MAYFLOWER WIND

Prepared for:
Mayflower Wind Energy LLC

Mayflower Wind (Falmouth Connector Project) Analysis to Support Petition Before the Energy Facilities Siting Board
Volume I: Text

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Abbreviation and Acronyms

Abbreviation/Acronym	Definition
AADT	Annual Average Daily Traffic
ac	Acre
AC	Alternating Current
ACEC	Areas of Critical Environmental Concern
ADT	Average Daily Traffic
AIS	Air Insulated Switchgear or Substation
APE	Area of Potential Effect
AUL	Activity and Use Limitations
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
BUAR	Massachusetts Board of Underwater Archaeological Resources
BWSC	Bureau of Waste Site Cleanup
CCA	Community Choice Aggregation
CCC	Cape Cod Commission
CCRTA	Cape Cod Regional Transit Authority
CFCRI	Commercial Fisheries Center of Rhode Island
CFR	Code of Federal Regulations
Cluster Study 1	ISO-NE First Cape Cod Resource Integration Study
CMR	Code of Massachusetts Regulations
CO_2	Carbon Dioxide
COP	Construction and Operations Plan
CVA	Certified Verification Agent
CZM	Coastal Zone Management
dBA	A-weighted decibel
DC	Direct Current
DFG	Department of Fish and Game
DMF	Division of Marine Fisheries
DoD	Department of Defense
DOER	Department of Energy Resources
DP	Dynamic Positioning
DPU	Department of Public Utilities
DRI	Development of Regional Impact
ECC	Export Cable Corridor
EDC	Electric Distribution Company
EDPR	EDP Renewables
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EFSB	Energy Facilities Siting Board
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJ	Environmental Justice
ENGIE	ENGIE SA
ENF	Environmental Notification Form
EMF	Electromagnetic Field
EO	Executive Order
EPA	Environmental Protection Agency
EPCI	Engineering, Procurement, Construction, Installation
ESA	Endangered Species Act
Eversource	NSTAR Electric Company d/b/a Eversource Energy
FAST	Fixing America's Surface Transportation Act
FCP	Fisheries Communications Plan
FDPW	Town of Falmouth Department of Public Works
FEMA	Federal Emergency Management Agency
FIR	Fabrication and Installation Report
FIRM	Flood Insurance Rate Map
FLO	Fisheries Liaison Officer

FR	Fisheries Representatives
ft	foot/feet
FWRA	Freshwater Recharge Area
G&G	Geophysical & Geotechnical
G.L.	Massachusetts General Laws
GHG	Greenhouse Gas
GIS	Gas Insulated Switchgear or Substation
GW	gigawatt
GWSA	Global Warming Solutions Act
ha	hectare
HCA	Host Community Agreement
HDD	Horizontal Directional Drilling
HDPE	High-Density Polyethylene
HIS	Highly Integrated Switchgear or Substation
HPFF	High-Pressure Fluid-Filled
HRG	High-resolution geophysical
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAC	Inter-array cable
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IHA	Incidental Harassment Authorization
IMO	International Maritime Organization
in	inch
ISO-NE	Independent System Operator New England
JBCC	Joint Base Cape Cod
JPE	Joint Powers Entity
km	kilometer
kV	kilovolt
LOA	Letter of Authorization
LSCSF	Land Subject to Coastal Storm Flowage
LSP	Licensed Site Professional
m	meter
MARPOL	International Convention for the Prevention of Pollution from Ships
MassCEC	Massachusetts Clean Energy Center
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation
MassGIS	Massachusetts Geographic Information System
MassWildlife	Division of Fisheries and Wildlife
Mayflower Wind	Mayflower Wind Energy LLC
MCP	Massachusetts Contingency Plan
MCT	New Bedford Marine Commerce Terminal
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MF	Magnetic Fielde
mG	milligauss
MHC	Massachusetts Historical Commission
MHHW	Mean Higher High Water
MHW	Mean High Water
mi	Mile
MLA	Massachusetts Lobstermen’s Association
MLLW	Mean Lower Low Water
MLW	Mean Low Water
mm	millimeter
MW	megawatt
NARW	North Atlantic Right Whale
NBPA	New Bedford Port Authority
NEPA	National Environmental Policy Act

NERACOOS	Northeastern Regional Association of Coastal Ocean Observing Systems
NHESP	Natural Heritage and Endangered Species Program
NHPA	National Historic Preservation Act
nm	Nautical Mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSRA	Navigation Safety Risk Assessment
O&M	Operations & Maintenance
OCS	Outer Continental Shelf
OEM	Original Equipment Manufacturer
OHM	Oils and Hazardous Materials
OMP	Ocean Management Plan
ORSP	Oil Spill Response Plan
OSHA	Occupational Safety and Health Administration
OSP	Offshore Substation Platform
OW	Ocean Winds North America LLC
PNF	Project Notification Form
POCO	Point of Change of Ownership
POI	Point of Interconnection
POWER	POWER Engineers, Inc.
PPA	Power Purchase Agreement
ppm	parts per million
PV	Plan View
RFA	River Front Area
RFP	Request for Proposal
ROD	Record of Decision
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
ROV	Remote Operated Vehicle
ROW	Right-of-Way
RTN	Release Tracking Number
SAP	Site Assessment Plan
SAV	Submerged Aquatic Vegetation
SIOW	Special Initiatives for Offshore Wind
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SMART	Solar Massachusetts Renewable Target
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SPI	Sediment Profile Image
SSU	Special, Sensitive, and Unique
SWPPP	Stormwater Pollution Prevention Plan
TCP	Traffic Control Plans
THPO	Tribal Historic Preservation Officers
TJB	Transition Joint Bay
TMP	Traffic Management Plan
USLD	Ultra-Low Sulfur Diesel
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

UXO	Unexploded Ordnance
VSC	Voltage Source Converter
WEA	Wind Energy Area
WPA	Wetlands Protection Act
WTG	Wind Turbine Generator
XLPE	Cross-linked polyethylene

1. Project Overview

Mayflower Wind Energy LLC (Mayflower Wind) is in the process of permitting the development of an offshore wind renewable energy generation facility (Clean Energy Resource) capable of generating up to approximately 2,400 megawatts (MW) of renewable energy from federal waters on the Outer Continental Shelf (OCS). Mayflower Wind's Clean Energy Resource encompasses all wind turbine generators (WTGs), offshore substation platforms (OSP[s]), inter-array cables, and offshore export cable corridor (ECC) in federal waters. For purposes of this Petition the "Project" includes all state-jurisdictional transmission connector elements, including the offshore export cables in state waters, the onshore facilities for the sea-to-shore transition and the onshore export cables. Also included are the onshore substation, the transmission lines to the point of change of ownership (POCO) for the Preferred Route or to the point of interconnection (POI) for the Noticed Alternative Route, and any other ancillary structures which are an integral part of the operation of these transmission connector facilities.

The purpose of the Project is to deliver clean, renewable energy from up to 1,200 MW of capacity from Mayflower Wind's Clean Energy Resource to Massachusetts and the New England regional electric grid. This Project and the associated Clean Energy Resource will significantly increase the renewable energy supply available to Massachusetts consumers. It will reduce carbon emissions across the region, displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security. It will also enhance economic competitiveness by reducing energy costs, attracting new investments, and creating job growth. Mayflower Wind is developing the Project in accordance with the need for clean energy and offshore wind established under the Commonwealth's public policies as reflected in legislation and executive orders, as further described in Sections 2 and 6 of this Analysis. The Project is needed to enable delivery of energy from the Clean Energy Resource to Massachusetts and the New England region, and the Clean Energy Resource is likely to be available to contribute to the regional energy supply. The Project will serve the public interest by making a substantial contribution to meeting individual New England state greenhouse gas reduction and renewable energy requirements, and is consistent with current health, environmental protection, and resource use and development policies of the Commonwealth.

The Clean Energy Resource will be subject to review under federal processes coordinated by the Bureau of Ocean Energy Management (BOEM), while the Project will be subject to Massachusetts regulatory agency reviews, including the review conducted by the Energy Facilities Siting Board (EFSB or Siting Board) for this Analysis filed pursuant to Massachusetts General Laws (G.L.) c. 164 § 69J (Section 69J Petition).

1.1 Introduction

1.1.1 Siting Board Jurisdiction

Pursuant to G.L. c. 164, §§ 69G and 69J, the EFSB has jurisdiction over the construction of "a new electric transmission line having a design rating of 69 kilovolts (kV) or more and which is one mile (mi) (1.6 kilometer [km]) or more in length on a new transmission corridor" and "an ancillary structure which is an integral part of the operation of any transmission line that is a facility" (980 Code of Massachusetts Regulations (CMR) 1.01). Accordingly, Mayflower Wind herein submits this analysis (the "Analysis") to the EFSB in support of its Petition for authority to construct, operate, and maintain new 200 kV to 345 kV (nominal voltage)[1] transmission export cables from its Clean Energy Resource to a new onshore substation as well as 345-kV transmission cables/lines from that new substation to a POCO for the transmission facilities with the interconnecting transmission owner in the Town of Falmouth, Massachusetts. As further described below, under Mayflower Wind's Preferred Route, from that POCO in Falmouth, the interconnecting transmission owner will site, design, construct and maintain the transmission facilities necessary to interconnect the Project to a POI located near the existing Interconnecting transmission owner Falmouth Tap substation. As further described below, under

[1] The maximum rated cable voltage is up to 362 kV.

Mayflower Wind's Noticed Alternative, Mayflower Wind would construct the Project all the way to the POI at Falmouth Tap using an underground route within the municipal roadway layout. A variant to the Noticed Alternative would include a transmission line between a new Mayflower Wind Substation at the Cape Cod Aggregates site and the POI to be sited, designed, and permitted by the interconnecting transmission owner within the existing utility right-of-way (ROW). The EFSB has jurisdiction over the proposed onshore transmission, the proposed onshore substation, and the proposed offshore transmission within state waters. As indicated in Alliance to Protect Nantucket Sound v. Energy Facilities Siting Board, 457 Mass. 663, 686 (2010), the EFSB may also consider potential in-state impacts of the proposed offshore transmission associated with the Project located in federal waters when conducting its review.

Concurrently with its Section 69J Petition, Mayflower Wind has also filed with the Department of Public Utilities ("Department" or "DPU"): (1) a request for approval of the Project pursuant to G.L. c. 164, § 72 ("Section 72 Petition"); and (2) a request for exemptions from the operation of the Town of Falmouth Zoning Bylaw for the Project pursuant to G.L. c. 40A, §3 ("Chapter 40 A, §3") ("Zoning Petition"). Section 72 requires a petitioner to seek approval from the DPU "for authority to construct and use or to continue to use as constructed or with altered construction a line for the transmission of electricity for distribution in some definite area." Under this statute, the DPU must determine that "such a line will or does serve the public convenience and is consistent with the public interest." Chapter 40A, § 3 authorizes the DPU to issue zoning exemptions for "[l]ands or structures" to be used by "public service corporations" if such zoning exemptions are required and "reasonably necessary for the convenience or welfare of the public."

As described in Section 4 of this Analysis, Mayflower Wind is presenting a Preferred Route with one variant and a Noticed Alternative Route with three variants. The Preferred Route and the Noticed Alternative Route for the Project, the offshore ECC, and a portion of the Clean Energy Resource are shown in Figure 1-1. Figure 1-2 depicts the Preferred Route (Panel 1) and Noticed Alternative (Panel 2) onshore transmission facilities along with variants for each. Figure 1-3 depicts the geographic relationship between the Preferred and Noticed Alternative routes and variants. Each point of intersection or link among the Preferred and Noticed Alternative routes and variants afford an opportunity for route options to switch between the Preferred Route and the Noticed Alternative Route. A final approved route could include a combination of segments of the Preferred Route, the Noticed Alternative Route and/or their variants. As described in detail in Section 4.6, potential offshore ECCs were identified and vetted through a process that included consultations with relevant regulatory agencies, bathymetric data, geophysical surveys, geotechnical surveys, benthic habitat mapping, and seagrass surveys. One ECC route has been carried forward from the draft Construction and Operation Plan (COP) submitted to the BOEM on February 15, 2021 and modified on August 30 and October 22, 2021.[2]

1.1.2 Document Organization

The Analysis supporting this Petition is presented in six sections. The balance of this Introduction (Section 1) presents a general description of the Project, the Project benefits, and the Project team. The remaining sections of this Analysis provide detailed information to support the Project, specifically: Project Need (Section 2); a comparison of Project alternatives (Section 3); a description of the Preferred Route and Noticed Alternative with variants, and Mayflower Wind's route selection process (Section 4); a comparison of the environmental impacts, cost and reliability of the Preferred Route and Noticed Alternative, and variants (Section 5); and a discussion of the Project's consistency with the current health, environmental protection, and resource use and development policies of the Commonwealth (Section 6).

1.2 Need for the Project

Section 2 of this Analysis summarizes the need for the Project. For the reasons explained in Section 2, Mayflower Wind has demonstrated that the Project is needed to deliver energy from the Clean Energy Resource and that the Mayflower Wind Clean Energy Resource is likely to be available to contribute to the regional energy supply. Therefore, Mayflower Wind has met the standard for demonstration of need in accordance with G.L. 164 §§ 69H, 69J and Siting Board precedent.

[2] The ECC route that has been carried forward was described as the "western option" in the COP.

In addition to the specific indicators of progress of developing the Clean Energy Resource and the Project, strong public policies and legislative mandates support the need for the Project. These public policies include those related to climate change, clean renewable energy, and offshore wind as an important energy resource for the Commonwealth, which are detailed in Sections 2 and 6 of this Analysis.

1.3 Project Description

The following sections describe the proposed Mayflower Wind Project, with particular focus on the portions of the Project within state jurisdiction, which are the focus of this Petition. A brief description of development activities in federal waters is provided for overall context in Section 1.3.1. More detailed discussions are provided in Section 1.3.2 for the entire onshore transmission system and the portion of the offshore ECC in state waters (see Figures 1-3 and 1-4).

1.3.1 Offshore Clean Energy Resource (Federal Waters, for background only)

The following provides a description of the offshore components of the Mayflower Wind Clean Energy Resource that fall within federal waters, and as such are not the subject of this Petition. This description is intended to provide the reader with a broader context for the Project and for background information only.

The Mayflower Wind Lease Area is located south of Martha's Vineyard and Nantucket (Figure 1-1) within the Rhode Island/Massachusetts Wind Energy Area (Figure 1-5). Wind turbine generators (WTGs) constructed within the Lease Area will deliver power via inter-array cables to one or more offshore OSP(s). The WTG/OSP positions have been established based on a 1 x 1 nautical mile (nm) (1.9 x 1.9 km) grid oriented along the cardinal directions to maintain a uniform spacing of WTGs across all the lease areas within the Massachusetts/Rhode Island Wind Energy Area. Up to four submarine offshore export cable(s), including up to three power cables and up to one dedicated communications cable, will be installed from one or more OSP(s) within the Lease Area in federal waters and will run through Muskeget Channel into Nantucket Sound in Massachusetts state waters (see Section 1.3.2).

Key characteristics of the Clean Energy Resource are summarized in Table 1-1.

Table 1-1. Key Project and Clean Energy Resource Details (Federal Water)

Project Attribute	Description
Project Capacity	Up to 1,200 MW
Lease Area Size	127,388 acres (ac) (51,552 hectares [ha])
Lease Area Distance from Shore	~26 nm (49 km) south of Martha's Vineyard ~20 nm (37 km) south of Nantucket ~41 nm (76 km) from the mainland (Upper Cape Cod)
Clean Energy Resource Layout and Size	Up to 149 WTG/OSP positions Up to 147 WTGs Up to 5 OSP(s) 1 nm x 1 nm spacing Up to approximately 2,400 MW
WTGs	Rotor diameter: 721.7 – 918.6 feet (ft) (220.0 – 280.0 meters [m]) Blade length of 351.0 – 452.8 ft (107.0 – 138.0 m) Hub height above Mean Lower Low Water (MLLW): 418.7 – 605.1 ft (127.6 – 184.4 m)
OSP(s)	Top of topside height above MLLW: 160.8 – 344.5 ft (49.0 – 105.0 m)
WTG/OSP Substructures	Monopile, piled jacket, suction-bucket jacket, and/or gravity-based structure Seabed penetration: 0 – 295.3 ft (0 – 90.0 m) Scour protection for up to all positions
Inter-Array Cables	Nominal inter-array cable voltage: 60 kV to 72.5 kV Length of inter-array cables beneath seafloor: 124.3 – 497.1 mi (200 – 800 km) Target depth of cover (below level seabed): 3.2 – 8.2 ft (1 – 2.5 m)

Project Attribute	Description
Offshore Export Cables	Number of export cables: Up to 4 (including up to three power cables; and up to one dedicated communications cable) Nominal export cable voltage: 200 – 345 kV [3] Total Length of Offshore Export Cable Corridor: 50.9 mi (82 km) Length of Offshore Export Cable Corridor in Federal Waters: 25.5 mi (41 km) Depth of cover (below level seabed): Target: 6 ft (1.8 m) Min – Max: 3.2 – 13.1 ft (1 – 4 m)
Offshore Structure Marking and Lighting	Consistent with applicable regulations and BOEM Guidelines (BOEM, 2021) [4] and with the latest Offshore Structure Private Aids to Navigation Permit Recommendations from the U.S. Coast Guard (United States Coast Guard (USCG), 2020):

1.3.2 Detailed Description (State Jurisdiction)

Portions of the Project within state geographic jurisdiction that are the focus of this Petition include all of the transmission facilities and ancillary structures along the entire onshore transmission route, including the Mayflower Wind 345 kV onshore substation, to the POCO for the Preferred Route or to the POI for the Noticed Alternative Route, and the transmission facilities in the portion of the offshore ECC in state waters (Figure 1-4).

After crossing into state waters to the south of Martha's Vineyard and Nantucket, the ECC continues north through Muskeget Channel to the landfall in Falmouth. The sea-to-shore transition of the offshore export cables will be accomplished with horizontal directional drilling (HDD) at potential landfall location(s) in Falmouth. Details regarding the offshore export cables and export cable landfall are provided in Sections 1.3.2.1 and 1.3.2.2, respectively.

The underground onshore export cables between the landfall location(s) and a Mayflower Wind onshore 345-kV substation to be built in Falmouth will be installed within existing paved roadways or shoulder, or within property owned by the Town of Falmouth (Figure 1-2). The new Mayflower Wind onshore Substation at the Lawrence Lynch site (Preferred) in Falmouth will transform the voltage to 345 kV to enable connection by the interconnecting transmission owner to its interconnection facilities and the POI. The transmission line to be installed within the existing utility ROW #341 in Falmouth is not included within the scope of the Project subject to this Petition or this Analysis, as the Analysis terminates at the POCO of the transmission facilities at the border of Mayflower Wind's substation for the Preferred Route. The new Mayflower Wind Substation at the Cape Cod Aggregates site (Noticed Alternative) in Falmouth will transform the voltage to 345 kV to enable connection to the POI via a transmission line installed within and beneath existing roadway layout by Mayflower Wind. A variant to the Noticed Alternative terminates at the POCO of the transmission facilities at the border of Mayflower Wind's substation for the Noticed Alternative Route. Both transmission options will connect the respective onshore substations to the POI at or near the Falmouth Tap substation or a new substation to be built in that area by the interconnecting transmission owner.

Table 1-2 provides a summary of pertinent Project details associated with the Project Area subject to state jurisdiction.

1.3.2.1 Offshore Export Cables (within State Waters)

The offshore export cables will connect the OSP(s) located within the Lease Area to the landfall site(s). For transmission of the Clean Energy Resource's power to shore, Mayflower Wind plans to use High Voltage Alternating Current (HVAC) facilities at a voltage between 200-345 kV (nominal voltage) [6] as most suitable for the Project. HVAC is a commonly used electric power transmission technology and is the primary technology employed for the proposed transmission. For a similar offshore wind project, the

[3] The maximum rated cable voltage is up to 362 kV.

[4] https://www.boem.gov/sites/default/files/documents/renewable-energy/2021-Lighting-and-Marking-Guidelines.pdf

EFSB approved the use of HVAC for the offshore export cables in state waters.[5] Preliminary design plans for the offshore export cable and sea to shore transition via HDD are provided in Attachments B3 and B4.

Alternative routes for the ECC were evaluated and are discussed in Section 4 of this Analysis. Section 4.6 contains additional details regarding the Offshore ECC.

Table 1-2. Key Project Details for Areas Subject to State Jurisdiction

Project Attribute	Description
Offshore Export Cables (In State Waters)	Length of Offshore Export Cable Corridor in State Waters: ~25.5 mi (41 km) Cable crossings: Up to nine cables crossed Cable Corridor Width: up to 3,281 ft (1,000 m) Burial depth (below level seabed): Target: 6 ft (1.8 m) Min – Max: 3.2 – 13.1 ft (1 – 4 m) Target Cable Separation: 328 ft (100 m)
Sea-to-Shore Transition	To be accomplished with HDD Approximate Length of HDD: up to 4,920 ft (1.5 km)
Landfall Location(s)	Falmouth, MA Two landfall locations remain under consideration: Worcester Ave (Preferred Route), Central Park (Noticed Alternative)
Onshore Export Cables/ Underground Transmission Line	Nominal underground onshore export cable voltage: 200 – 345 kV [6] Up to 3 onshore export power circuits (with three single phase cables per circuit) plus associated communications and grounding cables Length (Preferred Route): Up to 2.0 mi (3.2 km) Length (Noticed Alternative): Up to 8.1 mi (13.0 km) Depth of Cover (below road surface to top of duct bank) Target: 3.0 ft (0.9 m) Min/Max: 2.0 – 15.0 ft (0.6 – 4.6 m)
Onshore Substation	Two locations remain under consideration: Lawrence Lynch (Preferred Route) and Cape Cod Aggregates (Noticed Alternative) Approximate substation development area: Up to 27.3 ac (11.0 ha) transform to 345-kV Two substation types under consideration: Air-insulated substation (AIS) or gas-insulated substation (GIS)
Point of Change of Ownership	Onshore substation boundary (Lawrence Lynch for Preferred Route)
Point of Interconnection	Falmouth Tap (new or upgraded 345 kV substation by interconnecting transmission owner)

[5] *Vineyard Wind LLC*, EFSB 17-05/D.P.U. 18-18/18-19, at 17 - 19 (2019) ("Vineyard Wind 1").

[6] The maximum rated cable voltage is up to 362 kV.

Each offshore export cable will be a three-core (three power cores) armored submarine cable (Figure 1-6). The cables will be up to 13.8 inches (in) (350 millimeters [mm]) in diameter. The power cores are either aluminum or copper stranded conductor, cross-linked polyethylene insulation, lead sheaths, and polyethylene over sheath. Filler material in the cable may be extruded interstitial fillers, extruded polyethylene, or polypropylene yarns. Each cable will contain a stainless-steel tube that houses and protects the fiber optic cable, the stainless-steel tube is coated with a polyethylene jacket. The power cores fillers and fiber optic tube are covered with armor bedding and galvanized or stainless-steel wire armor outer jacket, which will be polypropylene yarns soaked in bitumen.

Offshore cable installation will be accomplished via vertical injector, jetting sled, jetting Remote Operated Vehicle (ROV), pre-cut plow, mechanical plow, and/or mechanical cutting ROV system from the Lease Area to near landfall. From approximately 0.6 mi (1 km) offshore, the installation will be accomplished with HDD to avoid and mitigate for impacts to nearshore environmental resources such as eelgrass beds as well as public access and use of coastal areas and beaches during installation. Section 5.5. contains a more detailed description of construction methodologies, including proposed mitigation measures.

Cable protection is typically required at any existing cable crossing locations and for areas where cable burial cannot be achieved. For cable protection, methods will be determined based on the location, length, and extent of the non-burial, and when all remedial burial solutions have been ruled out. Remedial burial techniques may include jet trenching or controlled flow excavation that fluidizes the surrounding sand to allow the cable to further settle into the trench. These secondary cable protection methods may include the creation of a rock berm, concrete mattress placement, rock placement, and fronded mattresses. Half shells may be used as well, and they are typically used to protect cable ends at pull-in areas and where trenching is not possible. Scour protection may also be used.

Any required crossings of other project cables or existing third-party cables by the offshore export cables will use mutually agreeable crossing designs consistent with typical industry practices, which typically employ use of concrete mattresses (though other crossing methods may be assessed for use). Minimum separation distances will be determined so that both party's cables can be safely operated with risk of damage to either cable mitigated to the extent practicable.

1.3.2.2 Export Cable Landfall Locations

A number of potential landfall locations were considered, and Mayflower Wind selected two alternatives as shown in Figure 1-1 and Figure 4-3 and described in more detail in Section 4.3.3. These landfall locations are:

- The first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall); and
- Central Park near Crescent Avenue (Central Park Landfall).

The Worcester Avenue Landfall is the preferred landfall location. The appeal of this location is the large, landscaped public common that runs between the two lanes of Worcester Avenue and is protected by a short seawall, a broad beach, and Grand Avenue. This area has only a slight elevation change, making it a prime candidate for HDD landfall and the siting of accompanying transition joint bays (TJBs).[7] Although the landfall is located within Federal Emergency Management Agency (FEMA) Zone VE and Zone AE, it is unlikely to be impacted by a typical storm event, and the underground transmission system will be designed to withstand submergence. Stakeholder engagement will be critical at this location. Worcester Avenue is abutted by residences and the area is home to a popular road race as well as hotels and inns.

This landfall location avoids critical existing infrastructure, namely the submarine power and communications cables supplying Martha's Vineyard, and it avoids adverse impacts to State-mapped environmental justice populations. Worcester Park would require re-landscaping after the installation of HDDs and export cables is complete. The siting of the underground duct bank through Worcester Park

[7] At the onshore landfall location, a transition joint bay (TJB) will be installed at the end of each submarine cable. Each TJB is a concrete vault where one three-core submarine cable will be spliced to three single-core onshore cables.

seeks to avoid tree removal where possible, and trees would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth.

1.3.2.3 Onshore Export Cables

The onshore activities associated with the Project will originate from the landfall of the offshore export cables on the coast of Massachusetts within Falmouth. The selected landfall location will determine the route of the onshore export cable system between the landfall and a new onshore substation for the Project. The onshore export cable system will consist of up to three circuits with three, single-core cables per circuit, for a total of up to nine onshore export power cables, plus associated communications and grounding cables (Figure 1-7). The Preferred, Noticed Alternative and four variant routes for the onshore export cables are illustrated on Figure 1-3. Representative photos for the Preferred and Noticed Alternative routes are provided in Attachments A. Attachment B2 provides preliminary design plans for the Preferred and Noticed Alternative routes.

The onshore export cables will be installed within a common duct bank to be constructed within and beneath existing public roadways, shoulders, or municipal-owned land. Figure 1-8 provides an indicative illustration of the duct bank. The cable circuits will be installed using primarily an open-trench construction method typical of in-road utility line installation work.

1.3.2.4 Substation

As described above, Mayflower Wind will commission the development of a new onshore substation to interface with the Independent System Operator - New England (ISO-NE) regional electrical grid. Mayflower Wind has selected two alternative onshore substation locations in Falmouth, including the Lawrence Lynch site at 396 Gifford Street, and the Cape Cod Aggregates site at 469 Thomas Landers Road.[8] The substation options and the routing associated with them are discussed in greater detail in Sections 4 and 5 of this Analysis.

The preferred site for the onshore substation is the Lawrence Lynch site (Figure 1-9). This site is approximately 27.3 ac (11.0 ha) in size and consists predominantly of disturbed or developed land. The site, formerly used as a sand and gravel mine, is currently used as an aggregate processing and asphalt facility with several office buildings, areas of stormwater retention, active construction, and paved surfaces (Figure 1-9). Figure 1-10 illustrates the general substation layout for the Lawrence Lynch site.

For the Noticed Alternative, the Cape Cod Aggregates site is the proposed substation location. This site is an active aggregates plant, with various motorized vehicles, including earth moving equipment, trucks and other traffic frequently entering and exiting the yard (Figure 1-11). Figure 1-12 provides a general layout for the substation at the Cape Cod Aggregates site.

AIS, GIS, highly integrated switchgear (HIS), or a mixture of these may be used for the Project onshore substation. Major components proposed for the Mayflower Wind-owned onshore substation include, but are not limited to, either air-insulated or gas-insulated circuit breakers, disconnect and earthing switches (i.e., switchgear), fixed and/or variable shunt reactors, instrumentation, overvoltage protection and voltage transformers. A substation building will contain communication and control panels, auxiliary power equipment, and potentially switchgear (for the gas-insulated switchgear option). Potential additional equipment includes harmonic filters, synchronous condensers, and static synchronous compensators. The construction of the onshore substation includes two phases: the civil construction and the electrical construction. The onshore substation will be designed to serve as an unmanned station. During typical operation, there will be no need for an operator to be present on site.

Preliminary design plans for the Preferred and Noticed Alternative substations are provided in Attachment B2.

[8] The Cape Cod Aggregates site is located north of Thomas B Landers Road at the end of Blacksmith Shop Road.

1.3.2.5 Onshore 345 kV Transmission Routes

For the Preferred Route, 345 kV transmission from the onshore Project substation to the POI would be sited in Utility ROW #341. Mayflower Wind's responsibility for permitting, engineering, and constructing the Project would end at the POCO between its transmission facilities and those of the interconnecting transmission owner, at the border of Mayflower Wind's proposed new substation in Falmouth. The interconnecting transmission owner would then site, permit, build and own the interconnection facilities between the POCO and the POI at Falmouth Tap

For the Noticed Alternative Route Mayflower Wind's transmission facilities would be built underground within the paved roadway or shoulder of Thomas B Landers Road, Geggatt Road, Sam Turner Road and Hatchville Road. The cables would be installed within duct bank in a covered trench starting at the Mayflower Wind Substation at the Cape Cod Aggregates site and terminating at the POI substation (Falmouth Tap area). Preliminary design plans for the Noticed Alternative export cable route are provided in Attachment B1.

The Preferred and Noticed Alternative transmission routes are illustrated in Figure 1-2.

1.3.2.6 Point of Interconnection

The planned POI to the regional transmission system will be near the existing Interconnecting transmission owner substation (Falmouth Tap), as determined based on ISO-NE's Cape Cod cluster interconnection process (explained below).

As detailed in Section 4.3.2, Mayflower Wind evaluated a wide range of potential POIs, including a POI in Bourne. On October 21, 2020, ISO-NE initiated the First Cape Cod Resource Integration Study (Cluster Study 1). The Cluster Study was triggered under the ISO-NE Tariff because there are multiple projects proposing to interconnect in the same electrical area of the transmission system, and such projects cannot interconnect without the use of common significant new transmission infrastructure rated at or above 115 kV Alternating Current (AC) or Direct Current (DC). In the Cluster Study process, ISO-NE can relocate a project's POI to facilitate the interconnection of the projects in the cluster and meet reliability requirements. ISO-NE determined that certain Mayflower Wind interconnection queue positions on Cape Cod were eligible to enter the cluster, subject to availability of capacity in the cluster after higher queued positions enter. As a result, Mayflower will have 400 MW in this first cluster (Cluster 1). In Cluster 1, ISO-NE identified Falmouth as the likely POI for Mayflower Wind's first Cape Cod queue positions, which would move from Bourne. ISO-NE has initiated a second interconnection Cluster Study (Cluster 2) and Mayflower has additional queue positions, totaling 1,060 MW, eligible to enter Cluster 2. In the Cluster 2 System Impact Study phase, Mayflower expects its West Barnstable queue position to also move to Falmouth. Thus, with a POI in Falmouth, the Project will support delivery of up to 1,200 MW from the Clean Energy Resource.

The required upgrades to facilitate the relocation of the POI from Bourne to the Falmouth Tap area will be determined and managed through the Cluster Study process and by ISO-NE and the interconnecting transmission owner). The preliminary Cluster Study 1 results indicate that the interconnecting transmission owner will be responsible for installing a 345-kV transmission loop from Bourne to Falmouth to West Barnstable and a new 345 kV substation.

1.4 Routing Analysis

Section 4 of this Analysis presents Mayflower Wind's routing analysis which identifies Preferred and Noticed Alternative routes with variants. The proposed routes and their selection are described in Section 4 and are compared in Section 5.

1.4.1 Project Alternatives

Before completing the routing analysis, Mayflower Wind undertook significant efforts to evaluate a wide range of alternatives to achieve the Project objectives. This includes the evaluation of alternate POIs, offshore export cable routes, landfalls, substation locations, onshore export cable routes, transmission

routes and construction methods. Mayflower eliminated alternatives based on selection criteria including construction constraints, existing utility infrastructure conflicts, length of route, traffic congestion, land use and environmental and social impacts including environmental justice population impacts. Mayflower Wind employed this process to assess more than ten grid interconnection options, five offshore cable route options, twelve landfall locations (seven in Falmouth), sixteen potential substation locations, and transmission alternatives from landfall to substation and from substation to the POI. Project alternatives considered are addressed in Section 3, and routing and siting alternatives are detailed in Section 4 of this Analysis.

The following steps were taken during the route selection process:

- Identify potential suitable POIs with electric grid capacity.
- Use POI as determined by ISO-NE cluster interconnection process.
- Identify potential land parcels capable of substation development.
- Identify potential landfall locations capable of providing suitable area for HDD and TJB installation
- Identify a geographic Study Area that incorporates the POI, proposed substation location and proposed landfall location.
- Assess potential routing options within the geographic area that would connect landfall, substation, and POI.
- Evaluate each routing option for fatal flaws and only move forward with feasible options.
- Evaluate compiled scoring of each candidate route based on environmental impact, constructability, permitting, reliability, and cost criteria; and
- Conduct a comparative route analysis with scoring based on these considerations.

1.4.2 Existing Infrastructure

1.4.2.1 Onshore Infrastructure

Existing onshore infrastructure was assessed and considered for the routing analysis presented in Section 4. Existing infrastructure may include existing underground or overhead electric transmission facilities and ROWs, existing roads, and other existing buried utilities (e.g., water, sewer, natural gas, electric distribution, etc.). Eversource owns and operates ROW #341 that currently includes two 115-kV overhead transmission lines and a distribution line. The transmission line travels north through Falmouth to the existing Falmouth Tap substation area. As noted in Section 1.3.2.5, Mayflower Wind's Preferred Route will require an interconnection to be provided by the interconnecting transmission owner between Mayflower Wind's POCO and the POI. For Mayflower Wind's Noticed Alternative Route, a buried transmission system is proposed to be constructed within existing roads and road shoulder between the substation site and the POI. Both Preferred and Noticed Alternative onshore export cable routes extending from landfall to a new Mayflower Wind substation in Falmouth will be installed beneath existing previously disturbed public roadway layouts or other municipal-owned lands. Routing for buried export and transmission cables considered other built utility infrastructure located in or crossed by the proposed cable routes.

As noted above, Mayflower Wind sited and designed its Preferred and Noticed Alternative routes to follow existing infrastructure ROW to the extent practicable to reach the POCO or POI. The use of existing ROWs provides an opportunity to mitigate for environmental impacts and costs.

Another guiding principle used while conducting the routing analysis was to avoid conflicts with existing utility infrastructure that would make installation of the Project transmission facilities technically infeasible. Eversource owns and operates several existing submarine distribution cables that power Martha's Vineyard and make landfall at three locations along Surf Drive in Falmouth: Shore Street, Mill Road, and Elm Road. Mayflower assessed all three locations to determine if they would be appropriate for the landfall of Mayflower's export cables from the Clean Energy Resource. Mayflower conducted a site suitability analysis process that included the evaluation of multiple considerations. This analysis

(presented in Section 4.3.3.1) found that the challenges with Eversource's existing utility infrastructure at these three locations made them technically infeasible and prevented Mayflower from carrying them forward for further siting consideration.

1.4.2.2 Marine Infrastructure

Nantucket Sound and the waters to the south of Cape Cod contain existing marine infrastructure that was considered during the offshore routing analysis described in Section 4.6. These features include navigation channels, anchorage areas, and ordinance disposal sites, existing or planned marine cables, and are depicted on nautical charts jointly issued by the U.S. Department of Commerce.

The selection of landfall locations as well as the final ECC considered the location of existing marine infrastructure and sought to mitigate for risks to existing built infrastructure. The selected ECC and Preferred and Noticed Alternative landfall locations (See Figure 4-3) avoid the need to cross several existing power cables that extend between the Cape Cod shoreline and Martha's Vineyard.

1.4.3 Environmental and Socioeconomic Considerations

As detailed in Section 4.4, 4.5 and 4.6, the presence of and potential impacts to various environmental resources and/or socioeconomic concerns were an important consideration in the evaluation and selection of final substation sites, landfall sites, and onshore export cable and transmission routes.

1.4.3.1 Onshore Project Facilities

Figures 1-13 and 1-14 illustrate various environmental features for the Preferred and Noticed Alternative routes, and related variants. The features illustrated here represent a subset of environmental and socioeconomic considerations factored into the route scoring and analysis leading to the selection of the Preferred and Noticed Alternative (see Sections 4.4 and 4.5 of this Analysis). Both Preferred and Noticed Alternative routes and their respective substation sites have been selected to avoid or mitigate for impacts to the natural or human environment to the extent practicable.

1.4.3.2 Offshore ECC

Figures 1-15 illustrates the location of the offshore export cable relative to existing marine infrastructure, as well as additional mapped features representing regulated resources (i.e., Massachusetts Ocean Management Plan Special, Sensitive and Unique (SSU) resources). Section 4.6 of this Analysis provides a detailed discussion of the environmental and technical considerations use in the selection of the offshore ECC.

1.4.4 Summary of Routing

1.4.4.1 Preferred Route

The Preferred Route begins at the Worcester Avenue Landfall site, which is the easternmost routing location, situated at the first block of Worcester Park between the two lanes of Worcester Avenue. This location is protected by a short seawall, a broad beach, and Grand Avenue. Residences and a hotel are adjacent to this landfall site but are buffered from the park by Worcester Avenue on either side. A paved parking lot located nearby could be used for construction staging operations.

Preliminary design efforts suggest that siting the cable system and vaults in the park between the two lanes of Worcester Avenue could decrease utility conflicts, reduce traffic impacts, and increase installation speed relative to working in the single-lane roadways. The Worcester Avenue onshore cable route avoids local businesses and shops on Main Street.

There are no known existing submarine cables that make landfall at Worcester Avenue, and this landfall would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth.

The onshore export cable will travel north along Worcester Avenue and Worcester Court to the intersection of Jones Road, where it will travel in a westerly direction along Jones Road. Once at the intersection of Jones Road and Gifford Street, the onshore export cable will travel north along Gifford Street to the proposed Mayflower Wind Substation at the Lawrence Lynch site. The Preferred Route terminates at the POCO with the interconnecting transmission owner.

The total length of the route is 2 mi (3.2 km), and the route is located entirely within public roadway layouts and the municipal-owned Worcester Park. See Table 1-3 for a breakdown of road segments by length.

Table 1-3. Transmission Route – Preferred Route (Worcester Avenue)

Road Segment	Approximate Length (mi)
Worcester Avenue Landfall site to Jones Road	1.1
Jones Road	0.6
Gifford Street to new Mayflower Wind Substation at the Lawrence Lynch site (396 Gifford Street)	0.3
Total	**2.0**

1.4.4.2 Noticed Alternative Route

The Noticed Alternative Route begins at Central Park near Crescent Avenue (Central Park Landfall). Located approximately 700 ft (213 m) to the west of Worcester Park, the Central Park Landfall site provides an alternative to the Worcester Avenue Landfall site.

Central Park is a large, open public park owned by the Town of Falmouth and used for community sports. The Park comprises approximately 4.24 ac (1.72 ha) and is surrounded by commercial restaurants and residents on all sides. South of the park across Grand Avenue is the Town-owned Falmouth Heights Beach and Soprano's Casino by the Sea.

This landfall site would require a longer HDD trajectory than the preferred Worcester Avenue Landfall. There are no known existing submarine cables that make landfall at Central Park, and this landfall would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth.

The onshore export cables exit Central Park at its northwestern corner and continue west onto Crescent Avenue. For the purposes of preliminary siting and route scoring, Mayflower Wind has assumed the onshore export cable system will be installed through Crescent Park to reduce the potential for utility conflicts and reduce potential traffic disruptions. At Falmouth Heights Road, the route turns north for approximately 0.6 mi (1.0 km), continuing onto Davis Straights (Route 28) for approximately 0.4 mi (0.6 km) until it reaches Jones Road. Once at the intersection of Jones Road and Gifford Street, the onshore export cables travel north along Gifford Street and Blacksmith Shop Road, terminating at the proposed Mayflower Wind Substation at the Cape Cod Aggregates site. Mayflower Wind would then install underground transmission cables between the Mayflower Wind Substation at the Cape Cod Aggregates site and the POI at Falmouth Tap. The total length of the route is 8.1 mi (13 km). With the exception of the landfall in Central Park and short segment within Crescent Park, the route is located entirely within public roadway ROW. The Central Park onshore cable route avoids local businesses and shops on Main Street. See Table 1-2 for a breakdown of road segments by length.

Table 1-4. Transmission Route – Noticed Alternative

Road Segment	Approximate Length (mi)
Central Park - Crescent Ave - Crescent Park	0.2
Falmouth Heights Road	0.6
Davis Straits	0.4
Jones Road	0.6
Gifford Street	2.4
Locustfield Road	0.5
Blacksmith Shop Road	1.3
Thomas B Landers Rd	0.2
Geggatt Rd	0.5
Hatchville Rd - Sam Turner Rd	1.4
Total	**8.1**

As part of the routing analysis detailed in Section 4, four variants to either the Preferred or Noticed Alternative routes have been considered. These variants represent changes to small segments of the Preferred or Noticed Alternative routes. See Section 4.3.2.1 and 4.3.2.2 for a description of the variants considered in this analysis. Variant 1 is a variant to the Preferred Route. Variants 2-4 are variants to the Noticed Alternative Route.

1.4.4.3 Variants

Variant 1 (Central Park to Jones Road) begins at the Central Park Landfall location and turns west onto Crescent Avenue. At Falmouth Heights Road, the route turns north, continuing onto Davis Straights (Route 28) until it reaches Jones Road. The Variant joins with the Candidate Route 1 at Jones Road. The length of Variant 1 is 1.2 mi (1.9 km) the total length of the Candidate Route 1 with Variant 1 is 2.1 mi (3.4 km).

This route variant connects the Noticed Alternative landfall site at Central Park with the Preferred Mayflower Wind Substation at the Lawrence Lynch site.

Variant 2 (Worcester Ave to Jones Road) begins at the Worcester Avenue landfall location and continues along the path of Candidate Route 1. Once on Worcester Court, the route proceeds northerly for less than 1.0 mi (1.6 km) before turning west and merging with Jones Road. Variant 2 joins the Noticed Alternative Route at the intersection of Jones Road and Davis Straits Road. The total length of the Noticed Alternative using Variant 2, measured from landfall to POI, is approximately 7.9 miles (12.7 km). The total length of Variant 2 is less than 1.0 mi (1.6 km).

This route variant connects the preferred landfall site at Worcester Avenue with the Noticed Alternative Mayflower Wind substation at the Cape Cod Aggregates site.

Variant 3 (Paper Road) provides a short deviation from the Noticed Alternative Route, by using a Town-owned dirt road used by Cape Cod Aggregates (Paper Road). The Paper Road connects Blacksmith Shop Road to Thomas B. Landers Road. The route follows the Paper Road in a northerly direction, then turns east on Thomas B. Landers Road and continues to the Mayflower Wind at the Cape Cod Aggregates site.

This route variant would allow better separation of Mayflower Wind underground export cables and interconnection cables entering and exiting Cape Cod Aggregates. Use of the Paper Road would also reduce the potential for traffic congestion along a short segment of Blacksmith Shop Road but would result in tree removal at the northernmost end of the Paper Road. The deviation on the Paper Road and

Thomas B. Landers Rd is approximately 0.7 mi (1.1 km). The total length of the Noticed Alternative using Variant 3, measured from landfall to POI, is approximately 8.2 mi (13.2 km).

The above-described Candidate Routes as well as their variants are compared through the scoring analysis described below in Sections 4.4 and 4.5.

Variant 4 (Central Park to Cape Cod Aggregates) represents another routing option, which was scored for informational purposes but not ranked against the others. This variant involves truncating Candidate Route 2 at the Mayflower Wind at the Cape Cod Aggregates site, shortening its overall length to approximately 6.0 mi (9.7 km). In this scenario, Mayflower Wind's responsibility for permitting, engineering, and construction would end at the POCO between its transmission facilities and those of Eversource, with the interconnecting transmission owner responsible for permitting and building the facilities needed to interconnect the Project to the POI.

1.4.4.4 Offshore Routing

Mayflower Wind initially evaluated five ECC options from the Clean Energy Resource area through Muskeget Channel. Two ECC options were eliminated; the first, which closely paralleled the western option, was de-selected because of its similarity to selected corridors, and the second, which routed much farther to the east, was de-selected because of challenging seabed conditions (i.e., high sediment mobility, very shallow bathymetry, and high seabed slopes) that were identified in a desktop assessment amounting to a high level of technical risk, especially near Muskeget Island and Nantucket. The remaining three ECC options were evaluated in detail.

The selection of the ECC requires careful planning and route optimization with considerations including offshore physical hazards, economic or recreational use areas, protected areas, and interconnection points. Physical hazards may include shipwrecks, unexploded ordnance (UXO), other existing cables, and sea floor and subsurface obstructions. Economic or recreational uses may include commercial or recreational fishing, recreational boating and tourism, and anchoring. Protected areas may include areas protected for biological, cultural, or historical purposes.

In 2020, and 2021, Mayflower Wind performed marine surveys to identify and refine feasible routes for proposed offshore export cables that would avoid and mitigate for impacts to offshore and nearshore resources and existing infrastructure.

The selected offshore ECC located within Massachusetts State waters shown on Figure 1-3 is the product of a route selection process informed by marine surveys. A more detailed discussion of offshore routing is presented in Section 4.6 which demonstrates the superiority of the selected ECC. Preliminary Design plans for the Offshore Export Cable and HDD landfall are provided in Attachments B3 and B4, respectively.

The selected offshore ECC provides a relatively direct route for connecting the Clean Energy Resource to the Worcester Avenue Landfall or the Central Park Landfall in Falmouth. The offshore ECC maintains sufficient water depths for installation, avoiding and minimizing passage through shoals and large seabed slopes (see Section 4.6 for a more detailed discussion about Offshore ECC route selection). As described in Section 6.3.7, the offshore ECC also avoids and mitigates for impacts to SSU areas identified in the Massachusetts Ocean Management Plan (OMP), completely avoiding core habitat of the North Atlantic Right Whale and eelgrass. The offshore ECC also mitigates for impacts to hard/complex bottom.

1.5 Project Benefits

The purpose of the Project is to deliver up to 1,200 MW of clean, renewable wind energy from the Clean Energy Resource[9] to Massachusetts and the New England regional electric grid (See Section 1.2). In doing so, the Project and the Clean Energy Resource will serve the public interest by providing numerous benefits as detailed below, including: (1) environmental benefits that will come from delivering large

[9] Mayflower Wind intends to develop the Clean Energy Resource up to the maximum capacity of the Lease Area, which is approximately 2,400 MW based on the growth trajectory of wind turbine technology.

amounts of clean renewable into the electricity supply mix, thereby greatly reducing greenhouse gas emissions and contributing to the mitigation of climate change; (2) reliability benefits in the form of enhanced energy supply and fuel diversity and better ability to serve load during winter peak demand periods; and (3) economic benefits in the form of investment of billions of dollars in the region, stimulation of the local economies, employment opportunities, and development of the nascent offshore wind industry that is a key initiative of the Commonwealth and its policies and legislative mandates.

1.5.1 Environmental Benefits

The Project will provide significant environmental benefits. The Project is both consistent with, and directly advances, the Commonwealth's policies for developing offshore wind energy resources. The Project satisfies the legislative directives of the 2021 Climate Act by providing for the delivery of up to 1,200 MW of offshore wind energy into the Commonwealth that can serve commitments under existing Mayflower Wind Section 83C II Power Purchase Agreements (PPAs) and future procurements. See also Section 2 of this Analysis for additional discussion of specific Massachusetts policies and commitments supported by this Project.

Mayflower Wind's Clean Energy Resource will be among the largest contributors towards the Commonwealth's net-zero emissions goal. This 1,200 MW Project will eliminate over 2 million metric tons of greenhouse gas emissions annually, which is equivalent to reducing the Greenhouse Gas (GHG) emissions of more than 5 million mi driven each year (average passenger vehicle)[10] (Table 1-5).

As described in 1.5.2, as a result of the decommissioning of nuclear power plants at Pilgrim and Vermont Yankee, Yankee Rowe (185 MW), Connecticut Yankee (582 MW), Millstone 1 (652 MW), and Maine Yankee (900 MW) retirements, New England has lost significant "zero carbon" base load plants. These generation system changes increase the complexity and difficulty of achieving the aggressive GHG emissions reduction targets defined in the Global Warming Solutions Act of 2008 and in the *Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy of 2021*.The Project will help meet those targets by enabling up to 1,200 MW of zero-carbon electric power to be delivered to the ISO-NE grid.

Table 1-5. Avoided Emission Factors

Pollutant	Carbon Dioxide (CO_2)	Nitrogen Oxides (NO^x)	Sulfur Dioxide (SO_2)
Annual Avoided Emissions in New England (tons/year)	2,358,509	945	1,235
Avoided Emissions over Project Lifespan in New England (tons)	77,830,809	31,176	40,740

1.5.2 Reliability Benefits

The Project and the Clean Energy Resource will provide several reliability benefits to Massachusetts and New England, including:

- Enhancing the energy supply mix available to serve Cape Cod's electrical load by delivering energy onto the Cape at a POI in Falmouth. Cape Cod is at the outer reaches of the regional transmission system with limited supply options. Currently the area is supplied by one 345 kV and two 115 kV radial feeds. While recent significant investments in transmission reliability have bolstered the electricity supply to Cape Cod, Mayflower Wind would further improve the situation by feeding power into the center of the on-Cape transmission system, thus providing a more robust power supply.
- By having a POI on the Cape, enhancing the energy supply mix available to serve load in the southeastern Massachusetts load zone, which has been subject to system constraints and has experienced the retirement of large fossil fuel and nuclear generation facilities over the past ten years.

[10] Greenhouse Gas Equivalencies Calculator (https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator) (as of October 26, 2021)

- In addition to recently retired generation, ISO-NE has identified several thousand megawatts of additional fossil-fuel generation that is at risk for retirement in New England due to the age of the facilities and/or the effects of regulatory restrictions and the influx of low-variable cost renewable energy generation. The Project and the Clean Energy Resource will help fill this gap and will be located relatively near load centers, such as Boston and Providence.
- Enhancing the energy diversity of the overall New England generation supply mix with clean, renewable offshore wind generation that has a relatively high-capacity factor due to the superior wind resource that is available farther out to sea where the Clean Energy Resource will be located.
- Enhancing the fuel diversity of the ISO-NE system, especially during winter months, when offshore wind speeds are likely to be strong, providing a high-capacity factor during those cold periods when the natural gas system could be constrained and less reliable. Wind speeds in the North Atlantic tend to be at their strongest and most stable during the winter.

1.5.3 Economic Benefits

The Project and its associated Clean Energy Resource will generate numerous economic benefits in Massachusetts and across New England. Economic benefits will be realized throughout the preconstruction, construction, operations and maintenance, and decommissioning phases, and including the following:

- In January 2021, Mayflower Wind announced that the cost of power to customers from the 804 MWs of offshore wind power covered by the successful “Low Cost Energy” 83CII bid (awarded in October 2019) is on track to drop even further due to a recent change in the federal law pertaining to the Offshore Wind Energy Investment Tax Credit. This price reduction likely means that the customers of three Massachusetts electric utilities can expect to save over $25 million each year, resulting in a half a billion dollars in lower electric bills over the life of the 20-year contracts due to recent changes in federal law. In other words, Mayflower Wind’s record low price of $77.76 per megawatt hour, which was selected in that procurement process, should drop to $70.26 due to this change in federal law and Mayflower’s promise to rebate this value of federal tax credits written into the contracts to the three Massachusetts utilities which were approved by the Massachusetts Department of Public Utilities on November 5, 2020,
- The Host Community (Falmouth) will benefit from increased business activity, property taxes, and other revenue. For over a year (since October 2020) Mayflower Wind and Falmouth representatives have been discussing a Host Community Agreement (HCA) that includes support for the necessary approvals under Article 97 of the Amendments to the Massachusetts Constitution for the landfall and onshore cable routing beneath public beach and park areas. Mayflower Wind has offered two draft versions of an HCA (in May and September 2021), which it forwarded to the Town for review and comment. Mayflower Wind remains ready, willing, and able to continue good faith negotiations with the Town to achieve a mutually acceptable agreement on an expedited basis.
- Mayflower Wind is committed to encourage the hiring of personnel from the Project region to fill the positions required for the various preparation and construction activities. Furthermore, Mayflower Wind is committed to working upstream to aid in the development of a trained workforce for future construction of the Project and the Clean Energy Resource. The training and use of local and regional resources would be prioritized so that the regional populations can benefit as much as possible from the direct and indirect economic benefits. Mayflower Wind has further committed to make at least 75 percent of operations and maintenance local, contributing $20,000 in additional funding per employee shortfall to support workforce development.
- Mayflower Wind is based in Boston with all offices and operations in Massachusetts, and the Project and the related Clean Energy Resource have many full-time professionals working in Massachusetts on all aspects of the Project including design, permitting, stakeholder outreach, and financing.
- Mayflower Wind’s extensive offshore survey campaigns in 2019, 2020, and 2021 have drawn on support services from across the southeastern Massachusetts region, including services such as vessel maintenance and repair, fuel and provisioning, protected species observers, inspection and HSEE consulting, and pilotage.

- The Project development, together with the long-term operation of the Clean Energy Resource, is estimated to provide at least $2.4 billion in total economic benefit to the Commonwealth (MA Department of Energy Resources (DOER) 2020) (based on 804 MW).
- Mayflower Wind estimates the Project and related activities will create more than 10,000 jobs over the life of the Clean Energy Resource.
- Mayflower Wind has signed a lease agreement to utilize the New Bedford Marine Commerce Terminal as the primary staging and deployment base for the construction and installation of our offshore wind project. The New Bedford Marine Commerce Terminal is the first port in North America specifically purpose-built to support the staging and installation of offshore wind components.
- As part of its anticipated waterways license pursuant to G.L. c. 91, the Project will pay a Tidelands Occupation Fee to the Commonwealth. This fee will be calculated based on the area of jurisdictional seafloor occupied by the Project in state waters. It is anticipated that the precise amount of the fee will be determined at the completion of construction based on actual permanent occupation of Commonwealth tidelands, and that the fee will be substantial. The fee for Mayflower is currently estimated to be approximately $3 million, subject to adjustment based on final as built impact calculations.
- In accordance the Massachusetts OMP review process requirements, the Project will pay an Ocean Development Mitigation Fee. This fee is intended to compensate the Commonwealth for unavoidable impacts on public interests and rights in the Ocean Management Planning Area and to support planning, management, restoration, or enhancement of marine resources and uses. This fee is in addition to the tidelands occupation fee, and other direct and indirect contributions by Mayflower Wind, and will be finalized during Massachusetts Environmental Policy Act (MEPA) review.
- Offshore wind is a rapidly developing industry, where supply chain contractors are actively seeking opportunities to enter the U.S. market or expand existing U.S. operations into offshore wind services. While Mayflower Wind is committed to local sourcing as much as possible, the Project and the Clean Energy Resource are designed within the limits of the current domestic supply chain and the respective roles of market participants, including original equipment manufacturers (OEMs) and engineering, procurement, construction, and installation (EPCI) service firm. The near–term supply for many of the largest components—including export cables, substations, gearboxes, and generators− are largely served by European firms. The opportunity for suppliers to enter the U.S. offshore wind market is highest in foundations/substructures, towers, blade materials, and power converters and transformers. Potential areas for local contractors could include surveys, port operations, vessel operators, safety and training, blade repair, foundation and cable inspection and repair, among others.
- Mayflower Wind has partnered with the Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS) to share real-time weather and ocean data collected by the buoy for mariners and the scientific community to use. NERACOOS' mission is to produce, integrate, and communicate high quality information that helps ensure safety, economic and environmental resilience, and sustainable use of the coastal ocean. Mayflower Wind's floating buoy data will help to support these efforts and help to inform other research efforts in the Atlantic region. Mayflower has also partnered with other educational institutions (e.g., New England Aquarium to study highly migratory fish species within the Lease Area and fisheries research with Responsible Offshore Science Alliance (ROSA)).
- Mayflower is committed with working with local education institutions and engaging local students about potential career pathways in the offshore wind industry. Mayflower Wind has also engaged with other higher education institutions, such as Cape Cod Community College, Massachusetts Bay Community College, University of Massachusetts Amherst, University of Massachusetts Lowell, University of Massachusetts Boston, and University of Massachusetts Dartmouth. Mayflower has also held presentations about the Project for high school students, such as Falmouth Academy.
- Benefits to Low-Income Ratepayers: As mentioned above, Mayflower Wind has committed $5 million to the Cape Light Compact towards low-income strategic electrification to reduce electric bills for low-income ratepayers under the 83C II solicitation.

- Considering these benefits, the Project serves a key role in advancing a growing and thriving, utility-scale domestic offshore wind industry. Mayflower Wind is committed to working with BOEM, Massachusetts, local and regional officials, the Town of Falmouth, local businesses, research and educational institutions, the fishing community, environmental advocacy organizations, and other stakeholders to maximize this unique and timely opportunity to establish the Commonwealth and southern New England as a key center for the offshore wind industry in the United States.

1.6 Construction Overview

Section 5.5 contains a detailed description of construction methodologies, including proposed mitigation measures. Mayflower Wind has selected cable installation techniques to maximize efficiency while avoiding and minimizing potential impacts. Onshore cable installation is proposed via open-cut trenching to accommodate a buried concrete duct bank and associated splice vaults. The transition between onshore and offshore cables is proposed via HDD to avoid disturbance and any direct impacts to shorelines and coastal habitats. Mayflower Wind is considering the following methods to install and bury the offshore export cable: vertical injector, jetting sled, jetting ROV, pre-cut plow, mechanical plow, and mechanical cutting ROV system.

1.7 Schedule and Phasing

The Project will require both onshore and offshore construction activities. Offshore activities within state waters are limited to the installation of the offshore export cable including the sea-to-shore transition via HDD. Onshore construction activities will include installation of the onshore underground export cable to the substation, construction of the substation, and construction of the transmission line to the POCO or POI.

An indicative baseline construction schedule is provided on the next page with commentary that schedules may be moved year to year and timelines may be longer or shorter depending on the selection of final technologies and installation methodologies, and receipt of all federal, state, and local permits.

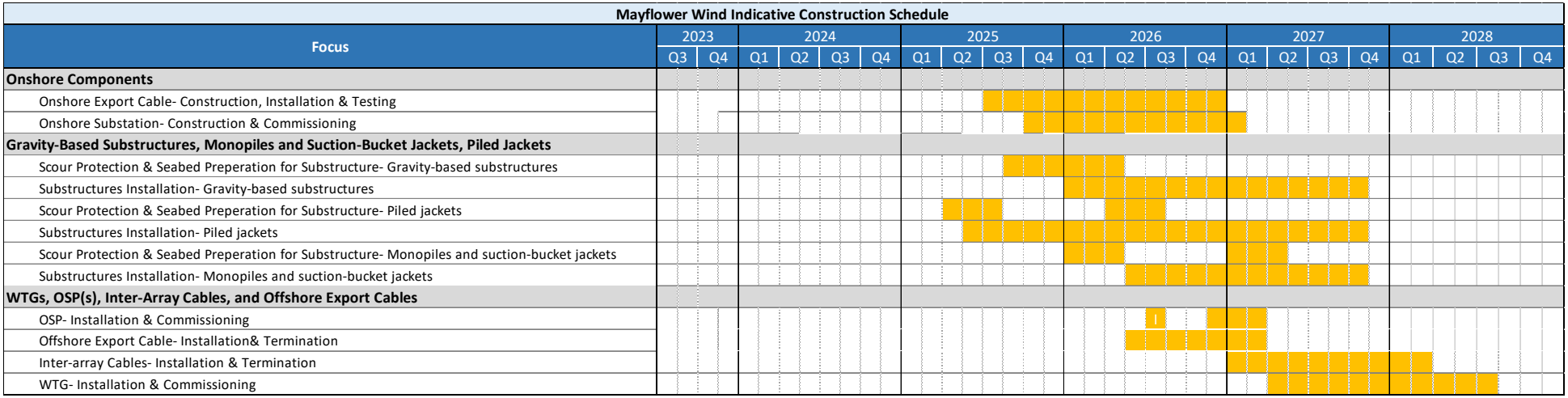
Mayflower Wind will acquire all necessary permits and authorizations before construction begins, which is currently anticipated to occur in 2025. The selection and contracting of fabrication contractors, installation contractors, port facilities, and deployment vessels/vehicles for the proposed Project will be finalized prior to construction. Construction is expected to take up to three years. Mayflower Wind's lease term for the operational phase is 33 years.

Seabed preparations will be the first offshore activity to take place. This may involve scour protection installation, although scour protection may be placed either prior to or after OSP(s) and WTGs installation, depending on the requirements of each substructure type. Installation of substructures will be the next installation activity. Each substructure has different seabed preparation and installation timelines.

The export cables and/or inter-array cables will be pulled into the OSP(s) and tested prior to energization. The OSP(s) topside could be installed immediately after the OSP(s) foundation is installed or could be installed after the export cable and/or inter-array cables are pulled into the OSP(s). Inter-array cable installation typically begins after the offshore export cable installation commences, but the order of installation will be finalized before construction commences. WTG installation and commissioning are expected to be the final offshore construction activities.

Onshore construction and installation activities will commence following receipt of required permits and authorizations. The exact sequence of construction activities will be governed by the needs of the Project, but it is generally expected that many of the onshore construction activities will be conducted simultaneously.

Construction activities are presented in an indicative sequence that could change based on installation methods, vessel and/or vehicle availability, and weather.



Indicative Project Schedule

1.8 Agency and Community Outreach

Mayflower Wind understands the importance of government agency and community stakeholder engagement and has implemented an “early and often” engagement approach. Prior to the lease auction in December 2018, Mayflower Wind began outreach efforts with key groups, including fishing organizations, local community leaders, and appropriate government regulatory agencies. Mayflower Wind initiated this early engagement to understand stakeholder and agency concerns, in particular the scientific, socio-economic, and environmental issues. Mayflower Wind is committed to continuing the outreach efforts to ensure that local communities welcome, understand, and benefit from the proposed Project.

Mayflower Wind has consulted with the fishing industry, Native American Tribes, landowners, environmental groups, higher-education institutions, municipal government officials, state legislators, chambers of commerce, trade associations, regional science organizations, and port managers. These engagements will, where appropriate, continue throughout the lifetime of the proposed Project.

In addition, Mayflower Wind will comply with all applicable Environmental Justice (EJ) requirements including the new EJ requirements under “An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy” signed by Governor Baker on March 26, 2021 (“2021 Climate Act”), and as interpreted through state agency guidance.

Key elements of the Mayflower Winds outreach program, as well as its outreach efforts to date, are described below.

Municipal and Stakeholder Briefings: Mayflower Wind has met regularly with municipal officials and other stakeholders on Cape Cod and Islands, including the Town of Falmouth, Bourne, Edgartown, Tisbury, Oak Bluffs and Nantucket. Mayflower staff have communicated early geophysical & geotechnical survey activity with all municipal harbormasters and conservation and permitting offices in Falmouth. Mayflower Wind has held virtual Open Houses to provide the public with opportunities to interact with Project subject matter experts, ask questions and share concerns. Due to the COVID-19 pandemic, community engagement activities were held remotely from March 2020 through June 2021. On February 10, 2021, Mayflower Wind held a Virtual Town Hall with State Representatives Dylan Fernandez and David Veira for an overview presentation of the Project and live Q&A session. On May 18, 2021, Mayflower Wind launched its first Open House entitled The Future of Clean Energy is Here. The first event was virtual, attracting 479 registrants. Mayflower Wind is committed to continue to host information sessions for local stakeholders, both virtually and in-person, throughout all phases of the Project.

Door-to-Door Outreach and Mailings: As part of the Open House promotion in February 2021, the Company distributed 15,000 informational postcards to Falmouth residents about the Project. In October 2021, the Company distributed 1,000 informational flyers both door-to-door or mailed in the Falmouth Heights community.

Website: A website was developed for this Project (see https://www.mayflowerwind.com). The website provides basic Project information, maps, frequently asked questions, regular updates, and contact resources. Stakeholders can sign up for updates as the Project progresses through the “Sign Up for Updates” tab. The Company has created a dedicated Falmouth-specific webpage (https://mayflowerwind.com/falmouth/) for Falmouth stakeholders to learn more about how the Project will impact and benefit the local community, as well as get in touch with the Cape-based Community Liaison Officer. As part of our commitment to fostering a local workforce, local contractors and suppliers can send their information directly to the Company’s Procurement team through the Contractors & Suppliers webpage (https://mayflowerwind.com/join-us/contractors-and-suppliers/). The website is now available in 9 different languages to increase accessibility.

Project Hotline: The toll-free Hotline number for the Project is 1-508-589-3557. The Project Hotline number is listed in all Project outreach materials, including fact sheets, subsequent mailings, the website, and at all community events. Mayflower Wind is committed to responding promptly to all inquiries.

Project E-mail: An email address (info@mayflowerwind.com) is designated for a timely response to property owner and other stakeholder questions, comments, or concerns.

Construction Community Outreach Plan: Mayflower Wind will execute a comprehensive construction community outreach plan to keep property owners, businesses and municipal officials including fire, police and emergency personnel, apprised of construction schedules, vehicular access, detours, and other traffic management information, local parking availability, emergency vehicle access, construction crew movement and parking, laydown areas, staging, and equipment delivery, nighttime or weekend construction, and road repaving.

1.8.1 Agency Meetings and Consultations

Mayflower Wind has been actively consulting with federal, state, and local agencies, and affected municipalities and tribes regarding Project status, planned studies, issues of concern, the permitting process, and related matters beginning in 2018. A list of meetings conducted to date with agencies, municipalities, and tribes through October 2021 is provided in Table 1-6. Mayflower Wind plans to maintain an active level of consultation and outreach as the design effort continues and the Project proceeds through the licensing and permitting phase.

1.8.2 Stakeholder Engagement

In addition to consultations described in Table 1-6, extensive and ongoing consultation has been conducted by Mayflower Wind with key stakeholders. Mayflower Wind has consulted with the fishing industry, Native American Tribes, landowners, environmental groups, higher-education institutions, municipal government officials, state legislators, chambers of commerce, trade associations, regional science organizations, and port managers. These engagements will, where appropriate, continue throughout the lifetime of the proposed Project. Mayflower Wind has engaged with the below mentioned entities while a list of government agency engagement can be found in Table 1-6.

- 300 Committee Land Trust
- 350 Cape Cod
- Association to Preserve Cape Cod
- Buzzards Bay Area Habitat for Humanity
- Cape and Island Self Reliance
- Cape Cod Aggregates
- Cape Cod Chamber of Commerce
- Cape Cod Commercial Fishermen’s Alliance
- Cape Cod Commission
- Cape Cod Community College
- Cape Cod Fisheries Trust
- Cape Light Compact
- Conservation Law Foundation
- Coonamessett Farm Foundation
- Delaware Indian Tribe
- Edgartown Select Board
- Environmental League of Massachusetts
- Eversource Energy
- Falmouth Academy
- Falmouth Beach Committee

- Falmouth Chamber of Commerce
- Falmouth Climate Action Network
- Falmouth Community Television
- Falmouth Conservation Commission
- Falmouth Economic Development and Industrial Corporation
- Falmouth Energy Committee
- Falmouth Fireworks Committee
- Falmouth Heights Maravista Neighborhood Association
- Falmouth League of Women Voters
- Falmouth Road Race Committee
- Falmouth Running Club
- Falmouth Select Board
- Falmouth Unitarian Universalist Fellowship
- Falmouth Volunteers in Public Schools (VIPS)
- First Congregational Church of Falmouth
- Fisheries Technical Working Group (New York State Energy & Research Development Authority)
- Fleet Forces Atlantic Exercise Coordination Center
- Greentown Labs
- Harbormasters of Edgartown, Falmouth, Tisbury (Massachusetts)
- Joint Base Cape Cod
- Lawrence Lynch
- MA/RI Joint Developer Marine Affairs Working group
- Marine Biological Laboratory
- Marine Recreational Fisheries Development Panel members and their respective affiliations
- Martha’s Vineyard Climate Action Task Force
- Martha’s Vineyard Fishermen’s Preservation Trust
- Mashantucket Pequot Tribal Nation
- Mashpee Wampanoag Tribe
- Massachusetts Aquaculture Organization
- Massachusetts Audubon Society
- Massachusetts Building Trades Council
- Massachusetts Climate Education Organization
- Massachusetts Lobstermen’s Association
- Massachusetts Maritime Academy
- Massachusetts Shellfish Officers Association
- Mohegan Tribe of Connecticut
- Nantucket Conservation Foundation
- Nantucket Land Bank

- Narragansett Indian Tribe
- National Society of Black Engineers Boston
- Navy Fleet Command
- New England Aquarium Anderson Cabot Center for Ocean Life
- New England Fishery Management Council
- New York State Energy Research and Development Fisheries Working Group
- National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service, Northeast Science Center
- NOAA, National Marine Fisheries Service, Protected Resources Division
- North Atlantic States Regional Council of Carpenters
- Northeastern Regional Association of Coastal and Ocean Observing Systems
- Northeastern University
- Oak Bluffs Select Board
- Old Colony Regional Vocational Technical High School
- Patriot Party Boats
- Piledrivers Local #56
- Responsible Offshore Development Alliance (RODA)/Special Initiatives for Offshore Wind (SIOW)
- SeaAhead Bluetech Innovation
- Seafarer's International Union
- SeaFreeze Ltd.
- Shinnecock Indian Nation
- St. Barnabas Episcopal Church
- State Representatives Antonio Cabral, Dylan Fernandes, Carole Fiola, Patricia Haddad, David Vieira
- State Senators Julian Cyr, Susan Moran, Marc Pacheco, Michael Rodrigues
- Tisbury Select Board
- Towns of Bourne, Falmouth, Nantucket, Edgartown, Oak Bluffs, Tisbury (Massachusetts)
- Tufts University
- University of Massachusetts – Dartmouth School for Marine Science and Technology, Ocean Corridor Economic Alliance Northeast
- University of Massachusetts Amherst
- University of Massachusetts Boston
- University of Massachusetts Lowell
- Vineyard Power
- Wampanoag Tribe of Gay Head
- Woods Hole Group
- Wood Hole Oceanographic Institution

Mayflower Wind plans to maintain an active level of consultation and outreach as environmental reviews and permitting processes continue and is available to meet with any interested party.

1.8.3 Abutter Notification and Outreach

The Project has hosted community virtual meetings and open house events in Falmouth. Following submittal of this Petition, EFSB staff will finalize an abutter notification letter. The letter will include a description of the Project including the Preferred and Noticed Alternative routes (with a supporting map). The letter will also include a description of the EFSB review process and will welcome interested citizens to attend an EFSB-convened public comment hearing(s) in the Project region.

The public comment hearing(s) will be conducted by an EFSB Hearing Officer. At the public comment hearing, Mayflower Wind will present an overview of the proposed Project. Public officials and members of the public will then have an opportunity to ask questions and make comments about the proposed Project.

In addition, Mayflower Wind will continue to regularly host public informational events and will widely advertise those events utilizing numerous outlets, including email, web, digital media, and posting in municipal and community bulletins. Mayflower Wind representatives plan to continue its efforts reach out to community and civic groups and to host office hours, info sessions and community forums, in a safe manner consistent with the Commonwealth's COVID-19 guidelines. Public events provide an opportunity for interested residents and officials to learn about Project details, connect with Project representatives, to have their questions answered and provide feedback.

Table 1-6. Consultations with Agencies, Municipalities, and Tribes

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
1/15/2019	State	Massachusetts Office of Coastal Zone Management (CZM), Massachusetts Board of Underwater Archaeology (BUAR)	In-person meeting	Introductory Project discussion and grounding session to unders10/26tand agency's needs and requirements
3/13/2019	Federal	BOEM	In-person meeting	Introductory Project meeting and discussion of anticipated 2019 milestones
6/12/2019	Federal	National Marine Fisheries Service (NMFS)	Letter	Letter to NMFS regarding geophysical equipment to be used during 2019 surveys
6/18/2019	Federal	BOEM	In-person meeting	2019 geophysical and geotechnical (G&G) pre-survey meeting
6/20/2019	Tribal	Narragansett Indian Tribe	In-person meeting	2019 G&G tribal pre-survey meeting
6/21/2019	Tribal	Mashpee Wampanoag Tribe	In-person meeting	2019 G&G tribal pre-survey meeting
6/21/2019	Tribal	Wampanoag Tribe of Gay Head	In-person meeting	2019 G&G tribal pre-survey meeting
7/1/2019	State	Massachusetts Department of Transportation (MassDOT), Highway and Rail Division	Call	Introductory discussions on the Project, proposed routing, and Use and Occupancy application process
7/11/2019	State	Joint Base Cape Cod (JBCC): MA National Guard Environmental & Readiness Center, Environmental Management Commission (EMC), MA Executive Office of Energy & Environmental Affairs	In-person meeting	Introductory Project meeting and discussion of proposed routing and interconnection on JBCC in Bourne; grounding session to understand JBCC's needs and requirements
7/17/2019	State	Massachusetts Department of Environmental Protection (MassDEP), Southeast Regional Office	In-person meeting	Introductory meeting to discuss project overview, proposed routing options under consideration, and interconnections to the electric grid
7/26/2019	Federal	NMFS	Email	Email stating that NMFS concurs with Mayflower statement that incidental take of marine mammals is not expected as result of 2019 G&G surveys, if geophysical equipment operating below 200 kHz is limited to daytime hours

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
7/29/2019	Federal	BOEM	Email	Submittal of Site Assessment Plan (SAP) to BOEM
8/1/2019	Federal	BOEM	Email	BOEM issued approval of 2019 G&G Survey Plan
9/3/2019	Federal	NMFS	Email	Email from NMFS concurring with Mayflower's assessment of geophysical survey equipment in relation to incidental take authorizations
10/16 – 10/17/2019	Federal/State/ Fisheries/Developers	RODA/Special Initiatives for Offshore Wind (SIOW)	In-person meeting	RODA quarterly meeting & SIOW Educational Forum
11/13/2019	Federal	BOEM	Email	Submitted Avian Survey Plan
11/18/2019	Federal	BOEM/Bureau of Safety and Environmental Enforcement (BSEE)	Call	Call to discuss technical requirements for offshore project components
11/21/2019	State	Massachusetts Department of Fish and Game (MA DFG) and Massachusetts Division of Marine Fisheries (MA DMF)	Letter	Letter from MA DFG and MA DMF requesting to be added to Mayflower correspondence distribution list
11/26/2019	State	MA DFG/MA DMF	Letter	Letter to MA DFG and MA DMF confirming that agency has been added to Mayflower correspondence distribution list related to offshore wind energy
11/27/2019	Federal	BOEM, NMFS	Email	Submitted PSO/PAM Report from 2019 High-resolution geophysical (HRG) survey
12/3/2019	Federal	BOEM	Call	Call to discuss 2020 G&G Survey Plan
12/12/2019	Federal	BOEM	Email	Final SAP redline and response to BOEM comments submitted to BOEM
12/20/2019	Federal	BOEM	Email	Submittal of 2020 Survey Plan to BOEM
1/3/2020	Federal	BOEM	Email	Received BOEM approval to deploy FLiDAR buoy outside of Lease Area
1/6/2020	Federal	USCG	Email	Received approval of Private Aids to Navigation (PATON) for FLiDAR buoy deployment
1/13/2020	Federal/State/ Fisheries/Developers	RODA	In-person meeting	Quarterly RODA meeting
1/14/2020	State	EFSB, DPU	In-person meeting	Introductory Project meeting with DPU Chait, EFSB Directors and Counsel
1/16/2020	Federal	BOEM/BSEE	In-person meeting	Meeting to discuss technical requirements for offshore project components

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
1/17/2020	Federal	NMFS	Email	Incidental Harassment Authorization (IHA) Application submittal
1/22/2020	Federal	BOEM	In-person meeting	Project management and COP strategy meeting
1/23/2020	Federal	BOEM	In-person meeting	2020 G&G pre-survey meeting
1/31/2020	Local	Town of Falmouth	In-person meeting	Project introductory meeting with the Town of Falmouth Assistant Town Manager
2/5/2020	Federal	BOEM, NMFS	Email	Submittal of 2019 Geotechnical Survey PSO Report
2/14/2020	State	Massachusetts Historical Commission (MHC)	Letter	Submitted Project Notification Form (PNF) for the Project, as then defined
2/25/2020	Federal	USCG	In-person meeting	Offshore wind meeting with USCG and other MA/RI wind energy developers
2/25/2020	State	BUAR	Letter	Submitted application for provisional Special Use Permit
2/26/2020	Tribal	Mashpee Wampanoag Tribe, Wampanoag Tribe of Gay Head	In-person meeting	2020 pre-survey meeting with the Tribes in Pocasset, MA
2/28/2020	State	MEPA	In-person meeting	Project introduction meeting
3/6/2020	Federal	NMFS	Email	Submittal of revised IHA Application and request for Letter of Concurrence
3/9/2020	State	NHESP (Natural Heritage and Endangered Species Program)	In-person meeting	Project introduction meeting
3/9/2020	Local	Town of Falmouth	In-person meeting	Introductory Project meeting with Select Board
3/9/2020	State	MHC	Letter	Received MHC response letter acknowledging review of Mayflower's Project Notification Form (MHC #RC.67760) with comments
3/12/2020	State	BUAR	Letter, Email	Issuance of Provisional Special Use Permit 20-001 for marine archaeological surveys in State waters
3/25/2020	Federal	U.S. Army Corps of Engineers (USACE)	Email	Submittal of Self-Verification Notification Form for the deployment of the FLiDAR buoy
3/25/2020	Federal	USCG	Email	Submittal of the Local Notice to Mariners for Mayflower 2020 geophysical surveys
3/25/2020	Federal	Navy Fleet Command	Email	Submittal of Notice to Fleet Command for Mayflower 2020 geophysical surveys

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
3/31/2020	Federal	USACE	Email	Received confirmation of receipt of Self-Verification Notification Form for FLiDAR buoy
4/10/2020	State	Division of Fisheries and Wildlife (MassWildlife)/NHESP	Letter	Filed Information Request for state-listed rare species
4/16/2020	Federal	BOEM	Email	Received BOEM approval of 2020 Survey Plan
4/22/2020	Federal	BOEM	Email	Submittal of departure request for early design and fabrication to BOEM
4/22/2020	Federal	NMFS	Call	Project introduction and high-level benthic sampling plan overview meeting
4/23/2020	Federal	BOEM	Email	Submittal of revised Avian Survey Plan
4/23/2020	State	BUAR	Email	Submittal of letter requesting alteration to policy guidance standard
4/27/2020	Federal	BOEM	Email	Request for extensions of short-term buoy deployment outside of Lease Area A-0521 — request granted
4/27/2020	Local	Town of Edgartown	Virtual meeting	Project introduction meeting with Select Board
4/28/2020	Local	Town of Tisbury	Virtual meeting	Project introductory meeting with the Select Board
4/30/2020	Federal	BOEM	Email	Submittal of first Avian Quarterly Report
4/30/2020	Local	Town of Bourne	Virtual meeting	Project introductory meeting with the Town Administrator
5/4/2020	Federal	BOEM/NMFS	Email	Submittal of benthic survey plan to BOEM/NMFS
5/5/2020	State	JBCC: EMC, Executive Office of Energy & Environmental Affairs	Email	Obtained wetlands survey data from JBCC officials for interconnection site
5/6/2020	Federal	USCG	Call	Introduced project and reviewed planned approach and outline of Navigation Safety Risk Assessment (NSRA)
5/7/2020	N/A	JBCC	Call	Project introduction meeting
5/11/2020	Federal	Department of Defense (DoD) Clearing House	Email	Submittal of informal Project Notification Form
5/21/2020	Federal	BOEM	Call	Discussed Avian Risk Assessment and Benthic Survey Plan
5/21/2020	State	MHC	Letter	Letter from MHC attaching BUAR's request for additional information

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
5/22/2020	State	BUAR	Call	Discussed geotechnical survey to take place along export cable route in MA state waters
5/26/2020	Federal	BOEM	Email	BOEM approval of SAP
5/27/2020	State	MHC	Letter	Submitted Mayflower Wind's response to MHC's 5/21/2020 letter
5/27/2020	State	BUAR	Letter, Email	Filed supplemental SUP information requested by BUAR Director
5/28/2020	State	BUAR	Email	Submittal of memorandum describing Mayflower's proposed geoarchaeological data collection strategy for Massachusetts State Waters
6/2/2020	State	BUAR	Email	Received formal approval of Special Use Permit No. 20-001 for underwater archaeological recon survey and documentation
6/3/2020	Federal	United States Fish and Wildlife Service (USFWS)/BOEM	Call	USFWS project introduction meeting
6/8/2020	Federal	BOEM	Email	Receipt of BOEM comments on Certified Verification Agent (CVA) Nomination
Various	State	BUAR	Email	Submittal of notification letter to report discovery of a 15l shipwrecks located within MA state waters
6/10/2020	Local	Town of Falmouth	Virtual meeting	Project update call with the Assistant Town Manager
6/10/2020	State	MassDEP	Call	Project introduction meeting
6/10/2020	Federal	NMFS	Call	Discussed Mayflower Benthic Survey Plan
6/9/2020	State	Eversource	Call	Co-optimization status call
6/17/2020	State	MassDEP	Call	Project update meeting
6/18/2020	State, Tribal	BUAR, MHC, Tribes	Letter	Sent notice letters to Tribes (copying MHC & BUAR) regarding BUAR meetings on July 1 to review proposed cultural cores
6/22/2020	Federal	Fleet Forces Atlantic Exercise Coordination Center (FFAECC)	Email	Geotechnical survey notification
6/22/2020	Federal	USCG	Email	Local notice to mariners submitted to the USCG

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
6/24/2020	Federal	BOEM/BSEE	Call	Presented progress made since January, current plans for what will be included in COP, and various PDEs
6/25/2020	Federal	NMFS	Email	Submittal of memo responding to NMFS' comments on Mayflower's Benthic FSP
6/26/2020	State	Massachusetts Ocean Team (CZM, MassDEP, BUAR, DMF)	Virtual meeting	Project introduction meeting
7/1/2020	Tribal, State	Mashpee Wampanoag and Wampanoag Indian Tribe, Massachusetts Historical Commission (MHC), MA BUAR	Call	Discussed geoarchaeological coring activities in state waters
7/1/2020	Federal	USCG	Email	Submittal of Local Notice to Mariners for upcoming geotechnical surveys in lease area
7/1/2020	Federal	FFAECC	Email	Submittal of Notice to Fleet Command for upcoming geotechnical surveys in lease area
7/7/2020	Federal	BOEM	Email	Submittal of final Phase 2 G&G Survey Plan
7/9/2020	Federal	NHESP	Call	Discussed avian surveys
7/9/2020	State, Tribal	BUAR, Tribes	Virtual meeting	Review offshore geophysical data review and discuss proposed cultural coring plan; MHC invited
7/14/2020	Federal	USCG	Email	Submittal of Local Notice to Mariners for the Fugro Brasilis
7/14/2020	Federal	FFAECC	Email	Submittal of Notice to Fleet Command for the Fugro Brasilis
7/14/2020	Tribal, State	BUAR, BOEM, MHC, Mashpee Wampanoag, and Wampanoag Indian Tribe	Email, Letter (MHC)	Submittal of revised state cultural coring plan
7/16/2020	Federal	BOEM	Email	Submittal of Mayflower's responses to BOEM's comments on CVA Nomination
7/17/2020	State	MassDEP	Virtual meeting	Met with MassDEP and MA CZM leadership
7/20/2020	Federal	BOEM	Email	Submittal of data request for sightings from the North Atlantic Right Whale Commission database
7/21/2020	Federal	BOEM/NMFS	Email	Submittal of memo on Spring benthic survey results

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
7/23/2020	Federal	NMFS	Email	IHA Approval
7/23/2020	Federal	BOEM	Email	Phase 2 Survey Plan approval
7/23/2020	State	MHC	Letter	Received letter from MHC commenting on the QMA's integrated geoarchaeological coring plan sent on 7/14/2020
7/28/2020	Federal	BOEM	Email	Provided notification to BOEM of upcoming summer 2020 benthic surveys
7/28/2020	Local	Town of Oak Bluffs Board of Selectmen	Virtual meeting	Project introduction meeting
7/28/2020	Local	Town of Nantucket, Energy Coordinator, Preservation Planner	In-person meeting	Gathered input on key observation points for visual impact assessment
7/29/2020	State	MA Ocean Team (MassDEP, MA CZM, MA BUAR)	Virtual meeting	Project update including p discussion of export cable routing, and benthic surveys
7/30/2020	Local	Town of Oak Bluffs	Virtual meeting	Project introductory meeting with the Select Board
7/30/2020	Federal	BOEM/NMFS	Call	Discussed spring benthic survey results and plans for the upcoming summer benthic survey
7/30/2020	Federal	BOEM, BSEE	Virtual meeting	Meeting to discuss BOEM comments on Mayflower Wind CVA Nomination
7/31/2020	Federal	BOEM	Email	Received confirmation that BOEM had no comments on the proposed geoarchaeological coring program
8/4/2020	State, Tribal	Mashantucket Pequot Tribal Nation, Mashpee Wampanoag Tribe of MA, Narragansett Indian Tribe, Wampanoag Tribe of Gay Head (Aquinnah), MHC, MA BUAR	Letter	Submittal of letter to tribes to update them on geotechnical survey campaign
8/6/2020	Federal	USCG	Email	Submittal of Local Notice to Mariners for upcoming benthic habitat survey in State and Offshore waters of MA, scheduled to commence on/about August 19, 2020
8/6/2020	Federal	FFAECC	Email	Submittal of Notice to Fleet Command for upcoming benthic habitat survey in State and Offshore waters of MA; scheduled to commence on/about August 19 2020

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
8/14/2020	Federal	BOEM	Email	Submittal of CVs, certifications, and NMFS approval letters for PSOs/PAM Operators for the 2020 Geotechnical Survey (update to initial list sent on 7/10/2020)
8/14/2020	State	MHC	Letter	Follow-up letter to MHC responding to comments and requesting a meeting
8/18/2020	Federal	BOEM	Call	Discussed G&G survey data to be submitted with the COP
8/20/2020	State	MHC	Call	Discussed proposed cultural coring plan (follow-up call to Cultural Coring Plan submitted on 7/14/2020 and MHC comment letter 7/23/2020)
8/20/2020	State	MHC	Letter	Cover letter and enclosures provided copies of the July 9, 2020, PowerPoint and supporting data for the cultural coring campaign
8/26/2020	Federal	NOAA	Email	Submittal of memo summarizing Mayflower's plan for the Summer 2020 benthic habitat field study
8/26/2020	Federal	NMFS	Email	Submittal of IHA Request for Increased Take for the common dolphin
8/27/2020	Federal	BOEM/BSEE	Email	Submittal of Lost and Damaged Equipment Report for a Shelby tube lost on 8/15/2020 72m below mudline.
9/2/2020	Federal	BOEM	Email	Consultation with BOEM regarding plans to archive geoarchaeological cores from 2020 surveys
9/3/2020	Federal	BOEM/BSEE	Email	Submittal of Lost and Damaged Equipment Report for 2.5m steel tubing with cone lost below the mudline on 8/30/2020
9/8/2020	Federal	BOEM	Email	Request for VMS data and polar histograms.
9/16/2020	Federal	NMFS	Email	Received amended IHA from NMFS to increase the amount of Level B common dolphin takes
9/16/2020	State	Falmouth Conservation Commission (FCC)	Call	Falmouth Wetlands – Negative Determination of Applicability. Received authorization for landfall geotechnical borings.
9/17/2020	Federal	BOEM	Email	Submittal of responses to BOEM comments on Mayflower CVA Nomination
9/23/2020	Local	Town of Falmouth	Virtual meeting	Project update call with the Assistant Town Manager

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
9/29/2020	Federal	DoD	Email	Received response from DoD Clearinghouse on Mayflower's informal Project Notification Form
9/29/2020	Federal	NORAD	Email	Received Informal Review Response letter for Mayflower's Informal Response Request
9/29/2020	Federal	Air National Guard	Email	Initiation of project consultation with Air National Guard
9/29/2020	Federal	US Navy	Email	Initiation of project consultation with the U.S. Navy
9/30/2020	Federal	BOEM/BSEE	Email	Received response to Lost and Damaged Equipment Report for the Shelby tube
9/30/2020	Federal	BOEM/BSEE	Email	Received response to Lost and Damaged Equipment Report for steel tubing and seismic cone
10/1/2020	Federal	NMFS	Email	Received response from NMFS/NOAA regarding the application process for the 2021 HRG survey IHA
10/5/2020	Local	Town of Falmouth Board of Selectmen	Virtual meeting	Select Board Meeting to provide project update and request Access Agreements for Landfall and Onshore Substation
10/13/2020	Federal	BOEM	Email	Received responses to BOEM comments on Departure Request for early fabrication of the OSP and inter-array cables
10/15/2020	Federal	USCG	Meeting	Meeting with District 1 and Headquarters at USCG to provide a project update and discuss Mayflower's approach to the NSRA
10/19/2020	Local	Town of Falmouth Energy Committee	Virtual meeting	Introductory Project meeting
10/20/2020	Federal	USCG	Email	Submittal of Local Notice to Mariners for upcoming fall benthic survey (marine remote sensing, bottom photography, sediment grabs) to commence on 11/7/2020. Received response from USCG on 10/21/2020.
10/21/2020	Federal	FFAECC	Email	Submittal of Notice to Fleet Command for fall benthic survey to commence on 11/7/2020
10/21/2020	State, Tribal	BUAR, MHC, Tribes	Letter	Sent letter to notify all parties on Mayflower's geoarchaeological core testing process

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
10/22/2020	Federal	BOEM	Email	Received approval to use a third party to write the Environmental Impact Statement (EIS)
10/22/2020	Federal	BOEM	Call	Discussed approach and methodology for the VIA and benthic findings from spring and summer surveys
10/26/2020	Federal	BUAR, MHC, Tribes	Email, voicemail	Sent Live Feed access information to Jonathan at MHC
10/23/2020	Federal	NMFS/NOAA	Email	Submittal of IHA for 2021 HRG surveys (received confirmation Robert Pauline will process the request on 10/27)
10/26/2020	Federal	BOEM	Email	Submittal of slides requested during 10/20/2020 meeting with BOEM containing information on the spring and summer 2020 seafloor surveys
10/27/2020	Federal	NORAD	Email	Provided 1x1 nm layout to NORAD for radar interference/mitigation discussions
10/27/2020	Federal, State, Tribal	MHC, BUAR, BOEM, Tribes	Letter	Provided call in details for geoarchaeological testing process
10/27/2020	Federal	BOEM, NMFS	Email	Submitted 2020 PSO/PAM Report for geotechnical survey along export cable corridor
10/29/2020	Local	Town of Falmouth	Virtual meeting	Project discussion with two Select Board members
11/4/2020	Federal	NOAA	Email	Submittal of updated IHA application for the 2021 G&G Survey
11/4/2020	Federal	BOEM	Letter	BOEM approval of CVA Nomination
11/5/2020	Federal	BOEM	Email	Submittal of revised VIA Methodology Memo (to be shared with John McCarty)
11/6/2020	Federal	NOAA	Email	Submittal of Fall 2020 Benthic Survey Plan
11/9/2020	Local	Town of Falmouth Board of Selectmen	Virtual meeting	Select Board Meeting to follow-up on request for Access Agreements for Landfall and Onshore Substation
11/10/2020	State	Mass Ocean Team	Call	Provided project update
11/10/2020	Federal	BOEM	Email	Submittal of Mayflower Qualification Card update (lease representative update and updated Officer Certificate)
11/12/2020	Local	Town of Falmouth Conservation Commission	Virtual meeting	Project introduction meeting

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
11/13/2020	Federal	BOEM	Email	Receival of updated Mayflower Wind Qualification Card (updated legal qualifications and Lessee contact information)
11/13/2020	Federal	BOEM	Email	Submittal of draft Request for Proposal (RFP) documents for procuring a third-party contractor to support BOEM with COP review and National Environmental Policy Act (NEPA) process
11/18/2020	Federal	NORAD	Email	Initial project mitigation discussions with NORAD
11/18/2020	State	MassDEP	Virtual meeting	Discussed Project update and permitting process with MassDEP leadership (Regional Director and Commissioner's Chief of Staff)
11/18/2020	Local	Town of Falmouth Beach Committee	Virtual meeting	Introductory Project meeting
11/19/2020	Federal	BOEM, BSEE	Email	Submittal of incident report to BOEM and BSEE regarding vessel strikes to our FLiDAR buoy
11/19/2020	Federal	BOEM	Call	Discussion of the BOEM recommended survey corridor width for inter-array cables
11/20/2020	Federal	USCG	Email	Submittal of Local Notice to Mariners for upcoming benthic surveys in State and nearshore waters scheduled to commence on 11/27/2020
11/20/2020	Federal	FFAECC	Email	Submittal of Notice to Fleet Command for upcoming benthic surveys in State and nearshore waters scheduled to commence on 11/27/2020
11/20/2020	Federal	USCG	Virtual meeting	Southeastern New England Port Safety & Security Forum; presentations from USCG, USACE, Environmental Protection Agency (EPA), NOAA, local Police Dept., Navy, harbormasters, and offshore wind industry representatives
11/25/2020	Federal	USCG	Email	Submittal of Navigation Safety Risk Assessment for Coast Guard review
11/30/2020	Federal	BOEM	Email	Received BOEM approval of the departure request for the early fabrication of Mayflower Wind's OSP and inter-array cables
12/1/2020	Federal	BOEM	Call	Discussed eliminating winter 2021 benthic campaign
12/8/2020	Federal	BOEM	Email	Provided draft NSRA to BOEM

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
12/14/2020	Federal	BOEM	Email	Submittal of responses to BOEM's comments on the revised VIA Methodology Memo
12/14/2020	Federal	USCG, BOEM	Call	Meeting to review the draft NSRA and get feedback from both agencies
12/21/2020	Federal	BOEM	Call	Discussed updates to Section 106 process
12/22/2020	Federal	NMFS, NOAA	Email	Notified NMFS that Mayflower Wind does not plan to perform benthic sampling during Winter 2020/2021
1/5/2021	Federal	BOEM	Virtual meeting	Introductory meeting with Mayflower Wind CEO and BOEM senior leadership
01/13/2021	Federal	BOEM, NMFS	Email	Submission of 2020 HRG PSO Report
01/21/2021	State	MHC	Call	Call with MHC official re: reconnaissance permit application
1/25/2021	Federal	EPA	Virtual meeting	Introductory Project meeting
1/28/2021	State	JBCC	Virtual meeting	Introductory Project meeting with Executive Director, JBCC
2/1/2021	Federal	BOEM	Email	Submitted fourth Quarterly Avian Report for digital aerial surveys conducted in the Lease Area
02/2/2021	State	MHC	Mail	Filed draft Archaeological Permit application re: Phase 1A cultural research
2/10/2021	Local	Town of Falmouth	Virtual meeting	Project update meeting with the Energy Committee
02/11/2021	State	EFSB	Virtual meeting	
	Provide Project update			
2/12/2021	Federal	BOEM	Email	Submittal of responses to BOEM's comments on 2021 G&G Survey Plan
2/12/2021	Tribal	Narragansett Indian Tribe, Wampanoag Tribe of Gay Head (Aquinnah), Mashpee Wampanoag Tribe, Delaware Tribe of Indians, Shinnecock Indian Nation, Mashantucket Pequot Tribe, Mohegan Tribe of Connecticut	Letter	Invitation sent via certified mail to Tribes for upcoming 2021 G&G Survey Tribal Pre-Survey Meeting

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
2/15/2021	Federal	BOEM	Email	Submitted Mayflower Wind Construction and Operations Plan
2/17/2021	Federal	BOEM	Email	Sent information to Brian Hooker regarding Mayflower's 2020 benthic sampling approach
2/23/2021	Federal	United States Geological Survey (USGS)	Email	Submitted lost equipment notification to USCG
2/25/2021	Tribal	Shinnecock Indian Nation, Delaware Indian Tribe, Mashantucket Pequot Tribal Nation, Mohegan Tribe Also invited: Mashpee Wampanoag, Narragansett Indian Tribe, Wampanoag of Gay Head (Aquinnah)	Virtual meeting	Tribal G&G pre-survey meeting and introductory project meeting
2/26/2021	State	MHC	Mail	Filed Archaeological Reconnaissance Permit application addressing agency review comments.
3/3/2021	State	Mass Audubon	Virtual meeting	Introductory Project meeting with president and offshore lead
3/8/2021	Federal	NMFS/NOAA	Email	Responded to NMFS 2021 IHA questions
3/8/2021	Tribal	Mashpee Wampanoag Tribe	Email	Provided follow-up information on 2021 G&G Survey Plan to Mashpee Wampanoag Tribe per request during 2021 Tribal Pre-Survey Meeting
3/9/2021	Local	Town of Falmouth		Project introductory meeting with the Economic Development and Industrial Corporation
3/11/2021	Federal	BOEM	Email	BOEM 2021 G&G Survey Plan approval
3/11/2021	Federal	BOEM	Virtual meeting	Bi-weekly call to discuss the deferred identification process
3/15/2021	Federal	BOEM, NOAA	Email	Avian data sharing with BOEM and NOAA
3/16/2021	Federal	USCG	Email	Fugro submitted Notices to Mariners for the GO Pursuit, GO Liberty, Westerly, and Time and Tide on 3/16/2021 (the Time and Tide was removed on 3/31)
3/24/2021	Tribal	Chappaquiddick Tribe of the Wampanoag Nation	Letter	Received letter (dated 3/18/21) from Chappaquiddick Tribe requesting to be a consulting party in the Mayflower Wind project

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
3/24/2021	Federal	BOEM	Virtual Meeting	Bi-weekly call with BOEM to discuss Deferred Identification; BOEM confirmed that portions of the Project can be separated into Deferred Identification
3/29/2021	Federal	BOEM	Email	Provided PSO certificates/resumes for upcoming G&G surveys to BOEM
3/29/2021	State	MA Coastal Zone Management (CZM)	Email	Provided survey area of interest for 2019-2021 to MA CZM upon their request for upcoming MA survey planning efforts
3/29/2021	Federal	BOEM	Email	Submitted Annual Avian Report (2019-2020)
3/29/2021	Federal, Tribal	BOEM	Email	Sent BOEM proof of delivery of invitations for the Mayflower Wind 2021 G&G Survey Tribal Pre-Survey Meeting mailed to the Narragansett Indian Tribe, Wampanoag Tribe of Gay Head, Mashpee Wampanoag Tribe of Massachusetts, Delaware Tribe of Indians, Shinnecock Indian Nation, Mashantucket Pequot Tribe, and Mohegan Tribe of Connecticut
3/31/2021	Federal	USACE	Email	Submitted Self-Verification form for 2021 geotechnical and benthic surveys
4/7/2021	Federal	BOEM	Aconex transmittal	Submitted polygon effort shapefiles for the Mayflower- Area of Potential Effects (APE)M high-resolution aerial data of the OCS-A 0521 lease area from November 2019 - October 2020
4/9/2021	Federal	BOEM	Email	Submitted addendum to the Mayflower Wind 2021 G&G Survey Plan
4/9/2021	State	MHC	Letter	MHC issued Phase 1A Recon Permit
4/13/2021	Federal	USCG	Virtual meeting	Attended USCG Offshore Wind Symposium and provided a Mayflower project overview and status update
4/13/2021	State	MHC	Email	Received receipt of archaeological field investigation permit
4/19/2021	Federal	NMFS	Email	Submittal of modified 2021 IHA Application
4/21/2021	State	MA BUAR	Email	Submittal of updated MA Bureau of underwater Archaeological Resources Special Use Permit to do intrusive borings and other activities on the seabed

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
4/23/2021	Federal	NOAA	Email	Submittal of Spring 2021 Benthic Survey Plan
4/24/2021	State, Tribal	Mashpee Wampanoag Tribe, MassCEC, Cape Cod Community College	Virtual meeting	Attended Offshore Wind 101 event with Mashpee Wampanoag Tribe, Massachusetts Clean Energy Center (MassCEC), and Cape Cod Community College
4/26/2021	State	MEPA Office	Call	Consultation with Director re: new Environmental Justice requirements
4/26/2021	Local	Town of Falmouth	Virtual meeting	Project introductory meeting and survey update with the Beach Commission
5/4/2021	Federal	BOEM	Aconex transmittal	Submittal of updated MARA to BOEM
5/10/2021	Federal	BOEM	Email	Updates to BOEM regarding Mayflower Wind benthic survey strategy
5/11/2021	Federal	BOEM	Email	BOEM acknowledgement of Mayflower benthic sampling strategy and confirmation that approach is consistent with BOEM regulations and guidance
5/12/2021	Tribal	Mashpee Wampanoag, Wampanoag of Gay Head (Aquinnah), Narragansett, Delaware, Mashantucket Pequot, Shinnecock Indian Nation of New York, Mohegan Tribe of Connecticut	Certified mail, Email	Sent invite to Tribes for a second pre-survey meeting for the 2021 G&G surveys to account for updated survey plan that includes High Voltage Direct Current (HVDC) route to Brayton Point
5/13/2021	Federal	BOEM	Email	Submission of responses to BOEM comments on 2021 G&G Survey Plan Addendum
5/14/2021	Local	Town of Falmouth	Email	Sent first draft version of Host Community Agreement (HCA) to Town for review and comment
5/17/2021	Federal	NOAA	Email	Received notice for publication of IHA in Federal Register (published 5/20/2021)
5/19/2021	Local	Town of Falmouth	Virtual meeting	Project and survey update with the Conservation Commission
5/26/2021	State	MA BUAR, MHC	Email	Letter sent to MHC and BUAR re: voluntary release of Revised Preliminary MARA
5/26/2021	State	EFSB/DPU	Virtual meeting	Pre-filing Project update
5/27/2021	Tribal	Mashpee Wampanoag, Narragansett Indian Tribe,	Virtual meeting	Tribal pre-survey meeting

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
		Wampanoag of Gay Head (Aquinnah), Mashantucket Pequot Tribal Nation, Mohegan Tribe of Connecticut, Delaware Indian Tribe, Shinnecock Indian Tribe		
5/29/2021	State	EFSB	Virtual meeting	Follow-up consultation with EFSB Director to clarify feedback from 5/26/2021 meeting
6/1/2021	State	MA BUAR	Email	Received Special Use Permit renewal from MA BUAR for 2021 surveys
6/2/2021	Federal	DOI, BOEM, Federal Permitting Improvement Steering Council (FPISC)	Email	Applied to be a FAST-41 covered project
6/3/2021	State/Tribal	MHC/SHPO, BUAR	Virtual meeting	Review 2021 marine geoarchaeological coring plan
6/3/2021	Local	Town of Falmouth	Virtual meeting	Meeting to discuss proposed routes, zoning, Article 97, and coordinating local improvements
6/7/2021	Federal	BOEM	Email	Approval of 2021 Survey Plan Addendum
6/15/2021	Federal	BOEM	Email	Provided qualifications and certifications of PSOs that will be on the R/V Shearwater for vibracore surveys (PSOs approved)
6/15/2021	Federal	DOI, BOEM, FPISC	Email	Approval of Mayflower Wind Project as a FAST-41 covered project
6/15/2021	State	MassDEP	Virtual meeting	Project update to Regional Director and Deputy Regional Director of Southeast Regional Office
6/16/2021	Federal	NMFS	Email	Information Request to NMFS for Vessel Trip Reporting data on new ECC to Brayton Point
6/18/2021	Federal	BOEM	Email	Reported a crew change on the GO Pursuit and provided PSO information (approved 6/21/2021)
6/18/2021	State	MHC	Email, Letter	Submittal of amended Project Notification Form; hard copy also mailed on 6/18/2021
6/24/2021	State	MA BUAR	Email	Submittal of modification to the scope of work for the BUAR Special Use Permit to support the Mayflower Wind 2021 field season for the Mayflower Wind Project

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
6/30/2021	Federal	NOAA	Email	Received IHA for marine site characterization surveys; effective from July 1, 2021, to June 30, 2022
7/8/2021	Federal	USCG	Email	Submitted Local Notices to Mariners for the GO Liberty, GO Pursuit, and Westerly geophysical surveys
7/8/2021	Federal	FFAECC	Email	Submitted Notices to Fleet Command for the GO Liberty, GO Pursuit, and Westerly geophysical surveys
7/9/2021	State	BUAR	Email	Submittal of application for modification to BUAR Special Use Permit adding Brayton Point ECC marine surveys to Falmouth SUP (submitted by Goodwin on behalf of Mayflower)
7/12/2021	Federal	NOAA	Email	Submittal of Summer 2021 Benthic Survey Plan
7/13/2021	State	MHC	Letter	Received MHC's response to Mayflower's PNF modification
7/21/2021	Federal	USCG	Virtual meeting	Provided project update to the USCG
7/21/2021	State	MassDEP	Virtual meeting	Provided project update to the Mass Ocean Team
7/21/2021	State	MA Ocean Team (MassDEP, MA CZM, DMF, MA BUAR)	Virtual meeting	Provided Project update
7/26/2021	State	MHC	Letter	Filed Draft Terrestrial Phase 1A Report
7/28/2021	Federal	BOEM	Email	Reported a crew change on the GO Pursuit and provided PSO information (approved 7/28/2021)
7/28/2021	Federal	US Navy	Virtual meeting	Project update meeting with the Naval Seafloor Cable Protection Office
8/4/2021	Federal	US Navy	Email	Confirmation that the Navy will not have siting conflicts with the proposed Brayton Point export cable corridor
8/5/2021	Local	Town of Falmouth	Virtual call	Discuss first draft of HCA. Town stated preference for Shore Street landfall. No written comments provided.
8/6/2021	Federal	BOEM, FPISC, BSEE, EPA, US Navy, NPS, USFWS, USACE, NOAA, USCG	Virtual meeting	Mayflower Wind EIS Interagency Meeting (CPP Workshop)
8/11/2021	Federal	BOEM	Virtual meeting	Discussed BOEM comments on the VIA

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
8/11/2021	State	MHC	Letter	MHC response/comments on Phase 1A Report
8/12/2021	Tribal	Mashpee Wampanoag, Pocasset Wampanoag of MA and RI, Narragansett Tribe, Mashantucket Pequot Tribal Nation, Mohegan Tribe of Connecticut, Delaware Indian Tribe, Shinnecock Indian Tribe	Virtual meeting	Provided a Project survey update to the Tribes
8/16/2021	Federal	BOEM	Virtual meeting	Discussed BOEM comments on the VIA (continued from 8/11/2021)
8/16/2021	State	MHC	Letter	Received comments from MHC on Phase 1A report
8/19/2021	State	BUAR	Virtual meeting	Meeting with BUAR director
8/25/2021	State	MA CZM	Virtual meeting	Project update and discussion of MEPA topics
8/26/2021	State	MA BUAR	Email	Filed Falmouth BUAR Special Use Permit Annual Report and Renewal Application
8/30/2021	Federal	BOEM	Email	Submitted a revised COP that includes responses to BOEM comments, Falmouth PDE changes, and the Brayton Point addition
8/31/2021	State	MEPA/EEA EJ	Virtual meeting	Pre-filing Project Update with MEPA and Massachusetts Executive Office of Energy and Environmental Affairs (EEA) EJ Directors; discuss new EJ requirements
9/1/2021	State	MassWildlife/NHESP	Virtual meeting	Prefiling Project update; discuss 2021 15th edition Atlas
9/2/2021	State	MassWildlife/NHESP	Email	Mayflower request for updated Massachusetts Endangered Species Act (MESA) project information under 2021 Atlas
9/9/2021	State	MEPA	Call	Consultation about project points of interconnection
9/9/2021	Federal	BOEM	Email	Submitted Appendix E to the Mayflower Wind 2021 G&G Survey Plan
9/10/2021	Local	Town of Falmouth	Email	Provided second draft version of HCA for Town review and comment
9/17/2021	State	MA CZM	Virtual meeting	Project consultation regarding fisheries-related topics; follow-up to the 8/25/2021 CZM meeting

Date	Type of Stakeholder	Agency/Stakeholder	Type of Correspondence	Topics Discussed
9/22/2021	Federal	BOEM	Email	Submitted updated Appendix E to the Mayflower Wind 2021 G&G Survey Plan
9/22/2021	State	EEA EJ Office	Email	Illustrative community organizations
9/23/2021	Federal	BOEM	Email	Submitted project shapefile package to BOEM for ICF's use
9/28/2021	State	MHC	Mail	Filed Revised Terrestrial Phase 1A Report addressing MHC comments and project changes/updates
9/30/2021	State	EFSB/DPU	Virtual meeting	Pre-filing Project update
9/30/2021	State	MA BUAR	Virtual meeting	MA BUAR approved renewal of Falmouth Special Use Permit for one year
10/8/2021	State	NHESP	Letter	NHESP issued updated state-listed rare species information under 15th Edition Atlas (2021)
10/15/2021	Local	Town of Falmouth	Virtual meeting	Project update and HCA discussion with the Town Manager and Assistant Town Manager
10/19/2021	State	MHC	Mail	Filed Terrestrial Phase 1B archaeological permit application with MHC
10/22/2021	Local	Town of Falmouth	Email	Mayflower Wind additional explanation of why Shore St. is infeasible as a landfall location
10/26/2021	Local	Town of Falmouth	Email	October 26, 2021 (HCA, siting): Additional technical materials sent. No written comments provided. Requested for next meeting
10/29/2021	Federal	EPA	Virtual meeting	Project update meeting
11/01/2021	Federal	BOEM	Notification	BOEM issued Notice of Intent to conduct an Environmental Impact Statement on the Mayflower Wind Project

1.9 Project Team

Mayflower Wind has assembled a capable and highly experienced team of project developers, planners, engineers, environmental scientists, attorneys, and outreach specialists for the Project. The team's principal organizations are described below.

1.9.1 Mayflower Wind

Mayflower Wind is a limited liability company organized under the laws of the State of Delaware on June 7, 2018, upon filing its Certificate of Formation. Mayflower Wind is a 50:50 joint-venture between Shell New Energies US LLC (Shell New Energies) and Ocean Winds North America LLC (OW). The Parent Companies and all their affiliates combined are responsible for the construction and development of 17 offshore wind projects totaling over 11,000 MW, they also own and/or operate more than 21,700 MW of onshore wind energy projects. This combined experience brings a depth of real-world experience in designing, permitting, financing, constructing, and operating wind projects.

Mayflower Wind's Massachusetts based team includes scientists, engineers, and managers with domestic offshore wind energy expertise and a strong knowledge of the local grid, infrastructure and coastline, and the ocean waters off Cape Cod and the Islands.

Mayflower Wind holds the lease for the approximately 127,388-ac (51,552 ha) (Lease Area OCS-A 0521 and is focused on developing and building a state-of-the-industry offshore wind energy facility. The privately financed Project will provide "zero carbon" electrical power to the New England electrical grid, and the Project will advance Massachusetts' leadership efforts towards making the Commonwealth an important hub of the growing Atlantic Coast wind energy industry for the region.

1.9.1.1 Shell New Energies

Shell has set itself an ambition to become a net-zero emissions energy business by 2050 or sooner. As part of the measures to fulfil this ambition, Shell is building an interconnected lower-carbon power business: from generating electricity, to buying and selling it, storing it and supplying directly to customers to power homes, businesses, and vehicles. Wind is critical to Shell's ambition to grow its lower-carbon power business. It enables Shell to generate renewable electricity in different parts of the world at scale. The total installed capacity of Shell's wind portfolio and pipeline today is more than 5 gigawatts (GW). The Shell share of total installed capacity of both onshore and offshore wind is 290 MW with 2,196 MW in development.

1.9.1.2 Ocean Winds

On January 23, 2020, EDP Renewables (EDPR) and ENGIE SA (ENGIE) formed a strategic 50-50 Joint Venture in offshore wind named OW Offshore, S.L. (Ocean Winds). EDP Renovaveis, S.A. (EDPR) is a Spanish sociedad anónima, whose majority shareholder, EDP-Energias de Portugal, Sociedade Anónima, Sucursal em España (EDP-Spanish Branch), is the Spanish branch of EDP-Energias de Portugal, S.A. (EDP). ENGIE SA is a French sociedad anónima whose main shareholders include the State of France, Blackrock, Caisse des Dépôts et Consignations, and CNP Assurances.

Ocean Winds is a global player, bringing together the expertise and development capacity of both EDPR and ENGIE. OW Offshore S.L. created the entity OW North America LLC as a holding company for all projects and investments operating the United States. Ocean Winds replaced EDP Renewables N.A. in the chain of ownership of Mayflower Wind. OW has a strategic advantage and is well positioned to play a leading role in the offshore market. EDPR and ENGIE are combining their offshore wind assets and project pipeline under OW, beginning with 1.5 GW under construction and 4.0 GW under development, with the target of reaching 5-7 GW of projects in operation or construction and 5-10 GW under advanced development by 2025. OW's primary target markets are in Europe, the United States and selected Asian countries, from where most of the growth is expected to come.

1.9.2 AECOM (Lead Environmental Consultant)

AECOM is an approximately 87,000-person engineering and environmental consulting firm based internationally, including offices in and around the greater Boston area. For the Mayflower Wind Project, AECOM's role is lead environmental consultant for the necessary federal, state, regional, and local permitting, as well as performing studies that include, but are not limited to biological resources, physical resources, cultural resources, and visual resources. AECOM is responsible for evaluation of environmental impacts and provided environmental support for the routing analysis. AECOM's work for the Mayflower Wind project is managed out of its Pocasset, MA office.

1.9.3 Day Pitney, LLP, Counsel

Day Pitney LLP is a full-service law firm with offices in multiple cities, including Washington D.C., New York City, Miami, and Boston. Among its services most relevant to the Project, Day Pitney has a national energy practice, including ISO-NE, transmission, interconnection and market rules expertise, and a Massachusetts regulatory, environmental, property and permitting practice, including before state and local authorities and agencies. The firm is providing counsel on all of these matters to Mayflower Wind with respect to the Project and will represent Mayflower Wind before the Siting Board.

1.9.4 Engineering Design Support

1.9.4.1 Burns & McDonnell

Burns & McDonnell is a leading engineering and construction firm in the power industry, consistently ranked among the top firms in Transmission and Distribution by Engineering News-Record. They are heavily involved in offshore wind market in the U.S., having been involved in the electric system studies, preliminary design, and permitting process for multiple proposed offshore wind projects along the east coast. The company has been involved in over $10B in substation and transmission line projects in the northeast US alone over the past 15 years. Burns & McDonnell supported Mayflower Wind's previously awarded 804 MW project starting in January 2020, performing conceptual and preliminary engineering services for the onshore transmission cables and onshore substation aspects of the project as well as providing technical support of the federal and state permitting processes. Burns & McDonnell has also provided analysis, technical support, and cost estimating of multiple high-voltage transmission options for interconnection (AC and DC).

1.9.4.2 Power Engineers

POWER Engineers, Inc. (POWER) is providing technical support for the Project. POWER is a global consulting firm specializing in the delivery of integrated solutions for its clients in power delivery, generation, renewables, storage, and campus energy, among others. POWER offers complete multidisciplinary engineering, environmental and program management services. Founded in 1976 by professional engineers with experience in high and medium voltage electric utility systems, it is a100% employee-owned company with more than 2,800 employees and 45 offices throughout the United States and abroad. Its professional services business has revenues of $500 million to $1 billion U.S. dollars. POWER is largest power delivery detail designer in the U.S. The leading industry magazine Engineering News-Record has ranked POWER #3 in Power in its 2020 rankings.

1.9.4.3 Tetra Tech

Tetra Tech is a U.S.-based consulting, engineering, program management, construction management, and technical services firm with extensive experience in terrestrial and marine renewable energy projects. As an industry leader in wind energy consulting, Tetra Tech has conducted work on more than 500 wind projects across North America, totaling 25,000 MW of wind generation in operation or under construction. Tetra Tech has acted as the Principal Consultant on the development of more than 50 offshore facilities, including deepwater ports, oil and gas platforms, subsea pipelines, subsea transmission cables, and renewable energy projects: including wind, wave, and hydrokinetic projects.

In support of these projects, Tetra Tech has conducted detailed impact assessments for various resources, including aquatic and terrestrial wildlife, wetlands/water bodies, threatened and endangered species, archaeological/historic resources, scenic resources, and land use. Tetra Tech has also led the design and execution of complex offshore marine studies (e.g., geophysical, geotechnical, marine cultural, offshore avian and bat, and marine species and habitat evaluations) and completed hundreds of NEPA compliant environmental impact assessment reports.

1.9.5 Other Local and Regional Support

Mayflower Wind has and continues to use local resources where possible. Local firm, CR Environmental, completed eelgrass surveys for the Project, and AECOM's benthic laboratory located in Pocasset, MA has provided benthic sample analysis.

1.10 Conclusion

By interconnecting up to 1,200 MW of low-cost clean energy, the Project advances the strong climate, clean renewable energy, and offshore wind policies of the Commonwealth and provides multiple economic and reliability benefits to the Commonwealth and its residents. The Project was chosen through the legislature-approved procurement process because it will contribute to the energy needs of the Commonwealth and provides substantial benefits. The Petitioner seeks authority to construct the Project, and for the reasons described in greater detail in the subsequent sections of this Analysis, the Project conforms to the Siting Board's standards under G.L. c.164, § 69J on need, alternatives, routing, minimization of environmental impacts and costs, and consistency with the Commonwealth's policies.

2. Project Need

The purpose of the Project is to deliver up to 1,200 MW of clean, renewable wind energy from Mayflower Wind Energy LLC (Mayflower Wind)'s offshore Clean Energy Resource to Massachusetts and the New England regional electric grid. Mayflower Wind is developing the Project in accordance with the need for clean energy and offshore wind established under the Commonwealth's public policies as reflected in legislation and executive orders, as further described in Sections 1 and 6 of this Analysis. The Project is needed to enable delivery of energy from the Clean Energy Resource to Massachusetts and the New England region, and the Clean Energy Resource will be available to contribute to the regional energy supply.

As described in Section 1, the Project is comprised of new Massachusetts-jurisdictional offshore and onshore transmission lines and certain ancillary structures, including onshore duct bank/cable vaults and a 345 kV substation, necessary to deliver energy generated by the Clean Energy Resource to Massachusetts and the regional power grid. Further details of the Project are described in Section 1 of this Analysis.

The need for the Project is supported by the laws and policies of the Commonwealth and demonstrated by the indicators of Mayflower Wind's development progress and commitments described further below.

2.1 Supporting Massachusetts Legislation and Policies

Massachusetts legislation and policies drive the need for the Project.

As discussed in the sections that follow, the Commonwealth's laws and policies drive the need for the Project. The Commonwealth has expressed through legislation and executive policies strong public policy directives to reduce greenhouse gas (GHG) emissions, develop clean renewable energy, and make offshore wind a major component of the energy resource mix supplying electricity to consumers in Massachusetts. In making its decisions about this Project and other transmission infrastructure designed to deliver the clean renewable energy from offshore wind projects to Massachusetts and the regional grid, the Siting Board should consider the public policies cited below supporting the need for the Project. These public policies are described in further detail in Section 6 of this Analysis.

2.1.1 Climate Change Legislation and Policies

- Global Warming Solutions Act: The Massachusetts Global Warming Solutions Act (GWSA), enacted in 2008, established aggressive GHG emission reduction targets mandating that the Commonwealth reduce its GHG emissions by 10 to 25% from 1990 levels by 2020 and by at least 80% from 1990 levels by 2050 (c. 298 of the Acts of 2008). Among other provisions, the GWSA obligates administrative agencies such as the Siting Board to consider reasonably foreseeable climate change impacts (e.g., additional GHG emissions) and related effects (e.g., sea level rise) in evaluating and issuing permits.
- An Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy: (c. 8 of the Acts of 2021 (2021 Climate Act)).[11] The 2021 Climate Act further commits and moves Massachusetts forward to a clean energy future. It builds on the GWSA and sets an ultimate emissions goal of "at least net zero statewide greenhouse gas emissions" by 2050. The 2021 Climate Act directs the Secretary of the Executive Office of Environmental Affairs (EEA), in consultation with the Massachusetts Department of Energy Resources (DOER), to set greenhouse gas emissions limits

[11] The 2021 Climate Act appears at: https://malegislature.gov/Laws/SessionLaws/Acts/2021/Chapter8.

for 2025, 2030, 2035, 2040, 2045 and 2050. The Act also increases the offshore wind procurement authorization under Section 83C to 4,000 MW, to be procured no later than June 30, 2027.[12]

The Project is both consistent with, and directly advances, the Commonwealth's policies for developing offshore wind energy resources. The Project satisfies the legislative directives of the 2021 Climate Act by providing for the delivery of up to 1,200 MW of offshore wind energy into the Commonwealth that can serve commitments under existing Mayflower Wind Section 83C II Power Purchase Agreements (PPAs) and future procurements.

- "Net Zero Policy": On January 21, 2020, Governor Baker, in his State of the Commonwealth address, announced a goal of net-zero GHG emissions by 2050. On February 26, 2020, the EEA released a Draft Letter of Determination with proposed language to set a 2050 GHG limit designed to achieve net-zero GHG emissions. Extensive comments were received from interested stakeholders on the draft.[13] On Earth Day, April 22, 2020, EEA Secretary Theoharides signed the Letter of Determination, setting the 2050 emissions limit as follows: "A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 85 percent below the 1990 level."[14]
- 2050 Roadmap: Offshore wind is poised to play a major role in Massachusetts' efforts to address climate change and protect the Massachusetts economy. On December 30, 2020, the EEA released its 2050 Decarbonization Roadmap that laid out pathways towards the Commonwealth's target of Net Zero greenhouse gas emissions by 2050 (2050 Roadmap).[15] Secretary Theoharides stated in this 2050 Roadmap:

  To achieve this [net-zero] target in a cost-effective and equitable manner, the Baker-Polito Administration launched a comprehensive process to chart pathways and strategies to meet this ambitious commitment. The resulting process, culminating in the 2050 Decarbonization Roadmap, included significant stakeholder engagement, science-based analysis, and a focus on reducing costs for residents and businesses while maintaining a healthy, thriving economy.

  Addressing climate change will also protect the Massachusetts economy, as analysis from the U.S. Environmental Protection Agency in 2015 found that reducing emissions will save the Northeast region at least $3 billion per year by 2050 and $42 billion per year by 2090. The 2050 Decarbonization Roadmap also makes clear that achieving Net Zero emissions will lead to the creation of thousands of local jobs while dramatically improving air quality and public health.[16]

  The 2050 Roadmap emphasizes that the "deployment of renewable energy resources is the foundational step in developing a low-cost and largely decarbonized energy supply for Massachusetts."[17] The development of offshore wind not only provides an affordable, clean energy

[12] When submitting amendments on the bill before signing it into law, Governor Baker stated in a letter to the legislature, "significant amounts of offshore wind, as much as 15 GW, will be necessary to reach the Commonwealth's net zero limit. We recognize that more work is needed to ramp up offshore wind development in Massachusetts and to provide clean, affordable power to residents." Letter from Massachusetts Governor Charles D. Baker to the Senate and House of Representatives (Feb. 7, 2021), available at https://d279m997dpfwgl.cloudfront.net/wp/2021/02/S9-Time-Stamped-Amendment-Letter.pdf

[13] See EEA, Request for Comment (Feb. 2020), available at mass.gov/doc/draft-letter-of-determination-on-the-2050-emissions-limit-revised-342020/download.

[14] See EEA, Determination of Statewide Emissions Limit for 2050, at 1 (Apr. 2020), available at mass.gov/doc/final-signed-letter-of-determination-for-2050-emissions-limit/download.

[15] EEA, Massachusetts 2050 Decarbonization Roadmap, at 4 (Dec. 2020), available at https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

[16] Id.

[17] Id. at 65. EEA Secretary Katie Theoharides stated, "Offshore wind is an absolutely critical part of a low-cost strategy to achieve net-zero emissions. By 2050, we're looking at something on the order of 25 [gigawatts] of offshore permitted and operating off of our coasts. We look forward to efforts to work with the incoming administration to ensure the two projects -- the Vineyard Wind project and the Mayflower Wind project -- that we have in the pipeline get permitted and built expeditiously, and that we can work with the administration on the siting of new lease areas that balance environmental impacts with this great energy resource we have off our coasts." Baker Emissions Roadmap Envisions "Decade for Action" Theoharides: Economy Can Thrive Amidst Major Changes, State House News Service, Colin A. Young, 12/30/20; https://www.statehousenews.com/email/a/20202700?key=534135e.

resource for the Commonwealth, but also the region more broadly.[18] Offshore wind must be deployed at scale (at least 15-20 GW installed) in the Commonwealth over the next 30 years.[19]

- Interim Clean Energy and Climate Plan for 2030: In conjunction with the 2050 Roadmap, the EEA also released the Interim Clean Energy and Climate Plan for 2030.[20] This Interim Plan builds upon the 2050 Roadmap, finding that the most cost-effective and low-risk paths to net-zero emissions by 2050 include a "balanced clean energy portfolio anchored by significant offshore wind resources," as well as increased transmission abilities so clean power can be delivered to Massachusetts, and widespread electrification of transportation and building heating.[21] The Interim Plan anticipates that offshore wind will be the "primary source of electricity for a decarbonized energy system" in Massachusetts.[22] To get there over the next decade, Massachusetts needs to, among other things, start getting clean power from the offshore wind projects already in the pipeline.[23]
- DOER Clean Energy Regulation Updates: In 2020 and 2021, DOER promulgated or updated many of its regulatory programs aimed at incentivizing clean energy resources. In 2020, DOER promulgated the first-in-the-nation Clean Peak Energy Standard, a program designed to incentivize clean energy to supply power when demand is at its greatest.[24] DOER likewise expanded the existing Solar Massachusetts Renewable Target (SMART) program by an additional 1600 MW and updated its regulations to further spur the development of solar photovoltaic and battery energy storage facilities in the Commonwealth.[25] In 2021, DOER updated its Class I and Class II Renewable Portfolio Standard regulations to increase deployment of clean energy resources in the Commonwealth.[26]

2.1.2 Offshore Wind Procurement Legislation, Policies, and Solicitations

- Offshore Wind Procurement Legislation: In connection with its clean energy and climate change policies, in 2016, the Commonwealth enacted a legislative mandate, Section 83C of the Green Communities Act (c. 169 of the Acts of 2008), as amended by An Act to Promote Energy Diversity (c. 188 of the Acts of 2016) ("Energy Diversity Act") that distribution companies jointly and competitively solicit proposals for offshore wind energy generation for an initial aggregate nameplate capacity of 1,600 MW. In addition, in 2018, An Act to Advance Clean Energy (c. 227 of the Acts of 2018, § 21), authorized the DOER to solicit another 1,600 MW for a total of 3,200 MW of offshore wind procurement, pending a DOER study about the "necessity, benefits and costs" of doing so. The DOER's study showed that, among other findings, an additional procurement for 1,600 MW of offshore wind energy has "a likelihood of cost-effectiveness that justifies additional solicitations," and the DOER has now required the Massachusetts electric distribution companies (EDCs) to solicit an additional 1,600 MW of offshore wind energy.[27] The Energy Diversity Act and its Section 83C solicitations recognize the necessity of the Commonwealth achieving the goals established pursuant to the GWSA. The 2021 Climate Act increased the total offshore wind procurement target for the state to up to 4,000 MW.
- 2019 Offshore Wind Solicitation: In accordance with Section 83C II of the Massachusetts Energy Diversity Act of 2018, which amended the Green Communities Act ("Section 83C"), EDCs serving

[18] Id.

[19] Id. at 55.

[20] EEA, Interim Clean Energy Climate Plan for 2030 (Dec. 2020), available at https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download.

[21] *See* Mass. Executive Office of Energy and Environmental Affairs, Interim Clean Energy Climate Plan for 2030, at 5 (Dec. 2020), *available at* https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download.

[22] *Id.* at 36.

[23] *See id.* at 38, 42; *see also* Mass. Executive Office of Energy and Environmental Affairs, Massachusetts 2050 Decarbonization Roadmap, at 55, 57, 65 (Dec. 2020), *available at* https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

[24] *See* 225 Code of Massachusetts Regulations (CMR) 21.00.

[25] *See* 225 CMR 20.00.

[26] *See* 225 CMR 14.00; 225 CMR 15.00.

[27] See Mass. DOER, Offshore Wind Study, at 5-6 (May 2019), available at https://www.mass.gov/doc/offshore-wind-study

Massachusetts customers issued in 2019 an Offshore Wind Energy Generation request for proposals ("Section 83C II RFP"). Mayflower Wind submitted a bid in response to the Section 83C II RFP and was selected as the winning bidder in October 2019. Mayflower Wind executed PPAs with the EDCs in December 2019 and the EDCs submitted those PPAs for approval with the Department of Public Utilities (DPU) in January 2020. By order dated November 5, 2020, the DPU approved the PPAs.

- 2021 Offshore Wind Solicitation: The EDCs issued a third offshore wind solicitation (Section 83C III) on May 7, 2021 (Section 83C III RFP). The EDCs did so in accordance with the authority granted to the DOER under the 2018 Act to require the EDCs to jointly and competitively conduct additional offshore wind generation solicitations and procurements, subject to the required solicitation and procurement process of said Section 83C, to ensure that the EDCs enter into cost-effective contracts for Offshore Wind Energy Generation equal to an additional approximately 1,600 MW of aggregate nameplate capacity not later than December 31, 2035. On September 16, 2021, Mayflower Wind submitted a confidential bid in response to the 2021 Offshore Wind RFP and followed with submission of a public bid on September 23, 2021. Mayflower Wind expects to participate in other future offshore wind solicitations, which will provide further impetus for Mayflower Wind's development of its Clean Energy Resource.

2.2 Need for the Mayflower Wind Project

For the reasons explained below, Mayflower Wind has demonstrated that there is a need for the Project to interconnect its Clean Energy Resource and enable delivery of its clean energy to Massachusetts and the regional transmission grid.

The Siting Board's review of proposed transmission facilities is conducted pursuant to General Law (G.L.) c. 164, § 69J. In reviewing petitions for such facilities, the Siting Board is charged with the responsibility for implementing energy policies to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out this statutory mandate with respect to proposals to construct electric transmission facilities in the Commonwealth, the Siting Board is required to evaluate, among other things, whether there is a need for additional transmission resources. (G.L. c. 164, §§ 69H, 69J).

The Siting Board requires an applicant seeking to construct a transmission line to interconnect a new or expanded generating facility to show: (1) that the existing transmission system is inadequate to interconnect the new or expanded generator; and (2) that the new or expanded generator is likely to be available to contribute to the regional energy supply.[28]

To show that the new or expanded generator is "likely to be available" the Siting Board has developed standards that vary according to the status of the generator:

If the new or expanded generator exists, or is under construction, the availability showing will be deemed to have been made. If the generator is planned, and is subject to the Siting Board's jurisdiction, that showing may be made by obtaining the Siting Board's approval of the generating facility. *If the generator is planned, and not subject to the Siting Board's jurisdiction, the showing may be made on a case-by-case basis based on indicators of project progress (e.g., progress in permitting or in obtaining project financing*). (Emphasis added.)[29]

[28] *Cape Wind Associates, LLC, and Commonwealth Electric Company d/b/a NSTAR Electric*, EFSB 02-2, at 16-17 (2005) (Cape Wind 2005 Decision"); *Vineyard Wind LLC*, EFSB 17-05/D.P.U. 18-18/18-19, at 11 (2019) ("Vineyard Wind 1").

[29] Cape Wind 2005 Decision at 16-17; Vineyard Wind 1 at 12.

2.2.1 Adequacy of Existing Transmission System

The Existing Transmission System is Inadequate to Interconnect the Clean Energy Resource.

Mayflower Wind's Clean Energy Resource is approximately 47 mi (72 km) offshore from the Cape Cod mainland, approximately 30 mi (49 km) south of Martha's Vineyard and 23 mi (37 km) south of Nantucket. There is no existing electric infrastructure serving this area, and no transmission to which the Clean Energy Resource can interconnect without new transmission being built. Therefore, the existing transmission system is inadequate to interconnect Mayflower Wind's Clean Energy Resource and new transmission is needed to interconnect it to the electrical grid.

In developing this new transmission through the Project, and as described in Sections 4 and 5 of this Analysis, Mayflower Wind has engaged in an extensive analysis of offshore and onshore routing alternatives to avoid and/or mitigate for impacts while enabling delivery of up to 1,200 MW to the point of interconnection (POI) in the Town of Falmouth.

2.2.2 Regional Energy Supply Contribution

The Mayflower Wind Clean Energy Resource will be available to contribute to the regional energy supply.

The Mayflower Wind Clean Energy Resource[30] is planned and is not subject to the Siting Board's jurisdiction because of its location in federal waters. Consequently, consistent with Siting Board precedent, Mayflower Wind may demonstrate that the Clean Energy Resource is likely to be available based on indicators of progress. As listed below, the indicators of progress clearly demonstrate that the Clean Energy Resource is likely to be available and that there is a need for the Project.

In addition to the specific indicators of progress, strong public policy supports the successful development of the Clean Energy Resource, making it likely to be fully developed. Such policies are noted in Section 2.1 above and are described in further detail in Section 6 of this Analysis.

Along with these policies supporting the development of Mayflower Wind's Clean Energy Resource, there are multiple project-specific indicators that demonstrate that the Mayflower Wind Clean Energy Resource is likely to be available to contribute to the regional energy supply. These indicators include the following:

- On December 13-14, 2018, the Bureau of Ocean Energy Management (BOEM) held a competitive lease sale for Wind Energy Areas offshore Massachusetts. Mayflower Wind Energy, LLC was identified as the winner of Lease Area Outer Continental Shelf (OCS)-A 0521 (127,388 ac [51,552 ha]), which is located 26 nautical miles (nm) (48 km) south of Martha's Vineyard and 20 nm (37 km) south of Nantucket and was awarded a lease. The lease area has the potential to generate up to approximately 2,400 MW of low-cost clean energy, or enough to power nearly 800,000 homes. The commercial wind energy lease OCS-A 0521 issued by BOEM on March 26, 2019, took effect on April 1, 2019.
- On December 18, 2018 and September 3, 2019, Mayflower Wind submitted three interconnection requests to Independent System Operator New England Inc. (ISO-NE), applying for interconnection service from ISO-NE and the interconnecting transmission owner. The interconnection requests include: Queue Position 829, for 1000 MW interconnecting at a proposed new 345-kV substation at Bourne, connecting to the existing NSTAR Electric Company d/b/a Eversource Energy (Eversource) 345-kV lines 322 and 342; Queue Position 830, for 860 MW interconnecting at the West Barnstable 345-kV line; and Queue Position 922, for a 200-MW increase to Queue Position 829. Related to each of these interconnection requests, Mayflower Wind has made financial deposits/payments of over $1.5 million and committed significant time and resources to facilitating the associated studies. ISO-NE has completed Feasibility Studies for Queue Positions 829, 830, and 922.

[30] Offshore Lease Area and export cables within federal waters

- In October 2019, Mayflower Wind was selected as the winning bidder in the Section 83C II solicitation.
- In December 2019, Mayflower Wind successfully completed negotiations of and entered into long-term PPAs between the EDCs and Mayflower Wind for 804 MW from the Clean Energy Resource.
- On November 5, 2020, the DPU approved the PPAs, [31] and in so doing it stated that the EDCs "have adequately demonstrated Project viability in a commercially reasonable timeframe."[32]
- On September 16, 2021, Mayflower Wind submitted an additional bid in response to the Section 83C III RFP to sell additional capacity from its Clean Energy Resource, which could commit up to an additional 1,200 MW from the Clean Energy Resource under long-term PPAs by means of another POI at Brayton Point in Somerset, Massachusetts, thereby potentially providing additional revenue assurance for and financial obligations on Mayflower Wind for the development of the Clean Energy Resource. This offshore wind energy solicitation, and others that are likely to follow, provide further strong impetus for Mayflower Wind's development of its Clean Energy Resource.
- On February 15, 2021, Mayflower Wind filed its Construction and Operations Plan (COP) with BOEM, the lead federal permitting agency and the agency responsible for completing the National Environmental Policy Act (NEPA) process. On August 30, and October 22, 2021, Mayflower Wind filed revisions and updates to its COP, adding a second POI at Brayton Point, and responding to BOEM environmental and engineering comments. On November 1, 2021, BOEM published a Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for the review of the Mayflower Wind COP.[33] The COP, if approved, would allow for the development of approximately 2,400 MW in the Mayflower Wind lease area, depending on technology.
- Concurrently with the filing of Mayflower Wind's Section 69J petition, Mayflower Wind submitted its Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA) Office, officially commencing MEPA review of the Project.
- On August 30, 2021, Mayflower Wind submitted a $13.96 million deposit for the interconnection of 1,000 MW, thereby financially committing to the interconnection cluster for Cape Cod under the Tariff rules of ISO-NE for interconnection clusters for its QP 829. Since the Cluster Study was oversubscribed, Mayflower lowered the interconnection to 400 MW in order to participate in the next phase of the cluster study. ISO-NE has since returned $8.4 million of the deposit to reflect the change from 1,000 MW to 400 MW.
- Mayflower Wind has executed a purchase option with Cape Cod Aggregates Corporation for a 33-ac (13-ha) parcel of land off Thomas B. Landers Road in Falmouth, Massachusetts, suitable for development of a 1,200-MW substation. Mayflower Wind is in discussions with the property owner of an additional parcel of land off Gifford Street in Falmouth, which would serve as the preferred substation site. Mayflower is advancing these negotiations to obtain an option to purchase this site.
- Mayflower Wind has engaged with Town of Falmouth leadership and is in the process of negotiating a Host Community Agreement with the Town.
- Mayflower Wind has executed a lease option with the Massachusetts Clean Energy Center (MassCEC) for the use of the New Bedford Marine Commerce Terminal as a staging and deployment base during construction. Mayflower Wind has committed to locate its operations and maintenance (O&M) port in Massachusetts with at least 75% of O&M jobs hired locally.

[31] On February 10, 2020, NSTAR Electric Company d/b/a Eversource Energy ("Eversource"), Massachusetts Electric Company and Nantucket Electric Company, each d/b/a National Grid ("National Grid"), and Fitchburg Gas and Electric Light Company d/b/a Unitil ("Unitil") (collectively, "Companies") each filed a petition with the Department of Public Utilities ("Department"), pursuant to the Green Communities Act, St. 2008, c. 169, § 83C ("Section 83C")1 and 220 CMR 23.00, for approval of two long-term contracts to purchase offshore wind energy generation and associated renewable energy certificates ("RECs"). The Department docketed the Eversource petition as D.P.U. 20-16, the National Grid petition as D.P.U. 20-17, and the Unitil petition as D.P.U. 20-18. The DPU issued an order on November 5, 2020 approving the contracts between Mayflower Wind and National Grid, Eversource and Unitil.

[32] Petition of NSTAR Electric Company et. al, for approval of long-term contracts for procurement of Offshore Wind Energy Generation, pursuant to Section 83C of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12, Mass. D.P.U 20-16, 20-17, 20-18 at 36 (Nov. 5, 2020), available at https://fileservice.eea.comacloud.net/FileService.Api/file/FileRoom/12850683.

[33] https://www.boem.gov/sites/default/files/documents/about-boem/regulations-guidance/86-FR-60270.pdf

- As part of Mayflower Wind's partnership with the MassCEC in the Section 83C II bid, Mayflower Wind has committed to invest $72.5 million over 25 years in programs administered by MassCEC that help make the Commonwealth a hub for offshore wind energy including $35 million towards ports and infrastructure, $10 million towards innovative technologies, $5 million towards workforce development, $5 million towards applied research, $10 million towards direct support for marine science, and $7.5 million towards operation and maintenance port upgrades. In addition, Mayflower Wind has committed $5 million to the Cape Light Compact Joint Powers Entity (JPE), the energy services organization operated by twenty-one towns on Cape Cod and Martha's Vineyard, towards strategic electrification to reduce electric bills for low-income customers.
- As a result of the extension of federal Offshore Wind Energy Investment Tax Credits in January 2021, Mayflower Wind announced that the cost of power in the Section 83C II PPAs will drop even further. This price reduction likely means that the customers of three Massachusetts electric utilities can expect to save over $25 million each year, resulting in a half a billion dollars in lower electric bills over the life of the 20-year contracts.
- Mayflower has conducted and continues to conduct extensive Geophysical, Geotechnical, and Benthic Surveys of the lease area and export cable route in both federal and state waters and onshore. These campaigns conducted in 2019, 2020, and 2021 are in support of state and federal permitting requirements and are intended to support design efforts and provide data in support of archeological clearance.

As stated above, Mayflower Wind received a NOI from BOEM on November 1, 2021, commencing the EIS scoping process for the Mayflower Wind COP. The BOEM Record of Decision (ROD) will provide further assurance that Mayflower Wind's Clean Energy Resource is likely to become available to contribute the regional energy supply. Mayflower Wind commits to submitting to the Siting Board, prior to commencing construction, a copy of the BOEM ROD approving the Mayflower Wind Clean Energy Resource. Prior to issuance of the ROD, Mayflower Wind will provide to the Siting Board the EIS as it becomes available.

Other significant indicators that progress has already been achieved, and will continue to be achieved during the review of this Petition demonstrating that Mayflower Wind's Clean Energy Resource is "likely to be available" to contribute to the regional energy supply include:

- BOEM vetted and pre-authorized offshore areas as suitable and desirable for offshore wind development and provided information demonstrating that the subject areas have characteristics that make them desirable for the development of offshore wind generation. Specifically, Lease Area OCS-A 0521, in which the offshore wind energy generation facility for Mayflower Wind will be built, was delineated through a robust review process involving significant public input over several years, a process intended to select an area that addressed concerns and was appropriate for offshore wind generation. That process culminated in the award of Lease Area OCS-A 0521 to Mayflower Wind.
- On May 26, 2020, BOEM approved the Project Site Assessment Plan (SAP)[34], and Mayflower Wind installed a meteorological-oceanographic buoy (metocean buoy) that has provided data used to inform the design and permitting strategy for Mayflower Wind. Mayflower has extended the campaign in order to collect a full two years of site data.
- There has been early and extensive outreach conducted by Mayflower Wind to stakeholders at the planning stages of Project development. For example, Mayflower Wind has met with numerous fishing groups and/or individuals, and the Commonwealth has participated in ongoing working groups for fisheries and habitat concerns. Mayflower Wind has met with the local Native American Tribes numerous times and conducted regular outreach to local municipalities, groups, and individuals on the South Coast and in the Cape and Island communities. Section 1 provides information about Mayflower Wind's ongoing outreach efforts.
- A third-party EIS contractor has been selected to support BOEM in reviewing the COP and producing the NEPA documents. BOEM issued a NOI to conduct an EIS for the Mayflower Wind Project on November 1, 2021. BOEM has indicated that they plan to issue a ROD within several months after

[34] BOEM. (2013). Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Massachusetts Revised Environmental Assessment. BOEM 2014-603. 674 pp. https://www.boem.gov/Revised-MA-EA-2014/.

the issuance of a Final EIS under NEPA. Additional permitting with the U.S. Environmental Protection Agency the U.S. Army Corps of Engineers, the U.S. Coast Guard, the National Marine Fisheries Service, and U.S. Fish and Wildlife Service will be initiated to facilitate approvals either prior to, or in the same time frame, as the state permitting is expected to be completed.

- As of the time of the filing of this Petition with the Energy Facilities Siting Board (EFSB), Mayflower Wind plans to participate in the ISO-NE Forward Capacity Market by bidding into and clearing in future Forward Capacity Auctions, thereby providing additional financial incentives and obligations for the development of the Clean Energy Resource.
- Mayflower Wind is a Covered Project under Title 41 of the Fixing America's Surface Transportation Act (FAST-41). FAST-41 maintains a permitting dashboard to keep regulators and stakeholders up to date on federal, state, and local permitting milestones and timelines associated with the Mayflower Wind Project. The Mayflower Wind permitting dashboard is located at: https://www.permits.performance.gov/permitting-project/mayflower-wind-energy-project.

2.3 Conclusion

Based on the reasons set forth above, Mayflower Wind has demonstrated and will be able to further demonstrate that the Project is needed to deliver energy from the Clean Energy Resource and that the Mayflower Wind Clean Energy Resource is likely to be available to contribute to the regional energy supply. Therefore, Mayflower Wind has met the standard for demonstration of need in accordance with G.L. c. 164 §§ 69H, 69J and Siting Board precedent.

3. Project Alternatives

The Project, which is the subject of this Petition, includes new Massachusetts-jurisdictional offshore and onshore transmission system necessary to deliver the clean, renewable energy generated by Mayflower Wind's Clean Energy Resource to Massachusetts and the regional power grid. Specifically, this includes the offshore and onshore transmission cables, a new substation to be constructed in Falmouth and certain other ancillary structures, as further described in Section 1.

In accordance with Massachusetts General Laws (G.L.) c.164 § 69J, this section describes the alternatives to the Project as well as the methods used to evaluate these alternatives. Section 69J specifies that the following information shall be provided, including "a description of the alternatives to the facility, such as other methods of transmitting or storing energy, other site locations, other sources of electrical power or gas, or a reduction of requirements through load management." This section will describe the alternatives to the construction of the Project that Mayflower Wind evaluated, including a "No-Build" option, and related alternatives and potential transmission system alternatives (e.g., different cable configurations and interconnection points). For the reasons explained below, a more traditional alternatives analysis that might look at other generation technologies is not applicable to this Project.

This Project is being proposed in response to specific legislative and regulatory mandates and executive policies for climate change response, clean energy and utility-scale offshore wind generation as described in Sections 2 and 6 of this Analysis. The purpose of the Project is to deliver up to 1,200 MW of clean, renewable wind energy from Mayflower Wind's Clean Energy Resource to Massachusetts and to the New England regional electric grid. This reliable resource will significantly increase the clean, renewable energy supply available to Massachusetts consumers, greatly reduce carbon emissions across the region, displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by reducing energy costs, attracting new investments, and creating job growth. The Project's extensive environmental and economic benefits are discussed in more detail in Section 1.5.

The Project will advance the strong public policies of the Commonwealth with respect to climate change, clean, renewable energy and offshore wind procurement, as embodied in legislation detailed in Sections 2 and 6 of this Analysis. The Project is being developed partly in response to specific legislation for the procurement of offshore wind energy under long-term contracts with the electric distribution companies.[35] Additionally, the Clean Energy Resource that the Project will develop is in a specific lease area obtained through the Bureau of Ocean Energy Management (BOEM) lease auction process. Accordingly, because of this statutory targeted need and impetus for the Project, and the specific location where the Clean Energy Resource must be sited, a more traditional Project alternative analysis that might look at other generation technologies and locations is not applicable.

New transmission facilities are needed to connect Mayflower Wind's Clean Energy Resource to the New England regional electric grid. As such, no-build and non-transmission alternatives would not address the identified need articulated in Massachusetts law and policy. Mayflower Wind does, however, examine some alternatives applicable to the Project. Alternative transmission routes, substation locations, and interconnection locations are discussed in Section 4 of this Analysis.

The following evaluation of alternatives demonstrates that the Project as proposed is the best alternative to meet the identified need, with a minimum impact on the environment, while providing a great degree of reliability at the lowest cost.

3.1 Project Alternatives

Mayflower Wind has evaluated the following alternatives for their relative effectiveness in meeting the purpose of the Project and the public policies and requirements of the Commonwealth. Specifically,

[35] Section 83C of the Green Communities Act (Chapter 169 of the Acts of 2008), as amended by Chapter 188 of the Acts of 2016, An Act to Promote Energy Diversity

Mayflower Wind evaluated "No-Build" and other non-transmission alternatives, and potential transmission system alternatives (e.g., different cable technology, configurations, and interconnection points).

3.1.1 No-Build and Other Non-Transmission Alternatives

Under the no-build alternative, no portion of the Project would be constructed. This alternative would fail to meet the public policy goals and legislative requirements of the Commonwealth and the purpose of the Project, including providing the Project's extensive environmental and economic benefits (see Section 1). Therefore, the no-build alternative was not considered further.

Given that the proposed Project is being developed to meet specific legislative requirements for offshore wind energy, other typical non-transmission alternatives such as energy efficiency, load management, large-scale demand response, solar, onshore wind, and combustion-based generation were also eliminated from consideration as they would not allow for the delivery of the electricity from the Clean Energy Resource to the existing regional transmission grid and would therefore not meet the public policy goals and requirements of the Commonwealth and the purpose of the Project.

3.1.2 Proposed Mayflower Wind Project

The Project's offshore transmission will include up to four submarine offshore export cable(s), including up to three high voltage alternating current (HVAC) power cables[36] and up to one dedicated communications cable, to be installed from one or more offshore substation platforms (OSP(s)) within the Lease Area in federal waters. These cables will run through federal and state waters to make landfall in Falmouth, Massachusetts using horizontal directional drilling (HDD) to bore underneath sensitive environmental resources such as beaches and nearshore eelgrass beds. After making landfall, power will be transmitted via up to three onshore export circuits[37] installed in buried duct banks. The duct banks will be installed within and beneath existing public roadways, shoulders, or municipal-owned land between the shore landing and a proposed substation, from which the Project will connect with the regional electrical grid at or in the vicinity of the Falmouth Tap substation.

As documented in Section 4 of this Analysis, Mayflower Wind has undertaken significant efforts to evaluate a wide range of alternatives to achieve the Project objectives. This includes the evaluation of alternate points of interconnection (POIs), offshore export cable routes, landfalls, substation locations, transmission technologies, transmission routes, and construction methods. Mayflower eliminated alternatives based on selection criteria including construction constraints, length of route, traffic congestion, land use, and environmental/social impacts. Mayflower Wind employed this process to assess more than ten grid interconnection locations, five offshore cable route options, twelve landfall locations (seven in Falmouth), fifteen potential substation locations, and transmission alternatives from landfall to substation and from substation to the POI. Certain alternatives were eliminated based on criteria including the need to minimize cost and environmental impacts, space availability, and technological incompatibility with the proposed Project's needs.

A more detailed Project description is provided in Section 1 and details regarding specific alternatives considered are described in Sections 4.3 through 4.6 and are summarized below.

3.1.2.1 Point of Interconnection Locations

As discussed in Section 4.3.2, Mayflower Wind considered several locations for interconnection, including onshore overhead routing to a purpose-built switching station in Bourne, Massachusetts. The recently completed Independent System Operator New England (ISO-NE) First Cape Cod Resource Integration Study (Cluster Study 1),[38] proposed relocating the Project's POI to a new 345-kV substation in the

[36] The nominal HVAC export cable voltage will fall between 200-345 kV, with a maximum rated cable voltage up to 362 kV.

[37] At the onshore landfall location, a transition joint bay (TJB) will be installed at the end of each submarine cable (up to four TJBs in total). Inside each TJB, one three-core submarine cable will be spliced to three single-core onshore cables. Each onshore underground circuit consists of three power cables (one per phase).

[38] First Cape Cod Resource Integration Study Final Report, dated July 30, 2021, ISO New England, Inc.

Falmouth Tap area, which is the proposed POI. This interconnection location greatly reduces the potential environmental impact of the Project.

3.1.2.2 Landfall Locations

After evaluating numerous potential landfall locations along the southern coast of Cape Cod, two locations were identified as superior to others and were retained as the proposed landfall sites for the Project. The selected landfall locations include the first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall) and Central Park near Crescent Avenue (Central Park Landfall) both of which are owned by the Town of Falmouth (see Figure 4-2). Potential landfall locations are evaluated further in Section 4.3.3.

3.1.2.3 Substation Locations

Out of sixteen onshore substation sites initially considered, fourteen were excluded from future planning. Some of the rejected substation sites were too small to house all necessary equipment or the preferred onshore substation configuration. Other sites were not chosen due to unnecessary environmental/social impacts that were apparent, such as required tree clearing, wetland and watershed resource disruption, or close proximity to residential neighborhoods. Two onshore substation locations were retained as the proposed substation sites for the Project and are described in further detail in Section 4.3.4.

3.1.2.4 Transmission Technologies

Mayflower Wind is considering two electric power transmission technologies for the proposed Project, HVAC and HVDC. These technologies are evaluated in terms of their practical aspects as well as reliability, cost, and/or potential environmental impact as described below. The choice between HVAC or HVDC technology for the export system is highly project specific.

For the reasons explained below, HVAC is the more appropriate technology for use in this instance, as it is better suited to the relatively short to moderate length of the export cable to shore.

Export Cable Technology Alternatives

Submarine HVAC and HVDC cables have been in use for decades. Both HVAC and HVDC cable capacities have increased over time. As evidenced by their wide use, submarine cables are considered reliable and are widely used for transmitting energy to remote loads, ensuring reliability across bodies of water, and delivering power to or from offshore locations.[39]

HVAC Transmission Technology

HVAC uses alternating current (AC) waveform for bulk transmission of power. An HVAC system for offshore wind transmission requires a transformation of voltage at the offshore end of the export cable circuits. The OSP(s) in the lease area step up the voltage from the wind turbine generator (WTG) array to a higher nominal export cable voltage, up to 345 kV, which is more suitable for long distance transmission. The 345-kV onshore substation in Falmouth, Massachusetts is likely to include similar voltage transformers to interface with the ISO-NE electrical grid.

For this transmission connector Project delivering power to Falmouth, Massachusetts, HVAC is the preferred transmission technology for the export system. HVAC is a proven, reliable technology, and other offshore wind projects in the Northeast have used or proposed this technology (i.e., Block Island, Vineyard Wind Connector 1, Vineyard Wind Connector 2, South Fork, Skipjack, and US Wind). This Siting Board has approved HVAC technology for the Vineyard Wind Connector 1 project. In addition, Mayflower Wind's successful bids into the second Massachusetts 83C solicitation were based on HVAC cable technology, and Orsted's successful bids into Rhode Island and New York also involve HVAC technology.

[39] *Offshore Wind Transmission Study Comparison of Options*, NJ Board of Public Utilities, pp. 71 - 73 (Dec. 29, 2020); https://www.nj.gov/bpu/pdf/publicnotice/Transmission%20Study%20Report%2029Dec2020%202nd%20FINAL.pdf

HVAC export cable systems have been the most common offshore transmission technology used in Europe and the United States to date. For projects that are built further offshore, however, there are benefits to using HVDC systems such as reduction in electrical losses. Offshore wind developer decisions regarding transmission technology involve balancing losses and costs, equipment delivery schedules, vendor pricing, and other commercial issues. For this Project, HVAC is a viable solution based on the distance (less than 75 mi [120 km]) between the OSP(s) and the onshore substation. At its closest point, the Lease Area is approximately 45 mi (72 km) from the mainland at Nobska Point in Falmouth. Use of the proven, reliable HVAC technology for the Project will facilitate timely and efficient project construction.

HVDC Transmission Technology

HVDC uses direct current waveform for the bulk transmission of power. The most common HVDC technology employed for offshore wind export systems is Voltage Source Converter (VSC) modular multilevel converter technology.

Under an HVDC transmission scenario, a nominal system operating voltage of up to ±525 kV could be utilized. The system would require up to four single-core power cables and up to one dedicated communications cable. The HVDC system would operate with one export cable at a voltage of up to +525 kV and the other at up to -525 kV, relative to ground voltage. Two additional cables could be employed to serve as a neutral return path operating at a low voltage, depending on system design configuration. The cables may be bundled or individually installed. Unlike HVAC technology, the voltage of each cable maintains constant polarity and the direction of the current is constant.

An HVDC system requires converters at each end of the HVDC transmission circuit. A converter station would be located on the OSP(s) within the Lease Area. The converter station collects the power from the WTGs and transforms it to a higher AC Voltage. The AC power is then converted to direct current (DC) and transmitted to shore. Onshore, the HVDC transmission is converted back to 345-kV HVAC for injection to the existing ISO-NE electrical grid. The onshore converter station would be in Falmouth, Massachusetts and would fit within the footprint of an AIS HVAC substation.

HVDC technology is considered an alternative to HVAC for the proposed Project. HVDC is being used for long-distance power transmission in overseas markets and has been proposed for some long-distance projects in the Northeast. HVDC is not a requirement based on the total transmission system distance (less than 75 mi) between the OSP(s) and the onshore substation.

Export Cable Transmission Voltage

The proposed Project will include up to four offshore submarine export cables, including up to three power cables and up to one dedicated communications cable, to connect the OSP(s) to the landfall site. For HVAC transmission of the proposed Project's power to shore, a nominal export cable voltage up to 345 kV has been identified as most suitable, with a maximum rated cable voltage up to 362 kV. Higher voltage HVAC cables were eliminated from consideration because there are few tested offshore cables of this type, and such cables are not expected to be commercially available in a reasonable timeframe. Under an HVDC transmission scenario, a nominal system operating voltage of up to ±525 kV could be utilized.

Higher voltages would not significantly change the size of the export cable or result in material reductions in the area of potential impact to the seafloor associated with installation. Voltages lower than the proposed 200- to 345-kV HVAC would require more cables to be placed along the seafloor, which would enlarge the impact area in the offshore environment and may increase the overall energy loss through transmission.

Cable Type

Cross-linked polyethylene (XLPE) insulation will be used for the Project's offshore and onshore cables. This cable type is considered state-of-the-art technology for offshore transmission worldwide. XLPE cables have proven to be more reliable with greater ease of handling than high-pressure fluid-filled (HPFF) and oil impregnated cables. XLPE also allows for standard and quicker jointing and termination.

3.1.2.5 Routing Options

Offshore Export Cable Routes

All alternative offshore export cable routes for the Falmouth Tap POI considered would run through Muskeget Channel into Nantucket Sound within Massachusetts state waters. Identifying export cable routes required to transmit energy from the OSP(s) to the landfall location requires careful planning and route optimization with considerations including offshore physical hazards, existing submarine cables, economic and recreational use areas, protected areas, and the interconnection points. Physical hazards may include shipwrecks, unexploded ordnance (UXO), other existing (and planned) cables, and sea floor and subsurface obstructions. Economic or recreational uses may include commercial or recreational fishing, recreational boating and tourism, and anchoring. Protected areas may include areas protected for biological, cultural, or historical purposes. As more fully described in Section 4.6, Mayflower Wind has identified a single offshore export cable corridor to the landfall location alternatives. The corridor selection is the product of detailed marine surveys, consultations with the Massachusetts Ocean Team, collaboration with other stakeholders, and input from federal resource agencies.

HDD will be used for the transition of the export cables from offshore to onshore, thus avoiding construction impacts to the beach, intertidal zone, and nearshore areas (See also details in Section 5.5.2). Open-cut trenching was evaluated as an alternative to HDD for transition from offshore to onshore. This process includes excavating the export cable's proposed sea-to-shore transition to the desired depth, placing the cable inside this newly created trench, and refilling the trench to the appropriate level. The open-cut trenching option was not selected because of the added, undue risk of potential impacts to nearshore resources including tidal zones, eelgrass zones, public beaches, and coastal dune areas. Details regarding the offshore export cable installation are provided in Section 5.5.1.

Onshore Export Cable Routes

The route between the landfall site and the new onshore substation will depend greatly on the landfall and substation locations chosen, as well as potential utility conflicts within certain roadways. A detailed discussion regarding the evaluation and selection of onshore export cable routes is provided in Sections 4.3.5 and 4.4.

Onshore export cables will be installed beneath previously disturbed public roadway layouts or other municipal-owned lands. The proposed configuration uses concrete-encased duct bank installed primarily via open-trench construction methods. Alternatively, cables may be installed by directly burying conduits in the road and omitting the concrete encasement where suitable. Multiple smaller trenches may be necessary depending on available space along the cable route. Additional description of the construction methods for onshore export cables is provided in Section 5.5.3.

Onshore Interconnection Routes

Alternatives considered for the transmission of electricity from the new Mayflower Wind Falmouth substation to the POI include a transmission line built within the existing off-road right of way (ROW) #341 (preferred) and an underground cable system (alternate) installed beneath public roadways or shoulders. The initial findings of the ongoing ISO New England Inc. Cape Cod Interconnection Cluster Study indicate that Mayflower Wind's Project will have a POI at the Falmouth Tap substation area. The Mayflower Wind Project will connect with the interconnecting transmission owner's facilities at the point of change of ownership (POCO) of those respective facilities, which is anticipated to be at the border of the Mayflower Wind substation site. Mayflower anticipates that the interconnecting transmission owner will construct the interconnection facilities from the POCO at the border of the Mayflower Wind substation to the POI at Falmouth Tap. Accordingly, impacts related to the construction of the interconnecting transmission line from the POCO at the Lawrence Lynch site to the Falmouth Tap POI are not included herein; but will be addressed in the appropriate siting proceeding by the interconnecting transmission owner. All onshore routes and variants are located within the Town of Falmouth.

The alternate underground cable system would be constructed within existing roadway layouts following Thomas B Landers Road, Geggatt Road, Hatchville Road, and Sam Turner Road from the Mayflower Wind Falmouth substation to the POI in the Falmouth Tap substation area. The underground cable

system would be designed, permitted and constructed by Mayflower Wind using the same methods as the onshore export cable system.

3.2 Conclusion

Mayflower Wind evaluated no-build and related alternatives relative to the identified purpose of the Project as well as other transmission alternatives. The no-build alternative and non-transmission alternative would not allow for the interconnection of the Clean Energy Resource to the existing electric grid and therefore it does not meet the Commonwealth's public policy goals and legislative mandates for utility-scale offshore wind generation as described in Sections 2 and 6 of this Analysis. In addition, the no-build alternative does not meet the purpose of the Project, including the Project's extensive environmental and economic benefits (see Section 1).

The analysis presented in this Section 3, together with the discussion of alternatives in Sections 4 and 5 demonstrate that the Project as proposed will best address the identified need with a minimum of environmental and construction impacts, with a great degree of reliability and at the lowest cost.

As a result of this analysis, proposed transmission infrastructure was advanced to the transmission routing analysis presented in Section 4. A more detailed comparison of the Preferred and Noticed Alternative routes and related avoidance or minimization of impacts is discussed in Section 5.

4. Route Selection

As discussed in Sections 2 and 3, Mayflower Wind proposes to address the identified need by constructing the Project to deliver up to 1,200 MW of energy from Mayflower Wind's offshore wind Clean Energy Resource in federal waters on the outer continental shelf. For purposes of this Petition, the "Project" includes all state-jurisdictional elements, including: the offshore export cables in state waters, the onshore facilities for the sea-to-shore transition, the onshore export cables, the onshore substation, and the transmission facilities to a point of change of ownership (POCO) that leads to a suitable point of interconnection (POI) for the Preferred Route or underground transmission in existing roadway layouts to the POI for the Noticed Alternative, together with any other ancillary structures which are an integral part of the operation of these transmission facilities.

Mayflower Wind developed the routing analysis with the objective of identifying a design capable of delivering up to 1,200 MW from the Clean Energy Resource to a suitable onshore landfall location and POCO/POI that was both feasible and cost-effective and more likely to mitigate for environmental impacts. The routing analysis identified the Preferred Route for the Project as the option that best balances minimization of environmental impacts including developed and natural environment impacts, constructability constraints, reliability, and cost. The route selection process was also highly dependent on the ISO New England Inc. (ISO-NE) cluster interconnection process for several interconnection queue positions seeking to interconnect on Cape Cod. Those queue positions included three from Mayflower Wind. As a result of that process, ISO-NE determined preliminarily that Mayflower Wind will have a POI for the Project in Falmouth at or near the existing NSTAR Electric d/b/a Eversource Energy (Eversource) substation at Falmouth Tap. This POI will be confirmed through the ISO-NE System Impact Studies for Cluster 1 later this year or early next year. Mayflower anticipates that the interconnecting transmission owner will construct the interconnection facilities from the POCO at the border of the Mayflower Wind substation to the POI at Falmouth Tap. Accordingly, impacts related to the construction of the interconnecting transmission line from the POCO at the Lawrence Lynch site to the Falmouth Tap POI are not included herein, but will be addressed in the appropriate siting proceeding by the interconnecting transmission owner.

As described in Section 4.5, based on the results of the routing analysis, Mayflower Wind selected Candidate Route 1 (described in Section 4.3.5.2), as the Preferred Route. The Preferred Route begins at the first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall) and travels underground to the proposed Mayflower Wind Substation at the Lawrence Lynch site. Candidate Route 2 was selected as the Noticed Alternative based on the results of the routing analysis (see Section 4.5), including route scoring. The Noticed Alternative Route, which is described in Section 4.3.5.2 in greater detail, begins at Central Park near Crescent Avenue (Central Park Landfall) and continues north following local roadways to the Mayflower Wind Substation at Cape Cod Aggregates site and ultimately the Falmouth Tap POI. Each point and segment where the candidate routes and variants intersect or link affords an opportunity for route options to switch between the Preferred Route and the Noticed Alternative. A final approved route could include a combination of segments of the Preferred Route, the Noticed Alternative Route and/or their variants. Mayflower Wind evaluated four route variants, described in section 4.3.5.2, to clearly compare options in which route segments are swapped.

This Section describes the process Mayflower Wind used to identify and evaluate candidate routes that lead to the selection of the Preferred Route for the Project, as well as a geographically distinct Noticed Alternative mentioned above. This Section also discusses Mayflower Wind's evaluation of various designs considered, resulting in the identification of the variants for the Project.

4.1 Overview of Route Selection Process

The following guiding principles were utilized while conducting the routing analysis:

- Comply with all applicable statutory requirements, regulations, and state and federal siting agency policies;

- Develop a reliable, operable, and cost-effective clean energy solution;
- Strive to use established linear corridors (e.g., utility right-of-way (ROW), roadway layouts) to the extent reasonable, practical, and feasible;
- Avoid/minimize the need to obtain additional properties or acquire property rights;
- Prefer direct routes over circuitous routes;
- Minimize Project costs through the avoidance of routes requiring complex/expensive engineering and construction;
- Avoid existing utility infrastructure that would make installation of the Project facilities infeasible;
- Consider and seek to mitigate for impacts to environmental justice populations; and
- Incorporate a balanced approach to avoid/mitigate for environmental and public impacts.
- The route selection process included the following steps:
- Identify potential suitable POIs with electric grid capacity;
- Use POI as determined by ISO-NE cluster interconnection process;
- Identify potential land parcels capable of substation development;
- Identify potential landfall locations capable of providing suitable area for horizontal directional drilling (HDD) installation and new transition vaults (also referred to as transition joint bays);
- Identify a geographic Study Area that incorporates the POI, proposed substation location, and proposed landfall location;
- Assess potential routing options within the identified geographic area that would connect landfall, substation, and a suitable POI;
- Evaluate each routing option for fatal flaws and only move forward with feasible options;
- Evaluate compiled scoring of each candidate route based on environmental impact, constructability, permitting, reliability, and cost criteria; and
- Conduct a comparative route analysis with scoring based on these considerations.

4.2 Project Study Area

Early in its Project development planning, Mayflower Wind began the route selection process by delineating a Study Area that encompassed possible routes for offshore and onshore export cables between the Clean Energy Resource (in Bureau of Ocean Energy Management [BOEM] Lease Area OCS-A 0521) and several potential POIs. Using the guiding principles above, Mayflower Wind considered all reasonable options within the geographic area and focused the evaluation on potential routes to southeastern Massachusetts.

Important features within the Study Area included:

- Locations of potential landfall sites and possible POIs to the electrical grid;
- Existing transmission infrastructure and its ability to accommodate up to 1,200 MW for the Project; and
- Locations of existing and planned submarine cables.

Mayflower Wind considered offshore routing options through Buzzards Bay, Nantucket Sound, Cape Cod Bay and Narragansett Bay, and encompassed landfall locations ranging from municipal beach parking lots to unimproved ways and other developed and undeveloped areas. As depicted on Figure 1-1, Mayflower Wind's Lease Area is located approximately 26 nm (37 km) south of Martha's Vineyard, 20 nm (37 km) south of Nantucket, and 39 nm (72 km) south from the mainland at Nobska Point in Falmouth, Massachusetts.

The potential onshore export cable routes encompassed several possible interconnections at substations located in southeastern Massachusetts. Mayflower Wind broadly considered several potential POIs and routes (Table 4-1). Interconnection at the various POIs could be accomplished by various offshore export cable routes, multiple landfall locations, onshore export cable routes, etc. The distances reported in Table 4-1 do not consider such specifics.

Table 4-1. Universe of Points of Interconnection Considered (all lengths approximate)

Route #	Interconnection Point	Export Cable Length (1) mi (km)		
		Offshore	Onshore	Total
1	Bourne Switching Station	56 (90)	18 (29)	74 (119)
2	West Barnstable Substation	54 (87)	5 (8)	59 (95)
3	Falmouth Tap Switching Station	56 (90)	7 (11)	63 (101)
4	Falmouth Bulk Station	54 (87)	5 (8)	59 (95)
5	Brayton Point (2)	102 (168)	<1 (<2)	<103 (<170)
6	Carver Station	75 (120)	50 (81)	125 (201)
7	Canal Station (via Cape Cod Canal)	75 (121)	<1 (<2)	<76 (<123)
8	Canal Station (onshore)	75 (121)	NA (3)	>75 (>121)
9	Kent County Substation (National Grid), RI	76 (123)	NA (3)	>76 (>123)
10	Pilgrim Station	90 (145)	NA (3)	>90 (>145)

Light gray shading identifies those POIs eliminated for this Project due to excess export cable route length based on the selection of HVAC technology.

(1) Onshore export cable distances extend from landfall to an onshore substation location. Transmission distances between substation and POI are not reported in this table.
(2) Not carried forward for this connector Project but remains a feasible option for a second connector project.
(3) Not evaluated due to length of offshore export cable meeting or exceeding maximum length.

4.3 Initial Route Concepts

Mayflower Wind evaluated initial route concepts to identify candidate routes that would be carried forward for further analysis including route scoring. A first step in the selection of viable routes was to assess the "universe" of routes identified in Section 4.2 and perform an initial screening to eliminate routes with excessive length or where potential interconnection points lacked sufficient capacity to accommodate the Project (see Sections 4.3.1). The remaining sections explain this process and identify routes carried forward to scoring as "candidate routes".

4.3.1 Route Concepts Eliminated for Excessive Length

Mayflower Wind evaluated and screened a wide range of routing options identified in Section 4.2 in several steps. For the reasons explained below, the first step in screening initial route concepts was to eliminate any option from the initial route concepts that significantly exceeded 71 mi (115 km) in total length.

As discussed in Section 3.1.2.4 (Export Cable Technology Alternatives), Mayflower Wind considered two electric power transmission technologies for the proposed Project, high voltage alternating current (HVAC) and high voltage direct current (HVDC). Marine HVAC and HVDC cables have been in use for decades. Both HVAC and HVDC cable capacities have increased over time. As evidenced by their wide use, marine cables are reliable and are widely used for transmitting energy to remote loads, ensuring reliability across bodies of water and delivering power to or from offshore locations. For this Project, HVAC is the preferred technology for the proposed landfall in Falmouth, MA and the transmission to several potentially suitable grid interconnection points.

Using current technology, Project engineers identified 75 mi (120 km) as an approximate maximum length for 200-kV to 345-kV (nominal voltage) HVAC export cables without the potential need for mid-point reactive compensation and special switching devices. Mayflower Wind believes this distance is an appropriate screening tool. However, the maximum practical distance can vary depending upon variables

that may influence the distance at which midpoint reactive compensation is required, such as the precise technology used (e.g., voltage level, cable design), cable loading, targeted capacity of the cable, and technical requirements set by the connecting grid. For example, increasing the distance of transmission lowers the capacity of the cable.

Under an HVDC transmission scenario, a nominal system operating voltage of up to ±525 kV could be utilized. The system would require up to four single-core power cables and up to one dedicated communications cable. The HVDC system would operate with one export cable at a voltage of up to +525 kV and the other at up to -525 kV, relative to ground voltage. Two additional cables could be employed to serve as a neutral return path operating at a low voltage, depending on system design configuration. The cables may be bundled or individually installed. Unlike HVAC technology, the voltage of each cable maintains constant polarity and the direction of the current is constant.

An HVDC system requires converters at each end of the HVDC transmission circuit. A converter station would be located on the offshore substation platform(s) (OSP(s)) within the Lease Area. The converter station collects the power from the WTGs and transforms it to a higher alternating current (AC) Voltage. The AC power is then converted to direct current (DC) and transmitted to shore. Onshore, the HVDC transmission is converted back to 345-kV HVAC for injection to the existing ISO-NE electrical grid. The onshore converter station would be in Falmouth, MA and would fit within the footprint of an air-insulated switchgear (AIS) HVAC substation.

HVDC technology is considered an alternative to HVAC for the proposed Project. HVDC is being used for long-distance power transmission in overseas markets and has been proposed for some long-distance projects in the Northeast. HVDC is not a requirement based on the total transmission system distance (less than 75 mi) between the OSP(s) and the onshore substation.

4.3.2 Potential POI

Mayflower Wind also assessed the viability of various POIs within feasible distance of the Clean Energy Resource based on the capacity and capability of the existing transmission infrastructure (See Table 4-1 and Figure 4-1). Results from an early assessment, described below and summarized in Table 4-2, indicated that, after consideration of cable length and the viability of interconnection points, the new Bourne 345-kV Switching Station was the most suitable POI for the Project at that time. In 2018 and 2019, Mayflower Wind's sponsor company submitted interconnection requests for two queue positions—one with a POI in Bourne and one with a POI in West Barnstable.[40] A third queue position request was made for a POI in Bourne to accommodate additional Project generation capacity.[41]

Table 4-2. Summary Comparison of potential POIs for Mayflower Wind

Criteria	Bourne	West Barnstable	Falmouth Tap	Falmouth Bulk
800 MW capacity	Yes	No	Yes (2)	Yes (2)
1,200 MW capacity	Yes	No	Yes (2)	Yes (2)
Cable route of acceptable length?	Yes	Yes	Yes	Yes
Retained for routing analysis?	No (1)	No	Yes	No (1)

(1) ISO-NE Cluster Study results moving POI to Falmouth Tap area
(2) Sufficient capacity with upgrades

On October 21, 2020, ISO-NE initiated the First Cape Cod Resource Integration Study (Cluster Study 1). The Cluster Study was triggered under the ISO-NE Tariff because there are multiple projects proposing to interconnect in the same electrical area of the transmission system and such projects cannot interconnect without the use of common significant new transmission infrastructure rated at or above 115 kV HVAC or HVDC. In the Cluster Study process, ISO-NE can relocate a Project's POI to facilitate the interconnection of the projects in the cluster and meet reliability requirements. ISO-NE determined that certain Mayflower

[40] QP 829 (Bourne) = 1000 MW (2018); QP 830 (West Barnstable) = 860 MW (2018)

[41] QP 922 (Bourne) = 200 MW (2019)

Wind interconnection queue positions on Cape Cod were eligible to enter the cluster, subject to availability of capacity in the cluster after higher queued positions enter. As a result, Mayflower will have 400 MW in this first cluster (Cluster 1). In Cluster 1, ISO-NE identified Falmouth as the likely POI for Mayflower Wind's first Cape Cod queue positions, which would move from Bourne. ISO-NE has initiated a second interconnection Cluster Study (Cluster 2) and Mayflower has additional queue positions, totaling 1,060 MW, eligible to enter Cluster 2. In the Cluster 2 System Impact Study phase, Mayflower expects the West Barnstable queue position to also move to Falmouth. Thus, ISO-NE's cluster interconnection process has determined the POI for the Project.

Section 4.3.2.1 identifies other POIs evaluated by Mayflower Wind prior to the initiation of Cluster Study 1 and the determination of the Project POI as noted above.

4.3.2.1 Potential POIs Assessed and Eliminated

POIs that Mayflower assessed and eventually eliminated included Bourne, Falmouth Bulk, and West Barnstable. Although Brayton Point was not carried forward for this connector Project, it remains a desirable POI for a second and separate Mayflower Wind connector project and is also discussed below. This subsection describes each POI in more detail.

Bourne

Initially, Mayflower evaluated the construction of a new 345-kV interconnection switching station to be located in the vicinity of the Eversource's 345-kV Bourne Switching Station just southeast of the Cape Cod Canal and approximately 0.3 mi (0.5 km) east of Sandwich Road in Bourne, MA.

As stated above, although the POIs for Mayflower Wind's interconnection requests in the ISO-NE interconnection queue seeking interconnection on Cape Cod are currently in Bourne and West Barnstable, Mayflower Wind expects that ISO-NE will move those POIs to Falmouth. This move will be as a result of the ISO-NE Tariff-driven interconnection cluster process.

The location of the new POI is expected to be at a new substation in Falmouth in the immediate vicinity of existing electrical infrastructure located at or near the Eversource Falmouth Tap substation. The required upgrades to facilitate the relocation of the POI, and to interconnect up to 1,200 MW from Mayflower Wind, will be determined and managed through the ISO-NE interconnection cluster process by ISO-NE and the interconnecting transmission owner.

Falmouth Bulk

Mayflower Wind evaluated a POI at Falmouth Bulk Station #933 in consultation with Eversource under its Preliminary Engineering and Design Agreement with Eversource, dated May 19, 2020. Falmouth Bulk is located adjacent to Mayflower Wind's preferred substation site. The two 115-kV circuits at Falmouth Bulk Station are limited in capacity (less than 400 MW). To meet the ISO-NE interconnection criteria, a Falmouth Bulk POI would necessitate significant upgrades from 115-kV to 345-kV, transmission system reinforcements, and potentially additional land for these upgrades (e.g., replacing two 115-kV transmission lines with two new 345-kV transmission lines and a new 345-kV substation). As indicated by the ISO-NE Cluster Study described in Section 4.3.2.1 above, Mayflower anticipates that its queue positions in Bourne will be moved to the Falmouth Tap area, not Falmouth Bulk. For these reasons, this location was eliminated from further consideration for the Project.

West Barnstable

In 2019, Mayflower Wind conducted a high-level assessment of a POI at the West Barnstable Substation located in Hyannis, MA. The 345-kV West Barnstable Substation has the capacity to accommodate 860 MW, based on an ISO-NE QP830 Feasibility Study. However, this Substation will be utilized as the interconnection for the 800-MW Vineyard Wind Connector 2 project with certain infrastructure improvements pursuant to Vineyard Wind's interconnection request filed with ISO-NE. Therefore, this POI was eliminated from further consideration for the Project. Mayflower expects that its current queue position with a POI in West Barnstable will be moved to the Falmouth Tap area as part of the ISO-NE cluster interconnection process.

Brayton Point

Brayton Point is the site of a recently decommissioned coal/oil fired 1,600-MW base load power plant located on an approximately 300-ac (121-ha) brownfields site in the Town of Somerset on Mount Hope Bay and the Taunton River. The substation which served Brayton Point is owned and operated by The Narragansett Electric Company d/b/a National Grid. The substation is connected to the bulk power grid by two 345-kV lines which run north to Medway as well as a number of 115-kV lines running north, east, south, and west. Brayton Point's existing, robust grid infrastructure and waterfront location make it an ideal interconnection location for offshore wind.

When fully built out, and with continuing advancements in wind technology, Mayflower Wind's Clean Energy Resource in its Lease Area will supply up to approximately 2,400 MW of offshore wind, enough to power nearly a million homes. Delivery of this amount of clean power will necessitate multiple POIs similar to that of Vineyard Wind Connector 1 and Vineyard Wind Connector 2. However, at over 103 mi long, the route to Brayton Point is approximately 40 mi (64 km) longer than the route to Falmouth Tap assuming the cables are routed on the east side of Aquidneck Island (Sakonnet River). For purposes of this Petition, the Brayton Point substation was eliminated from further consideration due to distance.

Although eliminated as a preferred POI for this Project due to the reasons mentioned above, this location does remain a feasible POI for a future Mayflower Wind connector project. In 2021, Mayflower Wind established ISO-NE interconnection queue positions with a POI at Brayton Point that it plans to use for development of a separate 1,200 MW connector project in the future to optimize and deliver the full Clean Energy Resource potential output from the Lease Area.

4.3.2.2 Preferred POI as selected by ISO-NE – Falmouth Tap

As described in Section 4.3.2 above, the ISO-NE Cluster Study 1 initially determined that the POI for the Mayflower Wind project will be in the Falmouth Tap substation area. As a result of the Cluster Study 1 results, Mayflower Wind evaluated a POI at or in the vicinity of the Eversource Falmouth Tap substation. The required upgrades to facilitate the relocation of the POI from Bourne to the Falmouth Tap area will be determined and managed through the Cluster Study process by ISO-NE and the interconnecting transmission owner. The preliminary Cluster Study 1 results indicate that the interconnecting transmission owner will be responsible for installing a 345-kV transmission loop from Bourne to Falmouth to West Barnstable. Under its Preferred Route, Mayflower Wind's responsibility for permitting, engineering, and constructing the Project would end at the POCO between its transmission facilities and those of Eversource, near Mayflower Wind's proposed new substation in Falmouth. The interconnecting transmission owner would then site, build, and own the interconnection facilities between the POCO and the POI at Falmouth Tap.

4.3.2.3 Landfall Locations

With ISO-NE's determination of the POI to be located in Falmouth, the next step in the initial route screening process was to identify potential landfall locations where the transition from offshore export cabling to onshore export cabling would take place. Mayflower Wind used the following criteria to identify potential landfall locations:

- Available land able to accommodate the entry pit and drilling equipment associated with HDD as well as the necessary permanent offshore-to-onshore transition infrastructure (e.g., municipal beach-front parking areas or other municipal-owned public space);
- Clear pathway to a roadway layout or other municipal-owned space of sufficient width to accommodate the installation of the duct bank;
- Sufficient water depths to accommodate the use of support barges at the HDD exit location;
- Avoidance of existing infrastructure, including submarine cables offshore and underground utility cables/pipelines onshore that would make construction infeasible;
- Avoidance and minimization of construction-period impacts to the public such as seasonal land uses;

- Environmental considerations that avoid and mitigate for impacts to wetland resource areas, such as salt marshes and mapped eelgrass habitat;
- Avoidance or minimization of adverse impacts to environmental justice populations; and,
- Overall length of the onshore export cable route.

Mayflower Wind will use HDD to transition between the offshore and onshore components of the Project. Water depth at the landfall approach is an important factor for HDD. The HDD exit pit located approximately 3,140 to 4,920 ft (1 to 1.5 km) offshore, would be located at water depths between 16 and 26 ft (5.0 to 8.0 m). The final selected landfall location needs to balance avoidance of submerged aquatic vegetation, risk of cable exposure due to wave action, and complexity of sea-to-shore HDD operations.

At least twelve landfall locations were considered for the proposed Project, seven located in Falmouth (Table 4-3). Many factors were considered and weighed when choosing or excluding landfall locations. Physical space availability was evaluated primarily for construction and installation. Mayflower Wind considered landfall locations which minimize the crossing of existing submarine cables, minimize use conflicts, and provide adequate workspace for the HDD installation and viable onshore installation routes to the POI. Mayflower Wind assessed land uses adjacent to potential landfall locations to understand environmental impacts, potential for use of existing infrastructure, and areas with historic and conservation districts or businesses that could be impacted.

As explained above, the ISO-NE Cluster Study has initially determined the Falmouth Tap area as the POI for the Project, thus narrowing the landfall location analysis to the area along Surf Drive Beach and Falmouth Heights Beach for the most efficient routing options. The five landfall locations associated with a West Barnstable POI were eliminated from further consideration. Two of the seven landfall locations associated with a Falmouth Tap POI, Kite Park at Grand Avenue and Old Silver Beach, were eliminated because of potential crossing under private land and excessive route length to the POI, respectively. .

Of the five remaining potential landfall locations Elm Road, Mill Road, and Shore Street were eliminated (Section 4.3.3.1) and Worcester Avenue and Central Park were retained (Section 4.3.3.2).

4.3.2.4 Potential Landing Locations Assessed and Eliminated

Shore Street Landfall

The potential landfall location at Shore Street is five blocks east of Mill Road at a large public parking lot (over two acres). This landfall location was disqualified as technically infeasible based on a request from Eversource to avoid the unnecessary risks and impact of siting near electrical cables serving Martha's Vineyard. Eversource has underground conduit and cable along both Surf Drive and Shore Street. At the corner of Shore Street and Surf Drive, there is a transition manhole for one energized cable landfall and one abandoned cable; in addition, Eversource plans to install manholes for a new cable planned for the 2024 installation timeframe. HDD and coastal excavation work needed to install new conduit and cable landfalls and transition manholes for submarine cable poses a hazard to existing cables in the vicinity while installation or maintenance is ongoing. Further, in coming ashore near Shore Street, Mayflower's underground transmission system would have to go underneath Eversource's existing underground cable, which would result in a permanent derating of the capacity of the existing Eversource lines. This derating means less energy can flow to Martha's Vineyard than planned, affecting both current and future needs of the Island. Shore Street is a narrow roadway located within the Falmouth Village Historic District and within a mapped environmental justice population. There are currently seven cables in underground conduit along Shore Street as well as sewer and water infrastructure running along Shore Street. Any effort to place additional underground cable along an already congested and narrow route presents a potential risk for the existing cables. These cables are a vital link between the mainland and Martha's Vineyard, necessary for providing the entire island's energy needs. With such limited space available along Shore Street, any digging in Shore Street could result in damaging the conduit and causing an outage. The Shore Street landfall location was eliminated from further consideration in the routing analysis for the above-stated reasons.

Table 4-3. Initial Cable Landfall Location Evaluation

No.	Name	Town	Grade	Comments
1	Worcester Avenue	Falmouth	Feasible	Good egress and elevation; area protected by a short seawall and broad beach; located near public common
2	Central Park	Falmouth	Feasible	Good egress and elevation; large open space
3	Shore Street	Falmouth	Disqualified	Good egress (a large public parking lot); but infeasible due to conflicts with existing underground utility infrastructure. Eversource requested that Mayflower avoid this landfall. Proximity to Eversource's Martha's Vineyard cables would result in line deratings for the existing cables used to serve Martha's Vineyard and/or put these existing cables at increased risk of failure; would adversely impact environmental justice population.
4	Mill Road	Falmouth	Less feasible	Would require crossing or proximity to four Martha's Vineyard submarine cable(s) and onshore transition vaults.
5	Elm Road	Falmouth	Less feasible	Space limitations for HDD setup; requires HDD under privately-owned strip of beach; would involve several offshore crossings of existing submarine cables
6	Kite Park at Grand Avenue	Falmouth	Disqualified	Requires HDD under privately-owned strip of beach
7	Old Silver Beach	Falmouth	Disqualified	Requires bridge crossing and lengthy offshore and onshore transmission routes
8	Monument Beach	Bourne	Disqualified	Promising if using Bourne POI; potential conflicts with town marina and boat moorings
9	Wianno Avenue	Barnstable	Disqualified	Promising if using West Barnstable POI; limited egress on municipal-owned land
10	Craigsville Beach	Barnstable	Disqualified	Promising if using West Barnstable POI; requires bridge crossing over Centerville River.
11	New Hampshire Avenue	West Yarmouth	Disqualified	Promising if using West Barnstable POI
12	Popponessett/ Mashpee Neck Road	Mashpee	Disqualified	Insufficient space for HDD setup; associated with use of West Barnstable POI

Mill Road Landfall

The potential landfall location at Mill Road is west of Shore Street situated behind a wide barrier beach. There is a large, municipally owned parking lot directly across from the beach that could provide sufficient space for staging installation vehicles and equipment. Private properties are offset from the potential worksite. The Mill Road route goes through a Historic District and is located along the edge of a mapped environmental justice population.

The Mill Road parking lot is the landfall site of an Eversource-Comcast submarine cable system that was installed in 2014 to serve Martha's Vineyard. The existing Eversource-Comcast Mill Road cable system consists of a fiber optic cable and 23-kV electric cable that enter vaults in the northeast corner of the parking lot. The southern end of Mill Road and the associated municipal parking lot abut Salt Pond. Much of the parking lot falls within the state-level delineation of beach/dune. The existing Eversource-Comcast easement stays outside that boundary, occupying the entire eastern end of the parking lot. The Mill Road area has limited space, which would make siting Mayflower's transition joint vaults and onshore cable system challenging and could introduce risk to the cables serving Martha's Vineyard. The Mill Road landfall location was eliminated from further consideration in the routing analysis for the above-stated reasons.

Elm Road Landfall

A landfall location at Elm Road in Falmouth was considered in early stages of the proposed Project's onshore evaluation but has since been eliminated. Elm Road is west of the Mill Road landfall location. Elm Road intersects Surf Drive at Falmouth's southern shoreline, then continues for 1.0 mi (1.6 km) north/northwest. At its southern end, Oyster Pond flanks it on the west side and Salt Pond flanks it on the east side. The proximity to both environmentally sensitive wetlands factored into the exclusion of this landfall location. Use of this landfall location would require HDD under a strip of private beach. Additionally, this location does not have any large areas for installation vehicles and equipment and thus, installation operations may have posed a risk to the nearby wetlands. Finally, the Elm Road landfall location would have involved several offshore crossings of existing submarine cables making landfall in Falmouth. HDD for the crossings would be technically challenging, requiring a traditional (concrete mattress-based or similar) cable crossing design, and could pose a risk to existing utility infrastructure due to existing subsea utility cables. The Elm Road landfall location was eliminated from further consideration in the routing analysis for the above-stated reasons.

4.3.2.5 Potential Landing Locations Assessed and Selected for Further Evaluation

Worcester Avenue Landfall

The landfall location for the Preferred Route is the first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall). This location is protected by a short seawall, a broad beach, and Grand Avenue. Residences and a hotel are adjacent to this landfall site but are buffered from the park by Worcester Avenue on either side. A paved parking lot located nearby could be used for construction staging operations.

Preliminary design efforts suggest that siting the cable system and vaults in the park between the two lanes of Worcester Avenue could decrease utility conflicts, reduce traffic impacts, and increase installation speed relative to working in the single-lane roadways. The Worcester Avenue onshore cable route avoids local businesses and shops on Main Street.

There are no known existing submarine cables that make landfall at Worcester Avenue, and this landfall would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth.

Central Park Landfall

This landfall location at Central Park near Crescent Avenue (Central Park Landfall) is presented as the Noticed Alternative to the landfall location for the Preferred Route. Located approximately 700 ft (213 m) to the west of the Worcester Park Landfall, the Central Park Landfall site provides an alternative to the Worcester Avenue Landfall site. Central Park is a large, open public park owned by the Town of Falmouth and used for community sports. The park comprises approximately 4.24 ac (1.72 ha) and is surrounded by commercial restaurants and residential areas on all sides. South of the park across Grand Avenue is the Town-owned Falmouth Heights Beach and Soprano's Casino by the Sea.

This landfall site would require a longer HDD trajectory than the preferred Worcester Avenue Landfall. There are no known existing submarine cables that make landfall at Central Park, and this landfall would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth.

4.3.2.6 Conclusion

Screening was performed on the potential landfall locations in Falmouth. Five landfall locations were selected for further evaluation, and two of the five satisfied the basic criteria for selection (Table 4-4). The landfall locations selected for further evaluation include the Worcester Avenue and Central Park landfall locations.

Table 4-4. Summary Comparison of Potential Landfall Locations for Mayflower Wind

Factor	Worcester Avenue	Central Park	Shore Street	Mill Road	Elm Road
Adequate space for onshore HDD	Yes	Yes	Yes	Yes	No
Access to public roads/ways	Yes	Yes	Yes	Yes	Yes
Conflicts with existing utilities	No	No(1)	Yes	Yes	Yes
Potential for environmental impacts	Low	Low	Moderate	Moderate	Moderate
Retained for routing analysis	Yes	Yes	No	No	No

(1) Preliminary evaluation based on municipal GIS utility data indicates that major utility conflicts are unlikely.

4.3.3 Sites for Proposed Substation

Mayflower Wind will build a new onshore substation in Falmouth to interface with the ISO-NE electric grid at 345 kV.

Mayflower Wind worked with local contractors to evaluate onshore substation locations in Falmouth, initially based on land availability and proximity to potential landfall location(s). Subsequently, Mayflower Wind ruled out locations with higher environmental impacts. Out of the sixteen onshore substation sites initially considered, fourteen were excluded from future planning (See Section 4.3.4.1). Some of the rejected substation sites were too small to house all necessary equipment and civil works (i.e., grading and stormwater management). Other sites were not chosen due to unnecessary environmental/social impacts which were apparent, such as required tree clearing, wetland and watershed resource disruption, or proximity to residential neighborhoods.

AIS, gas-insulated switchgear (GIS), highly integrated switchgear (HIS), or a mixture of these may be used for the Project onshore substation. Major components proposed for the Mayflower Wind onshore substation include, but are not limited to, either air-insulated or gas-insulated circuit breakers, disconnect and earthing switches (i.e., switchgear), fixed and/or variable shunt reactors, instrumentation, overvoltage protection and voltage transformers. A substation building will contain communication and control panels, auxiliary power equipment, and potentially switchgear (for the gas-insulated switchgear option). Potential additional equipment includes harmonic filters, synchronous condensers, and static synchronous compensators. The footprint necessary to accommodate the substation yard, site grading, and drainage is approximately 25–30 ac (10–12 ha).[42]

Using the approximate space requirements for AIS and GIS options, Mayflower Wind searched for properties that could potentially accommodate the Project's substation. The criteria used to screen potential substation sites included:

- A minimum land area of 25 ac (10 ha) (for AIS);
- Suitable surrounding land uses;
- Site topography and existing conditions;
- Real estate availability; and
- Site access

Section 4.3.4.1 identifies those substations sites considered but eliminated and the basis for elimination. There are two candidate onshore substation locations proposed for the Project (see Section 4.3.4.2). For the Preferred Route, the Lawrence Lynch site is the proposed substation location. For the Noticed

[42] Although HVDC technology was not selected for this Project, 25–30 acres sites could also accommodate the smaller footprint of an HVDC converter station.

Alternative, the Cape Cod Aggregates site is the proposed substation location. The following sections provide details on each of the onshore substation locations.

4.3.3.1 Substation Sites Considered but Eliminated

Mayflower Wind evaluated numerous potential substation locations, of which many were eliminated based on available developable property size, acceptability to the Town of Falmouth, or because other better suited sites were available (Figure 4-2). Evaluated but eliminated sites were as follows:

- Insufficient Development Area
  - Bishop of Fall River,
  - Breivogal Trustee/Cape Cod Aggregates
  - Steamship Authority Lot
  - Lawrence Lynch site on Locustfield Road (due to use by solar project)
  - Multiple sites (combination of five adjacent parcels)
- Poor Right of Way Accessibility
  - Town of Falmouth (east of the Cape Cod Aggregates site)
  - Bonito Trustee Williams P (William Bonito Construction)
- Lack of Public Acceptance
  - Town of Falmouth Sewage Treatment Facility
  - Town of Falmouth Water Supply
- Other Constraints
  - Yardwaste & Composting (extensive tree clearing, development area configuration)
  - Town of Falmouth, Route 28 (extensive tree clearing, development area configuration)
  - Falmouth Little Pond Teaticket (wetlands, property size)
  - Cape Cod Aggregates - Dimmock Avenue (moderate to high tree clearing)
  - Cape Cod Aggregates (west of ROW) – (extensive tree clearing)

4.3.3.2 Substation Sites Evaluated and Retained

Lawrence Lynch

The Preferred Route onshore substation is located west of Gifford Street and north of Jones Road at the end of Stephens Lane in Falmouth, MA. This site is approximately 27.3 ac (11.01 ha). The onshore export cables from the landfall location will enter the onshore substation from Gifford Street. The 345-kV transmission line will exit the yard in the southeast corner near the existing transmission ROW. As noted previously, for the Preferred Route, the Project will end at the POCO, and Mayflower expects that the interconnecting transmission owner will site, build, and own the interconnection facilities to interconnect the Project to the POI at or near the Falmouth Tap substation area.

An on-site wetland delineation was performed in April 2020. The field investigation identified three stormwater retention ponds and a potentially jurisdictional isolated freshwater wetland under the Falmouth wetland bylaw on the subject property. In the vicinity of the property, the field investigation identified an isolated freshwater wetland located on the adjacent Falmouth Department of Public Works (FDPW) property with a 100-foot buffer zone that extends on to the subject property, and nearby Sols Pond with a 100-foot buffer zone that also extends on to the subject property. The substation property is not located within the 100-year floodplain. The subject property is an active asphalt plant, and any tree removal required to construct the substation would be minimal.

This site is immediately adjacent to residences, and the substation fence line could potentially be within 100 ft (30.5 m) of the nearest residence. As described in Section 5.3.6.2, with appropriate mitigation in the form of lower noise specified equipment and/or sound walls, the substation will meet the applicable threshold (i.e., not more than 10 A-weighted decibel (dBA) above the lowest ambient sound levels) for sound at the nearest sensitive receptor (see In-Air Acoustic Assessment Report provided in Attachment H). This proximity to neighboring residences may also require visual screening measures such as decorative fencing or additional landscaping.

The site, formerly used as a sand and gravel mine, is currently used as an aggregate processing and asphalt facility with several office buildings, areas of stormwater retention, active construction with various motorized vehicles (e.g., earth moving equipment, trucks and other traffic frequently entering and exiting the yard), and paved surfaces (Figure 1-9). Mayflower Wind is in discussions with the property owner and is advancing negotiations to obtain an option to purchase the preferred Lawrence Lynch industrial property off Gifford Street.

Cape Cod Aggregates

The Noticed Alternative substation location is the Cape Cod Aggregates site, located at the northern end of Blacksmith Shop Road on the northern side of Thomas B Landers Road in Falmouth, MA. This site has approximately 33.6 ac (13.6 ha) of usable land for constructing an onshore substation. This option has sufficient space for both AIS and GIS configurations. The onshore export cables are planned to enter the substation from the southeast corner of the parcel, and the 345 kV transmission line will also exit the parcel to the southeast if continuing to the POI via roadway.

An on-site wetland delineation was performed in July 2020. No potentially jurisdictional vegetated wetlands or open water areas were observed or identified on the subject site. Crooked Pond is the nearest open water area and is located over 1,000 ft (305 m) to the east of the northeastern corner of the subject properties.

Although the Cape Cod Aggregates site is a viable option, it is not the Preferred option since it has some disadvantages based on location. The greater distance from landfall (3.6 mi [5.8 km] longer than the Preferred Route) would involve a longer period of roadway and traffic disruption to install underground cables. Associated costs are expected to be higher than the Preferred Route. Details regarding cost are presented in Section 4.7.

Sound mitigation (e.g., use of lower noise equipment and/or sound wall) will be required to meet the applicable Massachusetts Department of Environmental Protection (MassDEP) Noise Policy sound threshold. Based on an acoustic modeling assessment, mitigation would be required to attain the MassDEP limit (i.e., 10 dBA above minimum ambient sound). Factors contributing to this need include, the equipment configuration, construction grades, and the proximity of sound producing equipment to sensitive receptors. Greater mitigation (e.g., more and larger sound walls) would be required for the Cape Cod Aggregates site than for Lawrence Lynch site (see In-Air Acoustic Assessment Report provided in Attachment H). Moderate tree clearing may also be required.

This site is an active aggregates plant, with various motorized vehicles, including earth moving equipment, trucks and other traffic frequently entering and exiting the yard.

Mayflower Wind has executed an option to purchase the Cape Cod Aggregates property.

4.3.3.3 Conclusion

Mayflower Wind is in discussions with the property owner and is advancing negotiations to obtain an option to purchase the preferred Lawrence Lynch industrial property off Gifford Street. This parcel has several favorable characteristics including its size, current land use, access and egress, and positive communications with the landowner. The parcel will also limit the length of the underground export cable which will decrease cost and mitigate for the traffic impacts and construction duration of the Project. For these reasons, the Lawrence Lynch parcel is the Project's preferred substation location.

4.3.4 Onshore Routing

Using the proposed landfall locations identified in Section 4.3.3 and substation sites identified in Section 4.3.4 with a Falmouth Tap POI (based on the ISO-NE Cluster Study 1), Mayflower Wind considered multiple onshore routes that would connect these landfall locations to the POCO/POI.

The potential routes were screened by using recent aerial photos, Massachusetts Geographic Information System (MassGIS) data on land use and environmental constraints (e.g., presence of wetlands, rare species, etc.), and information gathered in discussions with municipal and state officials. The potential routes were eliminated from future screening if it was determined that they were clearly inferior based on environmental impact, constructability, cost and/or reliability. Based on this analysis, Mayflower Wind selected the most advantageous candidate routes and route variants for more detailed study and evaluation.

Initial screening criteria considered for onshore routing from either of the two candidate landfall locations to the Preferred and Noticed Alternative substation locations and ultimately the Falmouth Tap POI area included:

- Direct routes are preferential to circuitous routes;
- Use of public roadway layouts and/or other public ROWs;
- Adequate space available within the roadway layout and/or shoulder to accommodate the cable duct bank;
- Avoidance of subsurface utility conflicts;
- Avoidance and minimization of potential traffic impacts including major roadway crossings;
- Minimization of environmental impacts;
- Avoidance of densely populated residential and busy commercial areas;
- Avoidance of sensitive receptors (e.g., fire stations, hospitals, schools); and
- Construction feasibility.

Using the criteria listed above, Mayflower Wind identified several potential onshore routes.

4.3.4.1 Potential Onshore Export Cable Routes Evaluated and Eliminated

The identified potential onshore export cable routes that connect the landfall locations to the onshore substation sites were initially screened using the criteria listed above in Section 4.3.5. The factors taken into consideration while determining a route's feasibility include construction constraints, length of route, potential traffic congestion, and land use/population density along the candidate routes. Environmental impacts and impacts to human activity were also assessed during the selection process. The selection of two candidate landfall locations and two substation sites disqualified routes that may have been considered in association with eliminated landfall or substations sites. Such eliminated routes are not discussed in this section.

A brief description of routes evaluated and eliminated associated with the selected candidate landfall and substation locations (See Figure 4-3) are provided below.

1. Palmer Avenue / Goodwill Park Road / Lawrence Lynch — This option was not advanced because of the need for Article 97 approval.
2. Palmer Avenue / Goodwill Park Road / Gifford Street /… / Cape Cod Aggregates — This option was not advanced because of the need for Article 97 approval.
3. Teaticket Highway / Sandwich Road / Cape Cod Aggregates – This option was eliminated due to disruption to local businesses and potential for heavy to moderate traffic congestion.
4. Jones Rd / Route 28 / Thomas B. Landers Rd / Cape Cod Aggregates — This option was eliminated due to length and traffic disruptions on Route 28.

5. Surf Drive / … / Lawrence Lynch or Cape Cod Aggregates — This option was eliminated because of conflicts with an existing Eversource duct bank on Surf Drive.
6. Shore St / Main St / Gifford St / … / Lawrence Lynch or Cape Cod Aggregates — This option was eliminated because of conflicts with an existing Eversource duct bank on Shore Street and Gifford Street.
7. Spring Bars Rd / Dillingham Ave / Gifford St / … / Lawrence Lynch or Cape Cod Aggregates — This option was eliminated because of conflicts with an existing Eversource duct bank on Gifford Street.

4.3.4.2 Candidate Onshore Cable Routes Evaluated and Advanced to Scoring

Many variables were considered in determining which onshore cable routes to advance. Limiting the overall cable length is of paramount importance, as this will limit the amount of energy lost during transmission and will reduce the overall cost of the Project. Additionally, shorter underground routes reduce potential traffic impacts and general disruption to the community. These alternatives will be designed to mitigate for impacts to the local environment whenever possible.

Mayflower Wind identified two onshore cable routes, identified as Candidate Route 1 and Candidate Route 2 from the Worcester Avenue and Central Park landfall locations, respectively, that were found to be superior to other proposed routes, and these routes were advanced to the scoring phase of the route analysis. A detailed discussion of the results of the scoring can be found below in Sections 4.4 and 4.5.

Each point of intersection or link among the Preferred and Noticed Alternative routes and variants afford an opportunity for route options to switch between the Preferred Route and the Noticed Alternative Route. A final approved route could include a combination of segments of the Preferred Route, the Noticed Alternative Route and/or their variants. Mayflower Wind evaluated four route variants, described in section 4.3.5.2.2, to clearly compare options in which route segments could be swapped.

Candidate Route 1: Worcester Avenue to Lawrence Lynch

Candidate Route 1 is the Preferred Route. This route begins at the Worcester Avenue Landfall location, which is the easternmost landfall location, situated within the first block of Worcester Park between the two lanes of Worcester Avenue. Residences and a hotel are adjacent to this landfall site but are buffered from the park by Worcester Avenue on either side. A paved parking lot located nearby could be used for construction staging operations.

The first segment of the export cable route (approximately 0.4 mi [0.6 km]) would be installed within Worcester Park to reduce potential utility conflicts, allow for faster installation, and to reduce potential traffic disruptions. Thereafter, the export cable route would enter the Worcester Court roadway layout and follow existing roadway layouts, with duct banks installed beneath or adjacent to the paved roadway. Once on Worcester Court, the route proceeds northerly for approximately 0.7 mi (1.1 km) before turning west and merging with Jones Road for approximately 0.6 mi (1.0 km). The route then turns north onto Gifford Street for approximately 0.3 mi (0.5 km) where it enters the Mayflower Wind Substation at the Lawrence Lynch site. The total distance from the Worcester Avenue landfall location to the Mayflower Wind Substation at the Lawrence Lynch site is approximately 2 mi (3.2 km).

Mayflower Wind has also considered one route variant (Variant 1) to Candidate Route 1 (see Figure 1-2 for a depiction of this variant).

- **Variant 1 (Central Park to Jones Road)** begins at the Central Park Landfall location and turns west onto Crescent Avenue. At Falmouth Heights Road, the route turns north, continuing onto Davis Straights (Route 28) until it reaches Jones Road. The variant joins with Candidate Route 1 at Jones Road. The length of Variant 1 is 1.2 mi (1.9 km). The total length of Candidate Route 1 with Variant 1 is 2.1 mi (3.4 km).

  This route variant connects the Noticed Alternative landfall site at Central Park with the Preferred Mayflower Wind Substation at the Lawrence Lynch site.

Candidate Route 2: Central Park to Falmouth Tap

Candidate Route 2 is being considered as the Noticed Alternative Route. This route begins at the Central Park Landfall location, which comprises approximately 4.24 acres (1.72 ha) of public park. The onshore export cable route exits Central Park at its northwestern corner and continues west onto Crescent Avenue.

Approximately 300 ft (91.5 m) northwest from Central Park is Crescent Park, sandwiched between Crescent Avenue and Grand Avenue. On both sides of the green space, there are aboveground utilities present consisting of telephone poles with streetlights. The area has been lightly disturbed by landscaping, specifically by the planting of shrubs along Grand Avenue. There is a large brown patch of grass on the eastern side of the green space that may be indicative of drainage issues in the area.

For the purposes of preliminary siting and route scoring, Mayflower Wind has assumed the onshore export cable system will be installed through Crescent Park to reduce the potential for utility conflicts and reduce potential traffic disruptions. However, further utility survey may find that siting in the roadway along Crescent Avenue, Grand Avenue, and Manchester Avenue and/or Echo Avenue is both feasible and favorable, subject to future discussion with interested stakeholders.

Beginning at Central Park, the route travels approximately 0.2 mi (0.32 km) along Crescent Park/Crescent Avenue before reaching Falmouth Heights Road. At Falmouth Heights Road, the route turns north for approximately 0.6 mi (1.0 km), continuing onto Davis Straights (Route 28) for approximately 0.4 mi (0.6 km) until it reaches Jones Road. The route follows Jones Road in a westerly direction for approximately 0.6 mi (1.0 km) and then turns northerly onto Gifford Street. The route continues north on Gifford Street/Blacksmith Shop Road for approximately 4.2 mi (6.8 km) until reaching the Mayflower Wind Substation at the Cape Cod Aggregates site.

Candidate Route 2 includes an underground interconnection route in public roadway. From the Mayflower Wind Substation at the Cape Cod Aggregates site, the route heads east on Thomas B. Landers Road for approximately 0.2 mi (0.3 km). The route turns north to follow Geggatt Road for approximately 0.5 mi (0.8 km). At the end of Geggatt Road, the route proceeds to the northwest along Hatchville Road / Sam Turner Road for approximately 1.4 mi (2.3 km) to the Falmouth Tap POI.

Where the route follows existing roadway layouts, the proposed duct bank will be installed beneath pavement or in the shoulder adjacent to pavement. The total distance from the Central Park Landfall location to the Falmouth Tap POI is approximately 8.1 mi (13.0 km).

Mayflower Wind has also considered three route variants (Variant 2, Variant 3, and Variant 4) to Candidate Route 2 (see Figure 1-2 and 1-3 for a depiction of these variants).

- **Variant 2 (Worcester Ave to Jones Road)** begins at the Worcester Avenue Landfall location and continues along the path of Candidate Route 1. The first segment of the export cable route (approximately 0.4 mi [0.6 km]) would be installed within Worcester Park. Thereafter, the export cable route would enter the Worcester Court roadway layout and proceed northerly for approximately 0.7 mi (1.1 km) before turning west and merging with Jones Road. Variant 2 joins Candidate Route 2 at the intersection of Jones Road and Davis Straits Road. The length of Variant 2 is approximately 1.1 mi (1.8 km). The total length of Candidate Route 2 using Variant 2, measured from landfall to POI, is approximately 7.9 mi (12.7 km).

  This route variant connects the Preferred landfall site at Worcester Avenue with the Noticed Alternative Mayflower Wind Substation site at the Cape Cod Aggregates.

- **Variant 3 (Paper Road)** provides a short deviation from Candidate Route 2 by using a Town-owned dirt road used by Cape Cod Aggregates (“Paper Road”). The Paper Road connects Blacksmith Shop Road to Thomas B. Landers Road. The route follows the Paper Road in a northerly direction, then turns east on Thomas B. Landers Road and continues to the Mayflower Wind Substation at the Cape Cod Aggregates site.

  This route variant would allow better separation of Mayflower Wind underground export cables and interconnection cables entering and exiting the substation site. Use of the Paper Road would also reduce the potential for traffic congestion along a short segment of Blacksmith Shop Road but would

result in tree removal at the northernmost end of the Paper Road. The deviation on the Paper Road and Thomas B. Landers Road is approximately 0.7 mi (1.1 km). The total length of the Noticed Alternative using Variant 3, measured from landfall to POI, is approximately 8.2 mi (13.2 km).

- **Variant 4 (Central Park to Cape Cod Aggregates)** represents another routing option, which was scored for informational purposes but not ranked against the other options. This variant involves truncating Candidate Route 2 at the Mayflower Wind at the Cape Cod Aggregates site, shortening its overall length to approximately 6.0 mi (9.7 km). In this scenario, Mayflower Wind's responsibility for permitting, engineering, and construction would end at the POCO between its transmission facilities and those of Eversource, with the interconnecting transmission owner responsible for permitting and building the facilities needed to interconnect the Project to the POI.

The above-described Candidate Routes as well as their Variants are compared through the scoring analysis described below in Sections 4.4 and 4.5.

4.4 Analysis of Candidate Routes for the Onshore Cables

The Candidate Routes described above were evaluated and ranked, applying a scoring methodology based on 11 individual criteria. The criteria were developed to reflect the defined routing objectives and compare the relative levels of potential impacts to the developed and natural environments along the Candidate Routes. Cost estimates were also developed for the Candidate Routes, and the reliability of each Candidate Route was assessed. The routing analysis identified the routes that best balance minimization of environmental effects, reliability, and cost.

The offshore and onshore segments together form the complete Project route, but different criteria apply to the evaluation of offshore and onshore routes. Please refer to Section 4.6 for the offshore cable route criteria which are based primarily on marine survey results, consultation with the Massachusetts Ocean Team, and constructability considerations. The purpose of the scoring analysis described in this section is to identify a preferred route for the onshore export cables that best balances minimization of environmental effects, reliability and cost, evaluated based on the criteria described below.

4.4.1 Description of Scoring Criteria

The scoring criteria for the developed environment and natural environment used to evaluate the Candidate Routes and their respective Variants are summarized in Table 4-5.

Developed Environment Criteria are used to compare the existing conditions of the developed environment and surrounding population among the various Candidate Routes/Variants with any potential impacts that may occur as a result of the Project. Mayflower Wind applied the following Developed Environment Criteria in the scoring analysis of each Candidate Route:

- Residential Units;
- Sensitive Receptors;
- Potential for Traffic Congestion;
- Historic Resources;
- Archaeological Resources; and
- Potential to Encounter Subsurface Contamination

Natural Environment Criteria are used to compare the existing conditions of the natural environment and surrounding population among the various Candidate Routes with any potential impacts that may occur as a result of the Project.

The five natural environment criteria included in the scoring analysis are:

- Flood Hazard and Wetland Resource Areas;

- State-listed Rare Species Habitat;
- Public Water Supplies; and,
- Article 97-Jurisdictional Land;
- Tree Removal

Constructability factors, such as subsurface utility density, street width, and property acquisition, are reflected in the cost analysis in Section 4.7 or were used to eliminate potential routes; in general, subsurface utility density and street width are relatively homogeneous along the candidate routes and are not significant for route differentiation.

4.4.2 Criteria and Weight Assessment

Mayflower Wind assigned weighted values to an established set of individual criteria related to both developed and natural environment based on professional judgment and siting experience to ensure that scoring results reflect the importance of respective criteria in the process. The criteria were developed based on Mayflower Wind's routing objectives, environmental considerations, and feedback from consultations with state agencies and municipal officials. The criteria are summarized in Table 4-5.

A scale of 1-to-3 for weighting was considered to reflect relative importance of each criterion specific to this Project, with 1 being the lowest weight and 3 being the highest weight. The weighting for individual criteria is depicted in Table 4-6. Based on the approach described above, a weight of 3 was assigned to Residential Units and Potential for Traffic Congestion. A weight of 2 was assigned to Sensitive Receptors, Flood Hazard Areas and Wetlands, Rare Species Habitat, Article 97-Jurisdictional Land, and Tree Removal. The remaining scoring criteria, Historical and Archaeological resources, Potential to Encounter Subsurface Contamination, and Public Water Supplies, were assigned a weight of 1.

Once the weighting had been assigned, raw scores for each candidate route were developed and a ratio score was calculated to determine the relative score for each route. As presented in Table 4-7, based on the results of the weighting evaluation, the least impactful route overall was determined to be the Worcester Avenue Landfall to the Mayflower Wind Substation at the Lawrence Lynch site.

Table 4-5. Scoring Criteria for the Mayflower Wind Routing Analysis

Criteria	Basis for Inclusion	Data Source	Scoring	Raw Ratio Score
Developed Environment Criteria				
Residential Units	Residents along a Candidate Route may experience temporary traffic disruption, noise, and/or dust.	MassGIS standardized assessors' parcel mapping data set, aerial photography	Scored as the number of residential units with parcels directly abutting each Candidate Route. Based on pre-filing consultations with the Siting Board, Mayflower Wind counted individual residential units for apartment or condominium complexes, whenever possible.	Calculated by dividing the number of residential units for each Candidate Route by the maximum total number among all Candidate Routes.
Sensitive Receptors (hospitals, schools, municipal emergency services such as police and fire, elder care facilities, daycare facilities, district courts, religious facilities, funeral homes, and cemeteries)	Sensitive receptors may be affected by temporary traffic disruption, street closings, construction noise, and/or other temporary impacts due to project construction. Continuous access may be required for certain sensitive receptors (e.g., hospitals and emergency services). If a receptor has multiple entrances, the impact can be less pronounced than under single-entrance scenarios.	Property assessment data from MassGIS and local online databases, supplemented as needed with Google and Bing 2018-2020 aerial imagery	Scored as the number of sensitive receptors (defined based on mapped land use types that are potentially sensitive to temporary or permanent impacts) directly abutting each Candidate Route.	Calculated by dividing the total number of sensitive receptors for each Candidate Route by the maximum total number of sensitive receptors among all Candidate Routes.
Traffic Congestion (Construction)	Traffic on public roadways may experience temporary increases in traffic density and congestion, traffic disruption, and/or street closings associated with installation of underground cables. Likewise, repair and maintenance of underground cables may also impact traffic.	Massachusetts Department of Transportation (MassDOT) class (ranking of 1 through 3): 1 - Local roads and private ways; 2 - Minor arterials and major collectors; 3 - Principal arterials Off-road segments such as an unconstructed (paper) road were assigned a zero.	The traffic analysis was performed by dividing each Candidate Route into road segments, for which the MassDOT class was identified. Based on the MassDOT class of roadway, each segment was assigned a rank from 1 to 3, from lowest to highest potential for traffic impact. Local roads and private ways were assigned a "1"; minor arterials and major collectors were assigned a "2"; and limited-access and principal arterials were assigned a "3". Scored as the weighted average class determined by multiplying percentage of the total route within each class (0 through 3) by its numeric rank and adding up the total for a weighted route score.	Calculated by dividing the total weighted score for each Candidate Route by the maximum weighted score among all Candidate Routes.
Historic Properties	Protected historical properties may be affected by temporary construction related impacts, such as excavation, traffic disruption, noise and/or dust. Subsurface infrastructure is not expected to have permanent impact on historic properties.	MassGIS data from Massachusetts Historical Commission's (MHC's) Cultural Resource Information System to locate historic buildings, local historic districts, and National Register-listed individual buildings and districts. State Register of Historic Places, and local historic district inventories.	Scored as the number of historic resources directly abutting the Candidate Routes. If the Candidate Route passes through an Area or District, the Area or District was counted once along with designated historic properties within the Area or District immediately adjacent to the route.	Calculated by dividing the total number of historic districts/properties for each Candidate Route by the maximum total number of historic resources among all Candidate Routes.
Archaeological Resources	Archaeological resources can be impacted by the disturbance of subsurface artifacts through intrusive activities such as earth movement and excavation. Archaeological resources may be impacted by construction activities in areas of moderate or high archaeological sensitivity. Designation as high or moderate sensitivity is limited to areas that have not been significantly disturbed by previous construction activities, and which appear to maintain natural stratigraphic integrity. "High" sensitivity areas include those areas that contain known archaeological sites and those that have not been markedly affected by previous land-altering activities. Proximity to well-drained soils on relatively flat or gentle slopes, waterbodies (e.g., wetlands, ponds, rivers, streams, or the coast), and known areas of historic land use (as represented by existing and previously documented historic structures) are considered to be of "High" sensitivity; Areas of "High" sensitivity potentially disturbed by prior land-disturbing activity are considered to be of "moderate" sensitivity. Areas of "low" archaeological sensitivity include those that are perennially wet or have been extensively altered by development, construction, excavation, and/or erosion and are therefore unlikely to contain significant archaeological resources.	Archaeological Sensitivity Assessment prepared for the Project	Scored as the total number of miles for each Candidate Route mapped as "moderate" and "high" sensitivity areas.	Calculated by dividing the total number of miles of moderate and high archaeologically sensitive areas for each Candidate Route divided by the maximum total number of miles among all Candidate Routes.

Criteria	Basis for Inclusion	Data Source	Scoring	Raw Ratio Score
Subsurface Contamination	Subsurface contamination could add complexities to construction for special handling of contaminated soils and/or groundwater. The potential to encounter subsurface contamination was derived from the number of sites on or adjacent to each Candidate Route where a documented release of oil and/or hazardous materials occurred, or where past land uses potentially resulting in contamination have been documented in the MassDEP Bureau of Waste Site Cleanup (BWSC) online database, pursuant to the Massachusetts Contingency Plan (MCP) (310 Code of Massachusetts Regulations (CMR) 40.0000). This criterion was evaluated using the MassDEP BWSC online database.	MassGIS Activity and Use Limitations (AUL) and Chapter 21E Tier Classified Sites data layers MassDEP BWSC online database and EDR reports	Scored as the number of sites on or adjacent to each Candidate Route where a documented release of oil and/or hazardous materials occurred, or where past land uses are associated with a high risk for contamination are documented in the BWSC database, pursuant to the MCP (310 CMR 40.0000). Presence of sites on or adjacent were counted regardless of clean-up status.[43]	Calculated by dividing the total number of documented sites for each Candidate Route by the greatest total number of documented sites among all Candidate Routes.
Natural Environment Criteria				
Flood Hazard Areas and Wetlands [44]	Underground export cable and transmission cable installation can affect wetland resource areas through land disturbance, including work pad construction, vegetation removal, dewatering activities and construction of material laydown areas. Wetland resource areas applicable to the routing analysis, as defined in the Massachusetts Wetland Protection Act (WPA) regulations (310 CMR 10.00) and/or local wetlands regulations, include the following: • Bordering Vegetated Wetland; • Coastal Bank and Beach; • Isolated Vegetated Wetlands or Isolated Land Subject to Flooding; • Bordering Land Subject to Flooding and Land Subject to Coastal Storm Flowage (100-year floodplain); • 200-foot Riverfront Area; and • Certified or Potential Vernal Pools Falmouth bylaws require that “All underground utility systems and all aboveground service connections, including power, communications and gas, shall have their aboveground appurtenances designed to avoid system interruption or damage in the event of flooding to base flood elevation levels.”	Wetland resource areas were identified using a combination of field delineations and utilizing ArcGIS with the most current MassGIS data available. MassGIS mapping of the Federal Environmental Management Agency (FEMA) National Flood Hazard Layer; MassGIS MassDEP Wetlands (2005) dataset	Calculated as the total length (mi) of each Candidate Route located within the 100-year floodplain (excluding Zone X) and within regulated wetlands [5]	Calculated by dividing the total number of miles of 100-year floodplain (and regulated wetlands[4]) encountered for each Candidate Route by the greatest total measured length among all Candidate Routes.
State-Listed Rare Species Habitat	Underground export cable and transmission cable installation in off-road locations can potentially impact protected habitats for state-listed rare species. Scoring of protected habitats (Priority or Estimated habitats) for state-listed species was derived from the acreage of each Candidate Route and associated Landfall location or HDD staging area passing through protected habitat for state-listed species. The roadway parcel boundary was used as a conservative limit of disturbance for this analysis.	MassGIS mapping of Natural Heritage and Endangered Species Program (NHESP) Priority and Estimated Habitat) areas. This information can also be obtained from NHESP thru a formal Information Request	Scored as acreage of each Candidate Route within protected habitat (Priority or Estimated habitats) for state-listed species intersecting the ROW.	Calculated by dividing the total acreage of NHESP Priority and Estimated Habitat for each Candidate Route by the greatest total measured acreage among all Candidate Routes.
Public Water Supplies	Public water supply areas (i.e., Zone I and Zone II Water Supply Protection Areas and Wellhead Protection Areas) may be affected by construction activities.	MassGIS mapping of Zone I and Zone II MassDEP Wellhead Protection Areas	Scored as the length of each route that passes through a wellhead protection area.	Calculated by dividing the total number of miles of public water supply resources encountered for each Candidate Route by the greatest total measured length among all Candidate Routes.
Article 97-Jurisdictional Land	Underground cable construction can potentially effect conservation lands. For the purposes of this analysis, Conservation land properties that are primarily protected for conservation purposes (subject to Article 97 jurisdiction) and require legislative action for use of such lands. Underground installation within public roadways was assumed to have no impact on adjacent conservation lands.	MassGIS mapping of Protected and Recreational Open Space with the designated Article 97 attribute	Scored as the total number of Article 97 parcels affected by Project construction for each Candidate Route.	Calculated by dividing the total number of Article 97 parcels for each Candidate Route by the greatest total number of Article 97 properties among all Candidate Routes.
Tree Removal	Permanent tree removal may be required for the construction and safe operation of the overhead transmission line.	ArcGIS using interpretation of aerial photogrammetric mapping	Scored as the length of each route requiring permanent tree removal.	Calculated by dividing the total number of miles of permanent tree removal for each Candidate Route by the maximum total mileage among all Candidate Routes.

[43] Two MCP AUL sites were identified along the Candidate Routes; neither one appeared to be active: (1) A permanent solution of the contaminated site near Candidate Route 1 (Harvey's Hardware's) included removal of 2 underground storage tanks in the 1990s was closed with an A3 RAO with an Activity and Use Limitation (environmental deed restriction); and (2) 17 Walker Street is also an old AUL site that was inspected in 2011 (RTN 4-0001075). The Lawrence Lynch site has 2 RTNs which were closed out with Permanent Solutions/No Conditions.

[44] No routes evaluated include areas within regulated wetlands.

Table 4-6. Summary of Categories and Weights Used in Scoring Analysis

Scoring Criteria	Weight	Rationale Behind Assigned Weight
Developed Environment		
Residential Units	3	Potential temporary disruption during construction.
Sensitive Receptors	2	Potential temporary disruption/disturbance from construction activities. Access needs to be maintained for essential services throughout construction. Some of these receptors have more than one point of access and egress, and/or access/egress would be managed through construction planning.
Traffic Congestion (Construction)	3	Likely unavoidable temporary impacts to traffic during construction for in-road construction. Traffic mitigation plans (TMPs) would help manage and mitigate these impacts. Construction outside of high season, where possible, would substantially reduce the potential for impact.
Historic Properties	1	Limited potential for Project-related impacts associated with construction. Potential for visual effects on historic properties for permanent aboveground structures is limited to the substation location.
Archaeological Resources	1	Potential to encounter archaeological resources within areas of high or moderated sensitivity.
Potential to Encounter Subsurface Contamination	1	Potential risks of contaminant discharge, hazard to construction crews, and potential special handling and disposal requirements.
Natural Environment		
Flood Hazard Areas and Wetlands (1)	2	Potential sensitivity of these environmental resources as well as the permitting challenges associated with related impacts.
State-listed Rare Species Habitat	2	Potential disturbance of protected status and sensitivity of these resources to disturbance as well as the permitting challenges associated with related impacts.
Public Water Supplies	1	Project's construction-related activities would be performed in a manner that avoids impacts to water supply resources, and because the Project is not of a type that would pose a significant threat to these resources.
Article 97-Jurisdictional Land	2	Challenges associated with obtaining approval for use of these land subject to Article 97 jurisdiction and the associated risk to Project schedule.
Tree Removal	2	Potential for permanent disturbance to wildlife habitat.

(1) No routes evaluated include areas within regulated wetlands.

4.4.3 Criteria Evaluation Methods

After identifying the scoring criteria, Mayflower Wind conducted a scoring evaluation for each candidate route and applicable route variants. Each route was scored, weighted, and ranked to reflect its potential for impacts to the developed and natural environments, as well as the relative ease of constructability. For the purposes of scoring, the scored route extends from the HDD landfall location to the applicable POI/POCO. Mayflower Wind applied weights to the evaluation criteria that were deemed to be of higher significance than other criteria. A scale of 1-to-3 for weighting was considered appropriate to reflect the relative importance of each criterion specific to this Project, with 1 being the lowest weight and 3 being the highest weight.

Mayflower Wind assessed each criterion based on raw data (gathered field and online data and mapping) for each Candidate Route and identified the Candidate Route that had the highest score. All other routes were then compared against this number to arrive at a "ratio score" for each Candidate Route on a scale of 0 to 1. The ratio score normalizes the results by assigning a score of 1 to the route with the largest number weighted value for a particular criterion. All other routes are assigned a fraction relative to that highest weighted route. For example, for the residential unit criteria if route X has a score of 4, route Y has a score of 8, and route Z has a score of 16, then the ratio scores would be X = 0.25, Y = 0.5 and Z = 1.0, respectively.

The lowest ratio score therefore equates to the lowest potential for impact. For each criterion, the ratio score was then multiplied by its assigned weight to produce a weighted score that reflected the relative importance of the criterion.

For each Candidate Route, the analysis generated a "total ratio score" by summing all of the individual ratio scores from the scoring criteria as well as a "total weighted score" by summing all of the individual weighted scores from the scoring criteria. The total weighted scores were then sorted in order, from low to high, to identify a given Candidate Route's "rank." The lowest weighted score equates to the lowest potential for impact with emphasis on certain criterion as previously described in this section. The ranks developed in this routing analysis are based on the total weighted scores.

4.5 Route Scoring and Selection of Preferred Route and Noticed Alternative

4.5.1 Route Scoring and Selection

Mayflower Wind selected the Preferred Route based on the environmental evaluation criteria established in Section 4.4.1 and in consideration of cost, constructability, and municipal and regulatory input. As described in Section 4.3, the Proponent began with a broad routing analysis that resulted in the selection of suitable landfall locations, substation locations, and the POCO/POI (reflecting the ISO-NE Cluster Study results). The subsequent onshore routing analysis resulted in a refined list of Candidate Routes to carry into scoring; all scored routes are depicted in Figure 1-2 and Figure 1-3.

The discussion below is focused on results from the environmental scoring developed for the onshore portion of the export cable route, and thus is targeting the onshore routing. Offshore routing analysis is presented in Section 4.6 and is also included in the analyses of cost and reliability provided in Sections 4.7 and Section 4.8, respectively. Raw data and detailed scoring spreadsheets are provided in Attachment C.

The weighted ratio scores for Candidate Routes 1 and 2 are contained within Table 4-7. In considering the relative merits of the routes, Mayflower Wind began by assessing all Candidate Routes and variants on criteria defined in Section 4.4.1. On this basis, Candidate Route 1 scores better (8.80) than Candidate Route 2 (16.76), as depicted in Table 4-7. In particular, Candidate Route 1 is superior to Candidate Route 2 with regard to the number of residential units affected as well as the sensitive receptors, historic resources, and archaeological resources.

Table 4-7. Comparison of Weighted Scores - Candidate Routes

Scoring Criteria	Preferred Route [CR-1] *(Worcester Ave Landfall / Lawrence Lynch site)*	Noticed Alternative [CR-2] *(Central Park Landfall / Cape Cod Aggregates site)*
Residential Units	1.32	3.00
Sensitive Receptors	1.33	2.00
Potential for Traffic Congestion	3.00	2.78
Historic Resources	0.07	1.00
Archaeological Resources	0.20	0.99
Potential to Encounter Subsurface Contamination	1.00	0.00
Subtotal for Developed Environment Criteria	***6.92***	***9.76***
Wetland Resource Areas(1)	0.55	2.00
Rare Species Habitat	0.00	2.00
Public Water Supplies	0.00	1.00
Conservation/Recreation (Article 97) Lands	1.33	2.00
Tree Clearing	0.00	0.00
Subtotal for Natural Environment Criteria	***1.88***	***7.00***
Total	**8.80**	**16.76**

CR-1: Candidate Route 1; CR-2: Candidate Route 2
(1) Includes Land Subject to Coastal Storm Flowage mapped as FEMA flood hazard zone

In considering the relative merits of the routes, Mayflower Wind compared scoring for all candidate routes and variants on criteria defined in Section 4.4.1. For the purposes of scoring, each variant was scored as a complete route from landfall to either POCO or POI. On this basis, Candidate Route 1 scores better (8.80) than all of the proposed variant routes (Table 4-8).

Table 4-8. Comparison of Weighted Scores between Candidate Routes and Variants

Route	Weighted Score
Candidate Route 1: Worcester Avenue to Lawrence Lynch (terminates at POCO)	8.80
CR-1 with Variant 1: Central Park to Lawrence Lynch (terminates at POCO)	10.36
Candidate Route 2: Central Park to Cape Cod Aggregates & Falmouth Tap (terminates at POI)	16.76
CR-2 with Variant 2: Worcester Avenue to Cape Cod Aggregates & Falmouth Tap (terminates at POI)	15.04
CR-2 with Variant 3: Central Park to Cape Cod Aggregates & Falmouth Tap via Paper Road (terminates at POI)	18.46
CR-2 with Variant 4: Central Park to Cape Cod Aggregates (terminates at POCO)	11.54

Based on the above analysis, Mayflower Wind has selected Candidate Route 1 as the Preferred Route, and Candidate Route 2 as the Noticed Alternative. A detailed comparison of the Preferred Route and Noticed Alternative is presented in Section 5.

4.5.2 Geographic Diversity

The Preferred Route and the Noticed Alternative have geographically distinct: (I) landfall locations, (ii) routes to the respective substations, (ii) substation sites, and (iv) connections to the transmission system, with the Preferred Route connecting and ending at the POCO, and the Noticed Alternative connecting and ending at the POI. Given the circumstances of (i) an ISO-NE determined POI in Falmouth, (ii) limited feasible landfall locations in Falmouth, especially due to existing underground utility infrastructure and the need to avoid conflict with it, (iii) constricted space in the area, and (iv) Mayflower Wind's intent to mitigate for environmental impacts and adverse impacts to environmental justice populations, the geographically

distinct routes, though somewhat close to one another, provide some measure of geographic diversity in accordance with the Siting Board's standards and precedent.

4.6 Analysis of Offshore Export Cable Corridors

The following section describes how the initial route concepts associated with the anticipated POI were refined and optimized and provides details regarding the offshore Export Cable Corridors (ECCs) that were analyzed, and the basis for selection of a final preferred route. Three cable routes were evaluated in detail; the western, central, and eastern ECCs (Figure 4-4). As explained below, Mayflower Wind has selected the western ECC option as the offshore part of its Preferred Route and Noticed Alternative.

4.6.1 Surveys and Studies

Mayflower Wind has executed a number of marine field survey programs as well as desktop and modeling assessments in 2020 with additional surveys and studies ongoing in 2021 which support the evaluation of ECC route options. Relevant surveys and assessments include:

- Geophysical Surveys
  - Conducted in 2019, 2020 and 2021 as part of Marine Site Investigation Report
  - Data were collected using a variety of tools including multibeam echosounder, magnetometer, side scan sonar, sub-bottom profiler, single channel and multichannel ultrahigh resolution seismic.
  - Data support the identification of geohazards, the Marine Archaeological Resources Assessment, and characterization of seafloor conditions.
- Scour Potential Impacts
  - Conducted in 2020
  - Modeling exercise to determine the potential impacts of scour on the export cables and assess the need for scour protection
- Sediment Plume Impacts
  - Conducted in 2020
  - Modeling exercise to evaluate the amount of sediment suspended in the water column and the extent and thickness of sediment re-deposited to the seafloor as a result of construction/installation of the export cables
- Airborne bathymetric LiDAR survey
  - Conducted in 2020
  - Data collected provide accurate water depths along the ECC
- Benthic Habitat Characterization Surveys
  - Conducted in Spring, Summer, and Fall 2020 and Spring 2021
  - Data collected include benthic infauna and epifauna community analysis (via grab samples and sediment profile image [SPI] and plan view [PV] imaging) and sediment grain size (via grab samples, SPI, and PV)
  - Data support evaluation of presence of hardbottom, complex habitat, and presence or absence of seagrass or macroalgae
- Submerged Aquatic Vegetation (eelgrass) survey and assessment
  - Conducted in 2020
  - Data collected include nature and extent (along shore and seaward) of eelgrass at the landfall locations

- Designated Protected Areas Assessment
  - Conducted in 2020 and 2021
  - Desktop evaluation of Massachusetts and federal resources and protected areas along the ECC

The 2019 and 2020 surveys focused primarily on areas common to all three ECC options, as well as parts of the central ECC and eastern ECC. Additional surveys conducted or ongoing in 2021 focused on the western ECC.

4.6.2 Criteria for Evaluation

Numerous technical and environmental considerations and constraints have factored into determining the location of the ECCs and comparing ECC options to each other, including:

- Cable length
  - Minimizing cable length is critical for reducing transmission losses and avoiding higher costs.
- Water depth
  - Water depths greater than 20 ft (6.1 m) are most suitable for accommodating the cable laying vessels that are likely to be utilized for this Project.
- Seabed conditions
  - Sand waves and highly mobile sediments
  - Boulders/boulder fields
  - The route should be perpendicular, or nearly perpendicular, to any large seabed slopes, and likewise across any existing offshore cables and/or pipelines (or planned future offshore cables and/or pipelines).
  - The corridor should avoid or mitigate for impacts to Special, Sensitive, or Unique (SSU) natural resource areas, including but not limited to North Atlantic Right Whale Habitat, hard/complex bottom, and eelgrass.
- Obstructions
  - Anchorage areas and areas with mapped shipwrecks and boulders are to be avoided or mitigated.
- Existing and planned infrastructure
  - The corridor should consider the presence of other existing offshore cables and/or pipelines, or intended location of planned future cables and/or pipelines, in order to mitigate (if possible) or carefully manage the risks associated with installing and maintaining cables in proximity to other infrastructure.
  - The route should be perpendicular, or nearly perpendicular, to any large seabed slopes, and likewise across any existing offshore cables and/or pipelines (or planned future offshore cables and/or pipelines).

4.6.3 Alternative ECCs Considered

Mayflower Wind initially considered five ECCs from the Lease Area to landfall, which mainly diverted paths near and through Muskeget Channel. Two ECC options were eliminated; the first, which closely paralleled the western option, was de-selected because of its similarity to selected corridors, and the second, which routed much farther to the east, was de-selected because of challenging seabed conditions (i.e., high sediment mobility, very shallow bathymetry, and high seabed slopes) that were identified in a desktop assessment amounting to a high level of technical risk, especially near Muskeget Island and Nantucket.

Three ECC options, all of which pass through Muskeget Channel (the western, central, and eastern options), were retained for in-depth evaluation (Figure 4-4). Results from the 2020 geophysical and

geotechnical (G&G) survey as well as results of a benthic survey program were used to evaluate the offshore route segments associated with a POI at Falmouth Tap. The ECCs evaluated are described in Sections 4.6.2.1 through 4.6.2.3. In 2021, additional geophysical and geotechnical G&G survey is being conducted along the western ECC.

Mayflower Wind intends to maintain an ECC width between approximately 2,625 ft (800 m) and 3,281 ft (1,000 m) to allow for maneuverability during installation and maintenance. The ECC may be locally narrower or wider to accommodate sensitive locations, to provide sufficient area for anchoring, and/or at anticipated cable crossing locations.

The three route options retained for evaluation, the western, central, and eastern options, are described in Sections 4.6.3.1, 4.6.3.2, and 4.6.3.3, respectively. All three of the ECC options are co-located for a large portion of the total ECC length, differing only in route through Muskeget Channel. The three ECC options are compared in Section 4.6.4, and the Preferred Route characteristics are described in detail in Section 4.6.5.

4.6.3.1 Western ECC

The western option diverges from the common ECC from the Lease Area approximately 4.3 nm (8 km) south of the entrance to Muskeget Channel within federal waters. This ECC is located the farthest westward within Muskeget Channel, closest to Martha's Vineyard. The western ECC rejoins the common ECC north of the exit from Muskeget Channel. A portion of the western option is partially co-located in parallel with a planned export cable corridor for Vineyard Wind OCS-A-0501 Lease Area developments, which would provide the benefit of reducing the cumulative impact area of both projects. The western ECC is expected to cross the Vineyard Wind project export cable corridor south of Muskeget Channel. Up to seven separate cables may be crossed depending on installation timing and as-installed locations of each respective project.

4.6.3.2 Central ECC

The central and eastern ECC options share a common ECC entering Muskeget Channel and rejoin prior to exiting the Channel. The central option is located in between the eastern and western options within Muskeget Channel, east of the western ECC and Martha's Vineyard. The central ECC enters Muskeget Channel close to Nantucket, and then turns westward to before turning north passing through the central portion of Muskeget Channel. The central option re-enters federal waters, after passing through Muskeget Channel within Nantucket Sound.

A small portion of the central ECC option is partially co-located in parallel with a planned export cable corridor for Vineyard Wind OCS-A-0501 Lease Area developments. The common central-eastern ECC is expected to cross the Vineyard Wind project export cable corridor north of Muskeget Channel. Up to seven separate cables may be crossed depending on installation timing and as-installed locations of each respective project.

4.6.3.3 Eastern ECC

The eastern ECC option includes a short segment located to the east of the central option within Muskeget Channel, farther eastward from Martha's Vineyard and closer to Nantucket. The eastern option continues north from the common ECC it shares with the central option through Muskeget Channel, at a point where the central option diverges to the west before a turn northward through the Channel. This deviation from the central ECC results in a slightly shorter total ECC length compared to the central option.

The eastern option generally avoids overlap with a planned ECC for Vineyard Wind OCS-A-0501 Lease Area developments, except at the necessary cable crossing locations. The common central-eastern ECC is expected to cross the Vineyard Wind project export cable corridor north of Muskeget Channel. Up to seven separate cables may be crossed depending on installation timing and as-installed locations of each respective project.

4.6.4 Comparison of ECCs

Mayflower Wind completed an evaluation of the ECC options, considering technical and environmental factors. The ECC options costs are compared in Section 4.7.

Based on the analysis of the ECC options as described in the sections that follow, the western option was the selected route corridor for reaching the potential landfall locations because it will mitigate for technical risks and mitigate for cumulative impacts to sensitive/protected habitats of the Mayflower Wind and Vineyard Wind projects. Specific advantages of the western ECC include:

- Fewer areas of high risk related to extremely shallow water depths than the other options. The western ECC avoids ultra-shallow sections of the Muskeget Channel that would pose significant navigational hazards (even to a shallow-draft cable lay barge) during cable installation and (if needed) repair.
- Greater length of ECC proximate to or co-located with the Vineyard Wind cables, which may reduce the cumulative impact area of both projects.
- Shortest of the three options assessed. Minimizing cable length is critical for reducing transmission losses and avoiding higher costs.

4.6.4.1 Technical Considerations

Various technical considerations are important factors in the comparison and selection of ECC options. Relevant characteristics include:

- Cable length
- Water depth
- Seabed conditions
- Obstructions
- Existing and planned infrastructure

These characteristics are described further in Section 4.6.2 and discussed below.

Cable Length

Minimizing cable length is critical for reducing transmission losses and avoiding higher costs. The western, central, and eastern ECC options leading to the preferred Worcester Avenue Landfall are compared on the basis of length, possible dredge volume, and length through mapped hard/complex bottom in Table 4-9. As shown in Table 4-9, the western ECC option is the shortest in total route length.

Water Depth

Water depths greater than 20 ft (6 m) are generally favorable for submarine cable installation. Water depths among the three ECC options are compared in Table 4-9. The eastern ECC was characterized by extremely shallow water depths (less than 3 ft [0.9 m]), and as such, was eliminated from further consideration prior to execution of the geophysical survey. Extremely shallow water depths < 15 ft (4.6 m) below MSL affect accessibility for the installation vessels. The western ECC does not entirely avoid extremely shallow water depths but minimizes areas of extremely shallow water depths relative to the central ECC option. Local areas of extremely shallow water depth will be avoided to the extent practicable by micro-routing cables within the western ECC.

Seabed Conditions

Geologic and sea floor conditions existing within the Offshore Project Area influenced the siting and selection of ECCs. The G&G surveys of the central cable route documented variable conditions attributed to several factors including the geologically-recent influence of glacial advance and retreat, combined with gradual changes in coastal shorelines[45]; strong tidal flows resulting in high sediment mobility and the

[45] sea-level regression and transgression

formation of large bedforms (i.e., sand waves and mega-ripples) in some areas and erosion in other areas[46] (Fugro, 2021).

Sand Waves and Highly Mobile Sediments

Some areas of Nantucket Sound and Muskeget Channel have active sand waves that can exceed 16 ft (5 m) in height (Fugro 2021). The maximum observed sand wave height within the surveyed area was 27 ft (8.1 m) located on the central ECC. Marine survey work completed in 2020 and continuing in 2021 has allowed Mayflower Wind to understand the areas along the ECC options potentially affected by large sand waves indicative of highly mobile sediment conditions.

Pre-dredging may be required where large sand waves are present to achieve adequate depth of cover, and areas of highly mobile sediment also may require cable protection (e.g., rock berm or concrete mattresses) to mitigate for the risk of post-installation exposure of cables due to erosion.

All ECC options are affected by large sand waves and highly mobile sediments. Therefore, no route is favored based on a substantially lesser amount of pre-dredging required prior to installation. The estimated pre-installation dredge volume in state waters is greatest for the western ECC option by virtue of the greater length of the route within State waters.

Boulders/Boulder Fields

The presence of very large individual boulders or boulder fields may also require additional seabed preparations prior to installation of the offshore export cables. Boulder fields were identified within the ECC during the 2020 G&G survey (Fugro 2021). Boulder fields are located in the common portion of the ECC after the three ECCs rejoin after exiting Muskeget Channel and were also documented along approximately 3.1 mi (5 km) of the common central and eastern ECC. Boulder clearance will require special pre-installation seabed preparation to clear boulders (see Section 5.5.1.1 for details of the pre-installation seafloor preparation. The 2021 G&G survey also documented boulder fields in one or more portions of the western ECC option, based upon preliminary assessment of the survey results.

Shipwrecks and Other Obstructions

In addition to boulder fields, the G&G surveys of the western and central routes identified additional potential shipwrecks and other obstructions. The 2020 G&G survey of the central route documented multiple potential shipwreck locations[47] (Goodwin Associates, 2021) and multiple other anthropogenic magnetic anomalies (many of which are likely lobster traps) within the central ECC. The 2021 G&G survey of the western route also documented potential shipwreck sites or debris fields as well as multiple anthropogenic anomalies with the ECC. The eastern ECC was not surveyed for such features, because identification of extremely shallow water depths ruled out the option for further consideration and survey. Both ECCs include potential shipwrecks or debris fields as well as other potential obstructions. Neither the western or central ECC is favored over the other based on presence of shipwrecks and/or other obstructions.

Existing and Planned Infrastructure

Corridor selection also considers the presence of other existing offshore cables and/or pipelines or intended location of planned future cables and/or pipelines, in order to mitigate (if possible) or carefully manage the risks associated with installing and maintaining cables in proximity to other infrastructure. There are three existing subsurface cables routes that extend from Martha's Vineyard to Falmouth in proximity to the project. However, all three ECC options would avoid crossings of those cables. In addition, Vineyard Wind will have a planned cable corridor through Muskeget Channel. The Mayflower Wind western ECC crosses the planned Vineyard Wind cables prior to entering Muskeget Channel, and then parallels and in some cases overlaps the Vineyard Wind ECC through the channel.

[46] Fugro. 2021. Marine Site Investigation Report. Mayflower Wind Project | Offshore Massachusetts, Final. 02.20030002-MSIR 02. Prepared for Mayflower Wind Energy LLC, Boston, MA. Prepared by Fugro USA Marine, Inc., Norfolk, VA. February 10, 2021

[47] Goodwin Associates. 2021. Marine Archeological Resources Assessment for the Mayflower Offshore Wind Farm and Export Cable Located in Massachusetts State Waters and OCS Block OCS-A-0521 Offshore Massachusetts. Interim Draft Report. Confidential. Prepared for Mayflower Wind Energy LLC, Boston, MA. Prepared by R. Christopher Goodwin & Associates, Inc. Federick, MD. January 8, 2021.

Table 4-9. Comparison of Offshore Export Cable Corridors Physical Characteristics

Characteristics	Western	Central	Eastern
Total Length [1][2] in mi (km)	50.9 (82)	54.7 (88)	53.4 (86)
Total Length in State Waters [2] in mi (km)	25.5 (41)	22.4 (36)	21.8 (35)
Minimum Water Depths <15 ft (4.6 m) [3] (Y/N)	Y [5]	Y [7]	Y
Sand Waves Present [3] (Y/N)	Y [5]	Y [7]	NA [8]
Extreme (> 26 ft [5 m]) Sand Waves Present [3][4] (Y/N)	Y [5]	Y [7]	NA [8]
Highly Mobile Sediments Present [3] (Y/N)	Y [5]	Y [7]	NA [8]
Boulders/Boulder Fields Present [3] (Y/N)	Y [5]	Y [7]	NA [8]
Dominant Sediment Type(s) [3]	Sand and gravel [5]	Sand and muddy sand, coarse sediment [7]	NA [8]
Maximum Potential Dredge Volume in State Waters [5] in 1,000 cy (1,000 m^3)	646 (494)	567 (434)	552 (422)
Total Potential Dredge Volume, State and Federal Waters [5] in 1000 cy (1,000 m^3)	1,292 (988)	1,387 (1,060)	1,355 (1,036)

(1) Length shown is from edge of Mayflower Wind Lease Area to landfall at Worcester Ave, presented for comparison; overall offshore cable length may be longer as cable route continues into Lease Area to Offshore Substation and related to micro-siting of the cables within the ECC.
(2) Length reported per cable rounded to up to the next whole km measure.
(3) Reported for length of ECC between the split from common southern ECC to the point where ECCs rejoin north of Muskeget Channel.
(4) Extreme sand waves defined as those larger than 26 ft (5 m)
(5) Per Mayflower Wind 2021 survey preliminary assessment and confirmed in certain areas by information presented in the Vineyard Wind COP.
(6) Auster, 1998 Primary Habitat cited from Vineyard Wind COP Vol II
(7) Mayflower Wind MSIR (2021)
(8) Information not available for route or segment of route

4.6.4.2 Environmental Characteristics

Table 4-10 compares the three ECC options relative to specific environmental criteria, including SSU resources as mapped in the Massachusetts Ocean Management Plan (OMP). The OMP specifies that cable projects (including those associated with offshore wind renewable energy projects) are only required to address their compliance with the performance standards for the following SSU resources:

- North Atlantic Right Whale core habitat
- Humpback whale core habitat
- Fin whale core habitat
- Hard/complex seafloor
- Eelgrass
- Intertidal flats

All three ECC options avoid core habitat mapped for North Atlantic Right Whale as well as Humpback and Fin whale core habitat. The offshore export cable corridors and landfall location(s) are not located within mapped intertidal flats SSU. Additionally, the use of HDD for the sea-to-shore transition for the ECCs will avoid impact to mapped eelgrass beds.

The three ECC options traverse mapped hard/complex seafloor as mapped in the OMP and confirmed based on benthic and geophysical surveys (Table 4-10). The area of hard/complex seafloor with the ECCs was greatest for eastern ECC in total acreage (1,153 ac [467 ha]) as well as on an acres per mi (52.9 ac/mi) basis which accounts for differences in ECC length within state waters between the three ECCs.

In addition, one largely intact paleolandscape feature was identified as part of the 2020 G&G surveys and has been identified for avoidance to the extent practicable. This feature is located near the landfall approach, and is common to all three ECC options.

In consideration of overall disturbance of previously undisturbed areas, the western ECC which parallels and maximizes co-location with the Vineyard Wind ECC will reduce the cumulative impact of the projects on resources within Muskeget Channel.

Table 4-10. Comparison of Offshore Export Cable Corridors Environmental Characteristics (1)

Characteristics	Western	Central	Eastern
ECC Length in State Waters in mi (km)	25.5 (41)	22.4 (36)	21.8 (35)
Area of ECC within OMP Mapped Hard / Complex Bottom (2)(3) in ac (ha)	972.2 (393.4)	1034.3 (418.6)	1153.3 (466.7)
Area of ECC within Mapped Eelgrass Beds (2)(4) (with HDD) in ac (ha)	—	—	—
Area of ECC within Mapped Intertidal Flats in ac (ha)	—	—	—
Area of ECC within Mapped Northern Right Whale Core Habitat (2)(5) in ac (ha)	—	—	—
Area of ECC within Mapped Fin and Humpback Whale Core Habitat (2)(5) in ac (ha)	—	—	—

(1) All estimated lengths based on distances to the Worcester Avenue landfall (preferred landfall location); rounded up to next whole km
(2) Length reported per cable rounded to up to the next whole km measure.
(3) Hard/Complex Bottom is an SSU Area defined and mapped in the Massachusetts OMP; measured as total area within the ECC.
(4) Eelgrass beds based on MassGIS and 2020 submerged aquatic vegetation (SAV) survey conducted by Mayflower Wind (AECOM, 2021a); impact to eelgrass beds avoided with HDD for all routes.
(5) Northern Right Whale Core Habitat as defined and mapped in the Massachusetts OMP. OMP Mapped areas referenced in this table have not been confirmed by Mayflower Wind field survey

4.6.4.3 Conclusion

Based on the information contained herein, the western ECC is the preferred offshore route from the Lease Area to the landfall location in Falmouth. Key features of the western ECC which favored this selection included:

1) Provides the shortest cable length from the lease area to the landfall location thus minimizing electrical losses;

2) Minimizes technical risks associated with shallow water depths, interaction with existing or planned infrastructure, and seabed conditions; and

3) Minimizes the potential for cumulative environmental impact associated with construction of both the Mayflower Wind and Vineyard Wind projects by maximizing co-location.

4.6.5 Environmental Considerations along the Preferred ECC

A discussion of the environmental impact producing factors associated with the export cable installation and environmental considerations related to the selected western option is discussed below.

4.6.5.1 Export Cable Installation

Disturbance to the sea bottom from export cable installation will include the trench footprint, the area surrounding the trench where sediment suspended during installation will settle, and the footprint of any cable protection, such as mattresses. The seafloor may require preparation, including leveling, sand wave removal, and boulder removal, prior to installing cables. Additionally, for areas where anchoring may be required, anchor impacts have been considered.

Cable Installation Tool

Cable installation tools are described in detail in Section 5.5.1.2 Depending on the installation survey findings and seabed conditions encountered, several preparation and installation methods may be utilized to install the export cables. These methods include vertical injector; jetting sled; jetting ROV; pre-cut plow; mechanical plowing; and mechanical cutting ROV system. These cable laying techniques can involve cable pre-installation followed by burial and/or simultaneous cable installation and burial.

Anchoring

It is expected that a combination of a moored vessel solution and a Dynamic Positioning (DP) vessel solution will be used for the offshore export cable installation. The split between vessels will be determined based on the water depth profile along the route and the route length compared to cable-carrying capacity. A DP vessel maintains its position and heading by utilizing its own propellers and thrusters. For water depths greater than 49.2 ft (15.0 m), it is expected that a DP vessel can be used. Nearshore areas and areas with shallow water less than 49.2 ft (15.0 m) may necessitate a moored vessel solution, as operation of vessel thrusters is typically not realistic in these water depths. The maximum anchor radius from the cable installation barge will be approximately 2,625 – 3,281 ft (800 - 1,000 m) based on the anchor line length. This maximum radius will be forward and aft of the barge and will not extend outside of the width of the ECC. It is anticipated that anchoring will only occur along approximately 12 – 25 mi (20 – 40 km) of the nearshore ECC.

Cable Protection

Cable protection is typically required at any existing cable crossing locations and for areas where cable burial cannot be achieved. For cable protection, methods will be determined based on the location, length, and extent of the non-burial, and when all remedial burial solutions have been ruled out. Remedial burial techniques may include jet trenching or controlled flow excavation that fluidizes the surrounding sand to allow the cable to further settle into the trench. These secondary cable protection methods may include the creation of a rock berm, concrete mattress placement, rock placement, and fronded mattresses. Half shells may be used as well, and they are typically used to protect cables ends at pull-in areas and where trenching is not possible.

Based on preliminary understanding of site conditions from G&G surveys completed in 2019 and 2020, Mayflower Wind estimates 10 percent of the offshore export cable route will require additional secondary cable protection. Placement of secondary cable protection would likely be considered a permanent alteration of Land Under the Ocean.

Any required crossings of other Project cables or existing third-party cables by the offshore export cables will utilize mutually agreeable crossing designs consistent with typical industry practices, which typically employ use of concrete mattresses (though other crossing methods may be assessed for use). Minimum separation distances will be determined so that both cables can be safely operated with risk of damage to either cable mitigated to the extent practicable.

Sand Wave Dredging

The seafloor may require preparation, including leveling, sand wave removal, and boulder removal, prior to installing cables. An orange peel grabber may be used for localized boulder removal and a plow may be used for boulder field removal. If sand waves are present, the tops may need to be removed to provide a level bottom to install the export cable. Removal of sand waves can be conducted using a trailing suction hopper dredger, a water-injection dredge in shallower areas, or constant flow excavators.

4.6.5.2 Wetlands

Marine geophysical and geotechnical survey work performed in 2020 and in 2021 have enabled Mayflower Wind to assess installation methods and challenges within the offshore ECC. While the offshore ECC is suitable for cable installations, large sand waves are present across certain portions of the ECC. Pre-cable-laying dredging may be needed to ensure sufficient cable burial beneath the stable seabed. Mayflower Wind anticipates that any dredged material would be side cast next to where cable installation will occur. Mayflower anticipates that dredging associated with sand wave removal may be required along 10 percent of the route length. Areas most likely to require dredging would occur within Muskeget Channel and Nantucket Sound. Given the shifting nature of large sand waves, field conditions at the time of installation will determine the specific locations that require dredging.

In addition, limited areas where the seafloor is composed of consolidated materials may necessitate cable-trenching rather than jetting. While the priority will be to achieve sufficient burial depth in these areas, if burial is unsuccessful, it may be necessary to use concrete “mattresses” or placement of a layer of rock to protect the cable; Mayflower Wind will seek to avoid and/or minimize the use of such cable armoring, thus mitigating for potential impacts from installation.

The Massachusetts regulations implementing the Wetland Protection Act (WPA) describe various coastal wetland resource areas. This section addresses coastal resource areas affected by the Project that are below mean low water. Wetland resource areas affected above mean low water are discussed in Section 5.2.1. The offshore ECC is located entirely within Land Under the Ocean (310 CMR 10.25), and certain segments pass through Land Containing Shellfish as defined in the regulations (310 CMR 10.34). These two resource areas and compliance with the relevant regulatory requirements are described below. The use of HDD will result in the avoidance of impacts to nearshores areas, coastal beach coastal dunes, and/or coastal bank. Figure 4-5 and Figure 4-6 illustrate the regulated wetlands in proximity to the HDD landfalls for Worcester Avenue and Central Park, respectively

Land Under the Ocean

Land Under the Ocean is defined as the submerged land that extends seaward from Mean Low Water (MLW) out to the boundary of a municipality’s jurisdiction. Where the Project is in Nantucket Sound, this municipal offshore boundary is coincidental with the three nm (3.45-statute-mi) limit that extends seaward from municipalities. Submerged land in the central portion of Nantucket Sound, which is beyond these municipal boundaries, is under federal jurisdiction; Figure 4-4 illustrates the portion of the ECC within state and federal jurisdictions.

Impact Estimate

The immediate area impacted by offshore export cable installation is expected to be approximately 19.7 ft (6 m) wide. Dredging, which may be needed in areas where sand waves are present to achieve target depths cover, will result in an additional impact area. Where dredging is necessary, it will occur within an approximately 164-foot (50 meter) wide corridor centered on the alignment of the export cable. The estimated area to Land Under the Ocean associated with the export cable installation is reported in Table 4-11.

Table 4-11. Impacts to Land Under the Ocean (State waters only)

Direct Installation Disturbance Zone in ac (ha) (1)	Total Disturbance with Seafloor Preparation (2)
61.0 (25.7)	612.6 (247.9)

(1) Disturbance with the installation tool is assumed to be 6 meters wide per cable
(2) Total disturbance with seafloor prep includes direct installation, installation vessel anchoring, boulder clearance and sand wave pre-dredging and post-installation cable protection for four cables

Compliance with Performance Standards of the Wetland Protections Act

As afforded at 310 CMR 10.24(7), it is within the issuing authority’s discretion to consider the magnitude of the alteration and the significance of the project site to the interests identified in G.L. c. 131 § 40, the

availability of reasonable alternatives to the proposed activities, the extent to which disturbances are mitigated, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in G.L. c. 131 § 40. Although Mayflower Wind is of the opinion that the Project as currently proposed meets the applicable performance standards for all wetland resource areas where construction related activities are proposed, the Limited Project provisions specifically apply to the installation of an electric transmission system beneath Land Under the Ocean, and within Land Subject to Coastal Storm Flowage per 310 CMR 10.24(7)(b), which states:

> *10.24(7)(b): The construction, reconstruction, operation and maintenance of underground and* overhead public utilities, limited to electrical distribution or transmission lines, or communication, sewer, water and natural gas lines, may be permitted as a limited project pursuant to 310 CMR 10.24(7) provided that the project complies with all applicable provisions of 310 CMR 10.24(1) through (6), (9) and (10), and (7)(b)1. through 9.

The proposed Project will comply with "all applicable provisions of 310 CMR 10.24(1) through (6), (9) and (10), and (7)(b)1 through 9" and as such qualifies as a Limited Project.

The ECC is located either wholly or partially within two resource areas subject to jurisdiction under the Massachusetts WPA regulations; Land Under the Ocean (310 CMR 10.25) and Land Containing Shellfish as defined in 310 CMR 10.34. A detailed description of the Project's compliance with the performance standards set forth in the Massachusetts WPA regulations for these two resource areas is provided below.

The Massachusetts WPA regulations require that projects located within Land Under the Ocean satisfy general performance standards when the resource is found to be significant to the protection of marine fisheries, protection of wildlife habitat, storm damage prevention, or flood control (310 CMR 10.25 (3) through (7)). The proposed dredging required for the offshore export cable installation does not constitute either improvement or maintenance dredging and as such 310 CMR 10.25 (3) and (4) are not applicable. however, 310 CMR 10.25(5) states:

> *(5) Projects not included in 310 CMR 10.25(3) or (4) [relating to dredging projects for navigational purposes] which affect nearshore areas of land under the ocean* shall not cause adverse effects by altering the bottom topography so as to increase storm damage or erosion of coastal beaches, coastal banks, coastal dunes, or salt marshes.

A temporary displacement of marine sediments will occur during the installation of the offshore export cables as the cables are buried to a sufficient depth (Please refer to Section 5.5.1 for detailed construction-information). Under normal conditions, these displaced sediments return to the ocean floor in the wake of the sea-plow generally within a few meters of the furrow created by the cable installation. Accordingly, the proposed work activities will not cause adverse effects by significantly altering the bottom topography that would result in an increase to storm damage or erosion of coastal wetland resource areas including coastal beaches, coastal banks, coastal dunes, or salt marshes. It should also be noted that much of the seafloor along the cable route through state waters is a dynamic, wherein, bottom sediments are shifting, and bottom contours may change substantially following major weather events (e.g., Nor'easters and hurricanes).

It is anticipated that additional dredging will be required in areas where sand waves are present in order to ensure sufficient depth of cover for the export cables to prevent the cable from being exposed as the sand wave migrates across the sea floor. When sand waves are encountered it will be necessary to remove an area of the sand wave of sufficient width and depth so the cable installation tool (e.g., jet-plow) can make its way through the sand wave and install the export cable beneath the seabed. The marine sediments removed from the sand wave will be side cast during installation. Although sand waves are frequently located in high-energy marine environments in both Muskeget Channel and Nantucket Sound, they are located significant distances (greater than 6,500 ft (1,981 m)) from the nearest coastal beach, coastal bank, coastal dune, or salt marsh.

Dredging required for offshore export cable installation will occur within relative narrow corridors in areas where they are a significant distance from the coastline, and it is not anticipated that the installation of the offshore export cables will result in an increase the risk of erosion in coastal areas.

As stated in 310 CMR 10.25(6):

> *(6) Projects not included in 310 CMR 10.25(3) which affect land under the ocean shall if water-dependent be designed and constructed, using best available measures, so as to minimize* adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries habitat or wildlife habitat caused by:
>
> *(a) alterations in water circulation;*
>
> *(b) destruction of eelgrass (Zostera marina) or widgeon grass (Rupia maritina) beds;*
>
> *(c) alterations in the distribution of sediment grain size;*
>
> *(d) changes in water quality, including, but not limited to, other than natural fluctuations in the level of dissolved oxygen, temperature or turbidity, or the addition of pollutants; or*
>
> *(e) alterations of shallow submerged lands with high densities of polychaetes, mollusks or macrophytic algae.*

The Project is water-dependent as defined in the Massachusetts Waterways Regulations at 310 CMR 9.12(2)(b)10, which includes infrastructure facilities used to deliver electricity to the public from an offshore facility located outside the Commonwealth. The Project has been designed using the best available measures in order to mitigate for adverse effects.

A range of cable installation methods have been proposed by Mayflower Wind, as described in Section 5.5.1. These methods have been chosen in order to provide the flexibility to achieve target depth of cover in different soil types while minimizing to the extent practicable impacts to the seabed and water quality, which will be temporary in nature. The installation of the export cables will require temporary displacement of marine sediments to achieve the necessary cable cover depths, but it is anticipated that the method(s) of installation will result in minimal alteration to the bathymetry of the seabed. As previously discussed, additional dredging, which will result in additional alteration, may be required in areas where sand waves are present. Sand waves typically develop in high energy areas with constantly changing bathymetry, and any additional alteration due to the Project is anticipated to be temporary. As all impacts are anticipated to be minor and temporary, significant impacts to water circulation or sediment grain size distribution are not anticipated.

The ECC has been sited to avoid areas of eelgrass or widgeon grass, and the installation methodologies will mitigate for impacts to benthic organisms. Mayflower Wind will consult with the Division of Marine Fisheries (DMF) to mitigate for impacts to mollusks and other benthic organisms.

In addition, under 310 CMR 10.25(7), projects with certain adverse effects are presumed impermissible:

> *(7) Notwithstanding the provisions of 310 CMR 10.25(3) through (6), no project may be permitted which will have any adverse effect on s*pecified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

The 15th Edition of the NHESP Atlas (August 1, 2021) identifies all of the state waters within Nantucket Sound as Priority habitat of state-listed rare species. The ECC will cross Priority Habitat within state waters. Mayflower Wind will continue to consult with NHESP in accordance with the Massachusetts Endangered Species Act (MESA, 321 CMR 10.14) to ensure that any potential impacts to offshore rare species are avoided or mitigated to greatest extent practicable. These required consultations with NHESP are consistent with the procedures established under 310 CMR 10.37. Potential impacts and mitigation measures for rare species are discussed in Section 4.6.4.3.

Land Containing Shellfish

The Massachusetts WPA regulations define Land Containing Shellfish as land under the ocean, tidal flats, rocky intertidal shores, salt marshes, and land under salt ponds that is known to support the following species of shellfish: Bay Scallop (*Argopecten irradians*); Blue Mussel (*Mytilus edulis*); Ocean Quahog (*Arctica islandica*); Oyster (*Crassostrea virginica*); Quahog (*Mercenaria merceneria*); Razor Clam (*Ensis*

directus); Sea Clam (*Spisula solidissima*); Sea Scallop (*Placopecten magellanicus*); and Soft Shell Clam (*Mya arenaria*).

A segment of the ECC is located within Land Containing Shellfish within state waters. According to maps published by the DMF, the corridors cross the following areas mapped as shellfish suitability areas (see Figure 4-7). It is anticipated that the installation of the offshore export cables will result in mortality of shellfish and other organisms located directly within the path of the installation tool, as well as any organisms located within the water column that are impacted by water withdrawals. Impacts are expected to be temporary, and species will likely recolonize the dredge pathway in a short timespan given the proximity of nearby similar habitats and species, the limited area of disturbance within the extent of the larger habitat, and the mobility of the organisms. The unaffected areas located immediately adjacent to the dredge pathway will likely act as refuge areas for species capable of avoiding installation activities, and will allow species to begin recolonizing disturbed areas post-construction.

Impact Estimate

The estimated area of Land Containing Shellfish associated with the export cable installation and dredging is reported in Table 4-12.

Table 4-12. Impacts to Land Containing Shellfish(1) (State waters only)

Direct Installation Disturbance Zone in ac (ha) (2)	Total Disturbance with Seafloor Preparation (3)
39.7 (16.1)	341.9 (138.4)

(1) Measured based on MassGIS “Shellfish Suitability Area” layer
(2) Disturbance with for the installation tool is assumed to be 6 meters wide per cable
(3) Total disturbance with seafloor prep includes direct installation, installation vessel anchoring, boulder clearance and sand wave pre-dredging, HDD exit pit, and post-installation cable protection for four cables

Compliance with Performance Standards of the Wetland Protections Act

The Massachusetts WPA regulations require that projects located in resource areas that are determined to be significant to the protection of land containing shellfish and therefore marine fisheries shall satisfy certain general performance standards (310 CMR 10.34 (4) through (8)). These performance standards are excerpted below:

> *(4) Except as provided in 310 CMR 10.34(5), any project on land containing shellfish shall not adversely affect such land or marine fisheries by a change in the productivity of* such land caused by:
>
> > *(a) alterations of water circulation;*
> >
> > *(b) alterations in relief elevation;*
> >
> > *(c) the compacting of sediment by vehicular traffic;*
> >
> > *(d) alterations in the distribution of sediment grain size;*
> >
> > *(e) alterations in natural drainage from adjacent land; or*
> >
> > *(f) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of salinity, dissolved oxygen, nutrients, temperature or turbidity, or the addition of pollutants.*

For a majority of the ECC, the construction related impacts of the export cable installation are temporary, there are no anticipated alterations to water circulation, relief elevation, or distribution of sediment grain size once the cable has been successfully installed. Installation of cables within approximately 10% of the total ECC length may require permanent cable protection (e.g., concrete mattresses). This will result in a change in relief and substrate condition within those areas. Mayflower Wind expects that the cable

protection will colonize with benthic species over time, providing desirable habitat for certain species. The terrestrial components of the Project will not result in a permanent change to natural drainage from adjacent land, or the compaction of sediments from vehicular traffic, As described above, it is anticipated that the installation of the offshore export cable installation will result in some temporary impacts to shellfish in the area immediately along the installation path.

> *(5) Notwithstanding the provisions o*f 310 CMR 10.34(4), projects which temporarily have an adverse effect on shellfish productivity but which do not permanently destroy the habitat may be permitted if the land containing shellfish can and will be returned substantially to its former productivity in less than one year from the commencement of work, unless an extension of the Order of Conditions is granted, in which case such restoration shall be completed within one year of such extension.
>
> *(6) In the case of land containing shellfish defined a*s significant in 310 CMR 10.34(3)(b) (i.e., those areas identified on the basis of maps and designations of the Shellfish Constable), except in Areas of Critical Environmental Concern, the issuing authority may, after consultation with the Shellfish Constable, permit the shellfish to be moved from such area under the guidelines of, and to a suitable location approved by, the Division of Marine Fisheries, in order to permit a proposed project on such land. Any such project shall not be commenced until after the moving and replanting of the shellfish have been commenced.

The Proponent will work with the DMF and the Town of Falmouth to identify appropriate mitigation measures to minimize impacts to shellfish species, if deemed appropriate and feasible.

> *(8) Notw*ithstanding the provisions of 310 CMR 10.34(4) through (7), no project may be permitted which will have any adverse effect on specified habitat of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

Mayflower Wind will continue to consult with the NHESP in accordance with the MESA (321 CMR 10.14) to ensure that impacts to offshore rare species located within the ECC are avoided or mitigated to greatest extent practicable during installation. These required consultations with NHESP are consistent with the procedures established under 310 CMR 10.37.

4.6.5.3 Water Quality and Water Resources

Installation of the proposed offshore export cables will have localized and temporary effects on water quality, primarily related to trenching and limited dredging where sand waves are encountered. Temporary sediment disturbance associated with Project activities will cause minor, short-term, and localized increases in total suspended solids along the ECCs. Jet-plowing, minimizing the amount of sand wave dredging, and using DP vessels (as opposed to vessels that drop anchors) will minimize sediment disturbance, although some anchoring during cable installation may be necessary. Estimated dredge volumes for the ECCs are shown in Table 4-13.

Table 4-13. Impacts to Land Under the Ocean (State waters only,)

Parameter	Dredge Volume in 1,000 cy (1,000 m^3) (1)
Per Cable	161.5 (123.5)
Total for All Cables	646.1 (494.0)

(1) Includes pre-dredging of sand waves for four cables; Does not include 6,259 cy of dredging associated with the HDD exit pits for four cables.

Sediment Dispersion Modeling

The area surrounding the export cable that could be affected by re-sedimentation of sediment suspended during installation was estimated using a model described in Mayflower Wind Sediment Plume Impacts from Construction Activities (Fugro 2021). The model evaluated three segments of the ECC identified based on sediment characteristics that influence sediment suspension and dispersion (primarily grain size). Due to the significant overlap between the three ECC options, the central option (total length equal

to 88 km [55 mi]), was modeled as it was considered to be representative of the other ECC options. To account for the heterogeneity, the ECC, with the central option through Muskeget Channel, was broken into three segments: Nantucket Sound; Muskeget Channel, and the southern ECC.

Results of the sediment dispersion modeling for the ECC segments analyzed are summarized in Table 4-14, below.

Table 4-14. Estimated Area of Redisposition of Material Suspended During Export Cable Installation

Deposition thickness threshold inches (in) (centimeters [cm])	Nantucket Sound KP 0 to KP 20(1)		Muskeget Channel KP 20 to KP 45(1)		South of Muskeget Channel(1), (2) KP 45 to KP 88	
	Maximum observed distance from installation	Area of deposition exceeding threshold	Maximum observed distance from installation	Area of deposition exceeding threshold	Maximum observed distance from installation	Area of deposition exceeding threshold
	ft (m)	ac (ha)	ft (m)	ac (ha)	ft (m)	ac (ha)
0.01 (0.02)	3,126 (953)	301.5 (122)	2,365 (721)	437.4 (177)	2,378 (725)	857.5 (347)
0.02 (0.05)	2,289 (698)	217.5 (88)	1,437 (438)	321.2 (130)	1,738 (530)	625.2 (253)
0.04 (0.1)	1,653 (504)	165.6 (67)	620 (189)	239.7 (97)	1,174 (358)	496.7 (201)
0.20 (0.5)	72.2 (22)	113.7 (46)	108.2 (33)	158.1 (64)	288.6 (88)	279.2 (113)
0.39 (1)	55.8 (17)	96.4 (39)	88.6 (27)	133.4 (54)	85.3 (26)	212.5 (86)
1.97 (5)	29.5 (9)	222.4 (90)	52.5 (16)	54.4 (22)	32.8 (10)	16.8 (6.8)
3.94 (10)	N/A	0	N/A	0	N/A	0

Source: Mayflower Wind Construction and Operations Plan (COP) Appendix F1. Final Sediment Plume Impacts from Construction Activities, Mayflower Wind Energy LLC | USA C170693-02 05 | 8 February 2021 Final Report, Prepared by Fugro USA Marine Inc.(Arlington, TX). https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Appendix%20F1_Sediment%20Plume%20Impacts%20from%20Construction%20Activities.pdf

(1) Modelling was performed using sediment grain size data for the central route. Sediment characteristics within the segments is similar among all cable corridors, and as such results provide a representative indication of sediment dispersion and deposition for the Preferred western ECC.

(2) Approximately 2 km of the portion of the ECC south of Muskeget Channel is located within Massachusetts waters.

Offshore Vessel Refueling and Spill Prevention

Mayflower Wind will use a number of different vessels for the transportation, installation, and operation of Project components. The Project's vessel deployment plan will be finalized in coordination with selected contractors. A number of support vessels will also be used during all Project phases for support tasks. Vessels used in construction will require refueling. Mayflower Wind anticipates that smaller vessels will refuel in port. However larger installation vessels may require offshore refueling. Mayflower Wind will use a Jones Act-compliant bunker barge or vessel for offshore refueling. The offshore refueling process includes three primary activities including (1) mooring of the fueling vessel to the installation vessel, (2) transfer of fuel from the fueling vessel to the installation vessel, and (3) de-mooring from the installation vessel. In some cases, is may be necessary to relocate the installation vessel to a sheltered location for refueling.

Mayflower Wind believes that all safety and environmental incidents can be prevented; the foundation of the Mayflower Wind Health, Safety, Security & Environment Policy is to ensure risk is managed effectively and to uphold corporate values of honesty, integrity and respect. Mayflower Wind has developed a Safety Management System which defines a comprehensive safety system that will govern all future construction and operation activities. These Safety Management Systems will be implemented and fully functional before construction activities begin. Mayflower Wind will follow all federal, state, and local regulations pertaining to chemical and oil transfers to site, storage, removal from site, disposal, and accidental releases.

Accidental discharges of vessel fuels and oil could occur during construction and decommissioning. Best management practices for refueling and equipment servicing will be in place. As accidental events may

still occur, Mayflower Wind has included measures for cleanup of accidental releases in the Oil Spill Response Plan (OSRP) in accordance with the requirements of 30 Code of Federal Regulations (CFR) Part 254. In accordance with 30 CFR 254, the OSRP will demonstrate that Mayflower Wind can respond effectively in the unlikely event that oil is discharged from the Project. The OSRP will provide for rapid spill response, clean up, and other measures that would mitigate for any potential impact to affected resources from spills or accidental releases, including spills resulting from catastrophic events. Routine training and exercises regarding the content of the OSRP will be carried out regularly to prepare personnel to respond to emergencies should they occur. Secondary containment systems will be provided at operating areas more prone to spillage.

4.6.5.4 Rare Species

The entire portion of the ECC located in state waters is located within areas mapped by the Massachusetts NHESP in Nantucket Sound and Falmouth Harbor as Priority Habitat (PH 2158) and Estimated Habitat (EH 1366) for rare species. (Massachusetts Natural Heritage Atlas, 15th Edition, 2021). Species associated with these mapped habitats include: Roseate Tern, Common Tern, and Least Tern. In accordance with the MESA (321 CMR 10.14), Mayflower Wind has initiated consultations with NHESP to ensure that impacts to rare species located within the ECC are avoided or mitigated to the greatest extent practicable.

4.6.5.5 SSU Areas

As described above, the Massachusetts OMP identifies the following SSU areas for cable projects: (1) core habitat of the North Atlantic Right Whale, fin, and humpback whales; (2) hard/complex seafloor; (3) eelgrass; and (4) intertidal flats. For this Project, North Atlantic Right Whale Core Habitat, hard/complex seafloor, and eelgrass are all mapped in proximity to the ECCs; core habitat for other whale species is not present in or near the ECCs. and landfall locations have been assessed and selected partially on the basis of avoiding mapped eelgrass habitat. The sea-to-shore transition will be accomplished with HDD, from approximately 0.6 mi (1 km) offshore to the onshore landfall point.

As described above, an installation corridor has been identified around the ECC to provide some flexibility for final routing. For example, as shown on Figure 4-4, the installation corridor is narrower where necessary to avoid features such as SSU areas (e.g., hard/complex bottom). Nonetheless, some areas of mapped hard/complex bottom cannot be avoided, and the length the ECC crosses through hard/complex bottom is defined in Table 4-9.

Section 6.4.5 summarizes the Project consistency with the Massachusetts OMP.

North Atlantic Right Whale Core Habitat

The North Atlantic right whale (*Eubalaena glacialis*) is both a state- and federally listed endangered species that regularly uses Massachusetts waters for feeding. The OMP established the North Atlantic right whale core habitat SSU resource based on data that identified statistically significant use by right whales of certain areas of the Massachusetts coast (MassGIS, 2020b).

The western, central and eastern ECCs are not located within the North Atlantic right whale core habitat SSU resource area. However, the western ECC passes 0.5 mi (0.8 km) to the east of the North Atlantic right whale core habitat SSU resource area located south of Chappaquiddick Island (Figure 1-13) (MassGIS, 2020b).

Hard/Complex Seafloor

Hard seafloor is seabed characterized by exposed bedrock or concentrations of boulder, cobble, or other similar hard bottom distinguished from surrounding unconsolidated sediments. Complex seafloor is a morphologically rugged seafloor characterized by high variability in bathymetric aspect and gradient. Biogenic reefs and man-made structures, such as artificial reefs, shipwrecks, or other functionally equivalent structures, may provide additional suitable substrate for the development of hard bottom biological communities. Hard/complex seafloor is seabed characterized singly or by the combination of

hard seafloor, complex seafloor, artificial reefs, biogenic reefs, or shipwrecks and obstructions to navigation (EEA, 2015b).

The Falmouth ECC will cross through areas of hard/complex seafloor SSU resource as mapped by the OMP (Figure 1-13). Cable projects are considered an allowed use under the OMP for certain SSU resources, including hard/complex seafloor. However, the guidelines outlined in the OMP call for avoidance of hard/complex seafloor to the extent practicable (MassGIS, 2020j). Mayflower Wind is currently conducting geophysical and geotechnical surveys of the offshore ECCs to identify locations of hard/complex seafloor to inform the final placement of the offshore export cables to avoid, minimize, or mitigate the potential effects to this SSU resource.

Eelgrass

As described in Sections 4.6.3.4 and 6.4.5, the Massachusetts OMP identifies eelgrass as an SSU resource for cable projects. Typically, eelgrass habitat can be found relatively close to shore, and in the general Project area there is no mapped eelgrass more than a few thousand ft offshore. It is the intent of the Project to avoid mapped eelgrass using HDD methods.

Portions of the Falmouth ECC and the preferred and alternate landfall approaches in Falmouth will cross areas of MassDEP mapped eelgrass SSU resources (Figure 1-13). Cable projects are considered an allowed use under the OMP for certain SSU resources, including eelgrass. However, Mayflower Wind conducted field surveys in August 2020 to delineate the extent of seagrass beds at the preferred and alternate Falmouth landfall locations. The approach to the alternate landfall had nearly continuous submerged aquatic vegetation (SAV) bed coverage consisting primarily of eelgrass, with only a few areas of open bottom. The Worcester Avenue Landfall (which would also cover the Central Park Landfall) approach had patchier eelgrass distribution with several large areas devoid of eelgrass. However, due to the shallower water depths, eelgrass at Worcester Avenue extends farther offshore with the alternate approach. The underwater video data confirmed that the primary species present in the SAV bed was eelgrass

Mayflower Wind will use HDD to transition between the offshore and onshore components of the Project. Water depth at the landfall approach is an important factor at HDD punchout locations. The HDD exit pit, located approximately 0.6 - 0.9 mi (1 - 1.5 km) offshore, will be located at water depths between 16 and 26 ft (5.0 to 8.0 m).

Since the landfall sites for both the Preferred Route and Noticed Alternative Route and their associated Variants will utilize HDD to avoid impacts to eelgrass, there is no significant difference between these routes in terms of potential impacts to eelgrass.

4.6.5.6 Marine Archaeology

R. Christopher Goodwin & Associates was contracted to provide archaeological support for a high-resolution geophysical marine survey and subsequent geotechnical activities along the ECC. The western ECC G&G survey to support the Marine Archaeological Resources Assessment was conducted in 2021 (Fugro, report pending)

Archival and document research and field investigations were conducted as part of the cultural resource examination, and background research included a review of historic documents, previous research reports, a site file check, shipwreck inventories, secondary sources, and historic map analysis. Materials from archives at the Massachusetts Board of Underwater Archaeological Resources were accessed. These data assisted in validating the geophysical data and interpretations.

Historic documents indicate hundreds of shipwrecks and aircraft losses offshore from Cape Cod and the Islands. Based on magnetic anomalies and side scan sonar contacts, we anticipate that one or more potential shipwrecks and or debris fields associated with potential shipwrecks may be identified within the ECC; where appropriate recommendations will be made for avoidance zones. Additional data review and research will be required to determine if any of the potential shipwrecks are likely to yield historical information warranting consideration for listing in either the National Register of Historic Places (NRHP) or the State Register of Historic Places. One intact paleolandscape with archaeological potential was

identified within the ECC area of potential effect (APE) (near the landfall approach) which has been flagged for avoidance. Once analysis of the survey results is complete, a final report will be prepared to provide additional documentation regarding marine archaeological resources within the ECC.

4.6.5.7 Avian Resources

Portions of the ECC, including Muskeget Channel include areas with high avian species richness and abundance, and falls within Sea Duck Core Areas. Certain marine bird species may be disturbed by vessel-based construction activities. However, most birds within the ECC are likely habituated to vessel traffic, especially within Muskeget Channel. Although unlikely, there is a small potential for avian collision with vessels during low-visibility conditions. Most avian species (excluding gulls) are not likely be attracted to vessels during fair weather conditions. Therefore, because of the limited exposure to construction vessels, short term duration of construction and further behavioral limitation of proximity during fair weather conditions, no population level effects are expected for marine and coastal birds. Potential for collision risk will be further reduced with the use of down-shielding of lighting to the extent practicable to limit bird attraction and disorientation. Temporary displacement from forage areas associated with the construction activities will be of short duration. No long-term impacts to avian populations are anticipated.

4.6.5.8 Fish and Fisheries Resources

An important aspect of Mayflower Wind's siting strategy has been to avoid and mitigate for impacts, including impacts to fish and fisheries resources. The alignment of the ECC is intended to mitigate for impacts to fish and fishing. Measures to mitigate for impacts include, but are not limited to:

- Routing of offshore export cables to avoid sensitive habitats used by fish to the greatest extent practicable, including routing of the cable to avoid all eelgrass (see Section 6.4.5 for a discussion of consistency with the Massachusetts OMP;
- Ongoing consultation with commercial and recreational fisherman on the location of the cables;
- Planning and design of cable burial to reduce impacts to fishing during Project operations; and
- Implementation of a Fisheries Communications Plan (FCP), including the use of a Fisheries Liaison Officer (FLO) before, during, and after cable installation (see Attachment F for the FCP).

Mayflower Wind is actively engaged in outreach and two-way communication with the fishing community and with organizations that work on the overlap of fishing and offshore wind. Those in the fishing community that Mayflower Wind has communicated with range from individuals to fishing captains to large businesses, and the organizations range from federal agencies to non-profits to task forces. Mayflower Wind is currently working with three Fisheries Representatives (FRs), including the Massachusetts Lobstermen's Association (MLA), the New Bedford Port Authority (NBPA), and the Commercial Fisheries Center of Rhode Island (CFCRI). Mayflower Wind's FLO and other members of the team talk directly with fishermen, sit on boards and working groups of organizations alongside fishermen, and engage directly with fishermen in scientific research and other efforts. Project development has been and will continue to incorporate input from stakeholders in the fishing industry in a way that allows it to minimize interference with fishermen that have been fishing in the regional area for hundreds of years. Mayflower Wind will continue to strengthen existing and build new relationships with fishing organizations throughout Project development, construction, and operations

Mayflower Wind's three FRs, the MLA, the NBPA and CFCRI, collaborate on initiatives that mitigate for impacts to fisheries in the Offshore Project Area, provide information to Mayflower Wind from the fishing industry, and disseminate information from Mayflower Wind to the fishing industry.

Commercial and recreational fishermen may be temporarily excluded from actively fishing within or transiting through the localized construction areas and safety exclusion zones during this phase of the proposed Project. This may result in a temporary loss of access to fishing grounds. While construction activities are expected to cover a total duration of up to 3 years, each construction activity (e.g., wind turbine generator (WTG) installation, cable lay, etc.) will only cover discrete and localized portions of the Offshore Project Area on a temporary basis, relative to the available open water to navigate through, or grounds to fish within. Once construction activities are completed within safety exclusion zones, marine

activities, including commercial and recreational fishing, would be allowed to continue as they normally would prior to construction.

4.6.5.9 Marine Mammals

Mayflower Wind evaluated the best available literature and government databases; local and regional information evaluating the habitat use, abundance, and distribution of marine mammal species known to occur in Massachusetts waters; and marine mammal-specific surveys conducted for the proposed Project. During the construction phase, marine mammals may co-occur with, and be affected by, Project activities in the export cable corridor near the Muskeget Channel. During the operations phase,

Marine mammal species that are likely to occur in the vicinity of the ECCs, and are considered common or seasonally common, include the North Atlantic Right Whale (NARW; *Eubalaena glacialis*), Humpback Whale (Megaptera novaeangliae), Fin Whale (*Balaenoptera physalus physalus*), Sei Whale (*Balaenoptera borealis*), Minke Whale (*Balaenoptera acutorostrata acutorostrata*), Atlantic White-Sided Dolphin (*Lagenorhynchus acutus*), Short-Beaked Common Dolphin, Bottlenose Dolphin (Western North Atlantic Offshore Stock), Harbor Porpoise (*Phocoena phocoena*), Harbor Seal (*Phoca vitulina concolor*), and Gray Seal. Other marine mammals may also occur near the ECCs but are less common. When in the vicinity of the ECCs during construction, these species could be exposed to temporary stressors such as noise, increased vessel traffic, and equipment in the water that may result in short-term, localized disturbance of individuals.

Baleen whales are most frequently observed traveling through the MA/RI Wind Energy Area (WEA) in the spring and summer, particularly near and within the Muskeget Channel in the winter and spring while migrating between northern and southern feeding areas (BOEM, 2014). The exception to this seasonal occurrence is the blue whale (*Balaenoptera musculus*), which is considered to be a rare winter migrant in the MA/RI WEA. Toothed whales (e.g., sperm whale [*Physeter macrocephalus*], common bottlenose dolphin [*Tursiops truncatus*], pilot whale [*Globicephala* spp.]) can primarily be found within the Project Area in the summer and fall, and occasionally during the winter and spring seasons (BOEM, 2014). The harbor porpoise (*Phocoena phocoena*) is typically observed in the Project Area year-round, with peak abundance occurring during the winter and spring seasons. Pinniped species are present in the MA/RI WEA year-round with a lower abundance in the summer (DON, 2007).

Ship engines and vessel hulls emit continuous sound which overlaps with the hearing frequency range for all marine mammals (Erbe et al., 2019; National Science Foundation & U.S. Geological Survey [USGS], 2011). Cable installation vessels are expected to have similar noise profiles. Researchers have reported a change in the distribution and behavior of marine mammals in areas experiencing increased vessel traffic, likely due to increases in ambient noise from concentrated vessel activity (Mikkelsen et al., 2019; Tsujii et al., 2018; Pirotta et al., 2012; Erbe, 2002a; Jelinski et al., 2002). Possible effects from vessel noise are variable and would be contingent on species and other factors such as the marine mammal's activity, its proximity to the vessel, and its habituation to the vessel traffic noise and vessel movements. Because vessel traffic throughout the MA/RI WEA is typically high, marine mammals local to the area are presumably habituated to common vessel noise (BOEM, 2014). NARWs are known to continue to feed in Cape Cod Bay despite disturbance from passing vessels (Nowacek et al., 2004; Brown & Marx, 2000). Construction vessels will likely be stationary on site for significant periods of time; large construction vessels will likely travel to and from the Project Area at low speeds, potentially producing lower noise levels than vessel transit at higher speeds (Leaper, 2019; Pine et al., 2018; McKenna et al., 2013).

Potential exposure of marine mammals to vessels used during the construction phase is considered low due to the high seasonality of marine mammals present in the Project Area and the low amount of time marine mammals spend at the surface. There is a possibility that marine mammals may alter their behavior while in close proximity to vessels, but this avoidance behavior is expected to decrease vessel collision risk and isn't expected to significantly affect marine mammals in the Project Area. Project mitigation measures designed to reduce or eliminate vessel strikes with marine species will be implemented to further reduce potential effects of increased vessel traffic.

4.6.5.10 Conclusion

As described in Section 4.6.5.1. a range of cable installation methods have been proposed by Mayflower Wind, as further described in Section 5.5.1. These methods have been chosen in order to provide the flexibility to achieve target cover depths in different soil types while minimizing to the extent practicable impacts to the seabed and water quality, which will be temporary in nature. The installation of the export cables will require temporary displacement of marine sediments to achieve the necessary cable cover depths. It is anticipated that the method(s) of installation will result in minimal alteration to the bathymetry of the seabed. Additional dredging, which will result in additional alteration, may be required in areas where sand waves are present. Sand waves typically develop in high energy areas with constantly changing bathymetry, and any additional alteration due to the Project is anticipated to be temporary. As all impacts are anticipated to be minor and temporary, significant impacts to water circulation or sediment grain size distribution are not anticipated.

The following provides a concise summary of major findings relative to the offshore ECC.

- **Sediment dispersion:** Mayflower Wind anticipates that sediment mobilized during cable-laying will resettle rapidly, meaning that sediment mobilized during installation of the first cable will settle well before installation of the second cable based on sediment dispersion modeling.
- **Priority and Estimated Habitats:** The NHESP has mapped all state waters within Nantucket Sound as priority habitat of state-listed rare species for various shorebirds (e.g., Least Tern, Roseate Tern, Common Tern) (Massachusetts Natural Heritage Atlas, 15th Edition, 2021). As a result, the ECC will necessarily cross Priority Habitat within state waters. Mayflower Wind will continue to consult with NHESP to ensure that impacts to rare species from offshore export cable installation in Nantucket Sound are avoided or mitigated to greatest extent practicable.
- **OMP SSUs:** Mayflower Wind has located the ECC to avoid North Atlantic Right Whale core habitat. Further, potential impacts to eelgrass at the sea-to-shore transition will be avoided and/or greatly minimized with the use of HDD. The ECC alignment reflects an effort by Mayflower Wind to minimize the areas of hard and complex bottom that may be affected by cable installation, while balancing other technical complexities for installation.
- **Marine archaeological resources:** Potential shipwrecks or debris fields associated with potential shipwrecks may occur within the ECC; analysis of 2021 survey is ongoing. Where appropriate, avoidance zones will be recommended. One intact paleolandscape with archaeological potential was identified within the ECC APE (near the landfall approach) which has been flagged for avoidance. Mayflower Wind has sited and will execute the cable installation in a manner so as to avoid or mitigate for impact to marine archaeological resources to the extent practicable.
- **Avian:** Muskeget Channel is an area known for high avian species richness and abundance. Offshore cable installation activities may disturb marine birds, disrupt foraging, and experience slight increased potential for vessel collisions in the immediate area of construction. These potential impacts will not have long-lasting adverse effects on resident or migratory marine birds.
- **Fish and Fish Resources:** Mayflower Wind has not proposed any restrictions on navigation, fishing, or the placement of fixed or mobile fishing gear for the post-construction condition. However, construction and installation activities may temporarily affect navigation and/or fishing activities in the immediate vicinity of construction and installation vessels. These impacts are temporary in nature and largely restricted to the Project's construction and installation period. Because potential impacts are temporary and localized, the impacts will not be significant.
- **Marine Mammals:** As described in Section 4.6.5.9., potential exposure of marine mammals to vessels used during the construction phase is considered low due to the high seasonality of marine mammals present in the Project Area and the low amount of time marine mammals spend at the surface. There is a possibility that marine mammals may alter their behavior while in close proximity to vessels, but this avoidance behavior is expected to decrease vessel collision risk and isn't expected to significantly affect marine mammals in the Project Area. Project mitigation measures designed to reduce or eliminate vessel strikes with marine species will be implemented to further reduce potential effects of increased vessel traffic.

4.7 Cost Analysis

A variety of factors were considered in the cost assessment of these routes, including:

- Route Length: Route length is directly related to cost, since certain fixed costs (e.g., cost of cable supply and installation) are determined by length. Lengths of onshore routes as well as the incremental difference in lengths of offshore routes are factored into this analysis.
- Surface Cover: Although the majority of the potential onshore routes are within existing roadway layout, a small stretch of the Preferred Route and one of the variants for the Noticed Alternative Route are located within unpaved areas and construction costs differ somewhat between the two. The difference is driven by trench excavation, pavement restoration, loam and seed, and traffic control costs.
- Existing Subsurface Utility Density: The number of existing utilities in the roadway can determine the available lateral and below-grade space to physically accommodate an underground export cable. Increased utility density can complicate the construction process, resulting in greater costs. For the in-road portions of the proposed Project, Mayflower Wind mapped existing surface utilities in plan view using data from the Town of Falmouth and regional utilities. Subsurface utilities present in the Project study area included electric, communication, water, sewer, drainage, and natural gas.
- Trenchless Crossings: Trenchless crossing techniques such as HDD and jack-and-bore can be necessary based on physical constraints, environmental concerns, and the need to avoid existing infrastructure, and these types of construction methods are more costly than simple trenching. HDD length at each Landfall location will differ based on water depths offshore and the location of any sensitive resources; these different HDD lengths are factored into the cost analysis.
- Substation Type: Mayflower Wind has considered both AIS and GIS designs for the proposed onshore substation, the selection of which is largely based on the acreage of available suitable land and cost considerations. GIS layouts are more compact than AIS layouts; however, GIS comes with a cost premium related to equipment. Both proposed substation sites can accommodate a 1,200 MW AIS. As such, substation type does not result in a difference in cost between the Preferred and Noticed Alternative routes and associated Variants.
- Interconnection Type: Mayflower is considering a transmission interconnection option installed in public roadway as well as an option in Utility ROW #341, where the interconnecting transmission owner would site, build, and own the interconnection facilities to interconnect the Project. Construction in existing Utility ROW #341 is expected to be less costly than construction in public roadway.

Mayflower has sought to minimize costs where feasible, consistent with other considerations, such as constructability and minimizing environmental impact. Attachment E provides a cost comparison between the onshore Preferred Route and Noticed Alternative and the base routes versus variants, respectively. The comparative cost analysis incorporates the above-described factors. The routes with the most favorable cost are:

- Preferred Route
- Preferred Route with Variant 1

The Preferred Route, the Preferred Route with Variant 1, and Noticed Alternative with Variant 4 (6 mi [9.7 km]) are directly comparable. Each route ends at the POCO, with the transmission to the POI being built by the interconnecting transmission owner within existing utility ROW #341.

Key factors that reduced the cost for the Preferred Route compared to other routes include:

- **Shorter route length beneath public roadway and open space** – The Preferred Route is 2.0 mi (3.2 km), and the Preferred Route with Variant 1 is 2.1 mi (3.4 km). The route lengths beneath public roadway and open space are considerably shorter than the Noticed Alternative Route and related variants. As such, construction costs would be lower for the Preferred Route.

- **Shorter distance for HDD** - The Worcester Avenue HDDs are approximately 3,140 ft (957 m), whereas the Central Park HDDs are approximately 4,030 ft (1,228 m). Shorter HDD lengths translate to lower cost, requiring less casing and submarine cable supply, lower material disposal costs, and shorter construction duration with less.

4.8 Reliability Analysis

Mayflower Wind evaluated reliability for the Preferred Route and Noticed Alternative Route. Onshore export cable routes to the substation sites use underground installation for both Preferred and Noticed Alternative routes and associated variants. Therefore, aside from length, there are no reliability differences between the Preferred Route and Noticed Alternative. Increased length could increase the risk of potential faults. However, in this case route lengths are similar enough that this would not result in any significant difference in reliability.

With regard to the ECC, there is no significant difference with regard to cable type, the number of cables, burial depth, or risk to the export cables. Reliability was considered to be equivalent among the alternatives considered.

4.9 Summary and Conclusions

The route selection process undertaken by Mayflower Wind addresses the Siting Board's standards applicable to jurisdictional energy facilities in a comprehensive manner. Mayflower Wind identified various routes as potential alternatives to satisfy the Project need, and a process designed to ensure that no clearly superior route was overlooked. Mayflower Wind systematically compared possible routes based upon reasonable criteria to evaluate the environmental impacts, cost, and reliability of the identified route alternatives.

The onshore Preferred Route will enable Mayflower Wind to achieve the best balance between cost, environmental impact, and reliability in accordance with the Siting Board's standards and precedent. The Preferred Route is a feasible route for construction that mitigates for impacts to natural and developed environments. Under the factual circumstances of a POI in Falmouth and the limited options for feasible landfall locations, Mayflower Wind has also selected a viable Noticed Alternative Route with geographic distinctness that provides some measure of geographic diversity in accordance with the Siting Board's standards and precedent. Finally, Mayflower Wind selected variants for inclusion in the public notice issued in connection with review of the Petition. Each point where the candidate routes intersect or link affords an opportunity to switch between the Preferred Route and the Noticed Alternative. In other words, a final approved route could include segments of the Preferred Route and the Noticed Alternative Route or their variants. Section 5 of this Petition compares the potential temporary and permanent impacts of the Preferred Route and Noticed Alternative in detail.

Mayflower Wind has selected the western ECC for the Project. As documented in Section 4.6 above, the selected route is technically feasible and environmentally more favorable than other options considered.

5. Comparison of Preferred Route and Noticed Alternative Route

As presented in Section 4 of this Analysis, Mayflower Wind selected Candidate Route 1 as the Preferred Route for the onshore transmission route, connecting the Worcester Avenue Landfall site to the proposed Mayflower Wind Substation at the Lawrence Lynch site. Mayflower Wind chose this route because it provided the best balance of the applied route selection criteria, environmental impacts avoidance or minimization, and considerations of reliability and cost. Candidate Route 2 was selected as the Noticed Alternative. The Noticed Alternative is a geographically distinct alternative for the onshore transmission route connecting the Central Park Landfall site to the proposed Mayflower Wind Substation at the Cape Cod Aggregates site prior to connecting to the point of interconnection (POI) at or in the vicinity of the interconnecting transmission owner's Falmouth Tap substation.

This section provides a detailed analysis and comparison of the potential environmental impacts and mitigation, costs and reliability of the Preferred Route and Noticed Alternative Route for the Project. Descriptions of the Preferred Route and the Noticed Alternative Route are provided in Section 5.1. Section 5.2 provides a comparison of the potential impacts to the natural environment for the Preferred Route and Noticed Alternative Route, and Section 5.3 compares potential impacts associated with the developed environment, including community and socioeconomic impacts.

Each point of intersection or link among the Preferred and Noticed Alternative routes and variants afford an opportunity for route options to switch between the Preferred Route and the Noticed Alternative Route. A final approved route could include a combination of segments of the Preferred Route, the Noticed Alternative Route and/or their variants.

5.1 Route Descriptions

5.1.1 Preferred Route

The Preferred Route begins within the first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall) and travels underground to the proposed Mayflower Wind Substation at the Lawrence Lynch site. There are no known existing submarine cables that make landfall at Worcester Avenue, and this landfall location would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth. Residences and a hotel are adjacent to this landfall site but are buffered from Worcester Park by Worcester Avenue on either side. A paved public parking lot currently used for seasonal beach parking located nearby could be used for construction staging operations. Worcester Avenue transitions to the name Worcester Court north of its second intersection with Grand Avenue, which loops the Falmouth Heights neighborhood.

The first segment of the onshore export cable route (approximately 0.4 mi [0.6 km]) would be installed within Worcester Park to reduce potential utility conflicts, allow for faster installation, and to reduce potential traffic disruptions. North of the intersection with Lake Leaman Road, the underground export cable would enter the Worcester Court roadway layout and follow existing roadway layouts, with duct bank installed beneath or adjacent to the paved roadway. The route proceeds northerly on Worcester Court for approximately 0.7 mi (1.1 km) before turning west and merging with Jones Road for approximately 0.6 mi (1.0 km). The route then turns north onto Gifford Street for approximately 0.3 mi (0.5 km) where it connects to the proposed Mayflower Wind Substation at the Lawrence Lynch site. The total distance from the Worcester Avenue Landfall location to Lawrence Lynch site is approximately 2.0 mi (3.2 km). All of the Preferred Route for the export cable system is underground.

The Preferred Route onshore substation at the Lawrence Lynch site is located west of Gifford Street and north of Jones Road at the end of Stephens Lane in Falmouth, MA. This site is approximately 27.3 ac (11.0 ha). A 345 kV overhead transmission line will exit the substation yard in the southeast corner near utility right-of-way (ROW) #341. The Project will end at the point of change of ownership (POCO), and Mayflower expects that the interconnecting transmission owner will site, build, and own the

interconnection facilities to interconnect the Project to the POI at or near the Falmouth Tap substation area.

Mayflower Wind has also considered one route variant (Variant 1) to the Preferred Route 1 (see Figure 1-2 for a depiction of this variant), described below in Section 5.1.3.

5.1.2 Noticed Alternative

The Noticed Alternative Route begins at Central Park near Crescent Avenue (Central Park Landfall). Central Park comprises approximately 4.24 ac (1.72 ha) of public park. The onshore export cable exits Central Park at its northwestern corner and continues west onto Crescent Avenue. There are no known existing submarine cables that make landfall at Central Park, and this landfall would avoid the need to cross any existing submarine cables between Martha's Vineyard and Falmouth.

Approximately 300 ft (92 m) northwest from Central Park is Crescent Park, sandwiched between Crescent Avenue and Grand Avenue. On both sides of the green space, there are aboveground utilities present consisting of telephone poles with streetlights. The area has been lightly disturbed by landscaping, specifically by the planting of shrubs along Grand Avenue. There is a large brown patch of grass on the eastern side of the green space that may be indicative of drainage issues in the area.

For the purposes of preliminary siting, Mayflower Wind has assumed the onshore export cable system will be installed through Crescent Park to reduce the potential for utility conflicts and reduce potential traffic disruptions. However, further utility survey may find that siting in the roadway along Crescent Avenue, Grand Avenue, and Manchester Avenue and/or Echo Avenue is both technically feasible and favorable, subject to future discussion with interested stakeholders.

Beginning at Central Park, the route travels approximately 0.2 mi (0.3 km) along Crescent Park/Crescent Avenue before reaching Falmouth Heights Road. At Falmouth Heights Road, the route turns north for approximately 0.6 mi (1.0 km), continuing onto Davis Straights (Route 28) for approximately 0.4 mi (0.6 km) until it reaches Jones Road. The route follows Jones Road in a westerly direction for approximately 0.6 mi (1.0 km) and then turns northerly onto Gifford Street. The route continues north on Gifford Street/Blacksmith Shop Road for approximately 4.2 mi (6.8 km) until reaching the Mayflower Wind Substation at the Cape Cod Aggregates site.

The Noticed Alternative substation is located at the northern end of Blacksmith Shop Road on the northern side of Thomas B Landers Road in Falmouth, MA. This site has approximately 33.6 ac (13.6 ha) of usable land for constructing an onshore substation. This option has sufficient space for both Air Insulated Switchgear (AIS) and Gas Insulated Switchgear (GIS) configurations. The onshore export cables are planned to enter the substation from the southeast corner of the parcel, and the 345 kV transmission line will also exit the parcel to the southeast if continuing to the POI via roadway.

The Noticed Alternative Route includes an underground interconnection route in public roadway. The proposed underground route between the Cape Cod Aggregates site and the expected POI at or near Falmouth Tap travels along Thomas B. Landers Road for approximately 0.2 mi (0.3 km). The route along Thomas B. Landers Road is vegetated along both sides. Overhead power lines and buried water lines run along the road's southern side. East of the intersection with Blacksmith Shop Road, sparsely set residences border both sides of Thomas B. Landers Road. The route also passes to the north of Shallow Pond.

The underground route turns from Thomas B. Landers Road onto Geggatt Road, continuing northeast for approximately 0.5 mi (0.8 km) to its intersection with Hatchville Road. The overall setting of Geggatt Road is similar to Thomas B. Landers Road, with minimal residential development on either side and some evidence of buried utilities, including both water and natural gas. Overhead electrical lines are predominantly along the north side of Geggatt Road except in a few instances, where they temporarily cross the road. This route passes within 100 ft (30 m) of Randall Pond, which is visible from the road, and less than 400 ft (122 m) from Crooked Pond, which is obscured by tree cover. Beyond the presence of subsurface utilities and electrical poles, there are no other obvious areas of disturbance along Geggatt Road.

The route heads northwest along Hatchville Road and Sam Turner Road for approximately 1.4 mi (2.3 km) to the Falmouth Tap area. The above and below ground indicators of utilities along these roads are limited to utility poles and fire hydrants. There are no storm grates to indicate the presence of a drainage system. Along Hatchville Road and approximately 0.3 mi (0.5 km) of Sam Turner Road, the utility poles and the water line follow the east side of the road. North of the intersection with Pondview Drive, the utility poles switch back and forth across sides of the road. The proposed duct bank for the Noticed Alternative interconnecting transmission would be sited beneath pavement or in the shoulder adjacent to pavement. The total distance from the Central Park Landfall location to the Falmouth Tap POI is approximately 8.1 mi (13.0 km).

Mayflower Wind has also considered three route variants (Variant 2, Variant 3, and Variant 4) to the Noticed Alternative Route (see Figure 1-2, Panel 2 for a depiction of these variants to the Noticed Alternative), described below in Section 5.1.3.

5.1.3 Route Variants

Mayflower Wind has considered one variant (Variant 1) to the Preferred Route, which terminates at the POCO near the proposed Mayflower Wind Substation at the Lawrence Lynch site. Mayflower Wind has also considered three variants (Variants 2, 3, and 4) to the Noticed Alternative Route, which involve the proposed Mayflower Wind Substation at the Cape Cod Aggregates site. Each variant is a deviation to the Preferred or Noticed Alternative Route. For route scoring purposes, as described in Section 4.5, each variant was scored as a complete route between the landfall location and the POCO or POI.

5.1.3.1 Variant 1 – Central Park to Jones Road

Variant 1 (to the Preferred Route) begins at the Central Park Landfall location and turns west onto Crescent Avenue. At Falmouth Heights Road, the route turns north, continuing onto Davis Straights (Route 28) until it reaches Jones Road. The variant joins with the Preferred Route at Jones Road. The length of Variant 1 is 1.2 mi (1.9 km). The total length of the Preferred Route with Variant 1 is 2.1 mi (3.4 km).

This route variant connects the Noticed Alternative landfall site at Central Park with the Preferred Substation at the Lawrence Lynch site.

5.1.3.2 Variant 2 – Worcester Avenue to Jones Road

Variant 2 (to the Noticed Alternative Route) begins at the Worcester Avenue Landfall location and continues along the path of the Preferred Route. The first segment of the export cable route (approximately 0.4 mi [0.6 km]) would be installed within Worcester Park. Thereafter, the export cable route would enter the Worcester Court roadway layout and proceed northerly for approximately 0.7 mi (1.1 km) before turning west and merging with Jones Road. Variant 2 joins the Noticed Alternative Route at the intersection of Jones Road and Davis Straits Road. The length of Variant 2 is approximately 1.1 mi (1.8 km). The total length of the Noticed Alternative Route using Variant 2, measured from landfall to POI, is approximately 7.9 mi (12.7 km).

This route variant connects the Preferred landfall site at Worcester Avenue with the Noticed Alternative substation site at Cape Cod Aggregates site.

5.1.3.3 Variant 3 - Paper Road

Variant 3 (to the Noticed Alternative Route) provides a short deviation from the Noticed Alternative Route by using a Town-owned dirt road used by Cape Cod Aggregates (“Paper Road”). The Paper Road connects Blacksmith Shop Road to Thomas B. Landers Road. The route follows the Paper Road in a northerly direction, then turns east on Thomas B. Landers Road and continues to the Mayflower Wind Substation at the Cape Cod Aggregates site.

This route variant would allow better separation of Mayflower Wind underground export cables and interconnection cables entering and exiting the substation site. Use of the Paper Road would also reduce

the potential for traffic congestion along a short segment of Blacksmith Shop Road but would result in tree removal at the northernmost end of the Paper Road. The deviation on the Paper Road and Thomas B. Landers Road is approximately 0.7 mi (1.1 km). The total length of the Noticed Alternative using Variant 3, measured from landfall to POI, is approximately 8.2 mi (13.2 km).

5.1.3.4 Variant 4 – Central Park to Cape Cod Aggregates (Transmission via Existing Utility ROW from POCO to POI)

Variant 4 (to the Noticed Alternative Route) represents another routing option, which was scored for informational purposes but not ranked against the other options. This variant involves truncating the Noticed Alternative at the Mayflower Wind Substation at the Cape Cod Aggregates site, shortening its overall length to approximately 6.0 mi (9.7 km). In this scenario, Mayflower Wind's responsibility for permitting, engineering, and construction would end at the POCO between its transmission facilities and those of Eversource, with the interconnecting transmission owner responsible for permitting and building the facilities needed to interconnect the Project to the POI.

5.2 Potential Effects on the Natural Environment

This section describes the environmental resources along the Preferred and Noticed Alternative Routes and presents a comparative analysis of potential impacts to specific resources due to installation of the proposed onshore underground transmission system, and describes the measures that Mayflower Wind has identified to mitigate such impacts. To appropriately characterize impacts associated with proposed route variants, descriptions in the following subsections consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route. The same cumulative approach was taken with the route scoring described in Section 4 and included as Attachment C.

5.2.1 Wetland Resource Areas

Figure 5-1 and Figure 5-2 provide an overview of wetland resource areas in proximity to the Preferred and Noticed Alternative routes including relevant variants. The proposed transmission system and all related components will be installed underground within and beneath existing public roadways, shoulders, or open green space. Work conducted within the roadway and its shoulder will not result in direct impacts to resource areas subject to regulation under the Wetlands Protection Act, and it is not anticipated that the installation of underground utilities and manhole covers will result in any impacts to said resource areas. Accordingly, the Project as currently designed, including the Preferred Route, Noticed Alternative Route, and variants, will not adversely impact wetlands as a result of the installation of the onshore underground transmission system, regardless of the route chosen.

Mayflower Wind will use horizontal directional drilling (HDD) to transition between the offshore and onshore components of the Project to avoid impacts to coastal resource areas such as Barrier Beach, Coastal Beach, Bank, and Dune, as well as mitigate for impacts to eelgrass beds and Land Under the Ocean. Regardless of the route chosen, the Preferred and Noticed Alternative routes are equivalent with respect to impacts to the aforementioned coastal resource areas. The offshore export cable, which occurs within Land Under the Ocean (310 Code of Massachusetts Regulations (CMR) 10.25) and Land Containing Shellfish (310 CMR 10.34), is discussed in Section 4.6.5.2.

An on-site wetland delineation was performed at the Lawrence Lynch site in April 2020 and at the Cape Cod Aggregates site in July 2020. The field investigation at the Lawrence Lynch site identified three stormwater retention ponds and a potentially jurisdictional isolated freshwater wetland under the Falmouth wetland bylaw on the subject property. In the vicinity of the property, the field investigation identified an isolated freshwater wetland located on the adjacent Falmouth Department of Public Works (FDPW) property with a 100 ft (30 m) buffer zone that extends on to the subject property, and nearby Sols Pond with a 100 ft (30 m) buffer zone that also extends on to the subject property. The substation property is not located within the 100-year floodplain. Substation 30% design drawings provided in Attachment B2 include relevant wetland jurisdictional area boundaries for the site.

No potentially jurisdictional vegetated wetlands or open water areas were observed or identified on the Cape Cod Aggregates site. Crooked Pond is the nearest open water area and is located over 1,000 ft (305 m) to the east of the northeastern corner of the subject property.

5.2.1.1 Preferred Route

The Preferred Route will pass through approximately 0.26 mi (1,370 linear ft, .42 km) of Land Subject to Coastal Storm Flowage (LSCSF) between the Worcester Avenue Landfall and Jericho Path, resulting in temporary impacts to LSCSF. The installation of access manholes for the transition joint bays (TJBs) within Worcester Park will result in a permanent increase to impervious surfaces. The existing topography will be restored once the installation of the underground export cable system is complete, so no permanent changes to topography or flood storage capacity will occur.

Construction of the Mayflower Wind Substation at the Lawrence Lynch site will result in the alteration of approximately 707 sq ft (66 sq m) of Isolated Wetland (which does not meet the regulatory definition of Isolated Land Subject to Flooding).

With the exception of the above-mentioned resources, the Preferred Route does not affect other regulated inland or coastal wetland resources.

5.2.1.2 Noticed Alternative

The Noticed Alternative Route will pass through approximately 0.95 mi (5,020 linear ft, 1.53 km) of LSCSF in the vicinity of the Central Park Landfall and Falmouth Heights Road, resulting in temporary impacts to LSCSF. The installation of access manholes for the TJBs within Central Park will result in a permanent increase to impervious surfaces. The existing topography will be restored once the installation of the underground export cable system is complete, so no permanent changes to topography or flood storage capacity will occur.

Construction of the Mayflower Wind Substation at the Cape Cod Aggregates site will not result in the alteration of any wetland resource areas.

The alternate underground transmission route from the Cape Cod Aggregates site to the POI at Falmouth Tap will not result in the alteration of any wetland resource areas.

5.2.1.3 Variants

The following description of wetland impacts consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route.

Variant 1 (to the Preferred Route) will pass through approximately 0.95 mi (5,020 linear ft, 1.53 km) of LSCSF in the vicinity of the Central Park Landfall and Falmouth Heights Road, resulting in temporary impacts to LSCSF. The installation of access manholes for the TJBs within Central Park will result in a permanent increase to impervious surfaces. The existing topography will be restored once the installation of the underground export cable system is complete, so no permanent changes to topography or flood storage capacity will occur. After joining with the Preferred Route, no other regulated inland or coastal resources are affected by Variant 1 in combination with the Preferred Route.

Variant 2 (to the Noticed Alternative) will pass through approximately 0.26 mi (1,370 linear ft, .42 km) of LSCSF between the Worcester Avenue Landfall and Jericho Path, resulting in temporary impacts to LSCSF. The installation of access manholes for the TJBs within Worcester Park will result in a permanent increase to impervious surfaces. The existing topography will be restored once the installation of the underground export cable system is complete, so no permanent changes to topography or flood storage capacity will occur. There are no other regulated inland or coastal resources are affected by Variant 2 in combination with the Noticed Alternative.

Variant 3 and Variant 4 (to the Noticed Alternative) do not pass through regulated inland or coastal resources. Used in combination with the Noticed Alternative, each variant will pass through approximately

0.95 mi (5,020 linear ft, 1.53 km) of LSCSF in the vicinity of the Central Park Landfall and Falmouth Heights Road, resulting in temporary impacts to LSCSF. Consistent with the Noticed Alternative, the existing topography for portions of the route in LSCSF will be restored once the installation of the underground export cable system is complete and no permanent changes to topography or flood storage capacity will occur.

5.2.1.4 Comparison of Impacts and Mitigation Measures

The Preferred and Noticed Alternative routes have been selected to avoid and mitigate for wetland impacts. Construction of the Preferred Route to the Mayflower Wind Substation at the Lawrence Lynch site will result in the alteration of approximately 707 sq ft (66 sq m) of Isolated Wetland[48] (which does not meet the definition of Isolated Land Subject to Flooding), while the Noticed Alternative Route does not result in direct impacts to wetland or waterbodies. The isolated wetland at the Lawrence Lynch site is relatively minor in size and is located at the site of an active asphalt plant, and as such the difference between routing alternatives on the basis of wetlands impacts is negligible.

Both the Preferred Route and the Noticed Alternative Route, as well as Variants 1, 2, 3, and 4 in combination with the associated Preferred or Noticed Alternative Route, will temporarily disturb LSCSF. As none of the route options would have a significant permanent impact on LSCSF, they are equivalent with regard to associated impacts. The onshore Project (from landfall to POCO or POI) is not expected to impact other coastal and inland wetland resources.

A Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented for the Project that will specify erosion and sedimentation control measures to avoid and mitigate for impacts to wetlands or waterways outside the immediate construction limit of disturbance.

5.2.1.5 Compliance with Performance Standards under the WPA

The Wetlands Protection Act (G.L. Chapter 131, Section 40) (WPA) and its implementing regulations (310 CMR 10) protect wetlands and the public interests they serve, including flood control, prevention of pollution and storm damage, and protection of public and private water supplies, groundwater supply, fisheries, land containing shellfish, and wildlife habitat.

The installation of buried utilities in buffer zones and within paved roadways is defined as a “minor project” (310 CMR 10.02 (b)(2)(b)(i)). Minor projects are exempt from the WPA regulations and are therefore not subject to the performance standards that would otherwise apply to projects involving work within the buffer zone. For minor Projects, the performance standards apply only to those portions of the Project that are within wetland resource areas, but not those segments that are within a Riverfront Area (RFA) or the 100 ft (30 m) buffer zone of wetland resource areas. As sited and designed, the onshore Project components do not require work in state-regulated wetlands.

The Mayflower Wind project including the Preferred Route, Noticed Alternative Route, and variants will not adversely impact wetlands.

5.2.2 Rare Species

Mayflower Wind has consulted with and intends to continue consultations with the Natural Heritage and Endangered Species Program (NHESP) in accordance with the Massachusetts Endangered Species Act (MESA) (G.L. c. 131A) and the requirements of its implementing regulation (321 CMR 10.14). Mayflower Wind will avoid or mitigate for any adverse impacts to the greatest extent practicable and is developing plans to do so. Mapped Estimated and Priority Habitat (Massachusetts Natural Heritage Atlas, 15th Edition, 2021) are illustrated relative to the onshore project components in Figure 5-3 (Preferred) and Figure 5-4 (Noticed Alternative). The offshore export cable which occurs within mapped Estimated and Priority Habitats is discussed in Section 4.6.5.4.

[48] Isolated wetlands are defined by landscape position as “wetlands with no apparent surface water connection to perennial rivers and streams, estuaries, or the ocean.”

5.2.2.1 Preferred Route

The onshore Preferred Route does not include work within Estimated or Priority Habitat of rare species. The Worcester Avenue Landfall is located within Worcester Park, outside of mapped Priority Habitat.

5.2.2.2 Noticed Alternative

The onshore Noticed Alternative Route includes a small section of work within Estimated or Priority Habitat of rare species. The Noticed Alternative Route intersects 0.43 ac (0.17 ha) of Estimated or Priority Habitat within the Geggatt Road segment of the underground transmission route (Alternate). The area is associated with Massachusetts Department of Environmental Protection (MassDEP) mapped Open Water. Given that the underground cable construction is anticipated to occur within the existing roadway or road shoulder (within 10 ft [3 m] from the edge of existing paved roadway), no permanent impacts to Estimated or Priority Habitat are anticipated.

5.2.2.3 Variants

The following description of rare species impacts consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route.

Variant 1 (in combination with the Preferred Route) and Variant 4 (in combination with the Noticed Alternative Route) do not include work within the Estimated or Priority Habitat of rare species. The Noticed Alternative including the use of Variants 2 or 3 will intersect approximately 0.43 ac (0.17 ha) of Estimated or Priority Habitat within the Geggatt Road segment of the underground transmission route extending from the Mayflower Wind Substation at the Cape Cod Aggregates site to the POI near Falmouth Tap. The area is associated with MassDEP mapped Open Water. Because the underground cable construction is anticipated to occur within the existing roadway or road shoulder (within 10 ft [3 m] from the edge of existing paved roadway), no permanent impacts to the mapped Estimated or Priority Habitat are anticipated.

5.2.2.4 Comparison of Impacts and Mitigation Measures

The onshore Preferred Route and Variant 1 (from landfall to the onshore substation) are located outside of mapped Estimated or Priority Habitat, and therefore are equivalent with regard to associated impacts.

The onshore Project is not expected to adversely affect wildlife habitat. The Noticed Alternative Route and Noticed Alternative Route using either Variant 2 or 3 passes through a limited area of Estimated or Priority Habitat, in the vicinity of Geggatt Road. However, given that the underground cable construction is anticipated to occur within the existing roadway or road shoulder (within 10 ft [3 m] from the edge of existing paved roadway), no permanent impacts to Estimated or Priority Habitat are anticipated. Accordingly, the overall difference between routing alternatives and variants on the basis of impact to rare species habitat is negligible.

5.2.2.5 Compliance with Performance Standards under the MESA

The implementing regulations of the MESA (321 CMR 10.00) contain an exemption from review for projects in Priority Habitat for “installation, repair, replacement, and maintenance of utility lines (gas, water, sewer, phone, electrical) for which all associated work is within 10 ft (3 m) from the edge of existing paved roads” (321 CMR 10.14(b)(10)). Because the onshore duct bank and splice vaults will be installed beneath or within 10 ft (3 m) of road pavement in areas adjacent to mapped habitat, construction in those areas is exempt from review under the MESA. Hence, no adverse impact to rare species habitats by the onshore Project infrastructure is anticipated.

5.2.3 Water Quality and Water Supply Protection

Mayflower Wind identified and evaluated mapped water resources, MassDEP Zone I and II areas, and wellhead protection areas approved under MassDEP’s Drinking Water Program. Freshwater Recharge

Areas (FWRA) identified by the Cape Cod Commission's (CCC's) Regional Policy Plan were examined, as were the Potential Public Water Supply Areas mapped by the CCC's Priority Land Acquisition Assessment Project along the onshore Preferred and Noticed Alternative routes and variants. Mapped water supply protection areas are illustrated in Figure 5-5 (Preferred) and Figure 5-6 (Noticed Alternative). For the reasons explained below, the Project is not expected to result in any significant impacts to water resources along the onshore Preferred and Noticed Alternative routes or their variants.

5.2.3.1 Preferred Route

The onshore Preferred Route, including the construction of the Mayflower Wind Substation at the Lawrence Lynch site, does not include work within MassDEP Zone I and II areas, wellhead protection areas, or Potential Public Water Supplies. A small segment of the Preferred Route traverses an FWRA along Jones Road and abuts an FWRA on Gifford Street from the intersection with Jones Road to the Mayflower Wind Substation at the Lawrence Lynch site. Although no portion of the proposed Mayflower Wind substation at this site is within an FWRA, the property is located adjacent to the Sols Pond FWRA as mapped by the CCC's Regional Policy Plan.

5.2.3.2 Noticed Alternative

The Noticed Alternative onshore export cable route does not include work within MassDEP Zone I areas, wellhead protection areas, or Potential Public Water Supplies. However, the underground transmission route from the Mayflower Wind Substation at the Cape Cod Aggregates site to Falmouth Tap passes through approximately 1.03 mi (1.66 km) of a Zone II protection area.

Approximately 3.59 mi (5.79 km) of the onshore export cable route from Gifford Street to the Cape Cod Aggregates site passes through FWRAs. The Cape Cod Aggregates site is located entirely within a FWRA, and there is a Community Groundwater Well located to the north of the site. Likewise, a majority of the underground transmission route from the substation site to the Falmouth Tap POI is located in an FWRA.

5.2.3.3 Variants

The following description of water quality and water supply protection impacts consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route.

Variant 1 (to the Preferred Route) does not include work within MassDEP Zone I and II areas, wellhead protection areas, or Potential Public Water Supplies. However, Variant 1 used in combination with the Preferred Route, passes through a small portion of an FWRA after the variant joins the Preferred Route.

Variant 2 (to the Noticed Alternative), extending from the Worcester Avenue Landfall to Jones Road at the point where it joins the Noticed Alternative Route, does not include work within MassDEP Zone I and II areas, wellhead protection areas, and community groundwater wells or FWRAs. After Variant 2 joins with the Noticed Alternative Route, it passes through a Zone II protection area and FWRAs.

Variant 3 (to the Noticed Alternative), the Paper Road, falls within the same FWRA as the Noticed Alternative. The use of Variant 3 in combination with the Noticed Alternative passes through 0.1 mi (0.2 km) more miles of FWRA than the Noticed Alternative. Use of this variant does not otherwise affect any additional areas beyond those identified for the Noticed Alternative.

Variant 4 (to the Noticed Alternative) which terminates at the POCO at the Cape Cod Aggregates site, does not include work within MassDEP Zone I and II areas, wellhead protection areas, or Potential Public Water Supplies. The Noticed Alternative with Variant 4 intersects the same FWRA between the Central Park Landfall and the Cape Cod Aggregates site, but excludes the FWRA between the Cape Cod Aggregate site and the POI.

5.2.3.4 Comparison of Impacts and Mitigation Measures

The Preferred Route, Variant 1, and the portion of the Noticed Alternative between the Central Park Landfall and the Cape Cod Aggregates site (including Variants 2, 3, and 4) do not include work within MassDEP Zone I and II areas, wellhead protection areas, or Potential Public Water Supplies. A portion of the underground transmission route from the Cape Cod Aggregates site to the POI near Falmouth Tap for the Noticed Alternative Route and Variants 2 and 3 used in combination with the Noticed Alternative Route passes through approximately 1.03 mi (1.66 km) of MassDEP Zone II protection area (Figure 5-6).

The onshore export and transmission cables will be installed largely within existing paved roadways or shoulder, or within property owned by the Town of Falmouth. The use of proper erosion and sedimentation controls during construction will mitigate potential impacts to water resources during construction. Additional information regarding erosion and sedimentation controls to be utilized during construction are discussed below in Section 5.5.3.1. Once complete, the underground transmission system will have no impact on water quality or water supplies.

The use of proper erosion and sedimentation controls during construction will mitigate potential impacts to water resources. Additional information regarding erosion and sedimentation controls to be utilized during construction are discussed in Section 5.5.3.1. Upon completion of construction, there would be no Project-related sources of erosion or sedimentation.

The entire proposed Mayflower Wind Substation at the Cape Cod Aggregates site would be located within a FWRA. Regardless of the final substation site selection, the Mayflower Wind Onshore Substation will include a containment system capable of fully capturing fluids including dielectric fluid (fluid is required for transformers and shunt reactors, and in small quantities as an insulator for other instruments) in conformance with the Spill Prevention, Control, and Countermeasures (SPCC) regulations (40 Code of Federal Regulations (CFR) part 112).

Mayflower Wind will prepare an SPCC Plan. Mayflower Wind will also include spill response in its emergency response plan as part of the Project's overall safety management system. Appropriate spill containment kits and spill control accessories will be strategically situated at the substation and may include absorbent pads, temporary berms, absorbent socks, drip pans, drain covers/plugs, appropriate neutralizers, over pack containers all for immediate use in the event of any inadvertent spills or leaks. All operators will be trained in the use and deployment of such spill prevention equipment. Procedures for refueling construction equipment will ensure safety and spill prevention and will be further established during consultations with the CCC.

Accordingly, the overall difference between routing alternatives and the variants on the basis of water supply and water quality protection is negligible.

5.2.4 Climate Change Resiliency and Sustainability

This Project is being proposed in response to specific legislative mandates for climate change response, clean energy, and utility-scale offshore wind generation. The purpose of the Project is to deliver clean, renewable wind energy from up to 1,200 MW of capacity from Mayflower Wind's Clean Energy Resource to Massachusetts and the New England regional electric grid. This reliable resource will significantly increase the clean renewable energy supply available to Massachusetts consumers, reduce carbon emissions across the region, displace electricity generated by fossil fuel-powered plants, improve energy system reliability and security, and enhance economic competitiveness by reducing energy costs, attracting new investments, and creating job growth. Sea level rise and shoreline changes associated with climate change have the potential to affect project infrastructure. Mayflower Wind has considered both sea level rise and shoreline change in the siting and design of the Project infrastructure and has designed the Project to be resilient to the impacts of climate change.

5.2.4.1 Sea Level Rise

Mayflower Wind evaluated the potential risks of sea level rise on the Project's onshore infrastructure including the TJBs for sea to shore cable transition, underground export cable routes (conduits and splice

vaults), and substation sites. The substation sites at Lawrence Lynch and Cape Cod Aggregates are located well outside areas affected by sea level rise.

The Town of Falmouth has completed a Climate Change Vulnerability Assessment[49] to better understand the actual risk to municipal assets from flooding associated with present conditions and future climate change and sea-level rise impacts. That assessment projected sea level to rise from the present day[50] mean high water (MHW) level of 0.8 ft (0.2 m) relative to NAVD88 to a 2050 projected MHW of 3.5 ft (1.1 m) NAVD88, and a 2070 projected MHW of 5.3 ft (1.6 m) NAVD88. Mayflower Wind used the CCC's Coastal Planner,[51] which provides a modeling tool to depict sea level rise at one-ft increments between 1.0 and 6.0 ft (0.3 and 1.8 m) as well as overland surges from hurricanes. The model incorporates overlays from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) and the National Weather Service's SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model. The magnitude of sea level risk which can be projected with this tool is generally consistent with the sea level risk projections used for the Falmouth Climate Change Vulnerability Assessment. The tool uses mean higher high water (MHHW) as the base sea level elevation; MHHW is the average of the higher high-water height of each tidal day observed over the National Tidal Datum Epoch. Using the Coastal Planner tool, one can review the change in inundation when sea level is then raised in one-ft increments. A recent report prepared for the CCC[52] analyzing the potential economic impacts of climate change used a projected unmitigated sea level rise of 2.45 ft (0.75 m) by 2050. Therefore, based on the anticipated Project life of up to 30 years, Mayflower Wind selected a conservative sea level rise scenario of 4.0 ft (1.2 m) for evaluation of impacts to project infrastructure. This exceeds the sea level rise projected by the Town's Climate Change Vulnerability Assessment for the same period. The projected inundation associated with sea level rise provided by the tool does not account for storm surges. The Coastal Planner separately provides analysis of overland surges associated with hurricanes.

An economic study by ERG and Synapse Energy Economics (2021) also referenced a projected sea level rise of 7.7 ft (2.3 m) by 2100, and a 4.25 ft (1.30 m) rise by 2070. Therefore, the maximum condition analyzed by the Coastal Planner tool (6.0 ft) (1.8 m), might occur sometime between 2070 and 2100, well beyond the anticipated operational life of the Mayflower Wind Clean Energy Resource. Each of the landfall locations were evaluated using the Coastal Planner for sea level rise inundation as well current condition hurricane overland flows.

Preferred Route

Based on the Coastal Planner Sea Level Rise modeling tool, Worcester Avenue and the Preferred Route remain above inundation levels with a projected 4.0 ft (1.2 m) sea level rise (See Figure 5-7). Furthermore, the Worcester Avenue Landfall remains above the inundation levels with even the maximum 6.0 ft (1.8 m) sea level rise (Figure 5-8).

Based on the modeling of overland storm flowage provided by the Coastal Planner tool, the Worcester Avenue Landfall and associated route would experience overland flows under Category 2 or larger hurricane conditions at current sea level conditions (Figure 5-9). Portions of the Preferred Route between the second block of Worcester Park and Jones Road may be inundated in Category 3 or 4 hurricanes. Likewise, a small portion of the route along Jones Road and on Gifford Street, including portions of the Mayflower Wind Substation at the Lawrence Lynch site may be inundated during a Category 4 or larger hurricane. With sea level rise, overland flow associated with hurricanes would be expected to worsen (i.e., pushing further inland) and lower lying areas may experience overland flow with lesser storm intensity.

[49] Climate Change Vulnerability Assessment (2019) https://www.falmouthma.gov/DocumentCenter/View/7018/Falmouth-VA-Final-Report-Draft

[50] Present day for the Falmouth Climate Vulnerability Assessment was defined as by the 19-year tidal-epoch between 1991-2009

[51] Cape Cod Coastal Planner (2019) https://www.capecodcommission.org/our-work/cape-cod-coastal-planner/

[52] The Economic Impacts of Climate Change on Cape Cod Executive Summary. Eastern Research Group, Inc., and Synapse Energy Economics, Inc., to the Cape Cod Commission, June 2021. https://barnstablecounty.sharepoint.com/:b:/g/dept/commission/team/climate/EY464M9AfmNFib-vkXNvLycBw5Cx5p2AIX3nrdn61h_EEg?e=uECobR

Noticed Alternative Route

Based on the Coastal Planner Sea Level Rise modeling tool, the Central Park Landfall and associated route remains above inundation levels with a projected 4.0 ft (1.2 m) sea level rise (Figure 5-10). The Central Park Landfall and most of the Noticed Alternative Route remain above inundation levels even with a projected 6.0 ft (1.8 m) sea level rise. A small portion of the Noticed Alternative Route on Falmouth Heights Road would be inundated with a projected 6.0 ft (1.8 m) sea level rise (Figure 5-11). However, this magnitude of sea level rise is not projected to occur until well beyond the anticipated operational life of this Project.

The Central Park Landfall and much of the Noticed Alternative Route up to Jones Road may experience overland flow under a Category 2 or larger hurricane under existing sea level conditions based on the SLOSH modeling (Figure 5-12). A small portion of the Noticed Alternative Route on Falmouth Heights Road north of Crescent Avenue may be inundated under a Category 1 or larger hurricane at existing sea level. Inundation associated with hurricanes for the Noticed Alternative along Jones Road and Gifford Street are the same as those for the Preferred Route. The Cape Cod Aggregates site is located well outside of potential inundation zones associated with hurricanes. With sea level rise, overland flow associated with hurricanes would be expected to worsen (i.e., pushing further inland) and lower lying areas may experience overland flow with lesser storm intensity.

Variants

Variants 1, 3, and 4 include the Central Park Landfall and do not deviate from the Noticed Alternative between the landfall at Central Park and Gifford Street. As such, impacts from sea level rise and storm surge inundation would be the same as the Noticed Alternative.

Variant 2 includes the Worcester Avenue Landfall and follows the Preferred Route (See Figure 5-13) until it joins with the Noticed Alternative at Jones Road. This variant would not be affected by sea level rise inundation (See Figure 5-13), and hurricane storm surge inundation would be the same as the Preferred Route.

Comparison of Impacts and Mitigation Measures

The onshore export cable routes for both the Preferred Route and Noticed Alternative Route, along with their associated variants, are expected to avoid inundation at a 4.0 ft (1.2 m) sea level rise, consistent with the expected operational life of the Project. The Noticed Alternative, as well as Variants 1, 3, and 4, would experience inundation along a greater portion of the route in smaller hurricanes as compared to the Preferred Route and Variant 2. With sea level rise, the frequency and severity of overland storm flowage is likely to increase. Therefore, the Preferred Route and Variant 2 are favored over the Noticed Alternative Route and Variants 1, 3 and 4.

5.2.4.2 Shoreline Changes

The Preferred Route and Noticed Alternative Route, along with their associated variants, will require the installation of infrastructure (i.e., TJBs with manholes) at the respective landfall sites where the offshore export cables will transition to onshore export cables. To ensure that proposed onshore infrastructure associated with the Project will not cause or be vulnerable to shoreline erosion or shoreline retreat, Mayflower Wind has located the proposed infrastructure in upland areas a significant distance from the current MHW line, and has chosen a construction method (HDD) that will not directly impact coastal resource areas and shorelines. Figure 5-13 illustrates those portions of the Preferred and Noticed Alternative routes and associated variants that fall within mapped flood zones.

Preferred Route

The Worcester Avenue Landfall is located approximately 480 ft (146 m) from the current MHW line. The landfall site is located in a velocity zone (FEMA Zone VE; elev. 14 ft [4 m]), as established by FEMA (Figure 5-14). Velocity zones are subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Portions of the route north of the landfall location but within Worcester Park fall within mapped flood plain (FEMA Zones A, AE, or AO) (Figure 5-

13). The Preferred Route is not located within mapped flood plain north of Worcester Park to the Lawrence Lynch site.

The CCC Coastal Planner tool also provides estimated 40-year shoreline erosion estimates, reflecting potential vulnerability of structures located near the shoreline. The shoreline area nearest to the Worcester Avenue Landfall is located in an area of accretion (Figure 5-15), and as such, the Worcester Avenue Landfall is not vulnerable to shoreline erosion.

Mayflower Wind will use HDD to transition between the offshore and onshore components of the Project in order to avoid impacts to coastal resource areas such as Barrier Beach, Coastal Beach, Bank, and Dune, as well as mitigate for impacts to Land Under the Ocean. Avoidance of the resource areas will the potential for contributing to erosion or vulnerability to erosion and shoreline retreat.

Noticed Alternative

The Central Park Landfall is located approximately 500 ft (152 m) from the current MHW line. The landfall site is located in a velocity zone (FEMA Zone VE elev. 15 ft [5 m]), as established by FEMA (Figure 5-16). The northern portion of Central Park and portions of the Noticed Alternative Route up to Davis Straits north of Dillingham Avenue are located with the 100-year flood zone (FEMA Zones A, AO or AE; 1% annual change of flooding) (Figure 5-13). All Project components at the landfall location and along the onshore transmission route will be buried and designed for submerged conditions.

The Central Park landfall is located in an upland area. The shoreline south of the landfall is identified as an accretion zone, and as such the landfall is not affected by the 40-year predicted coastal erosion (Figure 5-17).

Mayflower Wind will use HDD to transition between the offshore and onshore components of the Project in order to avoid impacts to coastal resource areas such as Barrier Beach, Coastal Beach, Bank, and Dune, as well as mitigate for impacts to Land Under the Ocean. Avoidance of the resource areas will mitigate for the potential for contributing to erosion or vulnerability to erosion and shoreline retreat.

Variants

Variants 1, 3, and 4 include the Central Park Landfall and do not deviate from the Noticed Alternative between the landfall at Central Park and Gifford Street. As such, impacts from flooding or shoreline erosion would be the same as the Noticed Alternative (Figures 5-13, 5-16, and 5-17).

Variant 2 includes the Worcester Avenue Landfall and follows the Preferred Route until it joins with the Noticed Alternative at Jones Road. As such, this variant is the same as the Preferred Route with respect to flooding (Figures 5-13 and 5-14) and shoreline erosion (Figure 5-15).

Comparison of Impacts and Mitigation Measures

The landfall locations for the Preferred and Noticed Alternative routes, along with their associated variants, have been selected to avoid and mitigate for impacts to coastal resources that may cause or exacerbate coastal erosion and/or avoid and mitigate risks to the infrastructure associated with flooding and erosion. Based on the analysis above, the landfall locations for the Preferred Route, Noticed Alternative and all variants are not at risk relative to predicted 40-year shoreline changes. The Preferred Route and Variant 2 have a smaller portion of the total route located within the 100-year flood plain (FEMA Zones A, AO, or AE). Both the Worcester Avenue and Central Park Landfalls are located in FEMA velocity Zone (Zone VE) subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. However, because all Project facilities within the mapped flood plains will be subsurface, there is no material difference between the Preferred Route, Noticed Alternative, and Variants 1 through 4.

5.2.5 Tree Clearing

Only minor tree trimming activities are expected along in-road sections of the onshore routes.

5.2.5.1 Preferred Route

The landscaped area in Worcester Park would require re-landscaping after installation of the HDDs, TJBs, and first set of splice vaults located at the northern end of the route in the Park. The remaining cable installation within the park will have a smaller limit of disturbance and will not require intensive repair and re-landscaping following the installation of the onshore export cables. The siting of the underground duct bank through Worcester Park seeks to avoid tree removal where possible, and trees would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth.

Any tree removal required to construct the Mayflower Wind Substation at the Lawrence Lynch site, an active asphalt plant, would be minimal.

5.2.5.2 Noticed Alternative Route

The siting of the underground duct bank through Central Park and Crescent Park seeks to avoid tree removal where possible and would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth.

Moderate tree clearing may be required at the Cape Cod Aggregates site.

5.2.5.3 Variants

The following description of tree clearing impacts consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route.

Variant 1 includes Central Park, Crescent Park, and the Lawrence Lynch site. The siting of the underground duct bank through Central Park and Crescent Park seeks to avoid tree removal where possible and would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth. Any tree removal required to construct the Mayflower Wind Substation at the Lawrence Lynch site, an active asphalt plant, would be minimal.

Variant 2 includes Worcester Park and the Mayflower Wind Substation at the Cape Cod Aggregates site. The landscaped area in Worcester Park would require re-landscaping after installation of the HDDs, TJBs, and first set of splice vaults located at the northern end of the route in the Park. The remaining cable installation within the park will have a smaller limit of disturbance and will not require intensive repair and re-landscaping following the installation of the onshore export cables. Siting of the underground duct bank through Worcester Park seeks to avoid tree removal where possible, and trees would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth. Moderate tree clearing may be required at the Mayflower Wind Substation at the Cape Cod Aggregates site.

Variant 3 includes Central Park, Crescent Park, and the Mayflower Wind Substation at the Cape Cod Aggregates site. The siting of the underground duct bank through Central Park and Crescent Park seeks to avoid tree removal where possible and would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth. Moderate tree clearing may be required along the Paper Road and at the Mayflower Wind Substation at the Cape Cod Aggregates site.

Variant 4 includes Central Park, Crescent Park and the Mayflower Wind Substation at the Cape Cod Aggregates site. The siting of the underground duct bank through Central Park and Crescent Park seeks to avoid tree removal where possible and would be replanted following construction. All restoration plans would be developed in consultation with the Town of Falmouth. Moderate tree clearing may be required at the Mayflower Wind Substation at the Cape Cod Aggregates site.

Comparison of Impacts and Mitigation Measures

The Preferred Route, Noticed Alternative Route, and their associated variants may require tree clearing. However, for the Preferred Route and Variant 1, only minimal tree clearing at the Lawrence Lynch site may be required, whereas the Noticed Alternative Route and Variants 2, 3, and 4 may include moderate

tree clearing at the Cape Cod Aggregates site. As such, the Preferred Route and Variant 1 are favored over the Noticed Alternative Route and Variants 2, 3 and 4 with regard to tree clearing.

5.3 Potential Effects on the Developed Environment

Various developed environment considerations used in the evaluation for candidate routes and variants are presented below to provide a direct comparison of the Preferred Route and Noticed Alternative Route. To appropriately characterize impacts associated with proposed route variants, descriptions in the following subsections consider a cumulative assessment of impacts for the variants in combination with the associated Preferred or Noticed Alternative Route. The same cumulative approach was taken with the route scoring described in Section 4 and included as Attachment C.

5.3.1 Traffic Management

As noted previously, the onshore export cables will be constructed within existing roadway layouts or shoulder or within property owned by the Town of Falmouth. As such, Mayflower Wind evaluated potential traffic related impacts. The traffic analysis relied on Massachusetts Department of Traffic's (MassDOT) roadway classification system and MassDOT's 24-hour Annual Average Daily Traffic (AADT) counts for 2018 as a means of evaluating potential traffic impacts. Traffic volumes were derived from real counts and predetermined growth and seasonal factors from the Cape Cod Commission calculated from historic trends by the jurisdictions. Seasonal factors were used to adjust the data to the period between September and May, thereby deriving off-peak average daily traffic (ADT) volumes.

Public transit in the area includes the Cape Cod Regional Transit Authority (CCRTA) route of Sealine Hyannis-Falmouth/Woods Hole. The Sealine (bus) travels from downtown Hyannis, along Route 28 to Centerville and Osterville Centers, to Mashpee Commons, Falmouth Center, and the Falmouth bus terminal to Woods Hole. Mayflower Wind anticipates that construction would occur outside of high season, and thus lessen the magnitude of potential construction-related traffic impacts to the CCRTA.

5.3.1.1 Preferred Route

Mayflower Wind has developed indicative traffic control plans (TCPs) for the Preferred Route (see Attachment D) to indicate potential detours and signage during construction. The first segment (approx. 0.4 mi [0.6 km]) of the onshore export cable route would be installed within Worcester Park to reduce potential utility conflicts, allow for faster installation, and to reduce potential traffic disruptions. Roads on the Preferred Route are classified as 6 - Urban Collector/Rural Minor Collector or 5 - Urban Minor Arterial/Rural Major Collector. The Preferred Route has an expected off-peak ADT volume of 7,028, derived by averaging seasonal, bidirectional ADT values along the route.

A portion of the Preferred Route near the intersection of Jones Road and Worcester Court is part of the CCRTA Sealine bus route through Falmouth with scheduled stops at the Jones Road Stop & Shop, and the Falmouth Mall. In addition, a planned detour on Teaticket Highway during construction on Gifford Street near its intersection with Jones Road falls along the Sealine bus route.

The Lawrence Lynch site, as an active aggregate and asphalt facility, has numerous and various vehicles, including earth moving equipment, trucks and other traffic frequently entering and exiting the site. In contrast, the substation will be an unstaffed facility, with no regular associated traffic, and little potential for fugitive dust generation. Therefore, based on the expected reduction in scale of existing operations at this location, traffic flow in the vicinity of Jones Road and Gifford Street is likely to see some reduction in the post-construction condition.

Table 5-1 below presents a summary of the traffic management plan for the Preferred Route.

5.3.1.2 Noticed Alternative Route

While Mayflower Wind has not developed indicative TCPs for the Noticed Alternative Route, measures similar to those planned for the Preferred Route would be used to manage traffic related issues. Roads associated with the Noticed Alternative Route are all classified as 5 - Urban Minor Arterial/Rural Major

Collector, with the exception of a short segment near the Main Street/Gifford Street junction which is 3 - Urban Principal/ Rural Minor Arterial and Hatchville Rd - Sam Turner Rd which is 6 - Urban Collector/Rural Minor Collector. The Noticed Alternative Route has an expected off-peak ADT volume of 10,662, derived by averaging seasonal, bidirectional ADT values along the route.

The Noticed Alternative Route would have additional traffic related disruptions associated with construction of the Mayflower Wind Substation at the Cape Cod Aggregates site and the underground transmission line from Cape Cod Aggregates to Falmouth Tap.

5.3.1.3 Variants

Variant 1 includes roads classified as 5 - Urban Minor Arterial/Rural Major Collector and 3 - Urban Principal/ Rural Minor Arterial. The off-peak ADT using Variant 1 in combination with the Preferred Route is 10,717.

Variant 2 includes roads classified as 5 - Urban Minor Arterial/Rural Major Collector and 6 - Urban Collector/Rural Minor Collector. The off-peak ADT using Variant 2 in combination with the Noticed Alternative Route is 7,516.

Variants 3 and 4 include roads classified as 5 - Urban Minor Arterial/Rural Major Collector and 3 - Urban Principal/ Rural Minor Arterial. The off-peak ADT using Variants 3 and 4 is 10,662. The calculation relies on the same MassDOT data points as the Noticed Alternative Route.

Table 5-1. Preferred Route - Traffic Management Plan Summary

TMP ID	Street or Route	From	To	Construction Activity	TMP Action Plan	Estimated Traffic Impact1
Preferred Route						
1 (Segment 1)	Worcester Ave	Grand Ave		HDD casing pull back Utility work	Road Closure Local Detour 1: eastbound traffic on Grand Ave take Worcester Ave (south) to Nantucket Ave to Worcester Ave (north) to Grand Ave Local Detour 2: westbound traffic on Grand Ave take Worcester Ave (north) to Jericho Path to Worcester Ave (south) to Grand Ave	Work during off-peak hours Approximate 10-day construction duration Number of homes or businesses impacted: 0
2 (Segment 1)	Worcester Ave	Nantucket Ave		HDD casing pull back Utility work	Road Closure Local Detour 1: eastbound traffic on Nantucket Ave take Worcester Ave (south) to Grand Ave to Worcester Ave (north) to Nantucket Ave Local Detour 2: westbound traffic on Nantucket Ave take Worcester Ave (north) to Jericho Path to Worcester Ave (south) to Nantucket Ave	Work during off-peak hours Approximate 10-day construction duration Number of homes or businesses impacted: 0
3 (Segment 2 Moving Workzone)	Worcester Court	Lake Leaman Rd	Spring Bars Rd	11' wide trenching Utility work	Road Closure Local Detour 1: northbound traffic Lake Leaman Rd to Falmouth Heights Rd to Davis Straits (Route 28) to Spring Bars Rd Local Detour 2: southbound traffic Spring Bars Rd to Davis Straits (Route 28) to Falmouth Heights Rd to Lake Leaman Rd	Work during off-peak hours Approximate 50-day construction duration Number of homes or businesses impacted: 30
4 (Segment 2 Intersection Phase 1 and 2)	Worcester Court	Spring Bars Rd		11’ wide trenching Utility work	One-lane road Police detail	Work during off-peak hours Approximate 5-day construction duration Number of homes or businesses impacted: 0
5 (Segment 3 Moving Work zone)	Worcester Court	Spring Bars Rd	Davis Straits (Route 28)	11’ wide trenching and Splice vaults 2A, 2B, and 2C near Rose St Utility work	Road Closure Local Detour 1: northbound traffic Spring Bars Rd to Davis Straits (Route 28) Local Detour 2: southbound traffic Davis Straits (Route 28) to Spring Bars Rd	Work during off-peak hours Approximate 35-day construction duration Number of homes or businesses impacted: 17

TMP ID	Street or Route	From	To	Construction Activity	TMP Action Plan	Estimated Traffic Impact1
6 (Segment 3 Intersection Phase 1 and 2)	Worcester Court/Jones Rd	Davis Straits (Route 28)		11' wide trenching Utility work	One-lane road Police detail	Work during off-peak hours Approximate 5-day construction duration Number of homes or businesses impacted: 7
7 (Segment 4 Moving Work zone)	Jones Rd	Davis Straits (Route 28)/Teaticket HWY (Route 28)	Gifford St	11' wide trenching Splice vaults 3A, 3B, and 3C Utility work	Road Closure Local Detour 1: westbound traffic Davis Straits (Route 28) to Dillingham Ave to Gifford St Local Detour 2: eastbound traffic Gifford St to Dillingham Ave to Davis Straits (Route 28)	Work during off-peak hours Approximate 80-day construction duration Number of homes or businesses impacted: 125
8 (Segment 4 Intersection)	Jones Rd/ Gifford St	Jones Rd/Gifford St		11' wide trenching Utility work	One-lane road Police detail	Work during off-peak hours Approximate 5-day construction duration Number of homes or businesses impacted: 0
9 (Segment 5 Moving Work zone)	Gifford St	Jones Rd	Brick Kiln Rd	11 wide trenching Splice vaults 4A, 4B, and 4C Utility work	Road Closure (Local traffic only) Local Detour 1: northbound traffic Jones Rd to Teaticket Hwy (Route 28) to Sandwich Rd to Brick Kiln Rd Local Detour 2: southbound traffic Brick Kiln Rd to Sandwich Rd to Teaticket Hwy (Route 28) to Jones Rd.	Work during off-peak hours Approximate 40-day construction duration Number of homes or businesses impacted: 135

5.3.1.4 Comparison of Impacts/Mitigation Measures

The potential for traffic disruptions exists for both the Preferred Route and Noticed Alternative Route, along with their associated variants. By virtue of its shorter length, the duration of traffic disruptions for the Preferred Route would be shorter than those for the Noticed Alternative Route. The Project will work to maintain access to businesses during construction. Any in-road civil construction of the duct bank and associated vaults will occur outside of the busy summer season to the maximum extent practicable. Duct bank installation is anticipated to proceed at a rate of approximately 20 - 200 ft (6 – 61 m) per day. The rate of progress is influenced by the density of existing utilities, among other factors.

Mayflower Wind will develop a detailed Traffic Management Plan (TMP) to mitigate disruptions to the community in the vicinity of construction and installation activities. The TMP will be developed in consultation with the Town of Falmouth and will be submitted for review and approval by municipal authorities. One component of the TMP will be a detailed TCP to address specific control measures for the selected route. Indicative TCPs are provided for the Preferred Route in Attachment D. Mayflower Wind will authorize or hire one or more independent construction and environmental monitors to ensure compliance with the TMP and other environmental plans. Mayflower Wind will coordinate with the Town of Falmouth to determine the need for such monitoring.

Mayflower Wind will use signage, lane restrictions, police details, and other appropriate traffic management measures to maintain traffic flow and manage traffic. All work will be coordinated with town officials, and Mayflower Wind plans to implement an outreach program prior to and during construction to keep residents, businesses and officials apprised of project construction schedules, lane closures, detours, vehicle access, and other relevant traffic information (including but not limited to local parking availability; emergency vehicle access; areas potentially affected by construction crew muster points, laydown/staging areas, and equipment delivery; plans for nighttime or weekend construction, and road repaving schedules). Mayflower Wind plans to work with the local police and emergency service departments prior to commencement of any work to review and formulate a comprehensive traffic plan for the various phases of construction work.

The Preferred Route does not include an underground transmission system in roadway between the Mayflower Wind Substation at the Lawrence Lynch site and Falmouth Tap, and as such is expected to have fewer traffic related impacts. Mayflower expects that the interconnecting transmission owner will site, build, and own the interconnection facilities to interconnect the Preferred Route to the POI at or near the Falmouth Tap substation area via the utility ROW.

Accordingly, the Preferred Route is favored over the Noticed Alternative Route and Variants 1, 2, 3 and 4 with regard to duration of traffic disruptions and lowest anticipated off-peak ADT.

5.3.2 Historic and Archaeological Resources

The Project is subject to review by the Massachusetts Historic Commission (MHC) in compliance with G.L. Chapter 9, Sections 26-27C as amended by Chapter 254 of the Acts of 1988 (950 C.M.R. 71.00) known as “State Register Review”, and Section 106 of the National Historic Preservation Act (NHPA).

Early pre-federal Section 106 consultation with the MHC and the Tribal Historic Preservation Officers (THPOs) was initiated after Mayflower Wind filed, on February 14, 2020, a Project Notification Form containing a preliminary Project description, general schedule, and recommended cultural resource studies. MHC issued a response to the submittal on March 9, 2020. Reconnaissance level surveys were completed for the Preferred and Noticed Alternative routes as well as related variants (including substation sites and export cable landfall locations) under MHC permit #4080 issued on April 9, 2021. The reconnaissance level surveys of the export cable landfall locations were further supplemented by geotechnical borings undertaken in February 2021 by GZA GeoEnvironmental, Inc. at the Falmouth Beach parking lot near the Worcester Avenue Landfall location (see Attachment G for boring logs). A draft Phase 1A Reconnaissance Survey report was submitted to MHC for review on July 26, 2021. A revised Phase 1A Reconnaissance Survey report (addressing MHC’s August 11, 2021 comments) was submitted to MHC on September 28, 2021. A Phase 1B permit application was submitted to MHC on October 19, 2021. Consultation with MHC is ongoing and will continue as the Project design is refined. Potential

effects, if any, to archaeological resources will be addressed with the MHC and the THPO(s) through the federal Section 106 process, initiated by the Bureau of Ocean Energy Management (BOEM) on November 1, 2021, and the State Register Review processes.

Figures 5-18 and 5-19 illustrate the relationship of the Project to mapped historical resources for the Preferred and Noticed Alternative routes, respectively. Documentation on file at the MHC was examined in order to determine if previously recorded archaeological sites and cultural resources studies were identified within 1.0 mi (1.6 km) of the Area of Potential Effects (APE). As part of the assessment of archaeological resources for the APE, an archaeological sensitivity model was generated for Project components of the Onshore Project Area. This model serves as a baseline by which additional assessments of the various Project features will be made. The relevant findings of the archaeological assessment of the Onshore Project Area are documented in the Archaeological Reconnaissance Survey of Mayflower Wind Project Falmouth, Barnstable County, Massachusetts, prepared by AECOM and submitted September 28, 2021 to MHC. An assessment of potential visual effects on historic properties was completed for onshore and offshore Project Areas and summarized in the Analysis of Visual Effects on Historic Properties report prepared by AECOM and dated October 22, 2021[53]. The findings of these studies were used to support the analyses presented below which compares the Preferred Route and Noticed Alternative Route with respect to the potential effect of the Project on archaeological resources and historic properties.

The Project will largely be constructed in previously disturbed areas (i.e., within public roadway layouts, within property owned by the Town of Falmouth, or industrial land). The fact that these existing roadways have been graded, paved, and had subsurface utilities installed beneath them would typically warrant a classification of “low sensitivity.” However, given the presence of desirable environmental and historic features, many sections of these routes were instead assigned a “moderate sensitivity” for the potential presence of buried previously unknown historic or prehistoric archaeological resources.

Overall, much of the APE should be considered archaeologically sensitive. This is consistent with results of the modeling, reconnaissance survey, and observations made by consulted indigenous groups. The primary loci of areas deemed “not sensitive” are primarily those areas where historic and modern resource extraction has removed much of the prior landscape. Outside of these areas are a few additional areas where the APE is relatively distant (greater than roughly 500 ft [150 m]) from desirable environmental conditions.

5.3.2.1 Preferred Route

The Preferred Route includes one Historic District and three Historic Sites.

The Preferred Route export cable installation site at Worcester Park was modeled as archaeologically sensitive. Worcester Park is located near the shore and inland bodies of water; valuable resources when considering both historic and pre-contact sensitivity; and it is within a locus of known, dense historic settlement. Based on the walkover survey, areas indicated as having moderate sensitivity within the vicinity appear likely to have been disturbed by previous road and utility work. However, the high-sensitivity areas along the beach itself have the potential to remain intact. HDD for the sea to shore transition of the export cable will pass under the Falmouth Beach parking lot. The findings of a geotechnical boring conducted within the Falmouth Heights Beach parking lot at the south end of Worcester Avenue determined that it is unlikely that archaeological site preservation exists beneath the Falmouth Beach parking lot.

The onshore export cable route extending north from the preferred Worcester Avenue Landfall location was determined to be primarily sensitive (79%). The remainder of the route was characterized as not sensitive (21%). The portions through Worcester Park were determined to be least likely of any other portion of the onshore export cable route alternatives to contain significant modern subsurface disturbance.

While the onshore export cable routes traverse areas that would have been considered sensitive for archaeological resources, the co-location within the existing roadway and associated existing buried

[53] Appendix S Analysis of Visual Effects and Historic Properties (boem.gov)

utilities suggest that these areas have undergone at least some periods of modern disturbance. While the paving of the roads themselves had the potential to completely disturb shallow deposits, deeper deposits may also have been disturbed in discrete locations by the installation of existing utilities. In the absence of deeper utility installation, the paving of roadways may have acted to protect and preserve less-shallow archaeological deposits

The Mayflower Wind Substation at the Lawrence Lynch site was determined to be archaeologically not sensitive (100%) due to extensive excavation on the site for sand and gravel mining. Though much of its eastern half is within an area that had seen historic development and is in close proximity to freshwater resources, subsequent use of the western portion of the property for sand and gravel extraction has significantly affected much of the landscape. The intensity of the property's use-history is likely to have removed the chance for archaeological sites to remain intact. There are no previously recorded archaeological sites within the substation site.

5.3.2.2 Noticed Alternative Route

The Noticed Alternative Route includes two Historic Districts, six Historic Sites and 51 Historic Parcels.

The Mayflower Wind Substation at the Cape Cod Aggregates site was determined to be predominantly not archaeologically sensitive (92%). The remainder (8%) was determined to be sensitive. The Cape Cod Aggregates site contained much more evidence of historic disturbance compared to the Lawrence Lynch site, though otherwise was proximal to desirable landscape features when determining sensitivity. While no development is noted in this area until the middle of the twentieth century, the site could have seen use before that period due to its desirable location relative to environmental features, and convenience along the east-west route of historic Mill Road (now Thomas B. Landers Road). While the sensitivity model indicates that a large portion of this site may be intact, this is not expected to be the case. The sand and gravel extraction and storage on site would have seen very intensive activities and resulted in a significant amount of the landscape having been removed or compacted, both activities likely to eliminate potential for archaeology. There are no previously recorded archaeological sites within the substation site.

The alternative underground transmission route between the Cape Cod Aggregates site and Falmouth Tap, passes through relatively sensitive areas for archaeological resources. Areas along Thomas B. Landers Road, Geggatt Road, and Sam Turner Road pass through some of the most sensitive portions of the Project Area with existing evidence of pre-Contact sites documented during the file review at MHC.

5.3.2.3 Variants

Documentation on file at the MHC was examined in order to determine if previously recorded archaeological sites and cultural resources studies within the 1.0 mi (1.6 km) study area of the APE. A total of 14 pre-Contact and four post-Contact archaeological sites were recorded. Most of these sites are associated with the numerous ponds dotting the region, or development in and around historic Falmouth. Of these sites, one has mapped boundaries recorded through which the APE passes near Crooked Pond along the Noticed Alternative transmission route beneath Sam Turner Road leading towards Falmouth Tap.

Variant 1 includes one Historic District, two Historic Sites and seven Historic Parcels (between the Central Park Landfall and the Variant joining the Preferred Route at the intersection of Davis Straits Road and Jones Road). One additional Historic site is passed after the variant joins the Preferred Route.

Variant 2 includes one Historic District and two Historic Sites prior to joining with the Noticed Alternative Route. The remaining portion of the Noticed Alternative Route includes one Historic District, four Historic Sites, and 44 Historic Parcels.

Variant 3 passes no historic resources along the Paper Road segment. In combination with the Noticed Alternative Route, it passes two Historic Districts, six Historic Sites, and 51 Historic Parcels.

Variant 4 which follows the Noticed Alternative Route and terminates at the Cape Cod Aggregates site includes one Historic District, four Historic Sites, and seven Historic Parcels.

5.3.2.4 Comparison of Impacts/Mitigation Measures

Construction and operation of the Project is not anticipated to affect historic buildings or structures at the landfall locations or along the underground export cable routes for the Preferred Route or Noticed Alternative Route or their associated variants. Furthermore, both landfall locations were determined to have relatively low likelihood of intact archaeological resources from the parking lots inland, but potential for intact resources in the less disturbed beach area does exist. Mayflower Wind determined that the Preferred Route has the lowest likelihood of undiscovered archaeological sites of the routes examined.

The Mayflower Wind Substation at the Lawrence Lynch site on the Preferred Route has a lower likelihood of impacting archaeological sites but may have an adverse visual effect on an historic property (Oak Grove Cemetery), which will be mitigated to the extent practicable. Mitigation will be developed in consultation with MHC.

Potential effects, if any, to historic and archaeological resources will be addressed with the MHC through Section 106 of the NHPA and the State Register Review processes. Mayflower Wind proposes to design the onshore substation to mitigate visual effects to the extent practicable. Mayflower Wind will keep lighting at the onshore substation to a minimum. Only a few lights will be illuminated for security reasons on dusk-to-dawn sensors and other lights will utilize motion-sensing switches.

5.3.3 Open Space, Conservation, and Recreational Lands

The availability of high-quality recreation and open spaces is important to the people of Falmouth as well as visitors. Mayflower Wind's route options primarily follow existing paved roadway layout. Off-road route segments are proposed in key areas to reduce potential utility conflicts, allow for faster installation, and to reduce potential traffic disruptions. Impacts to open space and recreational lands would be temporary, and work areas would be re-landscaped in line with existing conditions. These areas are described below.

5.3.3.1 Preferred Route

Figure 5-20 illustrates protected open space including Article 97 lands for the Preferred Route. The offshore export cable landfall for the Preferred Route is sited within Worcester Park. The landfall location is characterized by manicured lawns with small ornamental plantings and park benches set in pavers near its northern and southern end. Worcester Park is located across Grand Avenue from the Falmouth Heights Beach. The Preferred Route continues along the Worcester Avenue corridor, with the underground export cable sited beneath approximately 0.4 mi (0.6 km) of Worcester Park. Construction transitions to the roadway layout on Worcester Court near its intersection with Lake Leaman Road.

Portions of Worcester Park between the landfall and Lake Leaman Road intersection are similarly characterized by manicured lawns, a flagpole, benches, small plantings, and scattered medium to large shade trees towards the northern end of Worcester Park. Worcester Park is subject to Article 97 of the Amendments to the Massachusetts Constitution (Article 97). Post-construction, the work areas would be re-landscaped in line with existing condition, therefore impact to this Article 97 property will be temporary. After exiting Worcester Park, the Preferred Route does not cross or occur within open space, conservation, or recreational lands, and hence will not otherwise affect open space, conservation, or recreation lands.

5.3.3.2 Noticed Alternative Route

Figure 5-21 illustrates protected open space including Article 97 lands for the Noticed Alternative Route. The landfall for the Noticed Alternative Route is sited within Central Park near Crescent Avenue. Central Park comprises approximately 4.24 ac (1.72 ha) of public park. The onshore export cable exits Central Park at its northwestern corner and continues west onto Crescent Avenue.

Approximately 300 ft (92 m) northwest from Central Park is Crescent Park, sandwiched between Crescent Avenue and Grand Avenue. On both sides of the green space, there are aboveground utilities present consisting of telephone poles with streetlights. The area has been lightly disturbed by landscaping, specifically by the planting of shrubs along Grand Avenue. Mayflower Wind has assumed the onshore

export cable system will be installed through Crescent Park to reduce the potential for utility conflicts and reduce potential traffic disruptions. However, further utility survey may find that siting in the roadway along Crescent Avenue, Grand Avenue, and Manchester Avenue and/or Echo Avenue is both technically feasible and favorable, subject to future discussion with interested stakeholders.

Both Central Park and Crescent Park are subject to Article 97. Post-construction, the work areas would be re-landscaped in line with existing condition, therefore impact to both Article 97 properties will be temporary.

After exiting Crescent Park, the Noticed Alternative Route would be constructed within the roadway layout, and as such would not otherwise affect open space, conservation, or recreational lands. Similarly, the transmission route from Cape Cod Aggregates to Falmouth Tap would not affect open space, conservation, or recreational lands.

5.3.3.3 Variants

Variants 1, 3, and 4 include the landfall at Central Park and have the same open space, conservation, and recreational considerations as the Noticed Alternative Route, as described above.

Variant 2 includes the landfall at Worcester Park and has the same open space, conservation, and recreational considerations as the Preferred Route, as described above.

5.3.3.4 Comparison of Impacts/Mitigation Measures

All of Mayflower Wind's proposed route options involve use of Article 97 lands, which will require state legislative action to proceed. The Preferred Route and Variant 2 include the installation of the underground export cable within Worcester Park, while the Noticed Alternative Route and Variants 1, 3, and 4 include the installation of the underground export cable within Central Park and Crescent Park. Construction of the Project would result in temporary disturbance of these park areas. Mayflower Wind would re-landscape disturbed work areas and consult with officials from the Town of Falmouth in development of the landscaping plan. As such, the Preferred Route, and the Noticed Alternative Route, along with their associated variants, are equivalent regarding impact to open space, conservation, or recreational lands.

5.3.4 Sensitive Land Uses

All potential impacts to sensitive land uses from the Project would be limited to the period of active construction, and upon the completion of construction, the operational phase of the Project would have no impacts to sensitive receptors. The discussion of sensitive receptors below is focused on construction-related issues of maintaining access and minimizing disturbance to uses such as hospitals, schools, police and fire stations, elder care facilities, cemeteries, daycares, district courts, and religious facilities. No sensitive land uses are located adjacent to the Preferred Route or Noticed Alternative Route substation locations, and the Project will have no post-construction impacts to any sensitive receptors.

5.3.4.1 Preferred Route

Sensitive receptors along the Preferred Route are shown on Figure 5-22. The Preferred Route passes parcels associated with a total of four sensitive receptors: (1) Royal Falmouth Nursing and Rehabilitations Center and (2) Morse Pond School on Jones Road, and (3) Atria Woodbriar Park and (4) Atria Woodbriar Place retirement communities on Gifford Street.

5.3.4.2 Noticed Alternative

Sensitive receptors along the Notice Alternative Route are shown on Figure 5-23. The Noticed Alternative Route passes parcels associated with a total of six sensitive receptors: (1) Royal Falmouth Nursing and Rehabilitations Center and (2) Morse Pond School on Jones Road, (3) Atria Woodbriar Park, (4) Atria Woodbriar Place retirement communities, (5) St. Joseph's Cemetery, and (6) Falmouth High School on Gifford Street.

Variant 1 in combination with the Preferred Route passes four sensitive receptors, the same as the Preferred Route. Variants 2, 3 or 4 in combination with the Noticed Alternative pass four sensitive receptors, the same as the to the Noticed Alternative Route.

5.3.4.3 Comparison of Impacts/Mitigation Measures

In summary, the Preferred Route and Variant 1 pass four sensitive receptors, and the Noticed Alternative Route and Variants 2, 3, and 4 also pass the same four sensitive receptors. None of the aforementioned sensitive receptors are located adjacent to the proposed substation locations, and the Project would have no post-construction impacts to any sensitive receptors. As discussed above, all impacts would be limited to the construction period when trenching and installation of the underground transmission system will have the potential to affect traffic flow in the vicinity of these receptors for a relatively brief period of time. Construction-period traffic issues are addressed in the indicative TCPs, and Mayflower will develop a TMP in consultation with the Town of Falmouth to mitigate disruptions to the sensitive receptors. As described in Section 5.3.1.4, police details and other appropriate traffic management measures will be used to maintain traffic flow, and traffic management will always be coordinated with Town officials. No sensitive receptors will be affected in the post-construction condition. As such, the Preferred Route, and the Noticed Alternative Route, along with their associated variants, are equivalent regarding impact sensitive land uses.

5.3.5 Visual Impact

The Falmouth Onshore Project Area extends from the onshore export cable landfall sites near the southern shoreline of Falmouth to the POCO (at the Lawrence Lynch or Cape Cod Aggregates sites) or the POI located approximately 1.5 mi (2.4 km) south of the Town's northern boundary. Cable installation along Mayflower Wind's proposed routes would be underground, and as such would not result in visual impacts to the community. The only at-grade features for these underground cables would be manhole covers for access to the TJBs and splice vaults. Because onshore export cable and transmission cables would be constructed largely within the roadway layout or shoulder, significant vegetation clearing for the construction of those cables is not anticipated.

The proposed substations for the Preferred Route and Noticed Alternative Route result in a permanent visual impact to the land use of the respective parcels.

For the Preferred Route and Variant 4, the only at-grade features for the underground export cables would be manhole covers. The transmission line between Mayflower Wind's onshore substation and the POI would be designed, permitted, and constructed by the interconnecting transmission owner. As such, visual impacts would be evaluated by the interconnecting transmission owner, as part of the design and permitting of those transmission facilities.

5.3.5.1 Preferred Route

Where possible, the segment of the underground export cable system located in Worcester Park is sited to avoid existing public shade trees. The Mayflower Wind Substation at the Lawrence Lynch site is close to adjacent residences, and the substation fence line could potentially be as close as 100 ft (30 m) to the nearest residence. Portions of the substation may be visible from the Oak Grove Cemetery as well as other nearby properties. Therefore, visual mitigation measures in the form of screening (e.g., decorative fencing and/or plantings) may be required in some locations, dependent on the actual tree clearing required at the perimeter of the property. If visual mitigation measures are required, Mayflower Wind would undertake the appropriate measures. The subject property is an active aggregate and asphalt facility, and any tree removal required to construct the substation would be minimal.

5.3.5.2 Noticed Alternative

Visual impacts associated with the Noticed Alternative Route are anticipated to be minimal, as no public shade trees are anticipated to be directly impacted by the installation of the underground transmission system within the existing paved roadways or shoulder of the Noticed Alternative Route. Where possible, the segment of the onshore export cable system located in Central Park and Crescent Park will be sited

to avoid existing public shade trees. The Mayflower Wind Substation at the Cape Cod Aggregates site is close to adjacent residences, and the substation fence line could potentially be as close as 200 ft (60 m) to the nearest residence. This proximity to neighboring residences may also require visual mitigation measures such as decorative fencing or additional landscaping dependent upon tree clearing activities. Moderate tree clearing would likely be required.

5.3.5.3 Variants

Variant 1 includes the Central Park Landfall, where the segment of the onshore export cable system located in Central Park and Crescent Park will be sited to avoid existing public shade trees. The Mayflower Wind Substation at the Lawrence Lynch site is also included, where visual mitigation measures in the form of screening (e.g., decorative fencing and/or plantings) may be required in some locations, dependent on the actual tree clearing required at the perimeter of the property.

Variant 2 includes the Worcester Ave Landfall, where the segment of the onshore export cable system located in Worcester Park will be sited to avoid existing public shade trees. The Mayflower Wind Substation at the Cape Cod Aggregates site is also included, where the proximity to neighboring residences may require visual mitigation measures such as decorative fencing or additional landscaping, dependent upon tree clearing activities.

Variants 3 and 4 include the Central Park Landfall, where the segment of the onshore export cable system located in Central Park and Crescent Park will be sited to avoid existing public shade trees. The Mayflower Wind Substation at the Cape Cod Aggregates site is also included, where the proximity to neighboring residences may require visual mitigation measures such as decorative fencing or additional landscaping, dependent upon tree clearing activities.

5.3.5.4 Comparison of Impacts and Mitigation Measures

Other than the proposed Mayflower Wind Onshore Substation, all onshore transmission infrastructure along the proposed routes would be underground and therefore have no permanent visual impacts. The only at-grade features along the routes would be manhole covers. Accordingly, there is no difference in visual effects between the routing alternatives.

5.3.6 Noise

Mayflower Wind has assessed potential effects of noise during construction and operation on sensitive receptors adjacent to the related construction work or operating facility. Sensitive receptors associated with this Project may include residential properties and hotel properties adjacent to the export cable/transmission routes, HDD landfall locations and/or substation sites. Construction related noise is addressed in Section 5.3.6.1. Noise associated with the construction and operation of the proposed Mayflower Wind Substation at the Lawrence Lynch site or the Cape Cod Aggregates site is addressed in Sections 5.3.6.2.

5.3.6.1 Construction Noise

The onshore export and interconnection cables are not anticipated to generate noise during operation; consequently, noise impacts associated with the onshore cables will be limited to the construction period.

Onshore cable construction will follow the sequence outlined in Section 5.5.3. The potential for noise impacts from construction activities during the Project depends on the construction equipment used for the four principal phases of construction and the hours of operation. Sound levels from typical construction equipment that will be used during the principal phases of construction, along with anticipated duration in front of any one location, are listed in Table 5-2. The noise levels are anticipated to be sporadic and of limited duration on a given day. Noise levels decrease as the distance from the source increases.

The amount of noise generated during the construction of the Preferred and Noticed Alternative routes is likely to vary based on factors such as the density of existing and subsurface materials encountered during

trenching operations. These factors may not only require louder equipment to construct the route but may decrease the speed of the overall construction, thereby increasing the length of time that noise is encountered in front of a particular business or residence.

The use of HDD introduces an additional construction sound source at the HDD landfall site which is atypical of conventional construction equipment. Mayflower Wind completed a sound study to evaluate the potential sound level at the closest sensitive receptor to the work area, and where appropriate, identified the mitigation measures needed to bring sound levels to an acceptable level (See Attachment H). There are no relevant quantitative construction noise policy limits for the Project. Therefore, a generally accepted guideline limit of 65 dBA L_{eq} for daytime noise exposures at residential buildings (based on noise ordinances throughout the country) is being used as the goal for these activities (Cowan, 1994). Mayflower Wind will also require that construction equipment be operated such that construction-related noise levels will comply with applicable sections of the MassDEP Air Quality Regulations at 310 CMR 7.10, particularly subsections (1) and (2), which pertain to the use of sound-emitting equipment in a considerate manner so as to reduce unnecessary noise. Boring operations associated with the HDD installation for the sea to shore cable transition require 24/7 operations to maintain borehole stability.

Preferred Route

The Preferred Route is 2.0 mi (3.2 km) long and passes 191 residential units and 4 sensitive receptors. Without mitigation, the noise level associated with export cable installation at the Worcester Avenue Landfall is predicted to exceed the target threshold of 65 dBA L_{eq} at the nearest sensitive receptor. However, with a combination of 16 ft (5 m) tall temporary construction noise barriers and equipment silencers, the predicted levels are less than the 65 dBA goal at the closest noise-sensitive properties.

Noticed Alternative Route

The Noticed Alternative Route is 8.1 mi (13.0 km) long and passes 434 residential units and 6 sensitive receptors. Similar to the Preferred Route, the noise level associated with export cable installation at the Central Park Landfall is predicted to exceed the target threshold of 65 dBA L_{eq} at the nearest sensitive receptor. However, with a combination of 16 ft (5 m) tall temporary construction noise barriers and equipment silencers, the predicted levels are less than the 65 dBA goal at the closest noise-sensitive properties.

Variants

- Variant 1, in combination with the Preferred Route, is 2.1 mi (3.4 km) long and passes 251 residential units and four sensitive receptors.
- Variant 2, in combination with the Noticed Alternative Route, is 7.9 mi (12.7 km) long and passes 374 residential units and six sensitive receptors.
- Variant 3, in combination with the Noticed Alternative Route, is 8.2 mi (13.2 km) long and passes 426 residential units and six sensitive receptors.
- Variant 4, in combination with the Noticed Alternative Route, is 6.0 mi (9.7 km) long and passes 356 residential units and six sensitive receptors.

Variants 1, 3, and 4 include the Central Park Landfall and all associated construction noise considerations, as described above for the Noticed Alternative Route. Variant 2 includes the Worcester Avenue Landfall and all associated construction noise considerations, as described above for the Preferred Route.

Comparison of Impacts/Mitigation Measures

Because the Preferred Route and Variant 1 are shorter than the Noticed Alternative Route and Variants 2, 3, and 4, the overall amount of noise generated by construction activities, as well as the duration of construction noise, is anticipated to be less. The Preferred Route passes by approximately 243 fewer residential units and two fewer sensitive uses than the Noticed Alternative Route, while Variant 1 passes by approximately 183 fewer residential units and two fewer sensitive uses than the Noticed Alternative Route.

With respect to HDD operations, both landfall sites would require sound mitigation to remain within the 65 dBA threshold. The anticipated length of the Central Park HDDs is approximately 25% longer than the Worcester Avenue HDDs. HDD construction at the Noticed Alternative landfall would be of longer duration than the Preferred Landfall.

In summary, the Preferred Route and Variant 1 are superior to the Noticed Alternative Route and Variants 2, 3, and 4 on the basis of the amount and duration of noise generated during the construction process and the number of residential and sensitive uses within close proximity of the route. Mitigation of construction noise is further discussed in Section 5.5.7.2.

Table 5-2. Typical Construction Sound Levels

Activity	Types of Equipment	Typical Sound Levels (dBa) at 50 ft (15 m)[1]
Manhole Installation	• Pavement Saw • Manhole Crane • Asphalt Paver • Backhoe/excavator • Dump Truck • Pneumatic Hammer/Mounted Impact Hammer (Hoe Ram) • Rock Drill	80-90 ft (24-27 m)
Trench Excavation; Duct Bank Installation; Pavement Patching	• Pavement Saw • Concrete Batch Truck • Pneumatic Hammer/Mounted Impact Hammer (Hoe Ram) • Backhoe/excavator • Dump Truck • Rock Drill	80-90 ft (24-27 m)
Cable Pulling, Splicing, and Testing	• Generator • Air Conditioner • Splicing Van	60-84 ft (18-26 m)
Final Pavement Restoration	• Bobcat with Sweeper • Pavement Milling Machine • Asphalt Paver • Dump Truck • Asphalt Roller	80-90 ft (24-27 m)

[1] Federal Highway Administration, Roadway Construction Noise Model User's Guide Final Report, FHWA-HEP-05-054 DOT-VNTSC-FHWA-05-01, January 2006.

5.3.6.2 Substation Noise

Mayflower Wind completed an in-air acoustic assessment to evaluate potential noise impact on sensitive receptors and conformance with applicable regulatory requirements and guidelines. The study report provided in Attachment H, Final In-Air Acoustic Assessment Report, documents ambient monitoring data collection efforts at the Preferred Route, Mayflower Wind Substation at the Lawrence Lynch site and the Noticed Alternative Route, Mayflower Wind Substation at the Cape Cod Aggregates site. Ambient noise levels have been monitored at the closest representative noise-sensitive receptors to each site, to be used as the baseline for the impact analysis. The CadnaA model has been used to generate noise contours around each site to determine the maximum future sound levels expected at each noise-sensitive receptor. Noise mitigation measures were then evaluated for locations predicted to exceed the MassDEP limit to show compliance with these measures in-place.

For equipment operation noise not associated with construction, the applicable MassDEP limit is 10 dBA above the measured minimum ambient levels at the select closest noise-sensitive receiver locations. Sound level measurements were conducted continuously from September 8 through September 10, 2020, to collect sound pressure level data in the Project vicinity. A total of four long-term (48-hour) measurements (two at each site) were conducted at property line locations representative of the closest noise-sensitive receptors to each site. The modeling examines the anticipated noise based on specific equipment types and locations on the property, anticipated grading, and surrounding topography. Model iterations were completed first without mitigation, and then with mitigation measures incorporated.

Preferred Route – Lawrence Lynch

The measured minimum ambient noise levels at the two selected property line receiver locations were 39 dBA (LLG-LT1) and 45 dBA (LLG-LT2). Modeled sound levels at these locations were found to exceed the 10 dBA limit above minimum ambient levels at LT1, but not LT2. Use of a 6.0 ft (1.8 m) sound barrier was found to be sufficient to reduce noise levels to fall within the applicable limit at LT1.

Noticed Alternative – Cape Cod Aggregates

The measured minimum ambient noise levels at the two selected property line receiver locations were 40 dBA (CCA-LT1) and 35 dBA (CCA-LT2). Modeled sound levels at these locations were found to exceed the 10 dBA limit above minimum ambient levels at LT2, but not LT1. Six 16 ft (5 m) sound walls targeting specific equipment and a 22 ft (7 m) sound barrier at the northeast corner of the substation pad were needed to bring sound levels at CCA-LT1 into conformance with the MassDEP limit.

Variants

Variant 1 includes the proposed Mayflower Wind Substation at the Lawrence Lynch site, while Variants 2, 3, and 4 include the proposed Mayflower Wind Substation at the Cape Cod Aggregates site. The use of these variant routes does not affect substation related noise.

Comparison of Impacts/Mitigation Measures

Sound mitigation (e.g., use of lower noise equipment and/or sound walls) is predicted to be required to meet the applicable sound threshold. Given the necessary equipment configuration, greater mitigation (e.g., more, and larger sound walls) are required for the Cape Cod Aggregates site than for the Lawrence Lynch site. Therefore, with respect to noise, the Mayflower Wind Substation at the Lawrence Lynch site, associated with the Preferred Route and Variant 1, is preferred.

The Mayflower Wind Substation at the Lawrence Lynch site is immediately adjacent to residences, and the substation fence line could potentially be within 100 ft (30 m) of the nearest residence. With appropriate mitigation in the form of lower noise specified equipment and/or sound walls, the substation is predicted to meet the applicable threshold (i.e., not more than 10 dBA above the lowest ambient sound levels) for sound at the nearest sensitive receptor (see In-Air Acoustic Assessment Report provided in Attachment H). This proximity to neighboring residences may also require visual mitigation measures such as decorative fencing or additional landscaping. These efforts can likely be combined with sound walls.

5.3.7 Air Quality

The following section discusses the air quality with respect to offshore construction in State waters and onshore construction activities. Emissions associated with offshore construction activities are addressed to offer a complete characterization of construction related air emissions.

5.3.7.1 Offshore Construction

For the offshore export cable construction in State waters, air emissions will be primarily from internal combustion engines, including marine diesel engines, diesel engines on construction equipment, and diesel generators. At this stage of the Project, the specific vessels (and hence, engines) that will be used for the Project are hypothetical but are anticipated to be further refined in the Fabrication and Installation Report (FIR) submitted to BOEM. However, vessels may still be changed out prior to and during construction due to availability at that time and limitations associated with the Jones Act.

Regardless of the specific vessel utilized during the offshore export cable installation, sulfur dioxide (SO_2) and particulate matter (PM) emissions will be mitigated with the use of clean, low-sulfur fuels in compliance with the air pollution requirements described below.

Annex VI of the International Maritime Organization's (IMO's) International Convention for the Prevention of Pollution from Ships (MARPOL) treaty, which is the main international treaty that addresses air pollution from marine vessels, is implemented through the Act to Prevent Pollution from Ships (33 U.S.C. §§ 1901-1905) and Control of NOx, SOx, and PM Emissions from Marine Engines and Vessels Subject to the MARPOL Protocol (40 C.F.R. Part 1043). MARPOL Annex VI specifies a fuel oil sulfur content limit of 1,000 ppm, with which any foreign and domestic vessel used during the Project will comply. Regulations of Fuels and Fuel Additives outlined in 40 C.F.R Part 80 limits the sulfur content of non-road diesel fuel to 15 ppm. All non-road engines (e.g., generators used offshore) will comply with this limit.

Environmental Protection Agency (EPA) emission standards for marine compression-ignition engines are contained in the regulations listed below:

- MARPOL Annex VI: Establishes NOx emissions limits from foreign vessels built after 2000 with engines greater in size than 130 kW (~174 horsepower) as well as global limits on the sulfur content of fuel oil used aboard any foreign or domestic vessel.
- 40 C.F.R. Part 89, Control of Emissions from New and In-Use Nonroad Compression- Ignition Engines: Sets emission standards and certification requirements for domestic Tier 1 and 2 domestic marine diesel engines below 37 kW (~50 horsepower).
- 40 C.F.R. Part 94, Control of Emissions from Marine Compression-Ignition Engines: Sets emission standards and certification requirements for Tier 1 and 2 domestic marine diesel engines at or above 37 kW and manufactured on or after January 1, 2004.
- 40 C.F.R. Part 1042, Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels: Sets emission standards and certification requirements for Tier 3 and 4 domestic marine diesel engines.

EPA's emission standards above are structured into tiers based on engine size, displacement, and age. Each tier was phased in over numerous years, with each tier becoming progressively more stringent. The marine engines and generators used during this Project will be certified by the manufacturer to comply with the applicable marine engine emission standards for NOx, CO, VOCs (as hydrocarbons [HC]), and PM.

EPA's Outer Continental Shelf (OCS) Air Regulations (40 C.F.R. Part 55) implement Section 328(a)(1) of the Clean Air Act (CAA) and establish federal air pollution control requirements for OCS Sources located beyond a state's seaward boundaries. Air emissions generated by the Project within Federal waters are regulated through the OCS Air Permit process under 40 C.F.R. Part 55. The air quality requirements of the corresponding onshore area (COA) also apply to sources located within 25 mi (40 km) beyond a state's seaward boundary. If Massachusetts is designated as the COA as Mayflower Wind anticipates, the Project's OCS Sources will be required to comply with the applicable Massachusetts air quality

regulations. Best Available Control Technology and Lowest Achievable Emission Rate under 310 CMR § 7.00 will require Mayflower Wind's OCS Air Permit to contain, at a minimum, emission limitations, monitoring, testing, and reporting requirements for OCS Sources. It is anticipated that Project vessels which are designated as OCS Sources will be required to have engines meeting EPA's or IMO's highest applicable marine emission standards, where available. Additionally, the Project will acquire emissions offsets in compliance with the Nonattainment New Source Review program, if required, to offset applicable NOx and VOC emissions.

5.3.7.2 Onshore Construction

Project impacts associated with onshore construction include construction vehicle emissions, construction equipment emissions, and the generation of fugitive dust during construction. Temporary and minor impacts to ambient air quality from onshore construction equipment will be localized to areas adjacent to active construction. Mayflower Wind will complete construction in accordance with applicable sections of the MassDEP Air Pollution Control Regulations at 310 CMR 7.00. Details on mitigation are provided in Section 5.5.7.1.

Because the Noticed Alternative Route and Variants 2, 3, and 4 are longer than the Preferred Route and Variant 1, a larger number of adjacent properties may experience temporary, minor impacts associated with construction related emissions.

5.3.8 Electric Magnetic Field (EMF) Analysis

Electric and magnetic fields (EMF) exist in ambient levels everywhere on earth. EMF levels can be steady or slowly varying, called direct current (DC) fields, or can vary over time, called alternating current (AC) fields. Earth's core creates a steady DC EMF that can be demonstrated with a compass needle. The known size of Earth's EMF along the southern New England coast is 516 milligauss (mG) (CSA Ocean Sciences Inc. and Exponent, 2019). EMF are produced by electrically charged objects, including cabling systems. Since EMF have a direct relationship to the presence of an electric charge, changes in EMF as a result of the proposed Project are only connected to the operational phase.

A study was conducted to model EMF levels associated with the proposed Project. Additional details regarding EMF modeling for the offshore and onshore Project components can be found in Attachment I. As described in Attachment I, model-calculated post-Project magnetic field (MF) levels for the proposed transmission system beneath beach, roadways, and other municipal parcels are well below the health-based guideline issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for allowable public exposure to magnetic fields (2,000 mG); this is the case for the maximum MF levels directly above the conductors onshore, with significant reductions in MF levels with lateral and vertical distance from the proposed cables.

5.3.8.1 Offshore EMF Analysis

The strength of EMFs from electrical transmission lines is directly proportional to the voltage and current. Additionally, EMF levels from submarine cables vary by cable design and cable burial depth. The nominal 200-345 kV offshore export cables are anticipated to be buried up to 13.1 ft (4.0 m). The internal conductors would be separated by layers of insulation and sheathing then surrounded by outer layers of additional insulation and steel wire armoring.

EMFs generated from submarine cables drop off rapidly with lateral and vertical distance from the cables. Burial depth is a key factor affecting EMF levels at the seafloor. A cable buried at 6.6 ft (2.0 m) below the seafloor sees over a 20-fold reduction in seafloor EMF levels compared to a cable laid at the surface. As displayed in the results in Table 5-3, the EMF levels between 10 ft (3 m) and 25 ft (8 m) away from the submarine cable decrease up to sixfold. The full EMF assessment for submarine cables can be found in Attachment I, EMF Assessment Report.

The modeling for the landfall sites considers the installation conditions for the Worcester Avenue Landfall (Preferred) as well as an eliminated location at Shore Street. Since this EMF Assessment modeling work was undertaken, Shore Street has been disqualified as an option at the request of Eversource to avoid

the unnecessary risks and impact of siting near electrical cables serving Martha's Vineyard. The evaluation and subsequent down selection of landfall site options is discussed in Section 4.3.3.1. As discussed in Attachment I, the Central Park Landfall installation scenario falls within the boundary conditions set by Worcester Avenue and Shore Street, and therefore the predicted MF for the Central Park Landfall would be within the results summarized in Table 5-3.

Table 5-3. Submarine Export Cable EMF Modeling Results

Case	Burial Depth	Predicted Maximum Magnetic Field (mG) above Cable Centerline	Predicted Magnetic Field (mG), ± 10 ft (±3 m) from Outer Cables	Predicted Magnetic Field (mG), ± 25 ft (±7.6 m) from Outer Cables
Seabed – Likely case	6.6 ft (2.0 m)	85.5	28.8 / 28.8	6.5 / 6.5
Seabed – Conservative case	On surface	1,859	41.9 / 41.9	6.9 / 6.9
Landside Beach – Worcester Ave.	52.8 ft (16.1 m)	3.8	3.4 / 3.4	2.8 / 2.8
Landside Beach – Shore St.	9.8 ft (3.0 m)	39.3	20.5 / 20.5	6.2 / 6.2
TJB – Worcester Ave.	6.6 ft (2.0 m)	77.2	36.8 / 36.8	10.3 / 10.3
TJB – Shore St.	6.6 ft (2.0 m)	86.0	28.8 / 28.8	6.8 / 6.8

Source: Attachment I, EMF Assessment Report, Table ES-1

5.3.8.2 Onshore EMF Analysis

Much like submarine cables, EMF produced by onshore transmission lines, including the onshore export cables, will directly relate to the voltage and current present. The highest modeled EMF levels for the underground duct bank cross sections occur directly above the duct banks. Rapid reductions in EMF levels were calculated in the model with increasing distance from the duct bank centerlines.

A summary of the modeled EMF results for all modeled cases are listed in Table 5-4. All model-calculated EMF levels remain below the ICNIRP health-based guideline of 2,000 mG for allowable public exposure to 60 Hz magnetic fields. While MF levels at lateral distances of ±10 ft (~±3 m) from the cables, for most of the modeled installation scenarios, are greater than the Massachusetts guideline of 85 mG for MFs at ROW edges, it should be noted that this guideline is not health-based and was instead adopted in the 1980s to maintain the status quo for EMF levels on and near overhead transmission line ROWs. Nonetheless, together with the corresponding edge-of-ROW electric field guideline level of 1.8 kV/m and an emphasis on EMF mitigation, the MA EFSB has now used this MF guideline level in analyses and decisions on transmission line projects for more than three decades. In more recent analyses and decisions on transmission line projects, the MA EFSB has put greater emphasis on mitigation strategies for MF levels rather than a specific MF guidance level (MA EFSB, 2019). While the cable and loading are based on a 275 kV nominal operating voltage, Mayflower Wind does not expect the RMS cable currents to exceed these values even for other operating voltages, due to thermal constraints on the cable system. Balanced phase currents were assumed for the cables.

Table 5-4. Export Cable and Underground Transmission Route EMF Modeling Results

Case	Maximum EMF (mG) above Duct Bank Centerline[(a)]	EMF (mG), ± 10 ft (3 m) from Duct Bank Centerline[(b)]	EMF (mG), ± 25 ft (8 m) from Duct Bank Centerline[(b)]
2D×5W Duct Bank	187.1	84.0 / 86.9	18.3 / 18.6
3D×2W Duct Bank	223.4	93.0 / 91.1	21.6 / 21.5
2D×2W Duct Bank	220.0	80.8 / 78.4	18.0 / 17.7
1D×4W Duct Bank	403.3	156.7 / 128.1	32.4 / 29.0
Splice Vault	292.7	132.0 / 110.6	31.0 / 27.9
Trefoil Duct Arrangement	321.5	145.0 / 145.0	31.7 / 31.7

(a) The maximum magnetic field is the field projected to occur at the location of closest approach to the duct bank at 3.28 ft (1 m) above the ground surface.
(b) The values presented are the modeled fields at the given lateral distances from the duct bank centerline. The two values presented correspond to the fields to the left and right of the centerline, respectively.

Source: Attachment I, EMF Assessment Report

5.4 Environmental Justice

Mayflower will comply with all applicable Environmental Justice (EJ) requirements including the new EJ requirements under "*An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy*" signed by Governor Baker on March 26, 2021, St. 2021, c. 8 ("2021 Climate Act"), as interpreted through state agency regulations and protocols. Part of Mayflower Wind's considerations in selecting its Preferred and Noticed Alternative routes was to avoid or mitigate for impacts to EJ Populations.

The Project will advance the transition to a just and equitable cleaner energy future by creating renewable-energy jobs that pay prevailing wage; and delivering renewable energy at a low-cost to families and businesses. Mayflower Wind intends to engage in programs that support workers in the transition to and the development of programs to recruit, train, and retain women, people of color, indigenous people, veterans, formerly incarcerated people, and people living with disabilities in jobs related to a cleaner energy economy.

This section provides information on potential impacts on EJ Populations and host communities. It describes the socioeconomic characteristics of overburdened communities in minority, low-income, or indigenous populations in the jurisdictions affected by the Project and includes an evaluation of potential Project-related effects, as well as proposed avoidance, minimization, and mitigation measures.

The assessment of potential effects on these sub-populations is required under Executive Order (EO) No. 12898 (1994). EO 12898 requires federal agencies to adequately identify and address disproportionately high health and/or environmental effects of federal actions on overburdened communities. The U.S. Environmental Protection Agency (EPA) *EJ 2020 Action Agenda* (EJ, 2016) furthers the intent of EO 12898 by setting eight priority areas and four significant national EJ challenges, which includes federal, state, and local collaboration and coordination on EJ issues. Thus, this assessment considers the areas in which the proposed Project may result in environmental effects, the presence, and characteristics of potentially affected overburdened communities residing in the area of interest, and the extent to which these communities are disproportionately affected in comparison to the wider population in the area of interest.

The 2021 Climate Act changed the definition of EJ communities under the Massachusetts' EJ Policy (the "Massachusetts Policy") (EEA, 2017). The 2021 Climate Act codified foundational definitions for environmental justice principles and populations, as well as environmental benefits and burdens. Those definitions are incorporated into the updated EJ policy, effective June 24, 2021 ("EJ Policy").

The EJ Policy builds on federal environmental justice guidelines established in Federal Executive Order and has been developed in ways that reflect the needs and circumstances specific to Massachusetts.

The EJ Policy reinforces its underlying purpose that all communities must have a strong voice in environmental decision-making regardless of race, color, national origin, income, or English language

proficiency, that such voices can influence environmental decision-making, and that increased investment in the preservation and enhancement of the Commonwealth's open spaces and urban park network must also remain a priority. In addition, increased attention must be focused on communities that are built in and around the state's oldest areas with a legacy of environmental pollution, particularly in areas with residents who have elevated rates of disease and health burdens (page 2 of the 2021 EJ Policy).

The EJ Policy contains provisions that apply to projects that are proposed near EJ populations, including provisions that require enhanced public participation under the Massachusetts Environmental Policy Act ("MEPA"),[54] provisions that require enhanced analysis of impacts and mitigation under MEPA for projects that exceed certain thresholds,[55] and provisions applicable to both public participation and analysis of impacts and mitigation by the Energy Facilities Siting Board ("EFSB").

Under the 2021 EJ Policy, a Massachusetts neighborhood is defined as an Environmental Justice population ("EJ Population") if any of the following are true:

- the annual median household income is not more than 65 per cent of the statewide annual median household income;
- minorities comprise 40 per cent or more of the population;
- 25 per cent or more of households lack English language proficiency;
- minorities comprise 25 per cent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 per cent of the statewide annual median household income; or
- a geographic portion of a neighborhood designated by the Secretary as an EJ Population in accordance with law.

5.4.1 Description of Affected Environment

The proposed Project has the potential to affect populations, the economy, and the environment directly and indirectly at the local and regional levels. The area of interest for this section includes Barnstable, Dukes, and Nantucket Counties, as well as nearby Bristol and Plymouth Counties, Massachusetts. The area of interest for EJ, minority and lower income groups, and subsistence resources is presented in Figure 5-24.

Minority population data were obtained from publicly available United States Census Bureau (USCB) data (USCB, 2019) for 2018. Poverty estimates were obtained from the Federal Reserve Bank of St. Louis' Economic Research tool (GeoFred, 2018) and were available for 2019. The most recent data for each parameter are summarized in Table 5-5.

Information for minority population data and poverty data at the Census block level was obtained from EPA's *Environmental Justice Screening and Mapping Tool* (EPA, 2019) as well as from the Massachusetts Bureau of Geographic Information (Massachusetts Geographic Information System (MassGIS), 2010).

[54] *Enhanced public participation* will be required for the following projects as they undergo review in accordance with MEPA:

1) Any project that exceeds an Environmental Notification Form (ENF) threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal; and

2) Any project for which the project site is located within one mile of an EJ Population (or in the case of projects exceeding an ENF threshold for air, within five miles of an EJ Population). (Section 16 of the EJ Policy)

The applicable MEPA thresholds for an ENF are codified at 301 CMR 11.03(5)(b)(1), 301 CMR 11.03(5)(b)(2), 301 CMR 11.03(8)(b), and 301 CMR 11.03(9)(b).

[55] *Enhanced public participation* requirements will be required as part of the Environmental Impact Report (EIR) for projects that:

1) Exceed a mandatory EIR threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal; and

2) Are located within one mile of an EJ Population (or in the case of projects exceeding a mandatory EIR threshold for air, within five miles of an EJ Population). The project proponent may submit actual air modeling data on the project's area of potential air impacts in its EIR scope to modify the presumed five-mile impact area. (Section 17 of the EJ Policy)

The applicable MEPA thresholds for an EIR are codified at 301 CMR 11.03(5)(a)(1), 301 CMR 11.03(5)(a)(6), 301 CMR 11.03(8)(a)(1) , and 301 CMR 11.03(9)(a).

Table 5-5. Minority Populations and Poverty Estimates

Jurisdiction	Race (percent of the population)[1]						Total Minority (%)	Population below the Poverty Level (%)
	American Indian and Native Alaskan[2]	Asian[3]	Black or African American[4]	Hispanic or Latino[5]	Native Hawaiian and Other Pacific Islander[6]	White[7]		
Massachusetts	0.5	7.2	9.0	12.4	0.1	80.6	19.4	9.4
Barnstable County	0.7	1.6	3.5	3.4	0.1	92.2	7.8	6.5
Bristol County	0.6	2.5	6.1	8.6	0.1	88.3	11.7	11.3
Dukes County	1.3	1.1	4.7	3.9	0.1	89.8	11.2	7.3
Nantucket County	0.4	2.0	11.3	15.2	0.1	84.2	15.8	5.5
Plymouth County	0.3	11.6	11.7	4.2	0.1	84.2	15.8	7.4

1. USCB (2019). Population Estimates Program.
2. A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
3. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent.
4. A person having origins in any of the Black racial groups of Africa.
5. A person who classified themselves in one of the specific Hispanic origin categories (including Mexican, Cuban or Puerto Rican), as well as those who classified themselves of “Other Spanish/Hispanic/Latino” origin (Spain, Spanish-speaking countries of Central and South American or the Dominican Republic. Persons of Hispanic origin may be of any race.
6. A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
7. A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
8. GeoFred (2018).

The proportion of the population under the poverty level in Massachusetts was 9.4% in 2019. The poverty rate in the counties was similar to the Commonwealth rate, with Bristol County having the highest rate (11.3%) among the counties and the only rate higher than the overall Commonwealth rate. The proportion of the population under the poverty level varies from 5.5% in Nantucket County to 11.3% in Bristol County.

Table 5-6. Employment Information of the Potentially Affected Environment (2018)1

Jurisdiction	Population age 16 years+	Employed population 16 years+)	Employment Rate (%)	Unemployment Rate (%)	Per Capita Income
Massachusetts	5,619,991	3,570,257	63.5%	3.6%	$41,794
Barnstable County	185,069	105,075	56.8%	2.8%	$42,578
Bristol County	456,450	283,422	62.1%	3.8%	$34,226
Dukes County	14,441	8,684	60.1%	2.0%	$43,822
Nantucket County	9,028	6,471	71.7%	2.0%	$51,270
Plymouth County	414,111	264,483	63.9%	3.7%	$41,343

[1]. USCB. (2018). DP03: Selected Economic Characteristics, 2018: ACS 5-Year Estimates Data Profiles.

Minority populations in the communities within the area of interest do not exceed 50%, and the percentage of the populations below the poverty level is not significantly higher than the Commonwealth-

wide level. Therefore, the area of interest does not include any EJ communities, as defined by EPA and CEQ guidance.

Following MEPA's EJ Transition Rule (effective June 24, 2021), Mayflower Wind identified EJ populations within 1 mi of the Project site using the Massachusetts latest EJ mapping tool based on 2020 Census data (the Massachusetts Environmental Justice Map Viewer available at https://www.mass.gov/environmental-justice).

The Project is not reasonably likely to negatively affect EJ Populations. Applying the Massachusetts EJ Policy updated in June 2021, the Project does not exceed any MEPA ENF thresholds for air, solid and hazardous waste, or wastewater and sewage sludge treatment and disposal. Although portions of the proposed onshore project (new substation, export cable route) are located in or within one mi of an EJ Population as identified by the Commonwealth using census block information on income and/or minority status from the Environmental Justice Map Viewer, neither the Enhanced Public Participation requirements nor the Enhanced Analysis of Impacts and Mitigation under MEPA apply to the Project under the June 2021 EJ Policy.

Regardless, the Mayflower Wind Project will be consistent with the Commonwealth's EJ Policy in that its impacts, including any on nearby EJ Populations, will be mitigated to the extent practicable and public participation will meet the requirements of the EJ Policy. Although the Project does not exceed any MEPA ENF thresholds for air, solid and hazardous waste, or wastewater and sewage sludge treatment and disposal, the Project has undertaken and will continue to undertake diligent efforts to conduct an inclusive community outreach program to facilitate meaningful opportunities for all potentially affected parties to participate. For example, under Mayflower Wind's early and often outreach approach, the Project team has held pre-Section 106 virtual meetings engaging tribal nations on proposed offshore geotechnical and geophysical surveys in Massachusetts waters.

EJ communities are critical to an inclusive and holistic state-wide transition to clean energy. Mayflower Wind's outreach program will facilitate meaningful opportunity for all interested parties, including proximate EJ residents, to participate in the Project. Mayflower Wind has and will continue to include the engagement efforts listed below throughout the planning, construction, and operations phases of the Project. These commitments are consistent with the Massachusetts EJ Policy as they facilitate opportunities for all interested parties to participate.:

1. Consulting with the Director of EJ, MEPA Office, Energy Facilities Siting Board ("EFSB"), and other applicable EEA agencies about applicable enhanced public engagement policies and procedures as they evolve under the 2021 Climate Act.
2. Continuing to utilize virtual communications technologies, while looking to schedule in-person public meetings at locations and times convenient for neighborhood stakeholders, and in consideration of public transportation availability. To the extent feasible, meetings would be held in places that community members already routinely use and feel comfortable visiting, with all appropriate health and safety precautions.
3. Holding pre-application meetings with the local community.
4. Providing Q&As and Fact Sheets to ensure that community members have educational information to evaluate a project's potential impacts.
5. Identifying applicable languages for the translations relevant to affected EJ populations and translating key public notices into other languages in areas with persons of limited English language proficiency.
6. On a case-by-case basis:
    a. Establishing one or more local information repositories (e.g., libraries) that are convenient and accessible for the impacted community, as well as providing availability of information online; and
    b. Gathering community-specific local media contacts (based on the culture of the community).
        i. Providing timely notices to neighborhoods potentially impacted by a decision.

ii. Providing online information to EJ Populations regarding workforce training and job opportunities.

5.4.2 Potential Effects to EJ Communities

One key purpose of the 2021 Climate Act and EJ Policy is to address and diminish the current and future impacts that climate change will have on EJ Populations by, among other things, achieving the Commonwealth's greenhouse gas emission limits (pages 4, 5, and 15 of the 2021 EJ Policy). The Project will bring up to 1,200 MW of renewable, emissions-free energy into the electrical grid in New England. The Project and the Clean Energy Resource will eliminate over 2 million metric tons of greenhouse gas emissions annually, the approximate equivalent to removing 5 million cars from the road. The Mayflower Wind Project advances the EJ Policy by:

- Promoting the re-use of industrial property for a clean energy project (e.g., substation sites on industrial land);
- Promoting regional and local partnerships focused on workforce development, supply chain improvements, and other economic development activities and increasing job opportunities; and
- Taking direct actions that address climate change and public health which should improve the overall quality of life for residents in the community.

The Project and the associated Clean Energy Resource will create positive economic development in the community with jobs and training opportunities in a range of fields. The Project will encourage investment in responsible economic growth in areas where there is existing infrastructure and long-standing ambitions for repowering and revitalization.

The potential impacts from construction will be temporary and carefully mitigated. Long-term impacts will be minimal and mitigated.

Overall, the proposed Project and the associated Clean Energy Resource have the potential to positively affect overburdened communities directly and indirectly at the local and regional level through its effects on employment opportunities, the supply chain, and the general economy, as well as on their health. Table 5-7, below, provides a summary of the potential positive effects to EJ or host communities.

5.4.2.1 Workforce Hiring

Skilled and unskilled labor is required for all phases of the Project. The Project and its associated Clean Energy Resource will directly and indirectly create an estimated 10,000 jobs over the Project's lifetime (with decommissioning) in Massachusetts, and an additional 480 jobs in operations will be created elsewhere in the region. Mayflower Wind will encourage the hiring of personnel from the Project region to fill the required positions. Mayflower Wind will execute a commitment to make at least 75% of operations and maintenance local.

Construction

Project construction and installation activities will likely increase employment opportunities and economic activity in and around the Project Area, and to a lesser degree in the wider region. Mayflower Wind's commitment to encourage the hiring of the skilled and unskilled labor from the Project region may provide new opportunity for low-income families.

Mayflower Wind's community engagement commitments include engaging local communities and local stakeholders as well as specific EJ communities, such as Indigenous communities. Mayflower Wind will maintain a stakeholder engagement plan with outreach and communications mechanisms to share information and gather input from external stakeholders, including EJ communities. These commitments are consistent with the Massachusetts EJ Policy as they facilitate opportunities for all interested parties to participate.

Mayflower Wind will develop a Traffic Management Plan to mitigate for disruptions to the community in the vicinity of construction and installation activities, especially along the underground transmission route.

The Traffic Management Plan will be developed in consultation with Town of Falmouth officials and will be submitted for review and approval by Town officials.

Mayflower Wind will authorize or hire one or more independent construction and environmental monitors to ensure compliance with the Traffic Management Plan and other environmental plans. Mayflower Wind will coordinate with Town of Falmouth officials to determine the need for such monitoring.

Mayflower Wind will develop an onshore construction schedule to mitigate for effects to recreational uses and tourism-related activities to the extent practicable.

Operations and Maintenance

During the operations phase, the proposed Project and the associated Clean Energy Resource will provide employment opportunities within the area of interest and Mayflower Wind's community commitments will carry on throughout the life of the proposed Project, including sourcing goods and services from the surrounding community to the maximum extent practicable. Mayflower Wind has committed to make at least 75% of operations and maintenance local, contributing $20,000 in additional funding per employee shortfall to support workforce development. These opportunities are expected to similarly benefit the general population and EJ communities.

Periodic planned and unplanned maintenance of Project components may affect communities in the immediate vicinity of these activities. Such activities may include planned replacement of equipment and materials, and the operation of maintenance equipment. These maintenance activities are not expected to affect the general population or EJ communities.

Decommissioning

Offshore decommissioning activities are expected to be comparable to the construction phase but less intensive, and effects on employment and the local and regional economy would be similar but less significant than during construction. While Project-related jobs will cease after decommissioning, the proposed Project's contribution to the development of technical and professional expertise within the local and regional workforce will be felt similarly by EJ communities and the wider population.

5.4.2.2 Procurement of Materials, Equipment and Services Including Port Use and Vessel Charters

The proposed Project and the associated Clean Energy Resource will positively affect the economy through the supply chain of Project-related activities, in the communities hosting the proposed Project, as well as within the general region, including around the New Bedford Marine Commerce Terminal (MCT).

The proposed Project and the associated Clean Energy Resource will benefit local coastal economies and industries supporting the activities of the proposed Project throughout its life. Installation and construction of the Project infrastructure will have a strengthening effect on the Massachusetts supply chain of Project-related activities. The construction phase will require the use of the port facilities near staging areas and require amenities and services for numerous workers, including lodging, restaurants, banks, shops, medical services, entertainment, parks, tourism, sports, gas stations, etc.

Periodic maintenance and repairs may require equipment, materials, supplies, and services such as vessel provisioning and servicing, which will be sourced from within the Project region to the maximum extent practicable. While the proposed Project is expected to benefit local economies and industries during operations and maintenance phase, the extent of the effect will be much lower than during the construction or decommissioning phases.

Offshore decommissioning activities are expected to be comparable to the construction phase but less intensive, and effects on the procurement of materials and equipment would be similar but less significant than during construction.

Overall, it is anticipated that potential effects of the construction, operations and maintenance, and decommissioning activities will not be different on any EJ Population compared with the overall population.

Influx of Non-Local Employees that Could Affect Housing

The proposed Project and the associated Clean Energy Resource may affect the demand for lodging in Falmouth as well as within the general region, including around the New Bedford MCT.

Even during peak construction activities, the influx of workers that may relocate to the area will only marginally add to the resident populations of local communities. Housing and accommodation in the region are plentiful and unlikely to be affected by the presence of temporary workers. Overall, it is anticipated that potential effects of the construction, operations and maintenance, and decommissioning activities on housing and temporary accommodations will not be different on any EJ Population compared with the overall population.

Table 5-7. Summary of the Potential Effects to EJ or Host Communities

	Potential Effects by Project Component					Period of Effect by Project Phase		
	Lease Area Infrastructure	**Offshore Export Cables**	**Landfall Locations, Onshore Export Cables and Transmission Cable**	**Onshore Substation**	**Ports**	**Construction**	**Operations**	**Decomm.**
Workforce Hiring	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	X	X	X
Procurement of materials, equipment, and services, including port use and vessel charters	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	Increase in employment and economic opportunities	X	X	X
Presence of Infrastructure	Disturbance of offshore economic activities	Disturbance of offshore economic activities	-	-	-	X	X	X
Vehicle Traffic	-	-	Reduced access; Disturbance	Reduced access; Disturbance	-	X	X	X
Influx of non-local employees that could affect housing	Increase in demand for lodging	Increase in demand for lodging	Increase in demand for lodging	Increase in demand for lodging	-	X	-	X
Planned Discharges – Air Emissions	-	-	Temporary disturbance from fugitive dust	Temporary disturbance from fugitive dust	-	X	-	X

5.4.2.3 Planned Discharges – Air Emissions

Construction-related air emissions may affect the communities in the immediate vicinity of the construction activities. Air emissions will mostly be created by vehicles and construction equipment, and will include carbon monoxide [CO_2], SO_2, nitrogen oxides [NO_x], sulfuric acid mist [H_2SO_4], particulate matter, etc. Earth-moving activities will also create particulate matters (construction dust).

Installation of the underground export cables, underground transmission cables, and the substation may temporarily affect neighboring communities in the Town of Falmouth.

Project activities would generate air emissions at the New Bedford MCT and, to a lesser extent, any of the other ports. Because these effects are typical for industrial ports, the proposed Project would not increase these effects above the levels typically experienced or expected in the vicinity of these facilities.

Overall, these effects will not be different on any EJ Population compared with the overall population.

The proposed Project will implement best management practices to mitigate for potential effects. In addition, an onshore construction schedule will be developed to mitigate for effects to neighboring communities to the maximum extent practicable. Onshore construction activities will comply with local regulatory authority requirements.

As part of Mayflower Wind's strategy plan to track and report on the status of environmental justice impacts, and engagement and employment (training, recruitment and hiring goals), Mayflower Wind has engaged a diversity, equity, and inclusion consultant). They are working to develop a supplier diversity plan and a workforce diversity plan for the Project.

5.4.3 Engagement and Employment Opportunities

5.4.3.1 Employment Opportunities

Overall, the Mayflower Wind Project and the associated Clean Energy Resource has the potential to positively affect overburdened communities directly and indirectly at the local and regional levels through its effects on employment opportunities, the supply chain, and the general economy, as well as health and wellbeing. The Project will have a positive effect to EJ populations or host communities through:

- workforce hiring,
- procurement of materials,
- equipment, and services, including port use and vessel charters, and
- indirect economic effects to local businesses such as restaurants and hotels to support workforce needs.

Mayflower Wind is preparing a local hiring plan to maximize Mayflower Wind's direct hiring of southeastern Massachusetts residents. Components of the plan shall include coordination with unions, training facilities, and schools.

Skilled and unskilled labor is required for all phases of the Project. The Project and its associated Clean Energy Resource will directly and indirectly create an estimated 10,000 jobs over the Project's lifetime (with decommissioning) in Massachusetts, and an additional 480 jobs in operations will be created elsewhere in the region. Mayflower Wind will encourage the hiring of personnel from the Project region to fill the required positions. Mayflower Wind will execute a commitment to make at least 75% of operations and maintenance local.

5.5 Construction Considerations and Methodologies

The following section describes construction methodologies for the offshore and onshore export cables including the sequence of construction activities and construction-related topics such as schedule, construction work hours, environmental compliance, monitoring, and mitigation.

The cable installation techniques and methods discussed below have been selected to maximize efficiency while mitigating for potential impacts. The progression of installation is expected to begin with the onshore substation site work, followed by the installation of substation equipment. The installation of the onshore underground cables will occur in tandem with the construction of the Mayflower Wind Substation. The HDD proposed at the landfall site as well as the installation of the offshore export cables are expected to follow.

5.5.1 Offshore Cable Installation

The proposed Project includes up to four offshore export cables, including up to three power cables and up to one dedicated communications cable, which connect the offshore substation platform(s) (OSP(s)) to the landfall site. The proposed export cable route starts from OSP(s) within the Lease Area and extends northward through Muskeget Channel, and then turns northwest to the landfall site in Falmouth. Prior to installation of the export cables, surveys will be conducted utilizing a range of sensors ranging from sonar, sub-bottom profiler, echo-sounder, and magnetometer. Some surveys will take place years in advance of the cable installation campaign to determine the optimal installation method. Additional survey data will likely be collected immediately before installation to identify any anomalies or changes from prior surveys (such as fishing gear, boulders, or mobile sand waves) for the vessels and installation team. These surveys assist in building a framework for the seafloor and subsurface along the export cable route and highlight areas requiring pre-lay route preparation. Potential impacts associated with installation are addressed in Section 4.6 of this Analysis.

5.5.1.1 Seabed Preparation for Cable Installation

The seabed may require preparation, including leveling, sand wave removal, and boulder removal, prior to installing cables. An orange peel grabber may be used for localized boulder removal and a plow may be used for boulder field removal in case boulders identified during pre-lay surveys cannot be easily avoided by micro-routing within the export cable corridor. If sand waves are present, the tops may need to be removed to provide a level bottom to install the export cables. Removal of sand waves can be conducted using a trailing suction hopper dredger, a water-injection dredge in shallower areas, or constant flow excavators. If deemed necessary, a pre-lay grapnel run will be conducted to clear the cable route of buried hazards along the installation route to remove obstacles that could impact cable installation such as abandoned mooring lines, wires, or fishing equipment.

Mayflower Wind may utilize equipment, as detailed in Table 5-8, to prepare the seabed as described above.

Table 5-8. Offshore Export Cable Seabed Preparation Equipment

Equipment	Use
Grapnel plow	Pre-lay grapnel run
Orange peel grabber	Localized boulder removal
Boulder clearance plow	Boulder field clearance
Trailing suction hopper dredger	Removal of sand wave tops
Water injection dredge	Removal of sand wave tops in shallow areas
Constant flow excavator	Seabed leveling and preparation

5.5.1.2 Cable Installation and Burial

Depending on the installation survey findings and seabed conditions encountered, several preparation and installation methods may be utilized. These methods are listed in Table 5-9 and described below. These cable laying techniques can involve cable laying followed by burial and/or simultaneous cable installation and burial.

Table 5-9. Offshore Export Cable Installation and Burial Equipment

Equipment	Use
Vertical injector	Vessel mounted burial solution for shallow water use that does not require seabed/sand wave sea leveling
Jetting sled	Shallow water uses for deeper trench depths (surface fed water supply) in areas of prepared/benign seabed surfaces
Jetting Remote Operated Vehicle (ROV)	Typically used in deeper water and can be used for unconsolidated soft beds
Pre-cut plow	Any depth and can be used for hard bottoms (plows can be used for a wide range of soils from unconsolidated sands to stiff clays)
Mechanical plowing	Any depth and can be used for hard bottoms (plows can be used for a wide range of soils from unconsolidated sands to stiff clays)
Mechanical cutting ROV system	Any depth, used for hard, consolidated substrate

5.5.1.3 Vertical Injector

A vertical injector is a deep burial jetting tool used for cable installation and burial. The vertical injector uses water propelled from jet nozzles to fluidize the seabed material to allow for lowering of the cable. This tool is towed along the back of a vessel and acts as a trowel creating a space for the cable to be installed and subsequently buried. This burial solution does not generally require seabed leveling in areas of sand waves or similar mobile sediment features. Hanging from the cable installation vessel or barge, this trenching system is one of the few options that does not require a level seabed – capable of trenching in areas of large sand waves.

5.5.1.4 Jetting Sled

A jetting sled is towed from a vessel and can be launched either during post-lay trench mode or fitted with the cable to simultaneously create a trench through soft seabed material and lay the cable. The trench is created by water jetting through unconsolidated, softer seabed material. As such, jetting is optimal in unconsolidated soils and sands with low shear strengths. The trenching systems offers sufficient maneuverability for any curves that the proposed offshore export cables may be laid in.

5.5.1.5 Jetting ROV

The jet trencher is an ROV based system that can be launched from cable installation vessels or from a dedicated support vessel. This self-propelled jetting method is capable of lowering the cable to depths of up to approximately 9.8 ft (3.0 m). This method is typically used in non-consolidated soils.

5.5.1.6 Pre-Cut Plow

This method is deployed when surface and sub-surface boulders are present. A basic mechanical plow will pre-cut a V-shaped trench ahead of cable installation. This allows for the boulders and soils to be lifted to the edges of the trenches for backfill purposes later. Once the cable is laid into the trench, the plow is re-configured into backfill mode where the boulders and soils that were previously relocated are then re-deposited.

A mechanical plow is towed from the back of a vessel and simultaneously cuts a narrow trench in the seafloor while also laying and burying cable. Plowing capability can increase from firm unconsolidated soils/sands to more consolidated soils and clays with medium shear strengths.

5.5.1.7 Mechanical Cutting ROV System

A mechanical cutting ROV cable burial system is a self-propelled system most suitable for soil with increased strength. This system can be utilized at any water depth and is anticipated for use along the export cable route to the Lease Area. The mechanical cutting ROV system utilizes a cutting wheel or chain to break up and excavate any material. Used only in hard, consolidated soils, a rotating chain or cutting wheel with dedicated teeth will excavate the soil from beneath the cable and various systems will be required to displace this soil away for the trench allowing the cable to be lowered to depth.

5.5.1.8 Anchoring

It is expected that a combination of a moored vessel solution and a Dynamic Positioning (DP) vessel solution will be used for the offshore export cable installation. The split between vessels will be determined based on the water depth profile along the route and the route length compared to cable-carrying capacity. A DP vessel maintains its position and heading by utilizing its own propellers and thrusters. For water depths greater than 49.2 ft (15.0 m), it is expected that a DP vessel can be used. Nearshore areas and areas with shallow water less than 49.2 ft (15.0 m) may necessitate a moored vessel solution, as operation of vessel thrusters is typically not realistic in these water depths. The maximum anchor radius from the cable installation barge will be approximately 2,625 – 3,281 ft (800 - 1,000 m) based on the anchor line length. This maximum radius will be forward and aft of the barge and will not extend outside of the width of the ECC. It is anticipated that anchoring will only occur along approximately 12 – 25 mi (20 – 40 km) of the ECC.

5.5.1.9 Cable Protection

Cable protection is typically required at any cable crossing locations and for areas where cable burial cannot be achieved. For cable protection, methods will be determined based on the location, length, and extent of the non-burial, and when all remedial burial solutions have been ruled out. Remedial burial techniques may include jet trenching or controlled flow excavation that fluidizes the surrounding sand to allow the cable to further settle into the trench. These secondary cable protection methods may include the creation of a rock berm, concrete mattress placement, rock placement, and fronded mattresses. Half shells may be used as well, and they are typically used to protect cables ends at pull-in areas and where trenching is not possible. Scour protection may also be used.

Based on preliminary understanding of site conditions from geophysical & geotechnical (G&G) surveys completed in 2019, 2020, and 2021, Mayflower Wind estimates 10% of the ECC from the lease area to landfall will require additional cable protection.

Any required crossings of other Project cables or existing third-party cables by the offshore export cables will utilize mutually agreeable crossing designs consistent with typical industry practices, which typically employ use of concrete mattresses (though other crossing methods may be assessed for use). Minimum separation distances will be determined so that both cables can be safely operated with risk of damage to either cable mitigated to the extent practicable. Target horizontal separation between each proposed Project cable is approximately 328 ft (100 m). Final cable spacing will depend on bathymetry and other detailed seabed characteristics and may be wider or narrower.

5.5.2 Transition from Offshore to Onshore

Horizontal Directional Drilling (HDD) will enable cable installation to pass beneath the nearshore area, tidal zone, eelgrass zone, beach, and adjoining coastal dune areas while mitigating for impact to these marine resources. Thus, Mayflower Wind has chosen to use HDD methods to bring the offshore export cables to the TJBs onshore. HDD is a “trenchless” process for installing cables or pipes which enables

the cables to remain buried below the beach and intertidal zone while limiting environmental impact during installation. The HDD installation will consist of up to four (4) 48 in (122 cm) diameter bores, each with a 30 in (76 cm) diameter High-Density Polyethylene (HDPE) DR-9 casing installed. With this design, each casing also serves as the carrier conduit for a three-core submarine power cable. A casing allows greater stability of the bore holes, potential re-use of the bore path or the ability to inject thermal grout into the borehole for better heat dissipation around the power cable. The approximate length of the HDDs is estimated to be between 3,000–4,100 ft (910 – 1,220 m), with a maximum depth of approximately 100 ft (30 m) below grade.

Installation of the landfall facilities associated with the HDD will include the use of onshore excavation and construction equipment and HDD support equipment. Construction related to the landfall site is expected to include the following:

- Construction of a temporary approach pit at a previously disturbed site at each onshore HDD entry point
- Drilling of a pilot hole along each planned HDD trajectory, below the beach and intertidal zone, and reaming of the bore hole to the necessary diameter
- Construction of a temporary approach pit or structure (e.g., cofferdam, gravity cell) at the offshore HDD exit point may be required to allow cable pull-in
- Insertion of conduit, made of HDPE or similar material, into each bore hole
- Installation of the offshore export cable through the conduit, below the beach and intertidal zone
- Disposal of drill cuttings and drill fluids
- Construction of onshore buried concrete transition pits or vaults and jointing of offshore export cable (3-core submarine cable) to onshore export cable (single-core underground cable)
- Site restoration of disturbed onshore areas

5.5.3 General Construction Methods for Underground Cable Installation

The new underground cable system will consist of three power circuits with three, single-core cables per circuit, for a total of nine power cables (up to 345 kV nominal voltage), plus associated communications and grounding cables, planned to be installed in a common duct bank where practicable. The maximum anticipated width of the trench excavation is anticipated to be approximately 11.0 ft (3.3 m) per trench. In areas where trench boxes cannot be used, the maximum width of disturbance will be 35.0 ft (10.6 m) per trench. The typical excavation depth will be approximately 8.0 ft (2.4 m) deep but could be deeper depending on survey results and potential utility crossings. Splice vaults or direct buried splice pits will be placed at required location along the route, per the final design. After completion of trenches, duct banks, and vaults or pits, cable installation and pulling operations will be performed. A pre-engineering survey will be performed to identify underground utility obstructions or potential crossings including other high-voltage cables or pipelines.

In general, construction is anticipated to consist of the following stages:

- Install soil and erosion controls and other mitigation measures, as appropriate;
- Excavate a trench;
- Install conduits and spacers in the trench, form the duct bank, and pour the concrete;
- Backfill the excavated trench and perform surface restoration; and
- Cable pulling, splicing, and testing.

Each of these phases is described in more detail below. The phases will be conducted in sequence at each location; Mayflower Wind anticipates that several phases of construction will be ongoing simultaneously along different sections of the route. Construction at the substation will take place concurrently with the installation of the new onshore export cable.

In most cases, the installation of the underground export cable will require a linear work zone along the construction corridor. It is anticipated that areas of typical open trench excavation will require an approximately 25 ft (8 m) wide workspace. Deep excavation at some dense utility intersections, which will be determined after the pre-engineering survey during the detailed design phase, may require a somewhat wider work area. Manhole and splice vault installations typically require an approximately 50 ft (15 m) wide work area (representing a maximum expected width of disturbance for installation). These work areas will include temporary traffic control devices necessary to guide motorists safely past the work zone. All excavated paved areas will be temporarily patched after in-street construction is completed in each location and will subsequently be repaired or replaced as required by the Town of Falmouth Department of Public Works (FDPW) and MassDOT (when applicable), to restore the street surface. Mayflower Wind will coordinate with Town and MassDOT officials on location-specific construction schedules.

Mayflower Wind anticipates that duct bank construction will progress at 20–200 ft (6–61 m) per day. While the construction stages mentioned above are listed chronologically, there may be additional days in between the completion of one activity and the commencement of the next activity, and it is likely that construction will not necessarily be completed in one segment prior to the commencement of construction in another segment. There may be cases where work on an unfinished segment may be temporarily halted due to unforeseen circumstances, and work would continue on other segments. Once the unanticipated circumstances are addressed, work would resume on the partially finished segment.

5.5.3.1 Soil and Erosion Control Installation

Mayflower Wind will obtain coverage for the Project under the National Pollutant Discharge Elimination System Construction General Permit and develop and maintain a Stormwater Pollution Prevention Plan (SWPPP) for the Project that will identify controls to be implemented to mitigate the potential for erosion and sedimentation from soil disturbance during construction. Prior to initiating construction, proper erosion/sedimentation control devices, such as straw or hay bales and siltation fencing, will be installed in accordance with approved plans and permit requirements (e.g., wetlands protection Orders of Conditions), with oversight by Mayflower Wind's construction supervisor. Weekly inspections to evaluate potential erosion and/or sedimentation issues will be conducted until "final stabilization" (i.e., 75% vegetative cover within the disturbed areas, road repaving) has been achieved. Photographic documentation will also be obtained.

In instances where work within the roadway will be conducted adjacent to storm drains, Mayflower Wind will install and maintain filter fabric barriers to prevent sediment from entering the storm drain system. When construction is complete at each location and the roadway has been re-paved, the filter fabric barriers will be removed.

Other measures to mitigate soil erosion will include the prompt removal of soils from the excavated trench. Soils will not be stockpiled along the road(s) but instead will be loaded directly into trucks to be hauled to an offsite disposal/re-use area, or to a temporary construction laydown area. This construction method will limit the potential for soils to be washed with stormwater into nearby storm drains.

5.5.3.2 Splice Vault Installation

Segments of underground cable must be spliced together at intervals along the route to create continuous stretches of cable from the TJBs to the substation. The proposed method for splicing uses splice vaults with access manholes installed along the underground cable route at intervals of approximately every 1,200 to 3,000 ft (370 to 910 m). Splice vaults provide a controlled environment to prepare the splices, reducing operating and maintenance costs for accessing the splices in the future.

Several factors contributing to the distance between splice vaults, including allowable pulling tensions, sidewall bearing pressure on the cable as it goes around a bend, the maximum length of cable that can be transported on a reel based on the reel's width, height, and weight, and the allowable voltage rise on the cable shield. Splice vaults are typically installed in a sequential schedule, and it is anticipated that each splice vault will take approximately 7 to 10 days to install. Each splice vault will be approximately 8 ft (2 m) wide by 30 ft (9 m) long and 8 ft (2 m) high but could vary depending on final cable system and

splice. The depth of cover above each splice vault will vary by location, with a typical target of approximately 3 ft (1 m) below grade. The splice vaults will be located entirely underground; the only visible aspects at ground level will be the manhole covers.

5.5.3.3 Trench Excavation and Duct Bank Installation

The anticipated method of underground cable installation along the routes is open trench installation. Where construction takes place within roads, the width of the trench will be marked on the street. Dig Safe will be contacted, and after the location of the existing utilities have been marked, the pavement will be saw cut. Saw cutting provides a clean break in the pavement and defines the extents of the trench for the next activity. Pavement will be handled separately from soil, and will be recycled at an asphalt batching plant or other approved facility.

Trenches will be primarily constructed using backhoes or excavators. In some areas, part of the excavation may be done by hand or vacuum excavation methods to avoid disturbing existing utility lines and/or service connections. The trenching operation will be limited to the length that can be completed in one day (approximately 20 to 200 ft [6 to 61 m] depending on conditions). A “clean trench” method will be used in which soil is loaded directly into a dump truck for off-site recycling, disposal, or reuse. Soil will not be stockpiled along the side of the trench. This method will reduce the size of the required work area and reduce the potential for soil migration and nuisance dust. Material that cannot be reused will be transported to a recycling facility or other suitable disposal facility.

Once excavated, the trench will be sheeted and/or shored as required by soil conditions, Occupational Safety and Health Administration (OSHA) safety rules, and local and state regulations, Shoring is designed to permit passage of traffic adjacent to the trench and will allow for the trench to be covered with a steel plate to allow traffic over the trench during non-working hours.

Once the open trench is prepared, the conduits will be assembled and lowered into the trench. The area immediately around the conduits will be filled with high strength thermal concrete (3,000 psi) to protect the conduits, the trench backfilled, and the surface restored. Backfill materials may consist of Fluidized Thermal Backfill or native soil, depending on local requirements.

During the trenching and duct bank construction, Mayflower Wind will make reasonable efforts to maintain access to adjacent residences and businesses. At various points in the trenching and duct bank construction process, it may be necessary to have an open trench that temporarily impedes access, but once the crews are finished, the trench will be steel-plated to re-establish access to nearby homes and commercial buildings. At the end of each workday, any remaining open trenches will be covered with securely anchored steel plates of sufficient thickness to withstand traffic loading.

5.5.3.4 Onshore Cable Installation and Testing

Following the installation of the splice vaults and duct bank as described above, the ducts will be swabbed and proofed to prepare for cable pulling activities. Up to nine single-core power cables, as well as associated communications and grounding cables, will be installed in segments between each splice vault. To install each cable section, first the splice vaults will be dewatered using temporary sump pumps. Then a cable reel will be set up at the “pull-in” splice vault and a cable puller will be set up at the “pull-out” splice vault, via the manholes. A hydraulic cable pulling winch and tensioner will be used to individually pull cable between splice vaults. This process will be repeated until all cables have been installed.

Once adjacent cable sections are installed, they will be spliced together inside the splice vaults. Splicing high-voltage solid-dielectric transmission cable is a time-consuming, complex operation. The splicing operation requires a splicing van and a generator, which typically will be located over one manhole access. The splicing van contains all of the equipment and material needed to make a complete splice. Once the complete cable system is installed, it will be field-tested from the substation(s). At the completion of successful testing, the line will be energized.

Following installation of the duct bank and splice vaults in public roadways, roadway surfaces will be restored. Mayflower Wind will work closely with the FDPW and MassDOT as applicable to determine the restoration requirements for all disturbed roadways and sidewalks to meet the standards of the state agencies including the Public Utility Road Restoration Standards, D.T.E. 98-22, att., Standards §§ 1.0-12.0 (August 26, 1999).

5.5.3.5 Dewatering

Although not expected, high groundwater conditions may be encountered during construction. Areas where groundwater may be encountered will be identified as part of the pre-construction environmental investigation of soils. Water found in all excavations must be assessed for obvious signs of contamination (e.g., discoloration, odor, signs of oil) prior to discharge. If feasible based on site-specific conditions, the least costly method when dewatering will typically be to recharge the groundwater back into the adjacent subsurface. This can be accomplished by discharging groundwater back within the open excavation associated with the project/pipe installation or discharging to the nearby ground surface via a filter bag or dewatering corral (if necessary), allowing groundwater to infiltrate back into the soil. For situations where on-site recharge of groundwater is not an option, such as when water exhibits signs of contamination, the water will typically need to be pumped by a waste management contractor for proper off-site disposal.

5.5.3.6 Laydown and Staging

Laydown and staging areas will be established prior to the commencement of construction activities. Where feasible, these areas will be located more than 100 ft (30 m) from any wetland resource areas, more than 200 ft (61 m) from perennial waterways, and outside the Zone I area of any public water supply wells.

5.5.3.7 Construction Equipment and Refueling

It is anticipated that vehicle fueling will be performed off-site at commercial service stations, and all major equipment maintenance will be performed offsite, likely at the contractor's base of operations. It will be necessary to refuel large equipment, such as excavators and paving equipment, on-site. Any such field refueling will not be performed within 100 ft (30 m) of wetlands or waterways, or within 100 ft (30 m) of known private or community potable wells. The Project is not located within a Town water supply Zone 1 area, and as such no vehicle or equipment refueling with occur within a Zone 1 area.

Construction equipment and vehicles and will be equipped with a spill containment kit and absorption materials, and additional spill containment equipment will be maintained on site for immediate use in the event of any inadvertent spills or leaks. All equipment operators will be trained in the use and deployment of spill containment materials.

All equipment will be inspected for incidental leaks (e.g., hydraulic fluid, diesel fuel, gasoline, anti-freeze) prior to site access and on a daily basis at the commencement of each work shift. Mayflower Wind will require documentation of all daily inspections as part of the contractor's approved means and methods. Additionally, fuel or oils of any kind will not be stored or brought into any splice vault, and no re-fueling of equipment either inside a vault or within 100 ft (30 m) of any vault will occur.

5.5.4 Substation Civil Works and Construction

The Mayflower Wind Substation at the Lawrence Lynch site is located west of Gifford Street and north of Jones Road at the end of Stephens Lane in Falmouth, MA. This site is approximately 27.3 ac (11.01 ha). The onshore export cables from the landfall location will enter the onshore substation from Gifford Street. The 345 kV transmission line will exit the yard in the southeast corner near the utility ROW. As noted previously, for the Preferred Route, the Project will end at the POCO, and the interconnecting transmission owner will site, build, and own the interconnection facilities to interconnect the Project to the POI at or near Falmouth Tap.

AIS, GIS, highly integrated switchgear (HIS), or a mixture of these may be used for the Project onshore substation. Major components proposed for the Mayflower Wind-owned onshore substation include, but are not limited to, either air-insulated or gas-insulated circuit breakers, disconnect and earthing switches (i.e., switchgear), fixed and/or variable shunt reactors, instrumentation, overvoltage protection and voltage transformers. A substation building will contain communication and control panels, auxiliary power equipment, and potentially switchgear (for the gas-insulated switchgear option). Potential additional equipment includes harmonic filters, synchronous condensers, and static synchronous compensators. The construction of the onshore substation includes two phases: the civil construction and the electrical construction. The onshore substation will be designed to serve as an unmanned station. During typical operation, there will be no need for an operator to be present on site.

An on-site wetland delineation was performed in April 2020. The field investigation identified three stormwater retention ponds and a potentially jurisdictional isolated freshwater wetland under the Falmouth wetland bylaw on the subject property. The field investigation identified an isolated freshwater wetland located on the adjacent FDPW property with a 100 ft (30 m) buffer zone that extends on to the subject property, and nearby Sols Pond with a 100 ft (30 m) buffer zone that also extends on to the subject property. The substation property is not located within the 100-year floodplain. Any tree removal required to construct the substation would be minimal as the subject property is an active asphalt plant.

This site is immediately adjacent to residences, and the substation fence line could potentially be within 100 ft (30 m) of the nearest residence. With appropriate mitigation in the form of lower noise specified equipment and/or sound walls the substation will meet the applicable threshold (i.e., not more than 10 dBa above the lowest ambient sound levels) for sound at the nearest sensitive receptor (see In-Air Acoustic Assessment Report provided in Attachment H). This proximity to neighboring residences may also require visual mitigation measures such as decorative fencing or additional landscaping. These efforts can likely be combined with sound walls.

It is anticipated that construction and commissioning of the substation is scheduled to occur over a period of approximately 18 to 24 months. And will include the following steps:

- Install perimeter construction fencing and security gate, install initial erosion controls;
- Prepare the site for construction, which includes clearing a small number of trees, grading the site, and excavating areas requiring drainage swales and basins required for stormwater management;
- Excavate areas required for major component foundations and full volume containment sumps;
- Form and pour major foundations/containment sumps;
- Excavate areas required for spread footings, form and pour footings;
- Deliver and place major equipment (e.g., transformers, reactors) using appropriate heavy load vehicles and equipment (transformers are filled with dielectric fluid later in the construction sequence);
- Trench areas for underground cabling, install duct bank, and backfill;
- Install ground grid and place crushed stone in yard area;
- Deliver and set prefabricated control equipment enclosure;
- Deliver and place other equipment (e.g., breakers), and begin to erect buswork;
- Complete buswork, begin cabling, including bringing transmission into the site;
- Complete cabling, control wiring, and installation of protection systems;
- Test and commission;
- Install permanent perimeter security fencing and screening;
- Restore and landscape periphery of site; and
- Remove construction stage erosion controls.

5.5.5 Construction Waste and Soil Management

Waste materials generated along the route during installation of the HDD, transmission duct bank, and vaults will be promptly removed and re-used or properly disposed of at a suitable facility. The largest quantity of construction waste will likely be from soils excavated from the trench and locations where splice vaults are installed. This material will be removed from the trench and hauled to an appropriate off-site disposal/re-use location or to a temporary construction laydown area for on-site re-use. Concrete and asphalt will be recycled at a local asphalt plant.

One G.L. Chapter 21E site with an Activity and Use Limitation (AUL), a form of environmental deed restriction) was identified along the Preferred Route (which is also Variant 2 of the Noticed Alternative Route) (Figures 5-25) which does not appear to be active. A permanent solution for the contaminated site near the Preferred Route (Harvey's Hardware's) included removal of two underground storage tanks in the 1990s and was closed with an A3 RAO with an AUL. The Lawrence Lynch site has two Release Tracking Numbers (RTNs) which were closed out with Permanent Solutions/No Conditions. In the event there are contaminated soil or other regulated materials encountered along the route, soils will be managed pursuant to the Utility Release Abatement Measure provisions of the Massachusetts Contingency Plan (MCP, 310 C.M.R. 40.0000 et seq.), the Chapter 21E regulations. Mayflower Wind will contract with a licensed site professional (LSP) as necessitated by conditions encountered along the Project alignment, consistent with the requirements of the MCP at 310 C.M.R. 40.0460 et seq.

5.5.6 Construction Hours and Schedule

Construction hours will be developed in accordance with local noise ordinances and municipal regulated construction hours. For the installation of the onshore duct bank and splice vaults, construction is anticipated to occur during typical work hours (7:00 AM to 6:00 PM), Monday through Friday. Construction required for the installation of the underground transmission system may occur outside of this time period under certain circumstances, such as when transmission cables are being spliced, and Mayflower Wind will work closely the Town of Falmouth to seek approval when work outside of these hours is necessary. Mayflower Wind will also coordinate with the Town to determine areas where construction hours will be limited (e.g., in front of schools). In certain locations, night work may be proposed to allow advancement of Project construction in areas with traffic congestion or other construction projects being advanced simultaneously. Mayflower Wind will coordinate with the Town of Falmouth to establish construction hours.

For work at the landfall site, the proposed HDD construction work hours are typically from 7:00 AM to 7:00 PM on Monday through Saturday. However, these hours will be extended during conduit pull-in and boring operations as the contractor will likely need to work around the clock once that process has begun. Mayflower Wind will work closely the Town of Falmouth to seek approval for when work outside of these hours is necessary.

Mayflower Wind intends to adhere to the general summer limitations on construction activities on Cape Cod, which is reflected in the Project schedule for construction at the landfall site and along the onshore export cable route as the route follows public roadway layouts. Activities at the landfall site where transmission will transition from offshore to onshore are not expected to be performed during the months of June through September unless authorized by the Town of Falmouth. Activities along the onshore transmission route will also likely be subject to significant construction limitations from Memorial Day through Labor Day unless authorized by the Town of Falmouth. Mayflower Wind will consult with the Town of Falmouth regarding the construction schedule.

5.5.7 Construction Mitigation, Compliance and Monitoring

Construction mitigation measures will help mitigate for the potential for temporary impacts to the human and natural environments. Typical mitigation for 5-20 dust, construction vehicle emissions, and construction compliance inspections are discussed below for underground transmission line construction. Specific discussions for stormwater runoff and associated erosion and sedimentation are discussed above in Section 5.5.3.1.

5.5.7.1 Air Quality

For the underground transmission system construction, dust will be controlled at the construction sites by use of appropriate methods, including the use of dump trucks to move soil out of the construction zone, and by covering temporary soil stockpiles. A “clean trench” method will be used in which soil is loaded directly into a dump truck for off-site recycling, disposal, or reuse. Soil will not be stockpiled along the side of the trench. This method will reduce the size of the required work area and reduce the potential for soil migration and nuisance dust. Material that cannot be reused will be transported to a recycling facility or other suitable disposal facility.

Mayflower Wind may also require contractors to place water trucks with misters in or near the work areas during construction activities. Water trucks and street sweeping will be used in combination within the roadway construction areas. In addition, Mayflower Wind will direct its contractors to retrofit any diesel-powered non-road construction equipment rated 50 horsepower or above to be used for 30 or more days over the course of the Project with USEPA-verified (or equivalent) emission control devices (e.g., oxidation catalysts or other comparable technologies). Mayflower Wind will also require contractors to use ultra-low sulfur diesel (ULSD) fuel in their diesel-powered construction equipment used for this Project. ULSD has a maximum sulfur content of 15 ppm as opposed to low sulfur diesel fuel, which has a maximum sulfur content of 500 ppm. The use of ULSD fuel results in a 97% reduction in the sulfur content as compared to low sulfur diesel fuel. Mayflower Wind will also require its contractors to comply with state law (G.L. c. 90, § 16A) and MassDEP regulations (310 C.M.R. 7.11(1)(b)), which limit vehicle idling to no more than five minutes. There are exceptions for vehicles being serviced, vehicles making deliveries that need to keep their engines running and vehicles that need to run their engines to operate accessories. There may be other times when idling is permitted as long as the idling is absolutely necessary (e.g., as a matter of safety).

In regard to the enforcement of the idling restrictions, it is the responsibility of every person on a job site to be in full compliance with all safety and environmental rules and policies. Supervisors and foremen at job sites are responsible for enforcement of these rules on a continuous basis. There also will be installation of anti-tracking pads and regular sweeping of the pavement of adjacent roadway surfaces during the construction period to mitigate for the potential for construction traffic to kick up dust and particulate matter.

5.5.7.2 Onshore Noise Mitigation

During construction, Mayflower Wind will require that construction equipment be operated such that construction-related noise levels will comply with applicable sections of the MassDEP Air Quality Regulations at 310 CMR 7.10, particularly subsections (1) and (2), which pertain to the use of sound-emitting equipment in a considerate manner as to reduce unnecessary noise. The Project will make every reasonable effort to mitigate for noise impacts from construction. Mayflower Wind will mitigate construction noise impacts by:

- Requiring well-maintained equipment with functioning mufflers;
- Requiring muffling enclosures on continuously-operating equipment such as air compressors and welding generators;
- Minimizing the amount of work conducted outside of typical construction hours;
- Using a low-noise generator (WhisperWatt™ or equivalent) to reduce noise impacts for cable pulling and splicing;
- Requiring strict compliance with the Massachusetts Anti-Idling Law to prevent equipment from idling and producing unnecessary noise while not in productive use; and
- If applicable, mitigating the impact of noisy equipment on sensitive locations by using shielding or buffering distance to the extent practicable.

5.5.7.3 Offshore Noise Mitigation

During offshore export cable installation, the primary source of noise will come from the ships' engines. The mitigation of noise impacts specific to activities in federal waters will be comprehensively and specifically addressed through federal review processes.

5.5.7.4 Environmental Inspections

Throughout the construction process, Mayflower Wind will retain the services of an environmental monitor to maintain compliance with all federal, state, and local permit requirements. It is anticipated that the monitor will conduct inspections at regular intervals and during periods of prolonged precipitation to verify that environmental controls are functioning properly and to make recommendations for correction or maintenance. If necessary, documentation identifying deficiencies of erosion control measures will be forwarded to the construction supervisor for implementation of immediate corrective measures. The environmental compliance manager will have immediate access to a Company contact and will have "stop work" authority relative to environmental non-compliance.

In addition to retaining the services of an environmental monitor, Mayflower will require the construction contractor to designate the Construction Supervisor or equivalent to be responsible for daily inspection to confirm that the Project is compliance with permit requirements. Mayflower Wind will also contract with a LSP as necessitated by conditions encountered along the Project, consistent with the requirements of the MCP.

5.5.8 Safety and Public Health Considerations

Mayflower Wind will design, build, and maintain the Project so that the health and safety of the public are protected. This will be accomplished through adherence to all applicable federal, state, and local regulations, and industry standards and guidelines established for protection of the public. More specifically, all design, construction and operation activities will be in accordance with applicable government and industry standards such as the Massachusetts Code for the Installation and Maintenance of Electric Transmission Lines (220 CMR §§125.00 et seq.) and the National Electrical Safety Code and OSHA regulations. The facilities will be designed in accordance with sound engineering practices using established design codes and guides published by, among others, the Department of Public Utilities (DPU), the Institute of Electrical and Electronic Engineers, the American Society of Civil Engineers, the American Concrete Institute, and the American National Standards Institute. The contractor will be required to comply with all Dig-safe regulations and protocols. Mayflower Wind will also ensure their contractors are in strict compliance with the local town road opening requirements and work closely with the applicable department of public works and local utilities. Following construction of the facilities, all transmission structures and substation facilities will be clearly marked with warning signs to alert the public to potential hazards.

5.6 Conclusion

Mayflower Wind has avoided and mitigated potential impacts from installation of offshore export cables within the offshore ECC as well as onshore construction of the Preferred or Noticed Alternative routes and associated variants, to the maximum extent practicable. While any combinations of the Preferred and Noticed Alternative routes and associated variants would satisfy the Project need, the documentation provided in this Section demonstrates the clear advantages of the Preferred Route over the Noticed Alternative. Several advantages of the Preferred Route over the Noticed Alternative Route include:

- Landfall location requiring a shorter HDD distance, resulting in;
  - Shorter construction duration;
- Shorter length for onshore export cable, resulting in:
  - Shorter construction duration;
  - Fewer traffic disruptions;

- Fewer potentially affected sensitive uses; and
- Fewer potentially affected residential uses.

The proposed onshore transmission system will be buried and will be constructed within existing public roadway layouts beneath pavement or within 10 ft of pavement, or within municipally owned property. As such, no permanent impacts to the natural or developed environmental and community are expected. Mayflower Wind will closely coordinate with the Town of Falmouth to address traffic management during construction. The Project will avoid removal of public shade trees to the extent practicable, and other tree clearing will be limited to the substation site, where such clearing is expected to be minimal. The proposed substation will result in a permanent visual alteration, the effects of which will be mitigated with visual screening. Accordingly, the environmental impacts associated with the Project have been properly mitigated.

6. Consistency with the Policies of the Commonwealth

The Mayflower Wind Project is consistent with the current Health, Environmental Protection, and Resource Use and Development Policies of the Commonwealth.

This section describes the Project's consistency with current applicable health, environmental protection, and resource use and development policies of the Commonwealth. The Project is consistent with these policies, as explained in further detail below.

6.1 Introduction

Pursuant to Massachusetts General Law (G.L.) c. 164 § 69J, the Energy Facilities Siting Board shall approve a petition to construct a facility upon a finding, among others, that the proposed plan is "consistent with the current health, environmental protection, and resource use and development policies as adopted by the Commonwealth." As discussed below and in more detail throughout the Analysis, the Mayflower Wind Project not only satisfies the requirements of G.L. c. 164, § 69J, but is also consistent with and directly advances important state energy policies as set forth in *The Electric Utility Restructuring Act of 1997* (c. 164 of the Acts of 1997), *The Green Communities Act* (c. 169 of the Acts of 2008), *The Global Warming Solutions Act* (c. 298 of the Acts of 2008), *An Act to Promote Energy Diversity* (c. 188 of the Acts of 2016), *An Act to Advance Clean Energy* (c. 227 of the Acts of 2018, § 21), and *An Act Creating A Next-Generation Roadmap For Massachusetts Climate Policy*, (c. 8 of the Acts of 2021 (2021 Climate Act)). The Project is also consistent with the health and environmental protection, resource use and development policies of the Commonwealth, as articulated herein.

6.2 Health Policies

An adequate and reliable supply of energy is critical to the state's citizens and economy, as recognized by the *Electric Utility Restructuring Act of 1997 (Restructuring Act,* c. 164 of the Acts of 1997) which provides that reliable electric service is of "utmost importance to the safety, health and welfare of the Commonwealth's citizens and economy…"[56] The Mayflower Wind Project will, through the transmission infrastructure proposed in this Petition, enable the delivery of up to 1,200 MW from its Clean Energy Resource to the Commonwealth of Massachusetts and the regional grid, meeting obligations under approved power purchase agreements (PPAs) and helping to ensure the availability of clean and reliable electric service to the citizens and businesses of the Commonwealth and the region. Thus, because the Project will be consistent with, and will promote, the Commonwealth's energy policies as outlined in the Restructuring Act, it will also be consistent with its health policies.

The Project will be designed, built, operated, and maintained so that the health and safety of the public are protected. As discussed in Section 5, all design, construction, and operation activities will be in accordance with the applicable federal, state, and local regulations, and industry standards and guidelines established for protection of the public, such as the National Electrical Safety Code and Occupational Safety and Health Administration (OSHA) regulations to ensure that the health and safety of the public are protected. As discussed in Section 5, the Project is being designed in a manner to avoid and/or mitigate potential adverse impacts related to traffic, noise, air and water quality, and electromagnetic fields (EMF). Following construction of the facilities, all transmission structures and substation facilities will be clearly marked with warning signs to alert the public to potential hazards.

[56] *See Restructuring Act* St. 1997, c. 164, § 1(h)

6.3 Environmental Protection Policies

The Project is fully consistent with and advances the Commonwealth's environmental protection and related energy policies as set forth in G.L. c. 164 and with other state and local environmental policies as described below.

6.3.1 The Green Communities Act, as amended by the 2016 Energy Legislation and An Act to Advance Clean Energy

In 2016, the Commonwealth enacted legislation that aimed to develop offshore wind energy generation projects by means of competitive solicitations by the Massachusetts electric distribution companies (EDCs).[57] Section 83C of the *Green Communities Act* (c. 169 of the Acts of 2008), as amended by *An Act to Promote Energy Diversity* (c. 188 of the Acts of 2016) (Section 83C), established a budding commercial-scale offshore wind industry in Massachusetts by directing procurement of cost-effective long-term contracts for 1,600 MW of offshore wind energy. Signed by Governor Baker in August 2016, Section 83C required the first solicitation for offshore wind energy to take place no later than June 30, 2017.

In addition, *An Act to Advance Clean Energy* (c. 227 of the Acts of 2018, § 21), authorized the Department of Energy Resources (DOER) to 1) investigate the necessity, benefits and costs of requiring the EDCs to conduct solicitations and procurements for up to 1,600 MW of additional offshore wind, and 2) evaluate the previous solicitation and procurement process and make recommendations for any improvements.[58] The DOER's study showed that an additional procurement for 1,600 MW of offshore wind energy has "a likelihood of cost-effectiveness that justifies additional solicitations," as such a procurement could result in over 6,000,000 MW hours of annual clean energy when fully operational.[59] In a July 2020 letter, DOER suggested that the relevant entities would begin drafting a Request for Proposals (RFP) for offshore wind generation consistent with *An Act to Advance Clean Energy* in 2020 and plan for selection of projects in 2022.[60]

On May 23, 2019, the Massachusetts EDCs, in coordination with the DOER, issued a solicitation for Long-term Contracts for Offshore Wind Energy Projects pursuant to Section 83C.[61] The solicitation sought to procure at least 400 MW, and up to 800 MW, of offshore wind energy generation. Project developers, including Mayflower Wind, submitted bids in August 2019.[62] Mayflower Wind proposed four potential projects — a 400 MW project and three proposals for 800 MW projects, including Mayflower Wind's Project 2, the 804 MW Low-Cost Energy proposal. Following a bid evaluation process, including monitoring and assistance by an Independent Evaluator, the EDCs selected Mayflower Wind's Project 2 as the winning bid on October 30, 2019.[63] On January 10, 2020, the EDCs and Mayflower Wind executed the long-term PPAs. On February 10, 2020, the PPAs were filed for approval with the Department of Public Utilities (DPU or Department) in Docket Nos. DPU 20-16, DPU 20-17, and DPU 20-18. By order dated November 5, 2020, the Department approved the PPAs. The Project and its delivery of energy from the Clean Energy Resource will be another significant step forward in meeting Massachusetts' growing demand for clean energy and response to climate change.

[57] *See* Section 83C of *An Act Relative to Green Communities*, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.

[58] Massachusetts DOER, Offshore Wind Study, at 1 (May 2019), *available at:* https://www.mass.gov/doc/offshore-wind-study/download.

[59] Massachusetts DOER., Offshore Wind Study, at 5-6 (May 2019), *available at* https://www.mass.gov/files/documents/2019/05/31/OSW%20Study%20-%20Final.pdf.

[60] Massachusetts DOER, Letter to Joint Committee on Telecommunications and Energy re: Offshore Wind Energy Transmission under Section 21 of Chapter 227 of the Acts of 2018 (*An Act to Advance Clean Energy*) at 4 (July 28, 2020), *available at* https://www.mass.gov/doc/offshore-wind-transmission-letter-07-28-20/download. In the same letter, the DOER, after investigating the feasibility of offshore wind transmission, decided not to require the EDCs to solicit 1,600 MW of offshore wind transmission.

[61] Information on the solicitation process is available at https://macleanenergy.com/83c-ii/83c-ii-documents/.

[62] Information on the bids is available at https://macleanenergy.com/83c-ii/83c-ii-bids/.

[63] *See* Mass. Executive Office of Energy and Environmental Affairs, Press Release: Project Selected to Increase Offshore Wind Energy in the Commonwealth (Oct. 30, 2019), *available at* https://www.mass.gov/news/project-selected-to-increase-offshore-wind-energy-in-the-commonwealth.

On May 7, 2021, a third offshore wind solicitation was issued by the EDCs in accordance with the authority granted to DOER under Section 83C to procure an additional approximately 1,600 MW of aggregate nameplate capacity not later than December 31, 2035.[64] On September 16, 2021, Mayflower Wind submitted a bid in response to the 2021 Massachusetts offshore wind solicitation, the public version of which became available on September 23, 2021.[65] The expected date of bid selection is December 17, 2021.[66]

Given the directives in Section 83C, the Project and its associated Clean Energy Resource satisfy Massachusetts' growing need for offshore wind energy projects. By delivering low-cost, clean energy from up to 1,200 MW from the Clean Energy Resource through the facilities being reviewed herein, the Mayflower Wind Project furthers the clean energy goals put forth by the Massachusetts legislature. The Project was chosen through the legislature-approved procurement process because it will contribute to the energy needs of the Commonwealth and will provide substantial environmental and economic benefits.

6.3.2 An Act Creating A Next-Generation Roadmap For Massachusetts Climate Policy, St. 2021, c. 8 (2021 Climate Act)

In 2021, the Massachusetts Legislature passed the 2021 Climate Act. This legislation further commits and moves Massachusetts forward to a clean energy future. The 2021 Climate Act builds on *The Global Warming Solutions Act* of 2008 and sets an ultimate emissions goal of "at least net zero statewide greenhouse gas emissions" by 2050. The act directs the Secretary of the Executive Office of Environmental Affairs (EEA), in consultation with the DOER, to set greenhouse gas emissions limits for 2025, 2030, 2035, 2040, 2045 and 2050. The act also increases the offshore wind procurement authorization to a total of 4,000 MW, to be procured no later than June 30, 2027.[67]

The Project is consistent with and directly advances the Commonwealth's policies for developing offshore wind energy resources. The Project satisfies the legislative directives of the 2021 Climate Act by enabling the delivery of energy from up to 1,200 MW of the capacity of the Clean Energy Resource into the Commonwealth (serving 800 MW under the existing PPAs and up to an additional 400 MW available for future procurements) and thereby advances the policies set forth in the 2021 Climate act.

6.3.3 State and Local Environmental Policies

The Project will contribute to a reliable, diverse, and decarbonized energy supply for the Commonwealth and region with minimal environmental impact. The Project will obtain all environmental approvals, licenses, and permits required by federal, state, and local agencies and will be constructed and operated in compliance with applicable federal, state, and local environmental policies. In addition to the Energy Facility Siting Board's review, the Project will undergo a Massachusetts Environmental Policy Act (MEPA) review and a federal consistency review by the Massachusetts Office of Coastal Zone Management (CZM), and, following completion of the MEPA review process, will secure state and local permits, reviews and approvals as set forth in Table 6-1 below.

Table 6-1 identifies the anticipated principal environmental reviews, permits, and approvals required for the Project. The Project will demonstrate compliance with applicable state and local environmental policies by meeting the requirements for each of these review programs, permits, and approvals.

[64] Information on the solicitation process is available at: https://macleanenergy.com/83c-iii/.

[65] Information on the bids is available at: https://macleanenergy.com/83c-iii/83c-iii-bids/.

[66] Information on the anticipated schedule is available at: https://macleanenergy.com/83c-iii-timeline/.

[67] When submitting amendments on the bill before signing it into law, Governor Baker stated in a letter to the legislature, "significant amounts of offshore wind, as much as 15 GW, will be necessary to reach the Commonwealth's net zero limit. We recognize that more work is needed to ramp up offshore wind development in Massachusetts and to provide clean, affordable power to residents." Letter from Massachusetts Governor Charles D. Baker to the Senate and House of Representatives (Feb. 7, 2021), *available at* https://d279m997dpfwgl.cloudfront.net/wp/2021/02/S9-Time-Stamped-Amendment-Letter.pdf.

Table 6-1. Environmental Permits, Reviews, and Approvals for the Mayflower Wind Project

Agency/Regulatory Authority	Permit/Approval	Status
Federal		
Bureau of Ocean Energy Management (BOEM)[68]	Site Assessment Plan (SAP)	Approved by BOEM May 27, 2020
BOEM	Construction and Operations Plan (COP) approval/Record of Decision (ROD)	Filed February 15, 2021. BOEM conducted sufficiency review. Mayflower responded to BOEM comments/questions and submitted revised versions of the COP on August 30, 2021, and October 28, 2021. BOEM published a Notice of Intent (NOI) to Prepare an Environmental Impact Statement (EIS) for the review of the COP on November 1, 2021.
BOEM	CVA Nomination	Approved by BOEM November 4, 2020
BOEM	Departure request for the early fabrication of Mayflower Wind's Offshore Substation Platform(s) (OSP) and inter-array cables	Approved by BOEM December 1, 2020
BOEM	Departure request for deferral of Lease Area geotechnical data	Approved by BOEM October 5, 2021
BOEM	National Environmental Policy Act (NEPA) Review	Initiated by BOEM on November 1, 2021
U.S. DoD Clearing House	Informal Project Notification Form	Submitted May 11, 2020
U.S. Army Corps of Engineers (USACE)	Individual Section 404 Permit Rivers and Harbors Act of 1899 Section 10 Permit	Filing planned for Q4 2022
U.S. Coast Guard (USCG)	Private Aids to Navigation Authorization	To be filed 3-6 months prior to offshore construction
USCG	Local Notice to Mariners	To be filed prior to offshore construction
U.S. Environmental Protection Agency (EPA)	National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities	Filing planned for Q1 2022
EPA	Outer Continental Shelf (OCS) Permit Act	Filing planned for Q4 2022
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act (ESA) Section 72 consultation Bald and Golden Eagle Act (BGEPA) Migratory Bird Treaty Act compliance	No take authorization is expected to be requested and coordination with USFWS has been initiated and will continue Basic site evaluation and characterization studies completed and detailed studies ongoing

[68] In its review of the COP, BOEM must comply with its obligations under the NEPA, the National Historic Preservation Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Migratory Bird Treaty Act, the Clean Air Act, and the Endangered Species Act. Thus, BOEM coordinates and consults with numerous other federal agencies including the National Marine Fisheries Service, United States Fish and Wildlife Service, the Environmental Protection Agency, and the United States Coast Guard during the review process. BOEM also coordinates with the states under the Coastal Zone Management Act to ensure that the project is consistent with the state's coastal zone management program.

Agency/Regulatory Authority	Permit/Approval	Status
National Oceanic and Atmospheric Administration (NOAA) U.S. National Marine Fisheries Service (NMFS)	Marine Mammal Protection Act Incidental Hazard Authorization (IHA) or Letter of Authorization (LOA)	Pre-construction: Concurrence for 2019 Geophysical and Geotechnical (G&G) surveys was issued by NMFS on July 26, 2019 IHA for 2020 G&G surveys issued on July 23, 2020 IHA for 2021 G&G surveys issued on July 1, 2021 IHA or LOA[69] for offshore construction: to be filed Q3 2022
State/Massachusetts		
Massachusetts Executive Office of Energy and Environmental Affairs	MEPA Environmental Notification Form (ENF) or Environmental Impact Report (EIR) Certificate of Secretary of Energy and Environmental Affairs	ENF filed concurrently with or shortly after the EFSB Petition and Analysis Draft EIR planned in Q1 2022, and Final EIR in Q3 2022
Massachusetts Energy Facilities Siting Board (EFSB)	Approval to construct the proposed Project, pursuant to G.L. c. 164, § 69J (Siting Petition) Certificate of Environmental and Public Need (Section 72 Approval Consolidated with EFSB)	Petition, dated November 17, 2021, accompanies this Analysis
Massachusetts Department of Public Utilities	Approval to construct and use proposed Project pursuant to G.L. c. 164, § 72 (Section 72 Petition) Individual and comprehensive exemptions from the zoning bylaws of Falmouth for the proposed Project pursuant to G.L. c. 40A § 3 (Zoning Petition)	Filed concurrently with or shortly after the EFSB Petition and Analysis Filed concurrently with or shortly after the EFSB Petition and Analysis
Massachusetts Department of Environmental Protection (MassDEP)	Chapter 91 Waterways License/Permit for dredge, fill, or structures in waterways or tidelands Section 401 Water Quality Certification	Joint application filing planned for Q3 2022
Massachusetts Office of Coastal Zone Management (MA CZM)	CZM Consistency Determination	Draft filed with COP on February 15, 2021; COP revisions filed on August 30, 2021, and October 22, 2021. State filing planned around completion of MEPA review process (after consultations with MA CZM).
Massachusetts Department of Transportation (MassDOT)	State Highway Access/Easement/Right-of-Way Permits Rail Division Use and Occupancy License (if needed)	Filing planned for Q1 2023
Massachusetts Board of Underwater Archaeological Resources (BUAR)	Special Use Permit	Special Use Permit for 2020 activities issued May 28, 2020 Received Provisional Special Use Permit on March 12, 2020 Renewal of Special Use Permit for 2021 issued on Sept. 30, 2021

[69] Mayflower Wind is engaging with NMFS with regards to whether an IHA(s) or LOA is most appropriate to support offshore construction.

Agency/Regulatory Authority	Permit/Approval	Status
Massachusetts Historical Commission (MHC)	Project Notification Form/Field Investigation Permits (980 C.M.R. § 70.00)	Project Notification Form submitted February 14, 2020 MHC issued comment letter for compliance with Sections 106 of the National Historic Preservation Act of 1966 (36 [Code of Federal Regulations] CFR 800) on March 9, 2020. Phase 1A Reconnaissance Survey Permit Application filed February 2, 2021, MHC issued Phase 1A Permit on April 9, 2021. Revised Phase 1A Report filed on Sept. 28, 2021 (accepted by MHC). Phase 1B permit application filed on Oct. 19, 2021.
Massachusetts Fisheries and Wildlife (MassWildlife) - Natural Heritage and Endangered Species Program (NHESP)	Endangered Species Act Checklist Conservation and Management Permit (if needed) or No-Take Determination	Submitted Information Request for state-listed rare species on April 10, 2020. NHESP issued letter identifying state-listed protected species in proposed Project areas on May 1, 2020, under 2017 Atlas (NHESP Tracking No.: 19-38917). Request for updated species info under 2021 Atlas filed on Sept. 9, 2021; updated information issued by NHESP via letter dated Oct. 8, 2021. Endangered Species Act Checklist filing planned for Q3 2022 (upon Final Environmental Impact Report certificate)
Massachusetts State Legislature	Article 97 legislation for change in use of certain state, county, or local public lands taken or acquired for natural resource purposes	Filing planned for Q4 2022
Massachusetts Division of Marine Fisheries (DMF)	Letter of Authorization and/or Scientific Permit (for surveys and pre-lay grapnel run)	TBD based on consultations with DMF
Regional (for portions of the Mayflower Wind Project within regional jurisdiction)		
Cape Cod Commission (CCC)	Development of Regional Impact (DRI) Review	Review process to be initiated in Q1 2023
Martha's Vineyard Commission	DRI Review	Review process to be initiated in Q1 2023
Local (for portions of the Mayflower Wind Project within local jurisdiction)		
Falmouth Planning & Zoning Board	Local Planning/Zoning Approval(s) (if needed)	Filing of application(s) planned for Q1 2023 Request for individual and comprehensive zoning exemptions [filed] [to be filed] pursuant to G.L. c. 40A § 3
Falmouth Conservation Commission	Notice(s) of Intent and Order(s) of Conditions (Massachusetts Wetlands Protection Act and municipal wetland non-zoning bylaws)	Filing of Notice of Intent NOI(s) planned for Q1 2023
Edgartown, Oak Bluffs, Tisbury and/or Nantucket Conservation Commissions	Notice(s) of Intent and Order(s) on Conditions (Massachusetts Wetlands Protection Act and municipal wetland non-zoning bylaws) for offshore route (if needed as dictated by final offshore route)	Filing of NOI(s) planned for Q1 2023
Falmouth Department of Public Works (FDPW), Board of Selectmen, and/or [Town Counsel]	Street Operating Permits/Grants of Location	Filing of application(s) planned for Q1 2023

6.3.4 Global Warming Solutions Act

The Global Warming Solutions Act (c. 298 of the Acts of 2008) (GWSA), enacted in 2008, established aggressive greenhouse gas (GHG) emissions reduction targets, mandating that the Commonwealth reduce its GHG emissions by 10 to 25% from 1990 levels by 2020 and by at least 80% from 1990 levels by 2050. In evaluating and issuing permits, the Siting Board and other administrative agencies are obligated by the GWSA to consider reasonably foreseeable climate change impacts (e.g., additional GHG emissions) and related effects (e.g., sea level rise). Additionally, pursuant to the GWSA, the Secretary of the EEA issued the Clean Energy & Climate Plan for 2020 in December 2010, and an update to that plan in December 2015. The Secretary of the EEA is currently drafting a Clean Energy & Climate Plan for 2030, the interim plan was released in December 2020.[70] The interim plan builds upon Governor Baker's 2020 commitment to achieve "net-zero" emissions in Massachusetts by 2050, described in Section 6.3.10. As a step on the pathway to "net-zero," the interim plan requires the state to reduce its annual gross emissions to 14.2 million metric tons of CO_2 equivalent or less by 2050, while ensuring that an equal amount of CO_2 is removed from the atmosphere each year by natural or working lands, or other forms of carbon capture and energy storage accredited to the Commonwealth.[71] The interim plan sets a new goal of achieving 45% below the 1990 baseline level by 2030.[72] The interim plan also established four pillars of decarbonization to achieve "net-zero" by 2050, one of which is decarbonizing the energy supply.[73] As a part of this effort, the interim plan notes that "offshore wind is anticipated to be the primary source of electricity for a decarbonized energy system." The Project will contribute to this goal by delivering energy from up to 1,200 MW of the capacity of the Clean Energy Resource to Massachusetts and the regional grid. The Project and the associated Clean Energy Resource will be among the largest energy resource contributors towards the Commonwealth's net-zero emissions goal.[74]

The Project is consistent with the goals of the GWSA because it will enable the delivery of clean energy from the Clean Energy Resource to the regional electric grid, thereby providing substantial amounts of clean renewable energy to the region. As discussed in Section 1, the Project will contribute to reducing GHG emissions in the New England region, including displacement of fossil fuel emissions in the Commonwealth. The Project and its associated Clean Energy Resource will eliminate more than 2 million metric tons of GHGs annually, which is equivalent to removing 5 million cars from the road. The Project when operational will have no adverse effects on climate change or negative impacts on sea level. Thus, the Project is fully consistent with the goals of the GWSA.

6.3.5 The Restructuring Act

As discussed in greater detail in Sections 3 through 5, the Project is consistent with the environmental policies of *The Restructuring Act* (c. 164 of the Acts of 1997), which provides that the Proponent must demonstrate that the Project minimizes environmental impacts and minimizes costs associated with mitigation, control, and reduction of the environmental impacts of the Project. An assessment of all effects of a proposed facility is necessary to determine whether an appropriate balance is achieved both among potentially competing environmental impacts and benefits, as well as among environmental impacts, cost, and reliability. A facility that achieves the appropriate balance thereby meets the Restructuring Act's requirement to minimize environmental impacts at the lowest possible cost.

Sections 3 through 5 of this Analysis demonstrate that Mayflower Wind designed the Project based on a thorough analysis of a range of alternatives and has proposed specific plans to mitigate costs and potential environmental impacts of construction, operation, and maintenance of the proposed Project. As

[70] Massachusetts Executive Office of Energy and Environmental Affairs, Request for Comment on Clean Energy and Climate Plan for 2030 (Dec. 30, 2020), *available at* https://www.mass.gov/doc/interim-clean-energy-and-climate-plan-for-2030-december-30-2020/download (EEA Interim Plan).

[71] *See infra* Section 6.4.8. "Net-zero" was defined by the EEA as "a level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 85 percent below the 1990 level." EEA Interim Plan at 2.

[71] EEA Interim Plan at 11.

[73] EEA Interim Plan at 5.

[74] EEA Interim Plan at 36.

such, the Project is consistent with the environmental policies of the Commonwealth as set forth in *The Restructuring Act.*

6.3.6 Environmental Justice Policy

The Project is consistent with Massachusetts' Environmental Justice (EJ) Policy, the EJ provisions of the 2021 Climate Act and the EJ Protocols put forth by the MEPA Office.[75] Because the Project does not exceed any MEPA ENF review thresholds that trigger the enhanced public participation or enhanced review provisions, the Project is not subject to the enhanced review provisions of the Massachusetts EJ Policy.[76] Nonetheless, Mayflower Wind has made and continues to make a diligent effort to include the community in inclusive outreach efforts and is consistent with the environmental justice principles of the 2021 Climate Act and the MEPA Public Involvement Protocol for Environmental Justice Populations.[77]

The 2021 Climate Act amends the EIR process in Massachusetts by directing that an EIR shall be required for any project that is likely to cause damage to the environment and is located within a distance of 1 mi of an environmental justice population.[78] The 2021 Climate Act requires that the EIR contain statements about the results of an assessment of any existing unfair or inequitable environmental burden and related public health consequences impacting the EJ population from any prior or current project that has damaged the environment. If the assessment indicates that the EJ population is subject to an existing unfair or inequitable environmental burden or related health consequence, the report must identify any: (1) environmental and public health impact from the proposed project that would likely result in a disproportionate adverse effect on such population; and (2) potential impact or consequence from the proposed project that would increase or reduce the effects of climate change on the environmental justice population.[79] The 2021 Climate Act requires that for every project that is required to file an ENF, the proponent of the project shall indicate on the document whether an environmental justice population that lacks English language proficiency within a designated geographical area is likely to be negatively affected by the project.

Further, the 2021 Climate Act identifies environmental justice principles, and directs that agencies should consider these principles in their policy-making decisions. The environmental justice principles are those that support protection from environmental pollution and the ability to live in and enjoy a clean and healthy environment, regardless of race, color, income, class, handicap, gender identity, sexual orientation, national origin, ethnicity or ancestry, religious belief or English language proficiency, which includes: (i) the meaningful involvement of all people with respect to the development, implementation and enforcement of environmental laws, regulations and policies, including climate change policies; and (ii) the equitable distribution of energy and environmental benefits and environmental burdens.

Finally, the 2021 Act required additional public participation requirements for those projects that may impact an EJ population. In response, in July 2021, MEPA Office issued the MEPA Public Involvement Protocol for Environmental Justice Populations, effective October 1, 2021 (MEPA EJ Protocol). As of the date of this filing, the effective date of the EJ Protocol has been pushed out to January 1, 2022. The MEPA EJ Protocol requires that all new ENFs submitted identify the location of the project relative to EJ Populations as identified on its official EJ Mapping Tool and provide a print-out to identify all EJ populations

[75] Courts in Massachusetts have recognized the applicability of the EJ Policy to EFSB review of jurisdictional facilities. *See Winchester v. Energy Facilities Siting Board*, 98 Mass. App. Ct. 1101 (Mass. App. Ct. 2020) (finding that the EJ Policy does apply to decisions of the EFSB but that the enhanced review provisions only need to be applied when the project exceeds ENF thresholds).

[76] Massachusetts Executive Office of Energy and Environmental Affairs, Environmental Justice Policy (June 24, 2021) https://www.mass.gov/service-details/environmental-justice-policy.

[77] Massachusetts Environmental Policy Act Office, Public Involvement Protocol for Environmental Justice Populations (effective October 1, 2021) https://www.mass.gov/doc/mepa-revised-public-involvement-protocol-for-environmental-justice-populations-june-2021-clean/download.

[78] For projects that impact air quality, this EIR is required if the project is likely to cause damage to the environment and is located within a distance of 5 miles of an environmental justice population.

[79] The 2021 Climate Act also requires that an EIR contain: (i) statements describing the nature and extent of the proposed project and its environmental and public health impact as a result of any development, alteration and operation of the project; (ii) studies to evaluate said impacts: (iii) all measures being used to minimize any anticipated environment and public health damage; (iv) any adverse short term and long-term environmental and public health consequences that cannot be avoided should the project be undertaken; and (v) reasonable alternatives to the proposed project and their environmental consequences.

within a 1-mile and 5-mile radius of the project.[80] The MEPA EJ Protocol also requires that the ENF indicate whether the project is "reasonably likely" to negatively affect EJ populations within a 1-mile or 5-mile radius of the project. Projects that are reasonably likely to negatively affect EJ populations within a 1-mile or 5-mile radius of the project are required to comply with additional public outreach and communication efforts such as submitting a Letter of Intent and a project summary to the MEPA Office and holding an informational community meeting before filing the ENF. The MEPA EJ Protocols also contain Protocols for Language Translation/Interpretation Services which require that written and oral translation/ interpretation services be provided for all languages spoken by at least 5% of the residents in the census block where residents are identified as lacking English proficiency. The Mayflower Wind Project is not reasonably likely to negatively affect an EJ population within a 1-mile or 5-mile radius of the project, and therefore the increased public outreach and communication requirements do not apply. Despite the inapplicability, Mayflower has used diligent efforts to involve the impacted communities and will continue to engage in open communication with the local communities in close proximity to the Project. Mayflower used the EJ mapping tool to identify the languages required and has thus far provided and will continue to provide the necessary language translation and interpretation services to those populations. Finally, as required by the MEPA EJ Protocols, Mayflower has promoted meaningful public involvement and maintains a distribution list of community-based organizations and individuals who have requested to receive ongoing project updates.

The Commonwealth's EJ Policy was originally published in 2002 by the predecessor to the current EEA. The EJ Policy was updated in 2014 by means of Executive Order, in 2017 by the EEA and again, most recently, in 2021 by the EEA.[81] The 2021 EJ Policy takes into account new directives and definitions from the 2021 Climate Act, such as a new definition of "environmental justice population" [82] and increased protections for EJ populations under the MEPA Environmental Impact Report (EIR) process.

The EJ Policy, updated in 2021, directs resources towards those high-minority/low-income neighborhoods in Massachusetts where individuals are most at risk of being unaware or unable to participate in environmental, energy, or climate change decision-making. The EJ Policy directs EEA to engage with these populations in order to restore degraded natural resources, increase access to open space and parks, address environmental and health risks associated with existing and potential new sources of pollution, appropriately address climate change, and to improve overall quality of life. Thus, the EJ Policy requires specific enhanced public participation (under EJ Policy Requirement #16) and analysis (under EJ Policy Requirement #17) under MEPA for certain projects that are proposed near EJ populations,[83] including certain projects under the jurisdiction of the Siting Board.

[80] The Commonwealth's EJ Mapping Tool can be found at: https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212.

[81] Massachusetts Executive Office of Energy and Environmental Affairs, Environmental Justice Policy (June 24, 2021) https://www.mass.gov/service-details/environmental-justice-policy.

[82] The new definition of Environmental Justice Population: "a neighborhood that meets 1 or more of the following criteria: (i) the annual median household income is not more than 65 per cent of the statewide annual median household income; (ii) minorities comprise 40 per cent or more of the population; (iii) 25 per cent or more of households lack English language proficiency; or (iv) minorities comprise 25 per cent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 per cent of the statewide annual median household income; provided, however, that for a neighborhood that does not meet said criteria, but a geographic portion of that neighborhood meets at least 1 criterion, the secretary may designate that geographic portion as an environmental justice population upon the petition of at least 10 residents of the geographic portion of that neighborhood meeting any such criteria; provided further, that the secretary may determine that a neighborhood, including any geographic portion thereof, shall not be designated an environmental justice population upon finding that: (A) the annual median household income of that neighborhood is greater than 125 per cent of the statewide median household income; (B) a majority of persons age 25 and older in that neighborhood have a college education; (C) the neighborhood does not bear an unfair burden of environmental pollution; and (D) the neighborhood has more than limited access to natural resources, including open spaces and water resources, playgrounds and other constructed outdoor recreational facilities and venues."

[83] The 2021 Climate Act provides the following definition: "Environmental justice population", a neighborhood that meets 1 or more of the following criteria: (i) the annual median household income is not more than 65 per cent of the statewide annual median household income; (ii) minorities comprise 40 per cent or more of the population; (iii) 25 per cent or more of households lack English language proficiency; or (iv) minorities comprise 25 per cent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 per cent of the statewide annual median household income; provided, however, that for a neighborhood that does not meet said criteria, but a geographic portion of that neighborhood meets at least 1 criterion, the secretary may designate that geographic portion as an environmental justice population upon the petition of at least 10 residents of the geographic portion of that neighborhood meeting any such criteria; provided further, that the secretary may determine that a neighborhood, including any geographic portion thereof, shall not be designated an environmental justice population upon finding that: (A) the annual median household income of that neighborhood is greater than 125 per cent of

A project that meets the following criteria is required to apply the enhanced public participation under MEPA and the EJ Policy:

1. The project exceeds an ENF threshold for air, solid and hazardous waste (other than remediation projects), or wastewater and sewage sludge treatment and disposal; and
2. The project site is located within one mile of an EJ population (or in the case of projects exceeding an ENF threshold for air, within five miles of an EJ population).[84]

A project that meets the following criteria is required to apply enhanced analysis of impacts and mitigation under MEPA and the EJ Policy:

1. The project exceeds a mandatory EIR threshold for air, solid and hazardous waste (other than remediation project), or wastewater and sewage sludge treatment and disposal; and,
2. The project site is located within one mile of an EJ population (or in the case of projects exceeding a mandatory EIR threshold for air, within five miles of an EJ population). The project proponent may submit actual air modeling data on the project's area of potential air impacts in its EIR scope to modify the presumed five-mile impact area referred to in this condition.[85]

The EJ Policy also lists specific criteria for enhanced public participation and enhanced analysis of impacts and mitigation in Siting Board proceedings under requirement #20. The provisions of #20 require the Siting Board to apply enhanced public participation measures (if required by #16) such as translating hearings and notices into languages relevant to EJ populations in accordance with the Commonwealth's Language Access Policy. Additionally, #20 requires the Siting Board to apply enhanced analysis of impacts and mitigation (if required by #17) for projects within Siting Board jurisdiction. Requirement #20 states, "decisions issued by the Siting Board include measures to mitigate such impacts for the affected communities, with enhanced review required where EJ populations are present."

The requirements for enhanced public participation and enhanced analysis of impacts and mitigation under the EJ Policy do not apply to the Project because the Project does not exceed any ENF or EIR thresholds for air, solid and hazardous waste, or wastewater and sewage sludge treatment and disposal. Although the Siting Board is not required by the EJ Policy to analyze the Project under the enhanced standards of the EJ Policy Requirements #16 or #17, Mayflower Wind will work with the Siting Board to develop appropriately accessible notices for the Project consistent with Siting Board precedent and guidance.

Further, regardless of the inapplicability of the EJ Policy obligations, Mayflower Wind's environmental analysis is intended to achieve the goals of the EJ Policy and the environmental justice principles of the 2021 Climate Act by minimizing environmental impacts and risks for all populations. Mayflower Wind has undertaken diligent efforts to identify EJ communities near the Project (see Figure 5-24) and will continue extensive community outreach efforts intended to include EJ populations in decision-making and facilitate open and informed communication and participation for all potentially impacted populations.

The Project is consistent with the EJ Policy, the 2021 Climate Act, and the MEPA EJ Protocols. Mayflower Wind has worked to reduce the impacts of the Project for all populations, including EJ populations. Mayflower Wind has also met the public participation requirements through extensive community outreach to the populations in the vicinity of the Project. Thus, although the direct requirements of enhanced public participation or enhanced analysis under the EJ Policy and the additional public outreach and communication requirements of the MEPA EJ Protocols do not apply to the Project because the Project does not exceed any ENF or EIR thresholds for air, solid and hazardous waste, or wastewater and sewage sludge treatment and disposal, and the Project will not negatively impact an EJ Population within a 1-mile or 5-mile radius, Mayflower Wind nonetheless has made and continues to make a diligent effort to include the community in inclusive outreach efforts. Additionally, potential impacts from the

the statewide median household income; (B) a majority of persons age 25 and older in that neighborhood have a college education; (C) the neighborhood does not bear an unfair burden of environmental pollution; and (D) the neighborhood has more than limited access to natural resources, including open spaces and water resources, playgrounds and other constructed outdoor recreational facilities and venues.

[84] EJ Policy #16 at 10.

[85] EJ Policy #17 at 10.

construction of the Project will be carefully mitigated and long-term impacts of the Project will be minimized, as described in Section 5.4. Mayflower will comply with the translation and interpretation requirements of the MEPA EJ Protocols and will make materials available in the identified languages spoken by more than 5% of the population in the area around the Project.

Finally, one of the main goals of the EJ Policy is to promote climate change resiliency and mitigate the potential effects of climate change. The Project is entirely consistent with and advances this goal, as it will deliver up to 1,200 MW of clean renewable energy to the Commonwealth and help achieve the goals of the GWSA.

6.3.7 Massachusetts Ocean Management Plan

The Massachusetts Ocean Management Plan (OMP), initially released in 2009 and revised in 2015, creates a framework for managing uses and activities within the state's ocean waters. The OMP's geographic scope includes the ocean waters, seafloor, and subsurface and its jurisdiction covers the area from the seaward limit of state waters (generally 3 mi (5km) offshore) to a nearshore boundary that lies approximately 0.3 mi (.5 km) seaward from Mean High Water (Figure 1-4). As stipulated in *The Oceans Act of 2008* (c. 114 of the Acts of 2008), and described in Chapter 1 of the OMP, implementation is achieved through existing state review procedures, whereby all licenses, permits and leases are required to be consistent to the maximum extent practicable with the OMP. Since the OMP is incorporated into the Massachusetts Coastal Zone Management Plan, all federal actions must also be consistent with the OMP, to the maximum extent practicable. Any project that requires an EIR pursuant to MEPA is subject to the OMP. The OMP's mapped resources guide the scope of relevant aspects of the MEPA review.

The Project is consistent with the OMP as it is located in the "Multi-Use Area", which covers the majority of the jurisdictional planning area. In Multi-Use Areas, proposed projects are subject to the siting and performance standards associated with allowable uses, which are governed by *The Ocean Sanctuaries Act* (G.L. c. 132A § 12A), as modified by *The Oceans Act* (c. 114 of the Acts of 2008) and include power and communications cables. Cables are allowed in the OMP Multi-Use Area, subject to the applicable siting and performance standards as well as other applicable law.

The OMP process mapped and evaluated natural resources and existing water-dependent uses (e.g., navigation and fishing), resulting in a series of maps identifying special, sensitive, and unique (SSU) resources and existing water-dependent uses that are relevant for particular types of projects. The OMP's general siting and performance standards are directly tied to these SSUs and uses and are discussed below in specific reference to cable projects.

Within areas mapped as SSUs, uses are presumptively excluded, but this presumption can be overcome by demonstrating:

1. The maps delineating the SSU resource do not accurately characterize the resource…; or
2. No less environmentally damaging practicable alternative exists…; and
3. The project proponent has taken all practicable measures to avoid damage to SSU resources, and the activity will cause no significant alteration to SSU resources…; and
4. The public benefits associated with the proposed activity outweigh the public detriments to the SSU resource.[86]

The Lease Area is located outside of the Commonwealth's waters and, therefore, does not fall within the scope of the OMP. Additionally, the offshore export cable corridor (ECC) through the Commonwealth's waters under consideration is located outside of the prohibited area (i.e., Cape Cod Ocean Sanctuary) established under the OMP. However, the offshore ECC route under consideration will be located within the Cape and Islands Ocean Sanctuary and are subject to the performance standards detailed in the OMP for cable projects.

Numerous ECC options were considered in Project development. As described further in Section 4.6, the western ECC option (the Falmouth ECC) heads northwest to the east of Wasque Shoals, avoids the

[86] Massachusetts Ocean Management Plan, pages 2-9 and 2-10.

deepest portion of the channel, and closely parallels another offshore wind project's ECC option within the Muskeget Channel. The eastern and central routes are located further to the east of the western ECC, and encounter greater technical complexities related to mobile sediments and water depth. As documented in Section 4.6 of this Analysis, the western ECC is the preferred offshore route from the Lease Area to the landfall location in Falmouth. Key features of the western ECC which favored this selecting included:

- Provides the shortest cable length from the lease area to the landfall location thus minimizing electrical losses;
- Mitigates technical risks associated with shallow water depths, interaction with existing or planned infrastructure, and seabed conditions; and
- Mitigates the potential for cumulative environmental impact associated with construction of both the Mayflower Wind and Vineyard Wind projects by maximizing co-location.

6.3.7.1 Management Standards for Special, Sensitive, or Unique Habitats

Relevant OMP regulations, found at 301 Code of Massachusetts Regulations (CMR) 28.00, provide management standards for SSU resources. Cable projects (including those associated with offshore wind renewable energy projects) are only required to address their compliance with the performance standards for the following SSUs: (1) core habitat of the North Atlantic right whale, fin, and humpback whales; (2) hard/complex seafloor; (3) eelgrass; and (4) intertidal flats. The OMP contains mapping that delineates these SSUs. Figure 1-15 provides the OMP mapping of SSUs located in the general Project area. The Project is not located in or adjacent to the following SSUs:

- Fin whale Core Habitat
- Humpback whale Core Habitat; or
- Intertidal flats.

However, the Falmouth ECC does pass through or near the remaining SSUs, including North Atlantic right whale core habitat, hard/complex seafloor, and eelgrass. The relationship of the Project to each of these SSUs is described in the subsections below.

Core Habitat of the North Atlantic Right Whale

The North Atlantic right whale (*Eubalaena glacialis*) is both a state- and federally listed endangered species that regularly uses Massachusetts waters for feeding. The OMP established the North Atlantic right whale core habitat SSU resource based on data that identified statistically significant use by right whales of certain areas of the Massachusetts coast (Massachusetts Geographic Information System [MassGIS], 2020c).

The Falmouth ECC is not located within the North Atlantic right whale core habitat SSU resource area. Although the offshore ECC is adjacent to the North Atlantic right whale core habitat SSU resource area located south of Chappaquiddick Island, it does not cross this resource area (Figure 1-15) (MassGIS, 2020c).

Hard/Complex Seafloor

Hard seafloor is seabed characterized by exposed bedrock or concentrations of boulder, cobble, or other similar hard bottom distinguished from surrounding unconsolidated sediments. Complex seafloor is a morphologically rugged seafloor characterized by high variability in bathymetric aspect and gradient. Biogenic reefs and man-made structures, such as artificial reefs, shipwrecks, or other functionally equivalent structures, may provide additional suitable substrate for the development of hard bottom biological communities. Hard/complex seafloor is seabed characterized singly or by the combination of hard seafloor, complex seafloor, artificial reefs, biogenic reefs, or shipwrecks and obstructions to navigation (EEA, 2015b).

The OMP provides guidelines for installation of transmission cables. Installation methods that achieve burial with the minimal seabed disturbance, including footprint, width of trench, and sidecast and

suspension of sediments, are strongly preferred. Such methods include jet plowing, remotely operated seabed tractors, and some towed seabed plows. In locations where seafloor bottom conditions prevent target burial depth, additional methods are required to protect the cable. Generally, past practices have involved the addition of rock armoring, concrete mattresses, or clean sand sediments. These materials are put down over the cable to provide necessary coverage and protection. Therefore, identifying potential transmission cable corridors in areas of the seafloor away from hard bottom is strongly recommended so that preferred installation techniques can be used, target burial depths can be achieved, and effects to environmental resources and water-dependent uses can be avoided and minimized (EEA, 2015b).

The offshore ECC will cross through areas of hard/complex seafloor SSU resource as mapped by the OMP (Figure 1-15). Cable projects are considered an allowed use under the OMP for certain SSU resources, including hard/complex seafloor. However, the guidelines outlined in the OMP call for avoidance of hard/complex seafloor to the extent practicable (MassGIS, 2020k). Mayflower Wind has conducted and is currently conducting geological and geotechnical surveys of the offshore ECC to identify locations of hard/complex seafloor, and extensive benthic sampling and imaging to characterize habitat, to inform the final placement of the offshore export cables to avoid or mitigate the potential effects to this SSU resource.

Eelgrass

Eelgrass (*Zostera marina*) and other seagrasses are often referred to as submerged aquatic vegetation (SAV) in order to distinguish these seagrasses from algae and emergent saltwater plants found in salt marshes. Vital to shallow coastal ecosystems, eelgrass beds provide important habitat, food, and shelter for diverse communities of fish, shellfish, and invertebrates throughout the region. Eelgrass beds are critical wetlands components of shallow coastal ecosystems throughout the Commonwealth of Massachusetts. Eelgrass beds provide food and cover for a great variety of commercially- and recreationally-important fauna and their prey. The leaf canopy of seagrass beds calms the water, filters suspended matter and, together with extensive roots and rhizomes, stabilizes sediment. Additionally, eelgrass is afforded additional protection under the Clean Water Act as a “special aquatic site” under the United States Environmental Protection Agency’s Section 404(b)(1) guidelines, as well as the Massachusetts Wetlands Protection Act.

The MassDEP has completed a statewide seagrass mapping effort to map the state's SAV resources (MassDEP, 2020). These data were used to create the final OMP SSU dataset for eelgrass to alert project proponents and permitting agencies to the likely presence of eelgrass in the general vicinity of the mapped SSU resource area.

Portions of the offshore ECC route and the preferred and alternate landfall sites in Falmouth will cross areas of MassDEP-mapped eelgrass SSU resources (Figure 1-15) (MassGIS, 2020). Cable projects are considered an allowed use under the OMP for certain SSU resources, including eelgrass. However, Mayflower Wind conducted field surveys in August 2020 to delineate the extent of seagrass beds at the preferred and alternate landfall locations. Using single beam echo sounding with precision navigation, side scan sonar, and towed underwater video, eelgrass distribution was accurately mapped near the three Falmouth landfall sites (Figure 1-15). The approach to the Mill Road and Shore Street landfalls had nearly continuous SAV bed coverage consisting primarily of eelgrass, with only a few areas of open bottom. SAV bed coverage on the western side of the Mill Road landfall approach did not extend as far offshore as compared to the eastern side of the Mill Road landfall approach or the Shore Street landfall approach. The Worcester Avenue approach had patchier eelgrass distribution with several large areas devoid of eelgrass. However, due to the shallower water depths, eelgrass at Worcester Avenue extends farther offshore than at the Mill Road or Shore Street sites. The underwater video data confirmed that the primary species present in the SAV bed was eelgrass. Additionally, Mayflower Wind is planning to use horizontal directional drilling (HDD) to install the offshore export cables at the landfall location (see Section 5 of this Analysis for details) to avoid seagrass beds to the extent practicable and mitigate unavoidable direct effects to seagrass beds associated with the Project.

6.3.7.2 Conformance with the OMP

While the OMP identifies some preliminary corridors for offshore wind transmission cables that are in presumptive compliance with the siting standards of the Plan, those corridors are not suitable to the Project. The Project team considered those corridors while assessing offshore routing alternatives, but they were unsuitable for the Project given that water depths within the mapped preliminary corridors are frequently too shallow, and the mapped corridors do not accommodate a landfall site in Falmouth. Section 4.6 contains a detailed discussion of routing considerations.

The Project is consistent with the OMP because:

- The Project is consistent with the siting and performance standards for cables, as the proposed ECC will avoid impacts to North Atlantic Right Whale core habitat and HDD is being used to place the cable below mapped eelgrass beds at the landfall approaches;
- The proposed ECC minimizes environmental impacts for the Project, as described in Sections 4.6 and 5.5;
- All practicable measures to avoid damage to SSU resources and mitigate impacts to those resources will be taken. The proposed ECC options avoid to the maximum extent practicable areas of hard/complex bottom, only passing through these areas where there is no less damaging practicable alternative (see Section 4.6 for a discussion of the routing considerations), and, where passage through hard/complex bottom is necessary, all practicable measures to avoid damage to SSU resources and mitigate impacts to those resources will be taken (see Sections 4 and 5); and
- The public benefits analysis described in the context of the public benefit determination demonstrates that the Project's public benefits outweigh any detriments to the SSU resources (see Section 1).

6.3.8 Landlocked Tidelands Legislation/Public Benefit Determination

In 2007, the Massachusetts Legislature passed *An Act Relative to the Licensing Requirements for Certain Tidelands* (c. 168 of the Acts of 2007). The act names the Secretary of the EEA as the "administrator of tidelands," and requires the Secretary to conduct a "public benefit review" and issue a written determination for projects based on the tidelands. Pursuant to the corresponding regulations, 301 CMR 13.02(1), the Secretary is required to conduct a public benefit determination for any project that: (a) files an ENF after November 15, 2007, (b) is required to file an EIR, and (c) is completely or partially located in tidelands or landlocked tidelands. Pursuant to 301 CMR 13.02(2), the Secretary may conduct a discretionary public benefit review for any project that (a) files an ENF after November 15, 2007, (b) is not required to file an EIR, and (c) is completely or partially located in tidelands or landlocked tidelands.

The Secretary is guided in this review process by analyzing the "water dependency" of the project. The Mayflower Wind Project is presumptively water-dependent: the Massachusetts regulations at 310 CMR 9.12(2)(e), provide that, "in the case of a facility generating electricity from wind power (wind turbine facility) or any ancillary facility therefore, for which an EIR is submitted, MassDEP shall presume such facility to be water dependent if the Secretary has determined that such facility requires direct access to or location in tidal waters." The Project is expected to receive such a determination. Under 301 CMR 13.04, "water dependent" projects are presumed to meet the criteria and provide adequate public benefit.[87] This public benefit determination is done in conjunction with Chapter 91 review by the MassDEP. 301 CMR 13.05 states "The Department shall incorporate the public benefit determination of the secretary in its official record of the Chapter 91 license." A discussion of the Project's Chapter 91 licensing process can be found in Section 5.

[87] The criteria for the Secretary to analyze for non-water-dependent projects are: (a) the purpose and effect of the project, (b) the impact on abutters and the surrounding community, (c) enhancement to the property, (d) benefits to the public trust rights in tidelands or other associated rights, including but not limited to, benefits provided through previously obtained municipal permits, € community activities on the site, (f) environmental protection and preservation, (g) public health and safety, and the general welfare. 301 CMR 13.04.

6.3.9 Massachusetts Coastal Zone Management Federal Consistency Statement

The Project is consistent with the coastal zone management program. The program requires a certification to the CZM affirming that the Project complies with the enforceable program policies of Massachusetts' approved coastal management program and will occur in a manner consistent with these policies.

The certification to the CZM will be made in accordance with the requirements of the Federal *Coastal Zone Management Act*, 16 U.S.C. 1451, et seq., the implementing regulations, 15 CFR 930, as well as 310 CMR 21.00. The certification will also be made pursuant to the relevant statutory and regulatory authorities of Massachusetts' Coastal Zone Management Plan and Program Policies.[88] The Analysis contained herein describes the Project's compliance with each of the Massachusetts coastal zone program policies.

6.3.9.1 Jurisdiction for Federal Consistency Certification

The Project requires a federal consistency certification because it requires federal action and may affect, and is located within, the coastal zone. The Project will require approval of the COP by BOEM. The Mayflower Wind Project will then require a permit from the US Army Corps of Engineers pursuant to Section 404 of the Federal *Clean Water Act* and Section 10 of the *Rivers and Harbors Act of 1899*. As described in the CZM Policy Guide,[89] the official Massachusetts coastal zone includes the lands and waters within an area defined by the seaward limit of the state's territorial sea, extending from the Massachusetts-New Hampshire border south to the Massachusetts-Rhode Island border, and landward to 100 ft (30 m) inland of specific major roads, rail lines, and other visible rights-of-way, where present, or in the absence of these, at the coordinates specified by CZM. The coastal zone includes all of Cape Cod, Nantucket, Martha's Vineyard, and the Elizabeth Islands. Accordingly, CZM jurisdiction over the Project extends to include the offshore ECC within State waters, associated landfall sites, onshore cable and transmission line routes, onshore substation, and POI. Applicable review procedures are set forth at 301 CMR 21.07.

6.3.9.2 Certification of Consistency with CZM Program Policies

The following section describes the Project's compliance with the CZM program enforceable policies and management principles as set forth in the policy appendix at 301 CMR 21.98.

Coastal Hazards

Coastal Hazards Policy #1

> *Preserve, protect, restore, and enhance the beneficial functions of storm damage prevention and flood control provided b***y natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flowage, salt marshes, and land under the ocean. (CZM, 2011 pp. 19-25)**

This policy protects natural areas of the Massachusetts coastline that serve valuable functions as flood and storm control features. Mayflower Wind will comply with this policy by utilizing construction techniques and placing the export cable landfall in an area where these natural ecosystem functions and landforms will not be altered.

Installation of the export cables in nearshore and offshore areas will affect Land Under the Ocean as defined in the Massachusetts Wetlands Protection Act (MA WPA; G.L. c. 131 § 40) and implementing regulations (310 CMR 10.00). The minor changes to the seabed associated with the burial of the cable

[88] Massachusetts Office of Coastal Zone Management, Coastal Zone Management Policies, available at https://www.mass.gov/files/documents/2021/01/14/czm-policy-guide-policies-with-index.pdf.

[89] Massachusetts Office of Coastal Zone Management, Coastal Zone Management Policies, at 3 (2011), available at https://www.mass.gov/files/documents/2021/01/14/czm-policy-guide-policies-with-index.pdf.

are not anticipated to significantly affect the storm damage prevention and flood control functions of Land Under the Ocean, nor is the more significant dredging that may be required in areas of highly mobile sediments as these areas are already subject to frequent and significant natural seabed disturbances from storms.

To avoid impacts to nearshore areas and other coastal landforms, Mayflower Wind will utilize HDD for the cable landfall, which is a trenchless installation method that will allow the Project to avoid directly impacting sensitive coastline areas (See Figures 4-5 and 4-6). An HDD landfall method would allow for the export cables to make landfall through a horizontal tunnel bored up to approximately 100 ft (30 m) underneath these nearshore areas and coastline features. The horizontal tunnel boring will be completed by a drill rig set up onshore within previously disturbed land or parking areas, with the drill exiting on the seafloor in Nantucket Sound several thousand feet from shore, where the direct burial of the export cables through State waters would end and the cables would be pulled to shore through the HDD conduit that will be placed inside the drilled borehole. Supporting vessels may also be positioned near the offshore exit point to support the HDD operation.

At the preferred landfall location for the Falmouth ECC the export cables will make landfall within the first block of Worcester Park between the two lanes of Worcester Avenue (Worcester Avenue Landfall). This location was chosen for the export cable landfall because it contains a highly developed land area including a seawall, a major secondary roadway, and a park between the two lanes of Worcester Avenue (See Figure 4-5). The selection of this location will control or eliminate the damage to coastal areas that assist in flood control and storm damage prevention. If the proposed landfall site is used, there will be no impacts to Coastal Dune, Coastal Beach, or Coastal Bank, as defined in the WPA.

Following completion of onshore construction, restoration of the HDD landfall location and installation of the underground transmission cable, the Project will have no effect on flood velocities or floodplain storage capacity, and therefore no permanent impacts to Land Subject to Flooding or Land Subject to Coastal Storm Flowage would result as all Project facilities will be below the ground surface and all pre-construction grades and contours will be restored to the extent practicable.

Coastal Hazards Policy #2

> *Ensure that construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport.* **Flood or erosion control projects must demonstrate no significant adverse effects on the project site or adjacent or downcoast areas. (CZM, 2011 pp. 25-26)**

The Project as proposed will not interfere with water circulation or pose a threat to the integrity of downcoast areas. During installation of the export cables in State waters, some dredging of highly mobile sediments along the export cable route may be required to allow for adequate burial of the cable to ensure safe operation. Assessments have been completed to evaluate scour influence on built infrastructure (e.g., export cable) as well as plume dispersion impacts during construction. These assessments concluded that the Project will is not expected to interfere with ongoing sediment transport functions and patterns occurring along the export cable route, and sediment will continue to naturally accumulate or erode based on pre-existing patterns of sediment transport occurring in Nantucket Sound and elsewhere.

Mayflower Wind will be constructing onshore portions of the Project within previously disturbed or developed areas of Falmouth (See Figures 1-9 and 1-11). Once landfall is made, the underground onshore export cable will be installed within previously disturbed areas such as an underground duct bank buried beneath existing roadway and/or shoulder layouts and a substation at an existing, active aggregates facility. Mayflower Wind will conform to all current State and local requirements for work in the vicinity of wetlands and waterbodies, including strict adherence to erosion and sediment control best management practices to prevent sediment transport from uplands to wetlands or waterbodies.

Coastal Hazards Policy #3

> *Ensure that state and federally funded public works projects proposed for location within the coastal zone will: (1) not exacerbate existing hazards or da***mage natural buffers or other natural resources; (2) be reasonably safe from flood and erosion-related**

> **damage; (3) not promote growth and development in hazard-prone or buffer areas, especially in velocity zones and Areas of Critical Environmental Concern; and (4) not be used on Coastal Barrier Resource Units for new or substantial reconstruction of structures in a manner inconsistent with the Coastal Barrier Resource/Improvement Acts. (CZM, 2011 pp. 26-28)**

Not applicable. There are no state or federally funded public works projects as a result of the proposed action.

Energy

Energy Policy #1

> *For coastally* **dependent energy facilities, assess siting in alternative coastal locations. For non-coastally dependent energy facilities, assess siting in areas outside of the coastal zone. Weigh the environmental and safety impacts of locating proposed energy facilities at alternative sites. (CZM, 2011 pp. 19-25)**

The Project involves the installation of a commercial-scale array of offshore wind turbine generators (WTGs) within an established federal lease area for wind energy generation, which will produce clean, renewable energy for the New England region, and fulfill the obligations of the 20-year PPAs between Mayflower Wind and the EDCs serving Massachusetts customers.

The Project is inherently coastally dependent. The federal lease areas were previously subject to an alternatives analysis by BOEM during establishment of the Massachusetts/Rhode Island Wind Energy Area (WEA), in which the Project is located. This analysis was conducted as a portion of the Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore Rhode Island and Massachusetts: Environmental Assessment which received a Finding of No Significant Impact in May 2013. This Environmental Assessment included a prepared Consistency Determination pursuant to 15 CFR 930.36(a) sent to the Commonwealth of Massachusetts on August 20, 2012, for review. The Environmental Assessment provided all data and information required under 30 CFR 939.39 to support the Consistency Determination. BOEM determined that the activities described in the revised Environmental Assessment were consistent with the enforceable policies of the Massachusetts Coastal Zone Management Program. The Commonwealth of Massachusetts concurred with BOEM's determination on January 30, 2013.

To transmit electricity generated from the offshore WTG array to the onshore administered electrical grid, the shortest practicable path to shore will be utilized while considering engineering feasibility and environmental constraints and regulatory concerns. This path to transmit the generated electricity will naturally cross through the coastal areas of Massachusetts, and Mayflower Wind has assessed multiple alternative routes for the offshore export cables, as well as potential landfall locations. The evaluation of these alternatives is detailed within Section 4.

The evaluation of multiple different landfall locations necessitated the evaluation of multiple onshore underground export cable routes within the coastal zone as well. Mayflower Wind also evaluated multiple different potential sites for the proposed onshore substation facility.

Mayflower Wind completed these efforts to site the Project in a way that would ensure minimal displacement of water dependent industries and mitigate environmental impact to the extent practicable. Therefore, the Project is fully consistent with this CZM policy requiring the assessment of siting project facilities within alternative coastal locations. The routing analysis is described in detail in Section 4.

Habitat

Habitat Policy #1

> *Protect coastal, estuarine, and marine habitats—including salt marshes, shellfish beds, submerged aquatic vegetati***on, dunes, beaches, barrier beaches, banks, salt ponds, eelgrass beds, tidal flats, rocky shores, bays, sounds, and other ocean habitats—and coastal freshwater streams, ponds, and wetlands to preserve critical wildlife habitat and other important functions and services including nutrient and sediment**

attenuation, wave and storm damage protection, and landform movement and processes. (CZM, 2011 pp. 41-48)

Mayflower Wind has designed the Project to avoid impacts to ecologically sensitive areas to the maximum extent practicable, including nearshore coastal areas, natural shoreline areas, as well as saltwater and freshwater wetlands that are particularly sensitive to impacts. Figure 1-15 shows the Falmouth ECC in relation to areas of concern or sensitive ocean habitat for consideration in siting transmission cables as mapped within the OMP. Figures 4-5 and 4-6 show locations of coastal and marine habitats in the vicinity of the export cable landfall locations. Selection of the preferred landfall location and use of HDD will avoid impacts to mapped coastal salt marshes, tidal flats, barrier beaches, salt ponds, bays and sounds, coastal beach, dunes, and rocky shores.

The offshore ECC is located entirely within areas designated as Land Under the Ocean by the WPA (G.L. c. 131 § 40). These areas may also contain shellfish and SAV. The proposed ECC has been evaluated for technical feasibility and environmental considerations, such as the presence of hard bottom habitat, mapped shellfish suitability areas, and the amount of dredging required. The proposed ECC crosses some areas of mapped hard bottom and shellfish suitability areas (See Figures 1-15 and 4-7). The Falmouth ECC under consideration is up to 3,280 ft (1,000 m) in width and is intended to allow maximum flexibility to refine siting to avoid sensitive habitats and resources. The Falmouth ECC width may be narrower or wider in certain locations to avoid known obstructions and/or to allow maximum flexibility to avoid critical features (e.g., complex hard bottom habitat) with micro-siting during installation. Not all sensitive habitat and resource areas can be avoided. Mayflower Wind has selected a preferred ECC to avoid impacts to these areas to the maximum extent practicable. Export cable installation will temporarily alter the seabed habitat, resulting in some effects associated with mortality and displacement during construction and some effects associated with recovery time from the areas affected by their placement. The Falmouth ECC in Massachusetts waters was characterized by more heterogeneous, complex habitats compared to the southern portions of the Falmouth ECC in federal waters. Disturbance of the benthic communities in these areas are expected to require a longer period (estimated one to three years) to recover. Construction related impacts are expected to be temporary.

The Project will utilize HDD for the export cable landfall which will limit impacts to both nearshore areas as well as coastal landforms, including eelgrass beds, shellfish suitability areas, Coastal Beach, and Coastal Dune (See Figures 4-5 through 4-7). Mayflower Wind has conducted surveys to identify and delineate areas of SAV, including eelgrass, at each of the Falmouth landfall locations. Based on the results of the 2020 survey, mapped eelgrass beds extend up to approximately 3,100 ft (945 m) from shore in some locations. Mayflower Wind anticipates that the use of HDD will avoid or mitigate impacts to mapped eelgrass beds. This information was used in selection of the preferred landfall location and will be used in the design of the HDD. The HDD construction method will avoid or significantly limit impacts to eelgrass beds, shellfish beds, SAV, dunes, beaches, tidal flats, and rocky shores.

Additionally, the onshore export cables will largely be installed within previously disturbed areas such as existing roadway and/or roadway layout from the landfall location to the onshore substation location – this will eliminate or greatly limit impacts to onshore coastal habitat areas to the maximum extent practicable.

Habitat Policy #2

Advance the restoration of degraded or former habitats in coastal and marine areas.
(CZM, 2011 pp. 48-50)

As described in Section 4.6 and 5.2, the Project has been designed to avoid impacts to coastal and marine habitats to the maximum extent practicable, and those impacts that cannot be avoided will be mitigated in accordance with applicable federal, state, and local regulations. Mayflower Wind has executed a deliberate siting process which seeks to address engineering and other technical constraints while avoiding and minimizing environmental impact. Through this siting process and the selection of appropriate construction methods, the Project will not permanently degrade any protected marine resources.

Ocean Resources

Ocean Resources Policy #1

> *Support the development of sustainable aquaculture, both for commercial and enhancement (public shellfish stocking)* **purposes. Ensure that the review process regulating aquaculture facility sites (and access routes to those areas) protects significant ecological resources (salt marshes, dunes, beaches, barrier beaches, and salt ponds) and minimizes adverse effects on the coastal and marine environment and other water-dependent uses. (CZM, 2011 pp. 50-53)**

The Project is not an aquaculture development, nor will it adversely affect any current aquaculture facilities or local shellfishing areas. Commercial and recreational fishing areas will not be permanently impacted by the Project nor will access to these areas be affected.

Temporary impacts to ocean bottom within areas suitable for shellfish, as identified by the Massachusetts Division of Marine Fisheries (DMF), will be necessary during the export cable burial. However, this temporary disturbance will occur at sufficient depth and distance from shore such that no impact to recreational shellfishing or shellfish resources is anticipated to occur.

Mayflower Wind is planning to install the export cable shore landfall(s) through the use of an HDD construction method to avoid sensitive eelgrass habitats that provide critical habitat for certain commercially and recreationally important shellfish species, such as bay scallops.

Additionally, Mayflower Wind continues to coordinate with local stakeholders and the commercial fishing industry and has developed a Fisheries Communication Plan for the Project (Attachment F), which included hiring of an on-staff fisheries liaison, conducting outreach to the commercial and recreational fishing industry, and holding regular “port hours” in the Port of New Bedford and Point Judith where the public can communicate and interact with a Mayflower Wind representative and ask questions about the Project or discuss any concerns related to potential impacts to fisheries.

Ocean Resources Policy #2

> *Except where such activity is prohibited by the Ocean Sanctuaries Act, the Massachusetts Ocean Management Plan, or other applicable provision of law, the* **extraction of oil, natural gas, or marine minerals (other than sand and gravel) in or affecting the coastal zone must protect marine resources, marine water quality, fisheries, and navigational, recreational and other uses. (CZM, 2011 pp. 53-55)**

Not applicable. The Project does not involve extracting oil, natural gas, or marine minerals.

Ocean Resources Policy #3

> *Accommodate offshore sand and gravel extraction needs in areas and in ways that will not adversely affect marine resources, navigation, or shorel***ine areas due to the alteration of wave direction and dynamics. Extraction of sand and gravel, when and where permitted, will be primarily for the purpose of beach nourishment or shoreline stabilization. (CZM, 2011 pp. 55-57)**

Not applicable. The Project does not involve mining or beach nourishment; therefore, this policy does not apply, and it is not anticipated to affect any ongoing or planned sand and gravel extraction activities.

Ports and Harbors

Ports and Harbors Policy #1

> *Ensure that d***redging and disposal of dredged material minimize adverse effects on water quality, physical processes, marine productivity and public health and take full advantage of opportunities for beneficial re-use. (CZM, 2011 pp. 57-61)**

Not applicable. At this time, Mayflower Wind does not anticipate that construction of the Project would require dredging at any port or harbor facilities. As such, there will be no dredge material produced from

port and harbor areas, nor will there be any need to dispose of dredge material originating from such facilities.

Ports and Harbors Policy #2

> *Obtain the widest possible public benefit from channel dredging and ensure that Designated Port Areas and developed harbors are given highest priority in the allocation of resources.* **(CZM, 2011 pp. 61-63)**

Not applicable. Mayflower Wind does not anticipate any dredging activities within channels to any port or harbor facilities in connection with the Project. At this time, Mayflower Wind does not propose to implement any port or harbor improvements to support the Project and anticipates using existing ports and facilities that are suitable to support the types and sizes of vessels required for use during construction. Similarly, during operations and maintenance (O&M) of the Project, Mayflower Wind would utilize existing port and harbor facilities that are capable of accommodating the necessary vessels and support activities required during that phase of the Project lifecycle.

Ports and Harbors Policy #3

> *Preserve and enhance the capacity of D***esignated Port Areas to accommodate water-dependent industrial uses and prevent the exclusion of such uses from tidelands and any other DPA lands over which an EEA agency exerts control by virtue of ownership or other legal authority. CZM, 2011 pp. 63-67)**

Not applicable. Mayflower Wind is planning to use existing port and harbor facilities that are suitable to support the types and sizes of vessels required for use both during construction, as well as O&M of the Project. Use of Port facilities is discussed in Section 1.

Ports and Harbors Policy #4

> *For development on tidelands and other coastal waterways, preserve and* **enhance the immediate waterfront for vessel-related activities that require sufficient space and suitable facilities along the water's edge for operational purposes. (CZM, 2011 pp. 68--70)**

The proposed export cables located within State waters, including the cable landfall, will not preclude the use of the immediate waterfront for vessel-related activities or other water-dependent activities. The Project will use an HDD landfall method to mitigate impacts to nearshore and coastal waters. During construction, this installation method may require a temporary, short-term prohibition on access to the waterfront within the immediate construction work areas and HDD path for safety reasons. However, it is anticipated that the installation of the export cables and landfall construction will take place outside of peak tourism season so as to not interfere with public access to waterfront areas. There will be no long-term impacts to immediate waterfront areas, public access, or vessel related activities along the waterfront area.

Ports and Harbors Policy #5

> *Encourage, through technical and financial assistance, expansion of water-dependent uses in Designated Port Areas an***d developed harbors, re-development of urban waterfronts, and expansion of physical and visual access.**

Not applicable. The Mayflower Wind Project is not located within a Designated Port Area, developed harbor, or urban waterfront, but it may utilize a number of port facilities, some of which are located within Designated Port Areas. Use of Port facilities is discussed in Sections 1 and 5.

<u>Protected Areas</u>

Protected Areas Policy #1

> *Preserve, restore and enhance coastal Areas of Critical Environmental Concern,* **which are complexes of natural and cultural resources of regional or statewide significance. (CZM, 2011 pp. 72-75)**

Not applicable. There are no Areas of Critical Environmental Concern (ACECs) in proximity to the Project; therefore, the Project will have no effect on ACECs.

Protected Areas Policy #2

> *Protect state designated scenic rivers in the coastal zone.* **(CZM, 2011 pp. 75-76)**

Not applicable. There are no designated scenic rivers within the area of the Project, and therefore, there will be no impact on these resources.

Protected Areas Policy #3

> *Ensure that proposed developments in or near designated or registered historic places respect the preservation intent of the designation and that potential adverse effects are minimized.* **(CZM, 2011 pp. 76-77)**

Mayflower Wind has conducted and is conducting assessments of historical and archaeological resources within the Area of Potential Effect (APE) for the Project. This includes both the terrestrial (onshore) and marine (nearshore and offshore) facilities for the Project. Mayflower Wind obtained a permit from the Massachusetts Board of Underwater Archaeological Resources (BUAR) to conduct a marine archaeological survey of the potential export cable routes and initiated surveys in both May 2020 and April 2021. Additionally, Mayflower Wind has submitted a Project Notification Form (PNF) to and secured a Reconnaissance Survey Permit from the MHC for the onshore Project facilities and has conducted a reconnaissance survey of the APE for the Project. Mayflower filed a draft reconnaissance survey (Phase 1A) report and a revised Phase 1A report addressing MHC's comments on the draft report. Mayflower Wind also anticipates conducting intensive surveys, as necessary, within areas identified as potentially sensitive for presence of previously unknown historic or archaeological resources. Potential effects, if any, to historic resources will be addressed with BOEM, BUAR, MHC, and the Tribes through established review procedures, and all appropriate measures consistent with NEPA and Section 106 of the National Historic Preservation Act and state register review process will be taken.

Mayflower Wind has evaluated potential visual impacts to historic resources as a result of the proposed Project facilities. There are no anticipated visual impacts to mainland (Cape Cod) historic resources from the WTGs/OSPs due to the distance from the Lease Area. Mayflower Wind has conducted visual simulations from various key observation points on Martha's Vineyard and Nantucket, including designated or registered historic places. In many instances, these properties were not designated or listed due to the significance of the viewshed from the historic property, and therefore, the significance of the designation or listing would not be diminished. Also, based on the distance of the Lease Area from these resources coupled with common weather conditions, it is anticipated that the WTGs/OSPs may not be visible from these resources for a significant portion of the year.

Similarly, for the onshore Project facilities, Mayflower Wind has assessed the potential visual impact of these facilities on historic resources. The onshore export cables will have no visual impact on historic resources as the cables will be buried predominantly beneath existing paved roadways and/or shoulder, and following completion of construction, the only visual indicators of the presence of the cables will be manhole covers within the roadway layout surface. The potential onshore substation sites are not located within any designated or registered historic districts, though the potential substation site located at 396 Gifford Street is located near the Oak Grove Cemetery, which is a listed property on the National Register of Historic Places (NRHP). If this site was selected for construction of the proposed onshore substation facility, Mayflower Wind does not believe the Project would have an unacceptable adverse effect on this NHRP-listed historic property, as the substation facility would be built within an existing industrial sand and gravel pit facility and would not require any tree clearing or land disturbance any closer to the cemetery than currently exists. Visual impacts may be mitigated or avoided by vegetative screening.

Public Access

Public Access Policy #1

> *Ensure that development (both water-dependent and nonwater-dependent) of coastal sites subject to state waterways regulation will promote general public use and enjoyment*

> *of the water's edge, to an extent commensurate with the* **Commonwealth's interests in flowed and filled tidelands under the Public Trust Doctrine. (CZM, 2011 pp. 78-87)**

The Project, as proposed, will have no appreciable effects on the Commonwealth's interests in flowed and filled tidelands under the Public Trust Doctrine or on the general public's use and enjoyment at the water's edge. The Project will make landfall in a highly developed section of the Massachusetts coastline utilizing an HDD method that will avoid impacting the public's use and recreation in coastal areas. During the installation of the export cables there may be a temporary, short-term prohibition on access to the waterfront within the immediate construction work areas and HDD path for safety reasons. However, it is anticipated that the installation of the export cables and landfall construction will take place outside of peak tourism season so as to not interfere with public access to waterfront areas. Additionally, there will be no long-term impacts to waterfront areas or to public access to the water's edge resulting from the Project.

Water Quality

Water Quality Policy #1

> *Ensure that point-source discharges and withdrawals in or affecting the coastal zone do not compromise water quality standards and protect designated uses and other interests.* **(CZM, 2011 pp. 92-95)**

Construction and installation activities associated with the Project have the potential to impact coastal and marine water quality through structure installations and removal, as well as vessel discharges such as domestic wastewater, uncontaminated bilge water, treated deck drainage and sumps, uncontaminated ballast water, and uncontaminated fresh or seawater from vessel air conditioning. Bilge water discharges may only occur in nearshore and offshore waters provided that the effluent is processed by an approved oil and water separator and the oil content of the bilge water is less than 15 ppm. Bilge water that cannot be discharged in compliance with regulations will be retained onboard the vessel for disposal at an approved receiving facility back in port. Generally, ballast water is pumped into and out of separate compartments and is not usually contaminated with oil. However, the same discharge criteria for oil content also applies to ballast water. All vessels will be required to comply with federal and state discharge requirements, as well as requirements for the control and prevention of accidental spills, which are detailed in the Oil Spill Response Plan developed for the Project. By complying with these state and federal regulations, it is anticipated that there will be no impacts to water quality.

Within the Lease Area and ECC, installation of the WTGs/OSPs, as well as burial of the export cable, will cause an increase in turbidity. However, mapped ocean currents should allow this sediment to settle rapidly into the local environment. Cable burial will also occur for all inter-array cables (IACs) between the WTGs and the OSPs using a similar method to the laying of the export cable. This is not anticipated to be a significant impact, as sediment that will be re-suspended is anticipated to settle rapidly within the immediate vicinity of the Lease Area. As part of the federal and state permitting processes under the federal Clean Water Act Section 404 and Section 401 Water Quality Certification frameworks, Mayflower Wind will engage with the permitting agencies and comply with the conditions of the permit issued.

The installation of scour protection as well as cable protections along the seafloor are anticipated to temporarily increase turbidity in the localized area. The surface sediments, however, are predominately sandy and anticipated to settle quickly and present temporary conditions similar to the installation of the WTG/OSP foundations and the IACs.

Use of the HDD construction technique for installation of the export cable at landfall is proposed to avoid large-scale disturbance of surface and underwater sediments that would have a more significant effect on water quality. However, the activity still has the potential to affect water quality as a result of an inadvertent release of the drilling fluid used to lubricate the drill head and help maintain the bore hole during drilling activities. The drill fluid will be composed of non-hazardous compounds and typically consists of mixture of bentonite, mud, and water. Regardless, any inadvertent release of this drilling fluid to coastal waters has the ability to negatively impact water quality. Mayflower Wind will develop and implement an HDD drill fluid management and contingency plan to avoid inadvertent returns before they occur, and to clean up any drill fluid that is released through an inadvertent return to the ground surface.

Provisions of this plan will include a requirement that the Project constantly monitor fluid pressures within the borehole and re-assess conditions and potentially re-align the bore path any time there is a drop in fluid pressure that could indicate the loss of drill fluid to an inadvertent return.

Mayflower Wind will require all vessels to comply with applicable regulations for the prevention and control of accidental spills of fuels, oils, and other hazardous materials. Mayflower Wind has also included an Oil Spill Response Plan that includes provisions for responding to oil and fuel spills. Other wastes generated during offshore construction and O&M activities, including septage, solid wastes, or other hazardous materials (chemicals, solvents, oils, greases, etc.) from equipment operation or maintenance will be temporarily stored and properly disposed of on land or otherwise disposed of in accordance with all applicable regulations. Construction of the onshore substation will be subject to the Massachusetts Stormwater Standards and will be designed with a stormwater management system to adequately manage stormwater runoff originating from these developments. By designing the stormwater management systems in compliance with state regulations pertaining to stormwater, the point source discharges associated with these discrete site developments is anticipated to have no adverse effect on water quality within the coastal zone.

Water Quality Policy #2

> *Ensure the implementation of nonpoint source pollution controls to promote the attainment of water quality standards and protect designated uses and other* **interests. (CZM, 2011 pp. 95-98)**

Nonpoint source pollution controls will be utilized during the construction and installation of all onshore portions of the Project to ensure that nonpoint source pollution will not adversely affect water quality within the coastal zone. These include construction phase best management practices, such as limiting of vegetation disturbance and soil grading, installation of erosion and sedimentation controls at the limit of work to manage stormwater runoff, implementation of vehicle refueling restrictions within 100 ft (30 m) of wetlands and waterbodies, strict storage and management of oils and hazardous materials (OHM) incidental to construction activities, and provisions for immediate containment, cleanup, and reporting (as necessary) of any inadvertent releases of OHM.

As part of the NPDES Construction General Permit for construction project disturbing one or more acres, Mayflower Wind will develop and implement a construction phase Erosion and Sediment Control Plan for the onshore Project facilities that includes all of the provisions detailed above and more and establishes requirements to inspect the construction areas on a weekly basis at minimum to determine compliance with the Construction General Permit conditions and the Project-specific Erosion and Sediment Control Plan.

Water Quality Policy #3

> *Ensure that subsurface waste discharges conform to applicable standards, including the siting, construction, and maintenance requirements for on-site wastewater disposal* **systems, water quality standards, established Total Maximum Daily Load limits, and prohibitions on facilities in high-hazard areas. (CZM, 2011 pp. 98-100)**

The Project does not propose any facilities that include a subsurface wastewater disposal system as the proposed onshore facilities will not be manned by any O&M personnel. Temporary sanitation facilities will be provided during construction of the onshore Project components through the use of portable latrines that will be periodically emptied and cleaned by a portable latrine service provider.

Likewise, the offshore facilities will not be manned by any O&M personnel. However, during construction and O&M activities, sanitation would be provided on the service vessels utilized by O&M personnel for transport to the offshore facilities. The transport vessels would hold sewage within holding tanks and dispose of all raw or treated sewage in accordance with all applicable discharge rules and regulations.

6.3.9.3 Conclusion

As described herein, the Mayflower Wind Project complies with the enforceable and applicable policies of Massachusetts' approved Coastal Zone Management Plan and will be conducted in a manner consistent with such policies.

6.3.10 Net Zero Emissions Policy

The Project is consistent with and advances the net zero emissions policy of the Commonwealth. On January 21, 2020, Governor Baker, in his State of the Commonwealth address, announced a goal of net-zero GHG emissions by 2050. On February 26, 2020, the Massachusetts EEA released a Draft Letter of Determination with proposed language to set a 2050 GHG limit designed to achieve net-zero GHG emissions.[90] Extensive comments were received from interested stakeholders on the draft.[91] On Earth Day, April 22, 2020, EEA Secretary Theoharides signed the Letter of Determination, setting the 2050 emissions limit as follows: A level of statewide greenhouse gas emissions that is equal in quantity to the amount of carbon dioxide or its equivalent that is removed from the atmosphere and stored annually by, or attributable to, the Commonwealth; provided, however, that in no event shall the level of emissions be greater than a level that is 85 percent below the 1990 level.[92] Further, the 2021 Climate Act codified this net zero emissions policy, and directed the EEA Secretary to create additional roadmaps and propose emissions limits in five-year increments between 2025 and 2050, with the ultimate goal being net zero. The 2021 Climate Act also sets the interim emissions limit at 50 percent below the 1990 level for 2030 and 75 percent below the 1990 level for 2040.

The Massachusetts 2050 Decarbonization Roadmap (the "Roadmap") was published in December 2020.[93] The Roadmap states that to meet the Net Zero by 2050 goals, "the region will need to dramatically expand its clean and renewable electricity supply."[94] To that end, the Roadmap notes the sizable impact that offshore wind will have in achieving this goal and explicitly notes Mayflower Wind in the context of offshore wind projects already in the pipeline that need to get permitted and built expeditiously.[95] The Roadmap likewise highlights the importance of additional electric transmission infrastructure in achieving net zero GHG emissions in a cost-effective manner, noting that "additional transmission increases access to, and the ability to share, additional low-cost clean energy resources across the Northeast, lowering costs overall."[96] As recognized by the Roadmap, the Project, by delivering energy from the Clean Energy Resource will support the Commonwealth's decarbonization plans by integrating up to 1,200 MW of clean, renewable energy with the New England transmission grid.

6.4 Resource Use and Development Policies

The Project will be constructed and operated in compliance with Massachusetts' policies regarding resource use and development and will deliver to the Commonwealth with up to 1,200 MW of clean, renewable energy. The Project is consistent with and will further the Commonwealth's offshore wind energy goals embodied in Section 83C of the *Green Communities Act* (c. 169 of the Acts of 2008), as amended by *An Act to Promote Energy Diversity* (c. 188 of the Acts of 2016).

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[90] *Request for Comments*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, (Feb. 26, 2020) *available at* https://www.mass.gov/doc/draft-letter-of-determination-on-the-2050-emissions-limit-revised-342020/download.

[91] The public comments can be read here: https://www.mass.gov/info-details/ma-decarbonization-roadmap#2050-emissions-limit:-letter-of-determination-.

[92] *Determination of Statewide Emissions Limit for 2050*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, (Apr. 22, 2020) *available at* https://www.mass.gov/doc/final-signed-letter-of-determination-for-2050-emissions-limit/download.

[93] *Massachusetts 2050 Decarbonization Roadmap*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, (Dec. 2020) *available at* https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

[94] *Massachusetts 2050 Decarbonization Roadmap*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, at 56 (Dec. 2020) *available at* https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

[95] *Massachusetts 2050 Decarbonization Roadmap*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, at 58 (Dec. 2020) *available at* https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

[96] *Massachusetts 2050 Decarbonization Roadmap*, Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, at 15 (Dec. 2020) *available at* https://www.mass.gov/doc/ma-2050-decarbonization-roadmap/download.

The Project is also consistent with the EEA's 2006 Smart Growth/Smart Energy policy which established the Commonwealth's Sustainable Development Principles, including: (1) supporting the revitalization of city centers and neighborhoods by promoting development that is compact, conserves land, protects historic resources and integrates uses; (2) encouraging remediation and reuse of existing sites, structures and infrastructure rather than new construction in undeveloped areas; (3) protecting environmentally sensitive lands, natural resources, critical habitats, wetlands and water resources and cultural and historic landscapes; (4) increase job and business opportunities; (5) promote clean energy; and (6) implement regional solutions.

As described more fully in Section 5, the Project will support these principles because, among other reasons, the onshore portion of the Project will be located primarily within previously disturbed rights-of-way (e.g., existing roadway layouts), thus minimizing clearing necessary to accommodate the proposed infrastructure. Where the onshore cables will not be located within previously disturbed right-of-way (ROW), they are proposed along or within previously disturbed lands (e.g., municipal-owned land). The Project has also been designed to mitigate impacts to sensitive lands (see Sections 4 and 5) and will deliver up to 1,200 MW of clean energy to New England as part of a regional solution for achieving GHG emission reduction goals while creating job and business opportunities. The Project, therefore, is consistent with, and furthers, the Commonwealth's policies regarding resource use and development.

6.5 Conclusion

The Project is consistent with the health and environmental protection, resource use and development policies of the Commonwealth, as articulated herein, and the Project advances important climate change, clean energy and offshore wind energy policies and legislative mandates of Massachusetts.