **Liquid level gauge is in place and in good working condition (if applicable)**

Remarks:

Form A4-17 Response Equipment Maintenance Log

This may be maintained on computer log or paper but kept on-site. Include description of maintenance activities performed (i.e. repaired boat motor, gate valves lubricated, booms cleaned, etc.).

Date	Equipment	Maintenance Performed

Annex 5 – Drills, Exercises, and Training Forms and Logs

Table A5-1 Drills and Exercises

Exercise	Purpose/Scope	Objectives	Frequency	Participants
QI Notification Exercise	Ensure the QI can be contacted in a spill response emergency in order to carry out required duties.	• Contact QI by telephone, radio, fax, pager, or email. • Confirmation received from QI of notification.	Monthly	Qualified Individuals
Incident Management Team (IMT) Tabletop Exercise (TTX)	Ensure the IMT is familiar with the emergency response procedures and the Incident Command System.	• IMT is familiar with emergency response procedures. • Employs proper procedures during a simulated emergency response.	Annually	IMT, OSPD, BOEM
On-Site Equipment Deployment Exercise	Verify that required response equipment is operable and facility personnel are capable of deploying the equipment.	• Verify that designated equipment is available. • Deploy at least minimum required equipment during exercise. • Verify that personnel tasked with deployment have received required training.	Annually	Project Response Team, OSPD, BOEM, OSRO
OSRO Equipment Deployment Exercise	Same as above, but performed by OSRO	• Same as above	Annually	OSRO
Discharge Prevention Briefings	Conduct Discharge Prevention Briefings	• Personnel have adequate understanding of the OSRP. • Describe known discharges or failures. • Discuss any recently developed precautionary measures.	Annually (optional)	Oil-handling Personnel
Simulated Spill Drill[2]	Test the resources and response capabilities of the OSRO.	• Demonstrate OSRO's ability to deploy resources to include: o On water containment and recovery o Sensitive habitat protection • Storage	Every 3 years	Oil-handling Personnel
Full-Scale Exercise (FSE)	Test the IMT's capability of establishing a UC and developing an Incident Action Plan. In addition to the work within the Incident Command Post, field personnel will deploy equipment in the field using the same exercise scenario.	• Demonstrate IMT's ability to establish the ICS, transfer incident management to a UC formed with government personnel, and produce an Incident Action Plan • Demonstrate field personnel's capability to deploy oil spill response equipment to protect sensitive sites	Every 4 years	QI, Spill Response Coordinator, IMT, federal, state, and local government personnel including OSPD, field personnel

Notes:

1. In a 3-year period, at least one of these exercises must include a worst-case discharge scenario.
2. In a 3-year period, all components of the response plan must be exercised.
3. Annually at least one of the first three exercises listed must be unannounced to participants.

Table A5-2 Spill Response Drill Form Notification Exercise

ATLANTIC SHORES OFFSHORE WIND, LLC
SPILL RESPONSE DRILL/EXERCISE DOCUMENTATION FORM

NOTIFICATION EXERCISE

1. Date performed: ______________________________
2. Exercise or actual response: ______________________________
3. Facility initiating exercise:______________________________
4. Name of person notified:______________________________

   Is this person identified in your response plan as qualified individual or designee?______________________________
5. Time initiated:______________________________

   Time in which qualified individual or designee responded:______________
6. Method used to contact:

   ____Telephone

   ____Pager

   ____Radio

   ____Other______________________
7. Description of notification procedure:

   ____
   ____
   ____
8. Evaluation of Drill:

   ____
   ____
   ____
9. Lessons Learned:

   ____
   ____
   ____
10. Changes to be implemented (if any):

    ____
    ____
    ____

Certifying Signature______________________________

Table A5-3 incident Management Team Tabletop Exercise

ATLANTIC SHORES OFFSHORE WIND, LLC
SPILL RESPONSE DRILL/EXERCISE DOCUMENTATION FORM

INCIDENT MANAGEMENT TEAM TABLETOP EXERCISE

1. Date performed:____
2. Exercise or actual response:_____________________________________
   If an exercise, announced or unannounced:___________________________
3. Location of tabletop:____
4. Time started:____
   Time completed:____
5. Response plan scenario used (check one):
   ____Average most probable discharge ____Worst case discharge
   ____Maximum most probable discharge ____Size of (simulated) spill-bbls/gals
6. Describe how the following objectives were exercised:

a) Spill management team's knowledge of oil-spill response plan:

____
____
____

b) Proper notifications:

____
____
____

c) Communications system:

____
____
____

d) Spill management team's ability to access contracted oil spill removal organizations:

____
____
____

e) Spill management team's ability to coordinate spill response with On-Scene Coordinator, State and applicable agencies:

____
____
____

INCIDENT MANAGEMENT TEAM TABLETOP EXERCISE (Continued)

f) Spill management team's ability to access sensitive site and resource information in the Area Contingency Plan:

____
____
____

7. Evaluation of Exercise:

____
____
____
____
____
____

8. Lessons Learned:

____
____
____
____
____
____

9. Changes to be implemented (if any):

____
____
____
____
____
____

Certifying Signature:____

Table A5-4 Spill Response Drill Form Equipment Deployment Exercise

ATLANTIC SHORE OFFSHORE WIND, LLC
SPILL RESPONSE DRILL/EXERCISE DOCUMENTATION FORM

EQUIPMENT DEPLOYMENT EXERCISE

1. Date performed:____
2. Exercise or actual response:____

   If an exercise, announced or unannounced:___________________________________
3. Deployment location(s):

   ____
   ____
   ____
4. Time started:____

   _______Time OSRO called (if applicable)

   _______Time on-scene

   _______Time boom deployed

   _______Time recovery equipment arrives on-scene

   _______Time completed
5. Equipment deployed was:

   _______Facility-owned

   _______OSRO-owned; if so, which OSRO:_________________________________

   _______Both
6. List type and amount of all equipment (e.g., boom and skimmers) deployed and number of support personnel employed:

   ____
   ____
   ____
   ____
   ____
7. Describe goals of the equipment deployment and list any Area Contingency Plan strategies tested. Attach a sketch of equipment deployments and booming strategies:

   ____
   ____
   ____
   ____
   ____

EQUIPMENT DEPLOYMENT EXERCISE (Continued)

8. For deployment of facility-owned equipment, was the amount of equipment deployed at least the amount necessary to respond to your facility's average most probable spill?

____
____
____

9. Was the equipment deployed in its intended operating environment?

____
____
____

10. For deployment of OSRO-owned equipment, was a representative sample (at least 1000 feet of each boom type and at least one of each skimmer type) deployed?

____
____
____

11. Was the equipment deployed in its intended operating environment?

____
____
____

12. Are all facility personnel that are responsible for response operations involved in a comprehensive training program, and all pollution response equipment involved in a comprehensive maintenance program?

____
____
____

13. Date of last equipment inspection:______________________________
14. Was the equipment deployed by personnel responsible for its deployment in the event of an actual spill?______________________________
15. Was all deployed equipment operational? If not, why not?

____
____
____

16. Evaluation of Exercise:

____
____
____

17. Lessons Learned:

____
____
____

18. Changes to be implemented (if any):

____
____
____
____
____
____

Certifying Signature:____

Table A5-5 Atlantic Shores Training Log

ATLANTIC SHORES OFFSHORE WIND, LLC
TRAINING LOG

EMPLOYEE TRAINING

Employee Name	Date	Hours of Training	Training Topic

Annex 6 – Regulatory Compliance and Cross-Reference Matrix

Table A6-1 Oil Spill Response Plans for Outer Continental Shelf Facilities Cross-Reference

Oil Spill Response Plans for Outer Continental Shelf Facilities 30 CFR 254, Subpart B		Plan Reference
254.21(b)(1)	Table of Contents	Table of Contents
254.21(b)(2)	Emergency response action plan	OSRP Section 2, Annex 3
254.21(b)(3)(i)	Equipment response inventory	Annex 9
254.21(b)(3)(ii)	Contractual agreements	Annex 8
254.21(b)(3)(iii)	Worst case discharge scenario	OSRP Section 1.1, Annex 7
254.21(b)(3)(iv)	Dispersant use plan	OSRP Section 2.4.9, Annex 7:
254.21(b)(3)(vi)	In situ burning plan	OSRP Section 2.4.10, Annex 7:
254.21(b)(3)(vi)	Training and drills	Annex 5
254.22(a)	Facility location and type	OSRP Section 1.3
254.22(b)	Table of Contents	Table of Contents
254.22(c)	Record of changes	OSRP Page iv
254.22(d)	Cross reference table	Annex 6
254.23(a)	Designation of QI	OSRP: Section 2.2, Table 2-2, Section 2.3
254.23(b)	Designation of spill management team	TBD[1]
254.23(c)	Spill response operating team	TBD[1]
254.23(d)	Spill response operation center	TBD[1]
254.23(e)	Oil handled, stored, or transported	Annex 7
254.23(f)	Procedures for early detection of a spill	OSRP Section 2.1
254.23(g)(1)	Spill notification procedures	OSRP Section 2.2, Annex 4
254.23(g)(2)	Methods to detect/predict spill movement	TBD
254.23(g)(3)	Methods to prioritize areas of importance	OSRP Section 2.4.7, Annex 7
254.23(g)(4)	Methods to protect areas of importance	OSRP Section 2.4.7
254.23(g)(5)	Containment and recovery equipment deployment	OSRP Section 2.4
254.23(g)(6)	Storage of recovered oil	OSRP Section 2.4.8
254.23(g)(7)	Procedures to remove oil and oil debris from shallow waters	OSRP Section 2.4.8
254.23(g)(8)	Procedure to store, transfer, and dispose of recovered oil and oil-contaminated materials	OSRP Section 2.4.8
254.23(g)(9)	Methods to implement dispersant use plan and in situ burning plan	OSRP Section 2.4.9, 2.4.10:
254.24(a)	Inventory of spill response resources	Annex 9
254.24(b)	Procedures for inspecting and maintaining spill response equipment	Annex 9
254.25	Contractual agreements	Annex 8

Oil Spill Response Plans for Outer Continental Shelf Facilities 30 CFR 254, Subpart B		Plan Reference
254.26(a)	Volume of worst-case discharge	OSRP Section 1.1, Annex 7
254.26(b)	Trajectory analysis	TBD
254.26(c)	List of special economic and environmentally important resources	Annex 7
254.26(d)(1)	Response equipment	Annex 9
254.26(d)(2)	Personnel, materials, and support vessels	TBD
254.26(d)(3)	Oil storage, transfer, and disposal equipment	Annex 9
254.26(d)(4)	Estimation of time to mobilize	TBD[1]
254.26(e)	Suitability of response	TBD[1]
254.27	Dispersant use plan	OSRP Section 2.4.9, Annex 7:
254.28	In situ burning plan	OSRP Section 2.4.10, Annex 7:
254.29(a)	Training	Annex 5
254.29(b)	Drills	Annex 5
254.30	Revision of OSRP	OSRP Page iv

Annex 7 – Worst-Case Discharge – Planning Calculations for Discharge Volumes, Response Equipment, and Detailed Spill Response Plan

Planning Calculations for Discharge Volumes and Response Equipment and Detailed Spill Response Plan

Per 30 CFR 254.26, the volume of the worst-case discharge scenario must be determined using the criteria in 30 CFR 254.47. The criteria in 30 CFR 254.47 applies to oil production platform facilities and pipeline facilities. Per BSEE /BOEM guidance titled, “Oil Spill Response Plan (OSRP) for Offshore Wind Facilities Discussion Handout” dated August 21, 2019 and provided to Atlantic Shores on February 11, 2021,the worst-case discharge for a renewable energy facility is defined as the release of all oil from a component located at an offshore facility, such as a WTG or an OSS.

A7.1 Facility Information

Facility information on Atlantic Shores is included in this plan in Section 1.3.

Table A7-1 Wind Turbine Generator Oil Storage

Wind Turbine Generators (WTG)								
Component	**Fluid Function**	**Representative Fluid Type**	**Maximum Approximate Volume per WTG**			**Total Maximum Volume for Project**		
			Liters	**Gallons**	**Barrels**	**Liters**	**Gallons**	**Barrels**
Emergency Generator Fuel	Diesel Fuel	Marine Diesel	1,514	400	10	302,833	80,000	1,905
Hydraulic Systems (Pitch, rotor lock, etc.)	Hydraulic Fluid	Mobil DTE 25 Castrol Hyspin AWH-M32 Kluber Summit HySyn FG 32 Mobil AW46 Shell Tellus 46	1,325	350	8	264,979	70,000	1,667
Yaw / pitch system grease	Grease	Castrol Tribol Kluberplex AG 11-462	568	150	4	113,562	30,000	714
Drive Train, yaw, pitch system	Gear and Bearing Lubricating Oil	Mobil SHC 630/632/XMP220/XMP320/XMP460 Optimol Synthetic A320 Castrol Optigear Synthetic X 320 Mobility 007 Shell Rhodina BBZ Fuchs Renolin Unisyn CLP 220 Staburags NBU 12 ALTEMP Kluberplex BEM 41-141	1,893	500	12	378,541	100,000	2,381
Gearbox	Gear and Bearing Lubricating Oil	Mobil SHC 630/632/XMP220/XMP320/XMP460 Optimol Synthetic A320 Castrol Optigear Synthetic X 320 Mobility 007 Shell Rhodina BBZ Fuchs Renolin Unisyn CLP 220 Staburags NBU 12 ALTEMP Kluberplex BEM 41-141	2,199	581	14	439,865	116,200	2,767
Transformer	Biodegradable Dielectric Insulating Fluid / Synthetic Ester	Midel 7131	6,814	1,800	43	1,362,748	360,000	8,571
Total Oil Storage			**14,313 L**	**3,781 gal**	**90 bbl**	**2,862,529 L**	**756,200 gal**	**18,005 bbl**

Table A7-2 Oil Storage for Offshore Substations (OSS)

Offshore Substations (OSS)											
Component	**Fluid Category**	**Representative Fluid Type**	**Maximum Approximate Volume Small OSS**			**Maximum Approximate Volume Medium OSS**			**Maximum Approximate Volume Large OSS**		
			Liters	**Gallons**	**Barrels**	**Liters**	**Gallons**	**Barrels**	**Liters**	**Gallons**	**Barrels**
Diesel Fuel Storage	Diesel Fuel	Marine Diesel	28,391	7,500	179	45,425	12,000	286	75,708	20,000	476
Diesel Engines	Internal Motor Lubrication	Motor Oil	19	5	0	38	10	0	57	15	0
Main Power Transformers Earthing Transformers	Biodegradable Dielectric Insulating Fluid, mineral oil, or synthetic ester oil	Midel 7131	98,421	26,000	619	295,262	78,000	1,857	492,104	130,000	3,095
Reactors	Gear and Bearing Lubricating Oil	Midel 7131	41,640	11,000	262	124,919	33,000	786	208,198	55,000	1,310
Total Oil Storage			**168,470 L**	**44,505 gal**	**1,060 bbl**	**465,644 L**	**123,010 gal**	**2,929 bbl**	**776,066 L**	**205,015 gal**	**4,881 bbl**
Total Storage for 10 Small, 5 Medium, or 4 Large OSS			**1,684,470 L**	**445,050 gal**	**10,600 bbl**	**2,328,220 L**	**615,050 gal**	**14,645 bbl**	**3,104,264 L**	**820,060 gal**	**19.524 bbl**

A7.2 Oil Volume and Spill Containment

If all the oils associated with the OSSs were released, the maximum worst-case scenario would be 205,015 gallons from a large OSS. However, control measures (e.g., containment structures) would be in place to contain a release of oil. Where possible, biodegradable oils will be used. In addition, monitoring equipment will be used to detect a release of oil. Monitoring equipment (e.g., tank level, containment liquids, oil detection equipment for the sump tanks) will be integrated in the Project's SCADA system and will cause an alarm and notification to O&M personnel. Project status, alarms and notifications are monitored 24 hours a day. Specific details will be identified in the final version of the OSRP.

Cooling oil for transformers, reactors, and other power electronics equipment is completely contained within the equipment. Containment tanks are used to capture any leaks from fill or drain connections. Open equipment (e.g. temporary diesel generators) that contains environmentally harmful substances are placed above drip trays.

Any temporary connections transporting oily substances (e.g., between diesel storage container and emergency generator) will be made using off-shore certified dry-break connectors and placed above a drip tray. A simple oil spillage kit, allowing to mitigate small, local spillage during maintenance, will be part of the delivery. The WTGs contain up to approximately 3,781 gallons of oil per WTG. Equipment in the WTGs are designed to have a secondary containment system, which would be sized according to the largest container.

A7.3 Resources of Special Economic or Environmental Importance

According to the RRT 2 RCP, NJDEP is the designated representative of the Region 2 RRT for the State of New Jersey. In addition, the NJDEP Office of Natural Resource Restoration is the Trustee for Natural Resources under the Oil Pollution Act of 1990.

At its closest point, the WTA is located approximately 8 miles from the New Jersey coastline in the vicinity of Atlantic City. The entire southern portion of the state along the coastline from the middle section of Monmouth County and south is made up of the Kirkwood-Cohansey aquifer system. The Cohansey aquifer is confined to Cape May County. The Kirkwood aquifer underlies the remainder of the region. This aquifer system is highly permeable due to the dominance of well-sorted, medium- to coarse-grained sand. There are three National Wildlife Refuges (NWR) in New Jersey that could be impacted by a spill from Atlantic Shores. The Edwin B. Forsythe NWR is located just north of Atlantic City. The Cape May NWR is located at the southern tip of the state on the coast. The Supawna NWR is located to the north and well inside Delaware Bay. Because of their locations, it is very unlikely that the Cape May and Supawna NWRs will be impacted from an incident at Atlantic Shores.

The New Jersey HPO maintains a registry of national and state historic places. This registry can be accessed at https://www.nj.gov/dep/hpo/1identify/nrsr_lists.htm.

The entire shoreline of the state of New Jersey can be considered an important economic site. New Jersey tourism relies heavily on visitors to the state's famous beaches. Any spill occurring in the summer months in the state that results in beach closures for any extended period of time will result in significant economic impact.

ESI maps, available from the National Oceanic & Atmospheric Administration, provide a summary of coastal resources that are at risk if an oil spill occurs in the area. The maps are available in pdf format at: https://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html.

A7.5 Response

The WTGs and OSSs are designed to utilize secondary containment systems to prevent a discharge of oil to the environment. Containment will be provided considering the size of the largest container. The secondary containment for the OSSs is connected to a sump tank.

Oils used by Atlantic Shores are expected to have a specific gravity of less than 1.0. Therefore, any discharges of oil to water would float on the surface of the water, and on-water mechanical recovery techniques could be used to recover the released oil.

Atlantic Shores will retain a third-party OSRO to assist in the unlikely event of a release of oil to the environment. In addition, Atlantic Shores will maintain a location for CTV operations near the lease area. CTVs are purpose built to support offshore wind energy projects. They are typically 75 ft in length and set up to safely and quickly transport personnel, parts and equipment. In addition to vessels, Atlantic Shores will maintain spill response equipment such as a spill overpack drum, containment bladders, absorbent booms, pigs, socks, and other sorbent materials. In addition, Atlantic Shores will ensure personal protective equipment (PPE) is on hand, such as goggles or safety glasses, face shields, gloves, and disposable chemical and oil resistant suits (e.g., Tyvek suits).

Atlantic Shores will contract with a USCG Classified OSROs which are listed at: https://cgrri.uscg.mil/UserReports/WebClassificationReport.aspx.. Once an OSRO is contracted, additional details will be provided regarding spill response resources and the time needed for procurement. In addition, a discussion of response to worst case scenario in adverse weather conditions will be addressed.

The UC will consider the use of alternate response countermeasures, such as dispersants and in-situ burning, for any spill at Atlantic Shores. Sections 2.4.4 and 2.4.5 of the main OSRP detail these policies and considerations.

Annex 8 – Agreement with Oil Spill Removal Organization

Details regarding contractual agreements will be provided for review and approval prior to construction.

Annex 9 – Equipment Inventory

Details regarding spill response materials, services, equipment, and response vessels for the Project will be provided for review and approval prior to construction.

A9.1 Maintenance Facilities

In support of necessary O&M activities, Atlantic Shores will maintain a management and administrative team, a “control room” operation, and maintenance facilities.

The technicians and engineers responsible for long-term maintenance will operate from O&M facilities. The O&M facilities will include office and training space, shop space, warehouse space for parts and tools, and a location for CTV operations. CTVs are purpose-built to support offshore wind energy projects. They are typically 75 ft in length and set up to safely and quickly transport personnel, parts, and equipment. The maintenance operation may also make use of larger Service Operations Vessels (SOVs). SOVs are typically 260 to 300 ft in length with accommodations for maintenance crews for up to two weeks operation in the WTA between returns to port for refueling and resupply. Helicopters can be used for fast personnel transfer or for visual inspections as needed.

In addition to the vessels above, it is anticipated that Atlantic Shores will maintain spill response equipment such as a spill overpack drum, containment bladders, absorbent booms, pigs, socks, and other sorbent materials. In addition, Atlantic Shores will maintain stockpiles of PPE such as goggles or safety glasses, face shields, gloves, and disposable chemical and oil resistant suits (e.g., Tyvek suits).

A9.2 Offshore Substations

Atlantic Shores will maintain spill response equipment at the OSSs. Brooms, shovels, sorbents, pigs, socks, and a spill overpack drum will be maintained at each OSS for response to minor leaks and spills inside or on the platform. In addition, Atlantic Shores will maintain stockpiles of PPE such as goggles or safety glasses, face shields, gloves, and disposable chemical and oil resistant suits (e.g., Tyvek suits).

A9.3 Oil Spill Removal Organization

Atlantic Shores will retain a third-party OSRO. The selected spill contractor will be responsible for the inspection and maintenance of their equipment. The equipment will be inspected on at least a monthly basis. Atlantic Shores will ensure that the OSRO has a maintenance program established for its equipment. A copy of the program would be requested and kept on file

A9.4 Inspections (30 CFR 254.43)

Response equipment will be inspected at least monthly and maintained to ensure optimal performance. Records of inspections of response equipment must be maintained for at least two years and made available to authorized BSEE representatives upon request.

Inspection of the sorbent boom will involve complete removal of booms from storage and the laying-out of the booms in an area that would not cause damage to the fabric of the booms. The inspector will examine each length of boom closely, making note of any fabric damages or wear, broken or frayed cable, missing weights and damaged connectors. The inspector will also verify the quantity of boom that is in storage to ensure there is sufficient supply. Any damages will be repaired, if possible. If the length of boom cannot be economically repaired, the inspector will request replacement.

A9.5 Operability Check

This activity is intended to periodically ensure the operability of certain items of equipment in the Atlantic Shores emergency equipment inventory, so that it is in a constant state of readiness for deployment. The designated inspector will check the operability of equipment. Any equipment that is electronic, electrical, or mechanical will be tested under actual load or use conditions.

During the operability check, the inspector will also perform routine maintenance on the equipment, as needed, such as battery replacements, oil and filter changes, and cleaning of boom. The inspector will indicate on the inspection form any problems encountered with the equipment and corrective measures taken or needed.

A9.6 Inventory

The inspector will verify the availability and condition of the variety of supplies, materials, and tools that are maintained in storage. The inspector will work from a list of items that are required to be maintained at all times. Any discrepancies in the list, or item replacement needs, will be noted on the inventory form. Inspection for condition of emergency resources will be checked periodically.

Annex 10 – Material Safety Data Sheets (MSDS)

MSDS for Project equipment will be provided for review and approval when available.

Appendix I-E

Draft HSSE Safety Management System

Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.

HSSE Safety Management System

CONTENTS

1. INTRODUCTION

This document provides an overall description of the key elements to be included in the Safety Management System (SMS) for the Atlantic Shores Offshore Wind project. It describes Atlantic Shores policies with regard to the safety requirements set forth in BOEM's *Guidelines for Information Requirements for a Renewable Energy Construction and Operations Plan (v. 4.0; May 27, 2020) (COP)*.

The SMS is an evergreen document and will be adapted and continuously improved as the Project develops. The SMS provides a structure for:

- Identification and vetting of risks and hazards to the health and safety of people and the Environment;
- Risk management and control measures implemented to ensure prevention of personal injury, asset damage, and adverse environmental impacts;
- Protection of employees, contractors, and the public from foreseeable hazards related to contact with Atlantic Shores operations or assets; and
- Robust health, safety and environmental monitoring and reporting practices.

The SMS describes the processes and procedures that, when successfully implemented, ensure the safety of personnel or anyone on or near the facilities. Building upon the SMS foundation of - *planning, doing, checking, acting and striving for continuous improvement* - that safety is ensured. Atlantic Shores understands that health, safety and environmental performance are critical factors during all operations on the OCS. As the Project evolves over the planning and design process, Atlantic Shores will update this SMS accordingly to reflect a periodic exchange of information with BOEM and BSEE about matters addressed in this document.

1.1 REGULATORY FRAMEWORK

Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf, OCS-A 0499 ("Lease") includes provisions to address federal safety requirements (Section 14 of the Lease). These requirements are summarized below:

a. Maintain all places of employment for activities authorized under the lease in compliance with occupational safety and health standards and free from recognized hazards to employees of Atlantic Shores or any contractor or subcontractor operating under this lease.;

b. Maintain all operations within the leased area in compliance with the regulations in 30 CFR Part 585 and orders from BOEM and other federal agencies with jurisdiction, intended to protect persons, property and the environment on the OCS; and,

c. Provide any requested documents and records, which are pertinent to occupational or public health, safety, or environmental protection, and allow prompt access, at the site of any operation or activity conducted under this lease, to any inspector authorized by the BOEM or other federal agency with jurisdiction.

An SMS must address the requirements set forth in 30 CFR §585.810 (and referenced in 30 CFR § 585.627(d), §585.614(b) and §585.651), including with respect to the COP a description of:

1. How you will ensure the safety of personnel or anyone on or near your facilities.;
2. Remote monitoring, control, and shut down capabilities.;
3. Emergency response procedures.;
4. Fire suppression equipment, if needed.;
5. How and when you will test your Safety Management System.; and
6. How you will ensure personnel who operate your facilities are properly trained.

1.2 INDUSTRY AND INTERNATIONAL STANDARDS

The Atlantic Shores SMS draws from decades of industry-leading offshore wind and other energy infrastructure experience of its parent companies, Shell New Energies and EDF Renewables. Both companies have long-standing, successful records developing, implementing and managing SMS for global and domestic operations. Atlantic Shores considers industry standards, such as ISO 45001 and API RP 75, to be important guidelines for the U.S. offshore wind industry[1] As this SMS evolves, Atlantic Shores will look to these and analogous standards to enhance its SMS program.

2. ABBREVIATIONS AND ACRONYMS

AED:	Automated External Defibrillator
ALARP:	As Low as Reasonably Practicable
ASOW:	Atlantic Shores Offshore Wind
BOEM:	Bureau of Ocean Energy Management
BSEE:	Bureau of Safety and Environmental Enforcement
CFR:	Code of Federal Regulation
COP:	Construction and Operations Plan
CPR:	Cardiopulmonary Resuscitation
CSMP:	Contractor Safety Management Plan
EMP:	Environmental Management Program
HAZID:	Hazard Identification
HSSE:	Health, Safety, Security, and Environment
JSA:	Job Safety Analysis
LOTO:	Lock Out / Tag Out
MOC:	Management of Change
NFPA:	National Fire Protection Association
NM:	Nautical Mile
OCS:	Outer Continental Shelf
OSHA:	Occupational, Health, and Safety Administration
PFD:	Personal Flotation Device
PIC:	Person in Charge
PPE:	Personal Protective Equipment
SMS:	Safety Management System
SPCC:	Spill, Prevention, Control, and Countermeasure
USCG:	United States Coast Guard

[1] ISO 45001:2018 *Occupational Health and Safety Management Systems* (*see* https://www.iso.org/iso-45001-occupational-health-and-safety.html) and American Petroleum Institute (API) *Recommended Practice 75, Recommended Practice for a Safety and Environmental Management System for Offshore Operations and Assets, 4th Ed.* (*see* https://www.api.org/products-and-services/standards/important-standards-announcements/recommended-practice-75)

3. MANAGEMENT COMMITMENT

The commitment of the Atlantic Shores Management Team is paramount to the implementation of the SMS, and the team has established a goal of eliminating safety-related incidents (referred to as “Goal Zero”). Atlantic Shores management will lead by example, set clear policy, allocate necessary resources and designate parties to provide subject matter expertise.

To achieve Goal Zero, Atlantic Shores will:

- Ensure a systematic approach to the management of HSSE and implement a safety management system designed to ensure compliance with regulations as a minimum and to achieve continuous performance improvement.
- Take responsibility and provide clear leadership.
- Be a leader in developing and promoting best practices in the offshore wind energy industry.
- Respect our neighbors and contribute to the societies in which we operate.
- Set targets for HSSE audits, improvement metrics and performance reporting.
- Require all contractors and subcontractors to manage HSSE in line with Atlantic Shores policy
- Ensure that HSSE compliance is the responsibility of all managers, teams, and individuals.
- Empower everyone to stop any work, or prevent work from starting, without retribution where adequate controls of HSSE risks are not found to be in place or an individual is not certain of the task at hand.
- Include HSSE performance in all staff evaluations.
- Encourage and promote involvement by all employees regardless of position or title.

Atlantic Shores is committed to the safety of all employees, contractors, visitors and vendors at all of its facilities. To guide Atlantic Shores in executing their commitment to safety, and building on lessons learned from the offshore wind, oil and gas, and other industries, a combination of regulatory sources has been assessed to support the development of comprehensive and robust safety management program.

The SMS draws on regulations from 33 CFR Parts 140-145 and incorporates information based on certain elements of 30 CFR Part 250, Subpart S, Safety and Environmental Management Systems (SEMS) and OSHA regulations.

3.1 ROLES

The following roles are tasked with fostering and implementing the SMS:

Management Team: The Management Team provides overall leadership to the Project team with regards to HSSE; ensures the safe management of all work associated with the Project; ensures that the project is fully and competently staffed for managing HSSE and that objectives are clearly defined for all team members; ensures that all levels of staff receive adequate and appropriate training; ensures that a means is in place to provide the appropriate level of response to HSSE protocol that is not followed.

Managers and Leads: Managers and leads provide direct support to help individual contributors manage HSSE compliance in their role; ensure the safe management of work under their direction; ensure that HSSE objectives are followed; ensure that staff under their direction receive adequate and appropriate training.

Individual Contributor: All employees, contractors, and subcontractors contribute to keeping Atlantic Shores incident and injury free; ensure the safe performance of their work; follow HSSE policies; attend all required training.

3.2 TRAINING REQUIREMENTS

Atlantic Shores team members will receive ongoing training in implementing the SMS and supporting policies. Team members will receive training to develop and maintain the following capabilities:

- Where to find Atlantic Shores HSSE policies;
- How to perform their work safely;
- The importance of and how to support and improve the Atlantic Shores safety culture.; and
- How to report accidents, near misses, or injuries.

In addition, managers and leads will receive training to ensure they have the necessary skills and knowledge to fulfill their safety leadership responsibilities including:

- Cultivate and model the safety culture.
- Communicate Atlantic Shores HSSE policies, expectations, and goals.
- Implement and manage the SMS.
- Ensure that the project is fully and competently staffed for managing HSSE.
- Implement the training program and HSSE recordkeeping, performance tracking, and reporting.
- Ensure that procedures are in place to provide an appropriate response to incidents or to noncompliance.

Further training requirements are addressed in section 9.

3.3 COMPETENCE ASSESSMENT AND RECORDS

Atlantic Shores will use a competence assessment process to assist the development and maintenance of highly and appropriately trained staff. Contractors working for or on behalf of Atlantic Shores will be required to meet these same training and recordkeeping standards.

Atlantic Shores and its contractors/subcontractors will maintain records for HSSE training of project personnel, situational exercises (e.g., tabletop and mock incident exercises), and relevant safety certifications. The Management Team will direct Managers to maintain a recordkeeping system that allows for regular review and reporting of all necessary training records and certifications.

4. EMPLOYEE INVOLVEMENT

Atlantic Shores values a high level of employee engagement in its safety program. Employee involvement in the SMS program will be maximized through initial safety orientation, frequent and repeated safety awareness training, and management programs that include:

- Safety Meetings;
- Safety Training Program; and
- Safety Recognition Program.

Atlantic Shores will establish a corrective action policy that clearly defines the expectations of all employees. The policy encourages trained employees to exercise appropriate judgement when undertaking work and follow established safety policies and procedures. The disciplinary policy clearly defines consequences and disciplinary actions when safety policies are violated.

5. SAFETY POLICIES

Specific safety policies and associated training will be developed in accordance with applicable provisions of 29 CFR Part 1910 (Occupational Safety and Health Standards), 29 CFR Part 1926 (Safety and Health Regulations for Construction), and 30 CFR Part 585 (Renewable Energy and Alternate Uses of Existing Facilities on the Outer Continental Shelf).

Atlantic Shores HSSE policies will be maintained through training, regular safety meetings, documentation and audits. The SMS addresses the following safety topics:

Safety Topic	Purpose
Contractor Safety Management Process (CSMP)	To confirm that contracts consistently and effectively cover the management of HSSE risks, and to deliver effective management of HSSE risks during contracted activities
Emergency Preparedness and Response Plan + Contact Form	To plan and prepare for Emergency Responses to Incidents that mitigate the consequences and enable resumption of normal operations/business activities
Crisis Management Plan	Managing crisis situations that can arise with little or no warning, cause a high level of concern in the minds of many stakeholders - external and internal, and puts the Atlantic Shores license to operate at risk
Oil Spill Response Plan	To prepare for fuel or other liquid hydrocarbon and chemical spills offshore and to develop plans to mitigate their consequences
Office and Work from Home Safety Plan	To improve and maintain worker welfare for employees, contractors, and subcontractors with a goal of driving performance through demonstrating care for people
Environmental Management Program (EMP)	To define detailed plans for ensuring compliance with all environmental laws and regulations during construction, installation, and operation.
Incident Management and Investigation Plan	To manage, log, investigate, and learn from incidents.
Drug and Alcohol Policy	To manage the risk caused by the use of alcohol and drugs
Personal Protective Equipment (PPE) Procedure	To manage the risk to people where personal protective equipment is used
Aviation Incident Prevention Plan	Controls to manage air safety are established for aircraft, operators, facilities and operations for aircraft that are owned, operated, managed or contracted by Atlantic Shores
Incident Communication Plan	To direct internal and external notifications and communications for response and learning.
Life Saving Rules and Goal Zero Principle	To state guiding safety principles for project.
Management of Change Process	To manage the HSSE and Social Performance risks resulting from unforeseen consequences of changes
Crane and Material Handling Requirements (Lifting and Hoisting)	To manage the risks of lifting and hoisting operations
Working at Heights/Dropped Object Prevention Policy	To prevent falls and drops and to reduce the consequences if a fall or drop occurs when working at heights
Permit to Work System	To manage the risks of hazardous work and work that could interfere with other hazardous operations

Vehicle Safety Plan	Controls to manage road safety are established for drivers, vehicles and journeys. Extra controls are established for professional drivers and in areas with high road safety risks.
Waste Management Plan	To minimize the generation and optimize the reuse, recycling and disposal of wastes
Facility Security Plan for Shore Base and Substation	To manage security risks by assessing security threats and providing controls to safeguard people, assets including information, and reputation.
Spill Prevention, Control, and Countermeasure Plan (SPCC)	Details proper containment and cleanup procedures for unintentional spill or release of substances at onshore facilities.
Bypassing of Safety Systems	To manage the risk of using override of process safeguarding systems and process safety alarms.
HSSE Disciplinary Action Policy	To provide appropriate consequences for intentional or unintentional failure to follow safety rules
Personnel Transfer at Sea Procedure	To ensure safety of all project personnel during transfers at sea between vessels and helicopter if needed.
Fitness for Duty	To reduce the risk of injury, illness, or incidents by evaluation of personnel's fitness for work
Stop Work Authority	Any individual has the right and obligation to declare a "Stop Work" if an unsafe situation is observed that could potentially result in an incident or would potentially cause harm to the environment or damage to equipment and/or property.
Lock Out / Tag Out Procedure	To manage the risk from exposure of people to energy and hazardous substances by isolating equipment and placing locks and tags.
Marine Incident Prevention Plan	Controls to manage Maritime Safety Risks are established for owned, operated or contracted vessels. Establish and maintain positive vetting to ensure a vessel is confirmed to be suitable for the intended usage
First Aid, CPR, and AED Procedure	Training and procedure for first responders
Bloodborne Pathogen Procedure	To establish a standard way of safely handling incidents where personnel have the potential to come in contact with blood or bodily fluids
Hearing Conservation Policy	To establish safe practices to address work environments with high decibel sound
Heat Stress Prevention	Establish safe work practices to address and prevent heat stress
Vessel and site-specific induction training	Establish what needs to be included in on-site induction training materials.
Hot Work	To manage the risk of igniting flammable materials during hot work
Confined Space Entry	To prevent or reduce the consequences of incidents related to planning, preparing, executing and supporting confined space work (CSW)
Wind Turbine Rescue from Height Procedure	Establish procedure for rescuing personnel from heights during various project phases

Electrical Work Requirements (Shock and Arc Flash Safety)	To manage the risk to people from electrical hazards
Fire Safety Awareness	Verify that all personnel are trained in basic fire prevention and suppression protocol

5.1 ORGANIZATIONAL REPORTING STRUCTURE

Atlantic Shores' organizational structure ensures responsibilities are delineated and accountability is described for all levels of the organization. As needed, positions and duties will be added to the structure, consistent with the Project safety needs and in coordination with project contractors.

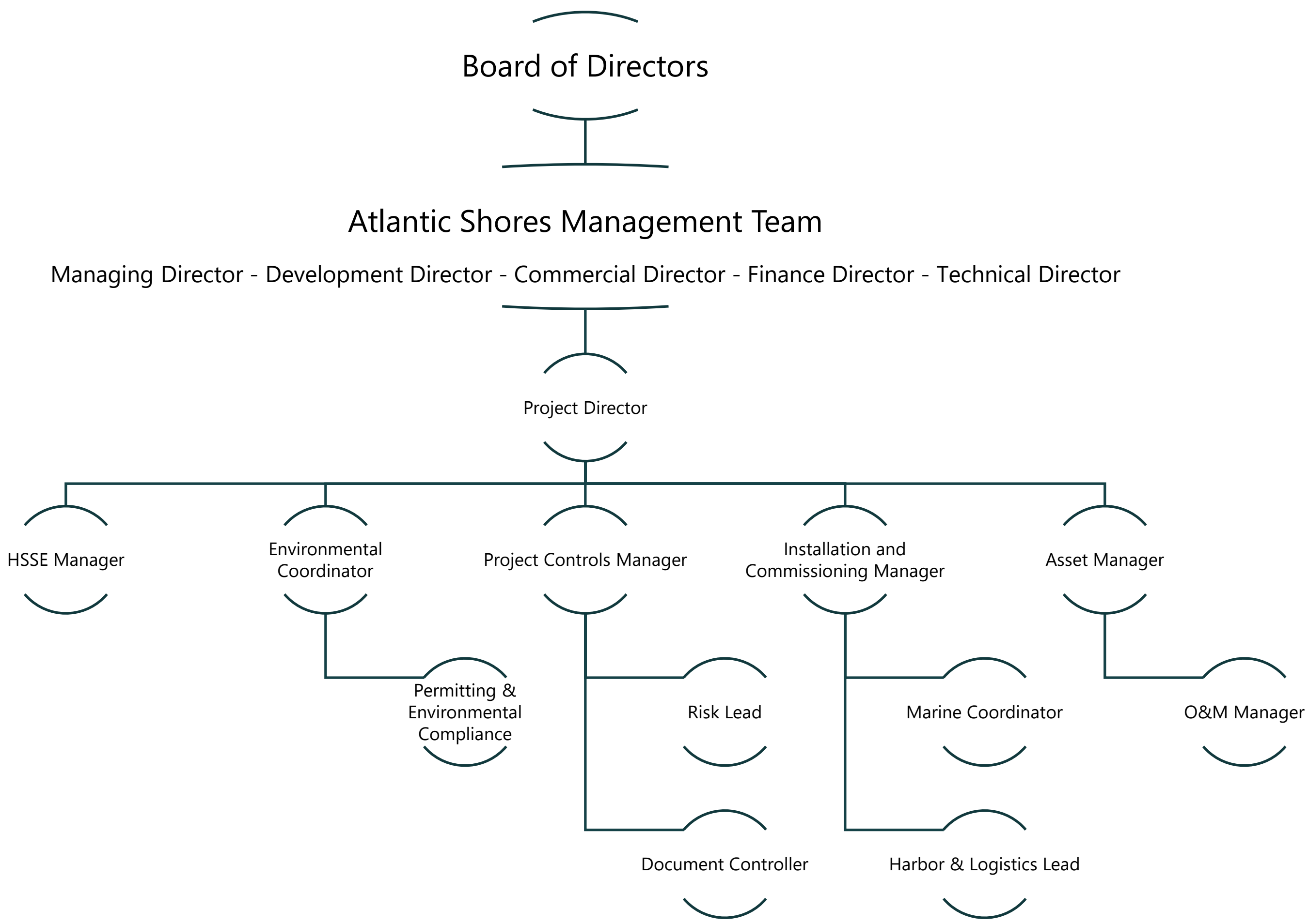


Figure 5-1 Atlantic Shores HSSE Management Organization

5.1.1 KEY ROLES AND DESCRIPTION OF RESPONSIBILITIES

This section lists the responsibilities of Project personnel for administering the SMS, though such personnel may have additional responsibilities that are beyond the scope of the SMS and are addressed elsewhere.

5.1.1.1 PROJECT DIRECTOR

The Project Director will manage all aspects of the Project and will ensure that the Project is constructed safely, in accordance with the environmental permits and applicable quality standards. The Project Director will be Atlantic Shores' authorized representative during the engineering and construction period for all matters related to the SMS including coordination with government authorities, first-responder emergency agencies, and coordination between contractors.

5.1.1.2 HSSE MANAGER

The HSSE Manager will report to the Project Director and will be responsible for monitoring compliance with the approved Construction and Operations Plan, the SMS, all safety-related regulatory requirements, and overall health and safety conditions for the Project. The HSSE Manager will review all contractor's safety management plans for compliance with the COP SMS, regulatory, and contract requirements. The HSSE Manager will establish a "safety first" working mentality at the project sites and on vessels involved in transport and construction.

5.1.1.3 ENVIRONMENTAL COORDINATOR

The Environmental Coordinator will report to the Project Director and will ensure that all local, state, and federal permit requirements and laws relating to environmental protection and reporting are implemented. The Environmental Coordinator will monitor contractors for compliance with Project specific environmental requirements and shall be responsible for verifying compliance with environmental protection programs and protocols for environmental incident response. The Environmental Coordinator will coordinate deployment of certified marine mammal observers and other environmental resource observers on the vessels as required by the conditions of the Project permits and approvals. The Environmental Coordinator will ensure contractors have compliant oil spill response plans, hazardous waste plans, and waste management plans in place.

5.1.1.4 INSTALLATION & COMMISSIONING MANAGER

The Installation and Commissioning Manager will report to the Project Director and will ensure compliance with permit requirements and applicable laws relating to the Project vessel activities (including installation vessels, transport vessels, service vessels, tugs, rescue boats, etc.). The Installation and Commissioning Manager will be kept informed of all planned vessel deployment each day.

5.1.1.5 MARINE COORDINATOR

The Marine Coordinator will conduct regular meetings with contractors to discuss vessel operation and deployments as appropriate for the level of marine activities scheduled. The Marine Coordinator will be the primary liaison with the USCG, port authorities, state and local law enforcement, marine patrol, and commercial operators (including ferry, tourist, and fishing boat operators). The Marine Coordinator will be responsible for all marine updates such as coordination with USCG regarding any required Notices to Mariners.

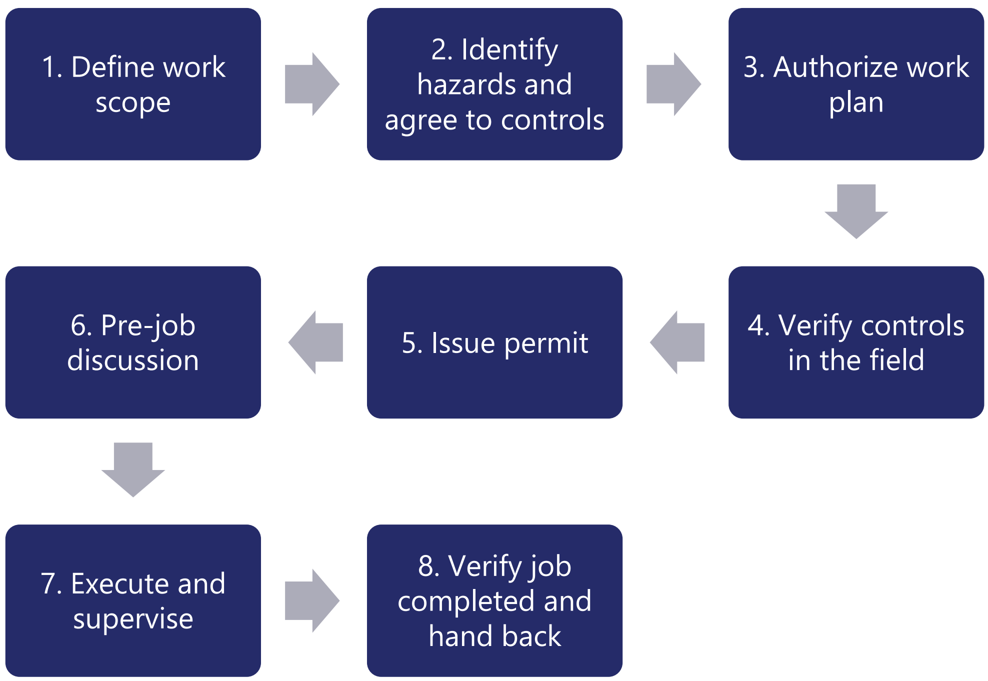
It will be the Marine Coordinator's responsibility to be knowledgeable of weather forecasts and have a communications plan in place with all contractors and vessels involved in the project. The Marine Coordinator will coordinate with the USCG and local law enforcement authorities for planning in the event of trespassing vessels within any safety zone established for the offshore Project construction activity.

5.2 PERMIT TO WORK

Atlantic Shores requires a safe system of work by incorporating a Permit to Work (PTW) process on routine and non-routine work activities. The PTW process is a comprehensive process for analysing, planning, authorizing, and executing work in a manner to prevent incidents. The Permit to Work System should support personnel in safely managing hazards associated with the work activity and the work location or equipment, such that:

- The hazards and controls are understood by the workers.
- The work area is isolated from process hazards.
- Work/activity conflicts are understood and are mitigated for.
- Anyone affected by the work understands the hazard that they could be exposed to

The Permit to Work 8 Step Process



Activities which will require a written safe system of work controlled through Permit to Work will include:

- Access to and work within Confined Spaces
- Access to and work on electrical systems
- Access to and work on mechanical systems
- Lifting and Hoisting operations
- Vessel Permits
- Pressurized pipe systems
- Instrumentation & Control
- Hot work (such as welding or grinding)
- Radiological processes (e.g., NDT)

- Significant Lifting Operations
- Work at Heights
- Work over water
- Transfer of personnel

5.3 JOB HAZARD / SAFETY ANALYSIS

Another key tool to the process, besides the Work Permit, is the Job Safety/Hazard Analysis (JSA/JHA).

The JSA/JHA also helps ensure appropriate precautions and procedures are employed to eliminate or minimize identified hazards and risks of conducted activities. The JSA/JHA is a process for discussing and documenting each step of a job, identifying the existing or potential hazards, and then determining the best way to perform the job to reduce or eliminate the hazards.

JSA/JHA are effective tools to be used for jobs that will take place even when a Work Permit is not required. Atlantic Shores views the JSA/JHA process as an ongoing, continual process that will evolve with the progression of the project from construction, through operations & maintenance, to decommissioning.

5.4 DRIVING SAFETY / JOURNEY MANAGEMENT

Atlantic Shores employees, contractors, and subcontractors driving a vehicle in the course of their work will comply with Atlantic Shores' driving standards and requirements. These requirements include:

- Have a current driving license that is valid for the location, type of vehicle and, where applicable, the cargo
- Be physically and mentally capable of operating the vehicle.
- Use three-point seatbelts at all times and make sure passengers do so throughout the trip.
- Do not use a mobile phone, pager or similar mobile device (whether hands free or not) while driving.
- Do not allow unauthorized passengers in the vehicle.
- Visually inspect the vehicle for roadworthiness every day before use, including the tires and windshield
- Drive with lights on during daytime, except where prohibited by law.
- Use vehicles equipped with 3-point seatbelts, head restraints, anti-lock braking systems, vehicle side-impact protection, and airbags for both driver and front seat passenger.
- Periodically question and review the number of journeys with the intent to eliminate journeys and lower your travel risk.
- Attend an accredited Defensive Driving Course at a frequency based on the annual miles driven.
- Non-professional drivers shall conduct a Journey Management Assessment (JMA), which is a mental risk assessment, prior to every road trip. The JMA will cover fitness to drive, vehicle condition, the route and road conditions.
- Do not allow driving for more than 10 hours or a combination of work-related activities and driving for more than 14 hours.
- The use of motorbikes, other motorized devices with two or three wheels, All Terrain Vehicles or Quads are not allowed for company business.

5.5 WORKING AT HEIGHTS / FALL PROTECTION

All work at height should be properly planned and appropriately supervised. This includes planning for an emergency rescue. A risk assessment will be completed for a potential fall from ANY HEGHT to determine the appropriate level of risk mitigation. All work should be risk based, well organized, and planned in advance. There is a requirement to complete a risk assessment for work at height. The Atlantic Shores Fall Protection Program is intended to provide general procedures for protecting workers working from heights. Activities that expose workers to any potential fall, regardless of height, shall employ suitable fall hazard control measures. Whenever possible, tasks should be planned so that elevated work will not occur.

When fall hazards cannot be eliminated or prevented, personal fall arrest systems shall be used. Personal fall arrest systems ("PFAS") consist of an anchoring point capable of supporting at least 5,000 pounds, double latching snap hooks, a full-body harness with a shock absorbing lanyard and lifeline, or a suitable combination of these. PFAS shall conform to the ANSI Z359.2 Standard. PFAS components shall be configured so workers can neither free-fall more than six feet, nor contact any lower level.

Those working at height should be competent to do so. Verify the competence of people who:

- Inspect, maintain or repair Fall Protection Equipment
- Inspect, maintain or repair ladders.
- Use Fall Protection Equipment
- Construct or inspect temporary work platforms.
- Perform work using Rope Access techniques and equipment.

Other measures to prevent injury will include:

- Where there is a Risk of a fall, apply the following Hierarchy of Control:
  - First: Eliminate the work at height via design change or scope modification, etc.
  - Second: Work from a permanent work platform with guardrails and toe boards
  - Third: Work from a temporary work platform (scaffold), or mobile work platform, with guardrails. Assess the hazards of installing, operating, or maintaining the work platform when deciding whether it is Reasonably Practicable.
  - Fourth: Use personal Fall Protection Equipment
- Periodically inspect Fall Protection Equipment and ladders in line with manufacturers' recommendations. Verify that Fall Protection Equipment and ladders that fail inspection are not used.
- Visually inspect Fall Protection Equipment and ladders before each use.
- Tie off 100% of the time when wearing personal Fall Protection Equipment, including while:
  - moving to and from the work at height
  - moving at height; and within 6 feet of a platform edge without a guardrail
- Verify that anchor points meet relevant parts of ANSI/ASSE Z359 before starting work.
- Use a fit-for-purpose harness and lanyard to tie off personal Fall Protection Equipment to an acceptable anchor point.
- Use three points of contact at all times when climbing up and down ladders.
- Use a ladder climbing safety device when climbing up or down uncaged ladders when these are 20 ft or longer.
- Determine the method(s) used to rescue people who have fallen, are suspended in a harness and could develop suspension trauma. Verify the competence of people who are to perform rescues.
- Stop operations if safe conditions cannot be maintained.

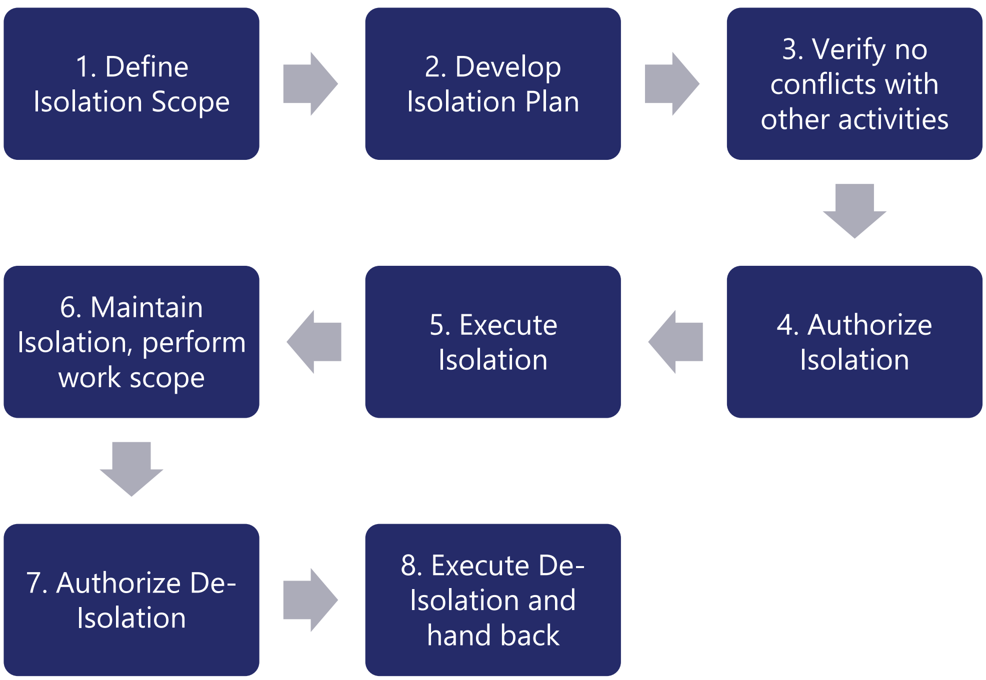
5.6 LOCK OUT TAG OUT (LOTO)

5.6.1 GENERAL LOTO DESCRIPTION

The intent of the isolation and lock out tag out system is to manage the risk to people, the environment, and assets, resulting from exposure to energy (e.g., pressure, electrical, kinetic, temperature) and hazardous substances, during invasive maintenance, through effective isolation of equipment and the placement of locks and tags. Lock out tag out (LOTO) is a procedure required to isolate personnel from all potential energy sources when performing maintenance or service on equipment; especially when that maintenance or service requires the disabling or removal of normal guards and safety devices.

The OSHA standard for The Control of Hazardous Energy (Lockout/Tagout) (29 CFR 1910.147) for general industry, outlines specific action and procedures for addressing and controlling hazardous energy during servicing and maintenance of machines and equipment. The control of hazardous energy is also addressed in a number of other OSHA standards, including marine terminals (1917 Subpart C), longshoring (1918 Subpart G), construction (1926 Subparts K and Q), electrical (1910 Subpart S), and electric power generation, transmission and distribution (1910 Subpart R and 1926 Subpart V).

Atlantic Shores will have written LOTO program in effect for execution and documentation. The 8-step isolation process is mapped below.



5.6.2 LOTO PROCEDURE

- All personnel associated with the scope will share information prior to the start of the work requiring LOTO and agree to make all LOTO procedures uniform for the duration of the project.
- Repairs, maintenance, or other work scopes shall not be carried out on equipment in operation. All equipment shall be shut down and a LOTO device used in such a manner that the equipment cannot be accidentally started while being worked on. The power switch of the equipment to be worked on shall be locked out / tagged out.
- Keys for safety locks shall be stored in a secure location accessible only to those authorized.
- Once locked out and proven to be deenergized, the equipment shall be released for work using a PTW issued by an appropriately authorized person and explained clearly to the recipient working party.
- The current status of work ongoing under a LOTO and PTW shall be recorded in a log and kept up to date with every shift change. The log shall be available to all in control of supervision of works at the site.
- To ensure the equipment has been properly locked out of service prior to starting any work, a qualified person shall attempt to turn on the power source to ensure the equipment does not become energized.
- Tower/Nacelle Specific – Before equipment is unplugged or plugged into any power system, the power source shall be locked out / tagged out. This includes all equipment that is unplugged or plugged into portable generators, transformers, controllers, control panels, etc.
- Examples of equipment repairs or maintenance that require LOTO procedures include, but are not limited to the following:
  - Nacelle hub entry;
  - Repairs to electrical systems;
  - Generator repairs; and
  - Cabling inspection/repairs.

5.7 ACCESS AND EGRESS

All access to the Offshore Project Area is controlled by the Site Manager or designated subordinate and will be performed to the procedure outlined in the access/egress document. All personnel intending to transfer to the offshore site require up-to-date sea survival training, medical fitness for duty verification, specific training documents for the work they are to undertake, and site-specific induction training. The vessel master keeps a log of all persons that board their vessel and of all the persons transferring onto the differing wind turbines, offshore substations, or other vessels. These log sheets are maintained for audit purposes.

Access/Egress conditions and risks will be assessed prior to transfer activities via NOAA's Operational Risk Assessment or a comparable plan designed by the transfer vessel operator.

5.8 ELECTRICAL SAFETY

Atlantic Shores shall address and minimize personnel exposure to electrical hazards through effective equipment operation, design, specification, installation, and maintenance. All electrical work shall be done in accordance with the latest codes, standards, and regulations including NFPA 70E. Electrical hazards include:

- Electric shock/electrocution;
- Electric arc flash;
- Trips and falls;

- Ignition by static electricity in flammable atmospheres; and
- Ignition by electrical equipment in flammable atmospheres.

A subject matter expert for electrical safety will develop Electrical Safety Rules consistent with internationally recognized standards. These Rules will establish work practices and procedure that minimize the exposure to electrical hazards for persons working on or near electrical equipment. These will include:

- Defining which people can work on electrical equipment. Only use property trained and authorized personnel to carry out work on electrical equipment.
- Specify when to require a permit to work.
- Manage work on or near electrical equipment to provide safe isolation.
- De-energize and isolate equipment as required in the Lock Out Tag Out process. Verify there is no voltage.
- Use physical barriers, protective equipment, special tools, or other controls to prevent harm to people when it is not possible to de-energize equipment.
- Verify electrical drawings are provided and maintained.
- Use equipment and work practices that manage static electricity.

5.9 HOT WORK

Hot work is defined as welding, flame cutting, burning, grinding, or using a torch. When possible, hot work should be performed in a shop, outside the facility, or in a Safe Welding Area ("SWA"). A SWA shall be established on all locations where substantial welding or flame cutting is anticipated. All welding and flame cutting operations shall be conducted in the established SWA unless otherwise authorized. The location of the SWA will be based on a specific risk assessment.

If hot work needs to be performed outside of the SWA, especially inside a nacelle, all movable fire hazards in the vicinity shall be removed to a safe distance or guards used to confine the heat, sparks, and slag, and to protect the immovable fire hazards. A Work Permit shall be issued for all hot work done outside of the SWA and approved by the contractor and supervisor. Hazards and recommended special precautions should be documented in the Work Permit.

The hot work equipment and work area shall be inspected prior to beginning any hot work operations to ensure safe working conditions. This includes checking for explosive atmospheric conditions in all vessels, piping and confined spaces and documenting the results on the Work Permit. Oxygen and acetylene cylinders shall be stored valve end up and properly secured. Only certified personnel/welders shall be permitted to perform hot work.

5.10 LIFTING AND HOISTING SAFETY

Only trained and qualified personnel shall operate cranes and other such lifting equipment. All cranes and lifting equipment shall be strictly maintained in accordance with the manufacturer's recommendations and regulatory requirements.

The following requirements will minimize the possibility of an HSSE incident during lifting and hoisting operations:

- Verify Competence Assurance for people in HSSE Critical Positions who supervise or perform Lifting and Hoisting operations and who inspect and maintain lifting equipment.
- Apply procedures that are approved by a Subject Matter Expert for Lifting and Hoisting
- For Routine Lifts, develop general lifting procedures that identify and control the hazards.
- For all Non-Routine Lifts:

    - Assign the Authorized Person for the Lifting and Hoisting operation, and the Person in Charge Of The Lift
    - For Non-Routine Simple Lifts:
        - conduct a specific Job Hazard Analysis to define the lift plan.
        - assess Site Factors to define logistics, crane stability, and radius of operation.
        - assess Load Factors to define load integrity and stability.
    - For Non-Routine Complex Lifts:
        - use a Subject Matter Expert for Lifting and Hoisting to establish the lifting plan.
        - assess Site Factors to define logistics, crane stability, and radius of operation.
        - assess Load Factors to define load integrity and stability.
        - provide the requirements for lifting of personnel.
        - provide the requirements for performing Blind Lifts.
- Equipment to be used for Lifting and Hoisting must be inspected, maintained, and certified.
    - Use equipment only for its intended purpose and within its designed operating limits.
    - Maintain and inspect equipment in line with the manufacturer's recommendations.
- Manage Non-Routine Lifting and Hoisting in line with the Permit to Work process
- Check the Lifting and Hoisting equipment before all lifts and confirm that.
    - equipment is suitable for its intended purpose.
    - safety devices are installed and operational
- Confirm that required Controls are in place and the lift is carried out as per the applicable lift Procedure
- Keep people clear of overhead loads and areas of potential impact
- Assign a flagman when moving cranes near overhead electrical lines, reversing, or manoeuvring in an area with plant, machinery, or personnel

5.11 HOUSEKEEPING

Good housekeeping is essential so work may proceed in a safe and orderly manner. All walking areas, work areas, handrails, equipment, tools, firefighting, and life-saving equipment, etc. shall be kept clean and free of obstructions. Tools should be placed appropriately so as not to cause a hazard to the job at hand while in use, and promptly put away after use. Hand and power tools shall be kept in good condition with guards in place without modification. Defective tools shall be repaired by qualified repairpersons or replaced.

6. CONTRACTOR MANAGEMENT

Third party contractors and support services will be integrated into the SMS. Specific requirements will be developed for contracting, including:

- Minimum requirements for bridging documents
- Contractor safety audits
- Minimum contractor safety training
- Contractor roles in an emergency

Contractors are required to follow the same policies and procedures that Atlantic Shores employees follow for maintaining safety. Atlantic Shores will manage all contractors to ensure safety policies and practices are implemented. Contractor HSSE representative shall be well versed in the project SMS and be responsible for the following:

- Day-to-day site HSSE supervision (onshore/offshore)
- HSSE monitoring, inspection, and auditing
- Support the HSSE Manager in establishing and fulfilling project training needs.
- Participate in planning and coordination of all marine operations relating to the Project.
- Assist with preparation and maintenance of all HSSE documentation.
- Management of PPE inventory, inspection, and testing
- Participation in HSSE meetings, risk reviews and workshops
- Set an exceptional example of safe work for all others involved with the Project.

Contractor operations should not expose Atlantic Shores employees, contractors, subcontractors, or the public to hazards in violation of governmental regulations and Atlantic Shores policy. Contractors will submit proof of training and copies of certificates to the Site HSSE Representative before the start of any work activity. The competencies and training records of all employees will be requested and examined by the Site HSSE Representative before commencing work activities.

6.1 AUDITS

Safety programs for all contractors will be subject to audit by Atlantic Shores. Audits may include review of safety policies, procedures, training records, etc. and may be performed prior to contracting and during the course of the contract.

6.2 TRAINING

All contractors will be fully qualified to perform the roles for which they are contracted, including any prescribed safety standards and training. Atlantic Shores will provide safety orientation to familiarize contractors with any site-specific safety issues. Contractors may be required to demonstrate, through documentation or practical application, their knowledge and understanding of safety requirements for offshore wind farm construction.

7. MANAGEMENT OF CHANGE

Atlantic Shores will maintain a procedure for Management of Change (MOC), which helps to identify the potential risks associated with the change and receive any required approvals prior to the introduction of such changes.

The MOC process provides a coherent, systematic, and simple mechanism for identifying and controlling hazards through the change process with emphasis on the transition phase. When well implemented, MOC ensures that the safety of the Project and its personnel are safeguarded by the evaluation of hazards, threats, and other potential undesired events related to a significant change, and the intended benefits of the change are fully realized as planned.

7.1 ROLES AND RESPONSIBILITIES

The Project Director will be responsible for the implementation of the MOC program. All MOC documentation will be maintained by the HSSE Manager. Any Atlantic Shores employee can initiate the MOC process.

7.2 MANAGEMENT OF CHANGE PROCESS

The Management of Change policy shall be utilized for at least the following changes whether they are temporary or permanent:

- Physical Changes: including work site changes such as changes in construction vessels, working platforms, access and egress locations, etc.

- Organizational Changes: including changes in personnel, individual responsibilities, contractor or sub-contractor changes, etc.
- Technological Changes: including changes in equipment, equipment design, software controls or the technology used on the work site, etc.
- Procedural Changes, including changes to processes (i.e., work schedules, materials, equipment unavailability, new equipment, or operating conditions.

Atlantic Shores will develop a form to facilitate the processing of changes. The change form will, at a minimum, include a description and the purpose of the change, the technical basis for the change, safety and health considerations, documentation of changes for the operating procedures, maintenance procedures, inspection and testing, P&IDs, electrical classification, training and communications, pre-startup inspection, duration of applicability, approvals, and authorization.

For a more complex or significant design change, a hazard and risk evaluation procedure will be used, such as a Hazard Identification (HAZID) workshop. HAZID is further described in Section 11. Risk assessments should demonstrate that the risks with controls are "As Low as Reasonably Practicable." Contractors also have a responsibility to carry out risk assessments based on the risks associated with their scope of work.

Documentation of changes will be kept in an accessible location to ensure that design changes are available to any member of Atlantic Shores who may require them.

7.3 MANAGEMENT OF CHANGE COMMUNICATION

The communication of changes to appropriate personnel is essential to safety and preventing incidents. The following lists activities that fulfil those requirements:

- A meeting of all involved parties will be held as needed for major changes in Project organization, procedure, or technology.
- An e-mail notification will be sent out to all team members for each implemented change.

7.4 TRAINING REQUIREMENTS

All individuals will receive initial training on the MOC program and will also receive refresher training as required.

7.5 MANAGEMENT REVIEW

On an annual basis, management will review the MOC process and advise improvements or areas to refocus. The management team and the HSSE Manager will ensure that the MOC policy has been properly implemented and all elements have been completed and documented.

7.6 AUDITS AND ASSESSMENTS

Audits of the MOC program shall validate that the exercise of the MOC policy includes the following:

- Reason for change
- Authority for approving changes
- Analysis of implications
- Acquisition of required work permits.
- Documentation of change process
- Communication of change to affected stakeholders inside and outside the organization.

- Time limitations
- Qualification and training of personnel affected by the change (including Contractors)

8. UNSAFE WORKING CONDITIONS

All employees, contractors, and subcontractors have the personal responsibility and work-place authority to report any unsafe work practice or to immediately stop any unsafe work practice during operations.

Unsafe work conditions may be reported anonymously. Emergent safety issues shall be addressed immediately.

8.1 REPORTS OF UNSAFE WORK CONDITIONS

All employees, contractors, and subcontractors shall report to the appropriate supervisor any violation of a safety regulation or any other hazardous or unsafe working condition on any Atlantic Shores owned or leased property, facility, structure, or equipment. They may also report any unsafe practice or condition occurring while engaged in Atlantic Shores business.

8.2 STOP WORK AUTHORITY

All employees, contractors, and subcontractors have the responsibility and authority to intervene in an effort to stop any unsafe task or operation where the risk to people, the environment, or equipment cannot be managed in accordance with Atlantic Shores' established safety policies, procedures, or safe work practices.

No employee or contractor will be retaliated against for stopping work that is based on a good faith belief that it is unsafe.

9. SAFETY TRAINING AND FITNESS

As part of the safety culture, safety training is on ongoing component of the Atlantic Shores safety program. Safety training and awareness will include the following topics, as well as any emergent safety issues that may arise. The training topics listed in this section are the minimum required training for all employees, contractors, and subcontractors.

Orientation Training Visitors

- Site safety rules for moving around on the site.
- Safety equipment for moving around on the site.
- Restricted areas
- Emergency protocol and muster points
- Who to contact in an emergency or with a safety related need.

Site workers

- All visitor topics
- Driving rules (on site and off site)
- Hazardous substances
- Waste, dust emission and noise on site
- Permit to work systems.
- Accommodations for workers
- PPE requirements
- Employee and Contractor general roles and responsibilities

- Incident reporting procedure
- Site security

Example of Minimum HSSE training requirements depending on job function.

- Working at heights
- Electrical safety
- Water survival
- Confined space entry
- First aid and CPR
- Fire fighting

*Example of Specialized and Task Specific Training

- Use of specialized equipment
- Scaffolding and personnel platform equipment
- Diving operations
- High voltage and switching

Medical Audits and Fitness for Duty: Pre-employment screening completed by an occupational doctor may consist of the following:

- Medical history
- Occupational history
- Physical Examination
- Determination of fitness to work wearing PPE
- Baseline monitoring for specific exposures
- Respirator fit test

Periodic Medical Examination completed by an occupational doctor may include:

- Yearly update of medical and occupational history
- Yearly physical examination
- More frequent testing based on specific exposures

10. PERSONAL PROTECTIVE EQUIPMENT

All Atlantic Shores employees, contractors, and subcontractors will receive training or shall be able to demonstrate that they have received training on Personal Protective Equipment (PPE) and its requirements for use, maintenance, and care for all specific safety related equipment, as appropriate.

At a minimum, the following PPE will be included:

- Eye and face protection
- Head protection
- Foot protection

- Hearing protection
- Protective clothing
- Respiratory protection
- Safety belts and lifelines
- Personal flotation devices (PFDs)
- Eyewash equipment

In addition to care and maintenance of PPE, training will also address:

- Housekeeping
- Guarding of deck openings when required

11. DESIGN AND EQUIPMENT

11.1 LIGHTS AND WARNING DEVICES

Appropriate lights and warning signals will be deployed during construction and when the Project is operational. Requirements for lights, markings, and warning devices for structures are codified in 33 CFR Part 67. Structure lights and warning devices will comply with relevant guidelines and regulations including the following:

- General
  - BOEM Draft Proposed Guidelines for Providing Information on Lighting and Marking of Structures Supporting Renewable Energy Development
- Aids to Navigation
  - USCG District 5 Local Notice to Mariner (LNM) 45/20
  - USCG COMDTINST M16500.7A *Aids to Navigation Manual - Administration*, Chapter 4 section G, Offshore Renewable Energy Installation – 02 March 2005
  - NVIC 01-19 Guidance on the Coast Guard's roles and responsibilities for offshore renewable energy installations (OREI)
  - Navigation Regulations 33 CFR Part 67: Aids to navigation on artificial islands and fixed structures
  - IALA Recommendation 0-139: The Marking of Man-Made Offshore Structures
- Obstruction Lighting
  - FAA Advisory Circular 70/7460- 1M *Obstruction Marking and Lighting*
  - FAA Advisory Circular 150-5345-43J *Specification for Obstruction Lighting Equipment*

11.2 FALL PROTECTION SYSTEMS

Design of fall protection systems and anchor points will comply with all relevant parts of ANSI/ASSE Z359. Guardrails and other permanent forms of fall protection will be designed in accordance with generally accepted industry standards and applicable regulations, including:

- 33 CFR §142.87 -- Guarding of deck openings, which provides requirements for guarding decks of offshore structures.
- 29 CFR §1910.29 -- Fall protection systems and falling object protection—criteria and practices, which provides requirements for handrails of elevated platforms and walkways.
- ISO 14122 series Safety of machinery ‑ Permanent means of access to machinery, which provides requirements for guardrails and other permanent forms of fall protection

11.3 LOCK OUT TAG OUT

Equipment will be designed so that Lock Out Tag Out (LOTO) procedures compliant with 29 CFR Part 1910, Subpart J, Section 147 can be used during operation. Design of machinery, electrical, and hydraulic fluid power systems for safe isolation will comply with ISO 14118, IEC 60204-1, and ISO 4413, respectively.

11.4 CONFINED SPACE

Equipment will be designed to support the use of confined space procedures compliant with 29 CFR Part 1910, Subpart J, Section 146 during operation.

11.5 BOAT LANDINGS

Boat landings will meet requirements provided under 33 CFR §143.105 (*Personnel Landings).*

11.6 MEANS OF ESCAPE

All structures shall be equipped with escape means, as appropriate for unmanned structures and in accordance with the requirements of 30 CFR §143.101.

11.7 PERSONNEL LANDINGS

Personnel landings will be provided on all structures and will consist of boat landings and access ladders. Guards and rails will be installed for the unprotected perimeter of all floor or deck areas and openings, catwalks, and stairways. Training will ensure all workers are aware of the requirements and have sufficient knowledge to report any deficiencies.

11.8 LIFESAVING EQUIPMENT

Lifesaving equipment will be provided in compliance with SOLAS Chapter III – *Life-Saving Appliances and Arrangements* and 46 CFR Part 160 as far as practically possible. This includes:

- Survival (transfer) suits will be worn for marine transfer to/from vessels when a risk assessment considering air and water temperatures, other PPE interactions, expected duration of exposure, tidal strength, expected vessel reaction times, etc. warrant.
  - These survival suits will conform to USCG – UL1197 and/or be SOLAS approved.
  - Survival suits will always be coupled with a suitable USCG compliant industrial life jacket.
- Personal Floatation Devices / Work Vests are required for all personnel who require transport and access to the wind farm.
  - Atlantic Shores will provide awareness training on the type(s) of approved PFDs and their uses, stowage, care, and inspection, including additional requirements for hybrid work vests, if used.
  - These PFDs will be USCG approved and fitted with an integrated Personal Locator Beacon.

11.9 FIRE DETECTION AND SUPPRESSION

The fire and safety design are dependent on the selected operational philosophy (e.g., manned versus unmanned platform and the resulting design risk assessment). A fire hazard analysis will be performed to identify the critical scenarios and the actual mitigation for each scenario, utilizing applicable NFPA codes where possible.

A SOLAS approved fire, smoke and heat detection system based on the self-monitoring principle should be installed in accommodation, machinery spaces and other areas deemed high risk. The fire detection system should be designed to rapidly detect the onset of fire in areas covered by the detectors and should include both audible and visual alarms where appropriate. Appropriate fire extinguishing equipment shall be provided, each clearly labeled as to the type of fire that each is suitable for. Locations of such equipment must be strategically placed and clearly marked in accordance with SOLAS requirements.

Project design and firefighting systems will be consistent with the following standards, at a minimum:

- 46 CFR 108 Subpart D, *Fire extinguishing systems*
- 29 CFR 1910 Subparts E, *Exit Routes and Emergency Planning*
- 29 CFR 1926 Subpart F, *Fire Protection and Prevention*
- 29 CFR 1910 Subpart L, *Fire Protection*
- 33 CFR Part 145 Firefighting Equipment
- Applicable NFPA standards

11.10 MAINTENANCE OF EMERGENCY EQUIPMENT

Each piece of emergency equipment will be part of the Atlantic Shores maintenance program. All emergency equipment in use will be listed and include a description of the maintenance requirements or technical references for maintaining each piece of equipment.

12. REMOTE MONITORING, CONTROL, AND SHUTDOWN CAPABILITIES

12.1 SCADA SYSTEM

The Project's Supervisory Control and Data Acquisition (SCADA) system will provide the operator with the capability to remotely monitor and control the project assets, including the ability to shut down the equipment remotely if necessary.

The SCADA system will continuously assess the status of the wind turbines and subsystems. Control room operators will observe how the plant is functioning and can make modifications or interventions remotely as required.

The system will incorporate redundancies, such as multiple network connections (e.g., a combination of radio, fiber optic cables, satellite, LTE) to ensure constant control of project assets. Primary communication will be the fiber optic cables connecting each wind turbine, the offshore substations, and the onshore substations.

12.2 FAIL SAFE SYSTEMS

In addition to the capabilities of the SCADA system, the wind turbines will utilize standard fail safe mechanisms (e.g., mechanical brakes, pitch systems to feather blades) and protocols. In the event that the wind turbines lose power or are communications with the operations facility; these systems will ensure that the turbines initiate a safe shutdown until the connection is restored and system integrity is verified.

13. EMERGENCY RESPONSE

The SMS is primarily focused on preventing incidents. However, it is also critically important to be prepared if emergencies do occur. For this reason, Emergency Preparedness and Response plans are essential for responding effectively to an incident. Proper planning, training, and drilling will ensure that any impact of an incident will be kept to a minimum for the public and the environment.

Emergency response plans will be developed for a range of emergency situations. Plan development will include procedures for testing emergency plans through drills and exercises. Plans will be developed, at a minimum, for the following scenarios:

- Collision between vessel and structure
- Fire on structure and/or service vessel
- Evacuation
- Pollution incidents
- Adverse weather
- Vessel in distress, man overboard, and Search & Rescue
- Remote monitoring, Control and Shut Down procedures

13.1 TRAINING REQUIREMENTS FOR EMERGENCY RESPONSE

Individuals who will lead emergency responses, as well as those who will participate as emergency response team members, will receive initial training prior to their first involvement in an emergency response. These individuals shall also receive refresher training on an annual basis.

Data and other observational information from past drill and actual events shall be incorporated into training. Learning from external events not related to Atlantic Shores shall also be incorporated as applicable.

14. HAZARD IDENTIFICATION AND RISK MANAGEMENT

Managing risk effectively is critical to achieving the HSSE objectives under this management system. Atlantic Shores will review HSSE risks associated with planned operations, assess the impact and likelihood of the risks materializing, and implement effective actions designed to safeguard assets to enable safe operations.

Comprehensive risk management will reduce risks and mitigate consequences associated with safety, health, environmental and security incidents by providing essential information for decision-making and planning of work activities. The goal will always be to reduce the hazard to a level as low as reasonably practicable.

- A process including risk analysis methodology will be established that involves hazard identification, risk assessment, selection of controls and mitigation (recovery) measures to reduce risk to the Lowest Practicable Level.
- HSSE hazards will be identified and documented including their effects on people, assets, community and the environment in a Hazard and Effects Register, including methods for managing the risks.
- Instruction, training, and supervision will be provided so that employees, contractors, and subcontractors (as applicable) are competent to apply the HSSE & SP risk analysis methodology in their area of responsibility.
- Security risk management will be conducted in accordance with national legal requirements and Internationally Recognized Standards, including the Voluntary Principles on Security and Human Rights
- Environmental risks will be identified and assessed together with consultation from a Subject Matter Expert to determine impacts to the environment.
- Health risks will be identified and assessed together with consultation from a competent person to determine potential impacts to people.
- Risk assessments will be conducted for ongoing Atlantic Shores projects and operations to identify and address potential hazards to people, assets, the community and the environment.
- Assessed risks will be addressed and documented by specified levels of management appropriate to the nature and magnitude of the risk.

- The Hazard and Effects Register will be reviewed and updated when existing operations/activities are changed in a way that would change the hazards or reduce the effectiveness of controls and mitigation measures, and when learning is established as an outcome from incident investigations.
- A follow-up process will be established to ensure that risk management decisions are implemented into plans, procedures, training programs and as part of the Management Review process.

Risk Assessment Matrix						
Consequences		**Likelihood**				
		10^{-1}	10^{-1}-10^{-2}	10^{-2}-10^{-3}	10^{-3}-10^{-6}	<10^{-6}
		Happens often and might be expected	Known to have occurred within Company	Known to have occurred within industry	Conceivable but unusual in industry	Almost impossible. Rare or absent in industry.
	#	**A Frequent**	**B Occasional**	**C Possible**	**D Unlikely**	**E Improbable**
-More than 3 fatalities or multiple life-threatening injuries. -Total loss of asset -Massive Environmental/Community Effects	**5 Massive Effect**					
-Up to 3 fatalities or 1 life-threatening injury -Major Environmental/Community Effects	**4 Major Effect**					
-Major injury or health effect -Moderate Environmental/Community Impact	**3 Moderate Impact**					
-Minor injury or health effect -Minor Environmental/Community Impact	**2 Minor Effect**					
-Slight injury or health effect -Slight or no Environmental/Community Impact	**1 Slight or No Effect**					

15. IMPLEMENTATION, MONITORING, AND REPORTING

15.1 IMPLEMENTATION

The HSSE Manager ensures that the SMS is implemented and monitors the program's effectiveness using both proactive and reactive measures. The preparation of an SMS process is only the first step in the implementation of a safety management system.

Execution of plans and implementation of procedures means putting them into practice. This is most easily achieved if specific individuals are given responsibility for the implementation of plans and procedures (sometimes key procedure may have a 'process owner' e.g., Management of Change, Permit to Work). These individuals should have roles that cover:

- Identifying people to lead aspects of the plan execution and identify process owners for key procedures to drive implementation, monitor effectiveness and manage improvement.
- Communicating plans and procedures to those affected.
    - Clearly communicating who plans and procedures are for and who is expected to follow them.

- Clearly defining who is responsible for actions that need to be taken.
- Acting as leaders to set expectations and to follow up on progress.
  - Measure progress against clear milestones and/or KPIs and take action to adjust where it is clear that events are not going as per plan.
- Demonstrating commitment at all levels to execute the plans and to implement procedures.
- Providing training in procedures so that those who need to follow them know what is expected.

15.2 PERFORMANCE MONITORING

Plans and Procedures put in place to meet SMS requirements need to be monitored regularly to ensure they are in place and working effectively. Monitoring can be either pro-active (e.g., inspections and audits) or reactive (e.g., incident reporting). In both cases the results should be used to understand any weaknesses in plans and procedures and to identify corrective actions. Monitoring activities should be prioritized based on risk. Activities that check that controls are in place and effective range from:

- Field Inspections
- Management Safety Walks
- Formal Behavioral Safety Observation Programs
- Self-Assessment checks
- Checks on logs e.g., shift handover logs,
- Procedure Checks and Audits

Atlantic Shores will establish and maintain effective systems of monitoring HSSE performance and SMS compliance. Data will be recorded and reported, including:

- Providing input for the HSSE targets and KPIs
- Reporting and communicating the key messages obtained from HSSE statistics gathered
- Reportable incidents
- Exposure hours
- Environmental data (waste generated/disposed, spills, releases, etc.)
- Fines and settlements
- Annual management review of the SMS to assess its suitability and effectiveness, to propose amendments, and to report status to the Board of Directors

15.3 INCIDENT REPORTING

15.3.1 SAFETY OBSERVATION AND NEAR MISS REPORTING

- Safety observations should be either immediately corrected or reported so that an appropriate action can be completed.
- All near misses must be formally reported by employees, contractors, and subcontractors as soon as practical after the event. Every near miss will be investigated by the Site EHS Manager or the appropriate designee.

- Where appropriate, drills will be carried out to maintain a robust emergency process and competence to ensure measures adopted from near misses are appropriate.

15.3.2 NOTICE OF INCIDENTS

Atlantic Shores will maintain and follow an evergreen Project-specific Incident Communication Plan that includes internal and external reporting. Atlantic Shores will report to BOEM all incidents in the manner described in 30 CFR §585.832 and 30 CFR §585.833.

This includes immediate verbal reporting and written notifications within 15 days for:

- Fatalities, which also include a written report of casualty in accordance with 33 CFR §146.30.
- Incidents that require the evacuation of person(s) from the facility to shore or to another offshore facility.
- Fires and explosions
- Collisions that result in property or equipment damage greater than $25,000.
- Incidents involving structural damage to an OCS facility that is severe enough so that activities on the facility cannot continue until repairs are made.
- Incidents involving crane or personnel / material handling activities, if they result in a fatality, injury, structural damage, or significant environmental damage.
- Incidents that damage or disable safety systems or equipment (including firefighting systems)
- Damage affecting the usefulness of primary lifesaving or firefighting equipment.
- Other incidents resulting in property or equipment damage greater than $25,000.
- Any other incidents involving significant environmental damage or harm.

A written report must be provided within 15 days for:

- Any injuries that result in the injured person not being able to return to work or to all of their normal duties the day after the injury occurred.
- All incidents that require personnel on the facility to muster for evacuation for reasons other than weather or drills.

In addition:

- The USCG shall be notified immediately of any HSSE incident requiring their assistance offshore.
- The USCG and USACE must be notified for all operations and incidents impacting the seabed.

15.3.3 POLLUTION INCIDENTS

Pollution incidents will be reported in accordance with 33 CFR §146.45. The approved Atlantic Shores Oil Spill Response Plan (per 30 CFR Part 254) will be followed for specific pollution response actions.