

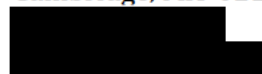


SECTION 83C

## Request for Proposal Application Form

**Proposal Applicant** Mayflower Wind Project 1 (408 MW)  
Mayflower Wind Energy LLC

**Contact** John Hartnett  
281 Albany Street  
Cambridge, MA 02139



**Public Version**



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## GLOSSARY

### Definitions

Board	Mayflower Wind Energy LLC Managing Committee pursuant to the Shareholder Agreement
Distribution Companies	“Fitchburg Gas & Electric Light Company” d/b/a “Unitil” “Massachusetts Electric Company and Nantucket Electric Company” d/b/a “National Grid” “NSTAR Electric Company” d/b/a “Eversource Energy”
EDP	EDP Energias de Portugal, SA
EDP Renewables	The Parent Company EDP Energias de Portugal, and all affiliates
EDPR NA	EDP Renewables North America LLC
EDPR Offshore NA	EDPR Offshore North America LLC
EDPR SA	EDP Renováveis, S.A.
EDP-Spanish Brand	EDP Energias de Portugal, Sociedade Anónima, Sucursal em Espanha
Eligible Facility(ies)	One that meets all necessary threshold criteria included in the RFP (per 2017 83C Q&A, <a href="https://macleanenergy.files.wordpress.com/2017/06/83c_batch-1.pdf">https://macleanenergy.files.wordpress.com/2017/06/83c_batch-1.pdf</a> )
Executive Committee	Mayflower Wind Energy LLC Executive Committee pursuant to the Shareholder Agreement
Lease Area	Federal offshore lease area OCS-A 0521
Mayflower Wind	“Bidder” or “Mayflower Wind Energy LLC”, a joint venture of EDPR Offshore North America LLC and Shell New Energies US LLC
Parent Company	Each of EDP Energias de Portugal and Royal Dutch Shell Plc, as applicable. Collectively, the Parent Companies
Offshore Delivery Facilities	<u>Transmission or interconnection facilities</u> constructed by an Offshore Wind Developer to transport Energy from Offshore Wind Energy Generation facilities to existing onshore ISO-NE Pool Transmission Facilities
Project	“Mayflower Wind Project (804 MW)” an offshore wind renewable energy project of approximately 800MW and all associated infrastructure sited in a portion of the Lease Area.
Royal Dutch Shell	Royal Dutch Shell Plc
Shareholder Agreement	Second Amended and Restated Limited Liability Company Operating Agreement of Mayflower Wind Energy LLC
Shareholders	EDPR Offshore North America LLC and Shell New Energies US LLC
Shell	The Parent Company Royal Dutch Shell Plc and all affiliates
Shell New Energies	Shell New Energies US LLC
Shell Oil Co.	Shell Oil Company
Sponsors	All affiliates of Mayflower Wind Energy LLC

## Acronyms

BOEM	Bureau of Ocean Energy Management
BOP	Balance of Plant
COD	Commercial Operation Date
COP	Construction and Operations Plan
CTV	Crew Transfer Vessel
EIS	Environmental Impact Statement
FDR	Facility Design Report
FiD	Final Investment Decision
FIR	Fabrication and Installation Report
GWSA	Global Warming Solutions Act
HDD	Horizontal Directional Drilling
HSE	Health, Safety, and Environmental
IAC	Inter Array Cable
IHA	Incidental Harassment Authorization
ISO-NE	ISO New England Inc.
ITC	Investment Tax Credit
JUV	Jack Up Vessel
LCoE	Levelized Cost of Energy
LiDAR	Light Detection and Ranging
O&M	Operation and maintenance
OCS	Outer Continental Shelf
OSP	Offshore Substation Platform
POI	Point of Interconnection
RFI	Requests for Information
RFP	Request for Proposals

ROW	Right of Way
SAP	Site Assessment Plan
SCADA	Supervisory Control and Data Acquisition
SOV	Service Operations Vessel
TSO	Transmission Service Operator
U.S.	United States
WTG	Wind Turbine Generator

## **SECTION 1 OF APPENDIX A TO THE RFP CERTIFICATION, PROJECT AND PRICING DATA**

The Certification, Project and Pricing Data (“CPPD”) document is a Microsoft Excel workbook that is provided on the website at [www.MACleanEnergy.com](http://www.MACleanEnergy.com).

## SECTION 2 OF APPENDIX A TO THE RFP EXECUTIVE SUMMARY OF THE PROPOSAL (INCLUDING THE BASE PROPOSAL AND ANY ALTERNATIVE PROPOSALS)

The bidder is required to provide an executive summary of the project proposal that includes a complete description of the proposed generation bid, the proposed contract term and pricing schedule, the overall project schedule and other factors the bidder deems to be important. A table summarizing proposal(s) including details such as capacity (MW), commercial online date, pricing (\$/MWh), etc. is encouraged.

Mayflower Wind, a joint venture of Shell and EDP Renewables, is excited to present this response to the Commonwealth of Massachusetts' second round of Section 83C offshore wind development requests for proposals. We are submitting three 804 MW proposals with multiple pricing options as well as a 408 MW proposal.:

- Proposal 1: the required 408 MW Project
- Proposal 2: **Low Cost Energy** – 804 MW Project delivering the lowest cost offshore wind energy ever in the U.S.
- Proposal 3: **Infrastructure and Innovation** – 804 MW Project with over [REDACTED] of strategic investments in port infrastructure, technology, and innovation to position Massachusetts as a global leader in offshore wind
- Proposal 4: **Massachusetts Manufacturing** – 804 MW Project with all the benefits included in Infrastructure and Innovation as well as investment of an [REDACTED] in a new manufacturing facility at [REDACTED], creating [REDACTED] manufacturing jobs annually, bringing the offshore supply chain to the Commonwealth with export opportunities within the U.S. and farther afield

The three main (804 MW) proposals provide Massachusetts with the ability to select the project scope that best meets your needs. Each of these proposals meet the requirements of the RFP by providing significant ratepayer benefits and providing for strong economic development in the Commonwealth with each targeted at different elements in that required formulation. The **Low Cost Energy** proposal is focused on generating the maximum benefits to ratepayers while providing [REDACTED] over the life of the project for initiatives to support the industry and local economy. The **Infrastructure and Innovation** Proposal builds on the initial proposal by [REDACTED] of immediate investment in port infrastructure and an [REDACTED] in near term funding to spur innovation in technology and the blue economy. Finally, the **Massachusetts Manufacturing** Proposal adds over [REDACTED] in investment during 2020-2023 and an [REDACTED] of lease payments over the next 12 years to support tower manufacturing. This manufacturing base, with tower production beginning in 2021, would represent a key step in Massachusetts becoming a true hub for the offshore wind industry in the U.S. and set the stage for the industry and local companies to compete globally.

We believe that Mayflower Wind represents the best choice for Massachusetts, the electric distribution companies, and their customers for the following reasons:

- Making safety the first priority for everyone, always
- Its cost-effectiveness - the lowest price for offshore wind seen in the U.S.
- The experience, capability, credibility, financial strength, and U.S. and international supply chain networks of our Sponsors: Shell, a global energy industry leader and EDP Renewables, the world's fourth-largest developer and operator of wind energy generation
- A proven track record of working with Federal, State, and Local agencies to successfully permit complex projects both offshore and onshore
- Confidence in timeline through early engagement and adoption of stakeholder recommendations in Project design
- The net economic benefits to ratepayers and citizens of the Commonwealth, including up to: \$3.7 billion in electric rate reductions, 10,680 jobs over the life of the project, and direct spending by Mayflower Wind of more than \$1.2 billion with virtually all in EDAs
- Commitment of 75% of O&M jobs being Massachusetts based with additional funding to support further training if further workforce development is required to meet this target

## GLOBAL COMPANIES WITH U.S. EXPERIENCE

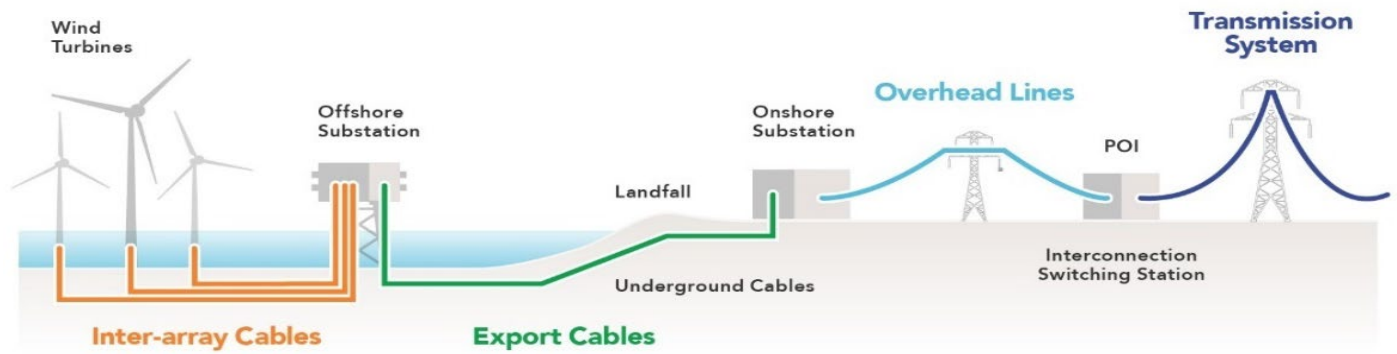
Through Mayflower Wind, Shell and EDP Renewables bring to Massachusetts deep experience in safely and successfully developing, permitting, financing, constructing, operating, and maintaining offshore and onshore wind power projects and offshore energy facilities of all kinds. Between our two Parent Companies Mayflower Wind draws on the combined strength of more than 18,000 U.S. employees, a supply chain of more than 5,000 U.S. companies of which more than 800 are small businesses or women- and minority-owned enterprises, \$400 billion in market capitalization, experience operating 6,100 MW of onshore wind in the U.S., and ongoing development and construction of 2,700 MW of offshore wind to go into service between now and 2023 in France, The Netherlands, Portugal, and Scotland.

Furthermore, when the planned combination of the offshore wind assets of EDP Renewables and Engie is finalized later this year, Mayflower Wind will be able to draw on the additional financial strength and expertise of a 160,000-person company (which has both a strong existing presence in Massachusetts and offshore wind experience) operating more than 100,000 MW of installed power production in 70 countries.

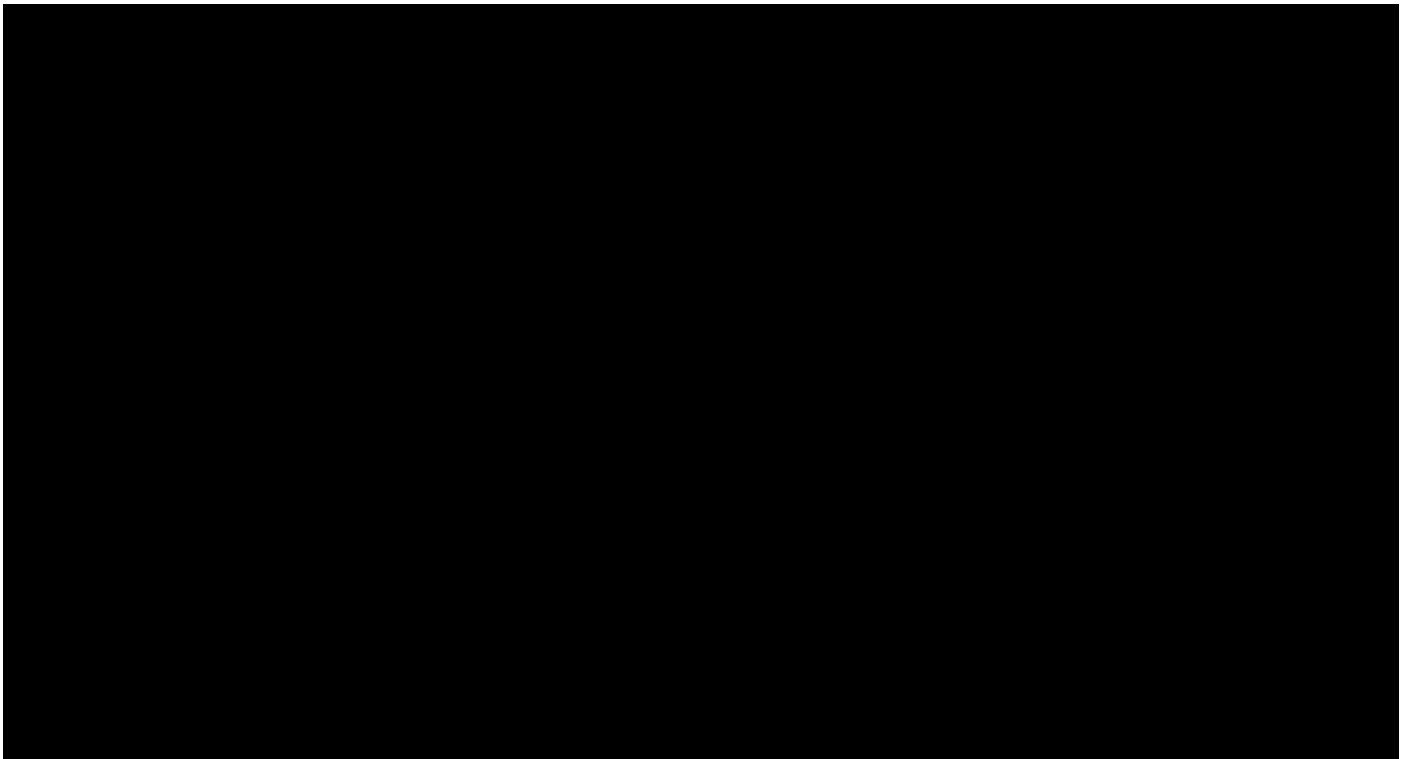
## ROBUST PROJECT AND DELIVERY TIMELINE

Mayflower Wind will incorporate proven engineering and technology combined with innovative advancements to maximize safety and reliability using the following components:

- [REDACTED] offshore wind turbines (with the 408 MW proposal utilizing the respective portion of energy);
- Monopile foundations and transition pieces;
- Strings of [REDACTED] offshore electrical inter-array cabling;
- Offshore substation to step the delivered power from the inter-array cabling from [REDACTED] export cable voltage;
- [REDACTED] offshore electrical export cables delivering power from the offshore substation to [REDACTED];
- Landfall and underground cabling to a new [REDACTED] onshore substation;
- [REDACTED]



Mayflower Wind has established a technically viable and commercially reasonable schedule to develop, finance, and construct the Project. COD for the 408 MW Project is September 2025. For all 804 MW Projects COD for Phase 1 is also September 2025 and COD for Phase 2 is December 2025. Development and stakeholder consultation began prior to lease award, in April 2019, and will continue throughout the life of the Project. [REDACTED]



PRICING SCHEDULE

Mayflower Wind presents four projects each for a 20-year term PPA, with multiple pricing options shown below for fixed and escalating pricing. All prices presented are for bids both with and without a commitment agreement.





## ESTABLISHING MASSACHUSETTS AS AN OFFSHORE WIND HUB

Mayflower Wind will drive investment of up to [REDACTED], as detailed below, to make Massachusetts a national hub for offshore wind through direct investment in manufacturing, fostering infrastructure improvements, workforce development, innovation, and entrepreneurship.

Our Massachusetts Manufacturing proposal brings significant capital investment to [REDACTED] and creates [REDACTED] manufacturing jobs annually, allowing Massachusetts to become a hub for the offshore wind industry and deliver turbine components to offshore wind projects up and down the east coast and farther afield.

We will make investments in community, environmental, and economic initiatives that reflect the core values of Mayflower Wind: Human and environmental safety first and always; Innovation and talent development to drive sustained economic advances, and, partnering with communities to maximize the positive impact of our Project. In particular, we are excited to announce our partnership with DEME Group, a leading European offshore wind contractor, that will place Massachusetts workers on DEME wind farm construction projects in Europe. This unique opportunity will provide real-world training and experience in offshore construction to accelerate the growth and development of a highly trained Massachusetts offshore wind workforce.

Mayflower Wind will deliver these investments through partnerships and collaborations with established local institutions. Mayflower Wind believes that the Massachusetts Clean Energy Center (MassCEC), acting as the lead to administer and manage most of these initiatives, is the ideal approach to maximize their impact on the emerging offshore wind industry in Massachusetts. We envision MassCEC taking the lead in refining and administering many of these programs to ensure that they are responsive to evolving local needs and opportunities.

	Project 1 (408 MW)	Project 2 (804 MW Low Cost Energy)	Project 3 (804 MW Infrastructure & Innovation)	Project 4 (804 MW Massachusetts Manufacturing)
Offshore wind turbine tower manufacturing facility at [REDACTED] supplying projects across the east coast and beyond – creating [REDACTED] manufacturing jobs annually				
<ul style="list-style-type: none"> <li>• Marmen investment in fitting out facility</li> <li>• [REDACTED]</li> </ul>				
Immediate Port Investment targeting [REDACTED]				
Upfront Investments in Innovation				
Commitment to a collaboration with the Massachusetts Clean Energy Center, in partnership with South Coast stakeholders <ul style="list-style-type: none"> <li>• port and infrastructure upgrades;</li> <li>• incubating entrepreneurial innovation, with targeted efforts in Gateway Cities;</li> <li>• offshore wind workforce development in partnership with South Coast and Cape Cod institutions;</li> <li>• applied and use-inspired offshore wind research.</li> </ul>				
Cape Light Compact’s bill-reducing and grid-reinforcing strategic electrification efforts for low-income households which will generate [REDACTED] in direct benefits for low-income ratepayers on Cape Cod and Martha’s Vineyard through deployment of efficient heat pumps, solar, demand response, and energy storage				
Support for innovative marine science and environmental research at Massachusetts colleges and universities, the Responsible Offshore Science Alliance, and non-governmental organizations				
<b>Total</b>				

MAYFLOWER WIND SAVINGS FOR MASSACHUSETTS

Over the 20-year PPA contract, Mayflower Wind will deliver significant cost savings to ISO-NE customers, roughly half of whom are Massachusetts ratepayers, through lower prices and offsetting RPS Class I ACP costs, as further described by the independent analyses in **Attachment 13.3-1 and 14.4-1**. Combined, Mayflower Wind will save the Ratepayer up to [REDACTED] over the 20-year PPA term.

Bid	Savings over 20 years
408 MW Fixed	[REDACTED]
804 MW Low Cost Energy Fixed	
804 MW Infrastructure and Innovation Fixed	
804 MW Massachusetts Manufacturing Fixed	

MAYFLOWER WIND’S CORE VALUES

Mayflower Wind is driven by three core values: safety, innovation, and community investment, all of which are reflected in our proposed projects.

SAFETY FIRST, SAFETY ALWAYS

Mayflower Wind believes in treating our people, environment, and community with care by working to empower our workforce to achieve zero recordable and lost-time incidents, and no harm to the environment. All Project leaders and personnel working on the Mayflower Wind Project will keep safety at the forefront of all project decisions and activities. Personnel working on-site are empowered by a culture that always prioritizes working in a safe and reliable manner.

INNOVATION AND INDUSTRY DEVELOPMENT

Mayflower Wind shares Massachusetts’ vision of the Commonwealth being a national and global hub for the offshore wind industry. To help realize that vision, we will fund workforce training, with a special focus on offshore wind safety training, incubation labs, “bluetech” and offshore wind programs, and applied research at local colleges and universities that, together, will position Massachusetts as a center of excellence for offshore wind talent and entrepreneurship.

Our goal is to train Massachusetts residents at every level of the offshore wind industry - from turbine installation, operation and maintenance to project management – in order to inspire and equip tomorrow’s offshore wind researchers, innovators, and entrepreneurs. Mayflower Wind’s Sponsors have a history of investing in new technologies that drive industry progress. For example, Shell and EDP Renewables have invested in numerous promising technologies that will reduce cost and expand the markets in which offshore wind can be delivered. Additionally, both Shell and EDP Renewables are original board members of the National Offshore Wind Research and Development Consortium, an entity that was established in 2018 to fund research and development projects that address technological barriers and lower the costs and risks of offshore wind in the U.S.

INVESTING IN COMMUNITIES

Offshore wind projects are delivered most successfully when working with communities and engaging the local economy. We are committed to building lasting partnerships with local communities by supporting jobs, economic development, and innovation that will flourish for decades to come.

We are committing to locate our operations and maintenance jobs and base in Massachusetts with at least 75% of O&M jobs being local, with a commitment of \$20,000 additional funding per employee shortfall to support further workforce development if required. Mayflower Wind’s partnership with the Massachusetts Clean Energy Center will foster infrastructure improvements, workforce development, innovation, and entrepreneurship. Our investment in marine science research with the UMass Dartmouth School for Marine Science and Technology (SMAST), New England Aquarium, the Responsible Offshore Science Alliance, and

others will enhance science-based decision making in collaboration with key stakeholders, including commercial fishermen. Mayflower Wind is also partnering with the 21-community Cape Light Compact JPE to increase access for low-income households to energy efficiency upgrades, solar energy, heat pumps, and energy storage devices.

## MEETING THE OBJECTIVES OF MASSACHUSETTS

Mayflower Wind is aligned with the objectives of the Commonwealth's Global Warming Solutions Act, Green Communities Act, and Act to Promote Energy Diversity. What these laws make clear is that, in seeking partners to develop offshore wind generation, Massachusetts and its electric distribution companies are seeking credible, proven providers, experienced in the New England market, to execute long-term wind energy contracts that

- will be cost-effective for ratepayers
- are commercially viable
- grow a diverse and competitive portfolio of wind energy providers, with all the benefits and innovation that competition will deliver
- create and foster direct and measurable jobs and economic and workforce development, particularly in economically distressed areas
- generate benefits for low-income ratepayers without increasing project costs
- deliver on the Commonwealth's commitment to reduce greenhouse gas emissions by 80 percent below 1990 levels by 2050
- improve electric system performance and reliability, particularly during peak demand periods, and
- avoid, minimize, and as necessary mitigate any impacts on the environment, endangered species, and commercial fishing.

The Mayflower Wind Projects meet the Commonwealth's vision of what offshore wind development must deliver for Massachusetts.

## A HEADSTART ON DEVELOPMENT

Mayflower Wind has invested more than \$150 million in this Project and expects to double this investment by the end of the year. Our dedicated project team is established in Massachusetts with its office in Cambridge. These investments in Massachusetts include:

- **Community Engagement and Investment:** Mayflower Wind began engaging local communities prior to the BOEM lease auction, consulting with the fishing industry, Native American Tribes, landowners, environmental groups, higher-education institutions, city and town government officials, chambers of commerce, supply chain, and port operators. We have and continue to invest in innovative State specific and regional collaborative efforts for environmental and fishing communities, including being a lead developer in establishing ROSA, a regional science entity focused on fisheries. We will continue this outreach to our communities and stakeholders to ensure a successful project.
- **Ports for Construction and O&M:** Mayflower Wind has executed a lease option with [REDACTED] for the use of [REDACTED] for construction activities, as well as an MOU with Boston Line to support O&M efforts. We are committed to utilizing Massachusetts ports and facilities for our long-term O&M of the Project.
- **Local Investment for Early Project Development:** Mayflower Wind has partnered with a wide range of locally-based engineering, environmental, and community engagement consultants to craft a

plan most responsive to Massachusetts' needs, objectives, and local conditions. The Port of New Bedford is the operations base for our geophysical campaign, now underway, and the upcoming geotechnical campaign. We have also utilized local consultants to support our submittal of the required Site Assessment Plan (SAP) to BOEM.

- **Focusing on Local Suppliers and Contractors:** Mayflower Wind is committed to ensuring that local companies and entrepreneurs are aware and have the opportunity to participate in contracting opportunities and will work with MassCEC through a web-based portal and in-person efforts like "Meet the Buyer" events. We will direct our primary contractors to make all reasonable efforts to utilize local suppliers and sub-contractors.
- **Floating LiDAR Deployment:** Mayflower Wind plans to deploy a floating LiDAR device this fall for wind-speed measurement and metocean remote sensing work. Our investment in this LiDAR will provide critical additional information about hub-height wind speeds and meteorological data specifically within Mayflower Wind's lease area. This LiDAR data will complement the valuable information from MassCEC's LiDAR deployed at the Woods Hole Air-Sea Interaction Tower (ASIT).
- **Geophysical and Geotechnical Surveys:** Mayflower Wind has already invested more than \$7 million in geophysical and geotechnical surveys critical for the design, optimization, and de-risking of the project. The geophysical survey, which mobilized July 29, 2019, from the MassCEC-managed New Bedford Commerce Terminal, is now in progress, and the geotechnical survey will begin [REDACTED]. We are also committed to keeping the Commonwealth informed of our progress and sharing the data from the surveys with academia, government and Tribes in order to continue to advance the knowledge of the offshore wind industry. Geophysical and geotechnical surveys at COP-required resolution and to meet Massachusetts archaeological standards will be conducted [REDACTED] for the proposed cable routes and foundation locations.

## CONCLUSION

Mayflower Wind is pleased to present these proposals, which we believe are the most compelling choice for a long-term offshore wind contract for Massachusetts and its electric distribution company customers under the second round of 83C solicitations.

Our proposals provide Massachusetts with the opportunity to select **Low Cost Energy, Infrastructure and Innovation**, or **Massachusetts Manufacturing**. Each of these proposals would provide the Commonwealth with the lowest price yet for U.S. offshore wind. Our Projects are cost-effective and bring substantial economic development benefits, and the ability to enhance these benefits depending on the proposal selected. We will deliver up to [REDACTED] in electric rate savings to Massachusetts customers, over 10,000 jobs, and up to [REDACTED] in overall economic benefits. Our commitment to ports, infrastructure, community, research, and workforce developments will plant the seeds for decades of sustainable, growth in Massachusetts' offshore wind economy.

Mayflower Wind is backed by two global leaders in offshore energy development with financial strength, capability, and proven expertise in completing large-scale, complex projects like this one. We will help create a competitive and diverse portfolio of wind energy suppliers for Massachusetts that will drive innovation and price competition. And underlying everything we do with the Mayflower Wind Project is our unwavering focus on safety, innovation, and workforce development in partnership with local communities.

Thank you for the opportunity to present this proposal and for your consideration.

## SECTION 3 OF APPENDIX A TO THE RFP OPERATIONAL PARAMETERS

Mayflower Wind anticipates that the Project will be fully or almost fully operational 365 days per year, with no more than [REDACTED] of capacity reductions required for planned substation maintenance. Each wind turbine is expected to require [REDACTED] per year of downtime, scheduled on a rotating basis throughout the turbine array, to complete annual planned maintenance.

Mayflower Wind has made these projections based on our Sponsors' experience with having installed more than 3,000 wind turbines across 61 separate wind power projects in the U.S. The rapid maturation of the wind power industry also provides increasingly useful data for predicting planned outages that Mayflower Wind intends to use.

The objectives of the long-term contract are fully aligned with the Project operational objective to maximize generation during peak production periods, which naturally coincide with peak consumption times.

With the deployment of Mayflower Wind's LiDAR buoy this fall, meteorological forecasting will enhance wind forecasts that will make the Project an ever-more reliable, cost-effective source of emissions-free electricity generation, requiring minimal outage time for maintenance and weather conditions.

### 3.1 MAINTENANCE OUTAGE REQUIREMENTS

3.1 Maintenance Outage Requirements – Specify partial and complete planned outage requirements in weeks or days for all generation facilities and associated facilities required for the delivery of energy from the generation facilities to the delivery point. Also, list the number of months required for the cycle to repeat (e.g., list time interval of minor and major overhauls, and the duration of overhauls).

To maintain a safe project maximizing total project availability, the Mayflower Wind team will implement a complete operations and maintenance plan, further detailed in **Section 11**. Service and maintenance activities related to key project components, such as the wind turbines, substation, or electrical cables, may require a partial outage of the Project to be conducted safely.

As much as possible, planned maintenance will be undertaken in favorable weather windows, namely when there are low wind speeds, to minimize overall production loss, and with favorable ocean conditions to ensure safe crew access to the equipment requiring service. The Mayflower Wind team will coordinate with ISO-New England to schedule maintenance activities to minimize the system impacts of necessary outages.

For this proposal, delivered energy will be a portion of the 804 MW project, therefore all outage percentages will remain the same for both the 408 MW and 804 MW projects.

### PLANNED MAINTENANCE ACTIVITIES

Periodic inspections and tests will be conducted for each major component as specified in the O&M plan to ensure all equipment is in safe operating condition in accordance with its specifications. In addition, some components require replacement of consumable materials, for example, lubricants and brake pads. These tasks will be scheduled in advance to maximize total project availability and are considered "planned maintenance activities." **Table 3.1-1** below details the expected outage requirements associated with planned maintenance activities.

While wind turbine maintenance will typically affect only the single turbine or turbines being serviced, substation maintenance may require a larger shutdown. Planned maintenance of the offshore and onshore



substations will be conducted so that at no point will there be a planned outage of more than [REDACTED] of the Project capacity. Maintenance schedules for the offshore and onshore substations will be carefully planned to optimize the frequency and duration of outages and limit production loss.

Component	Maintenance Intervals	Maintenance Duration	% Outage of Project capacity during maintenance
Wind Turbines	[REDACTED]	[REDACTED]	[REDACTED]
Wind Turbine Foundations			
Offshore Substation Foundations			
Offshore and Onshore Substations			
Export Cables			
Inter-array Cables			

TABLE 3.1-1: PLANNED MAINTENANCE ACTIVITIES

WIND TURBINES

Planned maintenance will be completed on each wind turbine generator every [REDACTED]. During planned maintenance, units are taken offline for intervals over several days for technicians to complete required annual maintenance tasks. To minimize safety risk, wind turbines will only be returned to service once all technicians have vacated. Mayflower Wind plans for a maximum of [REDACTED] wind turbines being offline at any given time from [REDACTED]. WTG planned maintenance will be scheduled as much as possible during summertime low-wind periods to minimize production loss.

OFFSHORE AND ONSHORE SUBSTATIONS

Planned maintenance of the Project’s offshore and onshore substations will require key components which include high-voltage transformers, switchgear, and breakers be taken offline in accordance with equipment manufacturer recommendations. These outages will be scheduled for low-wind periods and coordinated with ISO-NE to be completed outside peak load periods. [REDACTED], longer substation outages will be required to complete in-depth substation maintenance activities such as high-voltage electrical equipment inspections and tests, and functional testing of electrical protection system components. These substation [REDACTED]. Offshore and onshore substation outages will be conducted simultaneously to minimize production losses and, when possible, they will be aligned with other planned maintenance schedules to minimize production losses.

FOUNDATIONS, EXPORT CABLES AND INTER-ARRAY CABLES

Planned maintenance of the Project’s foundations, export cables, and inter-array cables will include periodic inspections in accordance with manufacturers’ recommendations. Mayflower Wind expects no planned maintenance outages required for these components.

## 3.2 OPERATING CONSTRAINTS

- 3.2 Operating Constraints – Specify all the expected operating constraints and operational restrictions for the project (i.e., limits on the number of hours a unit may be operated per year or unit of time).

Operating constraints are imposed on the Project to ensure the safety of personnel and the longevity of the assets. The most relevant constraints are turbine operating parameters and maintenance activities, which have an effect on overall performance and/or accessibility of the Project. Both of them are discussed in greater detail below.

### TURBINE OPERATING PARAMETERS

Wind turbine operations are limited by wind speed and internal equipment operational temperatures.

- Cut-in speed: approximately [REDACTED]
- Cut-out speed: approximately [REDACTED]
- Equipment operational temperature: [REDACTED]

Mayflower Wind does not expect any of these estimated operational parameter ranges will change significantly with the final selection of the turbine model.

Using the above constraints in wind speed assessments and temperature modeling, we expect the turbines will be able to generate power for over [REDACTED] per year. The wind speed cut-in and cut-out parameters, as well as the operational temperature range, has been considered and included in the energy production values presented in **Section 4**.

### MAINTENANCE ACTIVITIES

As with any electricity generating facility, both planned and unplanned maintenance activities may sometimes affect operations of the Project. As further detailed in **Section 11**, Mayflower Wind will be performing preventative maintenance to reduce unplanned maintenance activities that may constrain the operation and output of the Project. During operation, wind turbines, substations, and elements of the remaining infrastructure will be supervised and monitored 24 hours per day, every day of the year, using a remote monitoring system. This system will be connected to smart data analytic systems to diagnose root causes, predict future potential failures and will allow us to intervene before they happen to maximize the Project's performance.

## 3.3 ENHANCED RELIABILITY

- 3.3 Reliability – Describe how the proposal would provide enhanced electricity reliability to Massachusetts, including its impact on transmission constraints.

The Mayflower Wind Project will provide enhanced electrical reliability to Massachusetts by diversifying the offshore wind portfolio as well as the overall fuel generation mix, offsetting significant generation unit retirements within the Commonwealth, including the shutdowns of the Brayton Point station in 2017 and Pilgrim nuclear station in 2019.



Currently, the SEMA load zone of ISO-NE relies on natural gas as the primary fuel for generating electricity, with steadily decreasing reliance on oil and coal. In its most recent regional system plan, ISO New England states that “further retirements of coal and oil generators are expected after 2020 due to generally low natural gas prices, renewable energy additions, and pending environmental regulations and uncertainty surrounds the future of 3,300 MW from the region's remaining nuclear plants.” Since 2000, the share of natural gas generation in ISO-NE has increased from approximately 13% to 40%<sup>1</sup>. During this time, the natural gas pipeline system has remained relatively static. Retiring fossil fuel and nuclear generation units will likely be succeeded primarily by natural gas-fired units, increasing demand on already-constrained natural gas pipelines. The Project will mitigate natural gas demand and reduce threats to grid reliability because of pipeline constraints.

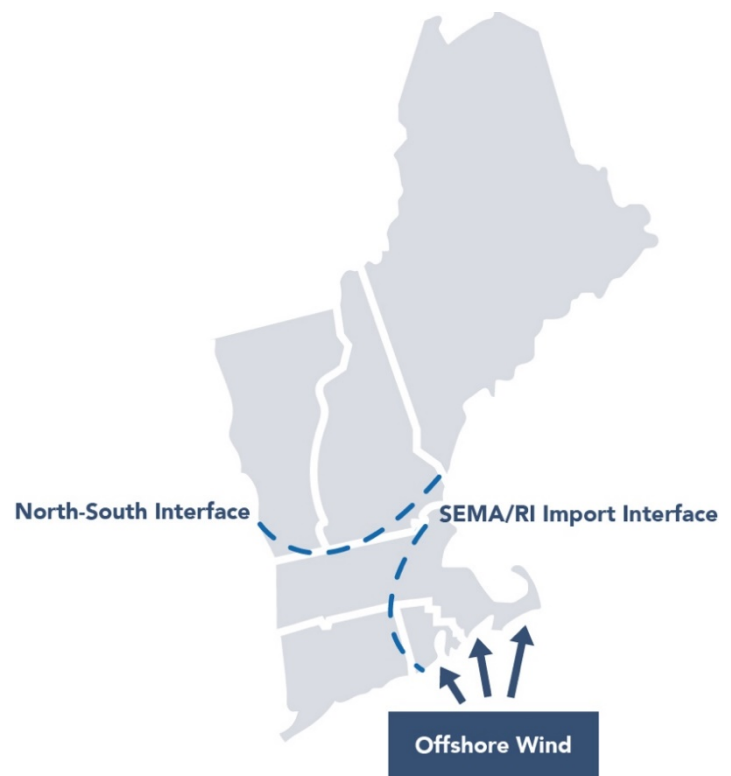
As a part of its regional system planning, ISO-NE in 2015-16 conducted an economic study of the impact of interconnecting 1,000 MW or 2,000 MW of offshore wind capacity into New England’s wholesale electricity markets and operations<sup>2</sup>. The study assumed offshore wind generation would interconnect to the grid at three substations in southern Massachusetts and Rhode Island: Barnstable, Brayton Point, and Kent County, R.I.

**Figure 3.3-1** illustrates the two major interfaces affected by offshore wind additions into the New England transmission system.

ISO-NE’s simulation results show that as offshore wind is added, less energy is required to flow through the North-South and SEMA/RI import interfaces to serve southern New England load, achieving positive impacts for Massachusetts through less constrained interfaces and reduced transmission congestion.

In addition to the study noted above, Mayflower Wind analyzed the interconnection of the Project to the ISO-NE transmission system at the [REDACTED]

[REDACTED] The analysis, detailed in **Section 6**, modelled two different loading scenarios based on different combinations of proposed generation coming online before the Project. The steady-state and load-flow analysis of the Project during summer peak conditions, under system healthy conditions and N-1 criterion, does not result in any voltage or thermal violations. Therefore, the addition of the Mayflower Wind Project will have no adverse impacts on the existing transmission system.



**FIGURE 3.3-1: ISO-NE OFFSHORE WIND**

Together, these results show that the Mayflower Wind Project will provide enhanced electricity reliability to Massachusetts, including a positive impact on relieving transmission constraints.

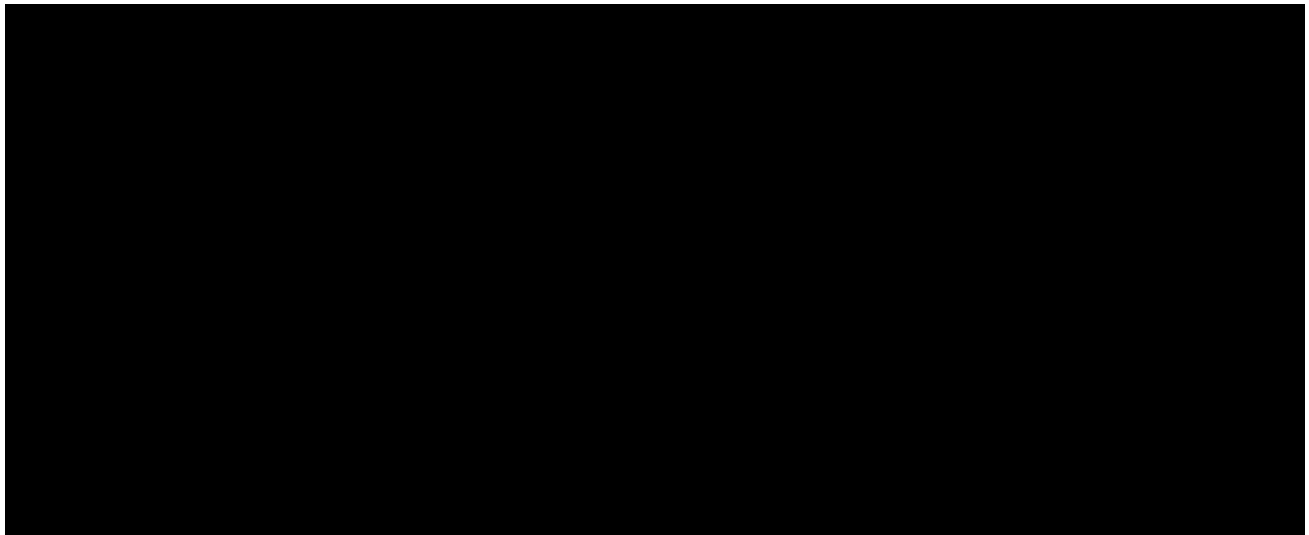
<sup>1</sup> 2019 Regional Electricity Outlook, ISO New England Inc., March 2019, 2019

<sup>2</sup> 2015 Economic Study: Evaluation of Offshore Wind Deployment, ISO New England Inc., September 2, 2016

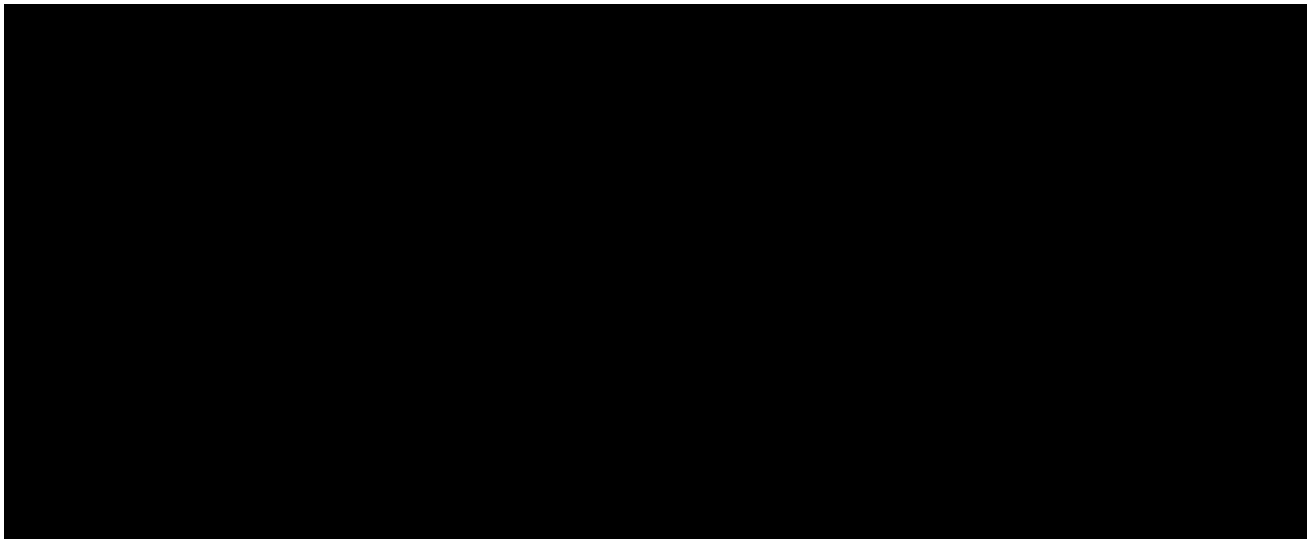
### 3.4 MODERATION OF SYSTEM PEAK LOAD

- 3.4 Moderation of System Peak Load – Describe how the proposal would contribute to moderating system peak load requirements and provide the following information:
- i) Estimated average output for each summer period (June- September) from 1:00 - 6:00 pm
  - ii) Estimated average output for each winter period (October-May) from 5:00 – 7:00 pm

As with all wind power projects, energy generation will vary both daily and seasonally according to changes in the wind resource characteristics across the site. The Mayflower Wind Project is projected to provide significant energy generation during all seasons of the year and hours of the day, with highest generation periods during the winter months. **Figure 3.4-1** presents the total energy production per month for the Project. **Figure 3.4-2** presents the average daily production during Summer (June – September) and winter (October – May) periods, with on peak hours highlighted red.



**FIGURE 3.4-1:** TOTAL AVERAGE ANNUAL MONTHLY GENERATION



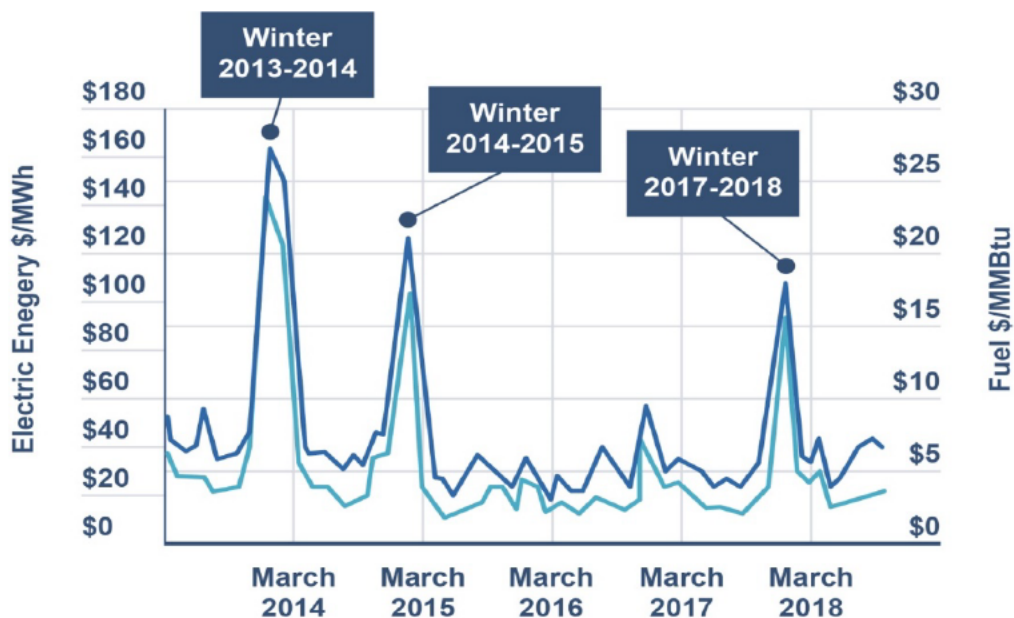
**FIGURE 3.4-2:** WINTER AND SUMMER ANNUAL AVERAGE DAILY GENERATION PROFILES

Based on the 408 MW scenario more fully described in **Section 4**, the estimated energy production from the Project during the peak load periods specified are shown in **Table 3.4-1** below.

	June – September (1:00-6:00PM)	October – May (5:00-7:00PM)
Estimated average hourly energy production		
Estimated total annual energy production		

**TABLE 3.4-1: PEAK LOAD PERIOD ENERGY PRODUCTION**

As illustrated in **Figure 3.4-3** below, the Project will deliver its maximum output during winter when demand for natural gas from residential heating and fuel for power generators is at its highest. Thus, the electricity generated by the Project will help to reduce the natural gas demand and corresponding risk of natural gas price spikes.



**FIGURE 3.4-3: WHOLESALE ENERGY PRICES SPIKES IN WINTER**

## SECTION 4 OF APPENDIX A TO THE RFP ENERGY RESOURCE AND DELIVERY PLAN

For Eligible Facilities, the bidder is required to provide an energy resource or fuel supply plan for its proposed project, including supporting documentation. The fuel supply/energy resource profile information should be consistent with the type of technology/resource option proposed and the term proposed. Bidders should respond to all information requests which are relevant to the bid in a timely manner.

The Mayflower Wind Project will use wind as its generation resource. To derive the energy production profile of the project, wind data was collected and analyzed. The Mayflower Wind Team has completed wind resource assessments for more than 50 offshore wind development opportunities totaling more than 40,000 MW of capacity across Europe, Asia, and the U.S. In addition to leveraging in-house capabilities, Mayflower Wind engaged [REDACTED] to complete an independent wind resource and energy production assessment for the Project, as more fully described below.

Mayflower Wind will install a floating metocean buoy equipped with a Light Detection and Ranging (LiDAR) system within the project lease area in fall 2019. The data collected from the metocean buoy will be used during pre-installation activities (for example, design work, installation logistics planning, and project financing) to supplement existing wind and metocean measurement data currently available. Floating LiDAR has become the standard method for collecting wind and oceanic data at offshore wind project sites.

### 4.1 ENERGY RESOURCE PLAN

#### 4.1 All Projects

Provide a summary of all collected wind data for the proposed site. Identify when and how (e.g. meteorological mast or LiDAR – for “Light Detection and Ranging”) the data was collected and by whom.

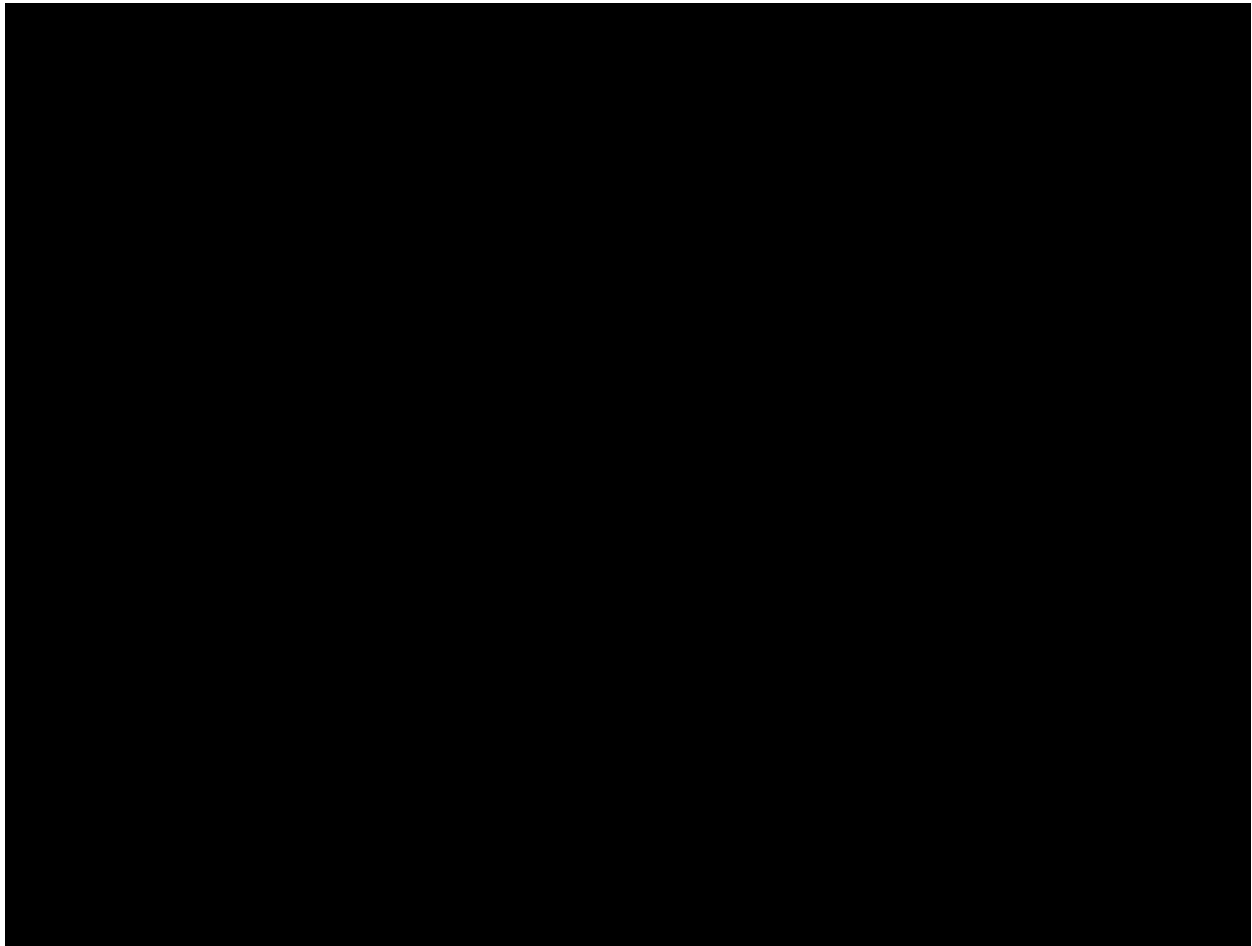
Indicate where the data was collected and its proximity to the proposed facility site. Include an identification of the location and height for the anemometers and/or “range gate” heights for sensing by LiDAR that were used to arrive at an assessment of the site generation capability.

Mayflower Wind will collect wind resource data using a combination of existing and new sensors and meteorological models. To estimate the generating capability of the Project, wind data was evaluated from the Woods Hole Oceanographic Institution’s (WHOI) Air-Sea Interaction Tower (ASIT) station, an offshore fixed platform with a main deck at approximately 40 ft (12 m) above mean sea level (amsl) and located 1.7 miles (2.7 km) south of the coast of Martha’s Vineyard and approximately 40 miles (64 km) north of the Mayflower Wind Project’s site center. The WHOI ASIT station also includes a co-located LiDAR. The following data sets collected from the WHOI ASIT are the primary basis for the energy production estimates presented below:

- Anemometer mounted on meteorological mast (with top measurements at 88 ft / 26.7 m amsl) – data available from 30 November 2016 to 26 December 2018.
- Co-located Windcube V2 profiling LiDAR (with measurement levels between 174 ft / 53 m and 656 ft / 200 m amsl) – data available from 07 October 2016 to 30 December 2018.

In addition to the WHOI ASIT data sets, modelled mesoscale data for the period from 1997 through 2018 (including MERRA, ERA, and CFSR datasets) were used to confirm the long-term accuracy of the wind speed

estimates. Complete details of the collected wind data and the methodology used to derive the Project's energy production estimates are provided in the Independent Energy Assessment Report included as **Attachment 4.1-1**.



**FIGURE 4.1-1:** LOCATIONS OF MEASURED DATA FOR THE WHOI ASIT AND DATA VALIDATION SOURCES

Describe any additional wind data collection efforts that are planned or ongoing.

Mayflower Wind will install a floating metocean buoy within the project lease area in [REDACTED]. The data collected from the metocean buoy will supplement existing wind and metocean measurement data and facilitate detailed design work, finalization of installation and operational logistics planning, and project financing.

Mayflower Wind will deploy a SEAWATCH Wind LiDAR Buoy, manufactured by Fugro GEOS Inc., outfitted with LiDAR for wind resource data collection, among other sensors and equipment. The LiDAR can measure the wind profile at multiple range gates from 13 ft (4 m) to 980 ft (300 m) above mean sea level. The buoy will be installed at [REDACTED] (see **Figure 4.1-1** above). Mayflower Wind has submitted a Site Assessment Plan (SAP) to BOEM which, upon approval, will initiate the deployment of the Project's LiDAR buoy. The buoy will be removed from the site after sufficient data is collected.

In addition to the data collected by the Project’s LiDAR buoy, Mayflower Wind will continue to use data from the WHOI ASIT LiDAR. Together, these data sets will enable a highly accurate and reliable assessment of the Project’s generation capability.

Provide (a) at least one year of hourly wind resource data. Real Data collected from the site is preferred, though projected data is permissible. Methodology must also be included. and (b) a wind resource assessment report for the proposed facility from a qualified unaffiliated third-party wind resource assessment firm. Include an analysis of the available wind data which addresses the relationship between wind conditions and electrical output. Provide a projection of net annual energy production, including projections of average net hourly energy production, based on the wind resource data (a 12 x 24 energy projection) at both P50 and P90 levels.

Mayflower Wind has been working with [REDACTED] a qualified unaffiliated third-party wind resource assessment firm, who has carried out an assessment of the Project’s site summarized in a report included as **Attachment 4.1-1**. This report includes:

- One year of hourly wind resource data – including the methodology used to derive it
- Analysis of the available wind data which addresses the relationship between wind conditions and electrical output.
- A projection of net annual energy production, including projections of average net hourly energy production, based on the wind resource data (a 12 x 24 energy projection) at both P50 and P90 levels.

[REDACTED] analyzed and validated the WHOI ASIT LiDAR measured data described in **Section 4.1**. These data sets were then projected as a long-term wind distribution using 20 years of mesoscale model-based Vortex-CFSR time series, ERA-5 and MERRA-2 reanalysis data. This long-term wind distribution at the WHOI ASIT station location was then extrapolated to individual turbine locations in the energy yield assessment using an ERA-5 based modelled Vortex wind speed map. The predicted average freestream long-term mean wind speed at a hub height of [REDACTED] is estimated at [REDACTED] the Project site. In addition to the standard offshore technical loss categories considered (described in detail below), the energy yield assessment factored in projected external wake losses associated with [REDACTED]

The annual energy production expectations and 12x24 energy projections at the P50 and P90 level are presented in **Table 4.1-1**, **Table 4.1-2** and **Table 4.1-3** below. These numbers consider a Project composed of [REDACTED] wind turbines

	Annual Energy Production (GWh)	Net Capacity Factor (%)
P50 – averaged over 20 years		
P90 – averaged over 20 years		

**TABLE 4.1-1: EXPECTED MAYFLOWER WIND PROJECT ANNUAL ENERGY PRODUCTION**

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												

Hour	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0												
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
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15												
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20												
21												
22												
23												



Provide a site-adjusted power curve. Each curve should list the elevation, temperature and air density used.

As mentioned above, the energy production estimates presented are based on the [REDACTED] turbine model. The power curve for the [REDACTED] turbine model is presented in **Table 4.1-4**. The power curve is valid for an air density of [REDACTED]

Wind Speed (m/s)	Power (kW)
[REDACTED]	

**TABLE 4.1-4: MAYFLOWER WIND'S SITE-ADJUSTED POWER CURVE**

Identify the assumptions for losses in the calculation of projected annual energy production, including each element in the calculation of losses.

The energy production estimates presented above take into account a range of potential technical losses, detailed in **Table 4.1-5**.

Corrections and Losses	
WTG Availability	[REDACTED]
Substation/BoP Availability	
Grid Availability and Disruption	
Wake Loss Internal	
Wake Loss External & Future	
Wind Farm Blockage Effect	
Power Curve Performance	

Corrections and Losses	
Wind Hysteresis (in Shut-Down and Start-Up)	
Sub-Optimal Performance Loss	
Electrical Efficiency (Cables, WTG & Grid Transformers)	
Blade Contamination, Degradation and Off-Design	
Wind Speed Interannual Variability	
<b>Overall Conversion Efficiency (%)</b>	

**TABLE 4.1-5: ASSUMPTIONS FOR LOSSES IN THE CALCULATION OF PROJECTED ANNUAL ENERGY PRODUCTION**

**WTG Availability:** represents the long-term turbine availability rate inclusive of operational downtime and downtime required to perform the maintenance and inspection of the turbines offshore.

**Balance of Plant (BoP) Availability:** represents the production downtime required for maintenance and inspections of all of the BoP components – onshore and offshore substations, inter-array and export cables. It is estimated that this downtime will represent an average loss of approximately [REDACTED] of production per year.

**Grid and Transmission Asset Availability:** represents the production downtime assuming that the local grid and/or offshore transmission owner's assets will be down for [REDACTED] in any one year during periods of average production.

**Wake Losses (Internal):** represents wake production losses caused by turbines located within the Project. These losses have been calculated using WAsP and WindFarmer models to minimize the level of uncertainty associated with their modelling.

**Wake Losses (External & Future):** represents wake production losses caused by turbines located in neighboring projects in offshore leases OCS-A 0501, 0520, and 0522. These projects have been assumed to come online at the same as the Mayflower Wind Project for this calculation. [REDACTED]

**Blockage Effect:** represents the wind farms influence on the wind flow slowing it down in both upwind and lateral directions relative to the turbine location – commonly termed the “blockage effect”. This effect continues to be investigated and quantified and has been considered to reduce the overall gross production by [REDACTED]

**Power Curve Performance:** represents production losses associated with complex wind shear events during extreme weather.

**Wind Hysteresis (Start Up and Shut Down):** represents production losses when turbines are starting up and shutting down at high wind speeds. When wind speeds exceed the turbine maximum operational speed for a predefined period of time, the turbine shuts down and does not start up again until the wind speed drops to a lower level. This loss factor accounts for the time period when wind speed is dropping from above cut-out to within safe operational speeds.

**Power Curve – Suboptimal Performance Loss:** represents production losses due to instrumentation and/or control system issues, compared to optimal output. The [REDACTED] considered is based on [REDACTED] real-world measurement and experience.

**Electrical Transmission Efficiency (Cables, WTG and Grid Transformers):** represents electrical transmission losses and has been calculated by [REDACTED] based on the proposed capacity and configuration of the Project.

**Blade Contamination, Degradation, and Off-Design:** represent production losses related to turbines becoming contaminated by particles or insects in the air and, later in project life, degradation and off-design operation factors. The magnitude of this loss will, to some extent, be dependent upon the diligence of the maintenance personnel. No losses related to icing or extreme temperature losses are projected by [REDACTED] for the Project.

**Wind Speed Interannual Variability:** Averaged wind speeds vary from year to year in a non-linear way, and compared to forecasted average outputs, a low-wind-speed year tends to result in a larger energy yield reduction than the corresponding increase during a high-wind-speed year.

## 4.2 OFFSHORE WIND ENERGY GENERATION DELIVERY PLAN

### 4.2 Offshore Wind Energy Generation Delivery Plan

Please provide an energy delivery plan and profile for the proposed project, including supporting documentation. The energy delivery profile must provide the expected Offshore Wind Energy Generation to be delivered into the ISO-NE market settlement system and permit the Evaluation Team to determine the reasonableness of the projections for purposes of Sections 2.2.1.3 Eligible Bid Categories and 2.2.1.7 Capacity Requirements, and 2.2.1.8 Interconnection and Delivery Requirements of the RFP. Such information should be consistent with the energy resource plan provided above and also considering any and all constraints to physical delivery into ISO-NE.

Mayflower Wind, or its assigned agent, as Lead Market Participant, will schedule and deliver its energy into the ISO-NE system at a Pool Transmission Facility (PTF). The project will interconnect to the ISO-NE system under the Capacity Capability Interconnection Standard (“CC Interconnection Standard”), meaning the Project will avoid any significant adverse effect on the reliability, stability, and operability of the ISO-NE system.

Mayflower Wind also intends to complete the Forward Capacity Auction Qualifications process set forth in Section III 13.1 of Market Rule 1 of ISO-NE’s Transmission Markets and Services Tariff.

Mayflower Wind’s energy delivery profile is fully described in the independent wind resource analysis and energy production estimation completed by [REDACTED] and has been summarized in **Section 4.1** above. The following data sets and tables can be referenced:

- 8760 average total hours of Project generation – CPPD form
- P50 12x24 Energy Projection – **Table 4.1-2**
- P90 12x24 Energy Projection – **Table 4.1-3**

In addition to the above, **Table 4.2-1** below presents the average hourly generation expected from the Project on a monthly basis. On peak hours, as defined in the RFP, are highlighted in blue and in bold font.

These values are based on the P50 energy production estimate, consistent with the values presented in previous sections, and based on the [REDACTED] turbine model.

Hour	Summer Avg. (June - September)	Winter Avg. (October - May)	Annual Avg.
0:00			
1:00			
2:00			
3:00			
4:00			
5:00			
6:00			
7:00			
8:00			
9:00			
10:00			
11:00			
12:00			
13:00			
14:00			
15:00			
16:00			
17:00			
18:00			
19:00			
20:00			
21:00			
22:00			
23:00			

TABLE 4.2-1: EXPECTED AVERAGE HOURLY GENERATION

### 4.3 REC/ENVIRONMENTAL ATTRIBUTE DELIVERY PLAN

Please provide documentation and information demonstrating that the project will Deliver GIS Certificates representing those RECs or Environmental Attributes. Please describe whether transfer of all GIS Certificates is authorized under the current ISO-NE GIS rules and protocols, or if a rule or protocol change is required. To the extent such change is required, please provide details regarding the proposal and the process for implementing the change.

As a qualifying renewable energy resource, the Mayflower Wind Project will produce Renewable Energy Certificates (RECs) and environmental attributes throughout its lifetime. The Project will use the New England Power Pool's Generation Information System (GIS) to track and deliver the Project RECs and environmental attributes. All the Project RECs and environmental attributes will be delivered to the Distribution Companies' GIS account(s) per the terms of the PPA.

### 4.4 ENERGY STORAGE SYSTEM OPERATIONS

#### 4.4 Energy Storage System Operations (if applicable)

PROJECT SUMMARY: Please provide the following:

Identify if New or Existing Facility, or an upgrade to Existing Facility: \_\_\_\_\_

Technology Type

Point of Interconnection

Deliverability Restrictions (if any)

Nameplate MW AC (at 100% project completion)

Net Contract MW AC (at 100% project completion)

Storage Energy (MWh)

Discharge Duration (hours)

Full Duty Cycle Efficiency (%)

Required Cycles per year/per day

Expected annual capacity degradation (%)

Specific Battery Chemistry (if applicable)

Describe the operation of the proposed Energy Storage System: (i.e. run hour limitations, ramp rates, spinning reserves, regulation up, regulation down). Please provide proposed operational management terms that memorialize the operational commitments of the facility.

Describe the location of the Energy Storage System, the anticipated interconnection point, and the value of the relative proximity of the system to the Offshore Wind Energy Generation facility, including any decreased risk of curtailment and/or deferred investment for the Offshore Wind Energy Generation Facility

Describe the proposed technology and equipment manufacturer by name and model (include inverter characteristics if applicable).

Describe the viability and operational reliability of the proposed technology and track record of the manufacturer. Provide examples of similar applications of the same size and scope.

Please provide an energy delivery plan and profile for the proposed project, including supporting documentation. This documentation may be either an hourly storage use schedule separately from the hourly wind delivery schedule, or the following parameters of the storage technology that will be used in conjunction with the bid: Charge rate (MW), Discharge rate (MW), Storage capacity (MWh), Round-trip efficiency (%). The energy delivery profile must provide the expected Offshore Wind Energy Generation to be delivered into the ISO-NE market settlement system by the Energy Storage System and permit the Evaluation Team to determine the reasonableness of your projections. Such information should be consistent with the energy resource plan provided above and also considering any and all constraints to physical delivery into ISO-NE.

Describe the conformance of the operation of the Energy Storage System with ISO-NE's implementation of FERC order 841, including whether the proposed Energy Storage System will be classified as a Binary Storage Facility or Continuous Storage Facility, the designation of the ISO-NE Markets that the Energy Storage System would participate in, and the plan to operate in multiple ISO-NE Markets.

Please list all anticipated revenue streams associated with the Energy Storage System

For existing facilities,

- describe existing operations, revenues, and participation in ISO-NE Markets
- describe any planned changes in operation, participation in ISO-NE Markets, and revenue streams
- describe existing operations, revenues, and participation in ISO-NE Markets
- describe any planned changes in operation, participation in ISO-NE Markets, and revenue streams

Please describe (a) (i) the specific services and/or products that will be provided to the Distribution Companies due to the proposed operation of the Energy Storage System under your proposal and (ii) the specific costs to be paid by the Distribution Companies through the power purchase agreement for such services and/or products and (b) a statement of how the proposal complies with RFP requirements. Please describe any additional benefits the Energy Storage System may provide not captured in the benefits provided through the operational commitments, including but not limited to,

- any non-monetizable benefits including but not limited to price changes in capacity and ancillary services markets, reduction in future market needs such as reserves or ramping, and increased capacity rating for Offshore Wind Energy Generation facility
- Emission reductions associated with the operation of the Energy Storage System and providing emission-free resources to the ancillary service markets including reserves and frequency regulation
- Value of procuring the Energy Storage System at the same time and as paired with the Offshore Wind Energy Generation facility

Mayflower Wind recognizes that energy storage is an exciting technology that has major potential economic and technical benefits for many applications and supports Massachusetts' goal of becoming a national leader in the emerging energy storage market through its Energy Storage Initiative. Adding storage can theoretically add more flexibility and dependability to the operation of variable renewable generation resources like offshore wind.

At this time, we have not included an energy storage component in the Mayflower Wind Project proposal for reasons described in more detail below. We believe the benefits of energy storage can be delivered more cost-effectively and efficiently through storage facilities sited next to major sources of electric demand, such as urban neighborhoods or institutional campuses. We will, however, continue to evaluate energy storage as the technology improves and costs decrease to determine whether, when, and how it could best be incorporated into the Project. Below, we explain all the considerations that went into our decision and how we anticipate those considerations could evolve in the future.

## TYPICAL ENERGY STORAGE BENEFITS

**Time Shifting:** Time shifting refers to a redistribution of generated power over hourly time scales. It is generally described as arbitrage on wholesale energy prices where the objective is to charge at low prices and discharge at high prices. Storage systems that participate in time shifting can stand alone and are generally not combined with generation resources. The most effective technologies for time shifting have high efficiency, long discharge durations, and low marginal cost in terms of energy capacity. The most effective placement of time shifting resources is at interconnection points with high price volatility that can support power flow in both directions with sufficient transmission capacity. This description does not fit with the type of installation that would be considered as part of an offshore wind project.

**Replacing Peak Capacity:** Using storage in periods of high demand involves reserving storage systems at a full state of charge in anticipation of these loads and dispatching stored energy in lieu of expensive peak-period generation. The State of Charge report prepared by multiple organizations (MA DOER, MassCEC, Customized Energy Solutions, Ltd., Alevo Analytics, Sustainable Energy Advantage, LLC, Daymark Energy Advisors, and Strategen) for the Massachusetts Energy Storage Initiative demonstrates that peak support is among the most important potential storage benefits for the Commonwealth.<sup>3</sup> This is illustrated by the following facts:

- The top 1% of hours for electric demand account for 8% of annual electricity spend.
- The top 10% of demand hours account for 40% of annual electricity spend.

The disproportionate cost of peak generation demonstrates significant potential benefit applying energy storage as an alternative. However, the report also documents that the highest rates of peak growth in Massachusetts are concentrated around urban areas. The State of Charge report identifies two versions of energy storage installations that would most effectively address peak support in these areas:

- Bulk/central facilities, or one large advanced storage plant connected to the transmission grid.
- Modular/distributed storage systems that are located near or within load centers and are either connected to the distribution system at substations or situated behind customer meters.

The first version emphasizes long-duration storage technologies. The second emphasizes distributed resources placed in close proximity to the load. Neither of these approaches, however, represents a type of installation that would be considered cost-effective or operationally optimal as part of an offshore wind project like Mayflower Wind.

**Capacity Firming:** Capacity firming consists of operating energy storage assets on short time charging cycles to smooth out variations in renewable generation. This application makes it possible to maintain output at a committed level for a certain period of time. Firming also shallows ramp rates and reduces the need for load-balancing activity on the grid. However, storage systems used for this purpose need high power capacity and can only support firming activity for short to medium durations. Due to these limitations

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<sup>3</sup> Massachusetts Energy Storage Initiative Study: "State of Charge Report" July 2017, page 36

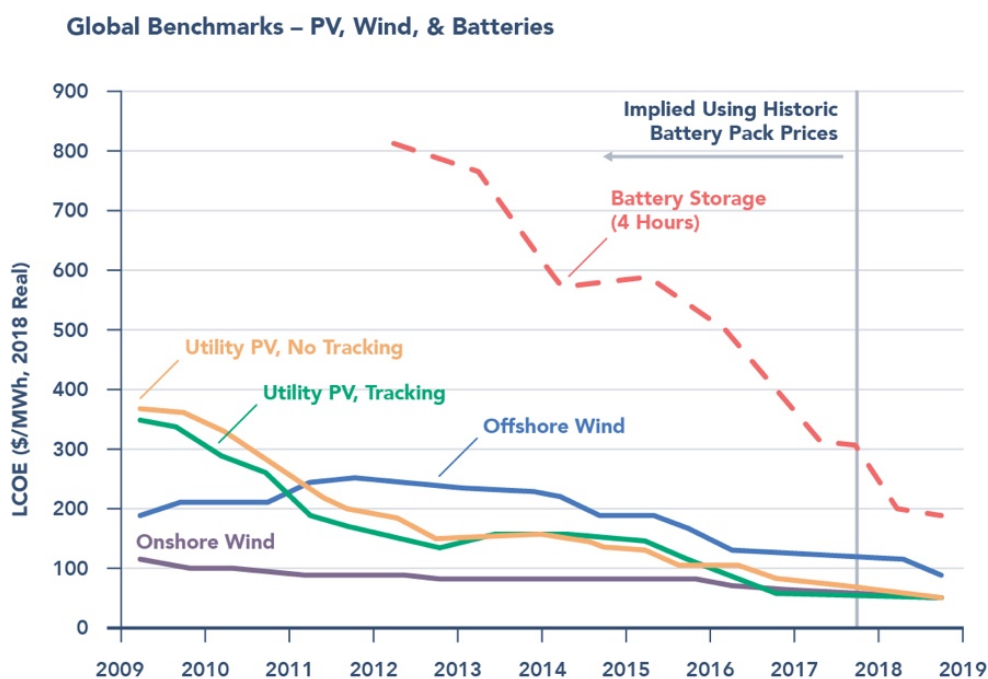


and to the lower variability of the wind climate offshore, we don't see storage used for capacity firming as a cost-effective solution for our Project today.

**Ancillary Services:** Ancillary Services are load-balancing activities that participants provide in exchange for market-based compensation. Battery storage systems offer quick response times and are adept at providing frequency regulation and spinning reserve capacity. As it happens with time shifting, storage systems performing ancillary services can stand alone and are not generally combined with generation resources. Additionally, during curtailment events, renewable generation facilities can provide ancillary services on their own without energy storage.<sup>4</sup>

## ENERGY STORAGE COSTS

While the levelized cost of energy (LCoE) does not show the time-varying value of offshore wind and storage, it can be used as a proxy to help determine incremental costs of adding storage to a project. Bloomberg New Energy Finance has tracked the LCoE of different storage technologies since 2009<sup>5</sup>, and since that time, the LCoE has declined more rapidly than any type of renewable resource. However, the LCoE of storage is still approximately double the LCoE of offshore wind.



**FIGURE 4.4-1: ENERGY STORAGE COSTS RELATIVE TO SELECTED RENEWABLE TECHNOLOGIES**

For the Mayflower Wind Project, the marginal costs of storage need to be considered alongside the increase in overall MWh price to ratepayers.

## ENERGY STORAGE CONCLUSION

Among the storage applications described in this section, peak support has the greatest potential benefit to Massachusetts. Dedicated storage facilities physically closest to load sources and matching needed durations, will better serve peak support needs than storage systems collocated with offshore wind projects. Moreover,

<sup>4</sup> NREL Technical Report: "Wind and Solar Energy Curtailment: Experience and Practices in the United States", March 2014, page 29

<sup>5</sup> Bloomberg New Energy Finance: "Battery Power's Latest Plunge in Costs Threatens Coal, Gas" 3/26/2019



additional offshore wind generation capacity without storage can still indirectly serve many of the technical goals described above, especially reducing the need for peak generation.

Currently, Mayflower Wind has concluded that an offshore wind project without integrated storage provides the most competitive price to the distribution companies, their ratepayers, and the Commonwealth as a whole.

While the project design does not currently include a storage component, Mayflower Wind sees that the price of storage is rapidly declining and recognizes that costs may decrease to a point that it becomes economical during project development. [REDACTED]

[REDACTED] In keeping with the Commonwealth's strong expressed interest in promoting energy storage technologies, Mayflower Wind will continue to evaluate all storage options, including through our Innovation Partnership with MassCEC. Additionally, through our collaboration with the Cape Light Compact, we will be supporting the deployment of distributed storage in low-income households across Cape Cod and Martha's Vineyard, [REDACTED]

## SECTION 5 OF APPENDIX A OF THE RFP FINANCIAL/LLEGAL

Bidders are required to demonstrate the financial viability of their proposed project. Bidders should provide the following information:

The ultimate guarantor of the Mayflower Wind Project's financial viability is the financial strength, experience, and credibility of our Parent Companies, Royal Dutch Shell and EDP Renewables, and all their affiliates, which we refer to collectively as Mayflower Wind's Sponsors. Between them, they have constructed or are developing 10 offshore wind projects and 61 onshore wind projects exceeding 7,600 megawatts in total capacity. This depth of real-world experience in designing, permitting, financing, and constructing wind energy has enabled the Mayflower Wind team to create robust, credible projections of what it will cost and how long it will take to build the project, ensuring that the revenue from electric distribution company ratepayers will make the project financially viable. Our Parent Companies are actively entering construction of two more projects off the coasts of the United Kingdom and the Netherlands, Moray East and Borssele 3 & 4, totaling another 1,682 megawatts of offshore wind generation. Every day our Sponsors are gaining new experience and insight into what it takes in today's and tomorrow's markets to successfully and cost-effectively source and install the components of a large offshore wind project like Mayflower Wind. Both Shell and EDP Renewables, as part of this project, have designated Shareholder Representatives whose sole job will be to assist Mayflower Wind in leveraging every available resource from the Sponsors to ensure we reliably deliver a cost-effective project to Massachusetts' ratepayers and electric distribution companies.

The Project's financial viability is also ensured by the combined financial strength of our two Parent Companies, who between them have more than \$440 billion in assets and in 2018 achieved \$410 billion in revenue and \$25 billion in net income. 11 world-class banks with whom Mayflower Wind's Sponsors have done extensive business have signed letters of support for the project. Between now and when the project goes into service in December 2025, Mayflower Wind will continuously tap into the technical capabilities and experience of leading global energy providers, as well as their supply chains and service partners. In short, the Project and its financial viability stand on the extraordinarily strong foundation of Shell and EDP Renewables.

### 5.1 FINANCING BENEFITS FROM RFP PROCESS

- 5.1 Each bidder is required to submit information and documentation that demonstrates that a long term contract resulting from this RFP Process would either permit the bidder to finance its proposal that would otherwise not be financeable, or assist the bidder in obtaining financing of its proposal.

A long-term power purchase agreement from a credit-worthy party is a prerequisite to secure a predictable revenue, which is essential for Mayflower Wind to secure competitive financing terms through its existing relationships with leading financing institutions; hence, securing a long-term contract with the Distribution Companies is the cornerstone of the Project to achieve the financial close date scheduled in [REDACTED].

Financing an offshore renewable wind facility without a long-term contract would significantly increase the cost of financing due to the associated risks for both the equity and debt providers, making the project economically unviable.

Mayflower Wind's Sponsors have extensive longstanding relationships with debt providers and, therefore, confidently present letters of support from the following leading financing institutions, each attached herein as **Attachment 5.1-1**.

## 5.2 MAYFLOWER WIND STRUCTURE

- 5.2 Please provide a description of the business entity structure of the bidder's organization from a financial and legal perspective, including all general and limited partners, officers, directors, managers, members and shareholders, involvement of any subsidiaries supporting the project, and the providers of equity and debt during project development. Provide an organization chart showing the relationship between the equity and debt participants and an explanation of the relationships. For jointly owned facilities, identify all owners and their respective interests, and document the Bidder's right to submit a binding proposal.

### BUSINESS ENTITY STRUCTURE

Mayflower Wind Energy LLC ("Mayflower Wind") is a limited liability company organized under the laws of the State of Delaware. Mayflower Wind was formed on June 7, 2018 by filing a Certificate of Formation in the office of the Secretary of State of the State of Delaware under and pursuant to the Delaware Limited Liability Company Act, as amended from time to time, and is governed by the Shareholder Agreement. Pursuant to the Shareholder Agreement, Mayflower Wind is authorized to (i) acquire, develop, construct, own, operate and maintain any offshore wind renewable energy project developed, constructed, or operated or to be developed, constructed or operated in any federal, state or municipal territorial waters offshore of, or for delivery of power to, the U.S. coast.

Mayflower Wind is a 50:50 joint-venture between Shell New Energies US LLC, a limited liability company organized under the laws of the State of Delaware and EDPR Offshore North America LLC, a limited liability company organized under the laws of the State of Delaware, as shown in **Figure 5.2-1**.



**FIGURE 5.2-1: SHAREHOLDERS OF MAYFLOWER WIND**

### SHELL NEW ENERGIES US LLC

Shell New Energies US LLC (“Shell New Energies”) is a wholly-owned subsidiary of Shell Oil Company, a Delaware corporation (“Shell Oil”). Shell Oil is ultimately owned by Royal Dutch Shell Plc (“Royal Dutch Shell”) and supported by the Shell group of companies. Royal Dutch Shell is a public company limited by shares, not directly or indirectly owned or controlled by another corporation or by any government.

The following **Figure 5.2-2** details the ownership and relationships of the business entities from Royal Dutch Shell to Shell New Energies:



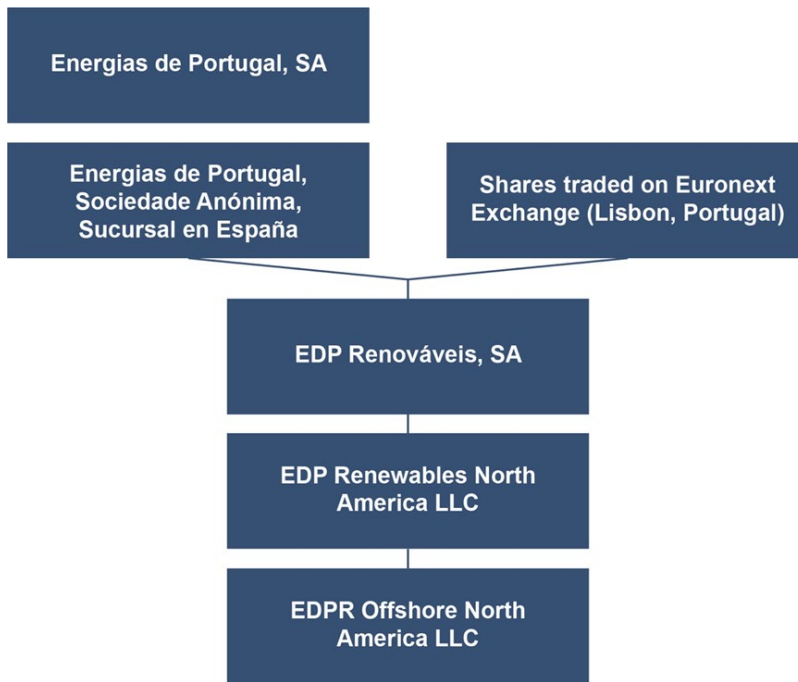
**FIGURE 5.2-2: SHELL GROUP ORGANIZATION CHART**

### EDPR OFFSHORE NORTH AMERICA LLC

EDPR Offshore North America LLC (“EDPR Offshore NA”) is a wholly-owned subsidiary of EDP Renewables North America LLC (“EDPR NA”), a limited liability company organized under the laws of the State of Delaware. EDPR NA is a direct, wholly owned subsidiary of EDP Renováveis, S.A. (“EDPR SA”), a Spanish *sociedad anónima*, whose majority shareholder, EDP-Energias de Portugal, Sociedade Anónima, Sucursal em Espanha (“EDP-Spanish Branch”) is the Spanish branch of EDP-Energias de Portugal, S.A. (“EDP”), a vertically-integrated utility company with a firmly established position in the global energy market.

As announced on May 21st, 2019, EDP Renewables and Engie signed a strategic memorandum of understanding to create a 50:50 joint-venture in offshore wind. The new entity will become a global player, bringing together the expertise and development capacity of both companies. The execution of the memorandum of understanding is subject to the respective approval processes, and upon completion, the joint-venture will replace EDP Renewables North America LLC in the chain of ownership of Mayflower Wind.

**Figure 5.2-3** details the ownership and relationships of the business entities from EDP to EDPR Offshore NA:



**FIGURE 5.2-3: EDP GROUP ORGANIZATION CHART**

## GOVERNANCE

The balanced partnership between Shell and EDP Renewables has been structured to fully utilize the complementary strengths of the Sponsors in order to deliver a cost-effective project, limit the execution risks and ultimately benefit Massachusetts to achieve its energy policy goals.

Mayflower Wind is overseen by the Managing Committee (equivalent to a board of directors) that steers the management of the company and by the Executive Committee that leads the day to day of the project execution and manages the project team. Furthermore, to ensure Mayflower Wind benefits of the vast pool of expertise and network of the Sponsors in an efficient manner, the governance of Mayflower Wind benefits of the role Shareholder Representative.

### MANAGING COMMITTEE (IE. BOARD OF DIRECTORS)

The Managing Committee is comprised of three designated members of each Parent Company, that bring a unique set of capabilities and complementary skills to steer Mayflower Wind and support the Executive Committee and the wider project team:

Key capabilities brought by Shell:

- Offshore regulatory experience (BOEM, NOAA, etc.)
- U.S. offshore logistics and engineering complemented with European offshore wind
- U.S. offshore supply chain networks

Key capabilities brought by EDP Renewables:

- U.S. grid connection and regulations
- U.S. permitting and environmental mitigation
- European offshore wind development, construction, and operation.

Additional to the experience of the Managing Committee, each Shareholder provides a dedicated Shareholder Representative as described below.

OFFICERS AND EXECUTIVE COMMITTEE

The Executive Committee is comprised of four experienced individuals totaling over 90 years of professional experience, most of which are in executing offshore projects of equivalent size and complexity in commodity and power markets and in community engagement related to large-scale wind or other energy projects. Two members have been appointed by EDPR and two members have been appointed by Shell reflecting the balanced governance agreed in the Shareholder Agreement.

Figure 5.2-4 shows Bidder’s Managing Committee, Officers and Executive Committee.



FIGURE 5.2-4: MAYFLOWER WIND GOVERNANCE

SHAREHOLDER REPRESENTATIVES

Additional to the experience of the Managing Committee and the Executive Committee, each Shareholder has appointed a dedicated Shareholder Representative. This non-executive role maximizes the Executive Committee and project team’s access to the wider Sponsors network of subject matter experts and supply chain. By acting as a focal point of contact to the sponsors the Executive Committee can efficiently tap into the capabilities of the Sponsors and remain fully focused on the timely delivery of the project. Access to these experts shall benefit Mayflower Wind in specialist disciplines, such as wind resource assessments, tax equity guidance, grid connectivity, engineering, financing, geophysical and geotechnical campaigns, and opportunities to gain synergies and lessons learned thank to the global portfolio of projects owned by the Sponsors.

A detailed biography of Mayflower Wind’s managers, members of the Executive Committee, and key personnel of the project team is provided in **Section 12**.

EQUITY AND DEBT PARTICIPANTS

Through development until Final Investment Decision “FID”, Mayflower Wind will develop and fund the project by means of equity investment of its Parent Companies. Construction financing will be structured as described in **Section 5.3** below.

Mayflower Wind intends to qualify for the Investment Tax Credit (“ITC”) as further described in **Section 5.10**, bringing in tax equity investors near the start of construction, with the final closings typically held at or around the commercial operation date of the Project.

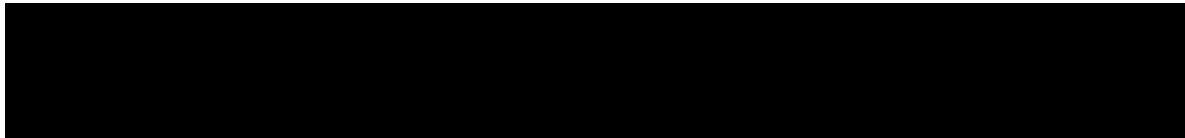
## RIGHT TO SUBMIT A BINDING PROPOSAL

As a proposed counterparty to long-term contracts for the sale of energy and RECs to be entered into with the Distribution Companies in the State of Massachusetts, Mayflower Wind’s Shareholders have authorized this binding proposal. The certification and authorization form has been signed by an officer of Mayflower Wind and is provided in **Appendix C**.

## 5.3 FINANCING PLAN

- 5.3 Please provide a description of the financing plan for the project, including construction and term financing. The financing plan should address the following:
- i. Who will finance the project (or are being considered to finance the project) and the related financing mechanism or mechanisms that will be used (i.e. convertible debenture, equity or other) including repayment schedules and conversion features
  - ii. The project’s existing initial financial structure and projected financial structure
  - iii. Expected sources of debt and equity financing
  - iv. Estimated construction costs
  - v. The projected capital structure
  - vi. Describe any agreements, both pre and post commercial operation date, entered into with respect to equity ownership in the proposed project and any other financing arrangement.

Mayflower Wind will finance the development of the Project



Mayflower Wind has forecasted the total construction cost to be [REDACTED], inclusive of development, engineering, construction, grid network upgrade costs and financing. The combined experience in U.S. development and offshore construction experience from the Sponsors and their respective company groups enables a competitive and reliable cost estimation to be produced.

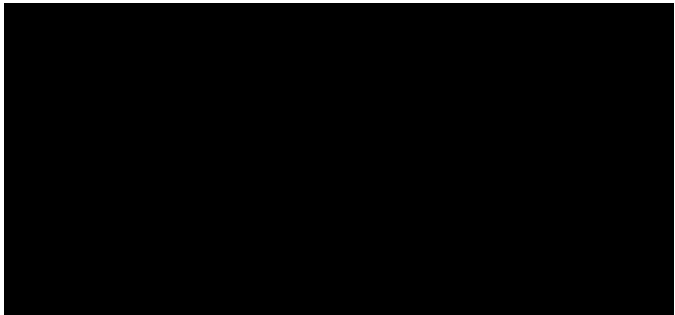
During the term of the PPA, [REDACTED]

Mayflower Wind will finance [REDACTED] of the Project through equity provided by its Parent Companies, which have invested \$150 million thus far in the development phase and are committed to capturing the ITC through additional major investments this year.

Mayflower Wind is in active engagement with multiple commercial and institutional debt investors regarding the long-term funding of the Project. Shortlisting and selection of lenders shall take place ahead of financial close.

Mayflower Wind and its Shareholders would also consider selling a cash equity stake (Class A shares) indirectly owned by Mayflower Wind to another equity investor at or after commercial operation date.

EDP Renewables has significant experience with tax equity investors and pursues tax equity partners to monetize tax benefits in order to finance [REDACTED] of the project costs. EDPR pursues tax equity partners once construction has commenced on the project and has successfully raised approximately [REDACTED] in tax equity since 2007. EDPR NA solicits bids for tax equity investments through a competitive RFP process, and responses are generally received from large financial institutions. Mayflower Wind’s Sponsors have partnered with tax equity providers on prior projects, including:



Mayflower Wind has not entered into any equity ownership agreements for the proposed Project. Nonetheless, in the event the Project qualifies for the ITC, Mayflower Wind will pursue tax equity partners to monetize these tax benefits, as discussed in **Section 5.10**.

In addition, the financing plan should address the status of the above activities as well as the financing of development and permitting costs. All bidders are required to provide this information.

As stated in **Section 5.2**, Mayflower Wind will develop and fund the Project through capital contributions by the Shareholders, such capital contributions to include all development and permitting costs. As described in the sections above, the financing mechanism will transition between the different phases of the project as shown in **Table 5.3-1** below.



Stage of Project	Financing Method	Status
Development and Permitting		
Construction		
Operation		
Decommissioning		

**TABLE 5.3-1: FINANCING METHOD AND STATUS**

## 5.4 FINANCING EXPERIENCE

5.4 Provide documentation illustrating the experience of the bidder in securing financing for projects of similar size and technology. For each project previously financed provide the following information:

- i. Project name and location
- ii. Project type and size
- iii. Date of construction and permanent financing
- iv. Form of debt and equity financing
- v. Current status of the project

Mayflower Wind's Sponsors have extensive experience financing offshore wind projects, with 5 projects financed with a total capacity of 1,810 MW. Furthermore, they have financed 61 onshore renewable energy projects in the U.S., as further described in **Section 12.4**, while Shell has financed 17 offshore oil and gas projects that are currently in operation or under construction.

Sponsor projects constructed and similar to this Project are provided in **Table 5.4.1** below.

Project Name and Location	Project Type and Size	Date of Construction and Permanent Financing	Form of Debt and Equity Financing	Current Status of The Project
Moray East, UK	Offshore Wind 950 MW			Under construction
WindFloat 1, Portugal	Floating Offshore Wind 2 MW			Decommissioned
WindFloat Atlantic, Portugal	Floating Offshore Wind 25 MW			Under Construction
Borssele 3 & 4, Netherlands	Offshore Wind 730 MW			Under construction
NoordZee Wind, Netherlands	Offshore Wind 108 MW			Operational
Shell & EDP Renewables (Onshore US)	61 Onshore Wind Projects Over 7,600 MW			Various

**TABLE 5.4.1: EXPERIENCE IN FINANCING PROJECTS**

From the projects above, Moray East and Borssele 3 & 4 stand out because of their similar project size and technology to the Mayflower Wind Project. Both projects were financed [REDACTED] and are a clear example of the financing experience and capabilities of this joint venture. An overview of these projects is provided below.

### **Project Example - Moray East**

Moray East Offshore Wind Farm, which achieved financial close and was awarded the EMEA Wind Deal of the Year 2018, is a 950 MW Project located in the Moray Firth off the coast of Scotland. In 2017 the project was awarded a record low Contract for Difference of £57.50/MWh (~\$77.29/MWh)<sup>6</sup>. Construction began in 2019, and commercial operation is scheduled for 2021. The project consists of 100 MHI Vestas V164-9.5 MW wind turbines, and three offshore substations and export cables. Additional Information can be found at <http://www.morayoffshore.com/moray-east/the-project/>.

### **Project Example - Borssele 3 & 4**

Borssele 3 & 4 are two wind farms that total 730 MW, representing 30% of the offshore wind capacity in the Netherlands. Financial close occurred in 2018, after being awarded one of the lowest guaranteed strike prices, at €54.49/MWh (~\$56.97/MWh)<sup>4</sup> in 2017. Construction began in 2019, and operations are scheduled for 2021. The project finance effort was led by Shell, delivering the lowest funding costs in offshore wind to date. The project consists of 77 MHI Vestas V164-9.5MW wind turbines.

## **5.5 FINANCIAL RESOURCES AND FINANCIAL STRENGTH**

5.5 Please provide evidence that the bidder has the financial resources and financial strength to complete and operate the project as planned.

Mayflower Wind's Parent Companies are leaders in the energy industry and have the resources and financial strength to deliver and operate this Project as planned. The financial strength of the Parent Companies is evidenced by their financial reports and credit ratings from major ratings agencies, provided in **Attachment 5.5-1**.

### **ROYAL DUTCH SHELL PLC**

Royal Dutch Shell is a major world oil and gas leader with ten decades of experience in developing, constructing, and operating large-scale offshore energy projects all over the world. As of fiscal year 2018, Royal Dutch Shell had over \$399.1 billion in total assets, \$198.6 billion of shareholder equity and \$26.7 billion in cash and equivalents. The company's net income was \$23.9 billion, and its capital expenditures were over \$23 billion.

The main financials of Royal Dutch Shell are included in **Table 5.5-2** below.

<sup>6</sup> Conversion to USD done at the exchange rate on the date of PPA award.

USD Million	2018	2017	2016
Total Assets	399,194	407,097	411,275
Total Net Assets	202,534	197,812	188,511
Revenues	396,556	311,870	240,033
Net Profit	23,906	13,435	4,777

TABLE 5.5.1: KEY ROYAL DUTCH SHELL FINANCIALS IN MILLIONS

#### EDP-ENERGIAS DE PORTUGAL, S.A.

EDP is a multinational, vertically integrated utility company. Throughout its 42 years of history, EDP has been building a relevant presence in the global energy scene, being present in 16 countries in 4 continents. As of fiscal year 2018, EDP had over €41.6 billion in total assets, €8.9 billion of shareholder equity and €1.8 billion in cash and equivalents. The company's net income was €876 million, and its capital expenditures were over €1.7 billion.

The main financials of EDP are included in **Table 5.5-1** below.

EUR Million	2018	2017	2016
Total Assets	41,626	42,075	44,083
Total Net Assets	12,900	13,480	13,736
Revenues	16,297	17,223	15,921
Net Profit	876	1,441	1,200

TABLE 5.5.2: KEY EDP FINANCIALS IN MILLIONS

## 5.6 FINANCIAL STATEMENTS AND ANNUAL REPORTS

- 5.6 Provide complete copies of the most recent audited financial statement and annual report for each bidder for each of the past three years; including affiliates of the bidder (if audited statements are not available, reviewed or compiled statements are to be provided). Also, provide the credit ratings from Standard & Poor's and Moody's (the senior unsecured long term debt rating or if not available, the corporate rating) of the bidder and any affiliates and partners.

Mayflower Wind was formed on June 7, 2018 and has not yet been required to file financial statements. Mayflower Wind is a privately held company that therefore does not have a credit rating.

Financial statements and annual reports of Mayflower Wind's Parent Companies for the past three (3) years can be found in **Attachment 5.5**.

EDP is a rated entity with current long-term credit ratings of BBB- from Standard & Poor's and Baa3 from Moody's.

Royal Dutch Shell is a rated entity with current long-term credit ratings of A-1+ from Standard & Poor's and Aa2 from Moody's.

## 5.7 BOARD OF DIRECTORS, OFFICERS AND TRUSTEES

5.7 Please also include a list of the board of directors, officers and trustees for the past three years and any persons who the bidder knows will become officers, board members or trustees.

Mayflower Wind was formed on June 7, 2018. At that time, as its sole member and manager, Shell New Energies appointed the following officers: [REDACTED]

In November 2018, upon the purchase of 50% membership interests in Mayflower Wind by EDPR Offshore NA, the initial shareholder agreement of Mayflower was amended. In such amendment the Managing Committee was agreed to be comprised of four managers: [REDACTED]

In April 2019, the Managing Committee appointed as members of the Executive Committee:

- President: John Hartnett
- CFO: Michael Brown
- Technical Director: Michiel Bekker
- Development Director: Seth Kaplan

In August 2019, the Shareholder Agreement was amended a second time and the members of the Managing Committee changed as shown in **Figure 5.2-4** and as of today the Managing Committee is comprised of the following six managers: [REDACTED]

## 5.8 SECURITY

5.8 The bidder should demonstrate its ability (and/or the ability of its credit support provider) to provide the required security, including its plan for doing so.

Mayflower Wind will provide required security by Letter of Credit from a bank, aligned with the requirements of the Distribution Companies. Shell and EDP Renewables have extensive arrangements with several large commercial banks to provide credit support for their obligations, including credit support provided under their numerous power purchase agreements.

## 5.9 CREDIT HISTORY

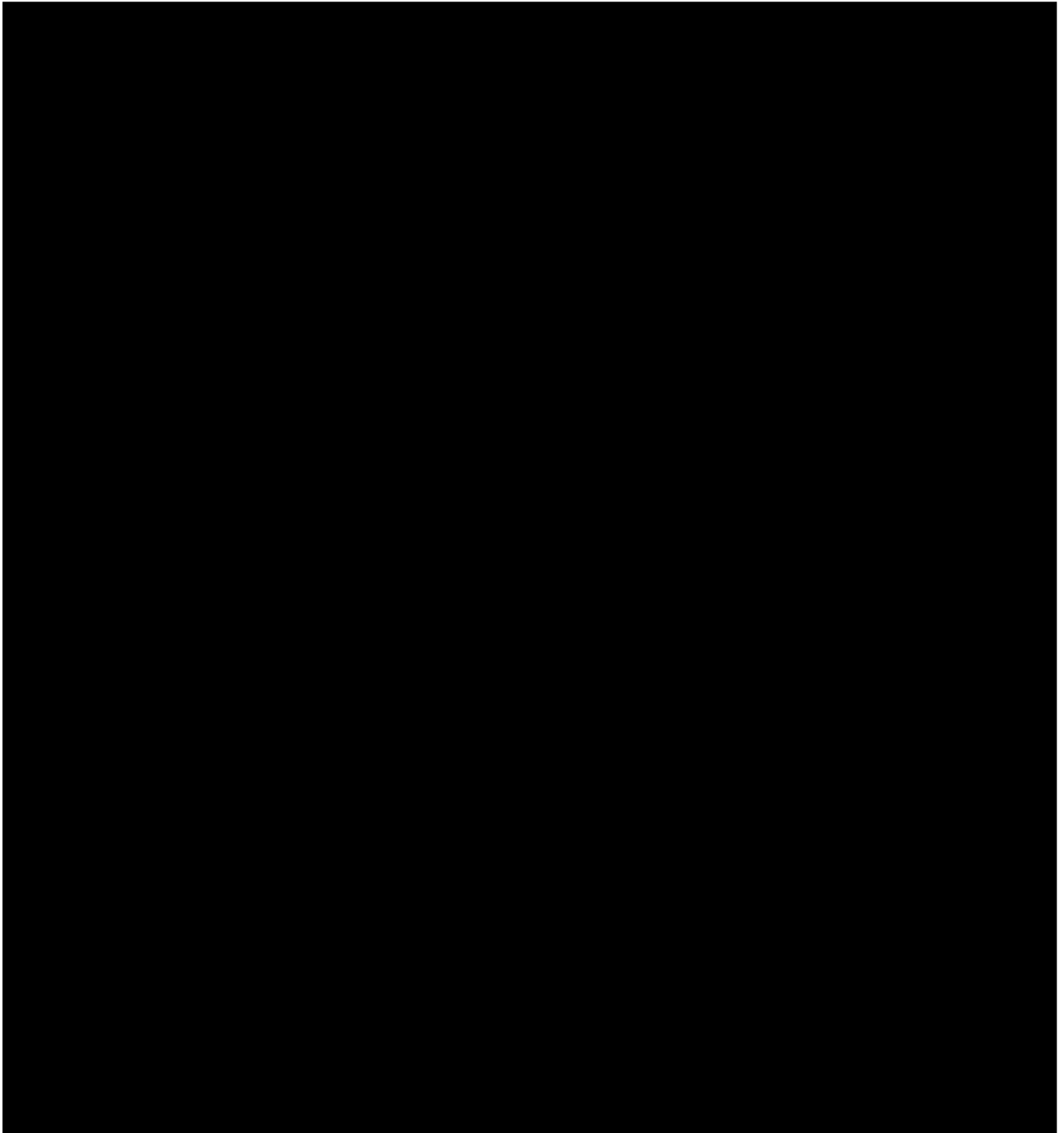
5.9 Provide a description of any current or recent credit issues/ credit rating downgrade events regarding the bidder or affiliate entities raised by rating agencies, banks, or accounting firms.

Neither Mayflower Wind, nor any Parent Company, nor any subsidiary of the Parent Companies have currently or recently been subject to a credit issue/credit downgrade event nor any issues raised by rating agencies, banks, or accounting firms.

## 5.10 ROLE OF PTC OR ITC

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5.10 Describe the role of the Federal Production Tax Credit or Investment Tax Credit (or other incentives) on the financing of the project.



5.11 PENDING OR PAST LITIGATION OR DISPUTES

5.11 Bidders must disclose any litigation or disputes in the last three year period related to projects developed, owned or managed by Bidder or any of its affiliates in the United States, or related to any energy product sale agreement.

Mayflower Wind is not involved in any ongoing litigation. EDPR NA and its subsidiaries may be involved in various legal proceedings, claims, investigations, and other legal matters which arise from time to time, as well as proceedings or matters arising in the ordinary course of business. Shell and its subsidiaries are involved in certain litigation or disputes related to projects developed, owned or managed by Shell or any of its affiliates in the U.S., or related to certain energy product sale agreement (the “Shell Disputes”). Please refer to **Attachment 5.11** for a list of all Shell Disputes.

5.12 OPERATING LIFE EXPECTATIONS

5.12 What is the expected operating life of the proposed project? What is the depreciation period for all substantial physical aspects of the bid, including generation facilities, delivery facilities to move power to the grid, and mandatory and voluntary transmission system upgrades?

The expected operation life of the Project is [REDACTED] with all major components of the facility having a useful life far beyond the 20-year PPA term.

Project Assets	Depreciation Period
Generation facilities: Wind turbines, foundations, Inter-array cables, offshore substation	[REDACTED]
Transmission lead lines from The Project site to grid: Export cables (offshore and onshore), [REDACTED]	
Transmission upgrades: mandatory and voluntary	

TABLE 5.12-1: DEPRECIATION PERIODS FOR SUBSTANTIAL PHYSICAL ASPECTS OF THE BID

## 5.13 FINANCING STATUS

- 5.13 Has the bidder already obtained financing, or a commitment of financing, for the project? If financing has not been obtained, explain how obtaining a long-term agreement as proposed will help you in obtaining financing for the proposed project, in obtaining more favorable terms for the financing of the proposed project, or in supporting the future capital investment.

[REDACTED] The continued development activities, including permitting, FEED studies, surveys, and real property rights will not be contingent upon a PPA award. Mayflower Wind is committed to developing the project in a timely manner.

As such, Mayflower Wind is confident in its ability to execute on the financing plan outlined in **Section 5.3** upon award of this long-term agreement.

## 5.14 EXISTING AGREEMENTS

- 5.14 State whether the bidder or its affiliates have executed agreements with respect to energy, RECs and/or capacity for the proposed project (including any agreements that have been terminated) and provide information regarding the associated term and quantities, and whether bidder has been alleged to have defaulted under or breached any such agreement. State whether the bidder or its affiliates have submitted proposals to other buyers, the status of consideration of such proposals, and the impact of such proposal(s), if they result in an executed contract or contracts, on the proposal(s) submitted in response to this RFP.

Mayflower Wind has not executed agreements with respect to energy, RECs and/or capacity for the proposed project. Mayflower Wind has not been alleged to have defaulted under or breached any agreements for energy, RECs and/or capacity for this project. Mayflower Wind has also not submitted proposals to any other offshore wind solicitations.

## 5.15 AFFILIATED ENTITIES

- 5.15 List all of the Bidder's affiliated entities and joint ventures transacting business in the energy sector.

Please refer to **Attachment 5.15-1** for a list of all operating project companies (and project companies with projects currently under construction) owned or controlled in whole or in part by EDPR NA. All of these entities conduct business in the energy sector to sell the project electrical output and attributes.

Please refer to **Attachment 5.15-2** for an audited list of Shell’s significant subsidiaries and other related undertakings.

## 5.16 BANKRUPTCY

- 5.16 Has Bidder, or any affiliate of Bidder, in the last five years, (a) consented to the appointment of, or been taken in possession by, a receiver, trustee, custodian or liquidator of a substantial part of its assets, (b) filed a bankruptcy petition in any bankruptcy court proceeding, (c) answered, consented or sought relief under any bankruptcy or similar law or failed to obtain a dismissal of an involuntary petition, (d) admitted in writing of its inability to pay its debts when due, (e) made a general assignment for the benefit of creditors, (f) been the subject of an involuntary proceeding seeking to adjudicate that Party bankrupt or insolvent, (g) sought reorganization, arrangement, adjustment, or composition of it or its debt under any law relating to bankruptcy, insolvency or reorganization or relief of debtors?

Neither Mayflower Wind nor any Sponsor of Mayflower Wind, has undertaken any of the above.

## 5.17 CONFLICT OF INTEREST

- 5.17 Briefly describe any known conflicts of interest between Bidder or an affiliate of Bidder and any Distribution Company, or any affiliates of the foregoing.

To the knowledge of Mayflower Wind, there are no conflicts of interest between Mayflower Wind or Mayflower Wind’s Sponsors and any Distribution Company, or any affiliates of any Distribution Company.

Certain current employees have had relationships with National Grid prior to joining EDPR NA. To the knowledge of EDPR NA, these relationships include:

Name	Role at EDPR NA	National Grid Relationship Role	Area of National Grid	Years
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TABLE 5.17-1: PRIOR RELATIONSHIPS TO NATIONAL GRID

With respect to EDPR NA and Eversource Energy, all known relationships are:

the 1990s, the number of people in the United States who are 65 years of age or older has increased by 50 percent, and the number of people 75 years of age or older has increased by 100 percent. The number of people 85 years of age or older has increased by 200 percent. The number of people 95 years of age or older has increased by 400 percent. The number of people 100 years of age or older has increased by 1,000 percent. The number of people 105 years of age or older has increased by 2,000 percent. The number of people 110 years of age or older has increased by 4,000 percent. The number of people 115 years of age or older has increased by 8,000 percent. The number of people 120 years of age or older has increased by 16,000 percent. The number of people 125 years of age or older has increased by 32,000 percent. The number of people 130 years of age or older has increased by 64,000 percent. The number of people 135 years of age or older has increased by 128,000 percent. The number of people 140 years of age or older has increased by 256,000 percent. The number of people 145 years of age or older has increased by 512,000 percent. The number of people 150 years of age or older has increased by 1,024,000 percent. The number of people 155 years of age or older has increased by 2,048,000 percent. The number of people 160 years of age or older has increased by 4,096,000 percent. The number of people 165 years of age or older has increased by 8,192,000 percent. The number of people 170 years of age or older has increased by 16,384,000 percent. The number of people 175 years of age or older has increased by 32,768,000 percent. The number of people 180 years of age or older has increased by 65,536,000 percent. The number of people 185 years of age or older has increased by 131,072,000 percent. The number of people 190 years of age or older has increased by 262,144,000 percent. The number of people 195 years of age or older has increased by 524,288,000 percent. The number of people 200 years of age or older has increased by 1,048,576,000 percent. The number of people 205 years of age or older has increased by 2,097,152,000 percent. The number of people 210 years of age or older has increased by 4,194,304,000 percent. The number of people 215 years of age or older has increased by 8,388,608,000 percent. The number of people 220 years of age or older has increased by 16,777,216,000 percent. The number of people 225 years of age or older has increased by 33,554,432,000 percent. The number of people 230 years of age or older has increased by 67,108,864,000 percent. The number of people 235 years of age or older has increased by 134,217,728,000 percent. The number of people 240 years of age or older has increased by 268,435,456,000 percent. The number of people 245 years of age or older has increased by 536,870,912,000 percent. The number of people 250 years of age or older has increased by 1,073,741,824,000 percent. The number of people 255 years of age or older has increased by 2,147,483,648,000 percent. The number of people 260 years of age or older has increased by 4,294,967,296,000 percent. The number of people 265 years of age or older has increased by 8,589,934,592,000 percent. The number of people 270 years of age or older has increased by 17,179,869,184,000 percent. The number of people 275 years of age or older has increased by 34,359,738,368,000 percent. The number of people 280 years of age or older has increased by 68,719,476,736,000 percent. The number of people 285 years of age or older has increased by 137,438,953,472,000 percent. The number of people 290 years of age or older has increased by 274,877,906,944,000 percent. The number of people 295 years of age or older has increased by 549,755,813,888,000 percent. The number of people 300 years of age or older has increased by 1,099,511,627,776,000 percent. The number of people 305 years of age or older has increased by 2,199,023,255,552,000 percent. The number of people 310 years of age or older has increased by 4,398,046,511,104,000 percent. The number of people 315 years of age or older has increased by 8,796,093,022,208,000 percent. The number of people 320 years of age or older has increased by 17,592,186,044,416,000 percent. The number of people 325 years of age or older has increased by 35,184,372,088,832,000 percent. The number of people 330 years of age or older has increased by 70,368,744,177,664,000 percent. The number of people 335 years of age or older has increased by 140,737,488,355,328,000 percent. The number of people 340 years of age or older has increased by 281,474,976,710,656,000 percent. The number of people 345 years of age or older has increased by 562,949,953,421,312,000 percent. The number of people 350 years of age or older has increased by 1,125,899,906,842,624,000 percent. The number of people 355 years of age or older has increased by 2,251,799,813,685,248,000 percent. The number of people 360 years of age or older has increased by 4,503,599,627,370,496,000 percent. The number of people 365 years of age or older has increased by 9,007,199,254,740,992,000 percent. The number of people 370 years of age or older has increased by 18,014,398,509,481,984,000 percent. The number of people 375 years of age or older has increased by 36,028,797,018,963,968,000 percent. The number of people 380 years of age or older has increased by 72,057,594,037,927,936,000 percent. The number of people 385 years of age or older has increased by 144,115,188,075,855,872,000 percent. The number of people 390 years of age or older has increased by 288,230,376,151,711,744,000 percent. The number of people 395 years of age or older has increased by 576,460,752,303,423,488,000 percent. The number of people 400 years of age or older has increased by 1,152,921,504,606,846,976,000 percent. The number of people 405 years of age or older has increased by 2,305,843,009,213,693,952,000 percent. The number of people 410 years of age or older has increased by 4,611,686,018,427,387,904,000 percent. The number of people 415 years of age or older has increased by 9,223,372,036,854,775,808,000 percent. The number of people 420 years of age or older has increased by 18,446,744,073,709,551,616,000 percent. The number of people 425 years of age or older has increased by 36,893,488,147,419,103,232,000 percent. The number of people 430 years of age or older has increased by 73,786,976,294,838,206,464,000 percent. The number of people 435 years of age or older has increased by 147,573,952,589,676,412,928,000 percent. The number of people 440 years of age or older has increased by 295,147,905,179,352,825,856,000 percent. The number of people 445 years of age or older has increased by 590,295,810,358,705,651,712,000 percent. The number of people 450 years of age or older has increased by 1,180,591,620,717,411,303,424,000 percent. The number of people 455 years of age or older has increased by 2,361,183,241,434,822,606,848,000 percent. The number of people 460 years of age or older has increased by 4,722,366,482,869,645,213,696,000 percent. The number of people 465 years of age or older has increased by 9,444,732,965,739,290,427,392,000 percent. The number of people 470 years of age or older has increased by 18,889,465,931,478,580,854,784,000 percent. The number of people 475 years of age or older has increased by 37,778,931,862,957,161,709,568,000 percent. The number of people 480 years of age or older has increased by 75,557,863,725,914,323,419,136,000 percent. The number of people 485 years of age or older has increased by 151,115,727,451,828,646,838,272,000 percent. The number of people 490 years of age or older has increased by 302,231,454,903,657,293,676,544,000 percent. The number of people 495 years of age or older has increased by 604,462,909,807,314,587,353,088,000 percent. The number of people 500 years of age or older has increased by 1,208,925,819,614,629,174,706,176,000 percent. The number of people 505 years of age or older has increased by 2,417,851,639,229,258,349,412,352,000 percent. The number of people 510 years of age or older has increased by 4,835,703,278,458,516,698,824,704,000 percent. The number of people 515 years of age or older has increased by 9,671,406,556,917,033,397,649,408,000 percent. The number of people 520 years of age or older has increased by 19,342,813,113,834,066,795,298,816,000 percent. The number of people 525 years of age or older has increased by 38,685,626,227,668,133,590,597,632,000 percent. The number of people 530 years of age or older has increased by 77,371,252,455,336,267,181,195,264,000 percent. The number of people 535 years of age or older has increased by 154,742,504,910,672,534,362,390,528,000 percent. The number of people 540 years of age or older has increased by 309,485,009,821,345,068,724,781,056,000 percent. The number of people 545 years of age or older has increased by 618,970,019,642,690,137,449,562,112,000 percent. The number of people 550 years of age or older has increased by 1,237,940,039,285,380,274,899,124,224,000 percent. The number of people 555 years of age or older has increased by 2,475,880,078,570,760,549,798,248,448,000 percent. The number of people 560 years of age or older has increased by 4,951,760,157,141,521,099,596,496,896,000 percent. The number of people 565 years of age or older has increased by 9,903,520,314,283,042,199,193,993,792,000 percent. The number of people 570 years of age or older has increased by 19,807,040,628,566,084,398,387,

\_\_\_\_\_

## 5.18 LITIGATION, DISPUTES AND CLAIMS AGAINST THE DISTRIBUTION COMPANIES

5.18 Describe any litigation, disputes, claims or complaints involving the Bidder or an affiliate of Bidder, against any Distribution Company or any affiliate of any Distribution Company.

To the knowledge of Mayflower Wind, there are no litigation proceedings, disputes, claims, or complaints involving Mayflower Wind or an affiliate of Mayflower Wind, against any Distribution Company or any affiliate of any Distribution Company.

## 5.19 LITIGATION, DISPUTES AND CLAIMS FOR PURCHASE OR SALE OF ENERGY

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- 5.19 Describe any litigation, disputes, claims or complaints, or events of default or other failure to satisfy contract obligations, or failure to deliver products, involving Bidder or an affiliate of Bidder, and relating to the purchase or sale of energy, capacity or renewable energy certificates or products.

To the knowledge of Mayflower Wind, there are no material litigations, disputes, claims or complaints, or events of default or other material failure to satisfy contract obligations, or failure to deliver products involving Mayflower Wind or any other subsidiary of EDPR NA in each case relating to the purchase or sale of energy, capacity, or renewable energy certificates or products. With respect to Shell, all known litigation, disputes, claims or complaints, or events of default or other failure to satisfy contract obligations, or failure to deliver products pursuant to the purchase or sale of energy, capacity or renewable energy certificates or products are:

[REDACTED]

[REDACTED]

[REDACTED]

## 5.20 INVESTIGATION BY GOVERNMENT AGENCY

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- 5.20 Confirm that neither Bidder nor any directors, employees or agents of Bidder, nor any affiliate of Bidder are currently under investigation by any governmental agency, and that none of the above have in the last four years been convicted or found liable for any act prohibited by State or Federal law in any jurisdiction involving conspiracy, collusion or other impropriety with respect to bidding on any contract, or have been the subject of any debarment action (detail any exceptions).

Mayflower Wind confirms that directors, employees, and agents of Mayflower Wind, and any other subsidiary of each Sponsor Parent Company, are not currently and have not been under investigation by any governmental agency in the U.S. for any act prohibited by state or federal law in any U.S. jurisdiction involving conspiracy, collusion, or other impropriety with respect to bidding on any contract or have been the subject of any debarment action in the U.S.

## 5.21 REGULATORY APPROVALS REQUIRED

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5.21 Identify all regulatory and other approvals needed by Bidder to execute a binding sale agreement.

[REDACTED]

[REDACTED]

## 5.22 FERC COMPLIANCE

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5.22 Describe how the project will conform to FERC's applicable regulatory requirements, including, but not limited to, FERC requirements relating to allocation of transmission capacity and open access, the justness and reasonableness of rates, the potential for undue preference or discrimination, and affiliate dealings, if any. Describe how your proposed approach is consistent with FERC precedent and ratemaking principles.

Mayflower Wind will obtain all necessary authorizations from FERC to supply power at wholesale for this proposal.

[REDACTED]

[REDACTED]

Mayflower Wind will build necessary interconnection facilities as needed for the project and as required by ISO-NE or affected systems. Mayflower Wind would expect that those facilities would be governed by the ISO-NE tariff and FERC regulation insofar as future use and open access.

## 5.23 DIRECT AND INDIRECT AFFILIATIONS

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5.23 Describe and document any and all direct and indirect affiliations and affiliate relationships, contractual, financial or otherwise in the past three years between the bidder and one or more of the Distribution Companies and their affiliates, including all relationships in which one of the Distribution Companies or their affiliates has a financial or voting interest (direct or indirect) in the bidder or the bidder's proposed project. These relationships include:

- Corporate or other joint arrangements, joint ventures, joint operations whether control exists or not;
- Minority Ownership (50% or less investee):
- Joint development Agreements
- Project agreements;
- Operating segments that are consolidated as part of the financial reporting process;
- Related parties with common ownership;
- Credit, debenture, and financing arrangements, whether a convertible equity feature is present or not;
- Wholly owned subsidiaries; and
- Commercial (including real property) relationships with any Distribution Company

To Mayflower Wind's knowledge, Mayflower Wind does not have any direct or indirect affiliations or affiliate relationships, financial or otherwise in the past three years with Distribution Companies and their affiliates.

## SECTION 6 OF APPENDIX A TO THE RFP SITING, INTERCONNECTION, AND DELIVERABILITY

This section of the proposal addresses project location, siting, real property rights and interconnection issues. Bidders should ensure that the threshold criteria outlined in Section 2.2 of the RFP are verified in their responses.

The Mayflower Wind Project is located offshore from the southern coast of Massachusetts, approximately 26 nautical miles (48 km) south of the island of Martha's Vineyard and 20 nautical miles (37 km) south of Nantucket, within federal lease OSC-A 0521. Mayflower Wind has secured or is on schedule to secure, the onshore and offshore property rights and interconnections required to develop and operate the Project for the term of the PPA.

Mayflower Wind's team includes siting and permitting subject matter experts who have deep experience permitting both onshore and offshore infrastructure, including decades of successful Federal permitting of offshore projects in U.S. Federal Waters and comparable onshore permitting in New England and throughout the U.S. Our team members have also assessed and managed multiple ISO-NE interconnection requests through to construction and operation.

Mayflower Wind has submitted [REDACTED] which are currently undergoing feasibility studies at ISO-NE, and analyses equivalent to a System Impact Study have been completed by Mayflower Wind consultants.

Mayflower Wind has focused on minimizing environmental impacts by identifying previously disturbed areas, existing cleared land and/or utility right-of-way corridors, and on maximizing benefits to Massachusetts ratepayers. [REDACTED]

Mayflower Wind is actively engaged in right-of-way discussions and negotiations with federal agencies, the Commonwealth of Massachusetts, utilities, and key landowners.

In addition, the Mayflower Wind team has engaged with state environmental officials [REDACTED] [REDACTED] By collaborating with these efforts, Mayflower Wind can minimize overall environmental impacts and reduce costs for Massachusetts ratepayers and electric distribution companies.

### 6.1 MAYFLOWER WIND PROJECT SITE PLAN

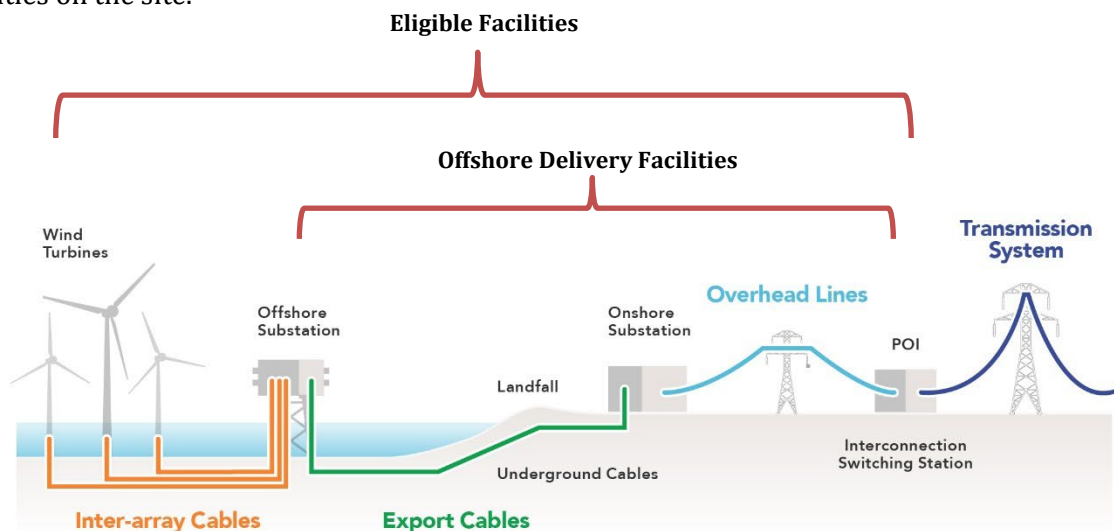
6.1 Provide a site plan (or plans) including a map (or maps) that clearly identifies the location of the proposed project site, Offshore Delivery Facilities project locations, the assumed right-of-way width, the total acreage for Eligible Facilities, the anticipated interconnection point (or, if applicable, multiple points for Offshore Delivery Facilities), deployment facilities, and the relationship of the site to other local infrastructure, including transmission facilities, roadways, federal and state waters, and waterways. In addition to providing the required map(s), provide a site layout plan which illustrates the location of all major equipment and facilities on the site.

Site plan included?    Yes    No    If not, please explain:

Site plan included? ☒ Yes ☐ No

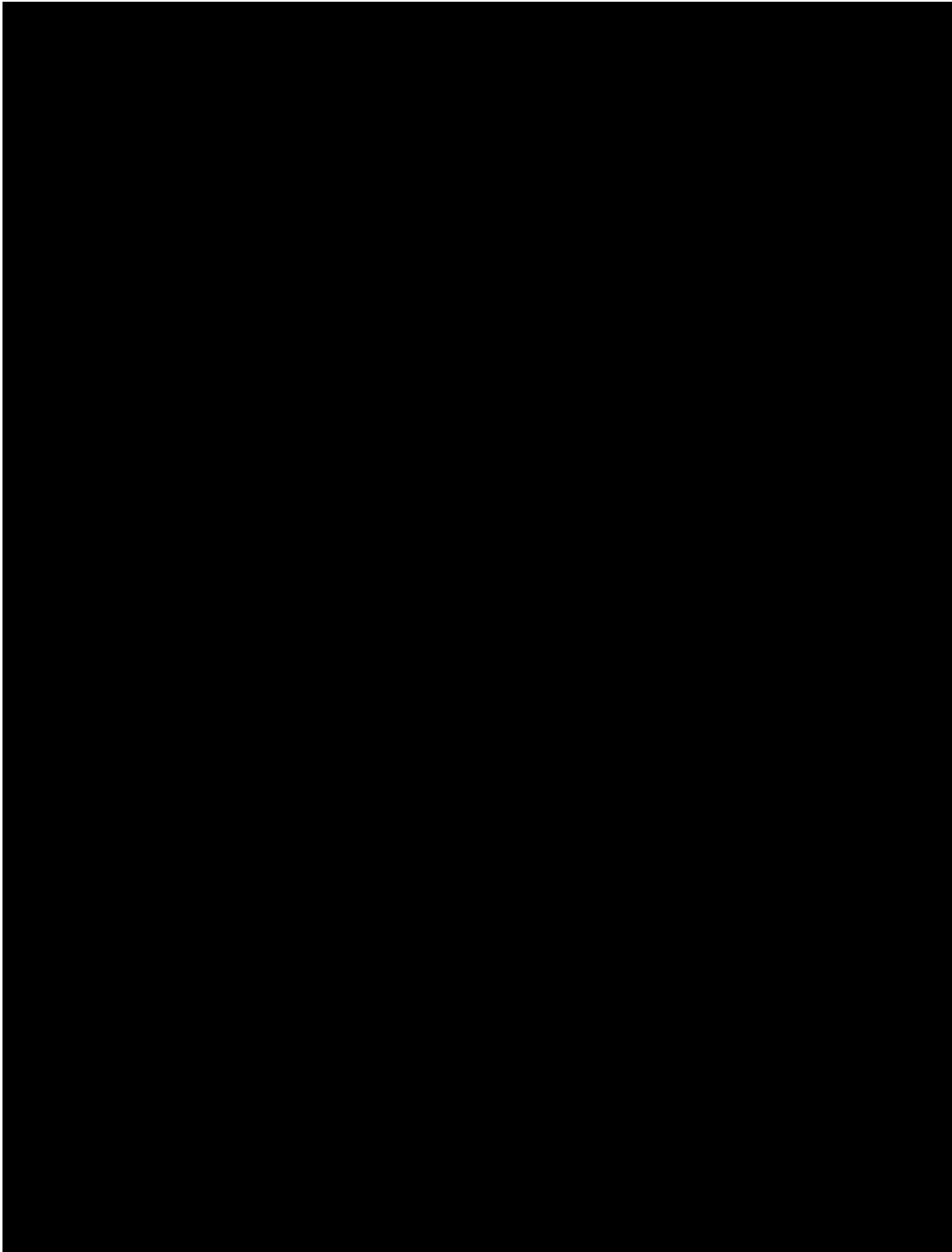
As stated before, the energy delivered for this proposal will be a portion of the 804 MW project. For this reason, all the information presented in this section refers to the 804 MW project.

**Attachment 6.1-1** provides site plans including maps that clearly identify the location of the proposed project site, Offshore Delivery Facilities project locations, the assumed right-of-way width, the total acreage for Eligible Facilities, the interconnection point, deployment facilities, and the relationship of the site to other local infrastructure, including transmission facilities, roadways, federal and state waters, and waterways. In addition, **Attachment 6.1-1** provides a site layout plan which illustrates the location of all major equipment and facilities on the site.

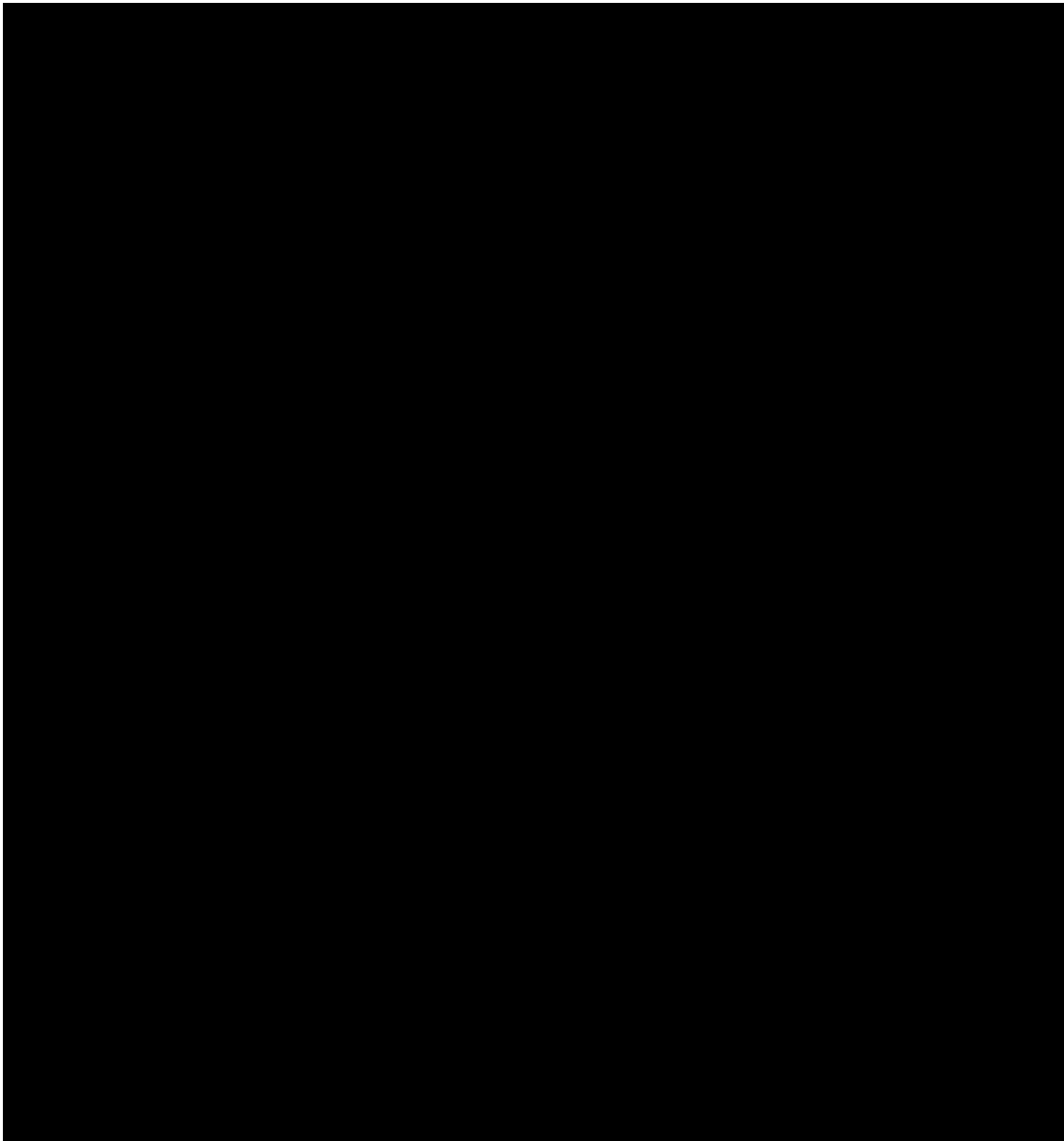


**FIGURE 6.1-1: PROPOSED ELIGIBLE FACILITIES AND OFFSHORE DELIVERY FACILITIES**

**Location of the Proposed Project Site:** Overview maps, indicative of the layouts, pending final design and permitting are further detailed in **Attachment 6.1-1**, and provided below as **Figure 6.1-2**. These maps include two variants of onshore transmission routes.



**FIGURE 6.1-2:** OVERALL SITE PLAN FOR 804 MW PROJECT, SEE ATTACHMENT 6.1-1 FOR FURTHER DETAILS



**FIGURE 6.1-3: OVERALL SITE PLAN FOR UPLAND PORTION OF ONSHORE DELIVERY FACILITIES**





**Total acreage for Eligible Facilities:** The Phase I development area (WTG layout) is approximately [REDACTED] in size. [REDACTED]

#### Attachment 6.1-1.

**Interconnection point:** The Point of Interconnection (POI) will be a [REDACTED]

**Deployment Facilities:** Mayflower Wind has reviewed 27 potential locations for marine terminals and waterfront facilities to stage, assemble, and deploy the Project for each stage of construction, and we are currently focused on negotiating for site control in three of those 27 locations. While Mayflower Wind is considering utilizing one or more of these properties as marine terminal facilities during the construction of the project, the [REDACTED] is the preferred staging port for construction. Deployment facilities are further described in **Section 10.1**.

## 6.2 REAL PROPERTY RIGHTS

- 6.2 Identify any real property rights (e.g., fee-owned parcels, rights-of-way, development rights or easements or leases) that provide the right to use the Eligible Facility site and Offshore Delivery Facilities locations including for Eligible Facilities and any rights of way needed for interconnection.
- i. Does the project have a right to use the Eligible Facility site and/or Offshore Delivery Facilities locations for the entire proposed term of the PPA or tariff (e.g., by virtue of ownership or land development rights obtained from the owner)?
- ☒ Yes ☐ No ☐ If not, please explain:
- ii. If so, please detail the Bidder's rights to control the Eligible Facility site and/or Offshore Delivery Facilities locations.
- iii. Describe the status of acquisition of real property rights, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project timeline.
- iv. Identify any joint use of existing or proposed real property rights

## RIGHT TO USE THE ELIGIBLE FACILITY SITE AND/OR OFFSHORE DELIVERY FACILITIES

Mayflower Wind has secured its offshore property rights through a competitive Federal lease process and is on schedule to secure the onshore property rights needed to develop and operate the Project for the term of the PPA. The status of acquisition of real property rights and plan for securing all necessary real property rights is detailed below in **Table 6.2-1**. The table details the onshore transmission route, showing variations 1A and 1B, [REDACTED] Mayflower Wind is confident we will be able to secure all necessary real property rights for this routing within the proposed project schedule. [REDACTED]

Property Rights Required		Status	Date
Offshore	Wind turbines, Inter-Array Cables and Offshore Substation Locations	Secured	April 1 <sup>st</sup> , 2019
	Offshore Cable Route – Federal Waters	Secured: Mayflower Wind has the right to project easements, per 30 CFR § 585.200(b)	April 1 <sup>st</sup> , 2019
	Offshore Cable Route – State Waters	In progress: engaging with MassDEP. License is issued by MassDEP after receiving Massachusetts Environmental Policy Act (MEPA) certificate and Energy Facility Siting Board (EFSB)/DPU approvals. [REDACTED]	[REDACTED]
Onshore	Route Option:	[REDACTED]	[REDACTED]
	Local Roads	In progress – engaging with town officials on-going. Street opening permits/grants of location will be applied for in or [REDACTED] after MEPA/EFSB/DPU reviews and approvals	[REDACTED]
	[REDACTED]		
	[REDACTED]		
	[REDACTED]		
	[REDACTED]		
	[REDACTED]		
	[REDACTED]		
	Route Option:	[REDACTED]	[REDACTED]
Local Roads	In progress – engaging with town officials on-going. Street opening permits/grants of location will be applied for in or [REDACTED] after MEPA/EFSB/DPU reviews and approvals	[REDACTED]	
[REDACTED]			
[REDACTED]			

Property Rights Required		Status	Date
Onshore Substations and Port Facilities			
	Facilities for all route options		
	Construction Port Facilities	Mayflower Wind has executed a lease option agreement with [REDACTED] see Section 10.2	
	O&M Port Facilities	[REDACTED]	

TABLE 6.2-1: STATUS OF PROPERTY RIGHTS REQUIRED

## BIDDER'S RIGHTS TO CONTROL THE ELIGIBLE FACILITY SITE AND OFFSHORE DELIVERY FACILITIES LOCATIONS

Mayflower Wind's rights to control the Eligible Facility Site and Offshore Delivery Facilities locations for the Project are described below.

**Wind Turbines, Inter-Array Cable, and Offshore Substation Locations:** The U.S. Department of Interior, Bureau of Ocean Management (BOEM) issued the lease for OCS-A 0521 to Mayflower Wind effective April 1, 2019. The wind turbines, the inter-array cables, and the offshore substation will all be located within the lease area, as allowed by the lease. A copy of the executed lease and a *Letter of Good Standing* from BOEM is provided in **Attachment 6.2-1**.

**Offshore Export Cable Route in Federal Waters:** In accordance with 30 CFR § 585.200(b), Mayflower Wind has the right to one or more project easements for the purpose of installing gathering, transmission, and distribution cables on the outer continental shelf as necessary. Mayflower Wind will apply for the project easement as part of its Construction and Operations Plan (COP). Once approved, BOEM will incorporate the approved project easement as an addendum in Mayflower Wind's lease (OCS-A 0521).

**Construction and O&M Port:** The [REDACTED] is the preferred staging port for construction and O&M. Mayflower Wind has executed a lease option [REDACTED] for staging turbine blades, nacelles, towers, and foundation transition pieces. Deployment facilities are further described in **Section 10.1**.

## STATUS OF ACQUISITION OF REAL PROPERTY RIGHTS

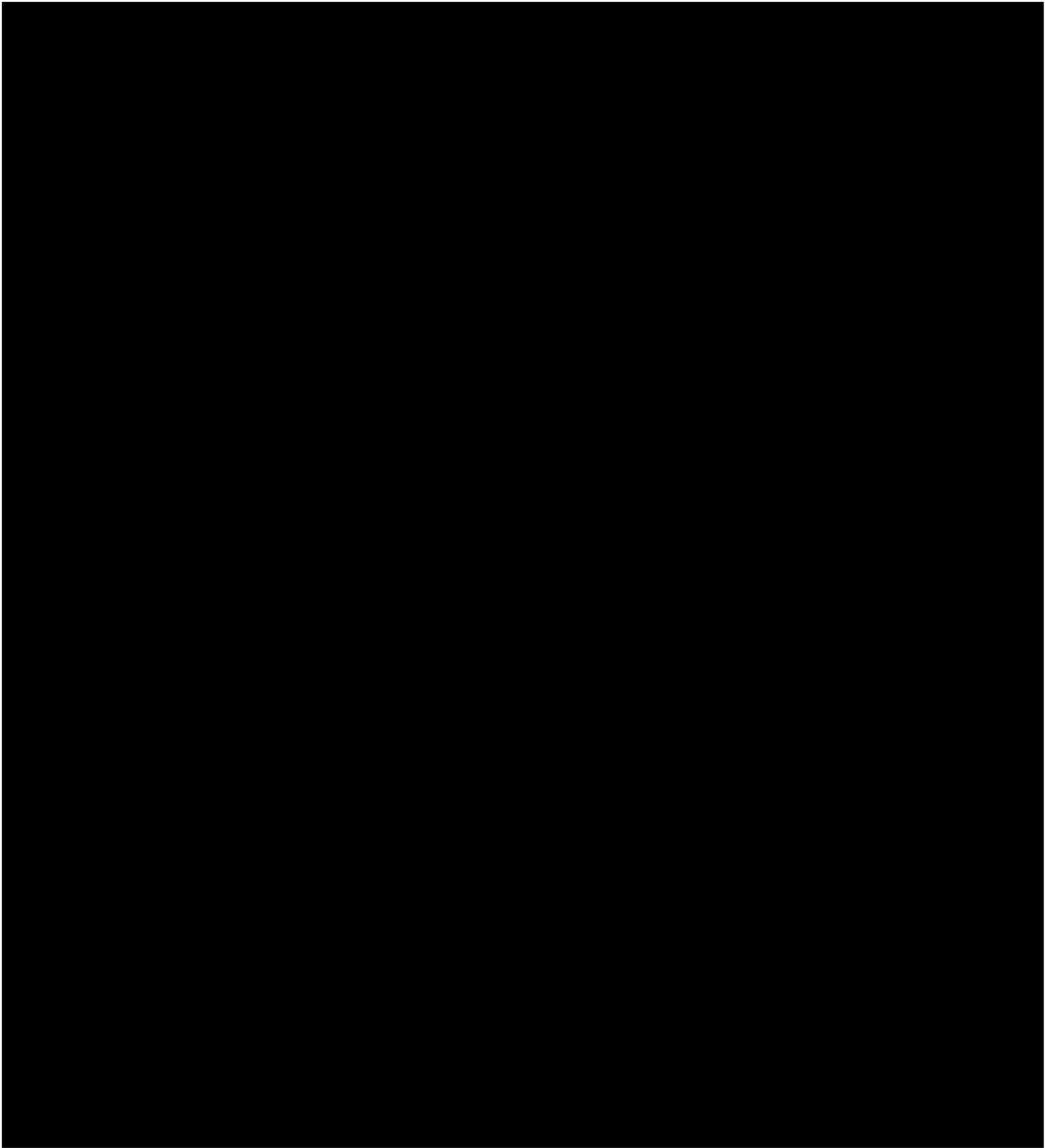
### OFFSHORE CABLE ROUTE

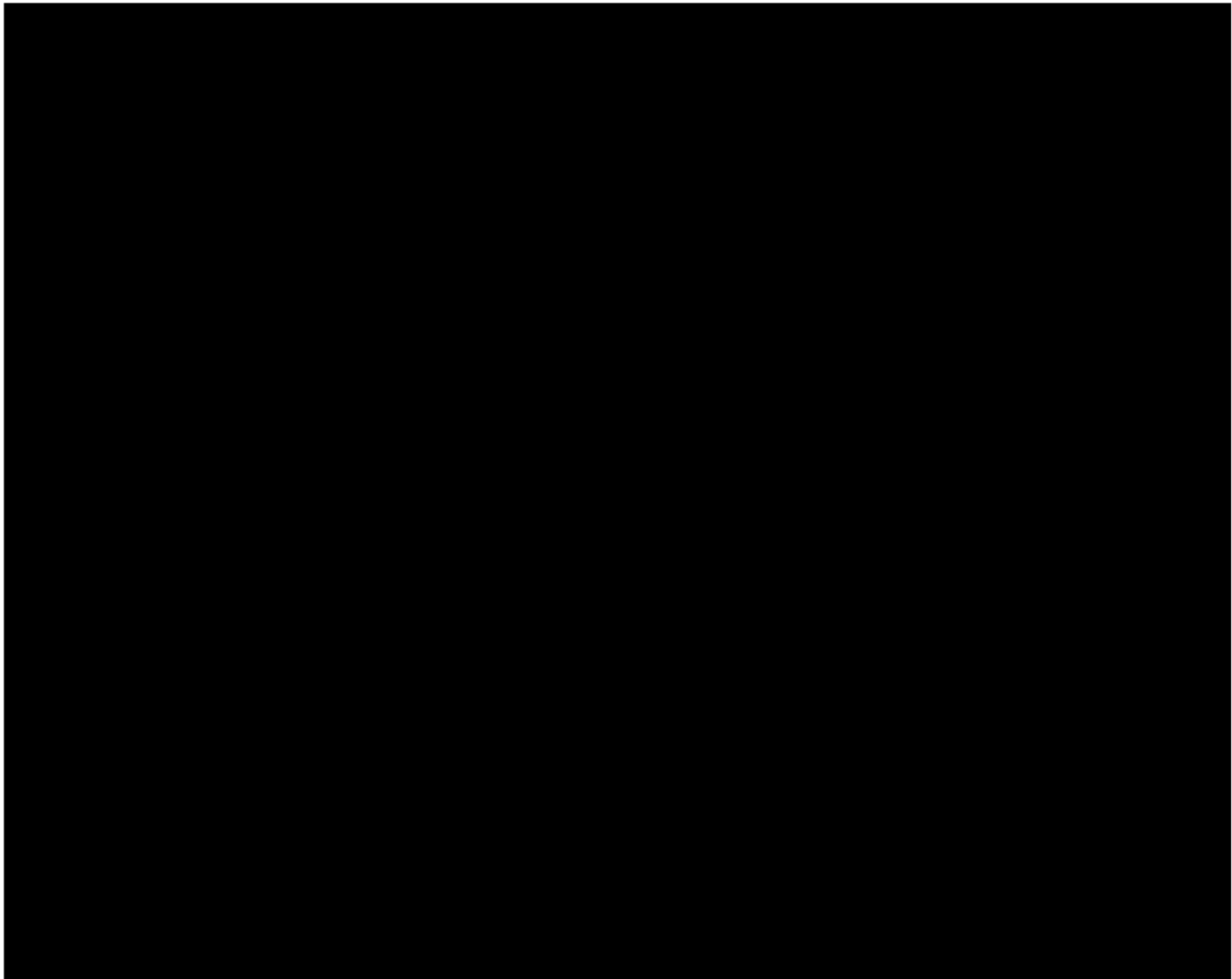
Mayflower Wind will acquire the necessary easement rights to install the offshore transmission cable within Massachusetts state waters as part of the Massachusetts Energy Facility Siting Board (EFSB) further described in Section 7. In accordance with Massachusetts General Laws Chapter 91 and 310 CMR 9.00, and after review of the state portions of the project by the Executive Office of Energy and Environmental Affairs under the Massachusetts Environmental Policy Act (MEPA), and by the EFSB, the Massachusetts Department of Environmental Protection (MassDEP) will issue a license that grants Mayflower Wind permission to locate export cables in state waters.

### ONSHORE CABLE ROUTES

[REDACTED]

[REDACTED]

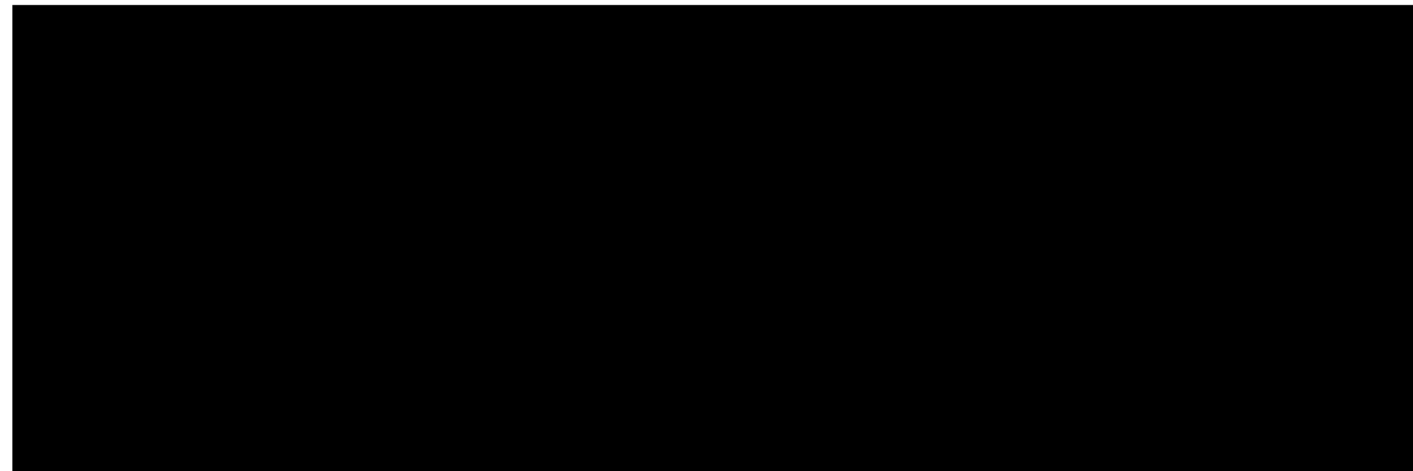




### CONSTRUCTION AND O&M FACILITIES

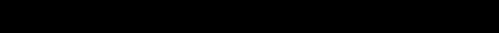
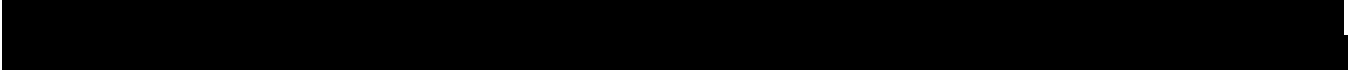

As stated above, the [REDACTED] is the preferred staging port for construction. Mayflower Wind has executed a lease option with [REDACTED] for staging turbine blades, nacelles, towers, and foundation transition pieces.

### SUBSTATION LAND





## JOINT USE OF EXISTING OR PROPOSED REAL PROPERTY RIGHTS

The proposed transmission routes will utilize existing rights-of-way jointly with other current uses. These include public roadways under the control of the respective towns,   
  


## 6.3 ZONING AND PERMITTING PLAN

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- 6.3 Provide evidence that the Eligible Facility site and Offshore Delivery Facilities locations are properly zoned or permitted. If the Eligible Facility site and Offshore Delivery Facilities locations are not currently zoned or permitted properly, identify present and required zoning and/or land use designations and permits and provide a permitting plan and timeline to secure the necessary approvals.

Detail the zoning and permitting issues:

Permitting plan and timeline:

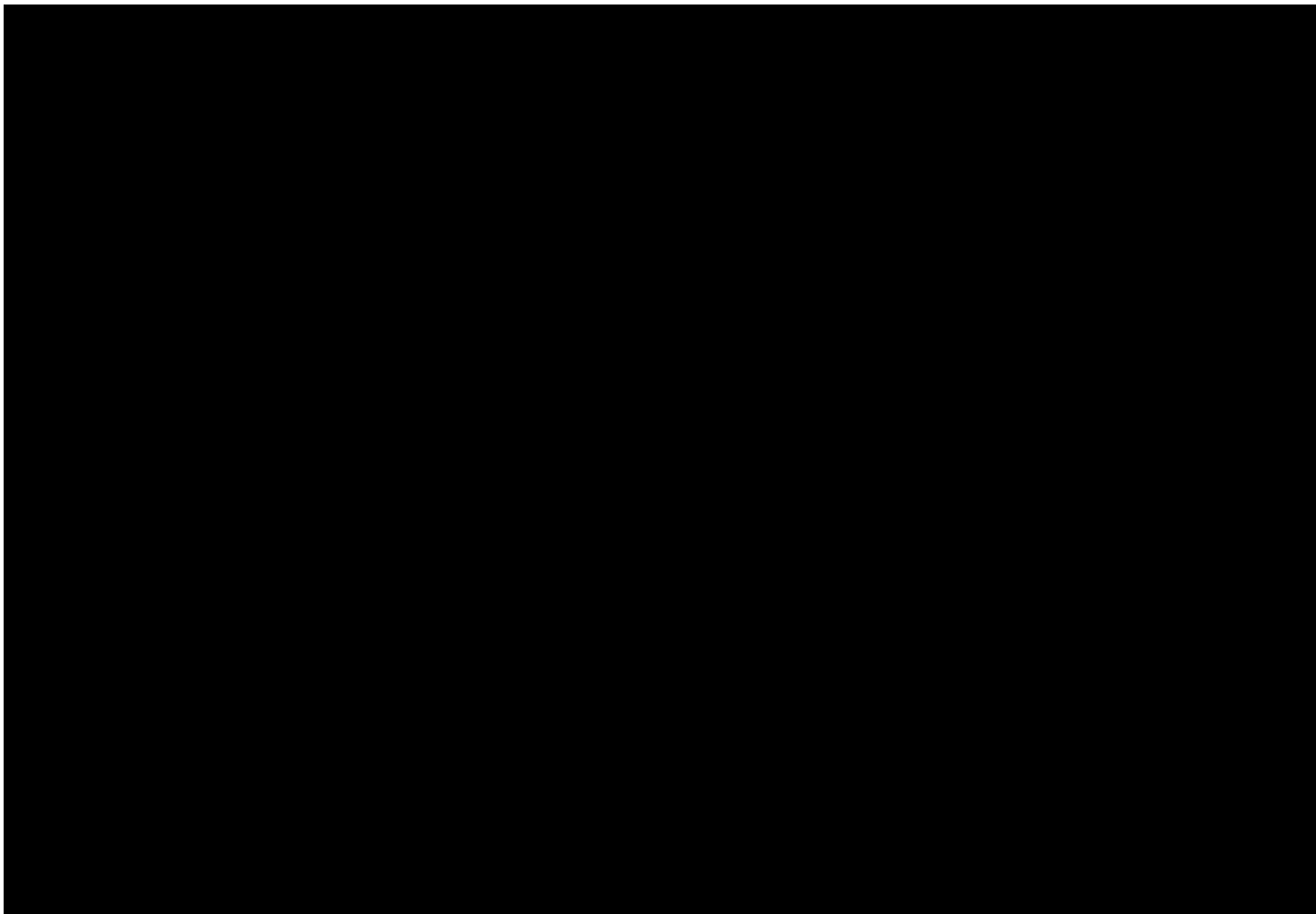
Start Date: Q1 2019

End Date: [REDACTED]

### PERMITTING PLAN AND TIMELINE

Mayflower Wind will submit all local, state, and federal permit applications needed for the onshore cable route and substation. All permitting is expected to be [REDACTED] **Figure 6.3-1** provides an overview of the permitting plan. **Table 7.1** in **Section 7.1** presents further detail on specific reviews/permits/approvals and status, and **Section 9** describes the full timeline.





**FIGURE 6.3-1: PERMITTING PLAN AND TIMELINE**

## **ZONING AND PERMITTING**

Mayflower Wind is confident in its ability to obtain all necessary zoning approvals and permits.

### **OFFSHORE CABLE ROUTE-FEDERAL WATERS**

In accordance with 30 CFR § 585.200(b), Mayflower Wind has the right to one or more project easements for the purpose of installing gathering, transmission, and distribution cables on the outer continental shelf as necessary. Mayflower Wind will apply for the project easement as part of its Construction and Operations Plan (COP). Once approved, BOEM will incorporate the approved project easement as an addendum in Mayflower Wind's lease (OCS-A 0521).

### **OFFSHORE CABLE ROUTE-STATE WATERS**

Permission to locate the export cables in state waters will be granted via a license issued by the Massachusetts Department of Environmental Protection (MassDEP) under Massachusetts General Laws Chapter 91 and its implementing regulations. MassDEP would issue the license after review of the state portions of the project by the Executive Office of Energy and Environmental Affairs under the Massachusetts Environmental Policy Act (MEPA) and by the Massachusetts Energy Facilities Siting Board/Department of Public Utilities.

## ONSHORE TRANSMISSION ROUTE

The majority of the transmission route options are located within [REDACTED] and are not anticipated to present any zoning issues. Zoning laws do not apply to state or local rights-of-ways and, as such, proposed transmission cable locations in these ROWs will not require zoning approvals. [REDACTED]

## CONSTRUCTION AND O&M PORT

Mayflower Wind has entered into a lease option agreement with [REDACTED] for the purpose of constructing the Project and for use of open waterfront. The [REDACTED] is zoned and designed to support the construction, assembly, and deployment of offshore wind projects, as well as handle bulk, break-bulk, container shipping and large specialty marine cargo. The first of its kind in North America, the Terminal has been engineered to be the most versatile heavy-lift cargo facility in the nation. Further details are provided in Section 10.

## 6.4 PROJECT SURROUNDING AREA

- 6.4 Provide a description of the area surrounding the Eligible Facility site and Offshore Delivery Facilities locations (including landfall), including a description of the local zoning, flood plain information, existing land or waterway use, and setting.

The Mayflower Wind Project, including the landfall, and existing land and waterway use, and setting are shown in **Attachment 6.1-1**.

## LOCAL ZONING

## FLOOD PLAINS

[REDACTED]

[REDACTED]

[REDACTED]

## WATERWAY USE

Waterway uses in the vicinity of the Eligible Facility site include commercial and recreational fishing, boating, and diving as well as tourist and commercial transportation between mainland Cape Cod, Martha's Vineyard, and Nantucket. These uses will continue throughout construction and operation of the project. Mayflower wind will obtain a Chapter 91 Waterway License for certain activities in state waterways or in tidelands such as the placement of submarine cables and the placement of any unconsolidated materials such as dredged materials at landfall locations.

## SETTING

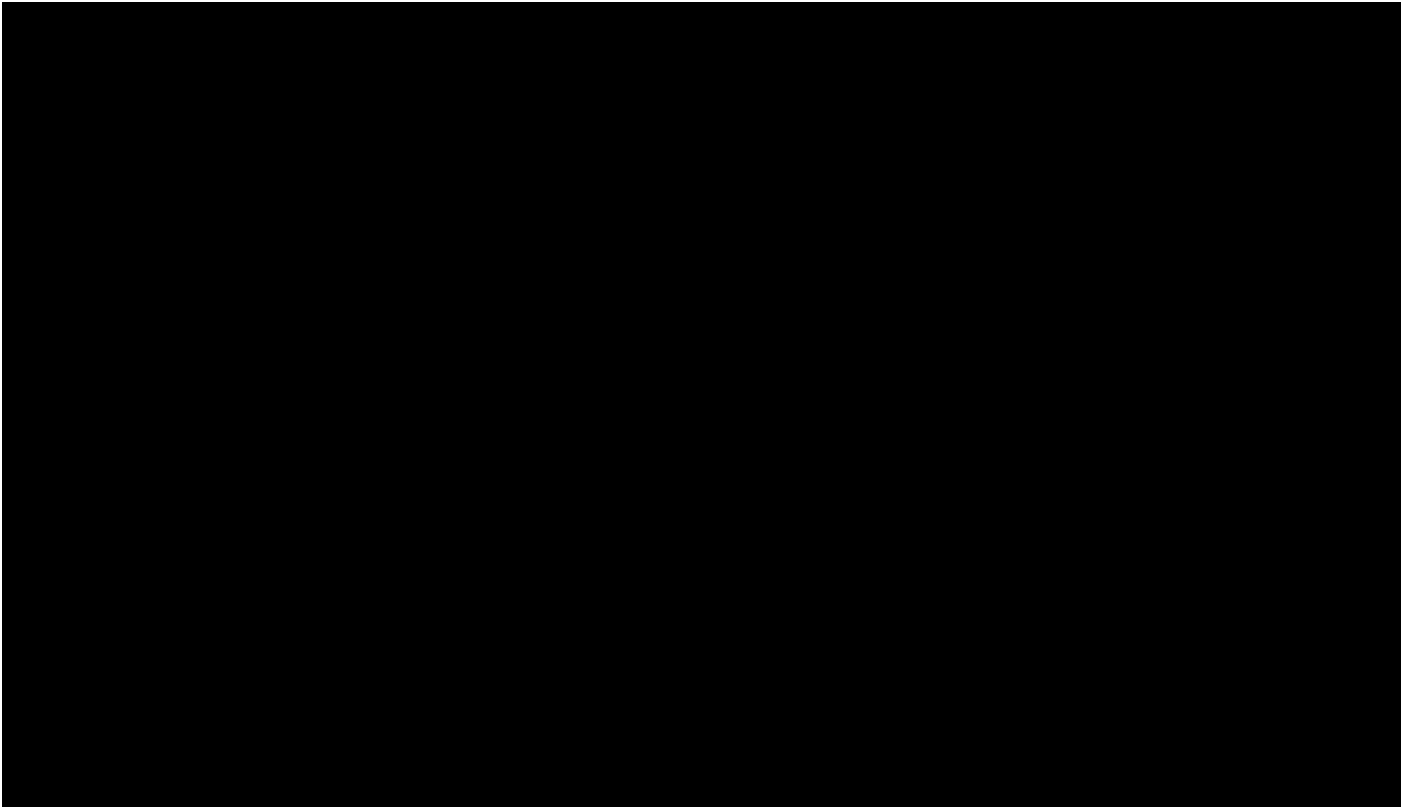
[REDACTED]

[REDACTED]

## MARINE INFRASTRUCTURE

As shown in **Attachment 6.1-1**, and below, marine infrastructure located within the vicinity of the project area include trans-Atlantic communication cables, electric transmission and communication cables

[REDACTED]



**FIGURE 6.4.1: MARINE INFRASTRUCTURE**

**TRANSMISSION ROUTE (INCLUDING LANDFALL)**

[REDACTED]

[REDACTED]

[REDACTED]



**FIGURE 6.4.2:** PROPOSED LOCATION FOR ONSHORE SUBSTATION



## 6.5 INTERCONNECTION PATH SITE CONTROL

- 6.5 Describe how the bidder plans to gain interconnection path site control and describe the status of the plan.

### OFFSHORE FEDERAL WATERS

The Mayflower Wind lease (OCS-A 0521) is in good standing with BOEM and allows the construction and operation of an offshore wind farm within their designated lease area and the installation of the related grid connection system within federal waters. The approval process under BOEM is comprised of the submittal and approval of a Construction and Operation Plan (COP), a Facility Design Report (FDR), and a Fabrication and Installation Report (FIR).

### STATE WATERS

Mayflower Wind will secure the necessary easement rights to install the offshore transmission cable within Massachusetts state waters through the EFSB application and approval process and a Chapter 91 Waterway License, described more fully in **Section 7**.

### ONSHORE TRANSMISSION AND SUBSTATION LOCATIONS

Mayflower Wind will be initiating discussions with [REDACTED]

Discussions with the appropriate town and state representatives are underway or in the process of being arranged to discuss the required rights and other permissions necessary for construction and operation of the transmission and other facilities, as presented in **Section 7.2**.

## 6.6 ISO-NE INTERCONNECTION STATUS

- 6.6 Please provide documentation to show evidence of the interconnection request to ISO-NE, the applicable New England Transmission Owner, or any neighboring control areas, to interconnect at the Capacity Capability Interconnection Standard. Please describe the status of any planned interconnection to the grid. Additionally, any studies undertaken by ISO-NE or the bidder must be provided.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

See **Attachments 6.6-1 and 6.6-2** for interconnection requests and Feasibility Study Agreements respectively.

## 6.7 ELECTRICAL SYSTEM PERFORMANCE

6.7 The studies should describe the Project's electrical system performance, its impact to the reliability of the New England Transmission system, how the project would satisfy ISO-NE's I.3.9 requirements, and how the project will meet the Capacity Capability Interconnection Standard. Projects that do not have I.3.9 approval from ISO-NE must include technical reports or system impact studies that approximate the ISO-NE interconnection process, including but not limited to clear documentation of study technical and cost assumptions, reasoning, and justification of such assumptions. All projects must also provide analysis that approximates the ISO-NE CCIS interconnection analysis as defined in Planning Procedure 10. Please also provide the status of any additional interconnection studies already underway with ISO-NE and/or the transmission owner. All studies must follow the current ISO-NE interconnection procedures and detail any assumptions regarding resources ahead of the Project in the ISO-NE interconnection queue. All network upgrades identified in these studies must be clearly documented and included in the bid price. Provide a copy of an interconnection agreement, if any, executed by the bidder with respect to the proposed project. If an interconnection agreement has not been executed, please provide the steps that need to be completed before an interconnection agreement can be executed and the associated timeline.

Performance and its impact:

Attachments:

*Copy of completed I.3.9 approval or I.3.9-equivalent study attached:*

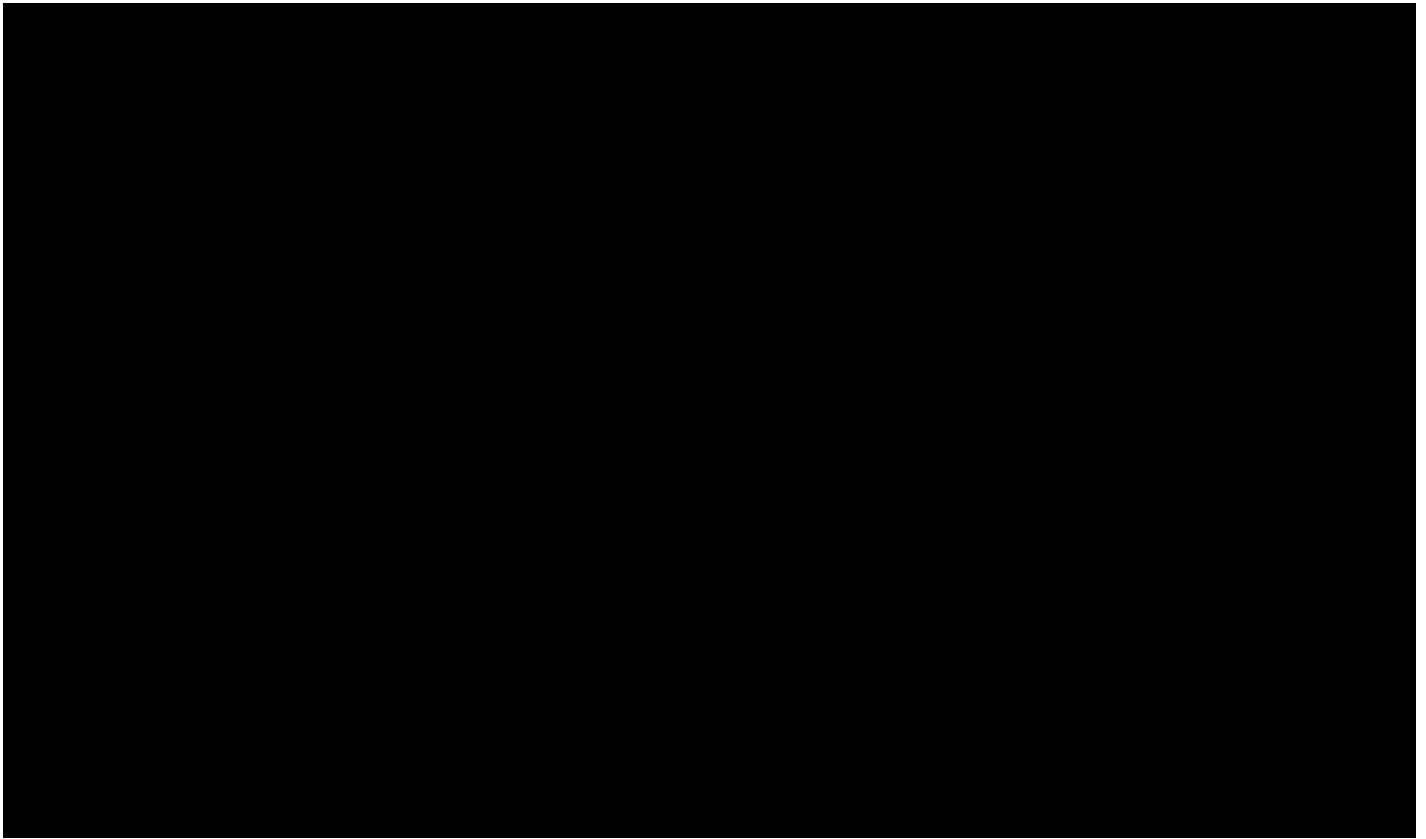
If none, please explain:

Mayflower Wind has contracted [REDACTED] to conduct an analysis of interconnecting 800 MW [REDACTED] to simulate the ISO-NE process required for I.3.9 approval and CCIS analysis. [REDACTED] performed the equivalent studies, as the Mayflower Wind queue positions are actively undergoing Feasibility Studies. [REDACTED]

[REDACTED] As designed, the Mayflower Wind Project [REDACTED] and is expected to increase the Commonwealth's electric system reliability, for the benefit of both Massachusetts ratepayers and electric distribution companies.

[REDACTED] used the available ISO-NE Planning Advisory Committee (PAC)s models for the following

- 2023 Summer peak case file (in PSS@E format) for steady state studies
- 2022 Case files (in ASPEN format) for short circuit studies
- 2021 Light load case file (in PSS@E format) for transient stability studies



**FIGURE 6.7-1: ISO NEW ENGLAND LOCAL SYSTEM DIAGRAM**

An ASPEN software study confirmed no short circuit issues due to the minimal increase in fault current in substations in the area contributed by Mayflower Wind, as detailed in the report.

Thermal analysis was performed for N-0, N-1 and N-1-1 per ISO-NE standards. No voltage or thermal violations were identified from adding Mayflower Wind.

A transient stability study [REDACTED] confirmed the Project does not create any instability for any study contingencies and no additional grid reinforcements are necessary.

In summary, no adverse impacts were found on the transmission system due to the Mayflower Wind Project connecting at [REDACTED]

The full [REDACTED] Study report can be found in **Attachment 6.7-1**.

Copy of completed CCIS-equivalent study attached: *See Attachment 6.7-1*

If none, please explain:

The Capacity Capability Injection Study (CCIS) thermal analysis was also conducted by [REDACTED], with all higher queued projects utilizing a 35% nameplate capacity for all offshore wind projects. The Mayflower Wind Project was confirmed as having no voltage or thermal violations for N-0 and N-1 contingency conditions, and therefore the project is capable of full capacity of 35% of its nameplate with no additional upgrades. For details see Section 4 of the [REDACTED] report found in **Attachment 6.7-1**.



Copy of Interconnection Agreement attached: *See below*

If none, please explain:

[REDACTED]

The project has contracted [REDACTED] to complete the third-party studies simulating the ISO-NE Feasibility, System Impact, and Capacity Capability Interconnection Standard studies to confidence in the viability of the project and the level of anticipated upgrades that would be required.

## 6.8 MULTIPLE INTERCONNECTION REQUESTS

- 6.8 If multiple interconnection requests have been made, please specify all such active requests which have not been superseded by subsequent requests and information regarding the status of each. Provide copies of any requests made and studies completed.

[REDACTED]

## 6.9 NETWORK UPGRADES

- 6.9 Please provide cost estimates for any necessary network upgrades identified in the studies identified in section 6.7

[REDACTED] Mayflower Wind's schedule and bid fully account for these upgrades.

## 6.10 ALTERNATIVE INTERCONNECTION SCENARIO

- 6.10 To the extent that you provide an alternative interconnection scenario based on ISO-proposed interconnection process changes, you must also include studies using the proposed ISO-NE-proposed process. Any such studies must be accompanied with clear documentation of study technical and cost assumptions, reasoning, and justification of such assumptions.

No alternative interconnection scenario is proposed.

## 6.11 ELECTRICAL MODELS

- 6.11 Provide the electrical models of all energy resources supporting the proposed project in accordance with the filing requirements of the ISO-NE Tariff Schedule 22 and 23.

Electrical models attached: If none, please explain:

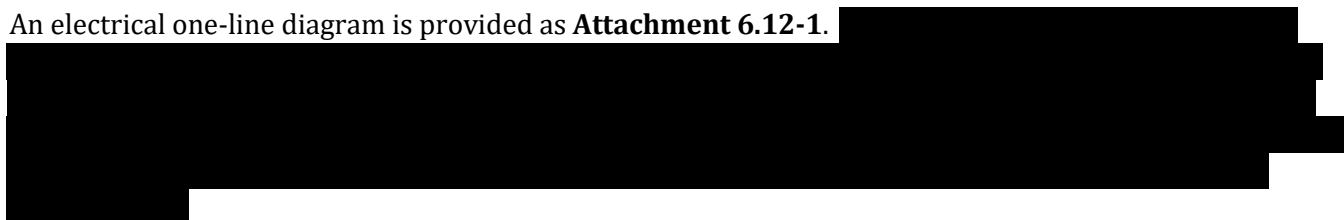
Electrical models of all energy resources supporting the proposed project in accordance with the filing requirements of the ISO-NE Tariff Schedule 22 and 23 are provided as **Attachment 6.14-1**. Mayflower Wind has provided these electrical models in both PSSE versions 32 as requested, and 33, the current version ISO-NE requires. The IDV was provided, as well as the dynamic DYR file. Models were provided using the expected wind turbine manufacturer-provided data as filed by the queue positions to date.

## 6.12 ONE-LINE DIAGRAM

- 6.12 Provide a copy of an electrical one-line diagram showing the interconnection facilities, the relevant facilities of the transmission and/or distribution provider, and any required network upgrades identified in the studies required in section 6.9 of this document

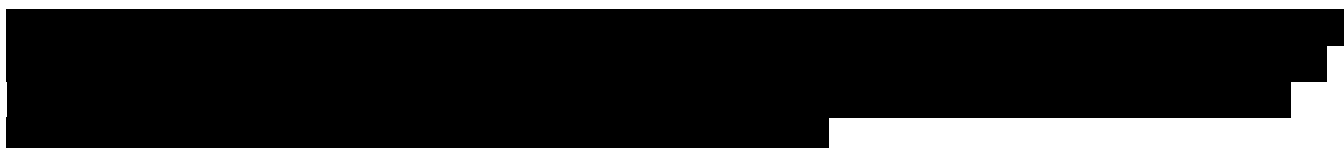
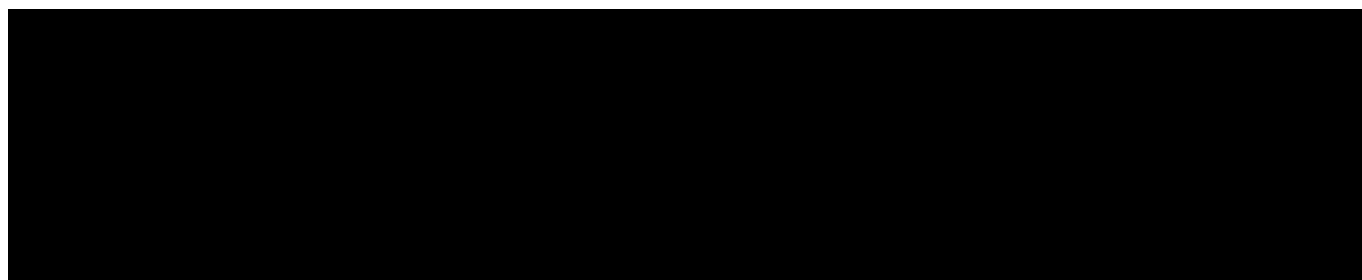
Electrical one-line diagram attached: If none, please explain:

An electrical one-line diagram is provided as **Attachment 6.12-1**.

A large rectangular area of the document is completely redacted with a solid black fill, obscuring several lines of text and any potential diagrams or tables that might have been present.

## 6.13 INTERCONNECTION FACILITIES

- 6.13 Specify and describe the current or new interconnection facilities (lines, transformers, switching equipment, system protection and controls, etc.) that bidder owns or is intending to construct or have constructed in order to deliver the proposed energy.

A rectangular area of the document is redacted with a solid black fill, covering approximately three lines of text.A large rectangular area of the document is redacted with a solid black fill, covering approximately ten lines of text.

## 6.14 INCREMENTAL DATA REQUIREMENTS

6.14 Incremental data requirements;

1. IDV file(s) in PSSE v32 format modeling all upgrades to the transmission network identified in the studies required in section 6.7 of this document. If none, please explain:

Mayflower Wind has provided the IDV files in PSSE versions in the 32 format requested and the 33 format currently required by ISO-NE. These are included at **Attachment 6.14-1**.

2. If the Bidder does not use PSSE, provide in text format necessary modeling data as follows:

Line Data:

Voltage Thermal Ratings

Impedances (r, X and B)

Line Length: from to

(bus numbers and names)

Not applicable, IDV files are provided.

Transformer data (including Phase shifting transformers if applicable):

Terminal Voltages	Thermal Ratings
-------------------	-----------------

Impedance

From	To
------	----

(bus numbers and names)

Not applicable, IDV files are provided.

Reactive compensation models as necessary

Not applicable, no reactive compensation is required.

Other changes to the model that would occur due to a Project such as terminal changes for lines/transformer/generator leads/loads etc.

Not applicable.

## 6.15 CONSTRAINTS OR CURTAILMENTS

6.15 Please detail with supporting information and studies (as available) that the delivery profile contemplated in your proposal reflects any constraints or curtailments, if any, after the upgrades that are expected to take place pursuant to the CCIS standards. If you are planning to make voluntary upgrades beyond those associated with the CCIS standard, as more fully described in the RFP, please describe the transmission network upgrades necessary, their estimated cost (for which the bidder would have cost responsibility, and the impact on the proposed generation schedule by reducing remaining constraints or curtailments.

In this section, the findings of the CCIS analysis are presented for the point of interconnection.

For this analysis, Mayflower and all other higher queued wind projects as shown in the [REDACTED] report, **Attachment 6.7-1**, were dispatched at 35% of nameplate capacity. Conventional units in the area of Mayflower were dispatched at 100% of nameplate capacity. The study included both Scenarios listed in section 4 of the [REDACTED] report.

For the purposes of the CCIS analysis, adjustments were made to the 2023 summer peak case file to increase the power transfer towards Maine and New Hampshire. To achieve this, the generation in the SEMA and SEMA/RI areas was increased and the generation in Maine and New Hampshire area was reduced.

These findings document that Mayflower Wind will be able to deliver energy from the Project to the Distribution Companies and the ISO-NE grid without material constraint or curtailment.

## 6.16 PROPOSED POINT OF DELIVERY SUFFICIENCY

---

- 6.16 Please provide sufficient information and documentation to demonstrate that the proposed point of delivery into ISO-NE, along with their proposed interconnection and transmission upgrades including any transmission upgrades beyond the point of interconnection, is sufficient to ensure the scheduled delivery profile of the proposal's Offshore Wind Energy Generation.

The Steady State Study, CCIS Analysis, Short Circuit Analysis, Transient Stability Analysis, and Weighted Short Circuit Ratio carried out by [REDACTED] and provided as **Attachment 6.7-1** confirm that the Mayflower Wind's proposed point of interconnection is sufficient to ensure its scheduled delivery profile. Each of these studies was conducted under current ISO-NE standards. These studies determined that Mayflower Wind did not introduce any adverse impacts to the transmission system for the interconnection of 800 MWs and that no transmission upgrades or reinforcements are necessary for the interconnection of up to 800 MWs [REDACTED].

## SECTION 7 OF APPENDIX A TO THE RFP ENVIRONMENTAL ASSESSMENT, PERMIT ACQUISITION PLAN AND NEW CLASS I RPS CERTIFICATION

This section addresses environmental and other regulatory issues associated with project siting, development and operations for all aspects of the project (including generation, delivery, storage, interconnection, etc.), and in all jurisdictions (federal, all interested states, etc.).

The Mayflower Wind Project will require local, state, and federal permits and approvals for relevant onshore, nearshore, and offshore work that will entail risk assessments and agency and stakeholder engagement at various stages. Mayflower Wind has the experience, knowledge, and capacity to obtain the permits and approvals necessary to develop and operate offshore energy projects. The team is comprised of proven leaders in offshore, onshore wind and other major energy infrastructure projects involving local, state, and federal permits and includes permitting subject matter experts from the first offshore wind project in U.S. Federal and Massachusetts waters to receive its full permits. The team also includes former Federal government employees (National Oceanic and Atmospheric Administration, the Bureau of Ocean Energy Management, and the U.S. Environmental Protection Agency), including former agency directors.

Mayflower Wind's unique blend of energy project development experience, including over 7 GWs of onshore wind and over four decades of offshore energy projects in the U.S. and Europe, is a core strength that distinguishes this team and project.

Contractors supporting the Project include environmental firms with expertise in developing environmental assessments and impact statements, survey design and execution, and scientists who are leaders in many fields and disciplines including marine acoustics, fisheries, marine mammals, birds, bats, ecosystem management, wildlife detection/deterrent technologies, and oceanography.

The team also includes several marine scientists with relevant advanced degrees and expertise in developing and advancing marine science and data consortiums for industry projects and for public-private collaborations between private industry, government, non-government and academic institutions. Team members are also leaders in the development of ocean policy and have contributed significantly to the U.S. governments' efforts to progress the science and responsible development of offshore wind.

Aligned with the team's expertise is Mayflower Wind's understanding of the important role and integration of stakeholder and government engagement, which is why Mayflower Wind implements an 'early and often' approach. Beginning in early 2018, nearly a year prior to the lease auction where Mayflower Wind obtained its offshore wind lease, Mayflower Wind started building relationships and trust with key groups, from fishing organizations to local community leaders and appropriate government regulatory agencies. Mayflower Wind initiated this early engagement to understand the scientific and environmental issues being raised by stakeholders and to ensure immediate considerations and integrations of proposed solutions, best available science, and best management practices were integrated early into the project planning. With this early engagement and adoption of recommendations from government and stakeholders, Mayflower Wind is positioned to deliver a financeable Project with permits and approvals secured in the timeline set forth in **Section 9**.

Mayflower Wind has successfully initiated the permitting process for the Project, engaging with federal agencies and the Commonwealth of Massachusetts. This early work meant that Mayflower Wind was able, three months after execution of Mayflower Wind's lease to obtain approvals and conduct geophysical and geotechnical surveys needed to start lease area site characterization. Mayflower Wind was then able to take the next step, submitting a Site Assessment Plan (SAP) for federal regulator review on July 29, 2019.

Mayflower Wind intends to maintain this fast but successful pace in obtaining all necessary permits and approvals for this project.

Mayflower Wind team will ensure that the Project will be sited, permitted, and operated successfully and responsibly by applying a mitigation hierarchy that is based on the best available science, avoiding, or minimizing, any potential adverse effects to other ocean users, local wildlife, and the environment.

Mayflower Wind will deploy robust, science-driven decision making to research, develop, and implement innovative solutions to successfully deliver the Project. Sustainable co-existence with the surrounding environment and communities, characterized by early, continuous and productive engagement with relevant stakeholders, is critical. Mayflower Wind will continue to lend its experience and expertise to the offshore wind, fisheries, science, and environmental communities because we recognize that the delivery of safe and reliable offshore wind energy depends on our ability to co-exist and build trust within the environment in which we propose to operate.

Our monitoring and research investments are targeted at both State and the greater North Atlantic region to generate data and science that informs the development and operation of our specific Project, as well as contributing to a better understanding of overall cumulative effects of the growing U.S. offshore wind industry and the impacts – positive and negative - to ocean resources in the North Atlantic.

Mayflower Wind is committed to leading, not following, the industry by establishing high-performance expectations and standards that will engender trust and confidence in our stakeholder communities and the regulatory agencies that will oversee Mayflower Wind’s efforts. We are focused on applying lessons learned from U.S. and abroad and on identifying unique and innovative approaches to environmental mitigation and monitoring and minimizing impacts to local communities. These efforts have been and will continue to be, pursued with input from stakeholders and communities to build this project responsibly and in such a way that is innovative and meets the expectations of stakeholders and Massachusetts ratepayers.

7.1 PERMIT LIST AND RESPONSIBLE AGENCIES AND GOVERNING BODIES

7.1 Provide a list of all the permits, licenses, and environmental assessments and/or environmental impact statements required to construct and operate the project. Along with this list, identify the governmental agencies and States that are responsible for issuing approval of all the permits, licenses, and environmental assessments and/or environmental impact statements. If a bidder has secured any permit or has applied for a permit, please indicate this in the response.

**Table 7.1-1** below provides a summary of the permits, licenses, approvals, certifications, and environmental assessments and/or environmental impact statements required to construct and operate the Project.

As stated above, the Mayflower Wind team will execute an ‘early and often’ strategy to engage with federal, state and local regulators. Mayflower Wind has initiated the permitting and approval process required to construct and operate the Project. Part of the Mayflower Wind permitting strategy will include conducting a series of the ‘one-agency’ meetings, that federal agencies look to as a key coordination tool in 2019 and 2020, with the first anticipated to occur in [REDACTED]. The purpose of these meetings is to bring together regulators for the key federal and state agencies reviewing this Project, describe Mayflower Wind’s proposed activities, identify opportunities to coordinate and align the various agency reviews, and to provide these agencies with the necessary information to help ensure timely delivery of the required permits. This action is in direct response to the agencies’ feedback during early engagements prior to and immediately following the issuance of the lease.

Mayflower Wind understands that it is critical to seek input from regulators early in the planning process. These steps will facilitate agency review of the permit applications and allow agencies to identify areas of concern and otherwise establish expectations. It will also allow the Mayflower Wind team to craft the best possible permit applications that fulfill the Project's objectives, while also helping to ensure that regulators receive the information they need to fulfill their responsibilities.

Specifically, Mayflower Wind anticipates that a number of federal permits should be issued during or shortly after the BOEM COP review and NEPA decision. Mayflower Wind intends to engage with the agencies together and independently between RFP and COP submission dates to ensure data and information in the COP supports other agencies' requirements. Furthermore, as part of the 'one-agency' strategy, Mayflower Wind will work to align and manage concurrently the Federal and State permitting processes, where possible, to drive efficiency and effectiveness of permit approvals.

Governmental Agency	Permit/License/Approval	Status
Federal		
Bureau of Ocean Energy Management (BOEM)	Geophysics & Geotechnical Survey Plan – 2019 activities	Approved by BOEM August 1, 2019
	Geophysics & Geotechnical Survey Plan – 2020 activities	
	Site Assessment Plan (SAP)	
	Construction and Operations Plan (COP)	
	Environmental Impact Statement (EIS)	
Federal Aviation Administration (FAA/BOEM)	Determinations of No Hazard (DNH)	
U.S. Army Corps of Engineers (USACE)	Individual Clean Water Act (CWA) Section 404 Rivers and Harbors Act of 1899 Section 10 Permit	
U.S. Coast Guard (USCG)	Private Aids to Navigation Authorization	



Governmental Agency	Permit/License/Approval	Status
U.S. Environmental Protection Agency (EPA)	National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities	
	Outer Continental Shelf (OCS) Permit	
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act (ESA) Section 7 Consultation, Bald and Golden Eagle Act (BGEPA), Migratory Bird Treaty Act (MBTA) compliance	
National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service	Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization (IHA) or Letter of Authorization (LOA)	
	Endangered Species Act Section 7 Consultation	
State		
Massachusetts Environmental Policy Act (MEPA) Office	Massachusetts Environmental Protection Act (MEPA) Environmental Notification Form (ENF) or Environmental Impact Report (EIR); Certificate of Secretary of Energy and Environmental Affairs	
Massachusetts Energy Facility Siting Board (EFSB)	M.G.L. c. 164, § 69 Approval to Construct  Certificate of Environmental Impact and Public Need (Section 72 Approval Consolidated with EFSB)	
Massachusetts Department of Public Utilities (MA DPU)	G.L. c. 164, § 72, Approval to Construct	

Governmental Agency	Permit/License/Approval	Status
	G.L. c. 40A, § 3 Zoning Exemption (if needed)	
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	
Massachusetts Office of Coastal Zone Management (MA CZM)	Coastal Zone Management (CZM) Consistency Determination	
Rhode Island Coastal Resources Management Council (CRMC)	Coastal Zone Management (CZM) Consistency Determination (if required)	
Massachusetts Department of Transportation (MassDOT)	State Highway Access/Easement/Right-of-Way Permit(s)	
	Rail Division Use and Occupancy License (if needed)	
Massachusetts Board of Underwater Archaeological Resources (MA BUAR)	Special Use Permit	
Massachusetts Historical Commission (MHC)	Field Investigation Permits (980 C.M.R. § 70.00) Reconnaissance survey application	
Massachusetts Natural Heritage and Endangered Species Program (NHESP)	MA Endangered Species Act Checklist; Conservation and Management Permit (if needed)	
Article 97 legislation (if needed)	Possible if change use of certain state, county or local public lands taken or acquired for natural resources purposes	
Regional/Local		
Cape Cod Commission	Development of Regional Impact (DRI) Review	

Governmental Agency	Permit/License/Approval	Status

**TABLE 7.1-1: REQUIRED PERMITS, LICENSES, AND ENVIRONMENTAL ASSESSMENTS**

## 7.2 PERMITTING TIMELINE

- 7.2 Provide the anticipated timeline for seeking and receiving the required permits, licenses, and environmental assessments and/or environmental impact statements. Include a project approval assessment which describes, in narrative form, each segment of the process, the required permit or approval, the status of the request or application and the basis for projection of success by the milestone date. All requirements should be included on the project schedule in Section 10.

## PERMITTING SCHEDULE

**Figure 7.2-1** below outlines the anticipated timeline required to obtain the permits, licenses, and approvals required to construct and operate the Project.



**FIGURE 7.2-1: PERMITTING PLAN AND TIMELINE**

## PROJECT APPROVAL ASSESSMENT

The Mayflower Wind Project approval assessment which describes each segment of the permitting and approval process, the status of the request or application, and the basis for projection of success by the milestone date is detailed below. The project schedule provided in **Attachment 9.1-1** provides a comprehensive overview of all permits, licenses, and environmental assessments and/or environmental impact statements.

Mayflower Wind is committed to conduct early and continuous engagement with federal, state and local regulatory agencies and non-governmental (NGO) stakeholders as a critical part of obtaining all necessary permits and approvals in a timely basis and ensuring the successful development and execution of the Project. Informal and formal coordination will include pre-construction survey notifications, pre-application agency meetings, stakeholder outreach meetings, and regular status updates to regulators and communities throughout the planning, development, construction and operation phases of the Project. To monitor progress and provide transparency to stakeholders, Mayflower Wind has established a regulator and stakeholder management system to track and manage communications throughout the permitting and approval process.

The Mayflower Wind team includes experts with deep knowledge of key Federal and State agencies and the mandates and responsibilities these agencies must meet in their respective decision-making. This experience helps differentiate Mayflower Wind from our competitors, given supporting team members have

either worked for or with these agencies for many years on various types of energy infrastructure projects and related permit requirements. Additionally, the Mayflower Wind team draws from its experience working alongside key agencies to create workable and transparent policies, best management practices, and collaboratively conducting and integrating science into agency decision-making processes. Together, this experience and expertise strongly positions the Mayflower Wind Project for permitting success.

A summary of agency consultations and stakeholder engagement activities undertaken to-date for the Project is provided below in **Table 7.2-1**.

Regulatory Agency or Stakeholder Group	Date	Summary of Consultation
BOEM		
BOEM		
NOAA, National Marine Fisheries Service, Protected Resources Division		
NOAA National Marine Fisheries Service, Northeast Science Center		
Massachusetts Office of Coastal Zone Management (MA CZM)		
Massachusetts Historical Commission		

TABLE 7.2-1: REGULATORY AGENCY OR STAKEHOLDER GROUP: CONSULTATION ACTIVITIES

## FEDERAL

### BUREAU OF OCEAN ENERGY MANAGEMENT

Approvals by the U.S. Department of Interior's (DOI) BOEM will be required for siting of a renewable energy project on the Outer Continental Shelf (OCS) per the Energy Policy Act of 2005 (43 U.S.C. § 1337(p)(1)). BOEM approval will require submission of a Site Assessment Plan (SAP; for meteorological buoy), which was submitted on July 29, 2019, and a Construction and Operations Plan (COP), including site characterization study results. After SAP approval, anticipated in [REDACTED] additional assessments and surveys will be conducted in coordination with BOEM based on identified information gaps and potential risks. Mayflower Wind intends to utilize the Project Design Envelope (PDE) approach in its COP development that will describe a reasonable range of potential project designs including wind turbine generators, export cable, inter-array, electrical service platforms, interconnections, and associated facilities. In accordance with the National Environmental Policy Act (NEPA), BOEM will evaluate the COP to determine the potential impact of the proposed activities on physical, biological, and socioeconomic conditions in the region. BOEM will determine if the COP is "Complete and Sufficient"; issue a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS); develop a Draft EIS for public comment; develop a Final EIS and publish its final Record of Decision (ROD) regarding COP approval. BOEM can approve, disapprove, or approve with modifications, the plan. Information in the SAP and COP site evaluation and characterization studies will also inform interagency consultations and coordination required for additional approvals and permits. Following COP approval, or approval with modifications, Mayflower Wind will submit a Facility Design Report (FDR) and a Fabrication and Installation Report (FIR). Both documents must be approved by BOEM before fabrication and installation can proceed.

BOEM requires Lessees to conduct a comprehensive assessment of existing resources within areas proposed for offshore wind development to characterize baseline conditions and assess potential impacts during project construction and operations. COP and SAP submittals to BOEM will include site characterization results such as geological conditions, geotechnical conditions, biological resources and archaeological resources, unexploded ordnance (UXO), etc. Mayflower Wind has used a combination of existing publicly-available survey data from government, academic, and NGO sources in combination with project-specific surveys to inform site characterization and initiate fulfillment of BOEM requirements. Information sources queried have included results of BOEM-funded surveys conducted in support of the Massachusetts Wind Energy Area (MA WEA) NEPA review, including surveys for birds, marine mammals, sea turtles, and other species and environmental resources. Additionally, Mayflower Wind has commissioned year-round digital aerial surveys over the lease areas to obtain additional data on avian, marine mammal and turtle abundance and distribution. Mayflower Wind has also consulted BOEM and other agencies regarding potential risks specific to the Mayflower Wind lease area, detailed in **Table 7.2-1** above.

Mayflower Wind is contracting an environmental consultant who will assess the existing environmental data and data gaps, manage the required studies and surveys, and complete the environmental assessments for inclusion in the COP.

Milestone Date(s): BOEM approval of the COP will be a major milestone in the overall permitting process and is anticipated to be received in [REDACTED]

### FEDERAL AVIATION ADMINISTRATION

Since the Project area is more than 12 nautical miles offshore, BOEM has jurisdiction over the Federal Aviation Administration (FAA) evaluation and review of aeronautical hazards. BOEM will conduct this evaluation as part of the COP review process and issue final approval related to potential impacts on air space and aviation activities. However, it is expected that BOEM will consult with and solicit FAA input in this review and will likely defer to FAA guidelines and requirements related to safety to ensure there is no

conflict with any airport facilities. Results of this review will specify requirements for placement and maintenance of lighting and other safety features during the construction and operation of the Project.

Milestone Date(s): [REDACTED]

## U.S. ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers (USACE) has jurisdiction over a variety of activities related to offshore wind development. Projects in Massachusetts are under the jurisdiction of the USACE New England District (USACE-NE). The USACE-NE may authorize projects under Individual Permits, Programmatic General Permits, or Nationwide Permits (NWP) depending upon the nature and extent of the proposed activity.

Mayflower Wind Project activities that are anticipated to require USACE approval include geotechnical investigations (vibracores and borings), placement of structures in the seabed (towers/buoys, turbines, cables), and dredging and filling (landfalls).

Activities that require authorization under Section 10 of the Rivers and Harbors Appropriation Act or Section 404 of the Clean Water Act (CWA) will be assessed by the USACE through the Section 10 and Section 404 processes, including the NEPA process for the Project. Activities that are limited in scope and are expected to have limited impacts with mitigation applied may be eligible for approval under the USACE NWP Program. There are currently NWPs for placement of Aids to Navigation, Scientific Measuring Devices, and Survey Activities. It is anticipated that survey activities and the installation of site assessment devices such as meteorological buoys for the Project will be eligible for approval under the NWP Program.

Milestone Date(s): [REDACTED]

## U.S. COAST GUARD

The Ports and Waterways Safety Act authorizes the U.S. Coast Guard (USCG) to implement measures for controlling or supervising vessel traffic or for protecting navigation and the marine environment.

A Navigational Safety Risk Assessment (NSRA) that assesses the potential effects of the project on marine traffic and safety will be included as part of the COP submittal. During the COP review process, BOEM will request that USCG review the NSRA and provide feedback on NSRA and the adequacy of the proposed navigational safety mitigation measures.

The USCG also requires wind farm developers to install and privately maintain navigation safety features, which may include lights, audible signals, and free-standing buoys or markers. Mayflower Wind will apply for USCG approval to install and maintain these Private Aids to Navigation (PATON) in accordance with USCG specifications prior to construction.

Milestone Date(s): [REDACTED]

## U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) has jurisdiction over several activities related to offshore wind development. Primary activities for Mayflower Wind that are anticipated to require EPA approval include potential discharges to the ocean or waters of the U.S. and air emissions.

The Clean Water Act prohibits the discharge of dredged material, solid waste, garbage, sewage, chemicals, wrecked or discarded equipment, rock, sand, excavation debris, and other waste into ocean waters without a

permit from the EPA. The EPA also issues National Pollutant Discharge Elimination System (NPDES) permits for discharges from point sources into the waters of the U.S.

The Clean Air Act regulates air emissions from stationary and mobile sources and authorizes the EPA to establish National Ambient Air Quality Standards (NAAQS). The EPA enforces the applicable Clean Air Act requirements for OCS sources, including emissions from activities associated with the construction and operation of offshore wind energy development projects. Sources located on or above the OCS at locations within 25 nautical miles of a state seaward boundary are required to comply with the air quality permitting requirements of the nearest onshore jurisdiction (i.e. the MassDEP). Although minimal emissions are expected to be associated with the Project, it is anticipated that an OCS Air Permit will be required for the use of marine vessels and other equipment throughout construction and operation phases of the Project.

The Project may also be subject to the EPA's General Conformity requirements for construction emissions. If determined to be applicable, Mayflower Wind may be required to obtain emissions offsets for potential non-attainment pollutant emissions associated with construction activities and demonstrate that the potential emissions of other criteria pollutants within state jurisdictional areas will not cause or contribute to an exceedance of the NAAQS and will do so if needed.

Milestone Date(s): [REDACTED]

## U.S. FISH AND WILDLIFE SERVICE

The U.S. Fish and Wildlife Service (USFWS) is responsible for the administration and enforcement of the federal Endangered Species Act (ESA; 16 U.S.C. § 1531 et seq.), Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668d), and Migratory Bird Treaty Act (MBTA; 16 U.S.C. §§ 703–712).

On the OCS, USFWS jointly administers the ESA with the U.S. Department of Commerce's (DOC) National Oceanic and Atmospheric Administration (NOAA) Fisheries. Section 9 of the ESA makes it unlawful to "take" a federally-listed species, meaning to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct" a federally-listed species.

Similarly, the BGEPA defines "take" to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (16 USC 668c) eagles, and includes criminal and civil penalties for violating the statute (16 USC 668). The USFWS has promulgated regulations that provide for a permitting framework for incidental take associated with otherwise lawful activities, including wind energy, under the ESA and BGEPA.

There is no permitting scheme for the incidental take of migratory birds associated with otherwise lawful activities; however, on December 22, 2017 the DOI Office of the Solicitor issued Memorandum M-370501 (the "M-Opinion") stating that the MBTA does not prohibit incidental take. The M-Opinion represents the direction of the Office of the Solicitor under the current federal administration and this interpretation could be reversed when a new administration takes office; the M-Opinion is, therefore, best interpreted as a temporary protection from prosecution for incidental take under MBTA.

To ensure compliance with ESA, BGEPA, and MBTA, the USFWS has established guidelines for the development of land-based wind energy projects (Land-Based Wind Energy Guidelines [WEG]; OMB 1019-0148) that provide a structured, tiered approach for assessing potential risk to wildlife, coordinating with federal and state regulatory agencies, addressing risk and securing Incidental Take Permits (ITP), as deemed appropriate. Although USFWS has not yet developed guidance for offshore wind, best practices to ensure compliance with the statutes can be informed by the USFWS Wind Energy Guidelines, BOEM OCS guidance (Regulatory Framework and Guidelines), and regional planning documents (e.g., National Ocean Council [NOC] Northeast Ocean Plan).



Informed by this rich and complex context Mayflower Wind will draw upon appropriate USFWS and other guidance documents and coordinate with USFWS, and where appropriate NOAA, during project risk assessment and planning to ensure compliance with the ESA, BGEPA, and MBTA. BOEM will also coordinate with USFWS during its review of the Mayflower Wind survey plans, SAP, and COP to ensure compliance with these statutes.

Milestone Date(s): [REDACTED]

## NOAA FISHERIES

In the North Atlantic, NOAA Fisheries is responsible for the administration and enforcement of the Marine Mammal Protection Act (MMPA), the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act; MSA), and the ESA.

The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas. “Take” as defined under the MMPA and associated regulations (50 CFR 216.3) means “to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal.” The MMPA may allow exemptions for the taking of marine mammals through an Incidental Take Authorization (ITA). NOAA Fisheries may issue two types of ITA: An Incidental Harassment Authorization (IHA), if potential harassment will occur for up to one year, or regulations and a Letter of Authorization (LOA) if there is potential for serious injury, mortality, or multiyear harassment. These authorizations permit the unintentional taking of small numbers of marine mammals, provided the take resulting from Project activities would have a negligible impact on the affected species or stocks, typically considered at the population level. Both forms of authorization require a public review and comment period. An ITA also requires monitoring and reporting of take.

In the context of the ESA, federal agency actions that are not likely to adversely affect (NLAA) species protected under ESA may qualify for an informal consultation, a process whereby the federal action agency (e.g., BOEM) prepares and submits an NLAA determination to NOAA Fisheries and requests that a Letter of Concurrence (LOC) be issued by NOAA Fisheries. If NOAA Fisheries agrees, it may then issue a LOC indicating that effects from the project will be wholly beneficial, insignificant, or discountable. In the event an action may affect a listed species under the ESA, a formal consultation between the federal action agency (e.g., BOEM) and NOAA Fisheries will occur. The consultation will result in the development of a biological opinion that contains NOAA Fisheries’ assessment of whether a federal agency action is likely to jeopardize a listed species or result in the destruction or adverse modification of its designated critical habitat. If take is authorized, NOAA Fisheries will issue an Incidental Take Statement (ITS) with Reasonable and Prudent Measures to minimize the impact of the take. BOEM will coordinate with NOAA Fisheries during its review of the Mayflower Wind survey plans, SAP, and COP to ensure that it has complied with the ESA, and where appropriate that Mayflower Wind has received any necessary MMPA authorizations. NOAA Fisheries may issue a LOC, Biological Opinion/ITS, IHA and/or LOA for the Project, as appropriate, for pre- and during construction activities and geophysical and geotechnical survey activities.

The MSA governs marine fisheries management in U.S. federal waters (out to 200 nautical miles from shore). It requires federal agencies such as BOEM to consult with NOAA Fisheries on proposed federal actions that may adversely affect Essential Fish Habitat (EFH). EFH includes areas necessary for spawning, breeding, feeding, or growth to maturity of federally-managed fisheries. The MSA also requires fishery management councils to describe and identify EFH in their respective regions, specify actions to conserve and enhance EFH and minimize the adverse effects of fishing on EFH. The New England Fishery Management Council (NEFMC) is responsible for managing fisheries and habitats in the New England region.

Consultations with NOAA Fisheries will be conducted during environmental reviews, including NEPA and potential ESA Section 7 consultation, to streamline requirements and avoid duplication. Mayflower Wind has

already initiated discussions with NOAA Fisheries' regulators and scientists about the potential impacts of this project on EFH, thereby allowing NOAA Fisheries to gain an early and comprehensive understanding of the project and science needs that will affect the permitting process. Mayflower Wind is also working closely with NOAA Fisheries to help plan and execute strategies, such as public-private partnerships, to generate new data and analyze and synthesize existing data that will help NOAA Fisheries in its mission and mandates related to offshore wind projects.

Milestone Date(s): Pre-construction: A MMPA Letter of Concurrence for Mayflower Wind's 2019 geophysical and geotechnical survey plan was submitted in June 2019 and concurrence by NOAA Fisheries was provided on July 26, 2019. [REDACTED]

Construction: [REDACTED]

## STATE

### MASSACHUSETTS ENVIRONMENTAL POLICY ACT (MEPA)

Those portions of the Project proposed within state boundaries are subject to Massachusetts siting and permitting reviews. These include the offshore export cables in Massachusetts waters (up to 3 nautical miles seaward of the low water mark of the shore), all of the onshore transmission located landward of the transition vaults at the landfall sites, the buried duct bank and splice vaults, proposed substation, and grid interconnection [REDACTED]

Until completion of a comprehensive review under the Massachusetts Environmental Policy Act (MEPA) Office, and approvals by the Energy Facilities Siting Board (EFSB) and the Department of Public Utilities (DPU), the Massachusetts permits for the project cannot be issued. The MEPA review process is managed through the MEPA Office within the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) and includes close coordination with all relevant state agencies including the Massachusetts Division of Fisheries and Wildlife. MEPA requires that state agencies study the environmental consequences of their actions, including permitting and financial assistance.

The purpose of MEPA is to provide meaningful opportunities for public review of the potential environmental impacts of projects and to "use all practicable means and measures to minimize damage to the environment" by studying alternatives to a proposed project and developing enforceable mitigation commitments, which will become conditions for the project in permitting. Under MEPA, before a state agency can issue a license or permit on a project subject to MEPA jurisdiction, it must make a Section 61 finding that all feasible measures have been taken to avoid damage to the environment or, to the extent such damage cannot be avoided, to minimize and mitigate the damage to the maximum extent practicable. 301 CMR § 11.12(5).

MEPA Regulations, along with the MEPA statute, govern the MEPA review process, which includes the preparation of an Environmental Notification Form (ENF) and/or Environmental Impact Report (EIR), contingent on thresholds exceeded. Like NEPA, MEPA review is not a permitting process. MEPA requires public study, disclosure, and development of feasible mitigation for a proposed project. It does not pass judgment on whether a project is environmentally beneficial, or whether a project can or should receive a permit. Those decisions are left to the permitting agencies. MEPA review occurs before permitting agencies act, to ensure that they are fully cognizant of environmental consequences of their actions.

The Project's voltage and length of electric transmission interconnect is anticipated to trigger the MEPA review thresholds and will require an ENF. For portions of the onshore transmission route, the Project may

also exceed ENF thresholds for conversion of land held for natural resources purposes in accordance with Article 97 to any purpose not in accordance with Article 97; and for release of an interest in land held for conservation purposes.

An EIR is also likely to be required. For Mayflower Wind, MEPA jurisdiction applies to only those portions of the Project located within Massachusetts, including its territorial waters.

Milestone Date(s): [REDACTED]

#### MASSACHUSETTS ENERGY FACILITIES SITING BOARD

The Massachusetts Energy Facilities Siting Board (EFSB) is an independent, nine-member review board within the Massachusetts Department of Public Utilities (DPU). The EFSB reviews requests for approval to construct proposed jurisdictional energy facilities. The EFSB is charged with ensuring that proposed energy facilities will provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. The EFSB's jurisdiction over the Mayflower Wind Project includes the offshore export transmission cables proposed for installation in state waters, the entirety of the onshore upland cable that will run [REDACTED]

The EFSB's review will cover potential environmental impacts and mitigation as well as the need for and cost of the facility, and alternatives and alternate routes for the proposed facility. Because of the review of need for these jurisdictional facilities, the EFSB will also require information on the offshore wind generation facilities associated with the Mayflower Wind Project. The Mayflower Wind Project consists of cases with both EFSB and DPU jurisdictions, which can incorporate a request for local zoning relief (DPU, Section 40A). It is anticipated that the Chairman of the DPU will issue a Consolidation Order directing the EFSB to render a decision in all related cases after conducting a single adjudicatory proceeding and developing a single evidentiary record.

Milestone Date(s) [REDACTED]

#### MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE, NATURAL HERITAGE AND ENDANGERED SPECIES PROGRAM

The Massachusetts Endangered Species Act (MESA), MGL Ch. 131A, prohibits the taking "of any rare plant or animal species listed as Endangered, Threatened, or of Special Concern by the Massachusetts Division of Fisheries and Wildlife (MassWildlife). The Natural Heritage and Endangered Species Program (NHESP), within MassWildlife, regulates the issuance of permits for activities within areas mapped as Priority Habitats of state-listed rare species to ensure that no takings occur. Like its federal analog, MESA defines "take" broadly to include the destruction of habitat, as well as the disruption of essential biological activities such as nesting, breeding, and migration.

Permits for taking rare species for scientific, educational, conservation, or management purposes can be granted through MassWildlife. If certain criteria are met, projects resulting in a "take" of state-listed rare species may be eligible for a Conservation and Management Permit, if commitments are made to mitigation that results in a net benefit to the species. The NHESP also reviews projects within Estimated Habitats of Rare Wetland Wildlife during review under the Massachusetts Wetlands Protection Act and submits letters to the conservation commission that the commissioners must consider before issuing a wetlands permit.

Project proponents with projects and activities within rare species habitat must submit a MESA Project Review Checklist with the NHESP for review and approval. During the regulatory review process, NHESP will provide a determination letter stating whether a project or activity, as currently proposed, will result in

a “Take” of state-listed species. Often projects will not negatively impact state-listed species or their habitats; others may require certain conditions such as timing restrictions to avoid impacts to state-listed species and their habitats. A small percentage of projects will impact state-listed species or their habitats and must either be revised to avoid such a “Take” or must meet the performance standards for the issuance of a Conservation and Management Permit.

Consultations with MassWildlife/NHESP will also be conducted as part of the MEPA review.

Milestone Date(s): [REDACTED]

#### MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

Massachusetts Department of Environmental Protection (MassDEP) carries out the Commonwealth’s obligations under the Clean Water Act by certifying that proposed discharges of dredged or fill material in waters of the U.S. comply with the Surface Water Quality Standards and other appropriate requirements of state law. Activities associated with the Mayflower Wind Project that will likely require Water Quality Certification include dredging, discharge of dredged or fill material, or placement, reuse or disposal of dredged material in state waters.

The Commonwealth’s primary tool for protection and promotion of public use of its tidelands, including filled tidelands, and other waterways is Massachusetts General Law Chapter 91, the waterways licensing program. Through Chapter 91, the Commonwealth seeks to preserve and protect the rights of the public and to guarantee that private uses of tidelands and waterways serve a proper public purpose. The electric interconnection of an offshore wind farm will require Chapter 91 approval for certain activities in state waterways or in tidelands such as the placement of submarine cables and the placement of any unconsolidated materials such as dredged materials at landfall locations.

Milestone Date(s): [REDACTED]

#### MASSACHUSETTS DEPARTMENT OF TRANSPORTATION

[REDACTED]

#### MASSACHUSETTS HISTORICAL COMMISSION

Both offshore and onshore components of the Project will be reviewed for areas with significant cultural resources associated with ancient and historic period Native American activities and colonial settlement.

The Massachusetts Historical Commission (MHC) serves as the home agency of the State Historic Preservation Officer (SHPO) in Massachusetts. The MHC was established to identify, evaluate, and protect important historical and archaeological assets of the Commonwealth. The Commission consists of 17

members appointed from various disciplines who serve as the State Review Board for state and federal preservation programs. Any new construction projects or renovations to existing buildings that require funding, licenses, or permits from any state or federal government agencies must be reviewed by the MHC for impacts to historic and archaeological properties. The review is conducted through a MA State Historic Preservation Determination. It is the nature of the federal or state agency activity that triggers MHC review, not listing in the National or State Registers of Historic Places. A listing in either register does not necessarily require review and likewise, lack of listing does not eliminate the need for review.

In accordance with Section 106 National Historic Preservation Act (NHPA), BOEM is the federal agency that will lead the review and assessment of the potential impacts of the Mayflower Wind Project on historic and archaeological properties. The scope and extent of the cultural resource surveys and reporting requirements for the Mayflower Wind Project will be determined in consultation with BOEM, the SHPOs of Massachusetts and Rhode Island, the Tribal Historic Preservation Officers (THPOs) of the Wampanoag Tribe of Gay Head (Aquinnah), Mashpee Wampanoag, and the Narragansett Indian Tribes, and the Massachusetts Board of Underwater Archaeological Resources (MBUAR). As per the lease agreement and in conjunction with these consultation activities, tribal pre-survey meetings with each THPO will be conducted for the Mayflower Wind Project [REDACTED]. The results of the cultural resource surveys will be included as part of the SAP and COP submissions for the Mayflower Wind Project.

Mayflower Wind has begun consultation with the SHPOs and THPOs as part of the BOEM permitting process. Results of the archaeological surveys, tribal pre-survey meetings, and geotechnical sampling will be considered early on in the siting process in order to allow for careful and strategic siting of infrastructure.

Consultations with the MHC, the MBUAR, and the appropriate Tribal Historic Preservation Offices will also be conducted as part of the MEPA review.

Milestone Date(s): [REDACTED]

## MASSACHUSETTS OFFICE OF COASTAL ZONE MANAGEMENT

In response to the federal Coastal Zone Management Act (CZMA), the Commonwealth of Massachusetts developed its coastal zone management program, which was approved by NOAA in 1978. This program is implemented by the Massachusetts Office of Coastal Zone Management (MA CZM). The *Massachusetts Office of Coastal Zone Management Policy Guide - October 2011* is the current official statement of the Massachusetts coastal program policies and legal authorities.

The CZMA gives individual states the authority to review federal projects to ensure that they meet state standards articulated in their coastal zone management plans through a process called federal consistency review. Federal consistency review is required for most projects that: 1) are in or can reasonably be expected to affect a use or resource of the Massachusetts coastal zone; and/or 2) require federal licenses or permits, receive certain federal funds, or are a direct action of a federal agency. BOEM will coordinate with MA CZM to ensure that the Mayflower Wind Project adheres to the coastal management plan standards.

MA CZM participates in the Massachusetts Environmental Policy Act (MEPA) and National Environmental Policy Act (NEPA) review processes to suggest how development can best be sited and designed to avoid adverse impacts. While not formally applied during MEPA review, the state's coastal policies are the primary focus of CZM's review and comments. Since the MEPA process precedes the submittal of permit applications, it provides an important opportunity to identify potential coastal effects at an early stage, consider project alternatives that can avoid or minimize these issues, and ensure that coastal policies are implemented effectively.

The Ocean Act of 2008 required the EEA Secretary to develop a comprehensive ocean management plan that is responsive to a set of directives and mandates, including the mandate that all state certificates, licenses,



permits, and approvals for any proposed structures, uses, or activities must be consistent with the plan to the maximum extent practicable. Administratively, the Massachusetts Ocean Management Plan is implemented through an interagency ocean management team, which is chaired by MA CZM and comprised of personnel from CZM, MassDEP's Wetlands and Waterways Program, the Department of Fish and Game's (DFG) Natural Heritage and Endangered Species Program and DMF, and the MEPA Office. The interagency team serves as a coordinating body on behalf of the EEA Secretary to support his/her oversight, coordination and planning authority functions for ocean waters and development. Through the MEPA process, the interagency team assists in the coordinated review of projects requiring the preparation of an Environmental Impact Report (EIR), including those that exceed mandatory review thresholds and those that are scoped for an EIR due to the nature of scope and intensity of potential impacts.

The EEA Secretary's final MEPA Certificate contains a determination as to the project's conformity with the applicable siting provisions of the Massachusetts Ocean Management Plan. Included with their Section 61 findings in the issuance of necessary licenses or permits, state agencies shall confirm that their authorization is consistent with the Massachusetts Ocean Management Plan and the Oceans Sanctuaries Act (which establishes Ocean Sanctuaries in Massachusetts waters— including the Cape Cod, Cape Cod Bay, and Cape and Islands).

During MEPA review of a project subject to the Massachusetts Ocean Management Plan and through administration of federal consistency review, CZM will seek to identify potential coastal effects of a proposed project, consider project alternatives that can avoid or minimize adverse impacts to resources and existing uses (and develop mitigation measures for unavoidable impacts as appropriate) and examine consistency with the coastal program policies. With its issuance of a federal consistency concurrence, CZM will affirm a project's consistency with the plan.

Milestone Date(s):

#### RHODE ISLAND COASTAL RESOURCES MANAGEMENT COUNCIL

The Rhode Island Coastal Resources Management Council's (CRMC) primary responsibility is the continued planning and management of the resources of the state's coastal region. CRMC is authorized under the federal Coastal Zone Management Act of 1972 to develop and implement Special Area Management Plans (SAMPs) to address specific regional issues. During the review of a project subject to SAMP and the federal consistency review, CRMC will seek to identify potential coastal effects of a proposed project, consider project alternatives that can avoid or minimize adverse impacts to resources and existing uses (and develop mitigation measures for unavoidable impacts as appropriate) and examine consistency with the coastal program policies. With its issuance of a federal consistency concurrence, CRMC will affirm the Project's consistency with the SAMP and approve with a majority vote of the Council.

In 2018, pursuant to the federal requirements of the CZMA at 16 USC § 1455(e) and 15 CFR Part 923 Subpart H, the CRMC filed with the Office for Coastal Management (OCM) of the National Oceanic and Atmospheric Administration (NOAA) to expand CRMC's existing federal consistency review authority on the outer continental shelf under the CZMA for the following two listed activities:

- 1) Any offshore wind facilities of a permanent nature, regardless of size; and
- 2) Underwater cables.

In December 2018, NOAA granted additional federal consistency oversight to CRMC to review federal licenses or permits issued by the Department of the Interior's Bureau for Ocean Energy Management (BOEM) for the listed activities above for consistency with the State's enforceable policies of the Ocean SAMP as provided by 16 USC § 1456(c)(3)(A) and the CZMA's implementing regulations at 15 CFR Part 930

Subpart D – Consistency for Activities Requiring a Federal License or Permit and Subpart E – Consistency for Outer Continental Shelf (OCS) Exploration, Development and Production Activities.

The 2018 Geographic Location Description (GLD) boundaries currently cover BOEM OCS Lease areas owned by Orsted (OCS – A 0486, 0487, and 0500), Vineyard Wind (OCS – A 0501) and Right-of-Way for The Narragansett Electric Co. (OCS – A 0506). BOEM Lease areas OCS – A 0520, 0521 and 0522 are not included in the GLD.

Milestone Date(s): [REDACTED]

## REGIONAL & LOCAL

### LOCAL AGENCIES

The cable landing area and onshore underground cables will require street opening permits or grants of location, as well as a permit(s) from the appropriate town conservation commissions. The substation will also require some local review (zoning, building permit, etc.). Portions of the onshore transmission and related facilities are proposed to be constructed [REDACTED] Mayflower Wind has initiated discussions with the towns. Mayflower Wind will obtain all needed approvals from the towns.

### CAPE COD COMMISSION, MARTHA'S VINEYARD COMMISSION

The Mayflower Wind Project is subject to review by the Cape Cod Commission (CCC) and is likely subject to review by the Martha's Vineyard Commission (MVC) as a Development of Regional Impact (DRI). The CCC and MVC are regional planning agencies created with authority to regulate large-scale developments, known as DRIs. The CCC and MVC review projects that may present regional issues related to factors such as water quality, traffic, community character, natural resources, and economic development. CCC and MVC approvals establish mitigation measures to address regional impacts. The CCC and MVC approvals supplement local authority. Because the Mayflower Wind Project is subject to EFSB review, the CCC and MVC will conduct their reviews under their adjudicatory processes.

Mayflower Wind anticipates that the MEPA, CCC and MVC review processes will be completed in approximately the same time frame as the EFSB review.

Milestone Date(s): [REDACTED]

### LOCAL ZONING BOARDS OF APPEALS

The construction of offshore delivery facilities may be subject to local planning and zoning review in [REDACTED]

These local planning and zoning reviews are fairly routine and well defined by the planning and zoning regulations on file at the government offices for each town. During these local reviews, an applicant must demonstrate that its project will be consistent with the pertinent local ordinances, or, where not consistent, apply for the appropriate variance.



[REDACTED]

Milestone Date(s): [REDACTED]

#### LOCAL CONSERVATION COMMISSION(S)

The Massachusetts Wetlands Protection Act (WPA) protects wetlands and associated public interests such as flood control, prevention of pollution and storm damage, and protection of fisheries, land containing shellfish, and wildlife habitat. These public interests are protected by requiring a careful review of proposed work that may alter wetlands. In addition to freshwater wetlands, protected areas include salt ponds, fish runs, and the ocean.

The MA WPA is administered at the local level by community conservation commissions, appointed by the selectmen or city council. On the state level, MassDEP oversees administration of the law. MassDEP develops regulations and policies and provides technical training to the local commissions. MassDEP also hears appeals of decisions made by the local commissions and issues superseding order(s) of conditions. Mayflower Wind may be required to obtain Orders of Conditions [REDACTED]

[REDACTED]

Milestone Date(s): [REDACTED]

[REDACTED]

### 7.3 EXPERIENCE IN ENVIRONMENTAL IMPACT ASSESSMENTS

7.3 Provide information detailing prior experience in environmental impact assessment processes.

#### MAYFLOWER WIND TEAM

The Mayflower Wind team has extensive experience and expertise in global impact assessment processes and a long and proven history of conducting onshore and offshore environmental impact assessments that have resulted in the successful development, permitting, financing, construction, and operation of offshore and onshore wind power projects and offshore energy facilities of all kinds while complying with the strictest global and local environmental requirements. Mayflower Wind's team also includes siting and permitting subject matter experts who have demonstrated experience fully and successfully permitting several major onshore electric transmission projects including assessing and managing multiple ISO-NE interconnection requests through to construction and operation. The Mayflower Wind team has a solid understanding of the environmental impacts associated with offshore wind development and the necessary measures to avoid, reduce, restore or offset these impacts.

Mayflower Wind benefits from a core project team that can readily access the deep expertise of each Sponsor by retaining support from Shell and EDP Renewables' subject matter experts. The strengths of Shell and EDP Renewables are complementary, bringing together a powerful combination of offshore and onshore environmental expertise that separates Mayflower Wind from other U.S. offshore wind developers.

In particular, Mayflower Wind will benefit from Shell's history of managing environmental impacts associated with its offshore energy projects, including monitoring and mitigating impacts on marine mammal populations, and conducting safe operations in the vicinity of endangered bird, whale, sea turtle,



and fish populations and protected and sensitive habitats and ecosystems. Shell is recognized as a trusted advisor and partner in the offshore environmental and ocean communities and aims to be a leader in the renewable energy industry.

Through Shell's operating offshore wind JV Noordzee wind, the Netherlands, and the JV Borssele 3/4, the Netherlands and currently under construction, Shell has a solid understanding of the environmental impacts associated with offshore wind development and the necessary measures to avoid, reduce, restore or offset these impacts. Shell's history and current activities also includes co-funding, sponsoring, or creating numerous multi-disciplinary studies and research and data programs with a range of stakeholders to better understand and minimize the impacts of energy exploration and development in the oceans. These programs range from understanding and minimizing the impacts of marine sound to characterizing habitats on artificial structures to monitoring the oceans using energy infrastructure to establish baselines and monitor environmental and climate change. Confirmation of the successful management of environmental monitoring and impact programs has resulted in a substantial list of peer-reviewed publications (see **Attachment 7.3-1**) and an extensive network of experts in the academic, research and development, and regulatory communities that Mayflower Wind can leverage in building the Project's monitoring and mitigation programs.

Specific examples relevant to offshore wind include sponsorship and active participation in the International Oil and Gas Producers Joint Industry Program on Sound and Marine Life (total funding since \$60 million by 12 companies with Shell share of \$6.4 million), co-funding of BLUE and AdBM pile driving quieting technologies, and the development of several marine sound risk assessment frameworks, such as the Population Consequence of (Acoustic) Disturbance (PCoD/PCAD) and Assess the Biological Significance of Noise Exposure on Marine Mammals frameworks. In the U.S., Shell, with partners from the National Academies of Science, Engineering, and Medicine and Universities have transitioned Shell's metocean buoys and offshore platform into ocean observatories, designing each to collect real-time ocean observations. Shell is currently outfitting offshore platforms with acoustic and other monitoring devices to track movements of highly migratory species and document fish abundance in the Gulf of Mexico. Additional programs include working with the U.S. Navy and Universities to deploy autonomous underwater and remotely operated technologies to assess ocean biodiversity on platforms and to monitoring ocean conditions to characterize ocean currents and heat content specific to development and progression of tropical storms and hurricanes.

Shell has also worked closely with NGOs, such as the Nature Conservancy, IUCN, and the National Fish and Wildlife Foundation (NFWF) to develop and implement conservation research programs that meet monitoring and mitigation objectives identified from environmental assessments. These range from coastal restoration projects of marshes and wetlands, the creation of artificial reefs, and conservation research to understand and protect endangered species and their habitats. These programs are only a few key examples that reflect the range of expertise that is available to the Mayflower Wind Project and will be leveraged by the Project team in establishing similar efforts to drive success and gain the confidence of stakeholders and regulators. Shell has been a partner with NFWF since 1998 funding over 280 projects, supporting the protection, restoration and management of over 160,000 acres of habitat, as well as the monitoring and management of key species in coastal ecosystems. Shell's NFWF Partnership supports such programs as: Shell Marine & Wildlife Habitat Program; Bats for the Future Fund; Monarch Butterfly and Pollinators Conservation Fund; and National Coastal Resilience Fund.

The Mayflower Wind team will also benefit from EDP Renewables' dedicated environmental and permitting team that has successfully completed environmental impact assessments and received permits for wind projects in states with complex permitting processes, such as Ohio, California, and New York. EDP Renewables' Moray East project in Scotland was the first of nine UK Round Three offshore wind projects to successfully achieve all permits. In addition, EDP Renewables has strong federal permitting expertise,

including the development of various Eagle Conservation Plans and Habitat Conservation Plans, and associated NEPA documentation.

EDP Renewables is an environmental leader in the renewable energy industry. As such, EDP Renewables has a long history in supporting organizations whose mission is to promote scientific research related to wind and wildlife impacts, such as the American Wind and Wildlife Institute (AWWI), Bats and Wind Energy Cooperative (BWEC), and most recently The Wind and Wildlife Research Fund (WWRF). This research enables a better understanding of the wind industry's impacts to wildlife, primarily birds and bat species, and strategies to avoid and minimize those impacts.

EDP Renewables develops and operates all its wind projects consistent with its internal standards that outline a tiered analysis process to assess risk at every stage of project development. This process recognizes that each project will have unique opportunities and challenges, and facilitates the guiding policy to avoid, minimize, and mitigate wildlife impacts throughout a project's lifecycle. In the U.S., this process is consistent with the U.S. Fish and Wildlife Service's Voluntary Land-Based Wind Energy Guidelines (WEGs). Related to this, all wind projects in the U.S. document this tiered process by preparing a Bird and Bat Conservation Strategy (BBCS).

Mayflower Wind will benefit from Shell's dedicated global impact assessment risk support team, which includes 68 authorized risk assessment subject matter experts (SME), with skill sets covering a wide range of safety, environmental and social performance disciplines, including marine mammals and acoustics, offshore ecology, stakeholder engagement, and others. These SME's will ensure that environmental risk assessments are conducted in line with international and national standards and that risks are mitigated to as low as reasonably practicable. This approach is unique in that it supports, and in some cases goes above and beyond, standard requirements in the U.S. by providing a thorough, specific and individual assessment of the Mayflower Project.

Mayflower Wind team's depth of experience and expertise in environmental risk assessment and creation and implementation of unique, site-specific environmental monitoring and mitigation programs will enable the Mayflower Wind Project to be permitted, constructed, and operated on time and in a manner that avoids or mitigates risks important to regulators and the communities involved.

## **SUBJECT MATTER EXPERTS SUPPORTING MAYFLOWER WIND**

Mayflower Wind has engaged top-of-class environmental consultants to provide project development and permitting support. Mayflower Wind's strategy is to build a consortium of experienced environmental consultants to provide the strongest applications and permits, conduct safe and reliable surveys and studies that are grounded in best available science and robust data to provide regulators and communities with upmost certainty that Mayflower Wind Project should be built and operated and will have minimal impact to the environment.



[REDACTED]

[REDACTED]

[REDACTED]

## 7.4 FISHERIES MITIGATION MEASURES

- 7.4 Please provide information on any fisheries mitigation measures designed to avoid, minimize and mitigate impacts on the commercial fishing industry, including but not limited to, progress on the following practices: fisheries outreach and communication plan; project siting and design; and financial compensation.

Mayflower Wind will implement a comprehensive suite of fisheries mitigation measures designed to avoid, minimize and mitigate impacts on the commercial fishing industry that include a fisheries outreach and communication plan, fisheries monitoring, fisheries mitigation measures, use of fisheries liaisons and fisheries representatives, participation in federal, state, and industry working groups, and supporting priority fisheries research. Each element is discussed in detail in the sections below.

Fishing was the Commonwealth of Massachusetts' first industry. Mayflower Wind recognizes that responsible development of the Mayflower Wind Project requires early, transparent, and continuous engagement and collaboration with the fishing industry. The success of the Mayflower Wind Project depends on our ability to co-exist with minimal disruption alongside Massachusetts fishermen and fishermen up and down the eastern seaboard that rely on Massachusetts ports. To achieve this, Mayflower Wind will develop and implement fisheries mitigation measures that avoid or mitigate impacts to fishermen and fisheries and collaborate with fishermen and fisheries managers to generate, sustain and innovate data and monitoring

efforts with the goal to maintain sustainable and healthy fisheries alongside responsible offshore wind development.

Additional detail on key Massachusetts fisheries and fish species is available in **Attachment 7.4-1**.

## FISHERIES OUTREACH AND COMMUNICATIONS PLAN

Mayflower Wind is developing a Fisheries Communication Plan (FCP) to guide outreach and communication with the fishing industry. The FCP will be developed according to BOEM's *Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf* (pursuant to 30 CFR Part 585). The FCP will describe the strategies that will be used for communicating with fisheries stakeholders prior to and during offshore activities including but not limited to:

- Roles of the fisheries liaison and fisheries representative(s);
- Potentially affected fisheries;
- Communication methods and tools;
- Measures under consideration to reduce potential impacts to fishery resources and operations; and
- Potential methods to monitor the effectiveness of impact-reduction measures.

Specific communication protocols will be detailed in the FCP and will include providing advance notification of project-related activities to local fishing groups and vessels and federal, regional, and state fishery management organizations. These notifications will include details on the location and timeline of offshore survey and construction activities in advance of mobilization, as well as ongoing updates until activities are completed. Additional fisheries communication methods and tools that may be included in the FCP are:

- A Project-sponsored 24-hour phone line for Project information;
- Access to relevant and appropriate information via the internet, email/social media, and/or local or industry-specific newspapers/publications for disseminating Project information;
- Direct access to Project scientists;
- Activities designed to educate the public, with emphasis on fisherman and boaters' education on survey and construction issues and other alerts;
- Meetings or open houses held periodically to keep the fishing industry informed of current project status; and
- Identification of specific methods for communicating with fishermen at sea.

Mayflower Wind will consult the following federal documents during the development of its Fisheries Communication Plan:

- Bureau of Ocean Energy Management (BOEM) Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf Pursuant to 30 Code of Federal Regulations (CFR) Part 585;
- Development of Mitigation Measures to Address Potential Use Conflicts Between Commercial Wind Energy Lessees/Grantees and Commercial Fishermen on the Atlantic Outer Continental Shelf Report on Best Management Practices; and
- Mitigation Measures: A Final Report for the U.S. Department of the Interior, Bureau of Ocean Energy Management, Office of Renewable Energy Programs, Herdon, VA, OCS Study

Key fisheries stakeholders relevant to Massachusetts that Mayflower Wind has engaged to date include:

- Bureau of Ocean Energy Management
- National Oceanic and Atmospheric Administration Fisheries
- US Fish and Wildlife Service
- Massachusetts Executive Office of Energy and Energy Affairs
- Massachusetts Division of Marine Fisheries
- Massachusetts Offshore Wind Habitat and Fisheries Working Groups
- Massachusetts Division of Fisheries and Wildlife
- Massachusetts Office of Coastal Zone Management
- Responsible Offshore Development Alliance
- New England Fishery Management Council
- Mid-Atlantic Fishery Management Council
- New Bedford Port Authority
- The Town Dock
- Massachusetts Lobstermen Association
- SeaFreeze Ltd.
- New York (NYSERDA) Fisheries Working Group
- Fisheries Survival Fund

Organizations and associations that Mayflower Wind intends to engage in the near future include:

- Cape Cod Commercial Fishermen's Alliance
- Cape Cod Fisheries Trust
- Martha's Vineyard Fishermen's Preservation Trust
- Massachusetts Aquaculture Organization
- Massachusetts Shellfish Officers Association
- Marine Recreational Fisheries Development Panel members and their respective affiliations

## **FISHERIES LIASON'S AND FISHERIES REPRESENTATIVES**

Mayflower Wind has contracted two Fisheries Representatives: Massachusetts Lobstermen's Association (MLA) and the New Bedford Port Authority (NBPA).

MLA is a member-driven organization that accepts and supports the interdependence of species conservation and the members' collective economic interests. For the past 56 years, the MLA has become a trustworthy voice for the industry on important issues and is looked to by both the fishing industry and the management community. Mayflower Wind scientists and MLA will work together to identify potential impacts to the lobstering community in the Project Area and collaborate on science initiatives that can help to better understand natural impacts to lobster in the region and to investigate potential impacts or changes to lobster populations with the introduction of turbines

The New Bedford Port Authority's primary charge is to support the Port of New Bedford through the implementation of best management practices over port resources and the development of economic growth strategies. New Bedford is the largest commercial fishing port in America by value of annual commercial fishery landings and 85% of those landings come from scallops. The number of boats utilizing the port provides strong representation of the scallop industry and the Mayflower Wind's relationship with the Port and its vessels is critical to collaboratively minimizing potential impacts to scallopers.

Mayflower Wind plans to coordinate with Fisheries Representatives that can provide insight into the use of the Project area by recreational fishermen and squid fishermen. Mayflower Wind plans to work alongside



our Fisheries Representatives to understand the potential impacts that the Project may have on these fishing communities.

Mayflower Wind is in the process of hiring Fisheries Liaison Officers (FLO). Mayflower Wind FLOs will act as personal conduits between fishermen and the Project team. The FLOs will regularly engage with fishermen following Mayflower Wind's principle of early and often engagement. Mayflower Wind will hire FLOs with experience working with fishermen and that also understand fisheries science and management.

## **PARTICIPATION IN FEDERAL, STATE, AND INDUSTRY WORKING GROUPS**

Mayflower Wind has already begun working with the Massachusetts Fisheries Working Group on Offshore Wind Energy and industry consortiums such as the Responsible Offshore Development Alliance (RODA) and the Responsible Offshore Science Alliance (ROSA) as forums for enhancing communications and collaboration. Mayflower Wind scientists are active participants and attendees at federal fisheries meetings and scientific conferences and workshops, such as NOAA Fisheries Management Council meetings, and will be participating in recreational fisheries meetings, including the NOAA 2019 New England Recreational Fishing Workshops.

Mayflower Wind is a member of the RODA Joint Industry Task Force. RODA is a not-for-profit, membership-based coalition of fishing businesses and associations with an interest in improving the compatibility of new offshore development with their companies. Its membership, working in numerous commercial fisheries, includes individual vessel owners, dealers, processors, and fishing groups. The Joint Industry Task Force is a group of RODA members and commercial offshore renewable energy developers with a mutual interest in promoting coexistence amongst offshore wind energy and commercial fishing practices. The Task Force aims to identify areas of cooperation and solutions to areas of conflict. The principles for the Task Force are:

- Promoting co-existence
- Providing for direct communication among industries
- Minimizing fisheries impacts
- Reducing risk and uncertainty
- Identification of conflicts and cooperative solutions
- Maintaining coastal fishing communities
- Ensuring representative of fishing interests at large in the process

Mayflower Wind worked with RODA, federal agencies, fishermen, and offshore wind developers to establish the Responsible Offshore Science Alliance (ROSA) to advance regional research and monitoring of fisheries and offshore wind interactions in federal waters through collaboration and cooperation. Mayflower Wind scientist, Dr. Ruth Perry, is a Board Member of ROSA and has dedicated significant time to jointly preparing grants and building the organization alongside the interested parties. Dr. Perry has extensive experience with setting up similar organizations and public-private partnerships in the Gulf of Mexico. She will continue to do so as an in-kind contribution and Mayflower Wind will also be investing in ROSA to help fund research priorities and needs identified by the organization. To date, ROSA has received expressions of support from the National Marine Fisheries Service, Northeast state agencies, the Bureau of Ocean Energy Management, five offshore wind energy leaseholders, and many others in the community

## **PROJECT SITING AND DESIGN**

Mayflower Wind is working collaboratively with state and federal agencies, fishermen, and other offshore wind developers to identify and implement project siting and design solutions that will ensure safe transit of fishing vessels through the Mayflower Wind Project and other adjacent lease areas.

FISHERIES MONITORING MEASURES

Mayflower Wind will develop and implement an integrated monitoring approach that includes academic institutions, fishermen, and consultants to identify and implement a suite of monitoring measures to inform project development and construction activities.

Mayflower Wind will be working with the [REDACTED] to conduct fisheries monitoring and impact assessment surveys that will assist in creating a baseline of existing fisheries information in and around the lease area. Potential marine fisheries surveys to be conducted by Mayflower Wind are detailed below in **Table 7.4-1**. This strong pre-construction baseline database, along with continued monitoring and data collection throughout the life of the Project, will be critical in determining any potential short- and long-term impacts and identifying potential fit-for-purpose and effective mitigation strategies.

Additionally, Mayflower Wind is working with adjoining lease holders to share fisheries survey data in and is participating in the Massachusetts Fisheries Working Group to help establish state-wide offshore survey consistency for fisheries. Furthermore, Mayflower Wind is committing financial and in-kind support to advance the collective understanding of Massachusetts fisheries ecology, ecosystems, and management. Mayflower Wind’s fisheries-focused commitments to fueling innovation, advancing research, and building consistency across modeling efforts are further detailed in **Section 14**.

Marine Fish Surveys and Studies in Planning Stage	Focus
Trawl surveys	Collect baseline data and to evaluate changes to mesoscale abundance and distribution of fish (demersal and benthic species) within Project Area. Trawl surveys will be video trawls of finfish and squid resources in the Lease Area and control areas.
Acoustic surveys	Collect baseline data and to evaluate changes to abundance and distribution of fish (pelagic and highly migratory species) around offshore structures. These surveys will be incorporated into innovation and environmental research partnerships.
Underwater video/photography surveys (drop camera system, ROVs)	Collect baseline data and to evaluate changes to abundance and distribution of invertebrate (scallops, etc.) and benthic habitats. Monitor reef effects of offshore structures and foundations. Surveys utilize [REDACTED] A component of these is incorporated into innovation and environmental research partnerships.

TABLE 7.4-1: POTENTIAL MARINE FISHERIES SURVEYS TO BE CONDUCTED AT THE MAYFLOWER WIND PROJECT

FISHERIES MITIGATION MEASURES

Mayflower Wind will develop fisheries mitigation measures based upon the current best available science and best management practices. Mayflower Wind recognizes that available science and management practices will evolve during the lifetime of the project and this evolution may affect changes or adaptations to mitigations proposed at earlier stages. Additionally, engagement conducted under the Fisheries Communication Plan and the input received by Fisheries Liaisons Officers and Fisheries Representatives and fisheries monitoring measures will inform the finalization and execution of fisheries mitigations throughout the lifetime of the Project.

Fish may be impacted by wind energy projects due to potential injury from noise during surveys and pile driving activities, temporary or long-term displacement, habitat alteration, or changes in prey availability or distribution. Concerns have also been expressed over potential impacts to fish and other marine organisms from electromagnetic fields (EMF) associated with electric transmission cables. Recent research



investigating habitat use around energized cables found no evidence that fish or invertebrates were attracted to or repelled by EMF from cables. A 2018 BOEM study on elasmobranch (sharks, rays, and skates) and American Lobster movement and migration found that EMF from operating direct current cables did not create a barrier to the movement of the species studied. See *Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and skates) and American Lobster Movement and Migration from Direct Current Cables*, OCS Study, BOEM 2018-003 (March 2018).

With respect to Mayflower Wind's offshore export cable in state waters, magnetic field levels associated with the cable are not expected to impact marine organisms. Because EMF from the offshore export cable is anticipated to be at low levels and decrease rapidly with lateral distance, the fields would be weak, small, and likely only detectable, if at all, to demersal species.

Mayflower Wind has considered the potential impacts to fish and fisheries and **Table 7.4-2** below identifies mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Research, Monitoring & Communications	<ul style="list-style-type: none"> <li>Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>Fisheries Communication Plan (FCP) - Development and implementation of a project-specific FCP that describes the strategies that would be used for communicating with fisheries stakeholders prior to and during offshore activities. The plan will include (1) Roles of the fisheries liaison and fisheries representative(s) (2) Potentially affected fisheries (3) Communication tools and information for fishermen and other stakeholders (4) Consider measures to reduce potential impacts to fishery resources and operations; and (5) Potential methods to monitor effectiveness of impact-reduction measures. As a component of the FCP, provide notifications to state and federal regional fishery management organizations and local fishing groups of the location and timeframe of the project survey and construction activities well in advance of the mobilization and with updates throughout the period.</li> <li>Additional communications – Fisheries Liaison Officers (FLO) to participate in federal and state working groups. FLOs (2 – 4) will be hired that can represent prominent fishing sectors and will engage regularly with fishing vessels and ports to solicit feedback on concerns and recommendations for mitigations and research and data needs that will be conducted as part of Mayflower Wind's environmental research investments.</li> </ul>
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>Vessel Speed Restrictions – Establish speed requirements for vessels operating nearshore in proximity to sensitive coastal habitats to reduce wakes leading to erosion (e.g., eelgrass beds, salt marshes, beaches).</li> <li>Anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable; they will be required to avoid known eelgrass beds and other SSU habitats as long as it does not compromise cable installation or health and safety of personnel.</li> </ul>

Project Phase	Potential Impacts	Mitigation
Pre-construction	Gear Entanglement	<ul style="list-style-type: none"> <li>Siting and Routing - Minimize export and inter-array cable crossings within a designated transit/fishing corridor.</li> <li>Siting and Routing – Work with Fisheries Representatives and Liaisons to map potential locations for gear in the Lease Area. Consider designated areas within the Lease for gear deployment (if necessary).</li> <li>Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>
	Habitat loss or disturbance/use conflicts – Known Fishing Features	<ul style="list-style-type: none"> <li>Siting and Routing - Set back offshore foundations a sufficient distance (minimum distance based on type of environment) from a known/utilized fishing feature (e.g., mud hole, hard bottom, etc.).</li> <li>Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>Scour Protection – Design scour protection system to reduce and minimize scour and sedimentation and use materials that could enhance fish habitat at base of offshore foundations.</li> <li>Mayflower Wind will work closely with municipal shellfish constables to coordinate shellfish seeding with planned activities prior to construction activities. Mitigation that addresses the anticipated level of impact will be developed in consultation with the shellfish constables, the Massachusetts Division of Marine Fisheries (DMF), the fishing community, and other interested parties. Mitigation measures may include relocating or translocating shellfish from the installation corridor, funding of local shellfish propagation programs, and/or the potential creation of a mechanism to compensate fishers for reimbursement of lost gear, harvest or fishing days.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>Transit corridor(s) – Proposed project includes an E to W transit corridor that aligns with neighboring leases as proposed in the December 2018 BOEM Final Sale Notice. Consider width of lane based on engagements with fisheries and USCG. Active participation on transit-related working groups (i.e. RODA Joint Industry Task Force) and incorporate consensus decisions from groups into project layout.</li> <li>Spacing between turbines – Proposed layout adopts best practice of an E to W orientation in the Lease Area with 1-mile spacing between turbine rows. Layout orientation aligns with neighboring leaseholders to provide fishermen consistent navigable routes to fishing grounds. Distance between turbine lines to be determined based on outcomes from on-going fisheries stakeholder efforts.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>
Construction	Gear Entanglement	<ul style="list-style-type: none"> <li>Vessel operations – Direct communications of vessel schedules and locations during construction activities FLOs, FRs, RODA, and other networks. Direct options for stakeholders to communicate with Mayflower team representatives to report gear loss.</li> <li>Cable Burial Depth - Install subsea cables to adequate depth based on future best management practices agreed upon by developers and fishermen; Investigate and deploy cable shielding materials where needed to avoid conflict with fishing vessels and gear operation.</li> <li>Fishing Gear Removal - Conduct operations surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> <li>Compensatory Mitigation Planning – Work with fisheries scientists, fishermen, economists and project-specific representatives (FLOs, FRs) to investigate types of compensatory mitigations.</li> </ul>
	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring – Implement construction fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>Time-area Restrictions – Work with fishermen to determine appropriate courses of action for areas that will be temporarily closed during specific construction activities</li> <li>Where possible, avoid sensitive areas and common fishing grounds inshore and offshore</li> </ul>
	Gear Entanglement	<ul style="list-style-type: none"> <li>Cable Burial Depth/Inspections - Inspect cable burial depth periodically during project operation to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity.</li> <li>Fishing Gear Removal - Conduct post-construction annual underwater surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>

Project Phase	Potential Impacts	Mitigation
Operations	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring - Implement operations fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>Cable Burial Depth – Install subsea cables to adequate depth (and consider use cable shielding materials to minimize potential but unlikely effects of magnetic fields, EMF).</li> <li>Where applicable, recording required cable protection on electronic charts to be distributed to fishermen.</li> <li>Anchor Buoys – when feasible, will require that all vessels on anchor within the project area to use mid-line anchor buoys to minimize the impact of anchor line sweep on bottom-dwelling fish and essential fish habitat (EFH).</li> <li>Mooring buoys – Consider the use of fixed mooring buoys at various strategic locations in the wind park to avoid the need for anchoring.</li> <li>Construction Methods –construction impacts to juvenile fish and EFH will be minimized by choosing the appropriate and least impactful installation method for each portion of the offshore route that can achieve the necessary burial depth with a relatively minor, temporary impact on the seabed. For example, installation of submarine cable using jetting, jet-plow, or mechanical trenching should minimize the area of dredging and direct seafloor impact.</li> <li>Applied construction methods for cable laying activities will be aligned with OSPAR and DOI guidelines.</li> <li>Soft Start – Incorporate slow start methods during initial pile driving activities to allow mobile fish and benthic organisms to migrate away from the impact area.</li> <li>Time-of-Year Restrictions – When necessary, adhere to species-specific State and federal designated time-of-year restrictions for designated diadromous fish, finfish, mollusk and arthropods identified within the Project Area to avoid spawning periods, larval settlement and juvenile development.</li> </ul>

**TABLE 7.4-2: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON FISH AND FISHERIES.**

## FISHERIES RESEARCH

Mayflower Wind’s scientists have been working closely with fishing organizations and government agencies to identify pathways to initiate research, standardize monitoring, minimize duplication of effort, and explore avenues to ultimately maximize effectiveness across regulatory requirements related to fisheries.

Through early engagement with fisheries managers, regulators and fishermen, Mayflower Wind understands the importance and urgency for research to answer outstanding questions on potential impacts to fish and their habitats from offshore wind development. As identified by the Massachusetts Department of Marine Fisheries, there are opportunities for wind developers conducting site characterizations and impact assessment research to coordinate and leverage resources to enable a broader understanding across wind

energy areas and leases. Mayflower Wind is establishing and participating in the following research efforts, to bring action and address the urgency expressed by stakeholders.

- Mayflower Wind has partnered with the Department of Energy National Renewable Energy Laboratory to submit a grant to the NYSERDA 2019 Program Opportunity Notice 4082 titled *Environmental and Fisheries Research for Offshore Wind Development, Commercial Fishing Access: Understanding offshore wind development constraints to commercial fishing access*. The proposal, titled *Collaborative Development of Strategies and Tools to Address Commercial Fishing Access in U.S. Offshore Wind Farms*, will develop solutions which preserve fishermen's ability to safely and effectively continue historic fishing practices to the maximum extent possible while working closely with OSW developers to ensure that projects meet energy generation and operational goals. This proposal brings together a multi-disciplinary team of offshore wind researchers, fisheries experts, developers, and regulators to identify priority issues and to collaboratively develop the technical solutions and tools to address them.
- Mayflower Wind is contributing [REDACTED] in environmental research funding to support the Responsible Offshore Science Alliance and the New England Aquarium Anderson Cabot Center of Ocean Life (NEAQ ACC). Scientists from each group will work together to establish and execute monitoring of highly migratory fish species that transit in and around the Mayflower Wind Project area. Funding will also support the collection of data related to movement ecology, biology, and population structure of key fish species and other efforts to increase the understanding of how migratory species may respond to installation and operations of offshore wind turbines. Mayflower Wind believes working with the NEAQ ACC will allow the exploration of novel approaches to complex issues facing offshore wind and fisheries co-existence

## 7.5 ENVIRONMENTAL CHARACTERIZATION

7.5 Provide a preliminary environmental characterization of the site and project, including both construction and operation. In addition, the bidder should identify environmental impacts associated with the proposed project and any potential impediments to development. A plan to avoid, minimize, or mitigate such impacts or impediments should also be included. The analysis should address each of the major environmental areas presented below, for the proposed project:

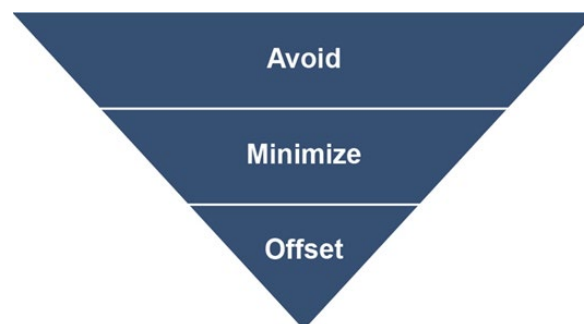
- i. Air quality
- ii. Community
- iii. Cultural resources
- iv. Fishery, avian, and marine mammal impacts
- v. Other ecological and biological resources (including endangered species)
- vi. Landscape and visual
- vii. Oceanography
- viii. Sound, noise and vibration
- ix. Socio-economic and land use
- x. Traffic and transportation (including Navigation)
- xi. Water resources (including quality and flood risk)

Mayflower Wind and its contractors have and are continuing to conduct preliminary environmental characterizations of the Lease area and Project. To develop the baseline site characterizations for the Mayflower Wind Project area, information and data were compiled from various surveys and studies including but not limited to:



- BOEM Massachusetts and Rhode Island Wind Energy Areas Environmental Assessments;
- BOEM Environmental Studies (<https://www.boem.gov/Massachusetts-Environmental-Studies/>);
- Marine Cadastre (NOAA and BOEM);
- Northeast Ocean Data Portal (Northeast Regional Ocean Council [NROC]);
- Mid-Atlantic Ocean Data Portal (MARCO);
- NOAA Northeast Fisheries Science Center;
- NOAA Integrated Ocean Observing System Regional Associations - Northeastern Regional Association of Coastal Ocean Observing Systems and Mid-Atlantic Regional Association Coastal Ocean Observing System
- Massachusetts Offshore Wind Wildlife Studies (Massachusetts Clean Energy Center);
- Publicly available information from Aerial and Acoustic Surveys for Large Whales and Sea Turtles;
- Abundance and Distribution of Seabirds off Southeastern Massachusetts, 2011-2015;
- Atlantic Marine Assessment Program for Protected Species (AMAPPS),
- Stellwagen Bank National Marine Sanctuary Research and Monitoring Programs,
- Atlantic and Great Lakes Sea Duck Migration Study,
- Cooperative Roseate Tern Metapopulation Project (CRTMP),
- Seabird Ecological Assessment Network (SEANET), and
- Marine-life Data and Analysis Team (MDAT) marine bird abundance and occurrence models.

Mayflower Wind has also conducted a preliminary review of potential impacts to environmental resources from project development, operations, and decommissioning and identified potential response measures within a mitigation hierarchy framework (MHF) (**Figure 7.5-1**). The MHF represents a tiered, hierarchical approach to exploring mitigation options that is widely accepted in Europe and reflected in the stepwise, sequential structure of U.S. and Canadian guidance for onshore and offshore wind development. Within this framework, preferred practicable options to avoid environmental impacts will be considered first, second-level options to minimize impacts are considered if potential impacts remain after first-level approaches have been addressed (i.e., implemented or modeled), and third-level options are only considered to compensate and offset any remaining residual impacts identified as potentially ecologically significant. In general, first-priority avoidance measures will be implemented in the siting phase and include best management practices for design and construction activities along with other siting considerations. If the environmental assessments indicate that potential impacts may remain after informed siting decisions have been made, options for avoiding and minimizing impacts or opportunities for additional support (i.e., offsite research and conservation efforts) will be identified.



**FIGURE 7.5.1** MITIGATION HIERARCHY FRAMEWORK

Mayflower Wind understands the importance of conducting a comprehensive assessment of potential direct and indirect risks to marine mammals, fish, sea turtles, invertebrates, and their habitats during the construction, operation, and decommissioning phases of the Project. Information gaps identified during the preliminary site characterization process are being addressed via additional surveys and/or studies, such as digital aerial avian surveys and continuing Massachusetts North Atlantic right whale surveys in coordination with adjoining lease developers. All desktop studies and surveys will be guided by the best available science for the region, be informed by current agency guidelines, and conducted to standards for addressing risk (e.g., before-after-control-impact, before-after-gradient studies). Other survey designs for fisheries are still in development at the time of this submission. It is Mayflower Wind's intent to coordinate with BOEM, NOAA Fisheries, USFWS, MA DMF, and other relevant parties before starting Lease area surveys. Mayflower Wind will also share appropriate data from field studies through existing federal and regional data portals.

Part of Mayflower Wind's 'early and often' engagement strategy includes working with stakeholders to solicit input and recommendations about potential impacts throughout the development process. Mayflower Wind also intends to use this input to inform future phases and working with stakeholders to proactively address potential concerns through a science-based approach. [REDACTED]

[REDACTED] the team will be working with [REDACTED] faculty to convene a series of workshops to identify key issues related to offshore, nearshore, and coastal environmental impacts throughout the development process and integrate the outputs of these workshops in Mayflower Wind's internal assessments and permits and approvals as relevant. These workshops will also help Mayflower Wind identify what information should be derived from monitoring and assessment efforts to understand identified impacts and develop effective mitigation strategies. These workshops will specifically solicit input from academia, policymakers and regulators, and the various fisheries active in the region.

Potential impacts to environmental and cultural resources are reviewed below. Examples of response measures and additional surveys to be considered by the Mayflower Wind, contingent on risk assessment in coordination with the appropriate agencies, are summarized at the end of each respective section. A more comprehensive mitigation plan is currently under development and will use the mitigation hierarchy to identify appropriate, practicable, and reasonable measures to mitigate project impacts. Comprehensive long-term monitoring plans (before, during, and after construction) will be developed utilizing stakeholder input and coordination described in **Section 7.6**. These plans will be implemented during the corresponding phases of the Project and the results will further help to identify impacts and modify mitigation measures, as necessary.

The construction schedule and sequencing for both onshore and offshore project elements will be modified to the maximum extent feasible to accommodate offshore time-of-year (TOY) restrictions protective of rare species, wildlife, and marine resources. Mayflower Wind will consult with federal and state agencies regarding construction scheduling and final TOY restrictions. Mayflower Wind will also consult with important stakeholders, such as fishermen, to identify other key time periods and areas where specialized mitigation measures may need to be implemented due to special uses of areas at different times of the year.

'Safety first, safety always' is a core value for Mayflower Wind. Protection of the environment and safety of personnel are critical, and Mayflower Wind will implement necessary and appropriate measures to assure regulators and stakeholders that the Project is being constructed and operated responsibly and with minimal impacts to the environment and ocean resources. In addition, Mayflower Wind intends to implement measures to protect the safety of its workers and the public on the water and land during construction and operation activities. These measures include creating and implementing safety plans for personnel, establishing temporary safety zones around all construction vehicles and vessels when appropriate, and constructing only under suitable and safe weather conditions. Mayflower Wind will also be developing and

executing safety monitoring programs and emergency response protocols for relevant construction and operation activities. Specifics of these plans can be reviewed in the following relevant sections.

AIR QUALITY

The Mayflower Wind Project is expected to have temporary minor, negative air quality impacts during construction associated with equipment and installation vessels, and a significant net positive benefit over the life of the Project.

The Mayflower Wind Project site is located on the outer more than 20 miles south of Martha’s Vineyard and therefore, the vast majority of support activities for construction and installation, operational phase maintenance, and decommissioning will occur far from land. During construction, a lesser degree of activity will occur at the construction staging port.

- Offshore construction activities and operational support: Emissions from installation and O&M vessels in or near the project area will nearly always be carried away from shore. In the rare event, emissions are carried toward shore, due to distances, they are not expected to affect any onshore areas.
- Nearshore and onshore construction activities: The construction of the Mayflower Wind Project is expected take place over a [REDACTED] period and therefore, air quality impacts are expected to be temporary and minor. Expected emissions sources include vehicles, heavy transport equipment, and installation vessels. Nearshore and onshore activities related to the operation of the Mayflower Wind Project after construction is complete are expected to be intermittent and have negligible impacts on air quality.

The National Ambient Air Quality Standards (NAAQS) have been established by the EPA to protect human health and include criteria for six major air pollutants (sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone, and lead). The Mayflower Wind Project will meet the NAAQS. More importantly, the air quality benefits of the Mayflower Wind Project (in the form of greenhouse gas emission reductions) far outweigh the minor emissions anticipated from construction. The Project will reduce greenhouse gas emissions by 1.56 million metric tons of CO<sub>2</sub> equivalents each year starting in 2026. This is a meaningful contribution to the targets established under the Global Warming Solutions Act and Massachusetts’ greenhouse gas emission targets for 2030, 2040, and 2050. Complete details of the Mayflower Wind Project’s greenhouse gas emissions reduction benefits are presented in **Section 13**

Mayflower Wind has considered the potential impacts to air quality during construction operations and **Table 7.5-1** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Pre-construction	Transportation-related emissions, studies and data gathering activities	<ul style="list-style-type: none"><li>• Minimize transportation-related emissions</li><li>• LiDAR on the metocean buoy will be solar-powered and use lithium batteries (no fuels (e.g. diesel or otherwise))</li></ul>



Project Phase	Potential Impacts	Mitigation
Construction	<p>Short-term air emissions will result from construction vessels, support vessels, and heavy equipment at ports.</p> <p>Air emissions from project activities are not anticipated to cause an exceedance of NAAQS.</p>	<ul style="list-style-type: none"> <li>Implementing dust-control measures in onshore construction and laydown areas.</li> <li>Selecting vessels with fuel-efficient engines for marine vessels and equipment. Potential use of battery hybrid marine propulsion and vessel performance monitoring IoT solutions is being explored.</li> <li>Using low-sulfur marine fuels</li> <li>Implementing best management practices for engine operations and maintenance.</li> <li>Obtaining and operating within permit requirements under the 40 C.F.R. 55 OCS Air Permit process.</li> </ul>
	<p><u>Onshore/nearshore:</u> Short-term air emissions from construction vehicles will be limited to areas adjacent to active construction</p>	<ul style="list-style-type: none"> <li>To minimize these impacts, construction activities will comply with the MassDEP Air Pollution Control Regulations (e.g., 310 C.M.R. §§ 7.02, 7.09). Mayflower Wind will minimize impacts related to fugitive dust, including, for example, the wetting of exposed soils and stockpiles to prevent dust generation. The relatively short duration of construction should lessen the likelihood that dust will migrate and cause impacts. For ROW construction, Mayflower Wind will use appropriately designed track out pads to prevent off-site migration of soils.</li> <li>Impacts from construction-vehicle fueling and exhaust will be minimized by directing contractors to turn off construction equipment when not in use and minimize idling times consistent with the Massachusetts' anti-idling law. Idling time will be limited to five minutes except when engine power is necessary for the delivery of materials or to operate accessories to the vehicle such as power lifts.</li> <li>Contractors will use ultra-low sulfur diesel ("ULSD") in off-road diesel vehicles and comply with the MassDEP Diesel Retrofit Program. All non-road engines will comply with the non-road diesel fuel sulfur limit of 15 ppm (per 40 C.F.R. Part 80).</li> <li>All non-road construction equipment with an engine rating of 50 or more horsepower that will be used for 30 or more days will either be EPA Tier 4-compliant or have EPA-verified (or equivalent) emissions control devices, such as oxidation catalysts or other comparable technologies (if commercially available) installed on the exhaust system side of the diesel combustion engine.</li> </ul>
Operations	<p>Short-term effects from air emissions will result from vessel operations.</p>	<ul style="list-style-type: none"> <li>Selecting O&amp;M vessels with fuel-efficient engines and equipment.</li> <li>Potential use of battery hybrid marine propulsion and vessel performance monitoring IoT solutions is being explored.</li> <li>Using low-sulfur marine fuels</li> <li>Implementing best management practices for engine operations.</li> <li>Obtaining and operating within permit requirements under the 40 C.F.R. 55 OCS Air Permit process.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	<u>Onshore/nearshore:</u> Technical specifications for equipment used in the substation(s) will not be determined until site assessment and the Independent System Operator of New England (ISO-NE) system studies are completed.	<ul style="list-style-type: none"> <li>If gas-insulated switchgear (GIS) is selected, the equipment will be hermetically sealed GIS, which will contain SF6. That equipment will meet the applicable requirements of 310 C.M.R. § 7.72. Equipment will carry a manufacturer representation of a maximum annual leak rate of less than a 0.1%. Mayflower Wind will follow manufacturer recommended maintenance procedures and best industry practices to avoid leakage of SF6 at the Substation.</li> </ul>

**TABLE 7.5-1: MITIGATIONS CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON AIR QUALITY.**

## ONSHORE COMMUNITY

Subsea cable laying and landside construction activities related to transmission and interconnection to the electrical grid will impact near-shore waters used by adjacent communities, as well as towns along the landside cable route. These impacts will largely be temporary during the construction period. Permanent impacts will be the addition [REDACTED] in some areas, and substation infrastructure installation on properties co-located with existing electrical infrastructure, or on private property currently zoned for industrial purposes. Potential construction impacts include restricted access for boating during subsea cable-laying, traffic diversions during cable installation along public roads, and construction noise.

The potentially impacted communities are [REDACTED]

**Mitigation of community impacts:** In order to identify community sensitivities and address concerns to the greatest extent practicable during the installation of transmission infrastructure, Mayflower Wind will hold open-house events in the potentially impacted communities to introduce the Project and the construction process. These events will provide detailed information about the construction process and provide residents the opportunity to learn about activities in the affected nearshore and landside areas and suggest opportunities to minimize impacts to those uses during construction.

Mayflower Wind will employ time of year restrictions to further minimize construction-related traffic impacts. Mayflower Wind will develop a business coordination plan designed to lessen impacts to businesses located along the routing options. This plan will reflect Mayflower Wind's outreach to each business that might be potentially affected by the Project to determine if there are specific timing concerns such as hours of operation, deliveries, high traffic periods, or other constraints. Mayflower Wind will engage in public outreach to ensure that emergency responders, residents, business owners, and town officials are apprised of construction schedules, vehicular access, lane closures, 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.

The Mayflower Wind team has extensive experience in working with local communities in Massachusetts and across New England; This experience has helped shape the Mayflower Wind Stakeholder Engagement Plan, further described in **Section 7.6**. Mayflower Wind has considered the potential impacts to communities and **Table 7.5-2** below presents mitigation measures currently being evaluated

Project Phase	Potential Impacts	Mitigation
Pre-construction	Impacts on local communities	<ul style="list-style-type: none"> <li>Working to identify other utility work that could be accomplished while the rights of way are open, to avoid multiple disruptions.</li> <li>Co-locating substation infrastructure with existing industrial/utility uses.</li> </ul>
Construction	Impacts on local communities	<ul style="list-style-type: none"> <li>Avoid construction during periods of high recreational use.</li> <li>Development and implementation of a construction neighborhood notification plan to ensure local communities are informed of upcoming development activities.</li> <li>Establishment of a project-sponsored 24-hour phone service to make project information available.</li> </ul>

**TABLE 7.5-2: MITIGATIONS CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON COMMUNITIES**

## CULTURAL RESOURCES

### OFFSHORE

Offshore wind energy projects and associated facilities, such as export cables, have the potential to impact archaeological sites, historic structures, cultural landscapes, and properties of religious and cultural significance to Native American Tribes. The potential visual impact of wind turbines on upland historic properties may be part of these effects and are discussed further in Section 7.5.6. On the OCS, historic properties that are listed or may be eligible for listing on the National Register of Historic Places (NRHP) include historic shipwrecks, navigational obstructions, and pre-historic archaeological sites. As the OCS is not federally-owned land, and as the Federal government has not claimed direct ownership of historic properties on the OCS, BOEM only has the authority under Section 106 of the NHPA to ensure that our funded and permitted actions do not adversely affect significant historic properties. The Mayflower Wind team is working closely with the BOEM to provide geophysical and geotechnical survey data in a timely manner and will comply with all Federal Lease stipulations when collecting data relevant for assessing the presence of historic properties.

The Massachusetts Board of Underwater Archeological Resources (MBUAR) has identified Nantucket Sound as an area of high sensitivity that is rich in submerged ancient Native American cultural resources and shipwrecks. Information on potential submerged cultural resources within the Mayflower Wind Project area was compiled from NOAA's Office of Coast Survey's Automated Wreck and Obstruction Information System. This database did not report any known wrecks or navigational obstructions within the Mayflower Wind Project area. Other yet unidentified archaeological features that may be present in the Mayflower Wind Project area include pre-contact materials (e.g. stone tools, pottery), debris fields, and pre-historic paleo landscape features. Mayflower Wind has met with the Tribal Historic Preservation Officers from the Wampanoag Tribe of Gay Head (Aquinnah), the Mashpee Wampanoag Tribe, and the Narragansett Indian Tribe to introduce the Mayflower Wind team, learn about respective tribal cultures in the area that the Project may affect, and to share 2019 plan for geophysical and geotechnical surveys. As part of Mayflower Wind's research and innovation commitments, scientists are working with the Mashpee Wampanoag Tribal Historic Preservation Officer to investigate methods for sharing geophysical and geotechnical data with the tribe in a useable way that tribal members can compare findings with traditional knowledge (e.g. oral histories). This type of unique data integration will further document the potential for areas within Mayflower Wind's lease that may have a higher potential for location of submerged cultural resources.

## NEARSHORE AND ONSHORE

Avoidance, minimization, and mitigation of offshore historical and archeological resources within the Project area in state waters will be determined in consultation with the Massachusetts Board of Underwater Archeological Resources through the Section 106 process.

For the most part, the onshore Project will be constructed in previously disturbed areas such as within public roadway layouts and existing cleared ROWs. Mayflower Wind will start with reconnaissance-level surveys to assess offshore conditions in the Lease Area, develop preliminary ground (bathymetric and sediment) models, and investigate whether the proposed onshore route options contain potentially significant resources that are eligible for listing on the National Register. Mayflower Wind will coordinate directly with the BOEM, Native American Tribes, and MHC regarding the need for additional field surveys and, to the extent necessary, will develop impact avoidance and mitigation plans through the Section 106 of the NHPA and the State Register Review processes.

Mayflower Wind has considered the potential impacts to cultural resources and **Table 7.5-3** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Pre-construction	<p>Disturbance to historic properties, cultural resources, and archaeological features (e.g., historic shipwrecks, navigational obstructions, debris fields, pre-historic paleo landscapes, pre-contact materials) during bottom-disturbing activities</p> <p>Visual impacts to historic properties or properties of religious and cultural significance</p>	<ul style="list-style-type: none"> <li>Mayflower Wind will coordinate with MBUAR and the Massachusetts Historical Commission (MHC) regarding proposed survey efforts, surveys results indicating potential to impact to archaeological resources and, to the extent necessary, impact avoidance and mitigation plans.</li> <li>Outreach and Coordination – Conduct pre-survey consultations with BOEM, MHC, and Officers of the Narragansett Indian Tribe, Mashpee Wampanoag Indian Tribes, and Wampanoag Tribe of Gay Head (Aquinnah).</li> <li>Siting and Routing – Avoid locating facilities in or near areas of identified or potential cultural resources and archaeological features.</li> <li>Avoidance – Implement buffer of a minimum of 50 m (164 ft) from potential archaeological resources during geotechnical exploration activities.</li> <li>Monitoring – A Qualified Marine Archaeologist will be present during High-Resolution Geophysical (HRG) surveys (e.g., side-scan sonar, magnetometer, Seismic penetration) and other bottom-disturbing activities.</li> <li>Archaeological surveys will be conducted by a Qualified Marine Archaeologist to evaluate the potential for cultural resources and archaeological features within the Mayflower Wind Project area which may include remote sensing surveys, evaluation of data, mapping, reporting, and permitting review.</li> </ul>



Project Phase	Potential Impacts	Mitigation
Construction	Disturbance to historic properties, cultural resources, and archaeological features (e.g., historic shipwrecks, navigational obstructions, debris fields, pre-historic paleo landscapes, pre-contact materials) during bottom-disturbing activities	<ul style="list-style-type: none"> <li>Unanticipated Discoveries Plan – All seafloor/bottom-disturbing activities will be halted upon the discovery of an unanticipated potential archaeological resource (e.g., shipwreck, evidence of pre-contact archaeological site) and BOEM will be notified within 24 hours of discovery.</li> </ul>

**TABLE 7.5-3: MITIGATIONS CURRENTLY BEING EVALUATED FOR POTENTIAL PROJECT IMPACTS ON CULTURAL RESOURCES.**

## FISHERY, AVIAN, AND MARINE MAMMAL IMPACTS

### FISHERIES

Many Massachusetts communities depend on fishing for their livelihood. Mayflower Wind recognizes that the Project must be built in a manner that avoids or minimizes impacts to these communities and to fishing grounds in and around the Project where construction and operations will occur. Mayflower is committed to bring fishermen collectively into the project planning process to better understand the history of fishing in this area, concerns of fishermen, and to work collaboratively with fishermen to develop monitoring protocols and to initiate research and data collection that can help inform the Project and fishermen on potential impacts. Mayflower Wind's fisheries mitigation measures will be grounded in transparent and open communication, minimal impact to fishermen and the fisheries they depend on, and collaboration with fishermen and fisheries managers to generate, sustain and innovate data and monitoring efforts to maintain sustainable and healthy fisheries alongside offshore wind development

Mayflower Wind has considered the potential impacts to fish and fisheries and **Table 7.5-4** below identifies mitigation measures currently being evaluated. Additional detail on key Massachusetts fisheries and fish species is available in **Attachment 7.4-1** with a Fisheries Mitigation Plan in **Attachment 7.4-2**.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of project)	Research, Monitoring & Communications	<ul style="list-style-type: none"> <li>Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>Fisheries Communication Plan (FCP) - Development and implementation of a project-specific FCP that describes the strategies that would be used for communicating with fisheries stakeholders prior to and during offshore activities. The plan will include (1) Roles of the fisheries liaison and fisheries representative(s) (2) Potentially affected fisheries (3) Communication tools and information for fishermen and other stakeholders (4) Consider measures to reduce potential impacts to fishery resources and operations; and (5) Potential methods to monitor effectiveness of impact-reduction measures. As a component of the FCP, provide notifications to state and federal regional fishery management organizations and local fishing groups of the location and timeframe of the project survey and construction activities well in advance of the mobilization and with updates throughout the period.</li> <li>Additional communications – Fisheries Liaison Officers (FLO) to participate in federal and state working groups. FLOs (2 – 4) will be hired that can represent prominent fishing sectors and will engage regularly with fishing vessels and ports to solicit feedback on concerns and recommendations for mitigations and research and data needs that will be conducted as part of Mayflower Wind's environmental research investments.</li> </ul>
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>Vessel Speed Restrictions – Establish speed requirements for vessels operating nearshore in proximity to sensitive coastal habitats to reduce wakes leading to erosion (e.g., eelgrass beds, salt marshes, beaches).</li> <li>Anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable; they will be required to avoid known eelgrass beds and other SSU habitats as long as it does not compromise cable installation or health and safety of personnel.</li> </ul>
Pre-construction	Gear Entanglement	<ul style="list-style-type: none"> <li>Siting and Routing - Minimize export and inter-array cable crossings within a designated transit/fishing corridor.</li> <li>Siting and Routing – Work with Fisheries Representatives and Liaisons to map potential locations for gear in the Lease Area. Consider designated areas within the Lease for gear deployment (if necessary).</li> <li>Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	Habitat loss or disturbance/use conflicts – Known Fishing Features	<ul style="list-style-type: none"> <li>• Siting and Routing - Set back offshore foundations a sufficient distance (minimum distance based on type of environment) from a known/utilized fishing feature (e.g., mud hole, hard bottom, etc.).</li> <li>• Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>• Scour Protection – Design scour protection system to reduce and minimize scour and sedimentation and use materials that could enhance fish habitat at base of offshore foundations.</li> <li>• Mayflower Wind will work closely with municipal shellfish constables to coordinate shellfish seeding with planned activities prior to construction activities. Mitigation that addresses the anticipated level of impact will be developed in consultation with the shellfish constables, the Massachusetts Division of Marine Fisheries (DMF), the fishing community, and other interested parties. Mitigation measures may include relocating or translocating shellfish from the installation corridor, funding of local shellfish propagation programs, and/or the potential creation of a mechanism to compensate fishers for reimbursement of lost gear, harvest or fishing days.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>• Transit corridor(s) – Proposed project includes an E to W transit corridor that aligns with neighboring leases as proposed in the December 2018 BOEM Final Sale Notice. Consider width of lane based on engagements with fisheries and USCG. Active participation on transit-related working groups (i.e. RODA Joint Industry Task Force) and incorporate consensus decisions from groups into project layout.</li> <li>• Spacing between turbines – Proposed layout adopts best practice of an E to W orientation in the Lease Area with 1-mile spacing between turbine rows. Layout orientation aligns with neighboring leaseholders to provide fishermen consistent navigable routes to fishing grounds. Distance between turbine lines to be determined based on outcomes from on-going fisheries stakeholder efforts.</li> </ul>
	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>• Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>

Project Phase	Potential Impacts	Mitigation
Construction	Gear Entanglement	<ul style="list-style-type: none"> <li>Vessel operations – Direct communications of vessel schedules and locations during construction activities FLOs, FRs, RODA, and other networks. Direct options for stakeholders to communicate with Mayflower team representatives to report gear loss.</li> <li>Cable Burial Depth - Install subsea cables to adequate depth based on future best management practices agreed upon by developers and fishermen; Investigate and deploy cable shielding materials where needed to avoid conflict with fishing vessels and gear operation.</li> <li>Fishing Gear Removal - Conduct operations surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> <li>Compensatory Mitigation Planning – Work with fisheries scientists, fishermen, economists and project-specific representatives (FLOs, FRs) to investigate types of compensatory mitigations.</li> </ul>
	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring – Implement construction fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>Time-area Restrictions – Work with fishermen to determine appropriate courses of action for areas that will be temporarily closed during specific construction activities</li> <li>Where possible, avoid sensitive areas and common fishing grounds inshore and offshore</li> </ul>
	Gear Entanglement	<ul style="list-style-type: none"> <li>Cable Burial Depth/Inspections - Inspect cable burial depth periodically during project operation to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity.</li> <li>Fishing Gear Removal - Conduct post-construction annual underwater surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>
Operations	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring - Implement operations fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>



Project Phase	Potential Impacts	Mitigation
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>• Cable Burial Depth – Install subsea cables to adequate depth (and consider use cable shielding materials to minimize potential but unlikely effects of magnetic fields, EMF).</li> <li>• Where applicable, recording required cable protection on electronic charts to be distributed to fishermen.</li> <li>• Anchor Buoys – when feasible, will require that all vessels on anchor within the project area to use mid-line anchor buoys to minimize the impact of anchor line sweep on bottom-dwelling fish and essential fish habitat (EFH).</li> <li>• Mooring buoys – Consider the use of fixed mooring buoys at various strategic locations in the wind park to avoid the need for anchoring.</li> <li>• Construction Methods –construction impacts to juvenile fish and EFH will be minimized by choosing the appropriate and least impactful installation method for each portion of the offshore route that can achieve the necessary burial depth with a relatively minor, temporary impact on the seabed. For example, installation of submarine cable using jetting, jet-plow, or mechanical trenching should minimize the area of dredging and direct seafloor impact.</li> <li>• Applied construction methods for cable laying activities will be aligned with OSPAR and DOI guidelines.</li> <li>• Soft Start – Incorporate slow start methods during initial pile driving activities to allow mobile fish and benthic organisms to migrate away from the impact area.</li> <li>• Time-of-Year Restrictions – When necessary, adhere to species-specific State and federal designated time-of-year restrictions for designated diadromous fish, finfish, mollusk and arthropods identified within the Project Area to avoid spawning periods, larval settlement and juvenile development.</li> </ul>

**TABLE 7.5-4: MITIGATIONS CURRENTLY BEING EVALUATED FOR POTENTIAL PROJECT IMPACTS ON FISHERIES**

## AVIAN

Potential impacts to avian species of concern include collision risk during operations, disturbance (temporary habitat loss) during construction, displacement during operations, alteration of food resource distribution (e.g., fish, aquatic invertebrates), and habitat loss, including coastal breeding habitats.

While BOEM avoided the areas of highest avian abundance in its designation of the Massachusetts Wind Energy Area, there is a potential for avian species protected under the BGEPA, ESA and/or MBTA to occur in the Mayflower Wind Project area, including four federally-listed marine and coastal birds (**Table 7.5-5**).

Species	Scientific Name	Federal Listing (ESA or BGEPA)	MESA Listing	Potential Presence	
				Lease Area	Export Cable Area and Onshore Substation
Seabirds					
Roseate tern	<i>Sterna dougallii</i>	E	E	✓	✓
Leach’s storm petrel	<i>Oceanodroma leucorhoa</i>	NL	E	✓	✓
Shorebirds					
Piping plover	<i>Charadrius melodus</i>	T	T	✓	✓
Rufa Red knot	<i>Calidris canutus rufa</i>	T	NL	✓	✓
Waterfowl					
Pied-billed grebe	<i>Podilymbus podiceps</i>	NL	E	✓	✓
Landbirds					
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	T	--	✓
Peregrine falcon	<i>Falco peregrinus</i>	NL	T	✓	✓
Grasshopper sparrow	<i>Ammodramus savannarum</i>	NL	T	--	✓
Vesper sparrow	<i>Poocetes gramineus</i>	NL	T	--	✓
Long-eared owl	<i>Asio otus</i>	NL	T	--	✓

ESA = Endangered Species Act; MESA = Massachusetts Endangered Species Act; E = Endangered; T=Threatened; NL = not listed; BGEPA = Bald and Golden Eagle Protection Act; ☐ = potentially present; -- = not present.

**TABLE 7.5-6: FEDERALLY- AND/OR STATE-LISTED AVIAN SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA**

There are three Federally-listed species of marine and coastal birds that may be present within the Mayflower Project Area: piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), and roseate tern (*Sterna dougallii*). Piping plover and red knot are shorebirds that are unlikely to come into contact with the Mayflower Project. Roseate terns may occur in the project area, as they forage offshore. Bald eagles are found year-round in Massachusetts, primarily in terrestrial environments near water, and the statewide breeding population is increasing. While bald eagles inhabit coastal marine environments, they do not normally occur in pelagic environments, and the Mayflower Wind Project area is outside of known high-use migration corridors of bald eagles. Golden eagles (*Aquila chrysaetos*) are rarely found in the eastern U.S. and only very rarely on the east coast and would not likely occur in the Mayflower Wind Project area. The state-threatened peregrine falcon has been shown to fly offshore, often for days at a time, and may

opportunistically hunt in the Mayflower Wind Project area or potentially perch on boats or anchored structures in the Mayflower Wind Project area.

Several species of pelagic seabirds that forage over the open ocean during both the breeding and non-breeding seasons are protected under MBTA and could potentially be impacted by the Mayflower Wind Project, including shearwaters, petrels, fulmars, phalaropes, and gannets. Nearshore species potentially impacted by the project activities in coastal waters include sea ducks, loons, grebes, terns, and most gulls most of which are also protected under the MBTA. The common tern (*Sterna hirundo*), arctic tern (*Sterna pardiasaea*) and least tern (*Sternula antillarum*) are also considered Species of Concern (SC) by the Massachusetts Division of Fish and Wildlife (MADFW). Additional details on marine and coastal birds are available in **Attachment 7.4-1**.

The Mayflower Wind Project is located within the Atlantic Flyway and within the North Atlantic/Shorebird Migratory Route, which are used by various migratory species protected under the MBTA. State-threatened grasshopper sparrow, vesper sparrow, short-eared owl, and long-eared owl are known to breed in coastal habitats on Cape Cod, Nantucket, and/or Martha’s Vineyard and could potentially be impacted by onshore project activities.

Mayflower Wind has considered the potential impacts to birds and is presently coordinating and engaging with federal agency scientists (BOEM, USFWS), state agencies, and NGOs, specifically the Massachusetts Audubon Society, to generate a thorough understanding on the bird species present and potential opportunities for collaborative research that can inform and validate the proposed mitigation strategies. **Table 7.5-7** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)		<ul style="list-style-type: none"><li>Consider, in coordination with USFWS and NHESP, conducting project and/or regional studies to identify displacement effects (Before-After-Control-Impact (BACI), Before-After-Gradient (BAG)) with the goal of informing future offshore siting decisions.</li><li>Initiate coordination of pre-construction monitoring plans and surveys with adjoining Massachusetts wind developers.</li><li>Develop new or leverage existing data portals to share bird data collected at the various project phases.</li><li>Consider collaborative opportunities to provide in-kind support, such as monopile foundations, to scientists to test monitoring technologies or to instrument platforms for collecting data on birds migrating in the area.</li></ul>

Project Phase	Potential Impacts	Mitigation
Pre-construction	Habitat loss, disturbance & displacement	<ul style="list-style-type: none"> <li>• Siting and Routing – Avoid/Minimize impacts of facilities in or near areas of known important or high bird use (e.g., nesting; foraging and overwintering areas, migratory staging or resting areas).</li> <li>• Siting and Routing – Avoid locating onshore facilities or landfall sites in or near rare species habitats or significant fish and wildlife habitats.</li> <li>• Siting and Routing – Utilize existing roadways, utility Rights-of-Way, and previously disturbed areas to locate land cables from the landfall to the Point of Interconnection to minimize alteration and disturbance to natural wildlife habitats.</li> <li>• Consult with NHESP to ensure that impacts to rare or sensitive species from offshore transmission within the habitat of state-listed species such as migratory birds including, for example, Least Tern, Common Tern, Piping Plover, and Roseate Tern are avoided or minimized to the greatest extent practicable, in accordance with the Massachusetts Endangered Species Act and its implementing regulations.</li> </ul>
Construction	Habitat loss, disturbance & displacement	<ul style="list-style-type: none"> <li>• Time-of-Year Restriction – Minimize landfall impacts during primary shorebird nesting season by Horizontal Direct Drilling (HDD) if known to utilize the immediate area of the landfall construction.</li> <li>• Construction Methods – Incorporate use of HDD at landfall sites (transition subsea export cable to land cable) and avoid disturbance to shorelines and coastal habitats.</li> </ul>
Operations	Collision risk (turbines)	<ul style="list-style-type: none"> <li>• Deterrent Devices – Consider the use of anti-perching devices to limit potential roosting activity and/or the use of other bird deterrent devices when deemed effective.</li> <li>• Lighting Schemes – Use lighting schemes for turbines that favor fewer lights, lower intensity lights, and strobing lights and avoid white lights, that are consistent with BOEM's lighting and marking guidelines and as well as Federal Aviation Administration (FAA) and USCG navigation lighting guidelines.</li> <li>• Consider using radar-operated lighting during operations.</li> <li>• Consider implementation of and/or participation in studies of emerging technologies (detection systems, deterrent systems, integrated detection-deterrent or detection-operational minimization systems).</li> </ul>
	Collision risk (vessels and helicopters)	<ul style="list-style-type: none"> <li>• Travel Routes – If important or areas of high bird use are identified, primary vessel transit and helicopter flight paths, as well as restrictions for helicopters altitude, may be considered.</li> </ul>

**TABLE 7.5-7: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON BIRDS**

## MARINE MAMMALS

Potential concerns related to marine mammals in the Mayflower Wind Project area are similar to those in lease areas throughout the Atlantic OCS. Of primary concern is that marine mammals may be adversely impacted by noise and vessels associated with surveys and project construction. Potential direct impacts include permanent and/or temporary threshold shift from geological/geophysical survey and construction noise, injury from vessel collisions, and disturbance. Indirectly, marine mammals may be impacted by changes in prey distribution and foraging habitat (e.g., increased turbidity).

Of key concern is the presence of the North Atlantic right whale, due to their small population size and relatively high mortality rates mainly caused by ship strike and entanglement with fishing gear. Mayflower Wind is considering the development and implementation of more stringent measures to avoid or minimize

any potential adverse effects to the North Atlantic right whale species associated with construction and operation activities.

Noise associated with construction activities has the potential to impact marine mammals. Reactions of marine mammals to noise may include apparent indifference, cessation of vocalizations or feeding activity, and evasive behavior (e.g., turns, diving) to avoid approaching vessels or pile driving activities. Additionally, continuous elevated anthropogenic sound levels may result in masking effects, i.e. it may affect the ability of marine mammals to use sound to communicate, detect prey or navigate. Short-term noise impacts associated with pre-construction activities (geological and geophysical surveys, buoy installation) and construction activities (vessel traffic, barge noise, pile driving, drilling, etc.) are expected to be localized and temporary. A full review of these noise impacts will be assessed, and extensive mitigation program will be developed and implemented to avoid and minimize impacts.

Vessels associated with the survey, construction and operation activities could collide with marine mammals (or sea turtles) during transit. Vessel collisions with marine mammals can cause serious injury or death and are a leading cause of mortality for certain species. Baleen whales are most at risk from ship strikes, and species including fin whale, North Atlantic right whale, humpback whale, and sperm whale are particularly vulnerable. Most ship strikes resulting in severe injury or death occur from ships traveling at 14 knots or faster and strikes from larger vessels (>80 m) are more likely to result in mortality.

The highly endangered NARW experiences the most numerous per capita vessel strikes and is especially vulnerable because it primarily utilizes busy coastal areas, swims slowly, and congregates at or just below the water surface. This species also shows no avoidance response when exposed to approaching vessels perhaps indicating habituation to ubiquitous vessel noise in its habitat. However, vessel speed restrictions are effective in decreasing NARW ship strikes; vessel speed limits of 10 knots have been shown to reduce ship strike mortality risk by 80-90%. All project vessels will follow NOAA NMFS collision avoidance guidance, including vessel speed restrictions to minimize the risks to NARW and other marine mammals.

Aerial and acoustic surveys have been conducted near the Mayflower Wind Project area as part of long-term population studies (e.g., Atlantic Marine Assessment Program for Protected Species [AMAPPS] for BOEM OCS assessments and Massachusetts Clean Energy Center North Atlantic right whale surveys). Data from these and future surveys provide information regarding the presence and distribution of marine mammals in the Mayflower Wind Project area. While there are approximately 38 marine mammal species that have ranges that include the Western North Atlantic, survey data indicate there are 18 marine mammal species that can be reasonably expected to occur within the Mayflower Wind Project area. All marine mammals are protected under the MMPA; however, only a few species expected in the Mayflower Wind Project area are also listed under the ESA and MESA.

In general, baleen whales are most frequently observed traveling through the OCS Project area in the spring and summer, and potential cable route areas in the winter and spring, as they migrate between southern breeding and northern feeding areas. The exception to this seasonal occurrence is the blue whale, whose migration pattern is not as well documented and is more often seen in winter around the Mayflower Wind Project area compared to summer. Toothed whales (e.g., sperm whale, bottlenose dolphin, pilot whale) can primarily be found within the Mayflower Wind Project area in the summer and fall, although some species may be present year-round. The harbor porpoise and seal species are typically observed in the Mayflower Wind Project area in winter and spring. Additional detail on marine mammals in the vicinity of the Project area is available in **Attachment 7.4-1**.

**Table 7.5-8** provides the listing status of each species as well as their potential presence in the region.



Species	Scientific Name	ESA Listing	MESA Listing	Potential Presence	
				Lease Area	Export Cable Area
Baleen whales					
North Atlantic right whale	<i>Eubalaena glacials</i>	E	E	✓	✓
Fin whale	<i>Balaenoptera physalus</i>	E	E	✓	✓
Minke whale	<i>Balaenoptera acutorostrata</i>	NL	NL	✓	✓
Sei whale	<i>Balaenoptera borealis</i>	E	E	✓	✓
Blue whale	<i>Balaenoptera musculus</i>	E	E	✓	✓
Humpback whale	<i>Megaptera novaeangliae</i>	NL	NL	✓	✓
Toothed whales					
Sperm whale	<i>Physeter macrocephalus</i>	E	E	✓	✓
Common bottlenose dolphin	<i>Tursiops truncatus</i>	NL	NL	✓	✓
Common dolphin	<i>Delphinus delphis</i>	NL	NL	✓	✓
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	NL	NL	✓	✓
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	NL	NL	✓	✓
Risso's dolphin	<i>Grampus griseus</i>	NL	NL	✓	✓
Long-finned pilot whale	<i>Globicephala melas</i>	NL	NL	✓	✓
Harbor porpoise	<i>Phocoena phocoena</i>	NL	NL	✓	✓
Seals					
Harbor seal	<i>Phoca vitulina</i>	NL	NL	✓	✓
Gray seal	<i>Haliochoerus grypus</i>	NL	NL	✓	✓
Harp seal	<i>Pagophilus groenlandicus</i>	NL	NL	--	✓
Hooded seal	<i>Cystophora cristata</i>	NL	NL	✓	✓

E = endangered; ESA = Endangered Species Act; NL = not listed; ✓ = potentially present; -- = not present.

**TABLE 7.5-8: MARINE MAMMAL SPECIES WITH POTENTIAL TO OCCUR IN THE MAYFLOWER WIND PROJECT AREA**

Mayflower Wind is considering the potential impacts to marine mammals and **Table 7.5-9** below presents mitigation, monitoring, and research measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Vessel collisions	<ul style="list-style-type: none"> <li>• North Atlantic Right Whale – Ensure all vessels maintain a separation distance of 500 m (1,640 ft) or greater from any sighted North Atlantic right whale or unidentified large marine mammal. Ensure that the following avoidance measures are taken if a vessel comes within 500 m (1,640 ft) of any North Atlantic right whale: <ul style="list-style-type: none"> <li>✓ If underway, any vessel must steer a course away from any North Atlantic right whale at 10 knots (18.5 km/h) or less until the 500 m (1,640 ft) minimum separation distance has been established (except as provided below).</li> <li>✓ If a North Atlantic right whale is sighted within 100 m (328 ft) to an underway vessel, the vessel operator must immediately reduce speed and promptly shift the engine to neutral. The vessel operator must not engage the engines until the whale has moved beyond 100 m (328 ft).</li> <li>✓ If stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 100 m (328ft), at which point the vessel then must steer a course away from the whale at 10 knots (18.5 km/h) or less until the 500 m (1,640 ft) minimum separation distance has been established.</li> </ul> </li> <li>• Large Whales other than the North Atlantic Right Whale – Ensure all vessels maintain a separation distance of 100 m (328 ft) or greater from any sighted ESA-listed whales or humpback whales.</li> <li>• Ensure that the following avoidance measures are taken if a vessel comes within 100 m (328 ft) of a whale: <ul style="list-style-type: none"> <li>✓ If underway, the vessel must reduce speed and shift the engine to neutral and must not engage the engines until the whale has moved beyond 100 m (328 ft).</li> <li>✓ If stationary, the vessel must not engage engines until the whale has moved beyond 100 m (328 ft).</li> </ul> </li> <li>• Small Cetaceans (Dolphins and Porpoises) and Seals – Ensure that all vessels underway do not divert to approach any small cetacean or seal. Ensure that all vessels maintain a separation distance of 50 m (164 ft) or greater from any sighted small cetacean or seal, except when a small cetacean or seal approaches the vessel. If a small cetacean or seal approaches any vessel underway, the vessel must avoid excessive speed or abrupt changes in direction to avoid injury to the animal.</li> <li>• Vessel Strike Avoidance Measures – Require all vessels operating within and transiting to/from the lease area comply with the vessel strike avoidance measures specified in lease stipulations, including: <ul style="list-style-type: none"> <li>✓ Ensure that vessel operators and crews maintain a vigilant watch for marine mammals (whales, dolphins, porpoises, seals), and slow down or stop their vessel to avoid striking these protected species.</li> </ul> </li> <li>• Engage with conservation organizations and academic institutions in developing NARW monitoring and mitigation plans.</li> </ul>

Project Phase	Potential Impacts	Mitigation
		<ul style="list-style-type: none"> <li>• Ensure that vessel operators monitor NOAA Fisheries' North Atlantic Right Whale reporting systems from November 1 through July 31 and whenever a Dynamic Management Area (DMA) is established within any area vessels operate.</li> <li>• Ensure that all vessel operators comply with 10 knot (18.5 km/h) speed restrictions in any DMA.</li> <li>• Ensure that all vessel operators reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of marine mammals are observed near an underway vessel</li> </ul>
	Entanglement avoidance	<ul style="list-style-type: none"> <li>• Ensure that any structures or devices attached to the seafloor for continuous periods greater than 24 hours use the best available mooring systems for minimizing the risk of entanglement or entrapment of marine mammals, manta rays and sea turtles, while still ensuring the safety and integrity of the structure or device. The best available mooring system may include, but is not limited to, vertical and float lines (chains, cables, or coated rope systems), swivels, shackles, and anchor designs.</li> <li>• All mooring lines and ancillary attachment lines must use one or more of the following measures to reduce entanglement risk: shortest practicable line length, rubber sleeves, weak links, chains, cables or similar equipment types that prevent lines from looping or wrapping around animals or entrapping protected species.</li> <li>• Any equipment must be attached by a line within a rubber sleeve for rigidity. The length of the line must be as short as necessary to meet its intended purpose.</li> </ul>
	Disturbance and temporary or permanent displacement	<ul style="list-style-type: none"> <li>• Long-term Monitoring – Identify collaboration opportunities to fund and implement long-term regional PAM within the Project Area to record marine mammal vocalizations, the ambient soundscape, and noise generated by the project before, during and after construction.</li> <li>• Identify R&amp;D and in-kind collaborative opportunities to further develop, improve and operationalize (automated) marine mammal detection methodologies, to facilitate data collection and the ability to detect marine mammal individuals under poor visibility conditions.</li> <li>• Initiate coordination of pre-construction monitoring plans and surveys with adjoining Massachusetts wind developers.</li> <li>• Develop new or leverage existing data portals to share marine mammal data collected at the various project phases.</li> </ul>
	Entanglement	<ul style="list-style-type: none"> <li>• Entanglement Avoidance – Ensure that any structures or devices attached to the seafloor for continuous periods greater than 24 hours utilize the best available mooring systems (e.g., vertical and float lines, swivels, shackles, anchor designs) to minimize the risk of entanglement while still ensuring the safety and integrity of the structure or device.</li> <li>• Provide assistance to authorized stranding response personnel as requested by NOAA Fisheries or Marine Mammal Stranding Centers if an entangled live or dead marine protected species is reported.</li> </ul>



Project Phase	Potential Impacts	Mitigation
Pre-construction	Disturbance or injury from sound generated during geological/geophysical surveys and construction	<ul style="list-style-type: none"> <li>• High-Resolution Geophysical Survey Equipment Ramp-Up – when technically feasible, employ a “ramp-up” of the high resolution geophysical (HRG) survey equipment at the start or re-start of HRG survey activities to minimize sound source impacts.</li> <li>• Visual Monitoring – Utilize NOAA Fisheries approved Protected Species Observers (PSOs) to visually monitor the clearance and exclusion zones. Ensure that active acoustic sound sources will not be activated until the PSO has reported the exclusion zone clear of all marine mammals for 60 minutes per BOEM Lease stipulations.</li> <li>• Passive Acoustic Monitoring (PAM) - Utilize NOAA Fisheries approved Passive Acoustic Monitors to acoustically monitor the clearance and exclusion zones during night-time operations and periods of low visibility per BOEM Lease stipulations.</li> </ul>

Project Phase	Potential Impacts	Mitigation
Construction	Disturbance or injury from sound generated during pile driving activities	<ul style="list-style-type: none"> <li>• Soft Start – Incorporate slow start methods during initial pile driving activities to allow whales to migrate away from the impact area.</li> <li>• Sound Attenuation Measures – Employ sound-attenuation measures, as necessary (e.g., bubble curtains, insulated piles); complete pile driving activities in most efficient manner possible to minimize sound exposure to marine species.</li> <li>• Continue to fund existing or new R&amp;D efforts on innovative sound reduction technology and processes, such as e.g. BLUE piling or AdBm.</li> <li>• Time-of-Year considerations – seasonal limitations on pile driving activities are an important element in our plans to protect the NARW and other marine mammals. In the current schedule, pile driving is limited between 1 January – 30 April; however, due to the evolving science and marine mammal survey results, Mayflower Wind may adjust these dates in consultation with the appropriate agencies and organizations.</li> <li>• Enhanced mitigation and monitoring protocols and techniques may be considered during periods of higher sensitivity and/or change in distribution of NARW in, and around, Mayflower’s lease area.</li> <li>• Development and implementation of clearance zones criteria protocols during pile driving activities for marine mammals and NARW. <ul style="list-style-type: none"> <li>✓ Pile driving is not to be initiated when NARW or other marine mammals are detected within a defined clearance zone.</li> <li>✓ Pile driving activities will be halted when marine mammal individuals are detected in the clearance zone unless it must proceed for human safety or technical reasons.</li> </ul> </li> <li>• Visual Monitoring – Utilize NOAA Fisheries approved Protected Species Observers (PSOs) to visually monitor the clearance and exclusion zones. Ensure that active acoustic sound sources will not be activated until the PSO has reported the exclusion zone clear of all marine mammals for 60 minutes per lease stipulation.</li> <li>• Real-time PAM will be implemented 60 minutes prior to pile driving and will continue for the duration of the pile driving activity.</li> <li>• In the current schedule, pile driving is not scheduled during night time hours. Pile driving efforts that started during daylight hours can be completed after dark. Opportunities for reliable and innovative monitoring of presence of marine mammals in the exclusion zone during night time will be assessed and may result in the modification of this measure, after discussions with regulatory agencies and conservation organizations.</li> </ul>

**TABLE 7.5-9: MITIGATIONS BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON MARINE MAMMALS.**

## OTHER ECOLOGICAL AND BIOLOGICAL RESOURCES

### SEA TURTLES

Potential concerns related to sea turtles in the Mayflower Wind Project area are similar to those in lease areas throughout the Atlantic OCS. Impacts may include collisions with Project vessels, disturbance or injury from sound generated during surveys and construction, temporary or permanent displacement, or alteration of foraging sources and habitats. Concern has also arisen regarding potential disturbance to turtle navigation

due to interference from electromagnetic fields (EMF) from wind turbines, electrical transformers or underground collector network cabling, but research to date does not indicate that EMF from wind energy projects poses a significant risk to sea turtles or other wildlife.

Information about sea turtle abundance and distribution off the coast of Massachusetts is limited but suggests that the four species in Table 7.13 are most likely to be found in the Mayflower Wind Project area during the summer and fall months; for instance, green, loggerhead, Kemp’s ridley, and leatherback sea turtles are known to forage in nearby Cape Cod Bay from June to October. Hawksbill sea turtles are also federally-listed but are rarely seen in Massachusetts.

Species	Scientific Name	ESA Listing	MESA Listing	Potential Presence	
				Lease Area	Export Cable Area
Loggerhead turtle	<i>Caretta caretta</i>	T	T	✓	✓
Leatherback turtle	<i>Dermochelys coriacea</i>	E	E	✓	✓
Kemp’s ridley turtle	<i>Lepidochelys kempii</i>	E	E	✓	✓
Green turtle	<i>Chelonia mydas</i>	T	T	✓	✓

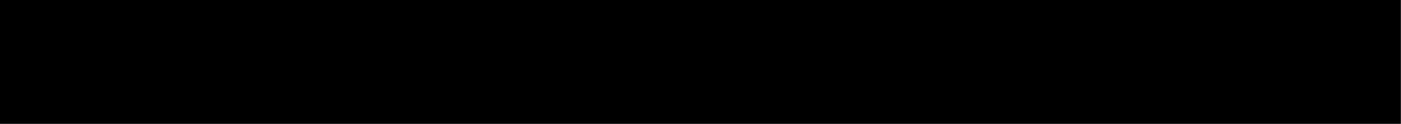
E = endangered; ESA = Endangered Species Act; T = threatened; X = potentially present; -- = not present.

TABLE 7.5-10: SEA TURTLE SPECIES WITH POTENTIAL TO OCCUR IN THE MAYFLOWER WIND PROJECT AREA

Information about sea turtle abundance and distribution off the coast of Massachusetts is limited but suggests that the four species in Table 7.5-10 are most likely to be found in the Mayflower Wind Project area during the summer and fall months; for instance, green, loggerhead, Kemp’s ridley, and leatherback sea turtles are known to forage in nearby Cape Cod Bay from June to October.

Potential concerns related to sea turtles in the Mayflower Wind Project area are similar to those in lease areas throughout the Atlantic OCS. Impacts may include collisions with Project vessels, disturbance or injury from sound generated during surveys and construction, temporary or permanent displacement, or alteration of foraging sources and habitats. Concern has also arisen regarding potential disturbance to turtle navigation due to interference from electromagnetic fields (EMF) from wind turbines, electrical transformers or underground collector network cabling, but research to date does not indicate that EMF from wind energy projects poses a significant risk to sea turtles or other wildlife.

ONSHORE TURTLES AND OTHER STATE-LISTED SPECIES



In consultation with NHESP, Mayflower Wind anticipates developing and implementing a construction-specific monitoring and mitigation plan for the [redacted] which would likely include construction activities occurring during the off-season [redacted] and the use of best management practices.

Mayflower Wind has considered the potential impacts to (sea) turtles and **Table 7.5-11** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Vessel collisions	<ul style="list-style-type: none"> <li>• Vessel Strike Avoidance Measures – Require all vessels operating within and transiting to/from the lease area comply with the vessel strike avoidance measures specified in lease stipulations, including: <ul style="list-style-type: none"> <li>✓ Ensure that vessel operators and crews maintain a vigilant watch for sea turtles and slow down or stop their vessel to avoid striking these protected species.</li> <li>✓ Ensure that all vessels underway do not divert to approach any sea turtle. Ensure that all vessels maintain a separation distance of 50 m (164 ft) or greater from any sighted sea turtle.</li> <li>✓ Ensure that vessels 19.8 meters (m) (65 feet [ft]) in length or greater that operate between November 1 through July 31, operate at speeds of 10 knots (11.5 mph) or less.</li> </ul> </li> <li>• Ensure that all vessel operators comply with 10 knot (18.5 km/h) speed restrictions in any DMA.</li> <li>• Provide assistance to authorized stranding response personnel as requested by NOAA Fisheries or Marine Mammal Stranding Centers if an entangled live or dead marine protected species is reported.</li> </ul>
Pre-construction	Disturbance or injury from sound generated during surveys and construction	<ul style="list-style-type: none"> <li>• High-Resolution Geophysical Survey Equipment Ramp-Up – when technically feasible, employ a “ramp-up” of the HRG survey equipment at the start or re-start of HRG survey activities to minimize sound source impacts.</li> <li>• Exclusion Zone – Ensure a 200-meter radius exclusion zone around a sound source during HRG survey for sea turtles.</li> <li>• Visual Monitoring – Utilize NOAA Fisheries approved PSOs to visually monitor the clearance and exclusion zones. Ensure that active acoustic sound sources will not be activated until the PSO has reported the exclusion zone clear of all sea turtles for 60 minutes per lease stipulation.</li> </ul>
Construction	Disturbance or injury from sound generated during pile driving	<ul style="list-style-type: none"> <li>• Exclusion Zone – Ensure a 200-meter radius exclusion zone during pile-driving for sea turtles.</li> <li>• Visual Monitoring – Utilize NOAA Fisheries approved PSOs to visually monitor the clearance and exclusion zones. Ensure that active acoustic sound sources will not be activated until the PSO has reported the exclusion zone clear of all sea turtles for 60 minutes per lease stipulation.</li> <li>• Sound Attenuation Measures – Employ sound-attenuation measures as necessary (e.g., bubble curtains, insulated piles); limit duration of pile driving activities to reduce sound propagation/reduce sound exposure.</li> </ul>
	Disturbance from construction activities	<ul style="list-style-type: none"> <li>• Consider planning construction activities outside the most active season of box turtles to minimize disturbance during periods of most important life functions.</li> <li>• Development of specific mitigation plans for endangered species.</li> </ul>

**TABLE 7.5-11: MITIGATIONS BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON SEA TURTLES.**

## FISH

Fish may be impacted by wind energy projects due to potential injury from noise during surveys and pile driving activities, temporary or long-term displacement, habitat alteration, or changes in prey availability or distribution. Concerns have also been expressed over potential impacts to fish and other marine organisms from electromagnetic fields (EMF) associated with electric transmission cables. Recent research

investigating habitat use around energized cables found no evidence that fish or invertebrates were attracted to or repelled by EMF from cables. A 2018 BOEM study on elasmobranch (sharks, rays, and skates) and American Lobster movement and migration found that EMF from operating direct current cables did not create a barrier to the movement of the species studied. See Electromagnetic Field (EMF) Impacts on Elasmobranch (shark, rays, and skates) and American Lobster Movement and Migration from Direct Current Cables, OCS Study, BOEM 2018-003 (March 2018).

With respect to Mayflower Wind's offshore export cable in state waters, magnetic field levels associated with the cable are not expected to impact marine organisms. Because EMF from the offshore export cable is anticipated to be at low levels and decrease rapidly with lateral distance, the fields would be weak, small, and likely only detectable, if at all, to demersal species.

Through early engagement with fisheries managers, regulators and fishermen, Mayflower Wind understands the importance and urgency for research to answer outstanding questions on potential impacts to fish and their habitats from offshore wind development. As identified by the Massachusetts Department of Marine Fisheries, there are opportunities for wind developers conducting site characterizations and impact assessment research to coordinate and leverage resources to enable a broader understanding across wind energy areas and leases. Mayflower Wind is establishing and participating in multiple research efforts, including participating in a leadership role, to bring action and address the urgency expressed by stakeholders.

PROJECT PHASE	POTENTIAL IMPACTS	MITIGATION
All phases (life-time of Project)	Research, Monitoring & Communications	<ul style="list-style-type: none"> <li>• Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>• Fisheries Communication Plan (FCP) - Development and implementation of a project-specific FCP that describes the strategies that would be used for communicating with fisheries stakeholders prior to and during offshore activities. The plan will include (1) Roles of the fisheries liaison and fisheries representative(s) (2) Potentially affected fisheries (3) Communication tools and information for fishermen and other stakeholders (4) Consider measures to reduce potential impacts to fishery resources and operations; and (5) Potential methods to monitor effectiveness of impact-reduction measures. As a component of the FCP, provide notifications to state and federal regional fishery management organizations and local fishing groups of the location and timeframe of the project survey and construction activities well in advance of the mobilization and with updates throughout the period.</li> <li>• Additional communications – Fisheries Liaison Officers (FLO) to participate in federal and state working groups. FLOs (2 – 4) will be hired that can represent prominent fishing sectors and will engage regularly with fishing vessels and ports to solicit feedback on concerns and recommendations for mitigations and research and data needs that will be conducted as part of Mayflower Wind's environmental research investments.</li> <li>•</li> </ul>
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>• Vessel Speed Restrictions – Establish speed requirements for vessels operating nearshore in proximity to sensitive coastal habitats to reduce wakes leading to erosion (e.g., eelgrass beds, salt marshes, beaches).</li> <li>• Anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable; they will be required to avoid known eelgrass beds and other SSU habitats as long as it does not compromise cable installation or health and safety of personnel.</li> </ul>



Pre-construction	Gear Entanglement	<ul style="list-style-type: none"> <li>• Siting and Routing - Minimize export and inter-array cable crossings within a designated transit/fishing corridor.</li> <li>• Siting and Routing – Work with Fisheries Representatives and Liaisons to map potential locations for gear in the Lease Area. Consider designated areas within the Lease for gear deployment (if necessary).</li> <li>• Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>• Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>
	Habitat loss or disturbance/use conflicts – Known Fishing Features	<ul style="list-style-type: none"> <li>• Siting and Routing - Set back offshore foundations a sufficient distance (minimum distance based on type of environment) from a known/utilized fishing feature (e.g., mud hole, hard bottom, etc.).</li> <li>• Siting and Routing – Avoid locating onshore facilities or landfall sites in or near significant fish habitats.</li> <li>• Scour Protection – Design scour protection system to reduce and minimize scour and sedimentation and use materials that could enhance fish habitat at base of offshore foundations.</li> <li>• Mayflower Wind will work closely with municipal shellfish constables to coordinate shellfish seeding with planned activities prior to construction activities. Mitigation that addresses the anticipated level of impact will be developed in consultation with the shellfish constables, the Massachusetts Division of Marine Fisheries (DMF), the fishing community, and other interested parties. Mitigation measures may include relocating or translocating shellfish from the installation corridor, funding of local shellfish propagation programs, and/or the potential creation of a mechanism to compensate fishers for reimbursement of lost gear, harvest or fishing days.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>• Transit corridor(s) – Proposed project includes an E to W transit corridor that aligns with neighboring leases as proposed in the December 2018 BOEM Final Sale Notice. Consider width of lane based on engagements with fisheries and USCG. Active participation on transit-related working groups (i.e. RODA Joint Industry Task Force) and incorporate consensus decisions from groups into project layout.</li> <li>• Spacing between turbines – Proposed layout adopts best practice of an E to W orientation in the Lease Area with 1-mile spacing between turbine rows. Layout orientation aligns with neighboring leaseholders to provide fishermen consistent navigable routes to fishing grounds. Distance between turbine lines to be determined based on outcomes from on-going fisheries stakeholder efforts.</li> </ul>

	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring &amp; Research – Compile existing fisheries data and economics from MA DMF, RI DEM, and federal sources to inform the development of mitigation plans and whether such should be altered over time. Develop pre-construction, construction, operations and decommissioning fisheries monitoring and research programs. Implement pre-construction monitoring programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>
Construction	Gear Entanglement	<ul style="list-style-type: none"> <li>Vessel operations – Direct communications of vessel schedules and locations during construction activities FLOs, FRs, RODA, and other networks. Direct options for stakeholders to communicate with Mayflower team representatives to report gear loss.</li> <li>Cable Burial Depth - Install subsea cables to adequate depth based on future best management practices agreed upon by developers and fishermen; Investigate and deploy cable shielding materials where needed to avoid conflict with fishing vessels and gear operation.</li> <li>Fishing Gear Removal - Conduct operations surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> <li>Compensatory Mitigation Planning – Work with fisheries scientists, fishermen, economists and project-specific representatives (FLOs, FRs) to investigate types of compensatory mitigations.</li> </ul>
	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>Long-term Monitoring – Implement construction fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> </ul>
	Use conflicts – General	<ul style="list-style-type: none"> <li>Time-area Restrictions – Work with fishermen to determine appropriate courses of action for areas that will be temporarily closed during specific construction activities</li> <li>Where possible, avoid sensitive areas and common fishing grounds inshore and offshore</li> </ul>
	Gear Entanglement	<ul style="list-style-type: none"> <li>Cable Burial Depth/Inspections - Inspect cable burial depth periodically during project operation to ensure that adequate coverage is maintained to avoid interference with fishing gear/activity.</li> <li>Fishing Gear Removal - Conduct post-construction annual underwater surveys and removal of fishing gear in and around offshore foundations.</li> <li>Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>



Operations	Indirect Impacts – Marine Resources	<ul style="list-style-type: none"> <li>• Long-term Monitoring - Implement operations fisheries monitoring and research programs. Contribute funds for collaborative long-term monitoring of marine resources and fisheries within the MA WEAs. Conduct collaborative fisheries studies and monitoring for impacts.</li> <li>• Compensation for Gear Loss - Develop a mechanism that could allow fishermen to be compensated for impacts that can be attributed directly to the project, e.g., damage to, or loss of, fishing gear.</li> </ul>
	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>• Cable Burial Depth – Install subsea cables to adequate depth (and consider use cable shielding materials to minimize potential but unlikely effects of magnetic fields, EMF).</li> <li>• Where applicable, recording required cable protection on electronic charts to be distributed to fishermen.</li> <li>• Anchor Buoys – when feasible, will require that all vessels on anchor within the project area to use mid-line anchor buoys to minimize the impact of anchor line sweep on bottom-dwelling fish and essential fish habitat (EFH).</li> <li>• Mooring buoys – Consider the use of fixed mooring buoys at various strategic locations in the wind park to avoid the need for anchoring.</li> <li>• Construction Methods –construction impacts to juvenile fish and EFH will be minimized by choosing the appropriate and least impactful installation method for each portion of the offshore route that can achieve the necessary burial depth with a relatively minor, temporary impact on the seabed. For example, installation of submarine cable using jetting, jet-plow, or mechanical trenching should minimize the area of dredging and direct seafloor impact.</li> <li>• Applied construction methods for cable laying activities will be aligned with OSPAR and DOI guidelines.</li> <li>• Soft Start – Incorporate slow start methods during initial pile driving activities to allow mobile fish and benthic organisms to migrate away from the impact area.</li> <li>• Time-of-Year Restrictions – When necessary, adhere to species-specific State and federal designated time-of-year restrictions for designated diadromous fish, finfish, mollusk and arthropods identified within the Project Area to avoid spawning periods, larval settlement and juvenile development.</li> </ul>

**TABLE 7.5-12:** MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON FISH

## BATS

The primary risk of impacts to bats from offshore wind energy facilities is collision risk during migration; however, the number of individuals passing through the Mayflower Wind Project area is likely minimal. Any tree removal or other disturbance to onshore habitats has the potential to affect bats but is unlikely to have a significant impact.

Eight species of bats could potentially occur within the Mayflower Wind onshore and offshore project areas, including several that are federally- and state-listed in Massachusetts, or are petitioned for federal listing

(Table 7.5-13). Species include cave-dwelling bats and migratory tree-roosting bats; tree-roosting bats are generally solitary and migrate long distances to warm climates whereas cave-hibernating bats hibernate during the winter months.

Common Name	Scientific Name	State Status	Federal Status	Cave-Hibernating Bat	Tree-Roosting Bat	Migratory Pattern
Big Brown Bat	<i>Eptesicus fuscus</i>	--	--	Yes	No	None
Eastern small-footed bat	<i>Myotis leibii</i>	E	--	Yes	No	None
Little brown bat	<i>Myotis lucifugus</i>	E	--	Yes	No	Some latitudinal migration
Northern long-eared bat	<i>Myotis septentrionalis</i>	E	T	Yes	No	Unknown but believed to be mostly philopatric
Silver-haired bat	<i>Lasionycteris noctivagans</i>	--	--	No	Yes	Continental
Eastern red bat	<i>Lasiurus borealis</i>	--	--	No	Yes	Continental
Hoary bat	<i>Lasiurus cinereus</i>	--	--	No	Yes	Continental
Tri-colored bat	<i>Perimyotis subflavus</i>	E	P	Yes	No	Some latitudinal migration

-- = NOT-LISTED; E = ENDANGERED; T = THREATENED; P= PETITIONED FOR LISTING.

**TABLE 7.5-13: BAT SPECIES WITH POTENTIAL TO OCCUR IN THE MAYFLOWER WIND PROJECT AREA**

Little is known about bat migration over marine habitats or the potential for offshore wind projects to impact bats. Bats migrating along the U.S. Atlantic Coast have been observed up to 27 mi (44 km) offshore, and hoary bats are regularly observed on Southeast Farallon Island, approximately 21 mi (33 km) from the California coast during fall migration. Several bat species have been observed on ships at sea or other remote islands, suggesting extensive movements over water. Although most migratory, tree-roosting bats are not currently protected under ESA/MESA, they represent the most commonly observed species as fatalities at operational land-based wind energy facilities (hoary bat, silver-haired bat, eastern red bat); there is, therefore, concern among agencies and conservation organizations regarding potential impacts to these species from wind energy.

Mayflower Wind has considered the potential impacts to bats and Table 7.5-14 below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Pre-construction	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>Siting and Routing – Avoid locating onshore facilities or landfall sites in or near rare species habitats or significant fish and wildlife habitats. Avoid siting near known hibernacula, maternal roosting colonies or other concentration areas as practicable.</li> </ul>
Construction	Habitat loss or disturbance	<ul style="list-style-type: none"> <li>Time-of-Year Restrictions – If northern long-eared bat is present, trees (&gt;5-in dbH) will only be removed when bats are hibernating or concentrated near their hibernacula. No trees within 150 feet of a known occupied maternity roost tree will be removed during the pupping season (June 1 to July 31) or within a 1/4 mile of a known hibernation site year-round.</li> </ul>
Operations	Collision risk	<ul style="list-style-type: none"> <li>Deterrent Devices – The use of acoustic deterrents or other deterrent technologies will be considered when deemed effective.</li> <li>Participation in studies of emerging technologies will be considered (detection systems, deterrent systems, integrated detection-deterrent or detection-operational minimization systems).</li> </ul>

**TABLE 7.5-14: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON BATS**

## INVERTEBRATES AND BENTHIC HABITATS

Potential impacts to invertebrates include habitat disturbance during construction, including changes in turbidity and disturbance to benthic substrates. Recent research also indicates that copepods and other zooplankton may exhibit short- or long-term displacement from wind energy projects.

Sediments in the Mayflower Wind Project area are dominated by fine sand and silt as compared to the other commercial leases within the MA Wind Energy Area that are predominately fine sand. There is a large muddy sand to mud patch in the area that is topographically similar to the surrounding sandy zones without a clear distinction of fauna between them. Grab-sampling by BOEM in 2017 yielded 151 infaunal taxa (co-dominated by amphipods and polychaetes), and beam trawl samples yielded 58 benthic epifaunal taxa (co-dominated by shrimp and sand dollars). Deposit feeding polychaetes, bivalves, amphipod, crustaceans, and echinoderms can be found in the Project area. Export cable routes areas are comprised of sandy sediments with a transition to sandy silt towards the continental shelf/slope. The invertebrate composition within the water column is dominated by copepods, along with water fleas (Cladocerans), seed or mussel shrimp (Ostracods), opossum shrimp (Mysids), krill (Euphausiids), sand fleas (Amphipods), decapods, isopods, pteropods, jellies (Cnidaria) and other planktonic species.

Mayflower Wind has considered the impacts to invertebrates and benthic habitats and **Table 7.5-15** below presents potential mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Pre-construction	Disturbance to seafloor and scour  Habitat loss or disturbance	<ul style="list-style-type: none"> <li>• Scour Protection – Design scour protection system to reduce and minimize scour and sedimentation and use materials that could enhance benthic habitat at base of offshore foundations.</li> <li>• Siting and Routing - Avoid locating offshore facilities in important habitat.</li> <li>• Conduct site reconnaissance geophysical and geotechnical surveys to develop sediment ground models to inform project planning.</li> <li>• Conduct baseline assessment using remotely operated and video technologies to document the presence and absence of invertebrate and benthic communities and potential substrates for invertebrate and benthic habitats</li> </ul>
Construction	Disturbance to seafloor and scour  Habitat loss or disturbance	<ul style="list-style-type: none"> <li>• Anchor Buoys – When feasible, require that all vessels on anchor within the project area to use mid-line anchor buoys to minimize the impact of anchor line sweep on benthic habitats.</li> <li>• Mooring buoys – Consider the use of fixed mooring buoys at various strategic locations in the wind park to avoid need for anchoring.</li> <li>• Construction Methods – Design transition of subsea export cable to landfall using method (i.e.; cofferdam and/or gravity cell) that reduces dredging footprint and impacts to benthic organisms.</li> <li>• Construction Methods – Incorporate use of Horizontal Direction Drilling (HDD) at landfall sites (transition subsea export cable to land cable) and avoid disturbance to nearshore productive shellfish beds.</li> <li>• Construction Methods –construction impacts to benthic organisms will be minimized by choosing the appropriate and least impactful installation method for each portion of the offshore route that can achieve the necessary burial depth with a relatively minor, temporary impact on the seabed. For example, installation of submarine cable using jetting, jet-plow, or mechanical trenching should minimize the area of dredging and direct seafloor impact.</li> <li>• Applied methods for cable laying activities will be aligned with OSPAR and DOI cable laying guidelines.</li> <li>• Minimize sand wave dredging through route engineering and installation tools that achieve greater burial depths.</li> <li>• Habitat Restoration – Restoration of any impacted nearshore shellfish beds.</li> </ul>

**TABLE 7.5-15: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON INVERTEBRATES AND BENTHIC HABITATS**

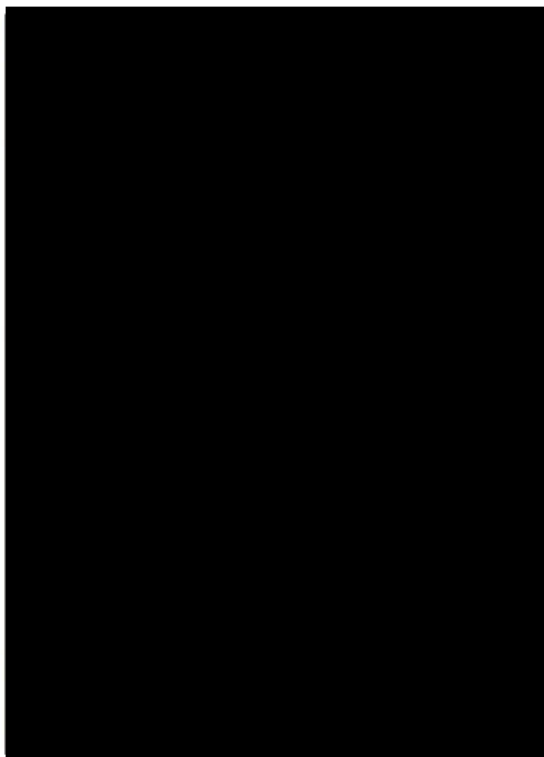
## LANDSCAPE AND VISUAL

### OFFSHORE

The Mayflower Wind Project area is located offshore of the southern coast of Massachusetts, south of the islands of Martha's Vineyard and Nantucket. A screening level Visual Impact Assessment (VIA) was completed for the Mayflower Wind project and surrounding area to assess the potential visual effects associated with the Project. Key observation points (KOPs), also known as viewpoints, were identified in the vicinity of the MA WEA, and a subset of KOPs were then selected for the screening analysis based on their historical and cultural significance, proximity to the Mayflower Wind Project area, designation as state or

federal recreation areas, and/or connection to scenic resource use. The VIA considered full-buildout of the Project area and considered turbines with an overall height of 820 ft (250 m).

Mayflower Wind Project area lies entirely beyond the visible horizon, meaning only a portion of the overall turbine height would be visible from any of the viewpoint locations. The Mayflower Wind project is also almost entirely beyond the 21 nm (39 km) boundary composited from all Massachusetts mainland and offshore island coastlines, that the Tribal Historic Preservation Officer of the Wampanoag Tribe of Gay Head (Aquinnah) requested be the minimum distance from for offshore wind development. The Wampanoag Tribe of Gay Head (Aquinnah) have lands on the southwest side of Martha's Vineyard, including the Gay Head Cliffs (a National Natural Landmark), and they consider an unobstructed view from the Cliffs to be crucial to the sacred nature of the site. Only an expected [REDACTED] will fall within a 21 nm boundary from any KOP and no turbines fall within this boundary from the Gay Head Cliffs.



**FIGURE 7.5-2: AQUINNAH REQUESTED MINIMUM DISTANCE FOR OFFSHORE DEVELOPMENT**

## NEARSHORE AND ONSHORE

The portions of the nearshore and onshore export cable to be installed underground will not result in any visual impacts. [REDACTED]

Mayflower Wind has considered the potential impacts to landscape and visual and **Table 7.5-16** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Construction	Short term visual impacts from the necessary clearing, grading, and development of the proposed new substation site.	Avoid/Minimize Visual Impacts – Substation to be located on previously-disturbed, private industrial land in remote area with natural vegetated buffer.
Operations	Visual impacts to viewpoints (e.g., tourist and recreational attractions, historical and culturally significant locations)	<ul style="list-style-type: none"> <li>• Avoid/Minimize Visual Impacts - [REDACTED]</li> <li>• [REDACTED]</li> <li>• [REDACTED]</li> <li>• Turbine Lighting – The Mayflower Wind Project will utilize lighting schemes to reduce visual impact in accordance with FAA/USCG lighting guidelines.</li> </ul>

**TABLE 7.5-16: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON LANDSCAPE AND VISUAL RESOURCES**

## OCEANOGRAPHY

The Mayflower Wind Project area is located on the Atlantic Continental Shelf, which is a tectonically passive trailing edge continental margin. Specifically, the area offshore of southwestern Massachusetts is referred to as the Nantucket Shelf Region, which is a shallow continental shelf environment in the shape of a peninsula extending out from Cape Cod and the islands of Martha's Vineyard and Nantucket. In addition, the Project area is southwest of the Nantucket Shoals, a relatively dynamic shallow area of the OCS off Nantucket.

In this area, there is a significant amount of variability in seabed forms from high flat areas to depressions, and sand waves. Prevailing winds come from the southwest. Water depths in the Mayflower Wind Project area range from approximately 130 to 210 ft (40 to 65 m). In general, water depths increase with increased distance from shore. Based on a review of GIS seismic data, there is no history of earthquakes in the Mayflower Wind Project area; however, a 2.57 magnitude earthquake was recorded to the west of the Project area in 1977.

The ocean environment is dynamic, and monitoring is necessary to characterize currents and other oceanographic conditions. Tropical storms, hurricanes, and winter storms can occur in the Project area (**Figure 7.5-3**). Ocean currents are highly seasonally and annually variable in and around Massachusetts and the Cape Cod region (**Figure 7.5-4**). Mayflower Wind is conducting in-depth oceanographic criteria



assessments of historic and present oceanographic conditions that will be used in the project design and construction and operations phases.

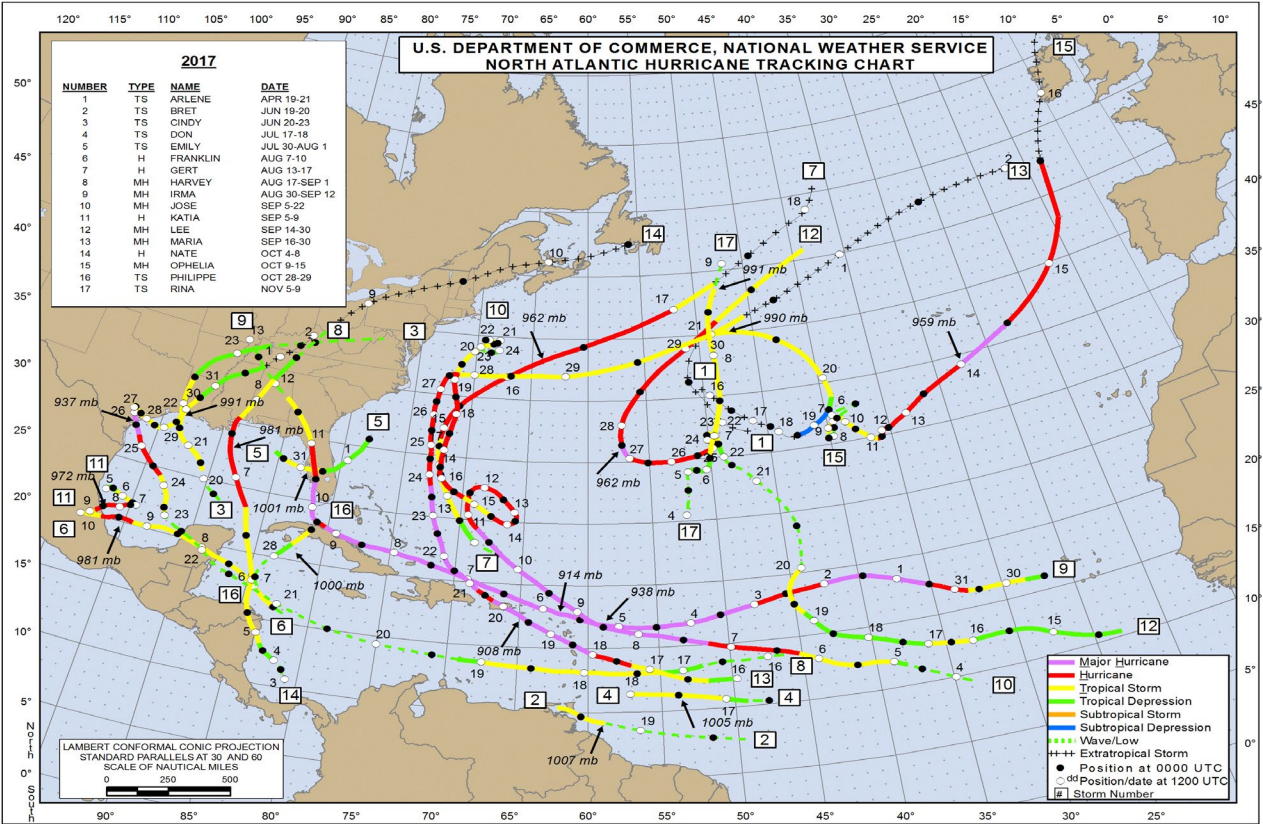


FIGURE 7.5-3: 2017 TROPICAL STORMS AND HURRICANE TRACKS. SOURCE: NOAA



FIGURE 7.5-4: SURFACE OCEAN CURRENTS IN AND AROUND MASSACHUSETTS. THE ARROWS INDICATE DIRECTION OF THE CURRENTS AND THE COLOR OF THE VECTORS REPRESENT SEAS SURFACE TEMPERATURES WITH RED INDICATING WARMER WATERS. SOURCE: NOAA IOOS MARACOOS



Mayflower Wind has considered the potential impacts to oceanography and **Table 7.5-17** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Vessel discharges and accidental spills (e.g., oil or chemical spills and releases)	<ul style="list-style-type: none"> <li>Response Plan –Mayflower Wind will require all vessels to comply with regulatory requirements for discharges and develop and implement Oil Spill Response Plans (OSRPs) for all project stages.</li> </ul>
	Monitoring & Research	<ul style="list-style-type: none"> <li>Mayflower Wind will deploy LIDAR and oceanographic buoy(s) to measure real-time conditions and share oceanographic data with NOAA and Massachusetts academic institutions.</li> <li>Mayflower Wind will invest research funds to collect data to inform ocean models developed by NOAA and SMAST that will assist the Mayflower Wind team in evaluating different turbine array scenarios and oceanographic conditions during all phases. Additional oceanographic monitoring will include the operations of gliders and other autonomous technology to characterize ocean conditions in the Project area.</li> </ul>

**TABLE 7.5-17: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON OCEANOGRAPHY**

## SOUND, NOISE, AND VIBRATION

### OFFSHORE

Reactions of marine mammals to noise may include apparent indifference, cessation of vocalizations or feeding activity, and evasive behavior (e.g., turns, diving) to avoid approaching vessels or pile driving activities. Additionally, continuous elevated anthropogenic sound levels may affect the ability of marine mammals to use sound to communicate, detect prey, or navigate.

Short-term noise impacts associated with pre-construction activities (geological and geophysical surveys, buoy installation) and construction activities (vessel traffic, barge noise, pile driving, drilling, etc.) are expected to be localized and temporary. A full review of these noise impacts will be assessed, and an extensive mitigation program will be developed and implemented to avoid and minimize impacts.

Mayflower Wind recognizes the potential impacts to marine animals associated with such activities as geophysical surveys and constructions activities (e.g. pile driving). Mayflower Wind will develop a noise mitigation strategy that integrates best management practices, innovations, and stakeholder input. Mayflower Wind Sponsors have played a leading role in increasing the understanding and management of underwater noise through extensive monitoring and mitigation programs, resulting in numerous peer-reviewed publications and have played a leading role in developing new noise-reducing technologies (eg. BLUE piling, AdBm) and autonomous noise monitoring technologies. **Attachment 7.3-1** contains an overview of a selection of those publications.

Recent studies conducted in the Rhode Island and Massachusetts WEAs between 2011-2015 indicate that the existing noise in the ocean contained primary frequencies of ambient noise ranged from 70.8 to 224 Hz, and sound pressure levels were between 96 dB re 1 µPa and 103 dB 50% of the time. Marine acoustic measurements taken in 2015 during Block Island pile driving activities provided estimated peak-to-peak apparent source levels between 233 and 245 dB re 1 µPa @ 1 m.

Noise resulting from increased vessel traffic associated with the Mayflower Wind Project activities could impact marine mammals (and sea turtles). Vessel noise is primarily composed of low-frequency components caused by propeller cavitation, though rotational and reciprocal machinery movement and hydrodynamic water movement over the boat hull also contribute to sound generation. As the intensity of vessel noise is largely related to ship size and speed, exposure of marine mammals and sea turtles to noise from construction and installation vessels would be variable. High levels of vessel traffic (e.g. from whale watching operations) have been noted to cause behavior changes in many cetacean species. However, because the lease area and adjacent waters are well-traveled and host active fishing (recreational and commercial) and commercial shipping industries, marine mammals and sea turtles in the area are likely habituated to these existing conditions. Increases in vessel noise in the area due to survey or construction activities are being assessed but are expected to be relatively insignificant. Any impacts to marine mammals or sea turtles from vessel noise are anticipated to be temporary, with behavior rapidly returning to normal following passage of a vessel, and it is unlikely that such short-term effects would result in long-term population-level impacts.

Mayflower Wind is developing an extensive monitoring and mitigation plan to ensure that adverse impacts are avoided and/or minimized during geophysical and geotechnical surveys and during construction. This monitoring and mitigation plan will be developed in consultation with key stakeholders, including the environmental NGOs and federal and state agencies.

Key components of this plan will be time of year restrictions to avoid pile driving activities during peak periods of marine mammal abundance and identification and application of efficient quieting technologies, where necessary. Protected Species Observers (PSO) will monitor for the presence of marine mammals and other marine species during pre-construction and construction activities. Passive Acoustic Monitoring (PAM) will be used where applicable and in compliance with BOEM Lease stipulations and NOAA authorizations. New technologies for monitoring of marine mammals during periods of poor visibility, e.g. night time, will be identified and applied when feasible and effective as well.

The Mayflower Wind Project area is located a minimum distance of approximately 19 nm (35 km) from shore, which will preclude any in-air noise impacts from construction pile driving or turbine operation reaching receptors along the coastline.

## ONSHORE AND NEARSHORE

Mayflower Wind is committed to minimizing the disturbance of construction activities on local communities. A noise assessment associated with onshore activities will be conducted, and the most appropriate mitigation measures will be developed to minimize potential disturbance. No horizontal direct drilling will be conducted during the tourist season which will avoid acoustic disturbance during this period.

Noise-emitting construction activities will include, for example, trench excavation, duct bank installation, manhole installation, backfill and compaction, pavement restoration, and splicing activities. Sound levels will vary among these activities, depending on the equipment used. Mayflower Wind will use equipment similar to that used in typical public works projects such as road resurfacing, storm sewer installation, or transmission line installation. Splicing equipment will include a splicing van, an air conditioning unit, and a generator.

It is not expected that the project will involve any blasting or noticeable vibrations.

Mayflower Wind's noise mitigation measures will include minimizing construction work outside typical construction hours to the extent possible, installing/maintaining mufflers on construction equipment where appropriate, maintaining and lubricating construction equipment for quietest performance, using muffling enclosures on continuously-operating equipment (e.g., air compressors, welding generators), using shielding or buffering distances for noisy equipment, turning off equipment not in use, and minimizing vehicle idling times. Prior to construction, a neighborhood notification plan will be developed and implemented to ensure

local communities are informed of upcoming development activities. A Project-sponsored 24-hour phone service for Project information will be made available as well.

Mayflower Wind will also comply with applicable sections of the MassDEP Air Quality Regulations [e.g., 310 C.M.R. § 7.10 subsections (1) and (2)] which address reducing unnecessary noise from sound-emitting equipment.

The project's proposed substation in [REDACTED] will contain sound-producing electrical equipment. Mayflower Wind will conduct a comprehensive sound level assessment for the installation of such electrical equipment. Baseline ambient sound levels will be measured to characterize the existing background near the proposed substation. Mayflower Wind will then model potential sound impacts at the nearest sensitive receptors for the proposed final design of the substation. As the specific substation equipment is selected and the civil and electrical layout is refined, the mitigation measures likely will change. Mayflower Wind will consider several means to minimize noise impacts on nearby receptors including, for example, using low-noise transformers, housing or enclosing synchronous condensers (if required), and a variety of sound barriers such that noise levels would meet all applicable regulatory standards (such as the 10 dBA limit at nearby residences as defined by MassDEP, and no "pure tones" as defined by the MassDEP Noise Policy).

It is essential that Mayflower Wind retain flexibility prior to final design of the substation. For example, the placement of the internal noise walls must be designed to ensure that they do not interfere with construction, operation, or maintenance; as a result, the walls may need to be farther from the equipment than modeled. In addition, the use of lower noise equipment may reduce the need or size for internal noise walls.

Mayflower Wind has considered the potential impacts caused by Sound, Noise and Vibration and **Table 7.5-18** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Monitoring & Research	<ul style="list-style-type: none"> <li>Continued investments in noise-reducing technologies specific for offshore wind development and installation.</li> <li>Funding to support standard and autonomous monitoring technologies to measure sound and monitor marine species in and around the Mayflower Wind Project area.</li> </ul>
Construction	Noise disturbance of local communities	<ul style="list-style-type: none"> <li>Sound impacts associated with landfall construction activities would be minimized with the use of acoustical blankets/barriers or similar measures to the extent possible. Mayflower Wind will work with owners of nearby properties to determine whether it will be possible to reasonably provide other accommodations during the noisiest periods.</li> <li>Development and implementation of a construction neighborhood notification plan to ensure local communities are informed of upcoming development activities.</li> <li>Establishment of project-sponsored 24-hour phone service to make project information available.</li> </ul>
Construction	Noise generated by pile driving	<ul style="list-style-type: none"> <li>Conduct a sound source verification study to verify sound source levels of pile driving and propagation modeling results.</li> </ul>
		<ul style="list-style-type: none"> <li>Conduct a multi-foundation design analysis, including non-driven solutions, such as gravity-based foundations and suction bucket technology (as described in <b>Section 8</b>), to determine the commercial and technical feasibility of alternative foundation types to avoid pile driving activities.</li> </ul>
		<ul style="list-style-type: none"> <li>Sound Attenuation Measures – Employ sound-attenuation measures as necessary (e.g., bubble curtains, insulated piles); complete pile driving activities in the shortest time possible to reduce prolonged sound exposure.</li> </ul>

**TABLE 7.5-18: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS CAUSED BY SOUND, NOISE, AND VIBRATION**

## SOCIO-ECONOMIC AND LAND USE

Potentially impacted communities within the project area include [REDACTED]

Long-term socio-economic impacts associated with the project, further detailed in **Section 14**, comprise significant job-creation over the development, construction, and operation of the project, along with investment in port infrastructure to support construction and O&M over the 30-yr. life of the project. These positive economic impacts will largely benefit Economically Distressed Areas (EDAs) in the project region, including [REDACTED]

In order to maximize these benefits, to the extent feasible, construction materials, vessel servicing, and commissioning will be sourced from within the project area over the life of the project. Mayflower Wind has reviewed 27 potential locations for marine terminals and waterfront facilities to stage, assemble, and deploy the project for each stage of construction, and we are currently focused on negotiating for site control in four of those 27 locations. While Mayflower Wind is considering utilizing one or more of these properties as marine terminal facilities during the construction of the project, the [REDACTED] is the preferred staging port for construction. Mayflower Wind has executed a lease option with [REDACTED] for staging turbine blades, nacelles, towers, and foundation transition pieces.

As described in **Section 7.5**, physical landside and nearshore impacts associated with cable laying and grid interconnection activities largely related to construction will be temporary and will be avoided or mitigated. Any socio-economic impacts associated with landside and nearshore construction will be temporary and will be minimized through implementation of a comprehensive communications plan that will alert residents, and local, state and federal officials of pending construction activities, anticipate conflicts with usual activity in the area, determine specific mitigation measures, and provide a real-time mechanism to address problems that may arise.

As further detailed in **Section 6**, the Mayflower Wind Team is working with [REDACTED]  
[REDACTED]  
By coordinating their respective projects within the same previously-disturbed footprint, Mayflower Wind will minimize environmental impacts and benefit Massachusetts ratepayers with reduced costs. [REDACTED]  
[REDACTED]

Impacts from Mayflower Wind’s proposed [REDACTED] construction will be avoided or minimized by implementing the same kind of mitigation measures it will use to avoid/minimize impacts during construction of the onshore export cable (e.g., construction-related noise, air, traffic impacts, water quality and/or water supply protection impacts).

Mayflower Wind has considered the potential impacts to Socio-economic and Land Use and **Table 7.5-19** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
Construction	Overlap between construction activities with peak tourist season	<ul style="list-style-type: none"><li>Time-of-Year Restrictions – Schedule nearshore construction activities to avoid the height of the summer tourist season and coordinate with stakeholders/visitors’ bureaus to schedule outside of major events taking place offshore.</li></ul>
Decommissioning	Use conflicts – Decommissioning	<ul style="list-style-type: none"><li>Habitat Restoration - Removal of offshore structures, foundations, inter-array cables and export cables following decommissioning.</li></ul>

**TABLE 7.5-19: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS TO SOCIO-ECONOMIC AND LAND USE**

**TRAFFIC AND TRANSPORTATION (INCLUDING NAVIGATION)**

**OFFSHORE**

The Mayflower lease area is bordered to the immediate south by a major shipping safety fairway that extends east then north into Boston Harbor. Vessel traffic in the Mayflower Wind Project area and vicinity primarily consists of commercial and recreational fishing vessels. Vessel traffic is relatively low in comparison to that in the offshore shipping lanes and inshore along the coast, at the entrances to ports and harbors, and between the islands. The Mayflower Wind Project area falls within the Narragansett Bay Operational Areas (OPAREA), where the U.S. Navy conducts surface and subsurface training operations. No military designated restricted areas or danger zones are present in the lease areas, but there is a danger zone to the north around Nomans Land, an island off the coast of Martha’s Vineyard. Potential impacts to



navigation include increased use of port(s), increase in navigation capacity in waterways and increase in traffic along roadways to and from port(s).

## ONSHORE

Mayflower Wind is committed to working closely with emergency responders, host communities, local businesses, residents, and sensitive receptors to minimize traffic impacts from the Project to the maximum extent possible. Mayflower Wind will minimize traffic impacts from the construction of in-road duct banks or otherwise by the limited duration of construction at any one location, and through the implementation of Traffic Management Plans ("TMPs") and will work with the relevant municipalities to refine the TMPs. Mayflower Wind will work with emergency response officials such as police and fire departments, departments of public works, and with MassDOT District traffic engineers to develop a series of temporary traffic control plans ("TTCPs"). TTCPs will be adapted to any changes in construction location, timing, or method and coordinate with the relevant authorities before implementing any changes. The TTCPs will minimize impacts to local vehicular and pedestrian traffic in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways of Massachusetts ("MUTCD") and other MassDOT guidelines. Traffic mitigation measures will be consistent with the Manual of Uniform Traffic Control Devices (2009 Edition) and the MassDOT Work Zone Safety Guidelines.

Mayflower Wind has considered the potential impacts to traffic and transportation and **Table 7.5-20** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases (life-time of Project)	Congestion in port(s), increase in navigation capacity in waterways	<ul style="list-style-type: none"> <li>Navigation Risk Assessment – The Mayflower Wind Project will develop a Navigation Risk Assessment in consultation with the U.S. Coast Guard to fully assess potential navigation impacts and conflicts.</li> </ul>
	Collision with turbines	<ul style="list-style-type: none"> <li>Vessel Transit Corridors – Consider wind turbine layout, spacing between turbines and orientation to allow safe passage of vessels and improve navigational safety in areas where freedom of vessel movement is inhibited by restricted ocean space and other obstructions to navigation.</li> <li>Vessel Safety – Marking offshore structures with USCG-approved measures (such as lighting) to ensure safe vessel operation.</li> </ul>
Construction	Congestion in port(s), increase in navigation capacity in waterways	<ul style="list-style-type: none"> <li>Mayflower Wind considers employing a Marine Coordinator to manage all construction and installation phase vessel logistics and to act as a liaison with the U.S. Coast guard, port authorities, marine pilots, state and local law enforcement, marine patrol, and port operators.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	Road congestion and access due to construction activities	<ul style="list-style-type: none"> <li>Traffic impacts would be mitigated by the limited duration of construction at any one location, and by the implementation of traffic management plans (TMP) on local streets and of temporary traffic control plans (TTCP) to govern roadways under MassDOT jurisdiction; pedestrian and bicycle safety and movement would also be addressed to minimize impacts of construction.</li> <li>Prior to construction a neighborhood notification plan will be developed and implemented to ensure local communities are informed of upcoming development activities. A Project-sponsored 24-hour phone service for Project information will be made available as well.</li> <li>Landfall construction impacts will be minimized by working within daytime shifts to the extent possible and coordinating work periods with the relevant town; work would also be performed off-season when there are fewer residents in the area.</li> <li>Emergency access will be maintained during construction and will minimize construction impacts by coordinating with emergency responders to make sure traffic plan and access arrangements for work areas are sufficient and that any signage or cones are appropriate and effective, and by using appropriate fencing.</li> <li>Time of year restrictions will be applied to minimize construction-related traffic impacts.</li> <li>A Business Coordination Plan will be designed to lessen impacts to businesses located along the routing options; this plan will reflect Mayflower Wind's outreach to each business that might be potentially affected by the Project to determine if there are specific timing concerns such as hours of operation, deliveries, or high traffic periods or other constraints.</li> <li>Public outreach will be conducted to ensure that emergency responders, residents, business owners, and town officials are apprised of construction schedules, vehicular access, lane closures, 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. The Project outreach plan would include information on complaint and response procedures; Project contact information; the availability of web-based Project information; and protocols for notifying schools and local and regional public transit operators of upcoming construction.</li> </ul>
Operations	Collision risk – Wind Turbines	<ul style="list-style-type: none"> <li>Siting and Routing - wind turbine layout, spacing between turbines and orientation will be designed to allow safe passage of fishing boats between the structures and to accommodate adequate area for fishing gear.</li> </ul>
	Fishing	<ul style="list-style-type: none"> <li>The potential for conflict originating from project navigation with fishing activities will be considered.</li> </ul>

**TABLE 7.5-20: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON TRAFFIC AND TRANSPORTATION**

## WATER RESOURCES (INCLUDING QUALITY AND FLOOD RISK)

### OFFSHORE

A review of regional current circulation indicates that the Nantucket Shelf Region is the northernmost location warmed by the Gulf Stream that flows north from the tropics. North of the Nantucket Shelf Region is



the Gulf of Maine, which is cooled by the Labrador Current that flows south from the Canadian Arctic. Oceanic circulation patterns are important in the transportation and dispersion of sediment and anthropogenic contaminants which determine the water quality of the area, therefore, the Nantucket Shelf Region is a major biogeographic boundary for many species. BOEM describes a range of currents, averaged over the water column from bottom to surface, that varies from 0.2 ft/s (5 cm/s) in the southwest portion of the MA WEA to 2.6 ft/s (80 cm/s) in the northeast portion, with a general increase to the north and east. Site-specific current data will need to be determined.

Tides in the area of the MA WEA occur twice per day and have an amplitude of 13.8 to 17.7 inches (30 to 40 cm). Tidal phases (e.g. new moon, full moon) in Massachusetts can increase normal water levels and cause flooding on coastal regions. Hurricanes are rare in Massachusetts; however, strong nor'easter storms are more common and can increase wind speeds, sea levels, and coastal water levels.

The project will impact a significant amount of Land Under the Ocean (LUO), including Land Containing Shellfish (LCS) associated with the installation of submarine cable, dredging of sand waves, sediment dispersion, anchoring, and cable protection.

The Mayflower Wind Project will comply with management standards in the Massachusetts Ocean Management Plan (OMP; 301 CMR 28.00) to minimize impacts to marine resources and will pay an Ocean Development Mitigation Fee (to compensate the Commonwealth for impacts to ocean resources and the broad public interest and rights in the lands, waters and resources of the OMP area). The OMP creates a framework for managing uses and activities within the state's ocean waters and identifies and maps ecological resources that are important components of the Commonwealth's estuarine and marine ecosystems (such as "special, sensitive or unique resources" or "SSU" areas), as well as key areas of water-dependent uses. Mayflower Wind's marine surveys will enable Mayflower Wind to further refine the OMP mapping of hard bottom, complex bottom, and eelgrass within the offshore cable corridor.

Potential impacts to water resources include accidental spills or releases of oils or other contaminants as well as temporary increases in sedimentation or turbidity as a result of bottom-disturbing activities. Other potential impacts include erosion and sedimentation, and stormwater discharges to potential wetlands and waterways as a result of clearing vegetation for the export cable area.

## NEARSHORE

[REDACTED]

The use of horizontal directional drilling (HDD) [REDACTED] landfall locations for the primary route option will avoid or minimize coastal area impacts to dunes, land subject to coastal storm flowage, and other coastal resources.

Mayflower Wind will develop a suite of measures that will avoid and minimize erosion and sedimentation, including, minimizing soil exposure, protecting areas of concern, installing control measures, establishing vegetation after work is completed, and inspecting and maintaining control measures.

There are no local, state, or federal wetlands resource areas, water bodies, Outstanding Resource Waters, Areas of Critical Environmental Concern, or 100-year floodplain areas in the vicinity [REDACTED] Mayflower Wind's proposed POI.

Mayflower Wind has largely avoided impacts to inland wetland resource areas by selecting routing options that run within or along previously-disturbed areas such as existing roadway layouts or existing cleared utility right-of-way corridors. Installation of duct banks within paved roads, even within the 100-foot buffer zones, should have no impacts to wetland area resources. Any impacts will be construction-related and therefore temporary. Mitigation of impacts would involve primarily post-installation restoration (e.g., re-paving or restoring road surfaces and shoulders to pre-construction conditions). Mayflower Wind will also implement all appropriate erosion and sedimentation controls.

Mayflower Wind has considered the potential impacts to water resources and **Table 7.5-21** below presents mitigation measures currently being evaluated.

Project Phase	Potential Impacts	Mitigation
All phases – lifetime of Project	Vessel discharges and accidental spills (e.g., oil or chemical spills and releases)	<ul style="list-style-type: none"> <li>Response Plan – Mayflower Wind will require all vessels to comply with regulatory requirements for discharges and develop and implement Oil Spill Response Plans (OSRPs) for all project stages.</li> <li>Waste Management Plan – Mayflower Wind will implement a Waste Management Plan to ensure marine trash/debris are not accidentally discharged into the marine environment.</li> </ul>
	Disturbance to habitat, seafloor, sedimentation	<ul style="list-style-type: none"> <li>Anchored vessels will avoid sensitive seafloor habitats to the greatest extent practicable; they will be required to avoid known eelgrass beds and other SSU habitats so providing it does not compromise cable installation or health and safety.</li> </ul>
Pre-construction	Erosion and sedimentation and other stormwater discharges to potential wetlands and waterways as a result of clearing vegetation for the export cable area	<ul style="list-style-type: none"> <li>Siting and Routing – Utilize existing roadways, utility Rights-of-Way and previously disturbed areas to located land cables from the landfall to the Point of Interconnection to minimize alteration and disturbance to wetlands and waterways.</li> </ul>
	Disturbance to seafloor, sedimentation, and turbidity from cable laying activities	<ul style="list-style-type: none"> <li>Site-specific data will be collected to further understand currents in the Project area, particularly in the areas closest to Nantucket Shoals where evidence of sand waves may be present.</li> </ul>

Project Phase	Potential Impacts	Mitigation
Construction	Erosion and sedimentation and other stormwater discharges to potential wetlands and waterways as a result of clearing vegetation for the export cable area	<ul style="list-style-type: none"> <li>• Use of Horizontal Direction Drilling (HDD) will be considered for sensitive wetland and stream crossings to avoid disturbance.</li> <li>• A Draft Construction Management Plan will be prepared that covers HDD construction management, including management of drilling fluid and handling of drill cuttings and fluids that minimize risk associated with drilling fluids (detailing steps to avoid seepage). A benign, natural substance such as bentonite clay or mud will be used as a drilling fluid. Bentonite solution will be prevented from being released as the drill head reaches the surface of the seafloor, including, potentially by replacing drilling fluid with water or by maintaining a drilling sleeve.</li> <li>• Incorporate use of erosion and sedimentation control measures along land cable route and upland construction areas adjacent to wetlands and waterway. These may include: <ul style="list-style-type: none"> <li>✓ minimizing soil exposure</li> <li>✓ protecting areas of concern</li> <li>✓ installing control measures</li> <li>✓ establishing vegetation after work is completed</li> <li>✓ inspecting and maintaining control measures.</li> </ul> </li> <li>• Impacted wetlands, waterways and other habitat disturbed during trenching operations will be restored.</li> <li>• Stormwater Pollution Prevention (SWPPP) – A SWPPP plan will be developed for the burial of cables for the export cable area.</li> <li>• Onshore erosion and sediment impacts associated with construction of the onshore export cable will be minimized and restored after construction has been completed. Mitigation measures would include minimizing the quantity and duration of soil exposure; protecting areas of critical concern during construction by redirecting and reducing the velocity of runoff; installing and maintaining erosion and sediment control measures during construction (including temporary erosion control barriers, silt fences, and hay or straw bales); establishing vegetation where required as soon as possible following final grading; and inspecting the construction route and maintaining erosion and sediment controls as necessary until final stabilization is achieved and final inspections completed.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	Erosion and sedimentation and other stormwater discharges to potential wetlands and waterways as a result of clearing vegetation for the substation	<ul style="list-style-type: none"> <li>• The Substation will be designed so post-development total discharge volumes and peak runoff rates will be less than the pre-development (existing) conditions for the 2-year, 10-year, and 100-year 24-hour storms. In addition, the proposed stormwater management design will meet or exceed the Massachusetts Stormwater Policy recommendations for the proposed substation, and the substation will comply with the MassDEP Stormwater Standards.</li> <li>• Stormwater Best Management Practices (“BMPs”) function to minimize potential adverse water quality impacts to groundwater and to downgradient receptors. The proposed stormwater management system will incorporate BMPs, as described in the MassDEP Stormwater Management Policy Handbook.</li> <li>• Mayflower Wind will minimize any erosion and sedimentation impacts during Substation construction by developing and implementing a Stormwater Management Plan, which will include best management practices to minimize off-site pollution, including disposal methods for construction debris, an erosion control barrier, dust control, and disturbed surface maintenance practices, among other appropriate measures.</li> <li>• The Substation will be equipped with containment for components containing dielectric fluid. Full containment for large transformers and oil-filled reactors is standard industry practice.</li> </ul>
Operations	Disturbance to seafloor, sedimentation, and turbidity from cable laying activities	<ul style="list-style-type: none"> <li>• Impacts to the seafloor will be minimized by a route selection process that has a specific goal of avoiding SSU areas (e.g., hard bottom, complex bottom) where possible - consistent with the OMP. The cable alignment within the installation corridor will be refined to avoid and minimize impacts to SSUs areas based on ongoing engineering analysis of results from marine surveys.</li> <li>• Turbidity will be minimized by choosing the appropriate and least impactful installation method for each portion of the offshore route that can achieve the necessary burial depth with a relatively minor, temporary impact on the seabed. For example, installation of submarine cable using jetting, jet-plow, or mechanical trenching should minimize the area of dredging and direct seafloor impact.</li> <li>• Applied methods for cable laying activities will be aligned with OSPAR and DOI guidelines.</li> <li>• Dredging will be avoided to the extent possible and by selecting the appropriate dredging tool.</li> <li>• Avoid and/or minimize the use of cable protection to the extent possible to minimize impacts. Mayflower Wind will work with appropriate agencies to minimize such impacts.</li> <li>• Minimize sand wave dredging through route engineering and installation tools that achieve greater burial depths.</li> </ul>

Project Phase	Potential Impacts	Mitigation
	Contamination of soil and groundwater	<ul style="list-style-type: none"> <li>Nearly all vehicle fueling will be performed off the construction areas, with only a few pieces of large, less mobile equipment (such as excavators or paving equipment) requiring onsite refueling. This refueling will not occur within 100 feet of wetlands waterways or known private or community potable wells, or within any town water supply Zone I area. Refueling will be performed by someone with knowledge of the area and equipped with a work zone spill kit.</li> <li>Proper spill containment gear and absorption materials will be maintained on-site, and all operators will be trained in how to use these materials.</li> <li>A dewatering procedure will be developed if groundwater is encountered or expected to be encountered during duct bank installation.</li> <li>Standard erosion control practices to minimize erosion during trenching and construction activities.</li> </ul>

**TABLE 7.5-21: MITIGATION MEASURES CURRENTLY BEING EVALUATED TO MITIGATE POTENTIAL PROJECT IMPACTS ON WATER RESOURCES**

## ADDITIONAL SUPPORT FOR ENVIRONMENTAL CHARACTERIZATION

Mayflower Wind understands and appreciates that several federal and state agencies have committed resources and funding for research studies and surveys to characterize environmental resources within the offshore wind areas within the southern New England region.

Mayflower Wind is dedicated to research and data collection efforts that advance environmental characterization towards and increase understanding of how offshore wind and other ocean users can co-exist. Mayflower Wind considers part of being a responsible developer includes being an active participant in the science community and showing leadership among the wind industry to help fill gaps in knowledge and understanding of the impacts of offshore wind to the ocean environment. Part of supporting environmental research also includes supporting environmental initiatives and improving upon best management practices to inform the development and operations of wind farms.

Mayflower Wind's Sponsors have developed long-standing relationships with key universities and research institutions in the U.S., with many in Massachusetts and the Northeast, including Woods Hole Oceanographic Institution, MIT, and the University of Massachusetts. These relationships include partnering on a wide-range of environmental and oceanographic research areas, such as ocean observing, ocean technology and innovation, marine life, climate change, and tropical storm and hurricane research. Presently, Mayflower Wind has invested in numerous and diverse environmental research efforts by providing funding and in-kind support of sponsored scientists and technicians to advance these and efforts of partners and communities.

Current efforts include the following:

- Participation in and funding to the National Offshore Wind Research and Development Consortium led by the Department of Energy National Renewable Energy Laboratory (NREL)
- In-kind support for NREL Collaborative Development of Strategies and Tools to Address Commercial Fishing Access in U.S. Offshore Wind Farms
- Founding Board Member for the Responsible Offshore Science Alliance (RODA)



- Funding and leadership role in the Consortium for Ocean Leadership Industry and Policy Forums (2019 topic focuses on the co-existence between offshore wind and ocean resources)
- Members of NOAA IOOS Regional Associations – MARACOOS & NERACOOS

Mayflower Wind is interested in continuing these efforts by supporting third-party applied research that can lead to a better understanding of the interaction of offshore wind with marine biological resources and increase our ability to mitigate potential impacts more effectively including gathering information on marine mammals, birds and fish and benthic resources that can lead to future adaptive management and informed agency permit decisions.

Mayflower Wind is currently identifying opportunities to fund or offer in-kind contribution of resources and equipment to help conduct third-party research related to the interaction of offshore wind with marine mammals (specifically the NARW), sea turtles, birds, bats, fish, invertebrates and their habitats, including those funded by federal and state agencies. Recent in-kind opportunities include Mayflower Wind scientists participating in discussions to form an environmental regional monitoring and research entity to study sea turtles, birds, bats and marine mammal interactions with offshore wind farm development. Another investment is significant in-kind support and funding to develop a regional entity focused on fisheries co-existence with offshore wind development. Mayflower Wind has also made commitments to collaborate with other developers in the MA WEA in supporting the continuation of aerial North Atlantic right whale surveys by the New England Aquarium, and the Massachusetts Clean Energy Center to obtain continued density and relative abundance estimates of large whales and other species. An additional commitment alongside Massachusetts wind developers includes coordination and alignment on digital avian surveys.

Mayflower Wind is committing [REDACTED] for environmental research and in-kind support, including staff marine scientists time and expertise and infrastructure, ranging between [REDACTED] per project. In-kind support also includes Mayflower Wind scientists participating on various research boards, state working groups, and offshore wind initiatives in leading forums and panels aimed at driving environmental collaboration, coordination, and the establishment of best practices. [REDACTED]

The specific allocation of these funds is still under discussion, but Mayflower Wind has identified early partners and will be providing funding prior to the outcome of this solicitation. These partners are:

- [REDACTED]
- Responsible Offshore Science Alliance (ROSA)
- New England Aquarium Anderson Cabot Center for Ocean Life (NEAQ ACC)
- Spherical Analytics – Marine Data Exchange

The first three partnerships are elaborated upon in **Section 14** as they focus primarily on fisheries science and technology innovation. Mayflower Wind's partnership with the NEAQ extends beyond environmental research into community outreach. Not previously described is the progressing NARW conservation and research. Mayflower Wind and NEAQ ACC scientists are currently investigating opportunities such as development of marine mammal assessment framework development, development and testing of novel monitoring technologies such as autonomous aerial survey methodology, radar, and eDNA mark-recapture, behavioural responses studies to pile driving, development a of environmental DNA studies, etc. Furthermore, discussions between Mayflower Wind and NEAQ ACC are considering methods to progress autonomous aerial survey technology to reduce the safety risks associated with current NARW surveys and to facilitate easier and cheaper monitoring techniques. More so, Mayflower Wind team is dedicated to innovation and to build upon existing efforts of the NEAQ ACC and Centre of Research into Ecological and Environmental modelling (CREEM), in collaboration with BOEM, MassCEC and Massachusetts Executive

Office of Energy and Environmental Affairs, who developed a framework to study the effects of offshore wind development on marine mammals and turtles.

Data sharing and data innovation are additional components of Mayflower Wind's environmental research commitment. Mayflower Wind will dedicate part of the [REDACTED] and significant in-kind staff support to collaboratively build data management systems to share offshore wind monitoring data and research conducted in the Project area. Synthesizing and transforming data into products and decision-making tools that are easy for stakeholders to understand and manipulate is another element of project success.

Mayflower Wind is working with Spherical Analytics to supplement its Marine Data Exchange program with offshore wind and ocean data. Spherical Analytics is building a trusted platform for global environmental data and insightful analytics. Currently, the group is working with the city of New Bedford and the New Bedford Port Authority to build a data platform that integrates and validates proprietary and local content fisheries data

Mayflower Wind will be working with Spherical Analytics to create environmental impact solutions and strategic decision tools specific for offshore wind that combine blockchain technologies with big data and machine learning. Spherical Analytics can use these technologies and integration techniques to insure the provenance, veracity, and integrity of environmental data, fisheries information, and any other source of data and combines these in such a way that can address current challenges for regulators, fishermen, and communities and assess potential changes to the ocean environment as offshore wind industry matures.

Currently, Spherical Analytics in partnership with the New Bedford Port Authority (NBPA) has been awarded the Seaport Economic Council (SEC) Grand Challenge Grant to seed the launch of the Marine Databank (MDB). The MDB will act as a data co-op, or on a mutual company model. Those sharing data, analytics, and other digital tools to contribute to science, sustainable fisheries, oceans health, coastal community resilience, and other pressing challenges include fishing boat/ fleet owners, shellfish harvesters, researchers, conversation groups and other public and private enterprises. Privacy and data ownership rights will be protected as they explore sharing, trading or licensing of their data, analytics, and models.

Mayflower Wind scientists will be working with Spherical Analytics to investigate data platforms similar to the Marine Databank that can serve as digital repository and tool for analyzing fisheries data with offshore wind technology, construction, and operations. Mayflower Wind will be providing data to this effort in addition to financial support.

The other component of Mayflower Wind's data innovation is spearheading an initiative to create an Offshore Wind Data Taskforce among federal data providers in the Northeast. Mayflower Wind has initiated conversations with NOAA (MARACOOS and NERACOOS), MARCO, and NROC to establish such as Taskforce that can build the database and data services to support the nascent offshore wind industry. Providing a secure and trusted data portal will generate the necessary confidence for developers to share environmental data that is certified to federal standards meaning the data submitted by offshore wind developers can be used with the same quality assurance as federal data.<sup>7</sup> Mayflower Wind will support – financially and in-kind – the initiation and activities to establish this coordination entity and develop needed data system to support offshore wind environmental data.

Mayflower Wind scientists will also be exploring opportunities to share archaeological analyses and geophysical data with local Native American Tribes. There is strong interest for Tribal Historic Preservation Officers to improve their skills with data platforms, such as ArcGIS, to view and study offshore wind survey data. Mayflower Wind has a skilled geospatial team that can help build tools for the THPOs that will allow

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<sup>7</sup> <https://ioos.noaa.gov/about/governance-and-management/certification-extending-reach-regional-data/>



for easy integration and viewing of Mayflower Wind Project data that will enable the THPOs to compare new data with oral history.

Additional data sharing efforts include working with BOEM and NOAA to provide data to the Marine Cadastre and working with NOAA Atlantic Seafloor Partnership for Integrated Research and Exploration (ASPIRE). ASPIRE is a major initiative that is multi-year and multi-national collaborative ocean exploration field program focused on raising collective knowledge and understanding of the North Atlantic Ocean. Geophysical survey data contributed to ASPIRE will help to meet national goals of mapping the entire Outer Continental Shelf by 2030. In addition, Mayflower Wind's data will aid ASPIRE with its research planning, testing of innovative seafloor equipment, and NOAA's management decisions in the region. Biological data from monitoring or impact assessments may be shared and with the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP), which is a spatially referenced online database aggregating marine mammal, seabird, sea turtle and ray and shark observation data from across the globe.

Mayflower Wind will continue to identify and fund environmental research efforts as the Project evolves and will do so in partnership with government agencies, environmental, universities, communities, and non-governmental organizations dedicated to the co-existence of renewable energy with the ocean environment

## 7.6 PUBLIC SUPPORT

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- 7.6 Provide documentation identifying the level of public support for the project including letters from public officials, newspaper articles, etc. Include information on specific localized support and/or opposition to the project of which the bidder is aware. Provide copies of any agreements with communities and other constituencies impacted by the project, and a stakeholder map with a plan for community engagement activities. Please discuss the status of the stakeholder plan.

### MAYFLOWER WIND PUBLIC SUPPORT

Mayflower Wind is committing to making key investments to support the overall growth of offshore wind as a long-term, vibrant industry sector for the Commonwealth, and working closely with all the communities with which our project engages. Our total investment in community, environmental, and economic programs, and efforts will be deployed in a manner that reflects the core values of Mayflower Winds: human and environmental safety first and always; innovation and talent development to drive meaningful economic advances; and working with communities to make sure our project will have relevant, positive impact. Mayflower Wind's commitment to working closely with all the communities with which our project engages has resulted in a broad level of public support for the Mayflower Wind Project which is reflected in the letters, **Attachment 7.6-2**, referenced below which represent environmental NGOs, Native American tribes, chambers of commerce, economic development councils, trade associations, regional science organizations, universities, and research institutions, and port authorities.

- Boston Harbor Cruises on behalf of Blue Atlantic ESVAGT
- Bristol County Community College
- Bristol County Chamber of Commerce
- Bristol County Economic Development Consultants
- Cape Cod Chamber of Commerce
- Cape Light Compact
- Environmental League of Massachusetts
- Fall River Redevelopment Authority

- [REDACTED]
- MARACOOS/NERACOOS
- New England Aquarium Anderson Cabot Center for Ocean Life
- Northeastern University
- Representative Dylan Fernandes and Senator Julian Cyr
- Representative Patricia A. Haddad
- SeaAhead Bluetech Innovation
- South Coast Chamber of Commerce
- Tufts University
- [REDACTED]
- University of Massachusetts Amherst
- University of Massachusetts Boston
- University of Massachusetts Lowell

## COMMUNITY ENGAGEMENT ACTIVITIES

Driven by our core value to work with communities to drive the energy transition and our understanding of the importance of early engagement based on past project experience, Mayflower Wind began engaging local communities prior to the BOEM lease auction. Mayflower Wind has consulted with the fishing industry, Native American Tribes, landowners, environmental groups, higher-education institutions, city and town government officials, chambers of commerce, trade associations, regional science organizations, and port managers. We will continue throughout the lifetime of the project to engage in close and constant outreach to our communities and stakeholders.

To inform stakeholder engagement planning, Mayflower Wind conducted a thorough stakeholder mapping process to identify relevant groups and individuals and evaluate their relevance to project activities including, history of engagement, role in approvals, mandate of organization, and opportunities for partnership. Mayflower Wind then:

- Prioritized each stakeholder based on their interest and influence over the project
- Defined engagement objectives and key messages for each stakeholder
- Proposed engagement method and timing
- Assigned responsibilities of engagement to Mayflower Wind team

To monitor progress and provide transparency to stakeholders, Mayflower Wind has established a stakeholder management system to track and manage communications throughout the permitting and approval process. The stakeholder management system enables us to:

- Maintain a register of all stakeholders and contact information, as appropriate
- Maintain a shared calendar of all stakeholder engagement activities
- Document records of engagement, including participants, key topics, meeting minutes, and issues
- Identify and track key issues
- Document and execute commitments to stakeholders
- Execute social investment programs
- Receive, track and resolve stakeholder grievances
- Send automated requests to ensure follow-up of actions to close-out

The stakeholder mapping, evaluation, and engagement planning were used to create a Stakeholder Engagement Plan (**Attachment 7.6-1**). The plan is a “live” document that will be continually updated to

incorporate lessons learned, new findings from research and other activities, and to address changing engagement strategies.

In addition to the general Stakeholder Engagement Plan, Mayflower Wind will also develop and implement targeted engagement plans and communication protocols with key stakeholder groups to respond to specific communication needs during construction activities.

Mayflower Wind will implement a Fisheries Communication Plan (FCP) to guide outreach and communication with the fishing industry. The FCP, further detailed in **Section 7.4**, will be developed according to BOEM's *Guidelines for Providing Information on Fisheries Social and Economic Conditions for Renewable Energy Development on the Atlantic Outer Continental Shelf* (pursuant to 30 CFR Part 585). The FCP will describe the strategies that will be used for communicating with fisheries stakeholders prior to and during offshore activities.

Mayflower Wind will also develop a business coordination plan designed to lessen impacts to businesses located along the onshore cable routes during construction. This plan, further detailed in **Section 7.5**, will reflect Mayflower Wind's outreach to each business that might be potentially affected by the Project to determine if there are specific timing concerns such as hours of operation, deliveries, high traffic periods, or other constraints. Mayflower Wind will engage in public outreach to ensure that emergency responders, residents, business owners, and town officials are apprised of construction schedules, vehicular access, lane closures, 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

## 7.7 NEW CLASS I RENEWABLE PORTFOLIO STANDARD ELIGIBLE RESOURCE

- 7.7 Provide documentation demonstrating that the project was or will be qualified as New Class I Renewable Portfolio Standard Eligible Resource under M.G.L. c. 25A, § 11F, and 225 CMR 14.00.

The Mayflower Wind Project will (i) use wind as its fuel source, (2) begin operation after 1997, and (3) be located within the ISO-NE Control Area. For these reasons, the Mayflower Wind Project qualifies as a "New Class I Renewable Portfolio Standard Eligible Resource" as defined under M.G.L. c. 25A, Section 11F and 225 CMR 14.00.

## 7.8 NEPOOL GIS ACCOUNT

- 7.8 All bidders must include sufficient information and documentation that demonstrates that the bidder will utilize an appropriate tracking system to ensure a unit-specific accounting of the delivery of Offshore Wind Energy Generation, to enable the Department of Environmental Protection, in consultation with DOER, to accurately measure progress in achieving the commonwealth's goals under chapter 298 of the acts of 2008 or Chapter 21N of the General Laws. The RECs associated with Offshore Wind Energy Generation must be delivered into the Distribution Companies' NEPOOL GIS accounts.

Mayflower Wind will register the Mayflower Wind Project with NEPOOL-GIS and use the NEPOOL Market Settlement Service to verify its Offshore Wind Energy Generation, and deliver the RECs associated, which will be sent via Forward Transfer to The Distribution Companies. This will enable the Department of

Environmental Protection, in consultation with DOER, to accurately measure progress in achieving the Commonwealth’s goals under chapter 298 of the acts of 2008 or Chapter 21N of the General Law.

NEPOOL-GIS rules for registration of new projects is summarized in **Figure 7.8-1** below.



**FIGURE 7.8-1: NEPOOL-GIS REGISTRATION PROCESS OVERVIEW**

**7.9 CLAIMS OR LITIGATION**

7.9 Identify any existing, preliminary or pending claims or litigation, or matters before any federal agency or any state legislature or regulatory agency that might affect the feasibility of the project or the ability to obtain or retain the required permits for the project.

To the best of Mayflower Wind’s knowledge, there are no existing, preliminary or pending claims or litigation, or matters before any federal agency or any state legislature or regulatory agency that might affect the feasibility of the Mayflower Wind Project or the ability to obtain or retain the required permits for the Mayflower Wind Project.

## SECTION 8 OF APPENDIX A TO THE RFP ENGINEERING AND TECHNOLOGY; COMMERCIAL ACCESS TO EQUIPMENT

This section includes questions pertinent to the engineering design and project technology. This section must be completed for all aspects of a project including generation, storage (as applicable) delivery, and interconnection facilities. Bidders should provide information about the specific technology or equipment including the track record of the technology and equipment and other information as necessary to demonstrate that the technology is viable.

Mayflower Wind brings significant experience in both onshore wind and offshore development and access to extensive U.S. and global and supply chain networks, supporting our ability to reliably deliver the Project. Mayflower Wind's Sponsors have installed more than 3,000 turbines in the U.S. and have been installing offshore platforms for over four decades.

The Mayflower Wind Project utilizes proven technologies; and, in light of the offshore wind market's ongoing evolution and BOEM's use of a design envelope, Mayflower Wind will continue to evaluate alternative technologies to ensure a deliverable project. We have designed the Project through comprehensive analysis and supply chain engagement including:

- RFP responses from major wind turbine manufacturers for full project supply and ITC eligibility
- Extensive foundation analysis and supply chain engagement
- Offshore substation and inter-array cable RFPs for ITC eligibility
- Detailed analysis of project interconnection requirements
- Engaging with manufacturers that are looking to expand operations into offshore wind

Mayflower Wind further understands the importance to the Commonwealth of developing the local supply chain, fostering innovation and workforce development, and promoting safety and environmental stewardship.

### 8.1 ENGINEERING PLAN

8.1 Provide a reasonable but preliminary engineering plan which includes the following information:

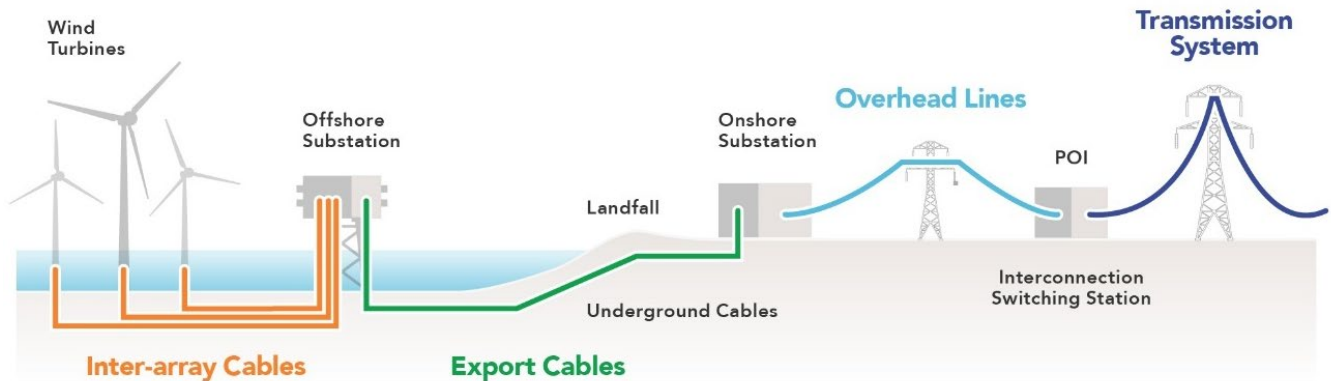
#### i. Type of generation and delivery technology

Mayflower Wind will incorporate proven engineering and technology combined with innovative advancements to maximize safety and reliability.

As stated before, the energy delivered for this proposal will be a portion of the 804 MW project. The 804 MW project consists of the following components, described further in **Section 8.1.ii**.

- [REDACTED] offshore wind turbines;
- Monopile foundations and transition pieces
- [REDACTED] strings, totaling [REDACTED] offshore electrical inter-array cabling with diameters of [REDACTED];

- [REDACTED] offshore substation to step the delivered power from the inter-array cabling from [REDACTED] export cable voltage;
- [REDACTED] Offshore electrical export cables delivering power from the offshore substation to shore;
- Landfall and [REDACTED] underground cabling [REDACTED] onshore substation;
- [REDACTED]



**FIGURE 8.1-1: CROSS-SECTION OF THE PROJECT**

ii. Major equipment to be used (including nacelle, hub, blade, tower, foundation, delivery facilities structures and platforms, electrical equipment and cable)

The following major system components comprise the Project as well as alternatives that will continue to be explored and assessed.

## TURBINE TECHNOLOGY

[REDACTED]

The Project utilizes the largest, most technologically advanced, next-generation turbine available. Benefits of utilizing this next-generation technology include:

- Increased efficiency of power capture through control and hardware improvements,

- Increased hardware reliability through lessons learned from early U.S. offshore projects,
- Better insight in optimum maintenance strategies tailored to very large wind turbines, leading to higher availability, and
- Improvements in safety systems designed for the U.S. offshore market.

Mayflower Wind will continue working with top-tier suppliers to make the final turbine selection closer to financial close. The following characteristics of the [REDACTED] and other turbines being considered are represented in **Table 8.1-1** below.

Turbine Characteristic	Project Case	Range of Alternatives	Notes for Ranges
Capacity (MW)	[REDACTED]	10 - 15 MW	Based on in-depth assessments of the wind turbine designs that are currently available in the market, Mayflower Wind expects this range of capacities to be available.
Rotor Diameter (m)	[REDACTED]	525 – 720 ft / 170 – 230 m	Given the site's climatic conditions, this range of currently available rotor sizes is expected to provide the best value.
Hub Height (LAT)	[REDACTED]	375 – 475 ft / 115 – 145 m	Derived from enough clearance between the highest expected wave, the main access platform and the blade tip for the abovementioned range of wind turbine sizes.
Design Class	[REDACTED]	S / T / 1B	Based on a site-specific analysis, the wind turbine design class shall be chosen. Currently, the expectation is that a S / T or 1B class wind turbine is required for site suitability. Based on in-depth assessments of the wind turbine designs that are currently available in the market, Mayflower Wind expects this range of design classes to be available.

**TABLE 8.1-1: TURBINE CHARACTERISTICS**

All turbine models under consideration are designed for offshore use, with materials and coatings, HVAC systems, and control and safety systems which are appropriate for the environment offshore Massachusetts and consistent with U.S. grid requirements.

## FOUNDATION TECHNOLOGY

There are several different foundation technologies that can be utilized for offshore wind projects. To evaluate and weigh the different options, Mayflower Wind engaged [REDACTED] to perform an in-depth analysis of foundation solutions. **Table 8.1-2** below describes the general characteristics and advantages of each foundation technology.



Item	Project Case	Alternative Technologies			
	Monopile	Jacket	Suction Jacket	Monobucket	Gravity Based Structure
<b>Construction Locations</b>	Europe, possible new fabrication sites in U.S.	U.S. and Global	U.S. and Global	Europe, possible new fabrication sites in US	North East for concrete
<b>Installation Methodology</b>	Hammer Driven	Hammer Driven Piles	Suction	Suction	Gravity
<b>Environmental Advantages</b>	Smaller seabed footprint	Smaller diameter piles driven	Virtually Noiseless Installation	Virtually Noiseless Installation	Virtually Noiseless Installation
<b>Site Preparation Works</b>	Scour Protection	Scour Protection	Scour Protection	Scour Protection	Seabed preparation
<b>Other Advantages</b>	Most common and proven technology	Lighter individual lifts	No hammer noises. Robust Structure.	No hammer noise. Quick installation time	Could be floated to site with local tugs

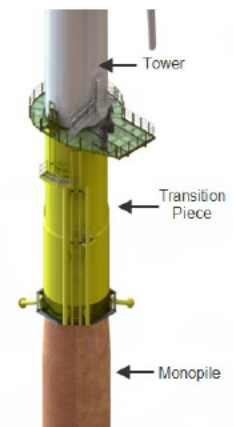
**TABLE 8.1-2: FOUNDATION COMPARISON TABLE**

Through the [REDACTED] analysis, the monopile and associated transition piece was selected for the Project. The fundamental aspects of the monopile and transition piece solution, as well as alternative technologies that will continue to be assessed, are described in detail below.

## MONOPILE AND TRANSITION PIECE

The monopile accounts for 90% of all installed offshore wind turbine foundations globally. The concept consists of a monopile driven into the seabed which is surmounted by a transition piece as shown in **Figure 8.1-2**. The wind turbine tower is connected to the transition piece, most commonly by a bolted flange.

A number of methods exist for connecting the monopile to the transition piece, with the two most common being a grouted connection or a bolted flange. Taken from the oil and gas industry, the grouted connection was used on many of the early offshore wind farm projects. The connection is made by pouring grout between the monopile and transition piece once it has been installed offshore. The grout then hardens and creates a bond between the two. The grouted connection is outfitted with shear keys or as a conical shape, which is suitable for a wide range of water depths and large turbine loads.

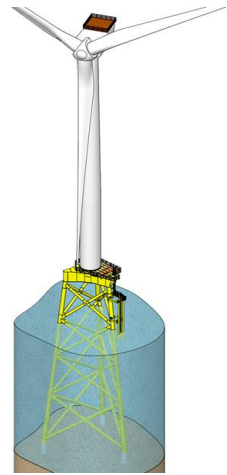


**FIGURE 8-1-2: MONOPILE AND TRANSITION PIECE**

Mayflower Wind has already completed concept foundation designs, found in **Attachment 8.1-1**, which have been used for all costings and installation methodology.

#### ALTERNATIVE: JACKETS

The jacket is a viable support structure alternative that Mayflower Wind has experience within the Moray East Offshore Wind Farm, which is currently under construction, and extensive experience with in the U.S. and globally in the oil and gas industry. Globally, jacket foundations are the second most deployed offshore wind foundation type and are the foundations utilized for the Block Island Wind Farm. With three or four legs, jacket foundations are installed by either setting the jacket on a pre-piled template or are piled following the set down of the foundation on the seafloor. An advantage of jackets is that they can be fabricated in more locations than monopiles and have lower weight lifts than a monopile requires for installation; however, they are more complicated to fabricate than monopiles.



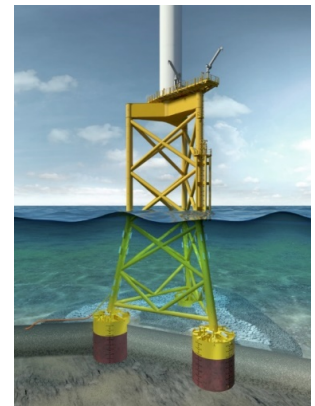
**FIGURE 8.1-3: JACKET FOUNDATION**

#### ALTERNATIVE: SUCTION BUCKETS

As an alternative to pile-driven foundation solutions, suction buckets may also be used. The suction bucket was originally pioneered in the oil and gas industry by Shell and continues to be used extensively in the oil and gas industry today. Suction buckets have two different configurations for the offshore wind industry: suction bucket jacket – a jacket that has suction buckets connected to the bottom of the jacket legs (See **Figure 8.1-4**) and a monobucket – a monopile with a suction bucket at the bottom.

A few offshore wind projects in Europe have successfully deployed suction bucket jackets. For a suction bucket jacket, large open buckets are connected to the underside of the jacket. The open side of the bucket faces the seafloor, and when the jacket is set on the bottom, the jacket will naturally embed a small amount due to the weight of the jacket. To complete the installation and secure the foundation, water and air are pumped out of the bucket using an ROV creating a negative pressure within the bucket. Given the weight of the foundation and the water pressure surrounding the bucket, the foundation embeds into the seafloor. The suction bucket technology works in the same way for a monobucket solution. Only one project in Europe has deployed a monobucket foundation on a pilot scale.

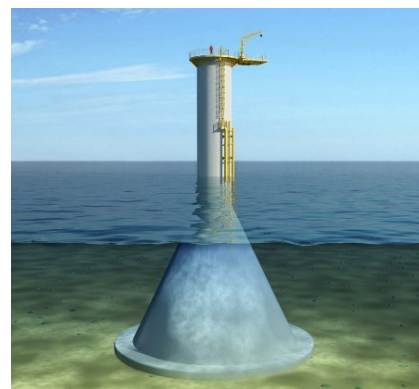
One of the significant benefits of suction bucket foundations is the fact that pile driving is not required for installation; however, the experience of installing suction buckets for offshore wind is limited, and the installation process is highly dependent on the soil type and soil strength at the specific installation point.



**FIGURE 8.1-4 SUCTION BUCKET JACKET**

## ALTERNATIVE: GRAVITY BASE

A gravity base foundation is another alternative foundation technology. Gravity base foundations sit on top of the seafloor and are not pile driven or embedded into the seafloor like monopiles, jackets, or suction buckets. Gravity based foundations can be manufactured using concrete or a combination of concrete and steel. Concrete manufacturing provides some advantages in cost and flexibility in manufacturing locale. Advantages of such a foundation include reduced volatility in raw material price, less susceptibility to fatigue, and less specialized fabrication, all of which help reduce costs when compared to steel structures. In addition to the manufacturing advantages, gravity base foundations can be towed to site with local tugs and ballasted once they are on-site to rest on the seafloor, not requiring the use of a heavy lift vessel for installation. Also, given that there are no piledriving activities, the installation is virtually noiseless. However, compared to monopile and jacket foundations, gravity base foundations require significant seabed preparation prior to installation.

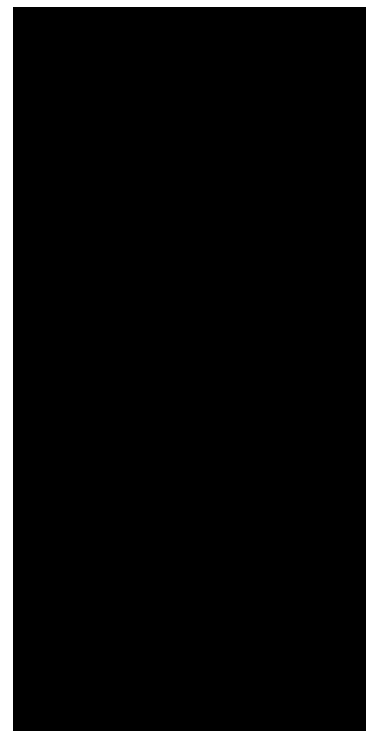


**FIGURE 8.1-5 GRAVITY BASE FOUNDATION**

## OFFSHORE SUBSTATION

The substation is where power is stepped up from the inter-array cable voltage to export cable voltage. Substations located offshore require a robust foundation design and typically include multiple decks for equipment. The lowest deck is typically the cable deck where the cable hang-offs are located at the top of the J-tubes. The upper decks contain the switchgear and transformers, monitoring, metering and control equipment for the substation and turbines, emergency generators, and cranes. Sensitive equipment is housed in controlled environments with heating, ventilation, air conditioning, and fire suppression systems. Additional substation equipment and systems include navigational aids, a workshop and stores, and facilities for technicians.

The substructure of an offshore substation is similar to that of the wind turbine foundations. The main requirement is to support the topside and array/export cables while resisting the adverse effects of the marine environment including extreme wave events, significant cyclic loading that creates fatigue damage, material (particularly steel) corrosion, and scour effects at seabed among numerous other considerations required in the design of the substructure. Monopile and jacket substructures are commonly used for offshore substations. The Mayflower Wind Project will employ a jacket foundation for the offshore substation substructure; however, a monopile is a viable alternative solution.



## ONSHORE SUBSTATION

The Project's onshore substation will step up the [REDACTED] substation will include [REDACTED]

The onshore

[REDACTED] t will also include all the associated earth leveling works and civil works. For further details of the onshore substation refer to **Section 6 and 10**.

OFFSHORE ELECTRICAL CABLING

The electrical output from each turbine will be transmitted by submarine inter-array power cables to the offshore substation. Inter-array cables of varying length will connect the turbines to each other and then to the offshore substation through the [REDACTED] of inter-array.

Offshore export cables will be comprised of [REDACTED]

[REDACTED] Both will include integral steel armor and fiber optics for remote monitoring and control. Where the cables exit from the monopiles and J-tubes, additional external sheathing is likely to be used to maintain the required bend radius and protect the cable.

For the Mayflower Wind Project, an estimated [REDACTED] of inter-array cable will be required with varying cross-sections, up to [REDACTED] with up to [REDACTED] each with up to [REDACTED] No offshore joints are expected in the IAC cable links between WTGs and from WTGs to OSP. It can be supplied in pre-cut lengths or in continuous lengths alongside all the cable accessories for installation and operation.

For export cables, the overall length will be approximately [REDACTED] and cross-sections of [REDACTED] [REDACTED] Due to the distance from the OSP to shore, one offshore joint is expected to be required for each cable. The installation process for inter-array and export cables are described in **Section 10**.



FIGURE 8.1-7: OFFSHORE ELECTRICAL CABLE CROSS-SECTION

- iii. Manufacturer of each of the equipment components listed above as well as the location of where each component will be manufactured.

The below table describes the location where each component of the Project is likely to be manufactured. Equipment manufacturers will be selected as the Project proceeds through development. **Section 8.1.iv** further describes current engagement and preferred manufacturers.

While Mayflower Wind is committed to local sourcing as much as possible, the Project is designed within the limits of the current supply chain. Offshore wind is a rapidly developing industry, where the supply chain is actively seeking opportunities to enter the U.S. market or expand existing U.S. operations into offshore wind services. Mayflower Wind has access to the existing supply chain networks in the U.S. and globally.

Components / Manufacturer	Currently Available Locations	Future Opportunities for Location
Wind Turbine		
Tower	Europe	Mayflower Wind has been in consultation with Marmen, one of the largest tower manufacturers in North America who, with the investment of Mayflower Wind pending award of the Mayflower Wind Project 4, will develop a new facility at [REDACTED] bringing towers commercially available [REDACTED] Please see alternate proposal for further details.

Nacelle	Europe	Nacelles and hubs are expected to be manufactured in Europe until approximately a 10 GW market exists. Currently, 4.8 GW have been awarded in PPAs with an additional 19.5GW to potentially be announced or awarded before financial close in 2023. Mayflower Wind has assumed that these components will still likely be purchased in Europe, however, will continue to work closely with major suppliers to utilize local fabrication if cost-effective and available.
Hub	Europe	
Blades	Europe	Similar to the U.S. onshore wind industry, and new offshore markets, blades are a component of turbines that are both labor-intensive and frequently become a viable component to manufacture locally due to the size and respective cost of shipping. Mayflower Wind has received letters from major suppliers expressing their intent to investigate U.S. manufacturing options that would be available for this Project.
Foundations		
Monopiles	Europe	Currently, there are no facilities suitable for monopile fabrication in the U.S. however multiple fabricators such as ███

**TABLE 8.1-3: TABLE COMPONENT MANUFACTURING LOCATIONS**

iv. Status of acquisition of the equipment components

In 2018, Mayflower Wind began the Request for Information (RFI) process related to the acquisition of the equipment components, that has resulted in engagement with 28 suppliers to date. Utilizing Mayflower Wind's access to long-standing relationships with the global and local supply chain, a thorough



assessment of the current market has been formed to develop a cost-effective and reliable price and schedule.

Requests for Information (RFI) were used to collate initial information from different suppliers prior to formally sourcing products or services. The RFIs compiled details about potential suppliers and their capabilities. The responses captured pricing, transport and installation options, scheduling, market availability, and U.S. local expansion opportunities.

Requests for Proposal (RFP) were used as a formal method of receiving detailed and comparable proposals from different suppliers for specified products and packages. The RFPs provided all the required information to make an informed purchasing decision. Mayflower Wind is currently assessing RFPs. The responses capture pricing, transport and installation options, scheduling, market availability, and U.S. local expansion opportunities. Mayflower Wind also used this information to inform the project’s ITC strategy, as discussed in **Section 5.10**.

Through this market assessment, Mayflower Wind has elected to prioritize top tier suppliers who bring the highest value to the project, listed in **Table 8.1-4** below. The schedule for further engagement and contracting is described in **Section 8.6** below.

Component	Manufacturers	RFI Response for Full Project	RFP Response for Full Project	RFP Response for ITC Option
Wind Turbines				
Foundations				
Substation(s)				
Electrical Cables				

TABLE 8.1-4: RFI AND RFP RESPONSES

Mayflower Wind has significant experience and existing contractual arrangements in place with the major turbine manufacturers in consideration [REDACTED]. For example, over 3,000 wind turbines have been supplied to Mayflower Wind's Sponsors for projects in the U.S.

These existing relationships and the experience of Shell and EDP Renewables provide direct benefits to the Mayflower Wind Project. The most notable of the benefits are:

- Highly competitive pricing,
- Increased number of bidders,
- A willingness to prioritize the Mayflower Wind Project over other commitments,
- Established points of contacts and historical relationships naturally mitigate potential issues related to miscommunication and scope of work interfaces.

This valuable supply chain network has already shown success in Mayflower Wind being able to receive offers to secure vital ITC components from multiple suppliers, to capture savings that would otherwise be borne by the ratepayer, as further described in **Section 5**.

Please refer to **Section 8.6** for the timeline for securing equipment.

- v. Whether the bidder has a contract for the equipment. If not, describe the bidder's plan for securing equipment and the status of any pertinent commercial arrangements

[REDACTED]

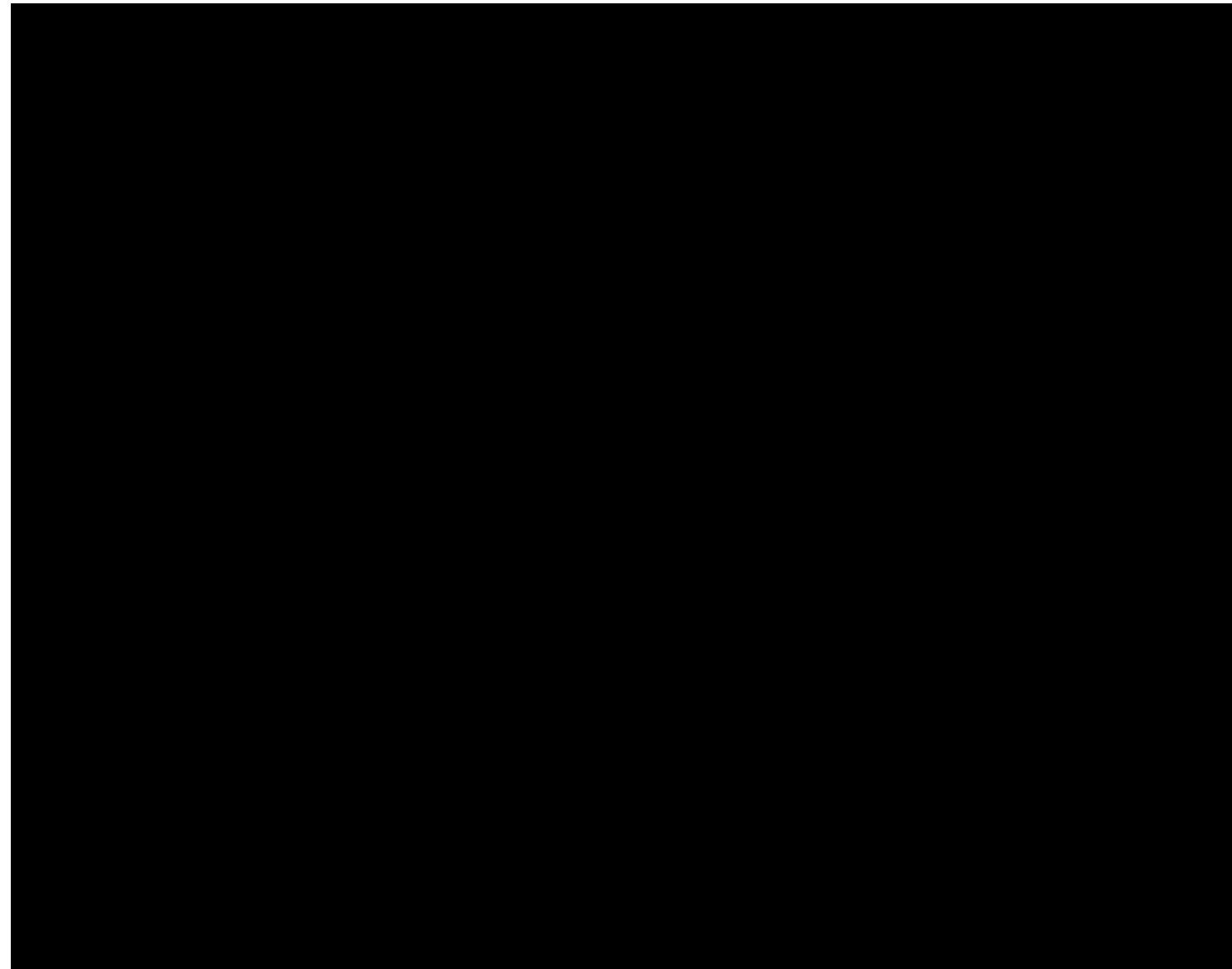
The contracting strategy for the Mayflower Wind Project is structured into several major packages; wind turbines, foundations, inter-array cables, export cables, substations, substation foundations, onshore substation, and onshore works. Each major package has up to seven scopes of work that are required:

[REDACTED]

[REDACTED]

[REDACTED]





vi. Equipment vendors selected/considered

Mayflower Wind is in advanced discussions with top tier suppliers for the major equipment which will make up the Mayflower Wind Project. Primary potential suppliers are summarized in **Table 8.1-4** above in **Section 8.1.iv** with the level of engagement that has already taken place. Further details of potential suppliers are provided in **Attachment 8.1-2**.

vii. Track record of equipment operations

The Mayflower Wind Project consists of the major components described in **Section 8.1.ii**. Mayflower Wind is in advanced discussions with top tier suppliers of these components. Details regarding the track record of the designs and suppliers are provided in **Section 8.3**.

viii. If the equipment manufacturer has not yet been selected, identify in the equipment procurement strategy the factors under consideration for selecting the preferred equipment

Mayflower Wind will select suppliers according to an established process which has been successfully implemented on dozens of major energy projects, see **Section 8.1.v**. The following commercial criteria of each tender will be evaluated, and each supplier will be ranked based on both a quantitative and qualitative criterion:

Category	Description

Category	Description

**TABLE 8.1-5: SUPPLIER CONTRACT EVALUATION CATEGORIES**

## 8.2 KEY EQUIPMENT SUPPLIERS

8.2 If the bidder has not yet selected the major equipment for a project, please provide a list of the key equipment suppliers under consideration.

Mayflower Wind is in advanced discussions with top tier suppliers for the major equipment which will make up the Mayflower Wind Project. Primary potential suppliers are summarized in **Table 8.1-4** above with the level of engagement that has already taken place. Further details of potential suppliers are provided in **Attachment 8.1-2**.

## 8.3 EQUIPMENT HISTORY

8.3 Please identify the same or similar equipment by the same manufacturer that are presently in commercial operation including the number installed, installed capacity and estimated generation for the past three years.

Equipment suppliers under consideration for the Mayflower Wind Project are summarized in **Table 8.1-4**. These suppliers were identified through extensive market research, supply chain engagement, and utilizing contacts with existing supply chain networks, Moray East, Borssele 3 & 4, and NoordZee in Europe, as well as numerous onshore projects located in the U.S.

Mayflower Wind already has experience with the following major turbine suppliers:

- Offshore Wind Turbines Procured: 217 MHI Vestas
- U.S. Onshore Wind Turbines Procured: 2,025 Vestas, 724 Siemens Gamesa, 443 GE

A summarized description of the experience and capabilities of the major equipment suppliers can be found in **Attachment 8.1.2**.

## WIND TURBINES

Mayflower Wind is currently evaluating several specific turbine models for the project. The models under consideration are next generation, 10+ MW turbines which are evolved from present turbine technology. The

turbines are variable-pitch, variable-speed models using tubular steel towers, and three upwind oriented blades. These major design characteristics of the turbine models considered are by far the most commonly used across the wind industry, both in the U.S. and globally, onshore and offshore.

Component	Manufacturers	Wind Turbine Platform	Number of Similar Installed	Total Capacity (MW)
Wind Turbines				

TABLE 8.3-1: SPECIFIC WIND TURBINE MODELS UNDER EVALUATION FOR THE PROJECT

FOUNDATIONS

Water depth, seabed conditions, wave heights, and current speeds vary widely between offshore wind project sites. Therefore, turbine foundations are designed for site-specific conditions. Mayflower Wind is currently considering monopile, jacket, suction bucket, and gravity base foundation solutions, all of which are proven designs that have been used on offshore wind project sites globally.

The manufacturers that Mayflower Wind has engaged have proven experience in manufacturing and supplying foundations to the offshore market:

Component	Manufacturers	Number of Monopiles Installed	Number of Jackets Installed
Foundations			

TABLE 8.3-2: FOUNDATION MANUFACTURERS UNDER EVALUATION FOR THE PROJECT

SUBSTATIONS

The Mayflower Wind team is currently considering an offshore substation design which includes either:

The first offshore substation was installed in 2002 and the technology and power conversion concepts used in substation design are used globally, are considered mature and proven through decades of operation, and carry little risk. Mayflower has engaged with multiple substation providers, and their offshore track record is listed in the table below:

Component	Manufacturers	Number of Offshore Installed	Total Capacity (MW)
Substation(s)			

**TABLE 8.3-3: SUBSTATION MANUFACTURERS UNDER EVALUATION FOR THE PROJECT**

## ELECTRICAL CABLING

Submarine electrical cabling is a mature and proven concept, with the first installations going back to the 1850s. The export cables for the Mayflower Wind Project will be comprised of either three-core copper or aluminum conductors, while the inter-array cables will be aluminum. Both will include integral steel armor and optic fibers for remote monitoring and control. This arrangement is by far the most common used on offshore wind projects globally. Mayflower Wind has engaged a number of cable manufacturers who have significant experience in delivering offshore electrical cables globally.

Component	Manufacturers	Total Length of Submarine Cable Installed (Km)
Electrical Cables		

**TABLE 8.3-4: ELECTRICAL CABLES UNDER EVALUATION FOR THE PROJECT**

## 8.4 TECHNOLOGY MATURITY

- 8.4 For less mature technologies, provide evidence (including identifying specific applications) that the technology to be employed for energy production is ready for transfer to the design and construction phases. Also, address how the status of the technology is being considered in the financial plan for the project.

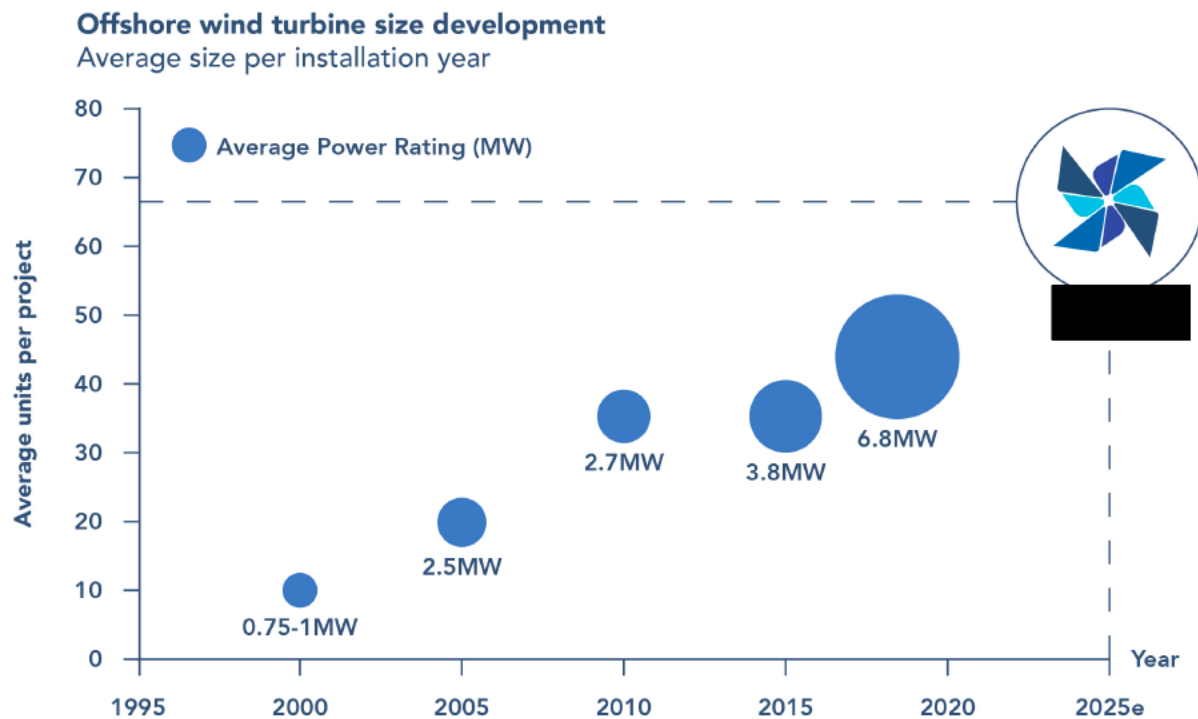
As detailed above in **Section 8.3**, all balance of plant equipment and major design concepts proposed for the Mayflower Wind Project have been proven through offshore wind operational experience.

The wind turbine proposed for the Mayflower Wind Project is an evolution of proven turbine designs currently installed at offshore wind projects around the world.

A new wind turbine platform will undergo an extensive test and validation program that can last several years. With test and operational data to verify the design margins of the new turbine platform, an OEM can identify opportunities for turbine improvement, including power upgrades, ‘power boost’, and/or rotor size increases. Through the lessons learned and by implementing these improvements, the platform evolves into new models. The wind turbine under consideration by Mayflower Wind will benefit from the above approach.

Wood Mackenzie, a premier research firm specializing in the global wind industry, states the following regarding offshore turbine size: *“MW rating continue to grow in the offshore section, as larger turbines provide a substantial balance of plant savings. The current generation of turbine models is already approaching 10 MW. Most of the leading turbine OEMs are already working on next-generation turbine platforms in the range of 12 to 13 MW. In addition, many of the turbines currently in development will experience MW rating upgrades after testing and initial load validation during pre-series production.”*

Wood Mackenzie research is presented in **Figure 8.4-1** below, illustrating the current and near-future increase in turbine capacities which will become available for the North American market. As shown, the Mayflower Project falls exactly within these projections, further demonstrating the confidence to deliver.



**FIGURE 8.4-1:** GLOBAL WIND ENERGY COUNCIL, GLOBAL OFFSHORE WIND REPORT 2019, PUBLISHED JUNE 2019

Mayflower wind will ultimately select the most appropriate and efficient wind turbine for this Project. The final selected wind turbine will have the required Type 1 and Type 2 certifications ahead of financial close.

## 8.5 EQUIPMENT LIST

- 8.5 Please indicate if the bidder has a full and complete list of equipment needed for all physical aspects of the bid, including generation facilities, turbine support structures, electrical platforms delivery facilities, and mandatory and voluntary transmission system upgrades. If not, identify the areas of uncertainty and when the full and complete list of equipment will be identified.

Mayflower Wind has developed a full and complete list of the equipment required for the Project in **Attachment 8.5-1**. It is noted that equipment related to transmission system upgrades is not included in the list as the Mayflower Wind Project will not require any network upgrades for interconnection (detailed in

**Section 6).** The equipment list was based on Shell and EDP Renewables’ experience gained developing and constructing offshore energy and wind power projects (see **Section 12.2**).

Given the Project’s current stage of development, specific makes and models of equipment may evolve as more information about the Project site is gained through ongoing and planned studies. Mayflower Wind does not expect the changes to materially impact construction logistics and thus, overall construction schedules.

## 8.6 TIMELINE FOR SECURING EQUIPMENT

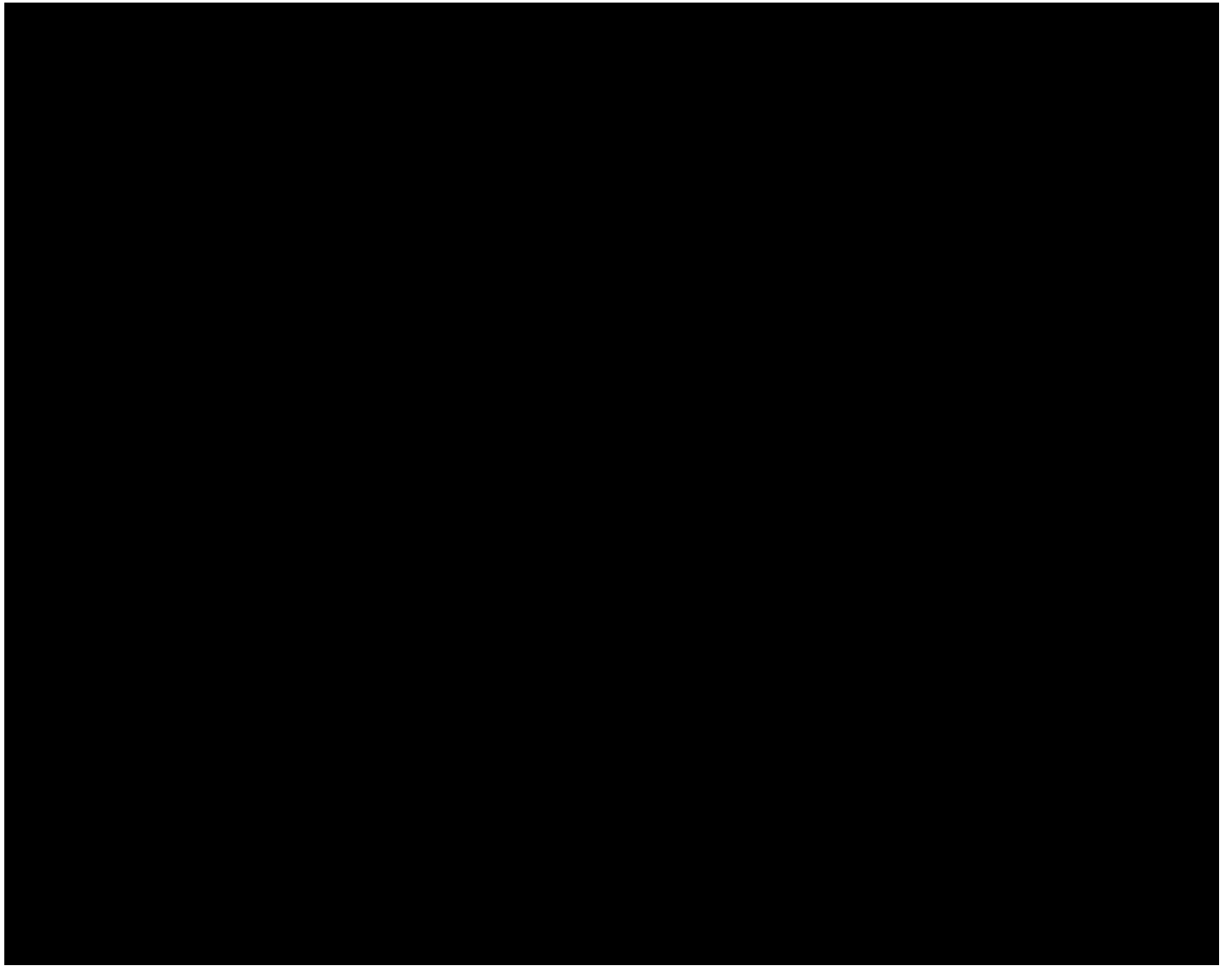
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8.6 Please indicate if the bidder has secured its equipment for all physical aspects of the bid, including generation facilities, delivery facilities, and mandatory and voluntary transmission system upgrades. If not, identify the long-lead equipment and describe the timing for securing this equipment.

Mayflower Wind has engaged with top tier suppliers for equipment which will make up the Mayflower Wind Project but presently has not executed specific contracts. Our contracting strategy is detailed in **Section 8.1**. In accordance with standard industry practice, contracts will be executed after a long-term power purchase agreement is in place, with the exception of ITC qualifying components, as described in **Section 5.10**.

The below schedule, **Figure 8.6-1**, presents the timeline to contracting, including engagement and execution for major packages and transmission system upgrades. Typically, major contracts are executed at financial close; however, some packages with longer lead times will be executed before financial close. Regarding the contracting timeline for long-lead equipment, below is the schedule for issuing RFPs for the various equipment packages which will make up the Mayflower Wind Project.





**FIGURE 8.6-1: DESIGN, CONTRACTING, AND PROCUREMENT OF MAJOR EQUIPMENT**

## SECTION 9 OF APPENDIX A TO THE RFP PROJECT SCHEDULE

A bidder must demonstrate that its proposal can be developed, financed, and constructed and be technically viable within a commercially reasonable timeframe. The bidder is required to provide sufficient information and documentation that shows that the bidder's resources, process and schedule are adequate for the acquisition of all rights, permits and approvals for all aspects of the project and for the financing of the project consistent with the proposed project milestone dates.

Bidders are required to provide a complete critical path schedule for the project from the notice of selection of the project for contract consideration to the start of commercial operations. For each project element, list the start and end date.

### MAYFLOWER WIND HAS A ROBUST SCHEDULE TO REACH COD FOR 408 MW IN 2025

Mayflower Wind has developed a technically viable and commercially reasonable schedule to develop, finance, and construct the Project. We draw extensively on the experience of our Sponsors in planning, scheduling, and completing energy projects ranging in size from [REDACTED] in total capital expenditure. This has led to robust schedule-assurance processes that have enabled Mayflower Wind to propose a reliable Commercial Operations Date (COD) in September 2025. We have comprehensively reviewed and validated the Project Schedule to ensure its credibility across a realistic range of scenarios, using input from:

- Current market information and binding proposals from suppliers within our Sponsors' extensive supply chain networks presenting timeframes for the procurement of materials and services for this Project;
- Decades of experience from Shell and EDP Renewables subject-matter experts in project design, property rights, environmental permitting, financing, and project management to deliver a cost-effective offshore wind project on schedule and on budget;
- Timelines and lessons learned from ongoing offshore wind projects in the U.S. and Europe.

In keeping with our core value of Safety First, Safety Always, we have developed a Project Schedule that can confidently be delivered without compromising safe design, safe construction, and safe operations.

Highlights of the Project Schedule during development and construction phases include:

- Time allocation for key stakeholder considerations including potential seasonal and time-of-year restrictions and environmental constraints, ISO-NE planned outage restrictions, peak Massachusetts summer tourist season, and nighttime restrictions on offshore activities. These considerations are further described in **Section 9.1**,
- Pre-financial close equity commitments in order to secure engineering needs, manufacturing slots, etc. for long-lead-time assets, [REDACTED]
- Securing the longest lead item component, [REDACTED]
- [REDACTED]

SCHEDULE OVERVIEW

The Project will be developed at the full 804 MW size with this proposal achieving COD and delivering energy and RECs from Phase 1 in September 2025. Once Phase 2 is complete the energy and RECs delivered will be the respective portion from the full project site.

The development phase will conclude at [REDACTED] construction and installation activities will be executed. COD for Phase 1 is planned for September 2025 and COD for Phase 2 is planned for December 2025. **Table 9-1** below identifies key project milestones.

Key project milestones	Date
Lease Site Award	April 2019
[REDACTED]	
Commercial Operations Date (Phase 1: 408 MW)	September 2025
Commercial Operations Date (Phase 2: 804 MW)	December 2025

TABLE 9-1: KEY PROJECT MILESTONES

A schedule overview is provided in **Figure 9-1** which identifies the critical path by red arrows. Detailed information about the critical path is provided in **Section 9.1**.

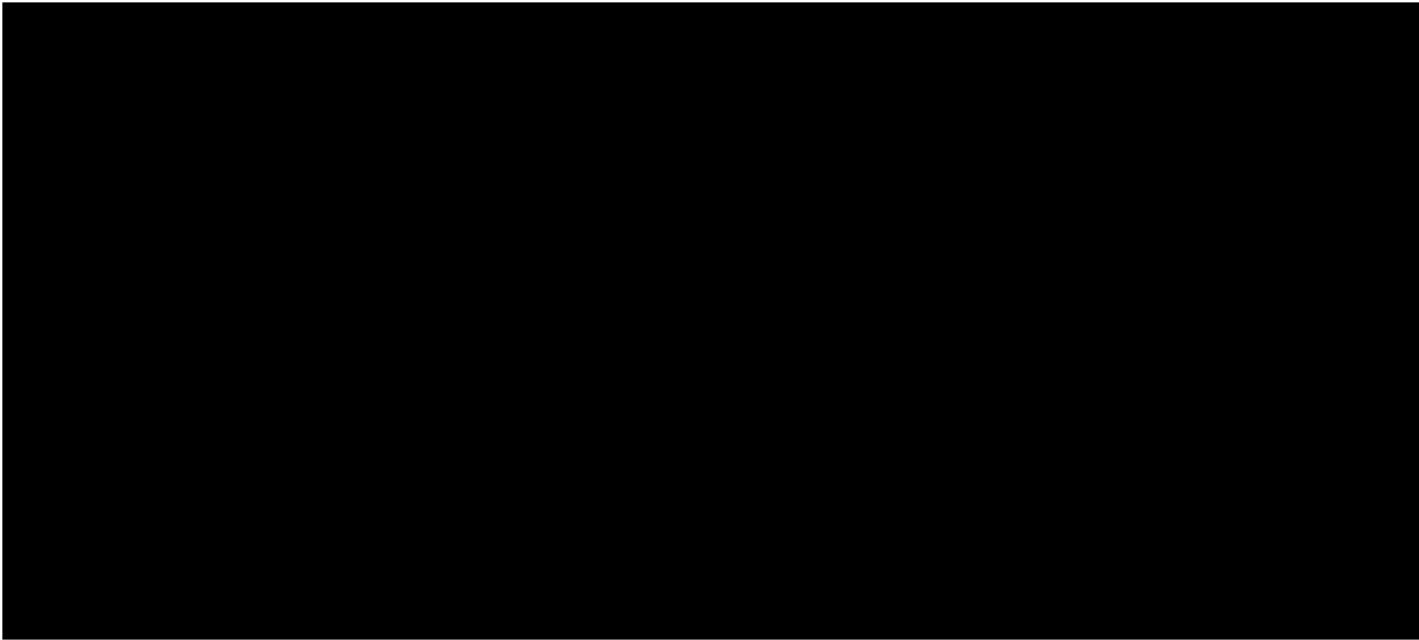
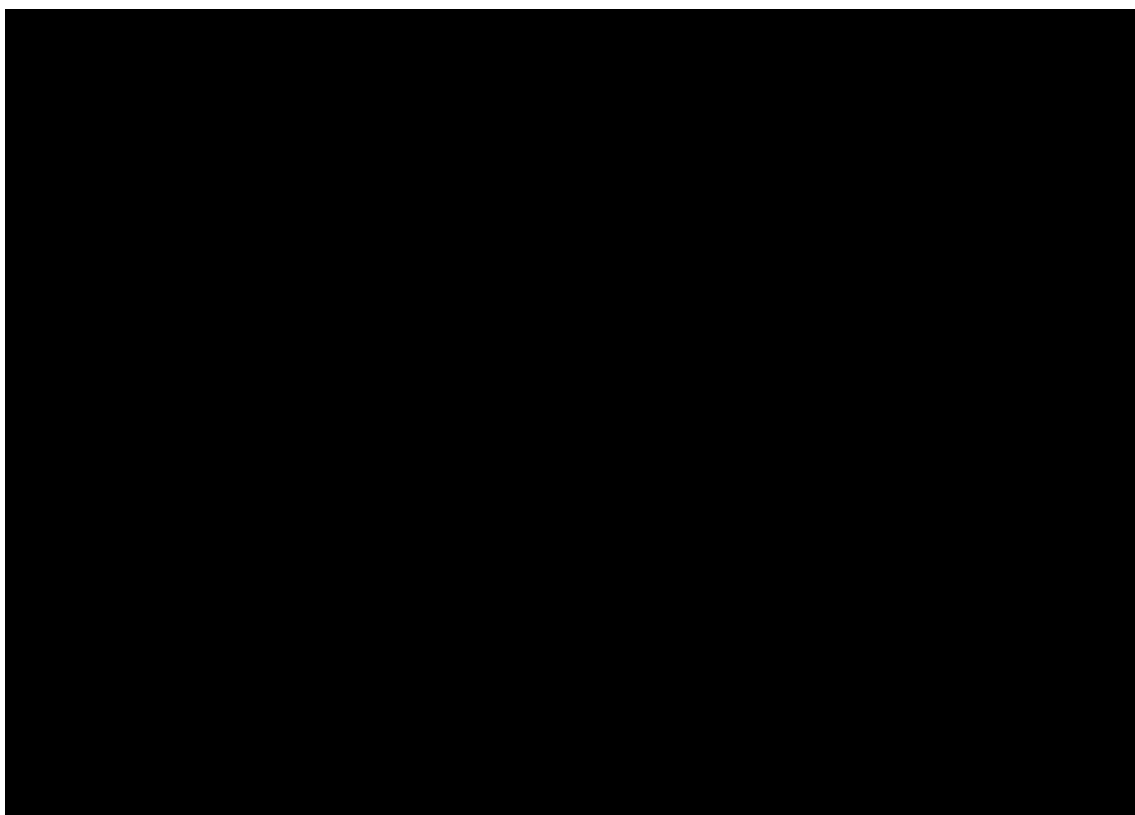


FIGURE 9-1: PROJECT SCHEDULE OVERVIEW

## RESOURCE ALLOCATION AND MANAGEMENT

Mayflower Wind has carefully assessed the resources and governance required to successfully acquire all rights, permits, and approvals for all aspects of the project and for the financing of the project consistent with the proposed project milestone dates. Mayflower Wind has developed and will execute a staffing plan that will grow the team from the current [REDACTED] upon financial close. As explained in **Section 5**, the project team is fully incentivized and has the sole purpose of delivering the Project. In addition, the project team will benefit from the vast pool of resources that Shell and EDP Renewables will make available to keep the Project Schedule on track. A Shareholder Representative from each Parent Company will be dedicated to facilitating the interaction between the project team and the Sponsors' resources. Furthermore, the project team will have access to top tier consultants and contractors, including local Massachusetts companies, that will provide specialized services to the Project.

**Figure 9-2** below highlights the Project team's growth plan from the current [REDACTED] upon financial close.



**FIGURE 9-2: FULL-TIME EQUIVALENT (FTE) EVOLUTION OF MAYFLOWER WIND'S PROJECT TEAM**

The resourcing during the construction and installation phase has been thoroughly assessed in close cooperation with our network of top tier contractors.

As further detailed in **Table 9-2** below, Mayflower Wind's experienced, well-resourced team, supported by its Sponsors has made significant achievements since it won a lease in December 2018.

Activity	Start	Finish	Status
Federal Waters Lease Awarded	N/A	April 1, 2019	Complete
Two Interconnection Requests submitted to ISO-NE	N/A		Complete
Lease Option Agreement to use the	N/A		Complete
(See Section 10.2)			
Foundation Concept Engineering & Preliminary Design Study	March 13, 2019	April 2, 2019	Complete
Offshore Property Rights Secured	December 2018	April 2019	Complete
LiDAR / Marine Buoy Contract Award	N/A	July 22, 2019	Complete
SAP Submission	N/A	July 29, 2019	Complete
Geophysical and Geotechnical Plan Submitted to BOEM	N/A	May 14, 2019	Complete
Tribal Consultations Initiated	N/A	June 19, 2019	Complete
2019 Geotechnical Offshore Survey Contract Awarded	N/A	April 3, 2019	Complete

TABLE 9-2: KEY ACTIVITIES 2018-2019

## SCHEDULE MANAGEMENT AND TOOLS

Mayflower Wind is using the following planning and scheduling software tools to ensure robust project controls:

- Oracle's Primavera P6 to develop, progress, and manage the Integrated Master Schedule;
- Deltek's Acumen Fuse to assess project intelligence through advanced analytics to quickly highlight schedule health, as well as improvements to schedule quality and project lifecycle maturity; and
- Primavera Risk Analysis to perform schedule risk analysis.

These tools will be used to track project progress and make adjustments to maintain the schedule by allocating resources as needed. These tools not only include consideration for time but also for resources, and cost.

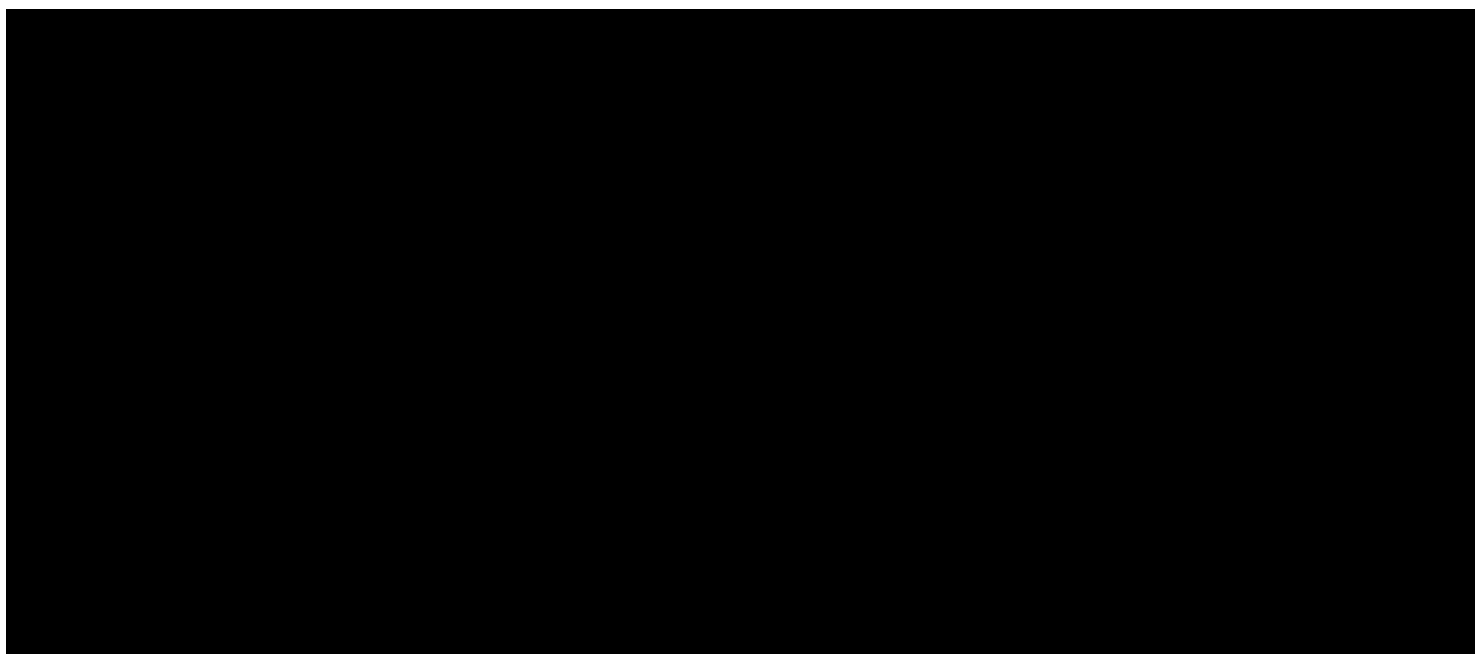
Mayflower Wind will also employ a management process to ensure confidence in meeting the critical path milestones and project objectives. This risk management process integrates input from the Project's risk register (upside and downside risks), cost estimate, and schedule into a probabilistic risk analysis. The probabilistic risk analysis provides ranges of possible final cost and schedule outcomes, as well as the key drivers that impact the Project.

## 9.1 PROJECT SCHEDULE

- 9.1 Identify the elements on the critical path. The schedule should include, at a minimum, preliminary engineering, financing, acquisition of real property rights, Federal, state and/or local permits, licenses, environmental assessments and/or environmental impact statements (including anticipated permit submittal and approval dates), completion of interconnection studies and approvals, procurement, facility contracts, start of construction, construction schedule, and any other requirements that could influence the project schedule and the commercial operation date.

### CRITICAL PATH

Critical path activities are shown below in **Figure 9.1-1** below. Additional details about the critical path can be found in the Project Schedule in **Attachment 9.1-1**.



**FIGURE 9.1-1: MAYFLOWER CRITICAL PATH TO COD**

Mayflower Wind's critical path has been broken in two phases, development and construction. The development phase is assumed to conclude at financial close and the construction phase is assumed to conclude at COD. All activities

[REDACTED]

[REDACTED]

[REDACTED]

## DEVELOPMENT: MILESTONES TO FINANCIAL CLOSE

Key development milestones to financing can be summarized by the following categories:

- Offshore and onshore surveys required for engineering design and COP submission,
- Federal, local, and state permitting submissions, certifications, and approvals,
- Preliminary engineering, detailed design, and design certifications,
- Acquisition of real property rights for State waters and onshore works,
- LGIA execution with ISO-NE.

The major development activities that are still ongoing and those which are expected to be concluded prior to the Mayflower Wind Project achieving financial close are noted in **Table 9.1-1** below. The following key milestones to achieve financial close are also found in the Mayflower Integrated Master Schedule in **Attachment 9.1-1**.

Activity	Expected Completion Date

**TABLE 9.1-1: MILESTONES TO FINANCING**

Mayflower Wind has a robust understanding of permitting requirements and expects to have all state, local and regional permits approved in [REDACTED]

[REDACTED] Other key federal permits required for financial close include the fabrication and installation report (FIR) and facility design report (FDR), both of which will be submitted upon COP approval with a planned six-month approval time.



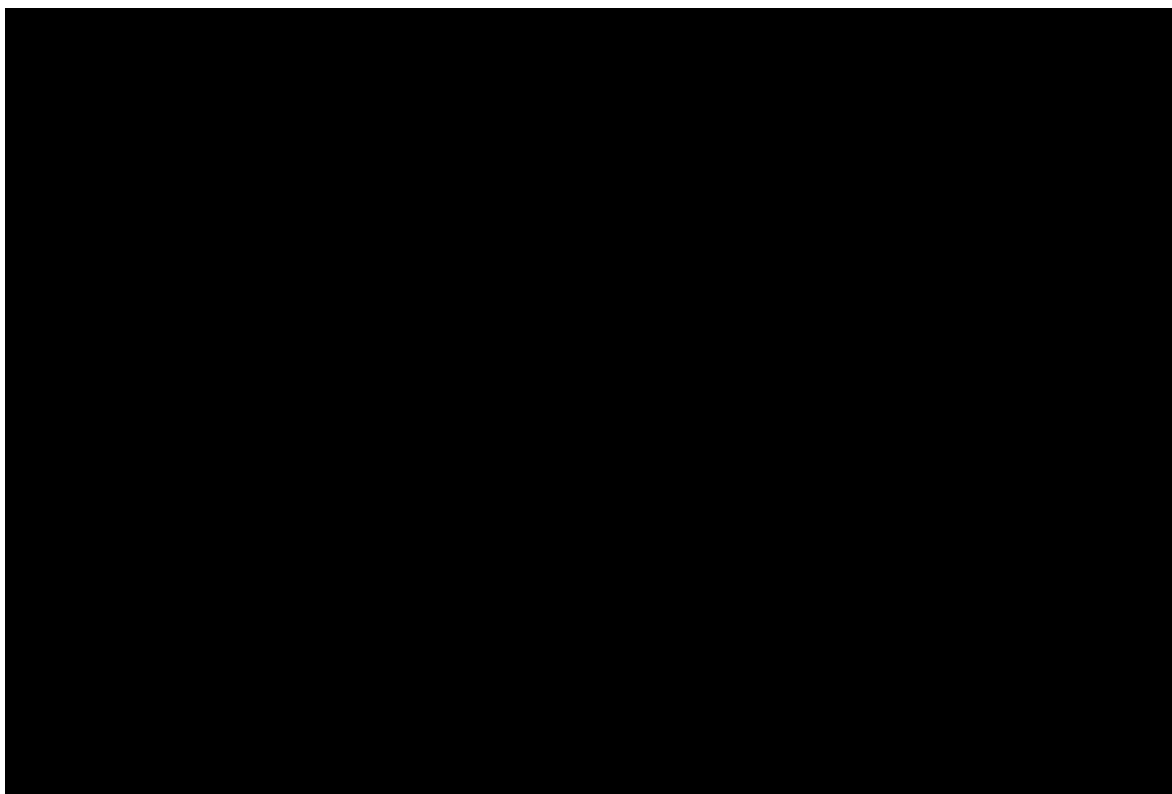
The schedule assumes an [REDACTED] for all major components with further details regarding our procurement strategy included in **Section 8**. Mayflower Wind started Preliminary Engineering for selected scope components in April 2019 and will continue front end engineering until [REDACTED]. Thereafter detailed design will continue until design certification is complete in [REDACTED]. Key dates for contracting work packages, engineering, and detailed design can found in **Attachment 9.1-1**.

#### CONSTRUCTION, INSTALLATION, AND COMMISSIONING: MILESTONES TO COD

The Project Schedule includes an overall execution duration of [REDACTED] to COD of Phase 1 in September 2025 and COD of Phase 2 in December 2025.

[REDACTED]

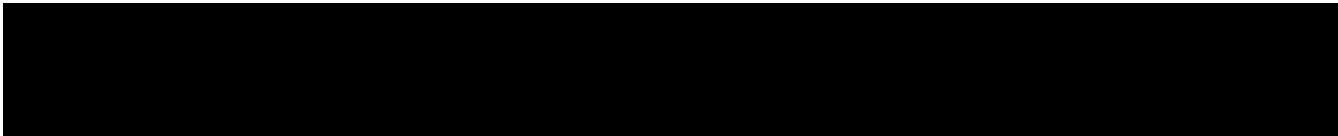
**Figure 9.1-2** below contains key milestones in the schedule from financial close to commercial operations:



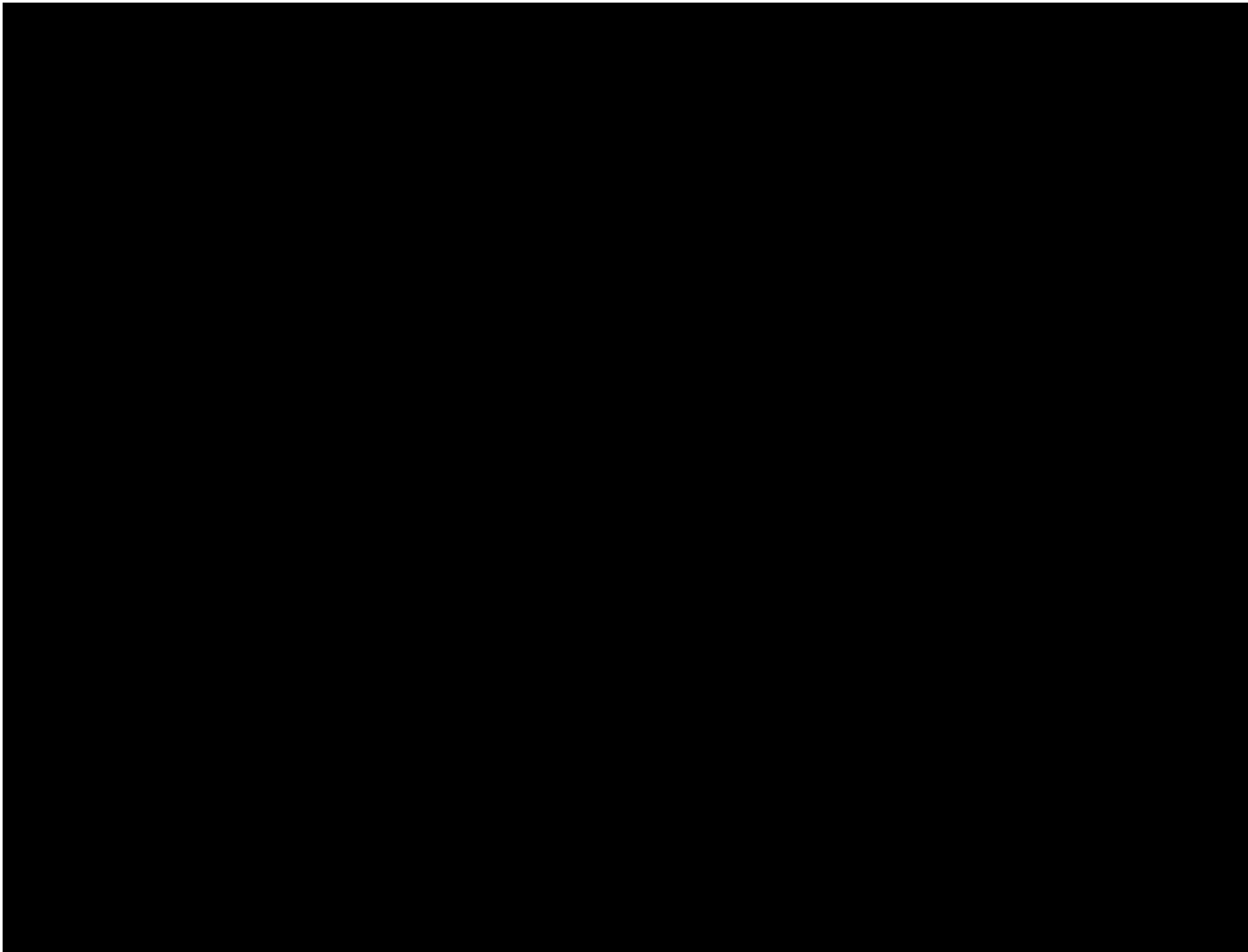
**FIGURE 9.1-2: KEY MILESTONES FROM FINANCIAL CLOSE TO COD**

Mayflower Wind's COD date is highly achievable and encompasses non-technical risks and external considerations built into the base durations to provide confidence that the proposed COD will be achieved in 2025. The Project Schedule contains sufficient float throughout the critical and sub-critical paths as well as additional schedule contingency between final commissioning and COD for both phases. The construction and installation schedule has been developed with the following considerations:

[REDACTED]

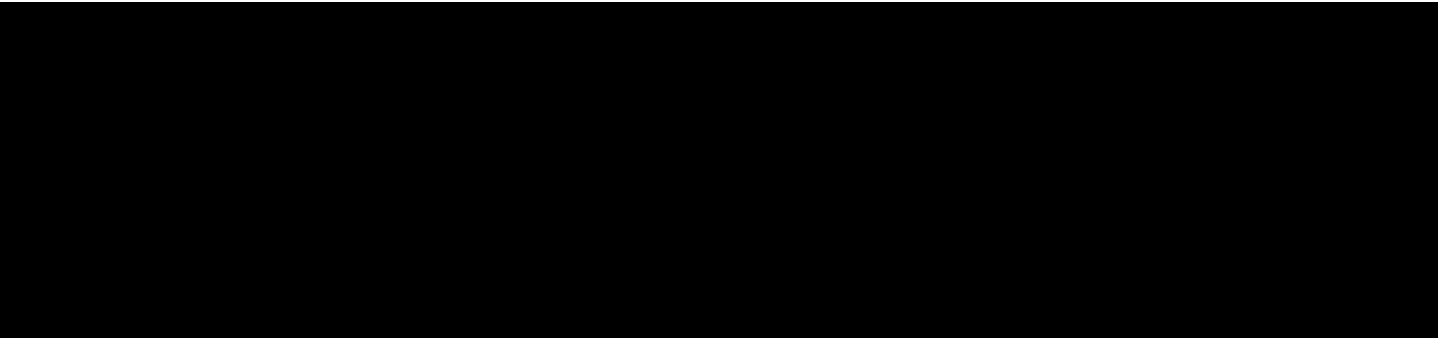


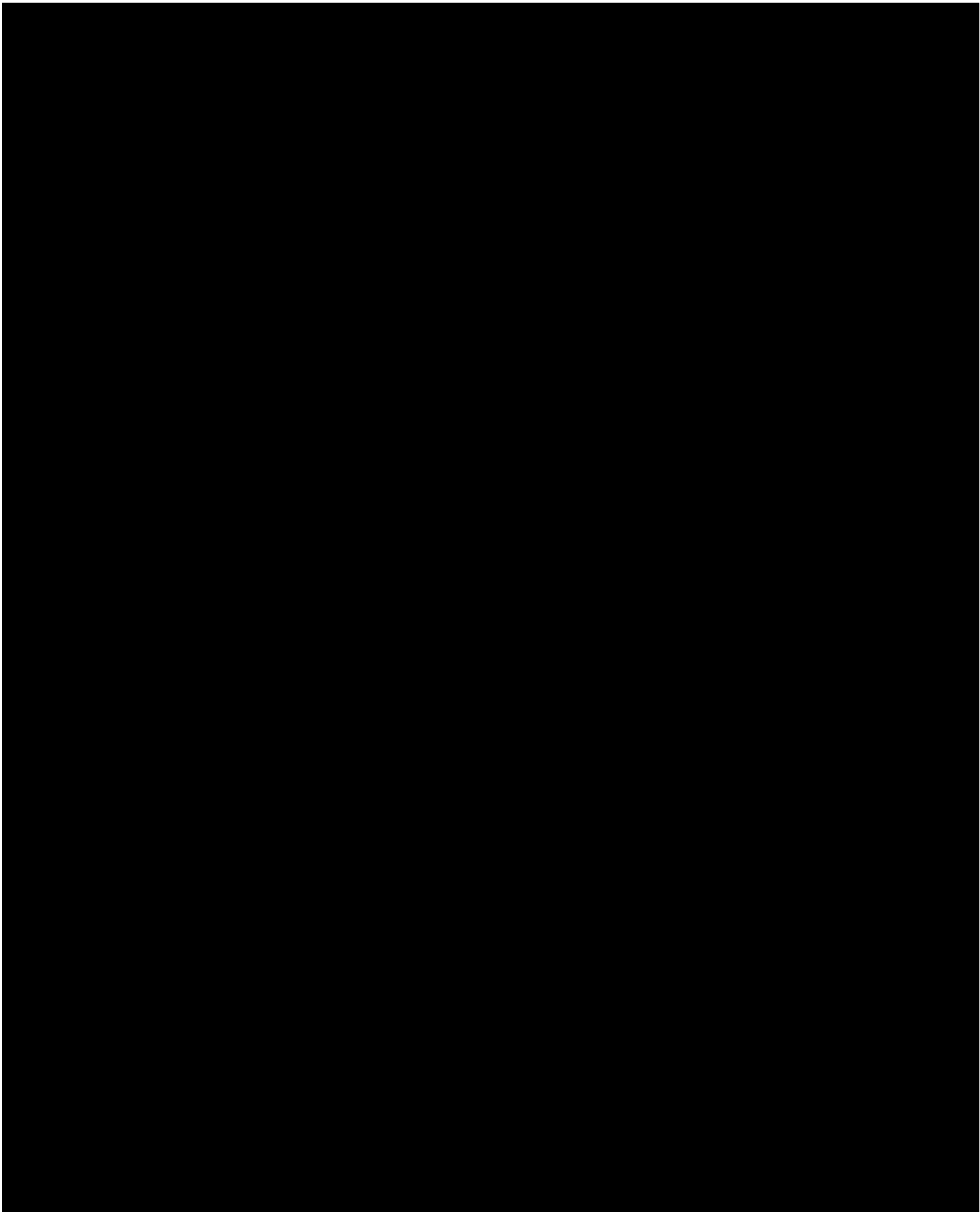
**Figure 9.1-3** below is a high-level overview reflecting the construction schedule inclusive of Transportation, Installation, and Commissioning.



**FIGURE 9.1-3: CONSTRUCTION & COMMISSIONING ACTIVITIES**

Notable aspects of the schedule of major work packages are presented in the bullet points below. The full Project Schedule is provided in **Attachment 9.1-1**.





## 9.2 MARITIME VESSELS

- 9.2 Include a discussion on use of maritime vessels and access to them. Also include a description and discussion of the laydown facility/facilities to be used for construction, assembly, staging, storage, and deployment.

### VESSEL SUPPLY CHAIN ANALYSIS

Mayflower Wind has completed an analysis of maritime vessels and our access to them to identify the different operation and installation solutions currently and forecasted to become available during the Project's construction timeframe, as well as the type and number of specialized vessels required to construct and operate the Project. This evaluation, drawing upon the Sponsors' extensive relationships and networks, resulted in collaboration with more than 70 different owners, operators, and vessel specialists including:

- 16 U.S. vessel owners and installation operators
- 20 EU vessel owners and installation operators
- 8 shipyards and designers
- 7 classification societies and consultants and service providers
- 15 marine equipment and original equipment manufacturers
- 4 brokers

The analysis considered the use of vessels for transportation, staging, and installation. A "Low, Medium, and High" risk weighting was assigned to the different vessels required during construction and operation based on:

- U.S. availability
- Global current availability
- Jones Act compliance (through vessel or strategy)
- Future expected availability

**Table 9.2-1** below shows the outcome of the vessel supply chain analysis and identifies the risk profile for each vessel type.

Vessel Type	Jones Act Required?	# of Jones Act Vessels available in U.S. (as of 2018)	# of Vessels available globally (as of 2018)	Risk Profile	Comments
-------------	---------------------	---	--	--------------	----------

Vessel Type	Jones Act Required?	# of Jones Act Vessels available in U.S. (as of 2018)	# of Vessels available globally (as of 2018)	Risk Profile	Comments
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Vessel Type	Jones Act Required?	# of Jones Act Vessels available in U.S. (as of 2018)	# of Vessels available globally (as of 2018)	Risk Profile	Comments
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**TABLE 9.2-1: VESSEL SUPPLY CHAIN ANALYSIS**

A complete description of all vessels which may be used by the project is included in **Attachment 9.2-1**.

**Section 10.1** lists in detail the type and number of vessels which are expected to be used during each stage of the Mayflower Wind Project's deployment, construction, and operation.

As noted in the risk table above, sourcing a WTIV carries medium to high risk given current market conditions. Mayflower Wind is actively engaged with WTIV suppliers, facilitated by the existing relationships between the Sponsors and premier vessel suppliers.

WTIVs are designed to install all the components of an offshore wind turbine (blades, rotor, nacelle, tower, and transition piece). Due to the need to have a very stable crane operation, they can also be used to install foundations. **Table 9.2-2** identifies some of the vessels considered for turbine installations and their required upgrades.

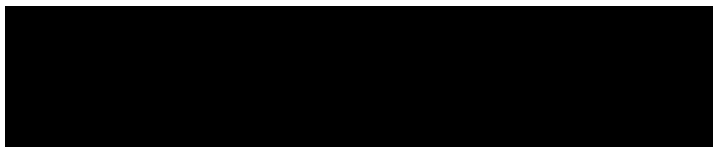
Vessel	Comments	Vessel Upgrades Required
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**TABLE 9.2-2: WIND TURBINE INSTALLATION VESSELS UNDER CONSIDERATION**

## DESCRIPTION OF LAYDOWN FACILITIES

Mayflower Wind has evaluated existing port facilities and coastal properties in and around Massachusetts and identified three potential marine terminals for storing and assembling components for the construction and operation of the Project. The [REDACTED] under continued evaluation and discussion are:



We are currently in advanced talks to gain site control for marine terminals and waterfront facilities and have signed a lease option with the [REDACTED]. However, our strategy is to remain flexible at this stage of project development to identify the most cost-effective locations for staging, assembling, and deploying the Project when we move into active pre-construction.

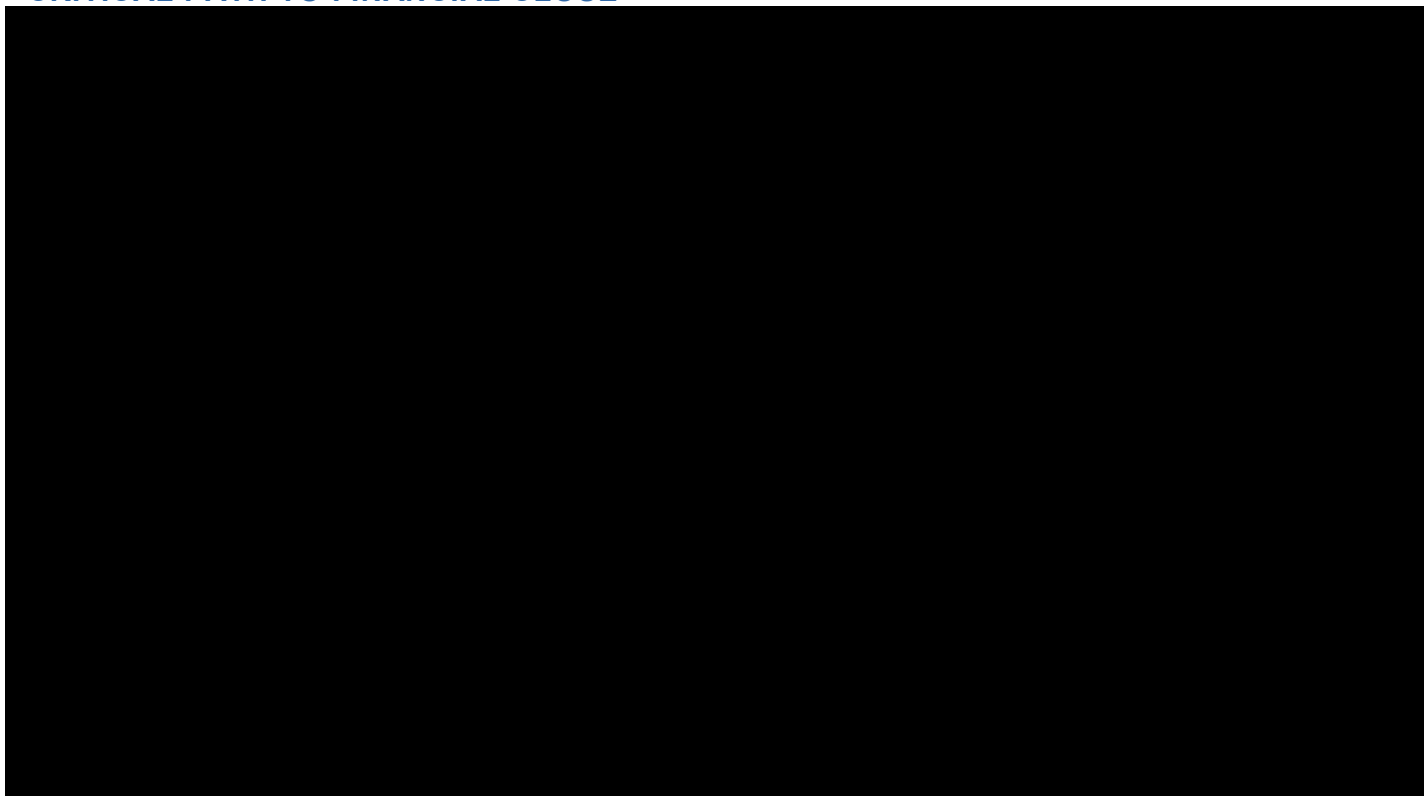
A complete description of the port study and potential locations is presented in **Section 10.2**.

### 9.3 STATUS OF CRITICAL PATH ITEMS

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- 9.3 Detail the status of all critical path items, such as receipt of all necessary siting, environmental, and ISO-NE approvals.

## CRITICAL PATH TO FINANCIAL CLOSE





Critical Activity	Completion Date	Status	Status Details

Critical Activity	Completion Date	Status	Status Details

Critical Activity	Completion Date	Status	Status Details

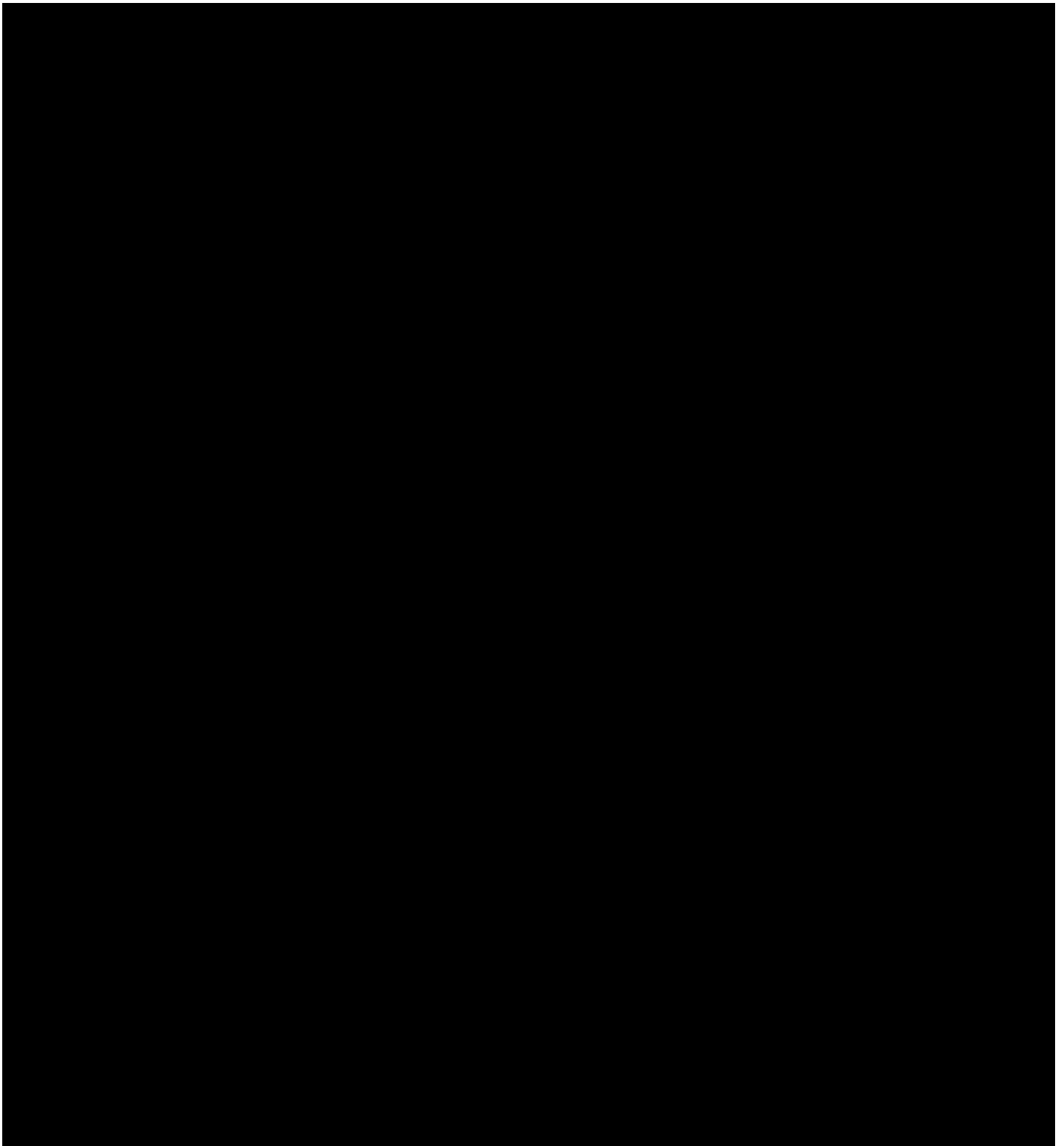
TABLE 9.3-1: CRITICAL PATH ACTIVITIES AND STATUS

CRITICAL PATH FROM FINANCIAL CLOSE TO COD

During construction, the critical path is driven by

As discussed in **Section 9.1**, Mayflower Wind will commit to early, long-lead funding for work packages on the critical path in order to plan the execution of activities according to external consideration windows and still have adequate float between execution activities.

**Figure 9.3-1** shows critical path activities from financial close to COD.



**FIGURE 9.3-1: CRITICAL PATH TO COD**

## SECTION 10 OF APPENDIX A TO THE RFP OPERATION AND LOGISTICS

This section of the proposal addresses necessary arrangements and processes for outfitting, assembly, storage and deployment of major project components such as turbine nacelles, blades, towers, foundations, and delivery facilities support structures, and other major components associated with delivery facilities and, and the storage facility (as applicable).

Large-scale infrastructure development and construction in the U.S. requires expert planning with local knowledge to deliver a project on safely and on time. Mayflower Wind, through the experience of its Sponsors, has significant experience and competence in onshore and offshore wind construction, operations, and logistics; offshore energy construction; and large-scale infrastructure development.

Through offshore energy production activities in the U.S., the Mayflower Wind team has decades of experience with and identified best practices for, offshore construction, marine logistics and complying with the Jones Act.

Mayflower Wind conducted extensive risk and sensitivity analysis to develop an optimal solution to deliver the Project reliably and cost-effectively.

### 10.1 DEPLOYMENT AND SPECIALIZED EQUIPMENT

10.1 Please list the major tasks or steps associated with deployment of the proposed project and the necessary specialized equipment (e.g. vessels, cranes).

The Mayflower Wind Project will be completed through six major tasks. The six major tasks, referred to herein as “work packages”, are illustrated in **Figure 10.1-1** below:



**FIGURE 10.1-1: WORK PACKAGES**

Mayflower Wind will initiate the work required for each work package in parallel, where suitable, in order to deploy the project in the most efficient way possible. A high-level overview indicating the schedule and parallel path of construction is shown in **Figure 10.1-2**. **Attachment 10.1** shows the anticipated water way route that vessels would take from [REDACTED] to the site.

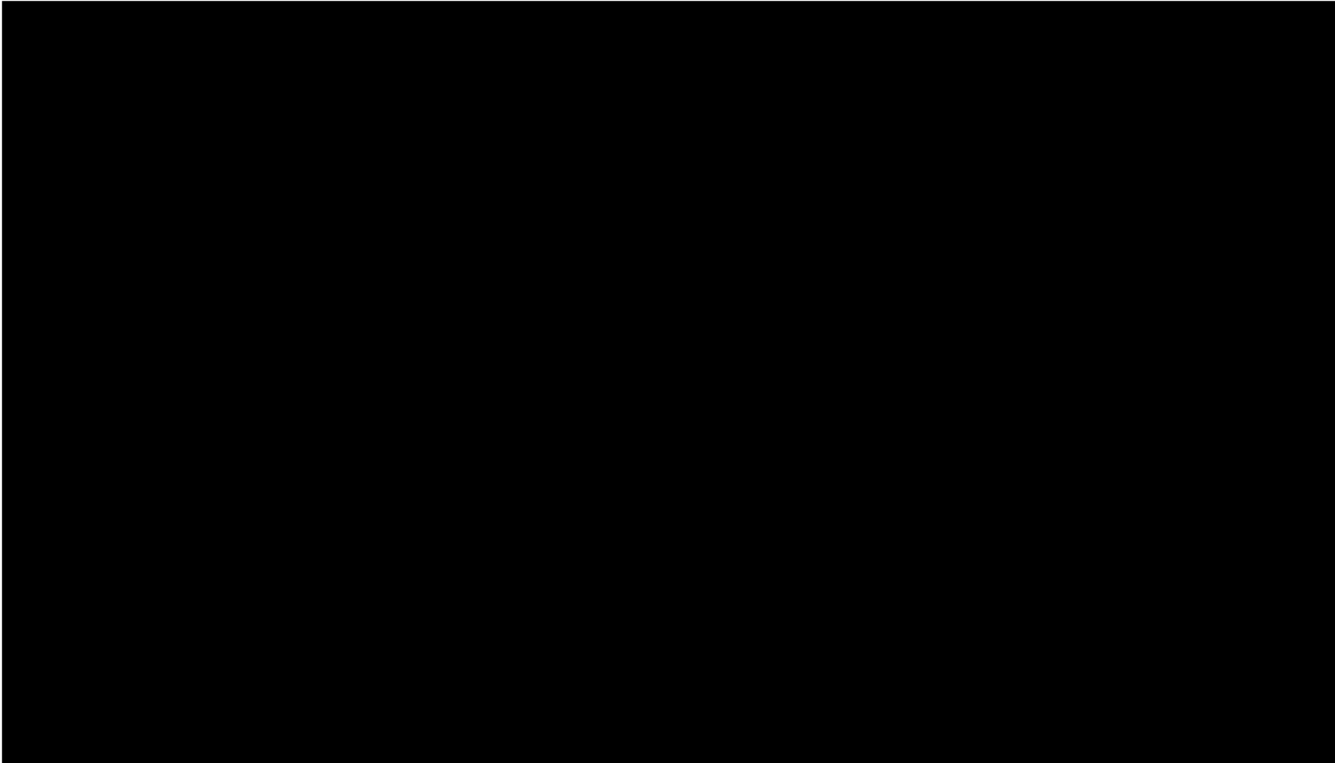


FIGURE 10.1-2: INDICATIVE TIMELINE AND VESSELS FOR INSTALLATION

Mayflower Wind evaluated historical weather data, input from close collaboration with fabricators and installation contractors, and data from its extensive experience in similar projects including Moray East, Borssele 3&4, and offshore oil and gas infrastructure construction in order to develop a credible and reliable schedule. Project task durations and timelines are further detailed in **Section 9**.

**Table 10.1-1** provides an overview of the major tasks necessary to deploy the Project, from the transportation of components from the site of original manufacture through to commissioning. For each major task, the specialized equipment needed is also noted. A detailed description of each major task, vessel strategy, and compliance with the Jones Act is presented in **Section 10.3**.

Work Package	Major Task	Specialized Equipment	Quantity
Wind Turbines (WTG)	Transportation to Staging Port from Europe		
	Staging Activities		
	Transportation to Site from Staging Port		

Work Package	Major Task	Specialized Equipment	Quantity
	Installation		
	Commissioning		
Foundations	Transportation of Monopiles to Site from Europe		
	Installation of Monopiles		
	Noise Mitigation		
	Transportation of Transition Pieces to Staging Port from Fabrication Facility		
	Transportation of Transition Pieces to Project Site from Staging Port		
	Installation of Transition Pieces on Monopiles		
	Grouting TP to monopile (if required)		
	Scour protection (where applicable)		
Inter-array cables	Seabed Preparation		
	Cable Transportation and Installation		



Work Package	Major Task	Specialized Equipment	Quantity
	Cable Protection (as needed)		
Export Cables	Survey		
	Seabed Preparation		
	Transportation and Installation (Far shore section)		
	Transportation and Installation (Nearshore section)		
	Splicing		
Offshore Substation(s)	Substation Foundation (Jacket) Transportation		
	Substation Foundation (Jacket) Installation		
	Substation Topsides Transportation and Installation		
Onshore Works	Onshore substation and cable installation		
	Landfall		

Work Package	Major Task	Specialized Equipment	Quantity

**TABLE 10.1-1: WORK PACKAGE TASKS AND REQUIRED EQUIPMENT**

## 10.2 MARINE TERMINALS

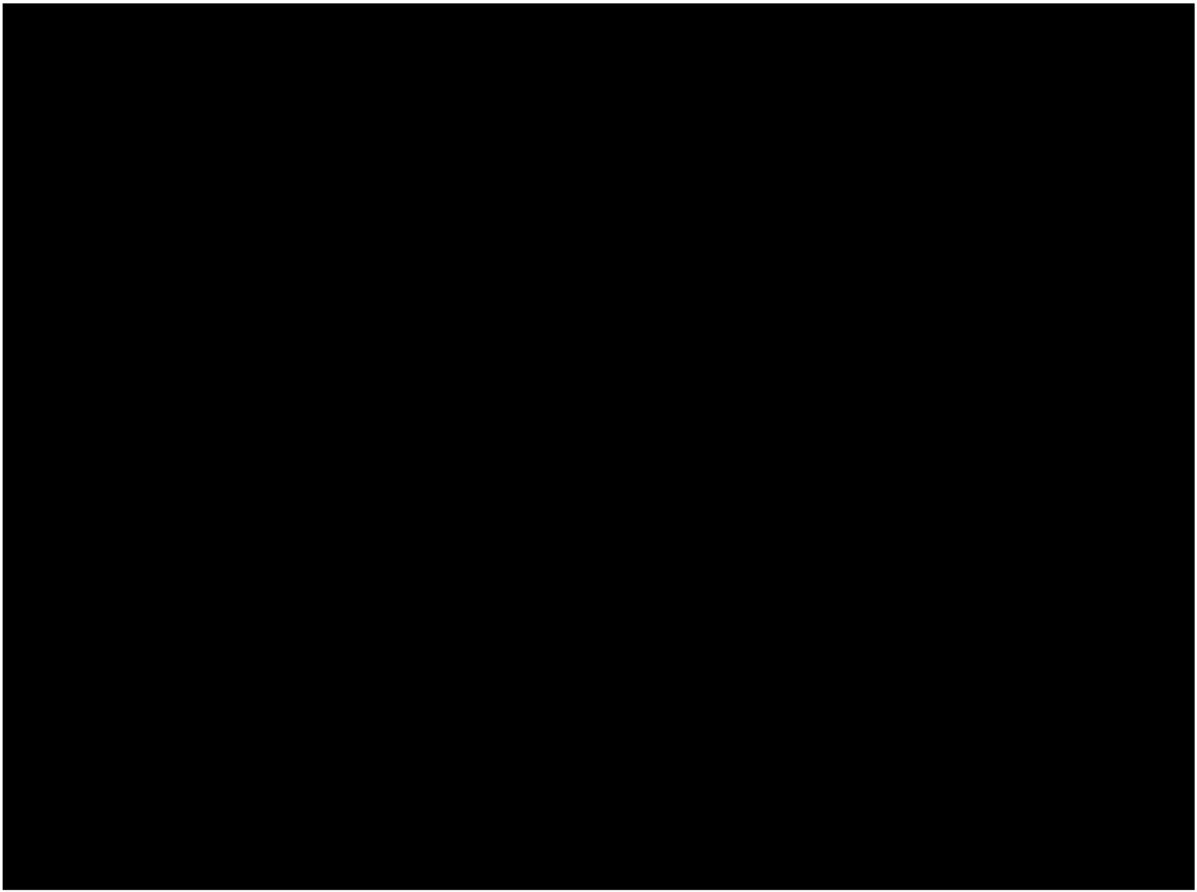
**10.2** Please provide documentation to demonstrate site control for all marine terminals and other waterfront facilities that will be used to stage, assemble, and deploy the project for each stage of construction.

- i. Evidence that the bidder or the equipment/service provider have a valid lease, or option to lease, a marine terminal and/or waterfront facility for construction of the offshore wind energy project (e.g., by virtue of ownership or land development rights obtained from the owner).
- ii. If not available, describe the status of acquisition of real property rights for necessary marine terminal and/or waterfront facilities, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project schedule.
- iii. Identify any joint use of existing or proposed real property rights for marine terminal or waterfront facilities.

Mayflower Wind has executed a lease option with [REDACTED] (**Attachment 10.2-1**) for the ability to utilize the [REDACTED] during construction.

Our strategy is to remain flexible at this stage of project development to identify the most cost-effective locations for staging, assembling, and deploying the project.

Mayflower Wind has reviewed 27 potential locations for marine terminals and waterfront facilities to stage, assemble, and deploy the project for each stage of construction, and we are currently negotiating with port operators for site control in four locations. For each of the ports considered, key criteria such as size, air draft, horizontal clearance and depth at berth were evaluated, and detailed in **Table 10.2-1**.



Location	
Owner	
Acreage	
Quayside Length	
Navigable Depth Restriction	
Unique Qualities	



1. *Journal of the American Medical Association*, 2000; 283: 2689-2695.

**TABLE 10.2-2: PORT UPGRADES TO SUPPORT MAYFLOWER WIND PROJECT**

[REDACTED]

[REDACTED]

[REDACTED]

### 10.3 STAGING AND DEPLOYMENT

10.3 Please describe the proposed approach for staging and deployment of major project components to the project site. Indicate the number, type and size of vessels that will be used, and their respective roles. Please include specific information on how the bidder's deployment strategy will conform to requirements of the Merchant Marine Act of 1920 (the Jones Act).

For six decades Shell has been active in designing, constructing, and operating offshore facilities in both shallow and deep waters in the U.S. Outer Continental Shelf (OCS). This experience will be directly applied to the deployment of the Mayflower Wind Project. The OCS is governed by a complex regulatory framework that is managed by multiple agencies and government stakeholders and includes requirements to comply with the Merchant Marine Act of 1920 (Jones Act). Shell's commitment to compliance with the law includes extensive processes and procedures to ensure Jones Act compliance. Shell has also worked closely with U.S. Customs & Border Protection (CBP), the agency charged with enforcing the Jones Act, and with the current Administration in advocating for clarity and consistency with respect to the application of the Jones Act to OCS operations. Shell's experience in securing multiple Jones Act-compliant vessels will be utilized by Mayflower Wind.

#### WIND TURBINE GENERATORS

The proposed approach for staging and deployment of the project's wind turbines will follow current industry standards, and include:

- Transportation of turbine components from the point of manufacture to a staging port;
- Staging of turbine components;
- Transportation of turbine components from the staging port to the point of installation (i.e. foundation location);
- Installation of the turbine components on the foundation; and
- Commissioning of the turbine.

#### TRANSPORTATION FROM POINT OF MANUFACTURE TO STAGING PORT

Mayflower Wind has conservatively assumed all turbine components will be manufactured in Europe for our transportation plan, however, turbine suppliers are exploring the possibility of manufacturing and supplying components from the U.S. U.S. based manufacturing will reduce transportation complexity.

The wind turbines components will be delivered to the project's staging port using multiple heavy-lift transport vessels, with transit durations expected between [REDACTED]. The transport vessels will be outfitted with appropriate component framing and sea fastening gear to ensure the safety of crew and equipment, and an optimized number of transits. Mayflower Wind expects all turbine components will be delivered to the staging port starting in [REDACTED].

These heavy-lift transport vessels are currently available in the market and are the preferred method of transportation for wind turbine components over significant distances.

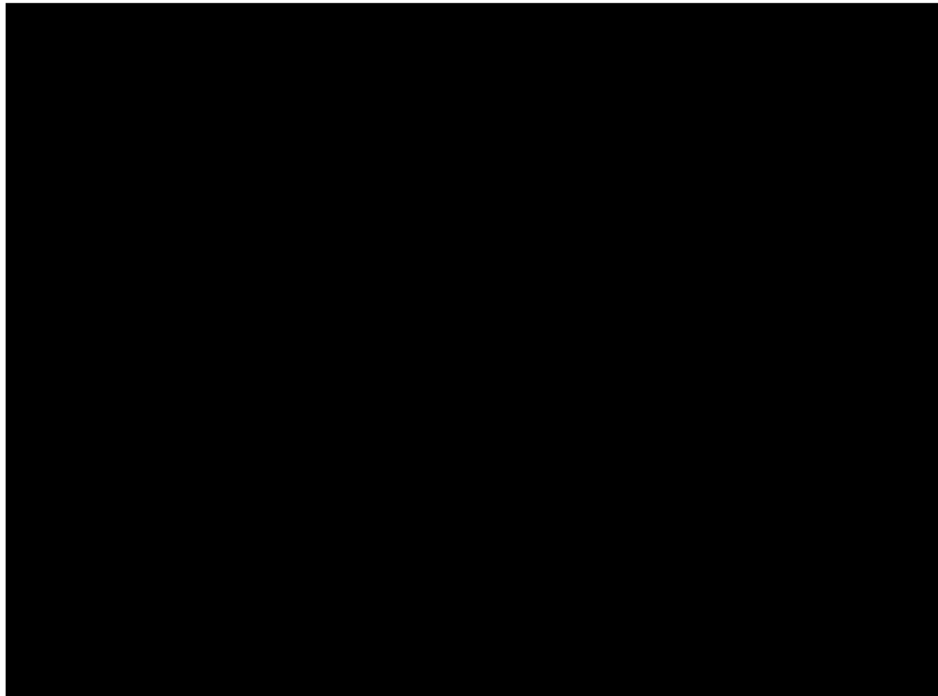
#### STAGING PORT

Turbines will be staged in the staging port to allow continuous and efficient supply during the offshore installation phase. Potential staging ports are detailed in **Section 10.2**, and Mayflower has projected the number of [REDACTED] and transition pieces that could be potentially staged in each port in **Table 10.3-1** below:



The primary activities which will occur at the staging port will include unloading components from the transport vessel, arranging the components for short term storage at the port, and re-loading the components onto the feeder barge/ vessel for transport to site. An example of how the [REDACTED] will be utilized for both turbine component and transition piece staging is seen in

**Figure 10.3-1.**



Self-propelled transport vehicles will be used to move turbine components around the staging port site. These vehicles are readily available in the market and are regularly used in the wind industry.

#### TRANSPORT OF TURBINE COMPONENTS FROM STAGING PORT TO POINT OF INSTALLATION

Turbine components will be delivered to their point of installation, a previously installed foundation, using a Jones Act compliant feeder barge or vessel (see **Figure 10.3-2**).





**FIGURE 10.3-2:** EXAMPLE OF A FEEDER BARGE (GUSTOMSC NG-3750C-FEEDER)

The components for two complete turbines will be loaded onto the feeder barge/ vessel from the staging port, which will, in turn, navigate to the project site and point of installation location. At the point of installation, a Wind Turbine Installation Vessel (WTIV) will lift components from the feeder barge/ vessel and install them on the previously installed foundation. A description of a feeder barge/ vessel is found in **Attachment 9.2-1**.

## INSTALLATION

The installation of each turbine will be accomplished using a WTIV. These vessels are currently available in the market and are the preferred equipment to install offshore wind turbines. The WTIV will pick components from the deck of the feeder barge/ vessel. Given the installation vessel will not transport any turbine components between foundation locations and will install components directly from the feeder barge/ vessel, the installation vessel is not required to comply with the Jones Act.

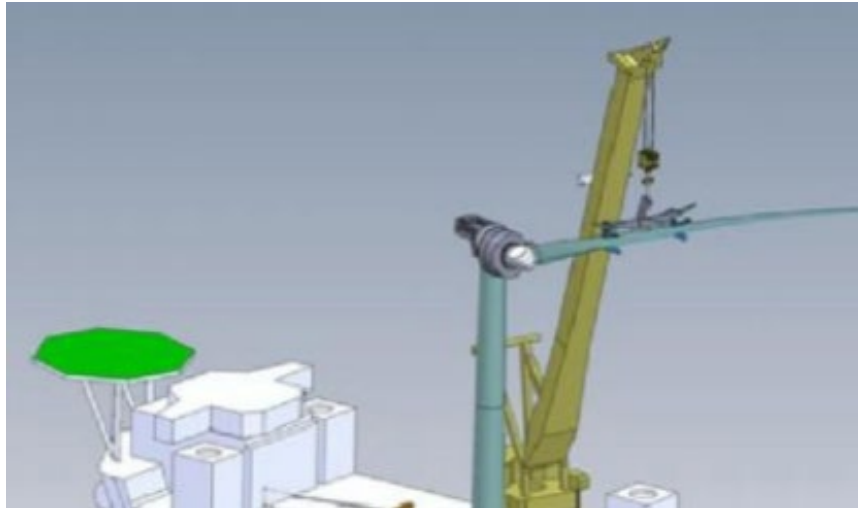
Both the WTIV and the feeder barge/vessel will work [REDACTED]. The installation sequence is as follows

- Position WTIV and jack-up
- Lift tower, either (partially) assembled or in sections
- Lift nacelle with hub
- Lift blades

The partially completed tower will be lifted by the WTIV crane using a gripper. The gripper will be attached to the crane hook and connected to the tower top. The tower will then be released from the grillage, lifted onto the foundation and bolted. Finally, the gripper will be released from the tower by releasing a handle. In the event the tower is lifted in sections, this is typically done using lifting eyes. These lifting eyes are directly bolted onto the tower section flange and removed after the tower section is installed and bolted on.

The nacelle will be lifted using a nacelle lifting yoke, slings, and shackles using lifting brackets or permanent connections on the nacelle. Tag line systems are used to limit movements during the lift. The nacelle will be lifted and placed onto the tower, after which the bolted connection with the tower top will be secured.

Blades will be lifted individually using a blade gripper that is remotely controlled (**Figure 10.3-3**). The blade gripper allows for maintaining a precise position and angle of the blade while the connection with the hub is established. After the blade is attached to the blade bearing the blade gripper can be detached and the hub can be rotated 120 degrees to be ready to receive the next blade. Mayflower Wind expects the installation of one complete turbine to take [REDACTED]



**FIGURE 10.3-3: LIFTING OF BLADES DURING INSTALLATION**

### COMMISSIONING

Once fully assembled, the turbines will undergo electrical and mechanical completion and commissioning processes. Mechanical and electrical completion involves finalizing the power cable connections, the ladder and lift connections, connecting the grounding cables, and completing other minor mechanical and electrical systems. During the commissioning phase, signal and insulation tests are performed, and the entire fire detection and lightning protection systems are tested. After energization, the turbine is powered up, switches and sensors are calibrated, and the pitch system, control system, and yaw system are tested. The turbine is considered commissioned after a trial run is successfully completed.

### JONES ACT COMPLIANCE

### WIND TURBINE FOUNDATIONS

Monopile foundations are assembled from two primary parts: the monopile that is driven into the seabed, and a transition piece is installed on the monopile.

### TRANSPORTATION OF MONOPILES

Monopiles will be transported by heavy transport vessel, each of which is capable of carrying up to eight monopiles each. Mayflower Wind expects that the transportation vessel will [REDACTED] To have a continuous supply of monopiles to the installation vessels, up to four heavy transportation vessels will be used.



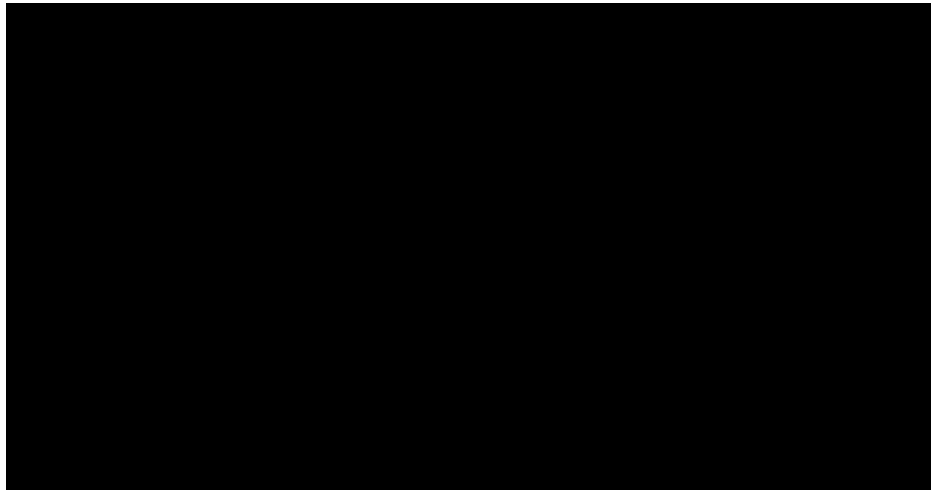
## INSTALLATION OF MONOPILES

### Seabed Preparation

Mayflower Wind is beginning geophysical and geotechnical campaigns at the project site this summer that will help to identify the required level of seabed preparation and finalize foundation concept selection. The area must be clear of boulders and checked for levelness of the site regardless of the final foundation type selected. If surface boulders are identified, they would be removed using a boulder grab or “peel grab” techniques.

### Monopiles

Monopiles will be lifted from the heavy transport vessel (**Figure 10.3-5**), upended, and lowered through a pile gate on the Heavy Lift Vessel to the required location on the seabed. A hydraulic pile driving hammer is then used to drive the monopile to the required depth. If boulders or much stiffer ground conditions are anticipated, a relief drilling spread may also be required. Anticipated duration of pile driving for the monopiles is [REDACTED] per foundation.



### Noise Mitigation

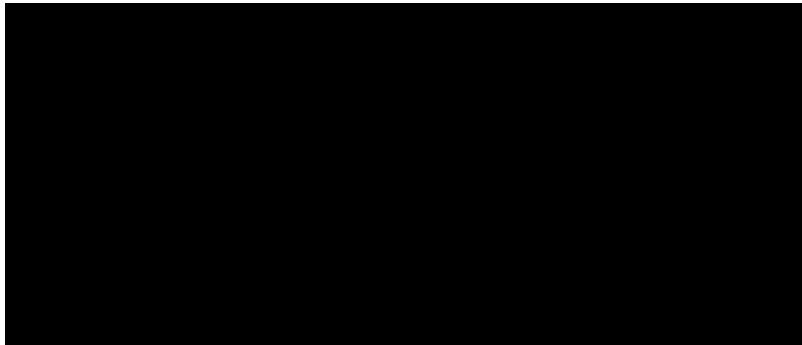
Mayflower Wind is actively exploring noise mitigation for pile driving activities. Noise mitigation techniques include several bubble curtain options, noise mitigation screens, vibratory hammers, soft start-up pile driving, and hydro sound dampers. [REDACTED]





### Transportation of Transition Pieces

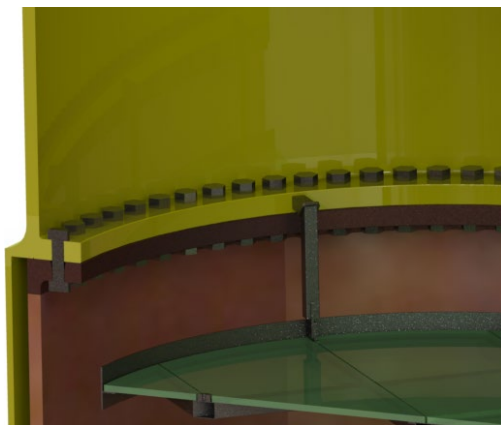
Transition pieces will be transported from a fabrication facility to the staging port in the U.S. via heavy transport vessel. They will be staged in a U.S. port and transported between [REDACTED]



### Installation of Transition Pieces

A transition piece, or secondary steel in the case of a one-piece monopile, will be installed prior to connecting the inter-array cabling and wind turbine generator. The transition pieces will be installed on monopiles using a second heavy lift installation vessel.

Several methods exist for connecting the monopile to the transition piece, with the two most common being a grouted connection or a bolted flange. The grouted connection was used on many of the early wind farm projects. The connection is made by pouring grout between the monopile and transition piece once it has been installed offshore. The grout then hardens and creates a bond between the two. A widely-used alternative to a grouted connection is a bolted flange connection, whereby the monopile and transition piece are connected by a flange interface and bolted in place around their circumference, as shown in **Figure 10.3-8** (similar to the connection between the transition piece and tower). On some projects, both bolted and grouted connections have been used.



**FIGURE 10.3-8: BOLTED CONNECTION BETWEEN THE TP AND MONOPILE FLANGE**

The transition piece has a skirt that overlaps the monopile several meters and acts as secondary steel support. The gap is often filled with non-load-bearing grout ensuring water tightness and protection of the flange.

### SCOUR PROTECTION (IF APPLICABLE)

After monopile installation, scour protection would be put in place if required to reduce erosion around the foundation. A dynamically positioned fall-pipe vessel could be used to lay a filter layer of rock. Mayflower Wind is investigating various scour protection alternatives to rock dumping.

### JONES ACT COMPLIANCE

[REDACTED]

### INTER-ARRAY CABLES

As described in **Section 8.1** approximately [REDACTED] of inter-array cables will connect the offshore wind turbines to the offshore substation. The inter-array cables will be transported directly to the installation site from the manufacturing facility on a cable lay vessel. The amount of cable that can be transported directly to the site is dependent on the size and capacity of the cable carousel that is on the cable lay vessel. [REDACTED]

### PRE-INSTALLATION SURVEY

Mayflower Wind will conduct a pre-installation survey of the cable routes (inter-array and export) to assess soil conditions, map the water depth, map shallow geology and locate offshore third-party assets or other objects that might impede the cable installation works. The pre-installation survey will provide input for route engineering. The pre-installation survey will comprise of:

- Side scan sonar (to identify objects on the surface, such as boulders)
- Sub-bottom profiler (to assess soil conditions)
- Multi-beam echo-sounder (to assess seabed morphology)
- Magnetometer (if considered necessary)

## SEABED PREPARATION

The seabed is required to be clear of all debris, such as wires, ropes, abandoned fishing gear, and boulders before the inter-array cable is installed. To clear smaller debris, a pre-lay grapnel run will be performed, which typically consists of a tug boat that will tow the grapnel plow (as seen in **Figure 10.3-9**) to clear the route. Debris caught by the grapnel will be removed from the route. To clear any boulders that are in the cable route, another vessel spread, likely with an ROV designed to remove boulders, will be mobilized.

## TRANSPORTATION

Inter-array cables will be spooled onto the cable installation vessel at the location of manufacture and delivered directly to site. Depending on the capacity of the carousel and specific cable lay vessel that is utilized, approximately one-third to one-half of the inter-array cables can be spooled on the cable lay vessel.

## INSTALLATION

Inter-array cables will be installed between wind turbine locations or between the turbine and the offshore substation. For installation, one end of the cable segment is connected to a pull-in rope which is subsequently attached to a winch on the wind turbine foundation. The cable is pulled through a direct entry point in the monopile to make its connection and termination at the turbine. A cable lay vessel, as described in **Attachment 9.2-1**, will then pay-out and lay the remainder of the cable section. The cable segment is cut and sealed, and the end pulled through another turbine foundation or the offshore substation to its termination point. Subsequently, the cable will be laid on the seafloor between two turbines or a turbine and substation and will be buried utilizing one of several techniques, all typical for the offshore wind industry, including jet plowing, mechanical plowing, or mechanical trenching. A cable protection system will be used to protect the cable as it enters the foundations, and potentially rock dumping could be required for additional protection as the cable approaches the foundation.

There are two approaches to burying the cable: simultaneous lay and burial, and post-lay burial. For simultaneous lay and burial, there is a combination of work steps; however, the vessel has to be capable of the simultaneous process, and the weather windows for simultaneous operation may be shorter. Post lay burial decouples the work steps and likely requires two vessels, one for cable laying and one for burial. This process allows for fast progress of cable laying that require shorter weather windows; however, the cable will be unprotected between the laying and the burial process.

Mayflower Wind will evaluate the different options following geophysical and geotechnical investigations to determine the best methodology for cable burial (simultaneous lay and burial or post lay) and the targeted cable burial depth. Specialized equipment, like a jet trencher or a cable burial tractor, which includes jetting and cutting equipment, could be utilized for cable burial.



To determine whether a cable has met its desired burial depth, measurements and surveys either during or after cable lay and burial will be performed. During cable burial, the burial depth can be measured, either utilizing a separate ROV from a dedicated survey vessel or using instruments, like a Depth of Burial Indicator (DOBI) or a depressor, on the trenching or burial tools. If the cable does not meet its desired burial depth, it will be noted, and additional cable protection measures may be considered. If surveys during cable lay and burial are not possible with the equipment selected and utilized, a post lay burial survey will be performed with an ROV. If there are portions of cables that do not achieve the target burial depth, additional cable protection systems, such as rock bags, rock dumping, or concrete mattresses, may be installed in those specific locations.

#### POST-INSTALLATION SURVEY

Following the inter-array cable installation, a post-installation survey may be completed to verify that the cable installation work meets the specified requirements and to document any deviations from the original design. This will verify the cable burial, crossings, endpoints, rock placement and other cable protection (as needed) are complete. The survey will confirm the position of the cable, the depth of burial and cover (if not ascertained during burial operations), locations of any areas with scour or erosion, and identify any free spans.

#### JONES ACT COMPLIANCE



#### EXPORT CABLES

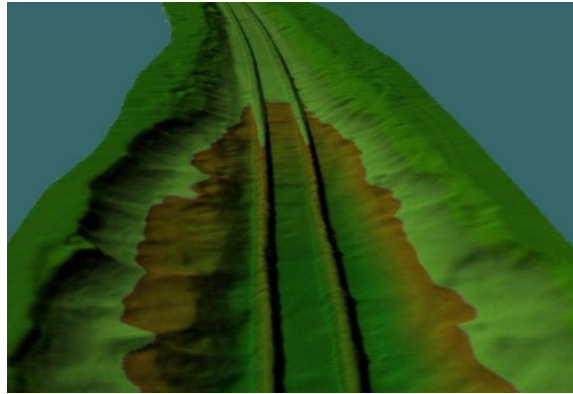
##### PRE-INSTALLATION SURVEY

The routes will be surveyed prior to selection of the final route and installation engineering. The objective of the pre-installation survey is to assess soil conditions, map the water depth, shallow geology and locate offshore assets or other objects that may impede the cable installation works. The pre-installation survey will provide input to the route engineering. Surveys that are relatively close to shore can be subcontracted to U.S. companies. The pre-installation survey will comprise of:

- Side scan sonar (to identify objects on the surface, such as boulders)
- Sub-bottom profiler (to assess soil conditions)
- Multi-beam echo-sounder (to assess seabed morphology)



- Magnetometer (if considered necessary)



**FIGURE 10.3-11: EXAMPLE MULTIBEAM SURVEY RESULT**

### SEABED PREPARATION

The seabed must be prepared for the export cable in a similar manner to seabed preparation for the inter-array cable. To clear smaller debris, a pre-lay grapnel run will be performed, which typically consists of a tug boat that will tow the grapnel plow to clear the route. Debris caught by the grapnel will be removed from the route or recovered and delivered to a foreign port. To clear any boulders that are in the cable route, another vessel spread, likely with an ROV designed to remove boulders, will be mobilized.

During the pre-installation study, the prevalence of sand waves along the cable route will be observed. The presence of sand waves along the proposed cable route may trigger additional study or engineering. Due to their mobility, it is possible that a buried cable can be over-buried or exposed during the lifetime of the connection. If sand waves are discovered during the pre-installation survey, Mayflower Wind will evaluate sand wave management options, including sand wave flattening and sand wave top removal (pre-sweeping activities), for implementation during the seabed preparation phase.

### TRANSPORTATION

The export cables are reeled onto the carousel of the cable installation vessel at the port of vessel mobilization in a similar manner to the inter-array cables. The installation vessel will transit directly to the site to begin installation. Each cable installation vessel can transit and install

### INSTALLATION

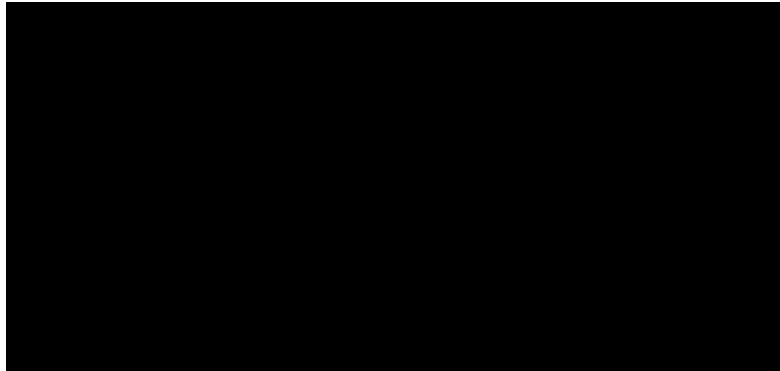
Mayflower Wind anticipates using two vessels for export cable installation: one will start cable laying operations at the offshore substation, and the second will start near shore in shallow water near the landfall location. Depending on vessel availability, this could be two cable lay vessels (CLV) or one CLV and a cable lay barge (CLB). Where the sections of the cables meet, the cables will be spliced together. This entire process will be repeated for a second export cable.

The nearshore vessel will have an anchor spread to maintain position while the cable is pulled ashore. The far shore cable lay vessel will be equipped with a DP2 dynamic positioning system to enable precise position holding at the installation location. For the underwater portions of the cable, the cable will either be simultaneously laid and buried or laid and subsequently buried with a different vessel. The cable that is in shallow water prior to reaching the HDD conduit will be buried following the cable laying.

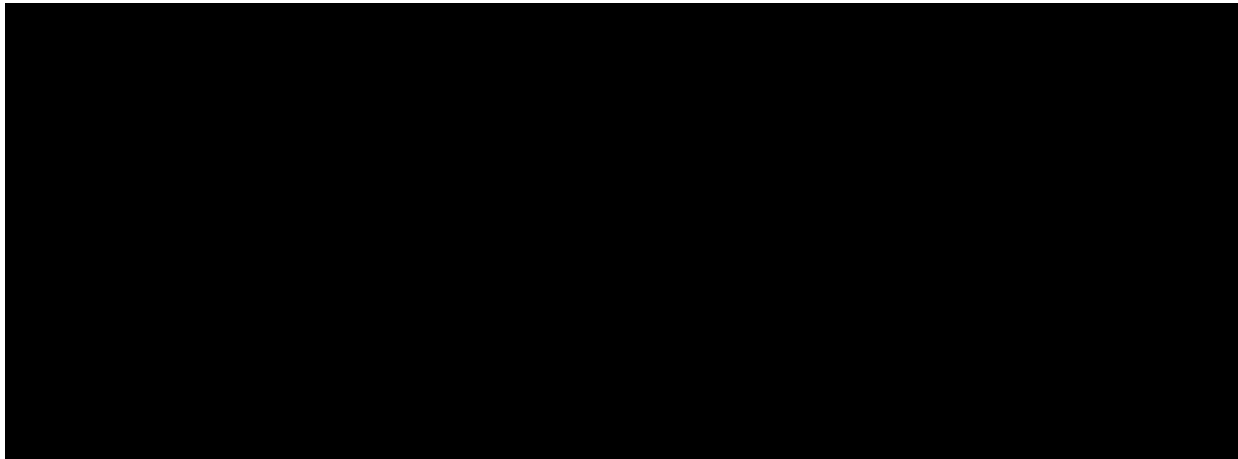
As with the inter-array cable, the export cable can be buried through either simultaneous lay and burial or post lay burial.

### **Far-shore Cable Installation**

For the far shore section of export cable that will originate from the offshore substation, a CLV equipped with DP2, similar to that as shown in **Figure 10.3-12**, will be utilized for installation.



Once the cable segment is pulled through the substation, the CLV will either simultaneously lay and bury the cable from the CLV using a jetting plow (**Figure 10.3-13**) trencher or will lay the cable and subsequently bury and protect the cable, both in a similar process as discussed for inter-array cable installation.

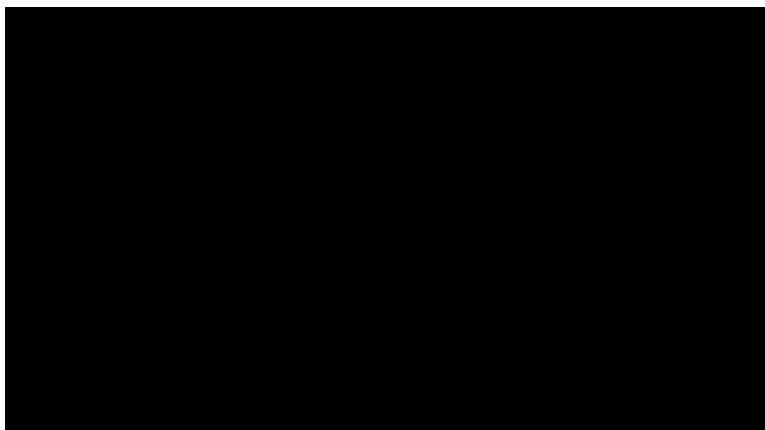


To determine whether a cable has met its desired burial depth, measurements and surveys either during or after cable lay and burial will be performed. During cable lay and burial, the burial depth will be measured, either utilizing a separate ROV from a dedicated survey vessel or using instruments, like a Depth of Burial Indicator (DOBI) or a depressor, on the trenching or burial tools. If the cable does not meet its desired burial depth, it will be noted, and additional cable protection measures may be considered. If surveys during cable lay and burial are not possible with the equipment selected and utilized, a post lay burial survey will be performed with an ROV.

### **Nearshore Cable Installation**

For the nearshore section of the export cable, a CLV or CLB with an anchor spread will be utilized for installation. An additional marine spread will be required to assist in the nearshore installation operation, including an ROV, anchor handling vessel, boulder clearance tool, and a tug to perform the pre-lay grapnel run. The vessel will be anchored nearshore to maintain its position near the cable landing. The cable will be floated in the shallow water, supported by buoyancy modules, and pulled-in to the HDD duct onshore. The

cable pull-in will be carried out during low water tide. Upon reaching shore, the cable's weight will be supported by support units and a cable roller track along the cable landing route. Typical construction and earth moving equipment will be utilized for pre-trenching and placement of the cable support units and roller tracks onshore, as shown in **Figure 10.3-14**.



Once the cable is pulled through the HDD duct, the cable roller track and support units will be removed. The progressive lowering of the cable onto the seafloor through removal of the pillow floats, buoys, etc., will follow. To maintain the integrity of the cable during the lowering procedure, tug vessels, and potentially divers, will be required. Depending on the soil conditions along the cable landing route, the cable will either be simultaneously laid and buried, or the cable will be laid and buried sequentially.

Following the successful burial of the cable, the CLV/CLB and anchor handling tug will remove the anchor spread. Depending on the vessel used for the nearshore operations, the cable may be transferred to another CLV to install the remaining cable to the offshore joining point. Remaining cable installation procedures and equipment will be utilized similar to the process described for the far shore export cable section.

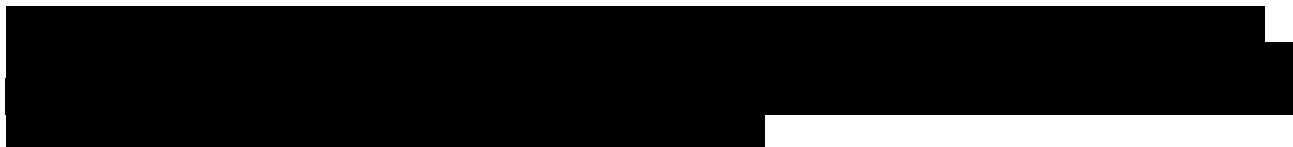
### **Cable Splicing**

CLVs can typically load up to a maximum of 7,000t in one length. As a result of this restriction, two segments will make up each Mayflower Wind export cable, requiring offshore splicing. There are two different splicing techniques that could be employed, in-line and omega. The splicing will be executed on the cable lay vessel's aft deck in a controlled environment, typically taking several days. Once cable splicing is completed, the export cable will be lowered to the seafloor. The placement process will be tailored to the utilized splicing technique.

### **POST-INSTALLATION SURVEY**

Following the export cable installation, a post-installation survey may be completed to verify that the cable installation work meets the specified requirements and to document any deviations from the original design. This will verify the cable burial, crossings, endpoints, rock placement and other cable protection (as needed) are complete. The survey will confirm the position of the cable, the depth of burial/cover (if not ascertained during burial operations), locations of any areas with scour or erosion, identify any free spans, etc.

### **JONES ACT COMPLIANCE**



## OFFSHORE SUBSTATION

### FOUNDATION TRANSPORTATION AND INSTALLATION

The substation will consist of a topside structure that will be installed on top of a jacket, similar to those commonly seen in the oil and gas industry. The jacket will be transported on a barge directly from the fabrication site to the installation location.

Once the jacket arrives on site, a heavy lift vessel will upend the jacket and set the jacket on the seafloor. The jacket will be set and post-piled.

### SUBSTATION TOPSIDES TRANSPORTATION AND INSTALLATION

After the substation jacket is installed, the topsides will also be delivered straight from the point of manufacture to the site on a heavy lift vessel. The heavy lift vessel will be utilized for both transportation and installation. Depending on where the topsides are fabricated, a vessel that is compliant with Jones Act requirements will be utilized. If the topsides are fabricated in Europe or Asia, a foreign flagged vessel may be used for transportation and installation.

Once the vessel with the substation topsides arrives on site, the vessel will be prepared and positioned on site. The topside is then lifted by the crane on the vessel and lowered onto the jacket. During the operation, the position and orientation of the topside shall be continuously controlled. After set-down of the topside on the foundation and slackening of the rigging, the position and inclination shall be verified to be within the acceptable tolerances.

### COMMISSIONING

Commissioning of the offshore substation will take place in two phases – prior to energizing (cold commissioning), and after energizing (hot commissioning). A set of visual inspections and tests will be performed on all major substation components – switchgear, reactors, transformers, and any other accessory equipment.

The primary steps to commission the offshore substation and cabling prior to energizing include visual inspection, non-electrical tests, electrical tests, functional mechanical checks and testing, protection testing, electrical insulation testing, pre-energization checks, trip tests, and load checks. Various methods can be used to determine that no damage was done during cable installation. These methods may include an optical time domain reflectometer (OTDR) test, time domain reflectometer (TDR) test, sheath integrity check, soak test, very low frequency test, series resonance circuit test, and partial discharge (PD) test.

A vessel equipped with adequate accommodation facilities onboard and with ability to safely transfer personnel via walk to work access gangway system or other means of safe personnel transfer could be required during some weeks for the commissioning works of the offshore substation.

After the export cable is energized, additional commissioning steps include checking and testing of major substation components, electrical circuits, sensors, auxiliary and safety systems.

### JONES ACT COMPLIANCE

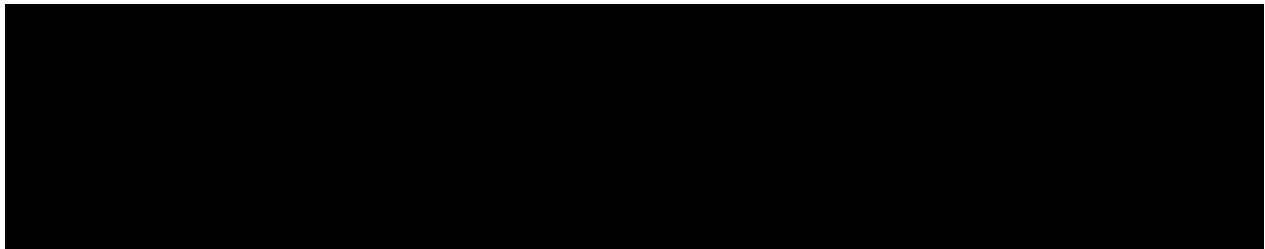
## ONSHORE WORKS

Onshore work will consist of installing offshore/onshore cable transition using horizontal directional drilling (HDD), onshore cable, and the onshore substation. Commissioning activities will proceed after installation is complete.

### NEARSHORE / ONSHORE TRANSITION AND HDD

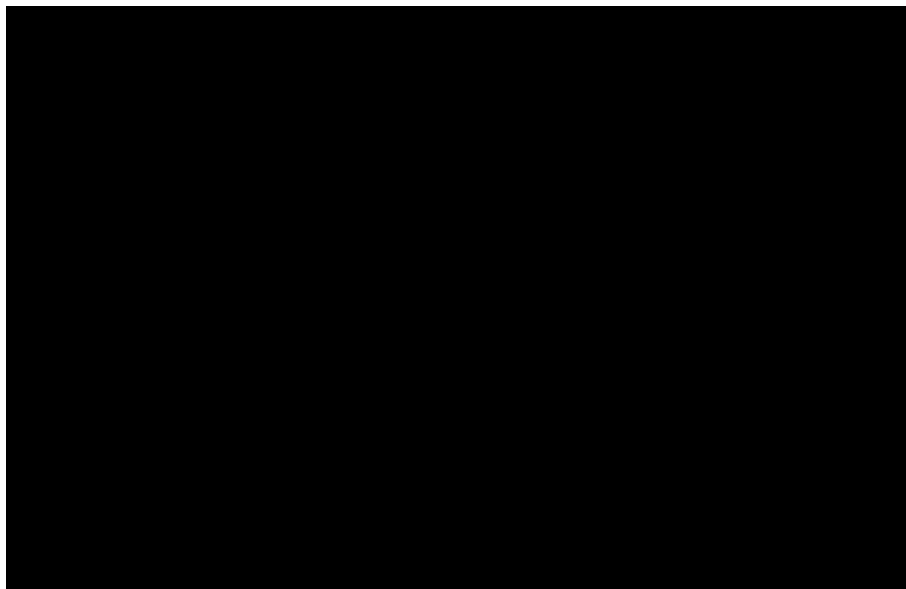
To minimize onshore and inshore disturbance, horizontal directional drilling (HDD) will be used to land the subsea export cables. The HDD process will include an onshore drilling team and floating vessels inshore to assist in the process. Two HDD bores will be drilled from shore, one for each incoming circuit.

When the submarine export cable is landed it will connect to an onshore cable inside a transition joint bay. Each offshore circuit cable will enter a bay vault from the HDD duct, be separated into individual phase conductors, and spliced to the onshore cable connected to the onshore substation. **Figure 10.3-15** shows a typical shore landing transition bay. The estimated land area needed for the two transition bays is approximately [REDACTED]



**FIGURE 10.3-15:** TRANSITION BAY (DIMENSIONS IN MM)

**Figure 10.3-16** shows landing locations [REDACTED]  
**Section 6.**

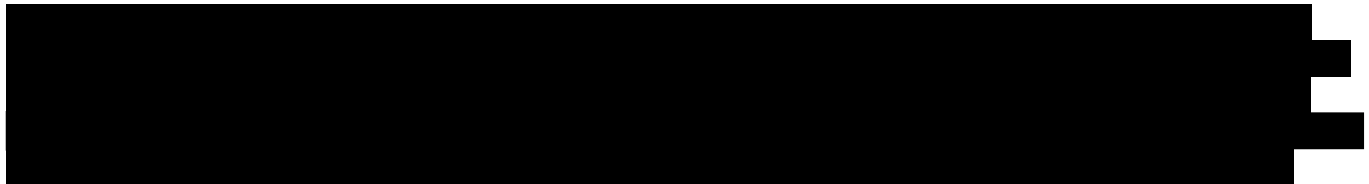


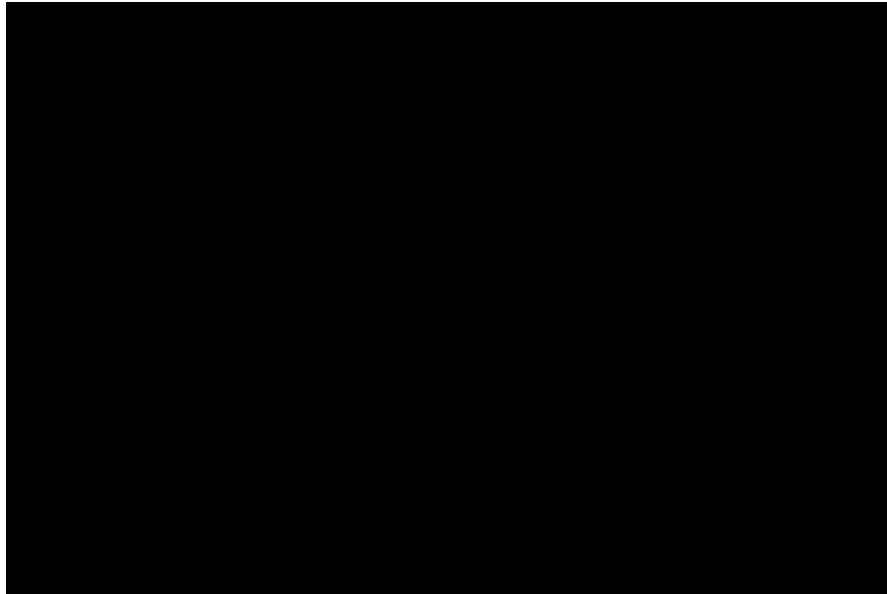
## ONSHORE CABLE



Installation of the duct bank and required vaults from [REDACTED] Some sections of the duct bank installation may require HDD installation if there are unavoidable utilities, streams or other water bodies. These will be identified during the detailed routing assessment.

## ONSHORE SUBSTATION





Substation footprint designs assume that an area of approximately [REDACTED] will be required to accommodate the [REDACTED]. The substation is typically arranged in a rectangular formation, and this is considered the most efficient use of space; however, for purposes of fitting the substation into the available space and constraints of the site the substation can be rearranged in a more linear format if required.

Routine civil work will be required for the onshore substation, including site leveling, equipment foundations, access, etc. Because the transformers are large, special transportation methods will be utilized and transport will be planned to minimize the impact to local traffic and residents. This will include off peak trucking on local streets.

## COMMISSIONING

At the completion of the electrical works, the cable, substation equipment, protection, and controls will be tested and commissioned for safe operation. Once settings are confirmed and key equipment is tested independently, an energized test is carried out to verify operation within specified tolerances.

## 10.4 DEPLOYMENT CONTRACTING

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- 10.4 List the party (e.g. the bidder, or equipment/service providers under contract to the bidder) responsible for each deployment activity and describe the role of each party. Describe the status of bidder's contractual agreements with third-party equipment/service providers.

Mayflower Wind has identified the work packages and roles that require contracting and has begun advanced discussions with the below major service providers, as well as specialist contractors who may be sub-contracted in an EPCI contracting strategy. **Table 10.4-1** presents roles within each work package that service providers may be responsible for, as well as the level of engagement to date.

As described in **Section 5.10** both [REDACTED] are conducting a Mayflower Wind funded FEED study to support the contractual decision for ITC components. They have provided pricing estimates for transportation and installation. It is anticipated that the installation contracting would not commence until a later date. The full contracting schedule is described in **Section 8**, which presents the contracting and design process of the major work packages.



Service Provider	Work Package	T - Transport I - Installation	RFI / RFP	Frame Agreement

**TABLE 10.4-1: SERVICE PROVIDERS CONSIDERED FOR MAJOR DEPLOYMENT ACTIVITIES**

\*Pricing estimates only

## SECTION 11 OF APPENDIX A TO RFP OPERATION AND MAINTENANCE

Projects that can demonstrate that the operation and maintenance (“O&M”) plan, level of funding, and mechanism for funding will ensure reliable operations of all aspects of the project during the term of the contract are preferred.

Mayflower Wind will implement an operations and maintenance (O&M) plan that ensures reliable operations of all aspects of the Project, optimizing the power generation in compliance with the PPA, ensuring personnel safety and strengthening the overall reliability of the Commonwealth’s energy system.

Mayflower Wind draws from over 40+ years of experience with offshore operations in the U.S. and Europe demonstrating commercial, technical, and stakeholder-engagement expertise. Shell has power operations in more than 20 countries with differing market structures and levels of regulation, over 15 years of experience in wind power, and a long history of trading and supplying wholesale power to energy retailers. EDP Renewables consistently achieves above 97% availability in its global wind portfolio of 11,800-megawatt of which more than 50% are located in North America. The complementary experience enables Mayflower Wind to manage and coordinate this Project through the entire life cycle through to decommissioning.

Mayflower Wind believes that deployment of established methods together with a combination of proven and innovative technology will contribute to safe, cost-effective offshore wind operations and has set forth the following four objectives:

1. Ensure personnel safety and environmental stewardship are fundamental to operating the Project.
2. Establish a robust and effective O&M plan to ensure the highest possible turbine reliability reducing downtime during peak demand and production periods.
3. Apply the latest proven technologies, such as hybrid LNG/ Hybrid Battery Service Operations Vessels, to reduce overall Greenhouse Gas Emissions and deploy remote turbine diagnostics to reduce the amount of time that personnel must spend offshore.
4. Utilize local talent and supply chain to sustain operate and maintain the project.

### 11.1 O&M PLAN

- 11.1 Provide an O&M plan for the project that demonstrates the long term operational viability of the proposed project. The plan should include the location of the O&M base, a discussion of the staffing levels proposed for the project, the expected role of the project sponsor or turbine manufacturer/outside contractor, scheduling of major maintenance activity, and the plan for testing equipment.

Mayflower Wind will lead the execution of the bespoke O&M plan, using a Massachusetts based port, employing an average of 80 locally based offshore and onshore technicians, and experienced engineers and managers to safely maintain and operate the Project. A 75% local employment commitment has been made for O&M roles to fully utilize a growing workforce in Massachusetts. Mayflower Wind will further invest \$20,000 per FTE shortfall to support the training and development of the workforce to ensure the 75% minimum threshold is met.

Mayflower Wind will use the buying power of our Sponsors, and local presence and port facilities, to benefit from the support from longstanding major contractors with extensive experience in the offshore wind industry coupled with local people and local businesses with local knowledge to execute a robust and efficient O&M plan. An MOU (**Attachment 7.6-2**) has already been executed with Boston Line and Service Co to provide port and shore-based logistics, demonstrating Mayflower Wind's commitment to utilize local businesses.

The vessel and port strategy will include

The offices and operations center will manage daily O&M, bringing permanent employment locally.

## O&M BASE IN MASSACHUSETTS

Mayflower Wind commissioned a third-party port assessment analyzing 27 potential locations for marine terminals and waterfront facilities for each stage of construction and O&M. That assessment has enabled Mayflower Wind to shortlist

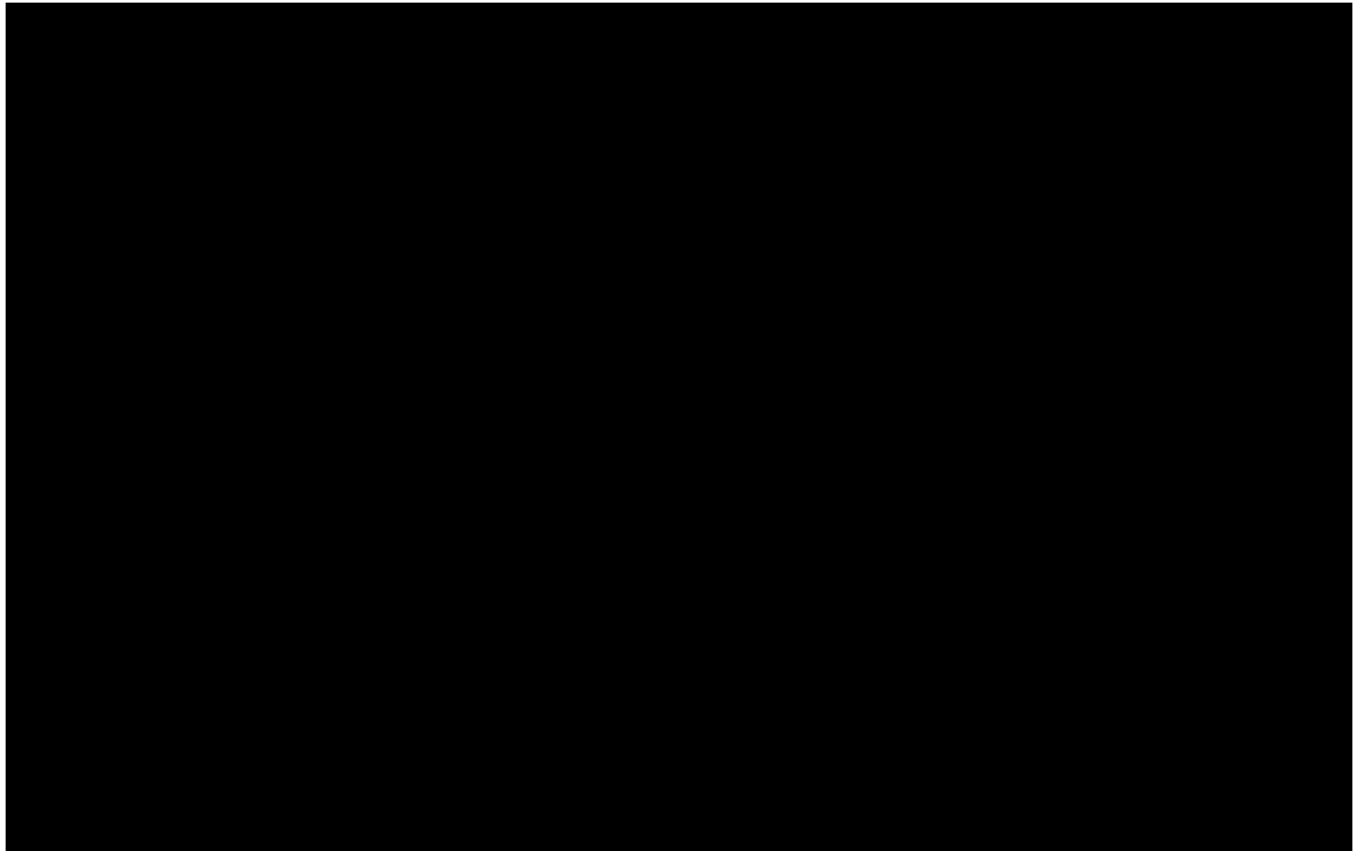


FIGURE 11.1-1: PORT LOCATIONS EVALUATED

## SOV BASE LOCATION

[REDACTED]

[REDACTED] locations have also been identified as potential staging ports during construction. Potential upgrades and leasing timelines are provided in **Section 10.2**. The exact layout of these O&M facilities is still subject to further development prior to the commencement of any operations. Mayflower Wind expects the SOV Base will be designed to accommodate and support continuous 24/7 operations. The facilities will be equipped with a shoreside cargo crane for lifting of large turbine components and provide parking for Mayflower Wind staff personal vehicles.

The SOV that berths at the SOV Base carries an onboard maintenance team that can perform nearly all maintenance required by the Project. The SOV will have onboard workspaces, storage, fuel, spares, onboard hotel/ catering, and accouterments to safely and comfortably accommodate the offshore technicians, vessel crew, and ad hoc personnel as required to support O&M operations for an average sustained period of roughly two to four weeks at a time.

[REDACTED]

[REDACTED]

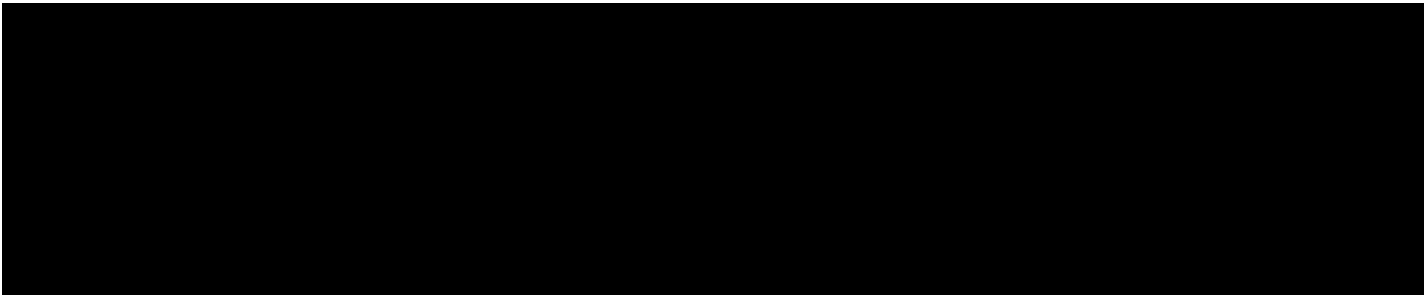
Vessels shall operate in accordance with the technical and HSSE expectations of Mayflower Wind, as well as in compliance with local standards and codes, national maritime regulations, USCG, SOLAS, MARPOL, ISM code, STCW and laws of good maritime practices. All vessels shall be certified by recognized class societies

[REDACTED]

**CTV BASE LOCATION**

The CTV Base supporting the transportation of technicians and light supplies to the site. Distance to the project is a critical factor, since reducing transit time will minimize operational costs and allow for a quick response for emergency maintenance. One-way transit times between the site and the CTV Base will be [REDACTED]. To berth a CTV, water depth and air draft requirements are minimal.

The following locations have been identified as potential O&M Bases:



The exact layout of these CTV Bases is still subject to further development before the commencement of any operations. It is expected that these facilities will be of such design that they can accommodate and support 24-hour operations for a minimum of two CTVs.

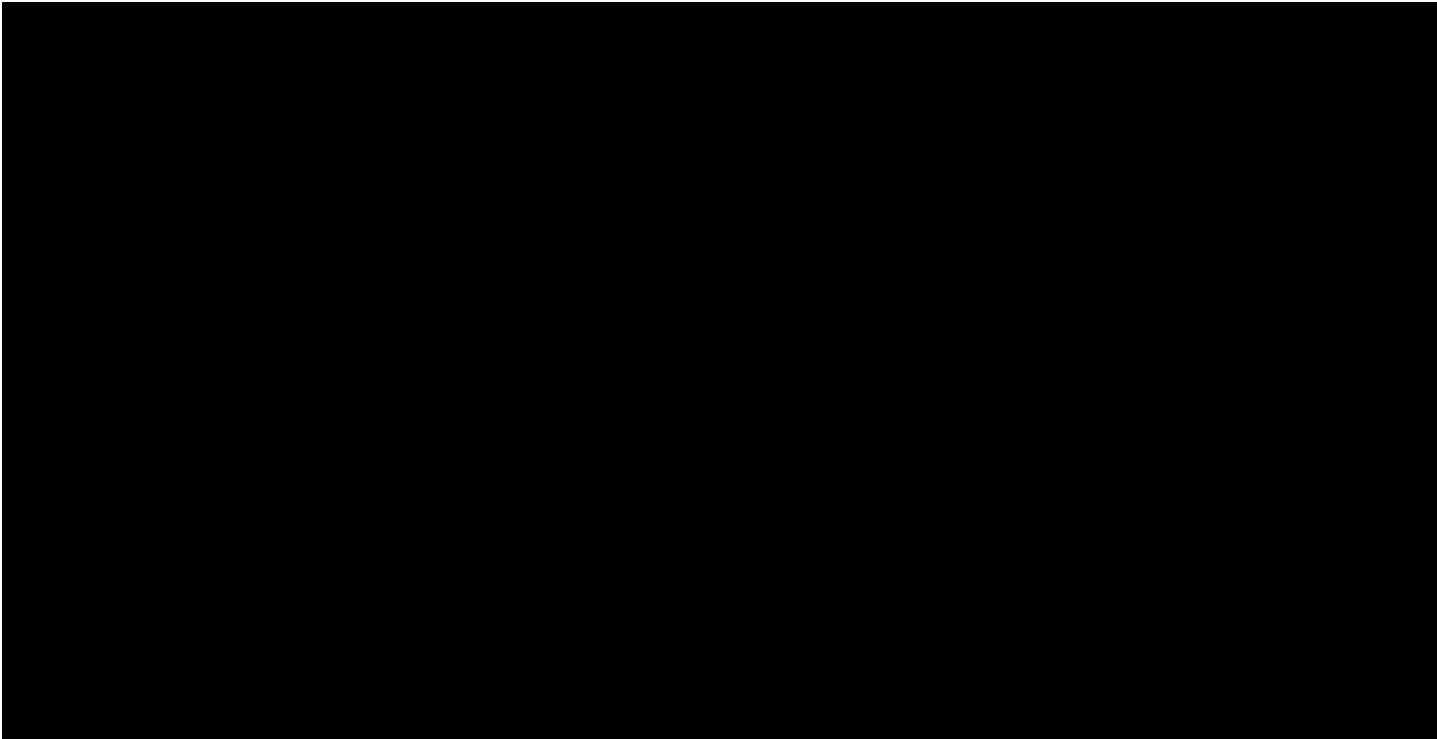


FIGURE 11.1-2: O&M STRATEGY



STAFFING O&M LOCALLY

Mayflower Wind is committed to training and developing a local workforce capable of operating and maintaining the Project. Operation and maintenance will require technicians, engineers, logistics, HSE, marine, and management, along with supporting roles to ensure safe and reliable operation.

**Table 11.1-1** below summarizes the expected number of new direct roles associated with O&M that will be created in Massachusetts. As further detailed in **Section 14**, the O&M Plan will create 7,720 job-years (1 job year equals 1 FTE working for one year) over the 30-year life of the project.

Service Provider Type	Contract Term	Expected Annual Employment Generation/Type	Target Company
Asset Management			
Wind Turbine O&M Services			
Wind Turbine O&M Services			
High Voltage Services (Substation O&M)			
Service Operations Vessel, Tender Vessels, and Crew Transfer Vessel			

**FIGURE 11.1-1: CONTRACT STRATEGY FOR MAYFLOWER WIND.**

## ROLE OF THE MAYFLOWER WIND TEAM

Mayflower Wind will design, manage and orchestrate all maintenance activities for the entire project acting as the project operator. The Mayflower Wind team will execute annual O&M plan updates whereby the production estimating, operating guideline, maintenance plan, component spare requirements, service provider plan, and logistics plan are defined and established for the next operating year. This plan will drive decision making related to O&M activities and allow for action on unforeseen operational challenges.

The O&M plan will address predictive, preventative and corrective maintenance as well as major repairs, retrofitting, inventory and spare parts management. Each activity is further summarized below.

**Predictive Maintenance:** Predictive maintenance process and tools provide early warning of potential failures to improve planning for major repair and retrofit campaigns. It also allows to identify and mitigate recurring failures. Mayflower Wind has access to state-of-the-art software and experts in data analytics to:

- Identify operating and maintenance risks.
- Prevent unexpected equipment failures.
- Anticipate potential equipment failures to reduce the probability of failure or degradation.
- Apply data analytics and machine learning algorithms to merge various data types such as operational data, faults, inspection reports, service reports, and other available data and extract usable information to proactively address conditions that affect production and asset integrity of the wind project.

The predictive maintenance scope considers specific hardware systems such as vibration monitoring, and data analytics like oil analysis, temperature trends, corrosion, and any other indicator or signals dominium use for mapping behaviors and alerts. The goal of predictive diagnostics is to identify failures early to reduce repair cost and limit operations impacts.

**Preventative Maintenance:** preventative maintenance is comprised of regular visual and physical inspections, as well as verification and work activities with a specific task frequency, which are necessary to comply with the O&M manuals and OEM recommendations. The activities include:

- Maintenance of the wind turbine and balance of plant warranties to reduce the probability of their failure or degradation.
- Development and execution of a comprehensive annual maintenance plan to be carried out at predetermined intervals or per prescribed OEM manuals.
- Where downtime is necessary to perform Preventative Maintenance, the execution of this Preventative Maintenance safely during times of low wind and/or lower power demand periods throughout the year.

As indicated in **Section 3.1**, preventive maintenance is an annual based campaign scheduled for the summer period, aligned with the terms of the PPA. The Mayflower Wind team will coordinate with ISO New England to schedule maintenance activities to minimize the system impacts of planned outages.

**Corrective Maintenance:** corrective maintenance is comprised of repair activities required on minor and major component failures where no major vessels or heavy lift vessels are required. The scope includes the transportation of spares and materials to the wind farm, and associated warehousing and is supported by the permanent O&M teams.

**Major Repairs and Retrofitting:** Taking into account a high level of component monitoring and analytics in the wind turbines, major repairs will be planned in yearly campaigns during the good weather season where specialists and heavy logistics will be arranged on a long-term agreement, avoiding more uncertain and expensive spot market resources.

**Inventory and Spare Parts Management:** The Mayflower Wind team along with the appropriate service providers will manage and maintain an inventory of spare parts in accordance with manufacturer's recommendations, standards of practice, and requirements identified in the Predictive Maintenance analysis to undertake commercially reasonable efforts to minimize downtime and maximize energy output. Industry-standard Inventory Management Systems are utilized to identify the appropriate storage location (on SOV or at onshore O&M support facility).

In addition to the O&M activities described above, the O&M plan considers the asset management activities required to operate and participate in the ISO-NE market taking advantage of the operational experience and resource of the Sponsors.



EXECUTING THE O&M PLAN AND SCHEDULING

Mayflower Wind intends to outsource some activities of the custom-designed site maintenance plans to local third-party service providers with specific expertise in the actions required. This allows the Mayflower Wind team to manage the annual maintenance of the site by contracting the appropriate partners to manage preventative, corrective, electrical and major-component repairs on all assets. As a general practice, Mayflower Wind will use all commercially reasonable efforts to minimize scheduled maintenance during times of peak electric demand. We will coordinate work with ISO-NE and the EDCs in full compliance with the regulation and obligations assumed in the PPA. Therefore, Mayflower Wind will not schedule maintenance of the Facility during the months of [REDACTED] and additionally will inform ISO-NE and the EDCs about the annual maintenance schedules before each year begins to elicit feedback and make necessary adjustments. A high-level representative schedule showing work activities and potential production impact is shown in **Table 11.1-2** below

Time Period	Type of Work	Mitigation for Minimal Impact
[REDACTED]		

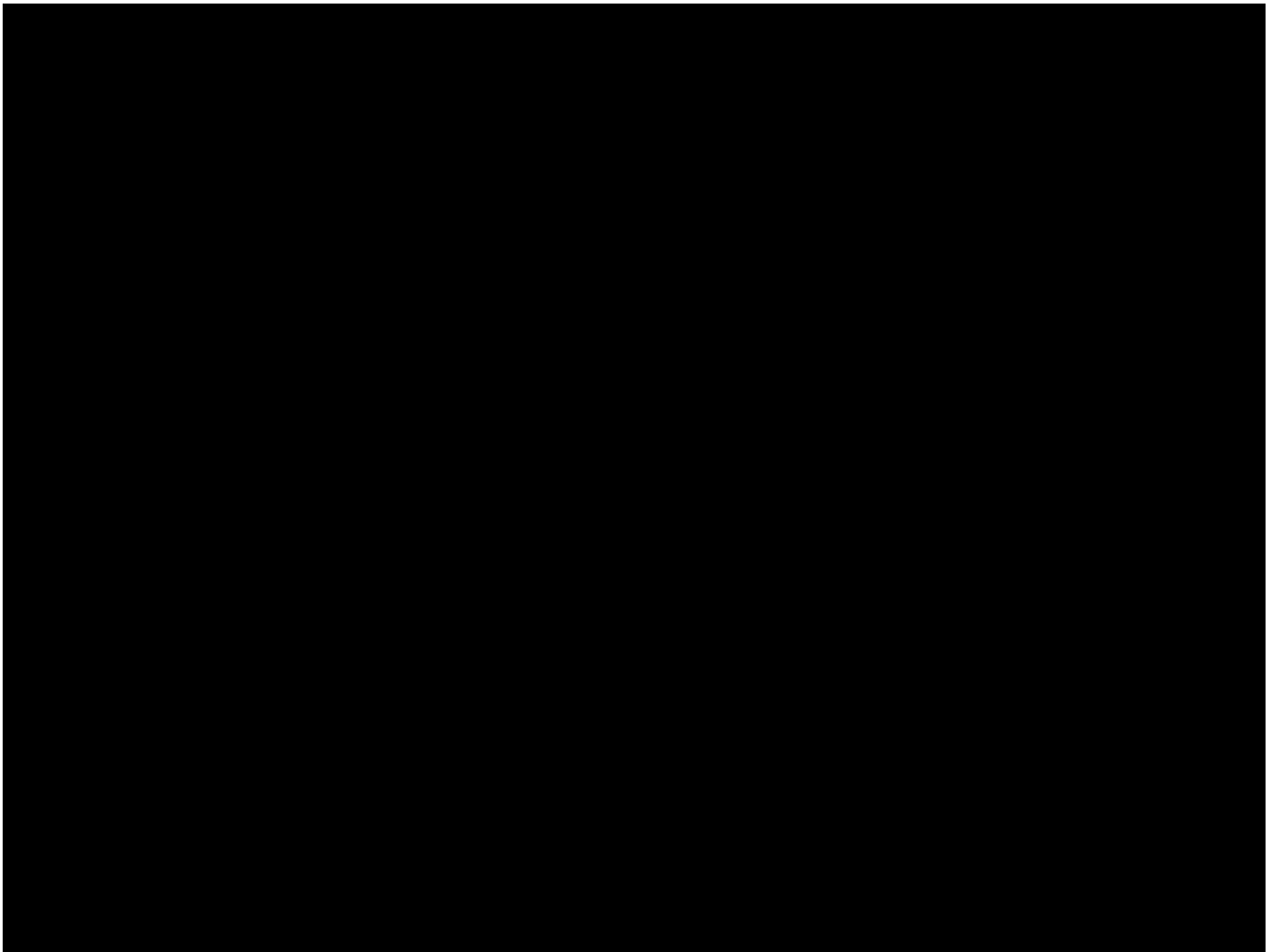
TABLE 11.1-2: EXPECTED MAINTENANCE SCHEDULE FOR THE MAYFLOWER WIND PROJECT

The Mayflower Wind O&M strategy addresses maintenance of wind turbines and the balance of plant which includes substructures, inter-array and export cables, offshore substation, cable route, and onshore substation, and energy metering system.

O&M CONTRACT STRATEGY

The Mayflower Wind O&M contract strategy considers [REDACTED]

[REDACTED]		
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**FIGURE 11.1-3: O&M CONTRACTING STRATEGY**

## **11.2 ACQUISITION OF PROPERTY RIGHTS FOR O&M**

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- 11.2 Please provide documentation to demonstrate site control for all marine terminals and other waterfront facilities that will be used for O&M.
- i. If available, evidence that the bidder or the equipment/service provider have right(s) to use a marine terminal and/or waterfront facility for O&M of the offshore wind energy project (e.g., by virtue of ownership or land development rights obtained from the owner).
  - ii. If not available, describe the status of acquisition of real property rights for necessary marine terminal and/or waterfront facilities, any options in place for the exercise of these rights and describe the plan for securing the necessary real property rights, including the proposed timeline. Include these plans and the timeline in the overall project schedule.
  - iii. Identify any joint use of existing or proposed real property rights for marine terminal or waterfront facilities.

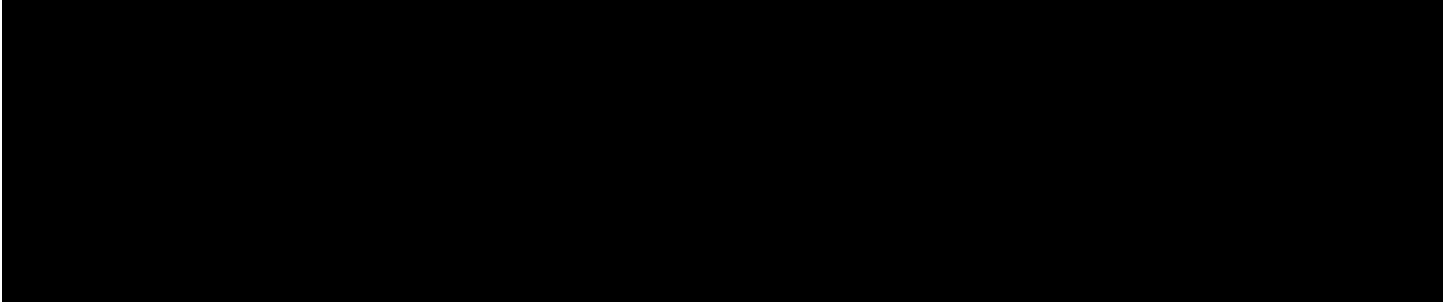
As detailed in **Section 11.1**, subject to securing a PPA under the conditions submitted in this Proposal, Mayflower Wind plans O&M activities will be executed from two ports or waterfront facilities located in Massachusetts.

The following locations have been identified as potential SOV Bases and CTV Bases

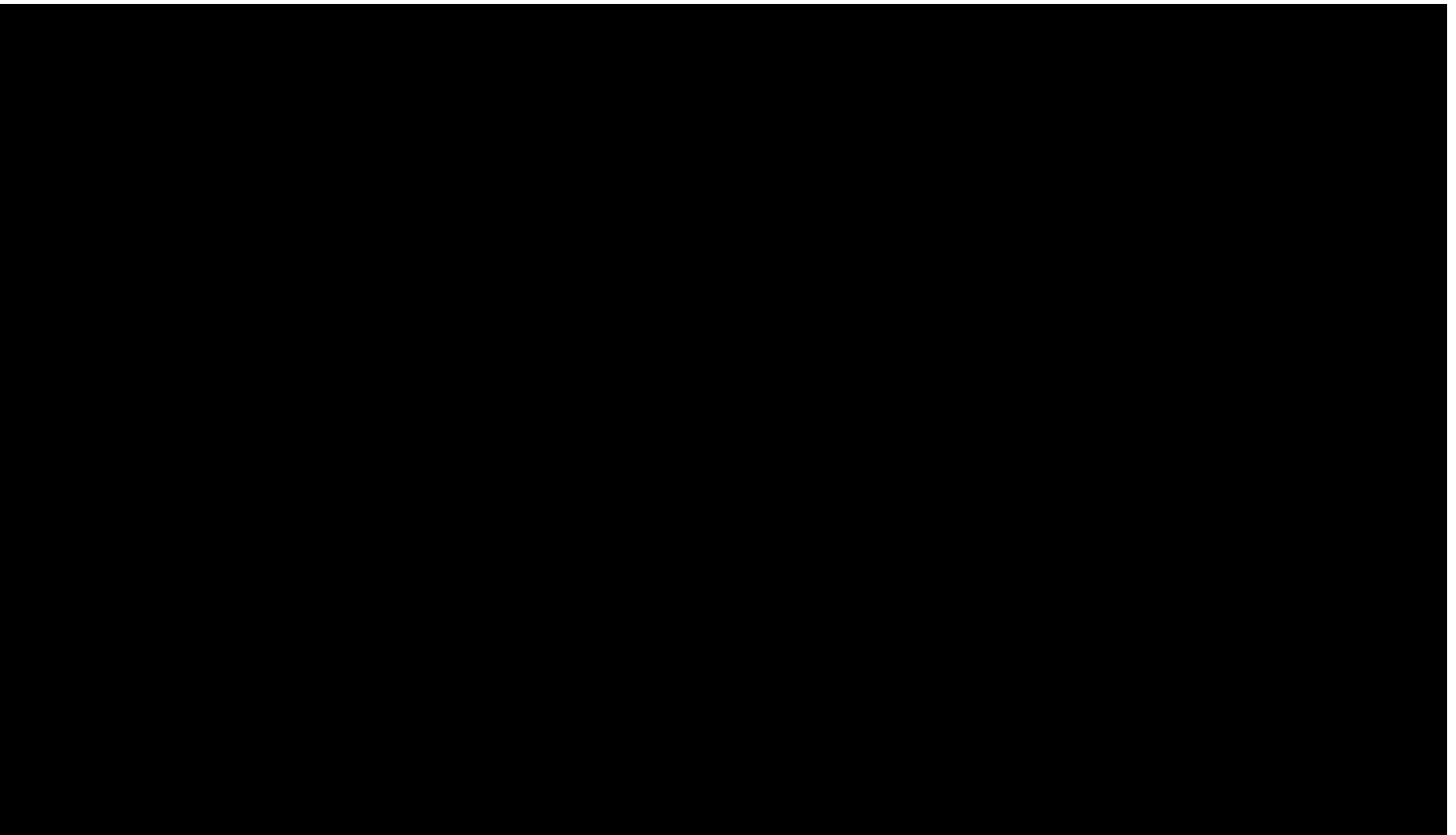
#### SOV BASE



#### CTV BASE



We are currently engaging with port operators and waterfront facility owners for SOV and CTV Bases in order to identify the most cost-effective locations for staging, assembling, and deploying the Project. Additionally, Mayflower Wind is proposing ambitious economic developments to the Commonwealth, of which the O&M Bases will be a fundamental partnership.



[REDACTED]

The site control activities, resources, and associated costs are fully captured in the Schedule described in **Section 9**.

It is important to take into consideration that the three locations shortlisted as the SOV Base have also been identified as potential staging ports during construction. Potential upgrades and leasing timelines are provided in **Section 10.2**. As shown in the timeline, the exact layout of the O&M Bases is still subject to further development prior to the commencement of any operations.

Mayflower Wind is open and flexible to explore options to cooperate with other offshore wind developers through joint use agreements. Mayflower Wind recognizes the benefits that coordinated decisions may bring not only to reduce the costs but also to increase the benefits and lay the foundations for a long term sustainable offshore wind industry in Massachusetts.

### 11.3 O&M FUNDING MECHANISM

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11.3 Describe in detail the proposed O&M funding mechanism and funding levels to support planned and unplanned O&M requirements.

During the Project life cycle, the funding of the O&M activities will be secured through the [REDACTED]

[REDACTED]

To determine the required O&M funding levels to support planned and unplanned O&M requirements, Mayflower Wind has performed a robust failure analysis and budgetary planning model that incorporates O&M costs, major component replacements, logistics, labor, and consumables and spare parts requirements. We have estimated expected failure rates of key wind turbine and BoP components by using the latest information from multiple OEMs and compiling historical failure rate data from the wind projects owned and operated by the Sponsors.

[REDACTED]

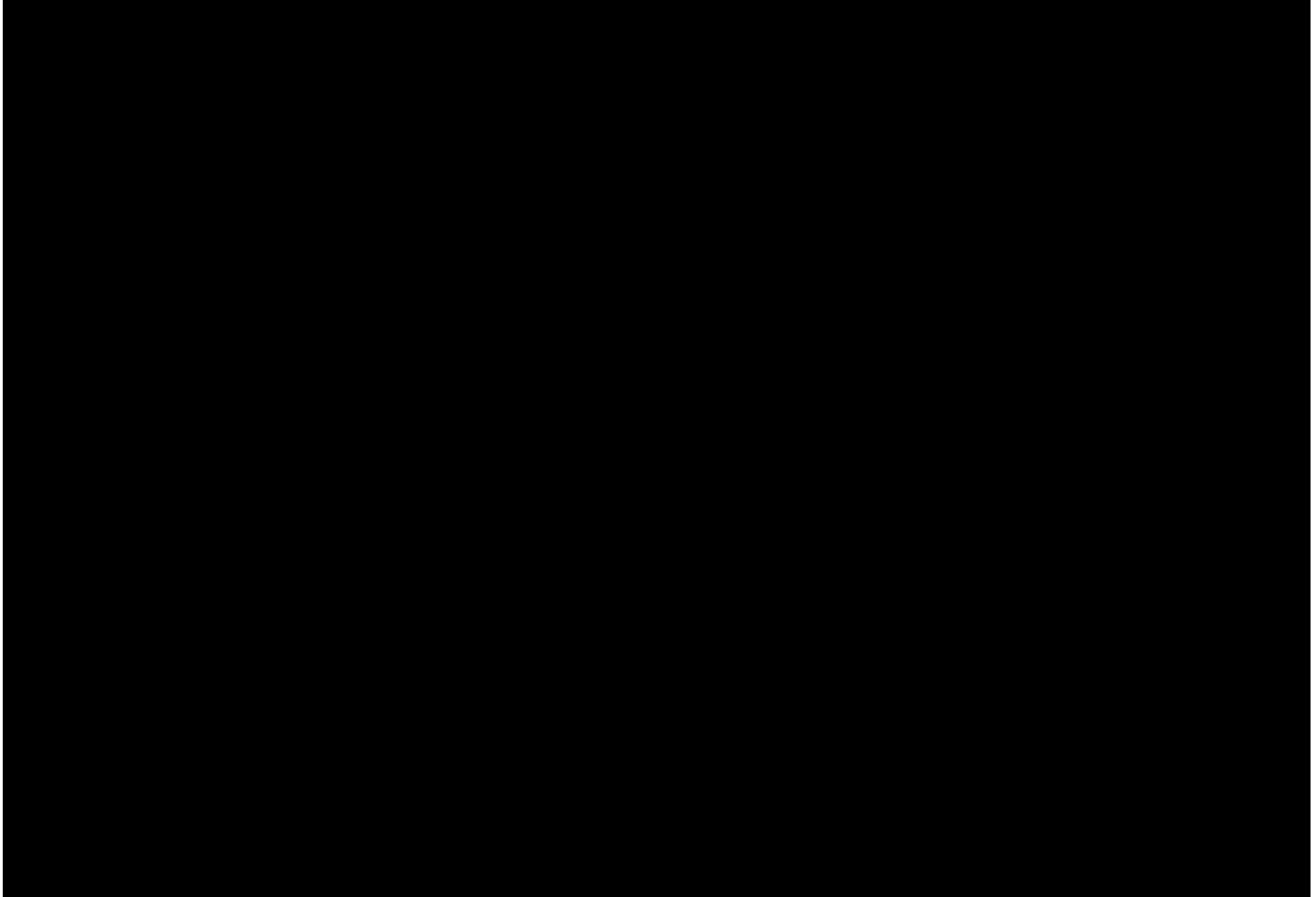
## 11.4 WARRANTIES AND GUARANTEES

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- 11.4 Describe the terms (or expected terms) of the warranties and/or guarantees on major equipment that the bidder is utilizing or proposing to utilize.

Exact details of the warranties and guarantees on the major equipment of the Facility will depend on the suppliers ultimately selected and the associated contracting strategy.

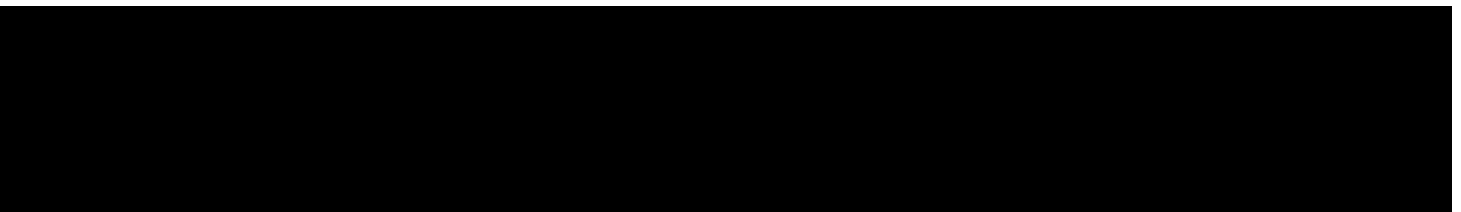
## WIND TURBINES



## 11.5 O&M CONTRACT

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- 11.5 Describe the status of the project sponsor in securing any O&M agreements or contracts. Include a discussion of the sponsor's plan for securing a medium-term or long-term O&M contract, including the expected provider of O&M services.



## 11.6 EXPERIENCE WITH O&M

### 11.6 Provide examples of the bidder's experience with O&M services for other similar projects.

Mayflower Wind draws from over 40+ years of experience with offshore operations in the U.S. and Europe demonstrating commercial, technical, and stakeholder-engagement expertise. Mayflower Wind's Sponsors have been operating wind projects since 1996 and consistently achieve above 97% availability in their global wind portfolio of over 12,000 MW of which more than 50% is located in North America, and continue to own and operate the first offshore wind project in The Netherlands, Noordzee Wind, since 2007. The complementary experience enables Mayflower Wind to manage and coordinate this Project through the entire life cycle through to decommissioning.



**FIGURE 11.6-1: NOORDZEE WIND – THE FIRST OFFSHORE WIND PROJECT IN THE NETHERLANDS**

With the Sponsors as owner-operator of wind and offshore production assets, Mayflower Wind has access to decades of knowledge, data, and procedures in:

- In-field management of high-risk assets and field operations
- Offshore safety and logistics
- Renewable energy asset management
- Engineering and operational support, including specialties in wind turbine O&M, high-voltage infrastructure, and Supervisory Controls and Data Acquisition (SCADA) data analysis
- Working cooperatively with local stakeholders
- Working with business, industry, regulatory and governmental partners.
- Power trading, marketing, and scheduling

Both Parent Companies are heavily investing in offshore wind and will have at least 2,800 MW of offshore wind operating before Mayflower begins operations, enabling further data sharing, lessons learned, and development of best practices to enhance the operations of the Mayflower Wind Project.



## SECTION 12 OF APPENDIX A TO RFP PROJECT MANAGEMENT/EXPERIENCE

Bidders are required to demonstrate project experience and management capability to successfully develop and operate all aspects of the project proposed. The Distribution Companies are particularly interested in project teams that have demonstrated success in projects of similar type, size and technology and can demonstrate an ability to work together effectively to bring the project to commercial operation in a timely fashion.

Mayflower Wind brings exceptional expertise to the Massachusetts offshore wind energy market. Mayflower Wind is supported by EDP Renewables, the fourth-largest wind energy producer in the world, and Shell, the fifth-largest company in the world in terms of revenue. Mayflower Wind will leverage the U.S. presence of the Sponsors, who combined have a U.S. installed capacity of over 6,100 MW of wind energy.

Together the Sponsors employ more than 18,000 individuals throughout the U.S. and have expanded their Massachusetts presence, with local offices in Cambridge, MA.

Furthermore, when the proposal to combine the offshore wind assets of EDP Renewables and Engie is executed later this year, Mayflower Wind will be able to draw on the additional financial strength and expertise of a 160,000-person company operating in 70 countries and operating more than 100,000 MW of installed power production capacity<sup>8</sup>, helping serve the retail electricity needs of over 1,600 commercial and industrial customers in Massachusetts, including the Boston Red Sox.

### 12.1 PROJECT ORGANIZATIONAL CHART

12.1 Provide an organizational chart for the project that lists the project participants and identifies the corporate structure, including general and limited partners.

As presented below in **Figure 12.1-1**, Mayflower Wind's organization is a combination of the Shareholders, Shell New Energies US LLC, and EDPR Offshore North America LLC, as previously described in **Section 5.2**, Mayflower Wind is underpinned by the combined resources and broad experience of its Sponsors, as well as the support of industry-leading consultants, as detailed in **Section 12.2** below.

<sup>8</sup> <https://www.edpr.com/en/news/2019/05/21/edp-and-engie-join-forces-create-a-leading-global-offshore-wind-player>

## 12.2 MAYFLOWER WIND EXPERIENCE

- 12.2 Provide statements that list the specific experience of the bidder and each of the project participants (including, when applicable, the bidder, partners, and proposed contractors), in developing, financing, owning, and operating generating and delivery facilities, other projects of similar type, size and technology, and any evidence that the project participants have worked jointly on other projects.

Mayflower Wind was established as a joint venture between Shell and EDP Renewables to strategically combine the skills and experience of each company. Shell brings unparalleled experience in U.S. offshore construction and operations, while EDP Renewables is a leading wind developer in the U.S. with significant experience in permitting and developing renewable energy projects.

Shell and EDP Renewables successfully worked together throughout 2018 to win the federal lease area OCS-A 0521 in BOEM's auction in December 2018. Since then, we have established a dedicated full-time project team, contracted international and local consultants and initiated the following key activities to further develop the Mayflower Wind Project:

- Geophysical Campaign
- Geotechnical Campaign
- LiDAR and Metocean Campaign
- Pre-FEED engineering – WTG foundations
- FEED engineering – offshore substation and associated foundation
- Environmental studies and surveys for COP submission

The sections below detail bidder and project participant experience.

## OFFSHORE WIND EXPERIENCE – DEVELOPMENT, CONSTRUCTION, AND OPERATION

Combined, the Sponsors have a global offshore wind project portfolio of 10 projects:

- **NoordZeeWind**, a 108 MW Dutch project, been successfully operating since 2007;
- **WindFloat 1**, the first offshore wind turbine in open Atlantic waters and the first deployment of a semi-submersible structure supporting a 2 MW wind turbine. The project was decommissioned in 2016 after 5 years of operations;
- **WindFloat Atlantic**, a 25MW floating project under construction in Portugal using 8MW turbines, the largest turbines ever to be installed on a floating platform;
- **Moray East**, a 950 MW project in Scotland, United Kingdom which achieved financial close in 2018 and set a price of £57.50/MWh (~\$77.29/MWh)<sup>9</sup>, which is currently under construction;
- **Borssele 3 & 4**, a combined 731.5MW capacity off the Dutch coast which achieved financial close in 2018 and set a price of €54.49/MWh (~\$56.97/MWh)<sup>22</sup>, which is currently under construction;
- **Moray West**, an early-stage project neighboring and benefiting from the advancement of Moray East;
- **Dieppe Le Tréport**, a 496 MW project in France, scheduled for commissioning in 2021;
- **Yeu Noirmoutier**, another 496 MW project in France, scheduled for commissioning in 2023;
- **Eoliennes Flottantes du Golf du Lyon**, a 24MW pilot project under development in France, scheduled for commissioning in 2021.
- **Atlantic Shores**, under development in U.S. federal waters off the coast of New Jersey;

The Sponsors have an overall combined project pipeline of over 6,000 MW of offshore wind bringing core capabilities across the value chain, including development, procurement, finance, construction, and operation.

### ONSHORE WIND EXPERIENCE

Mayflower Wind's Sponsors have successfully constructed and continue to operate more than 12,000 megawatts of installed wind capacity. EDP Renewables is ranked fourth in the world in net installed capacity of wind energy and continues to invest heavily in the sector, growing by 1,000 megawatts every year. A full list of onshore wind assets in the U.S. from EDP Renewables and Shell can be found in **Attachment 12.2-1**.

### ADVANCING THE INDUSTRY THROUGH TECHNOLOGY AND INNOVATION

The Sponsors believe in driving the development of offshore wind through investing in new technologies and helping advance innovation to reduce cost, risk and increase reliability and safety.

Through Mayflower Wind, Massachusetts will benefit from the support of the Sponsors in driving innovation and expanding the limits that conventional fixed foundation technology can operate in. As Massachusetts and the greater New England region look to future deep-water lease areas, Mayflower Wind will be able to deliver experience in floating technology to enable the New England region to become a leader in floating wind.



FIGURE 12.2-1: WINDFLOAT 1

<sup>9</sup> Conversion to USD done at the exchange rate on the date of PPA award.

EDP Renewables' WindFloat 1 was successfully deployed and decommissioned and has now evolved to a 25 MW project achieving COD in 2020. The innovation focus of the project is the conception of a floating foundation, based on the experiences from the oil and gas industry, to support multi-MW wind turbines in offshore applications. The floating foundation is semi-submersible, anchored to the seabed. Its stability is due to the use of "water entrapment plates" on the bottom of the three pillars, associated with a static and dynamic ballast system. The WindFloat platform adapts to any type of offshore wind turbine. It is built entirely onshore - including the installation of the turbine - thus avoiding the use of costlier and time consuming marine infrastructure and resources. EDP Renewables has several other floating platform projects in various stages of development in France, Portugal, and the U.S.

Shell Ventures is at the forefront of advancing technology and disrupting the global energy system. It invests in companies that reduce costs, lower emissions, electrify our energy system and help us gain data-based insights. Within Shell Ventures' portfolio is TetraSpar, a floating foundation concept which earned €18m (approximately \$20 million) in investments to develop the concept off the coast of Norway.

Shell's commitment to the global tech innovation space includes establishing the Shell Tech Works in Cambridge, Massachusetts, in 2013 and Founding Sponsorship of Greentown Labs in Somerville, the largest greentech incubator in the U.S. EDP Renewables is a member of the UMass Lowell WindSTAR Industry-University Collaborative Research Center (Mayflower Wind's commitment to bring this leadership in innovation and research to Massachusetts' offshore wind enterprise is detailed in **Section 14.2**).

## U.S. INDUSTRY LEADERS

In the U.S., Mayflower Wind's Sponsors, have successfully developed more than 7,600 MW of renewable energy facilities and have demonstrated a proven ability to successfully navigate complicated land, interconnection and permitting environments in order to achieve commercial operations for its' projects. 6,100 MW of operational assets are spread across;

- 14 U.S. states, one Mexican state, and one Canadian province; and
- 48 wind farms and five solar parks;

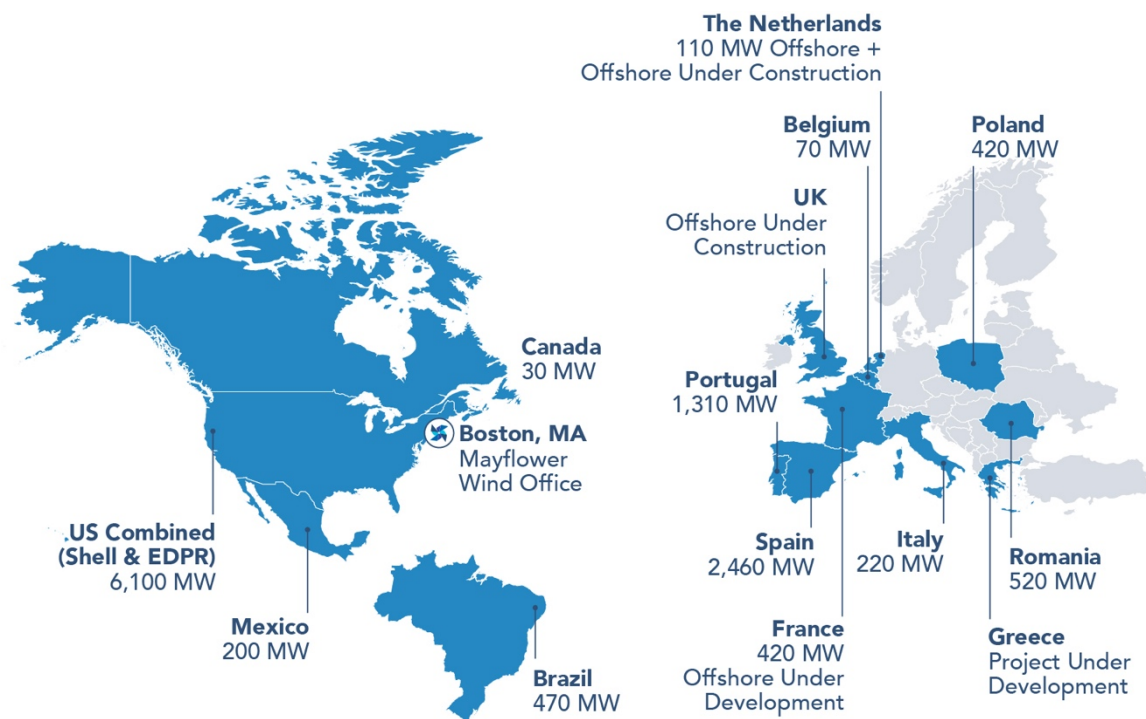
EDPR NA is the fourth largest developer and operator of wind energy in the U.S. and is currently constructing six additional renewable energy projects representing approximately 675 MW of additional capacity. EDPR NA is an industry leader in operational reliability, maintaining over 97% availability fleet-wide, as further described in **Section 12.4**.

Shell New Energies and its affiliates have a portfolio of wind farms including multiple joint venture interests spanning five operating wind projects in the U.S.

The Mayflower Wind team is located in Cambridge, Massachusetts, with the support of both EDP Renewables and Shell who have had a presence in the greater Boston area since 2010 and 1999 respectively.

EDPR NA's headquarters is in Houston, Texas, and the company has over 600 employees spread between Houston and regional offices in Kansas, Illinois, Indiana, Massachusetts, Mexico City, Oregon, New York, and Toronto.

Shell is also headquartered in Houston, Texas. Shell has approximately 17,900 employees in the U.S. and spends more than \$8 billion on approximately 5,000 U.S.-based suppliers, more than 800 of which are women, or minority-owned businesses.



**FIGURE 12.2-2: GLOBAL MAP OF INSTALLED CAPACITY AND PRESENCE FOR SHELL AND EDP RENEWABLES**

## EXPERIENCE WITH ISO-NE

Mayflower Wind has significant experience participating in ISO-NE markets. Its Interconnection Manager, Paul Sousa, has over 13 years of experience as a Senior Electrical Engineer in the Transmission Interconnection Group in New England's largest energy utility operating in three states. Paul has a proven track record of successfully completing 10 projects that have interconnected to the ISO-NE system, including three onshore wind projects.

EDP Renewables (via its subsidiaries) has imported over 1.5 million MWh of power into New England from its New York projects. It operates multiple projects qualified for New England states' Renewable Portfolio Standards (Marble River, Arkwright Summit, Madison, Marble River, Maple Ridge I & II, Jericho Rise). Additionally, EDP Renewables engages in internal bilateral transactions (IBTs) in ISO-NE, has several active large generator interconnection queue positions, actively engages in virtual bidding, and is an FTR market participant.

Shell has been a participant in ISO-NE since its inception and is active in all aspects of the ISO-NE market, including the energy, capacity, renewable and FTR markets, as well as, almost 20 years in managing generation. In addition, Shell maintains a real-time desk for 24/7 coverage.

## PRIMARY CONSULTANTS

Mayflower Wind is working with the following industry-leading consultants to complement the experience of the project team and to support and advise the successful development of the Project. **Table 12.2-1** below describes the function and experience they provide.

Consultant	Experience

Consultant	Experience



Consultant	Experience

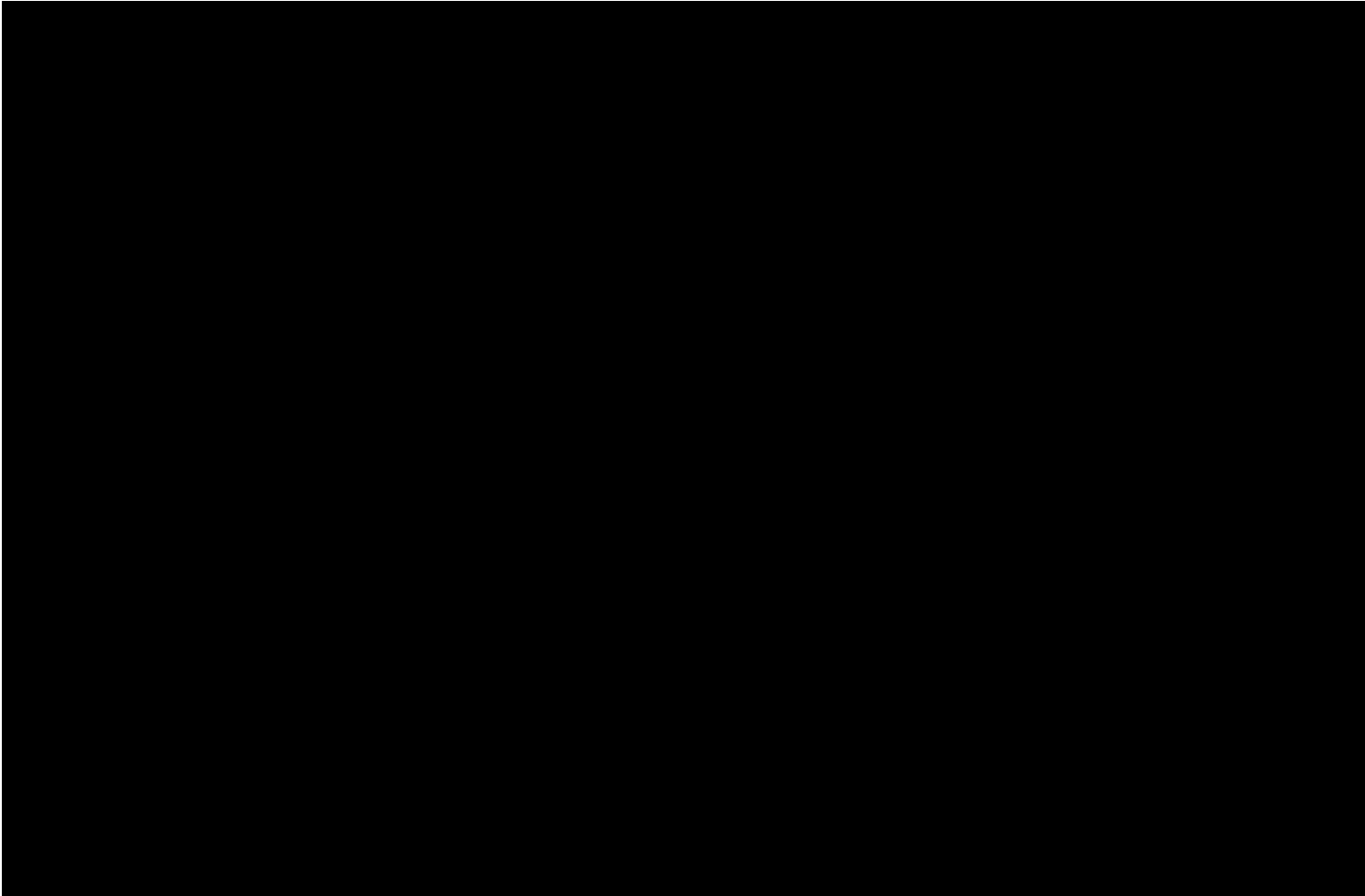
### 12.3 MANAGEMENT CHART AND PERSONNEL

- 12.3 Provide a management chart that lists the key personnel dedicated to this project and provide resumes of the key personnel. Key personnel of the bidder's development team having substantial project management responsibilities must have:
- i. Successfully developed and/or operated one or more projects of similar size or complexity or requiring similar skill sets; and
  - ii. Experience in financing power generation projects (or have the financial means to finance the project on the bidder's balance sheet).

The Mayflower Wind team is a highly experienced team with backgrounds in U.S. onshore wind, U.S. offshore oil and gas, and European offshore wind markets. Mayflower Wind has deep experience with the onshore and offshore permitting process, the U.S. offshore construction supply chain, and global financing markets. In December 2018, the team won lease area OCS-A 0521, and as a result, is the only new entrant to hold an



offshore federal lease in Massachusetts. Beyond the project team, as shown below in **Figure12.3-1**, Mayflower Wind has access to the expertise of over 18,000 individuals in the U.S. and over 80,000 globally.



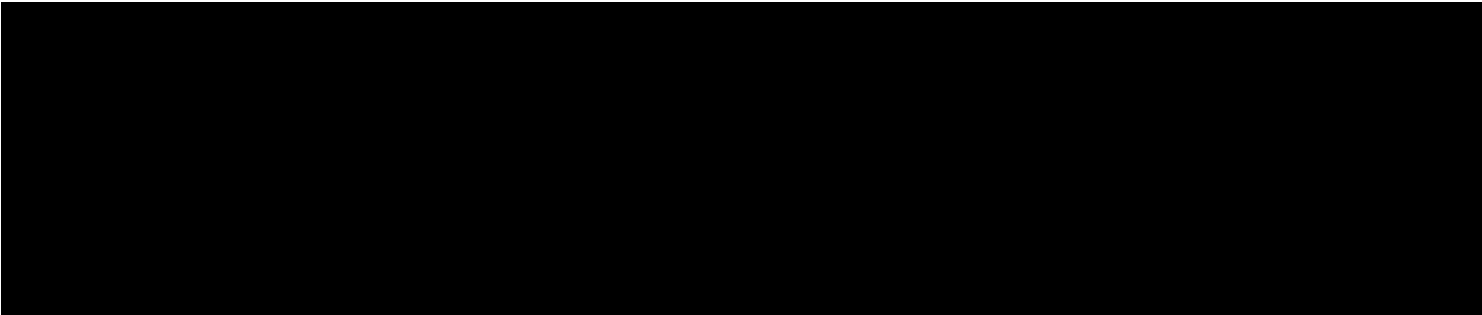
**FIGURE 12.3-1: MAYFLOWER WIND MANAGEMENT CHART**

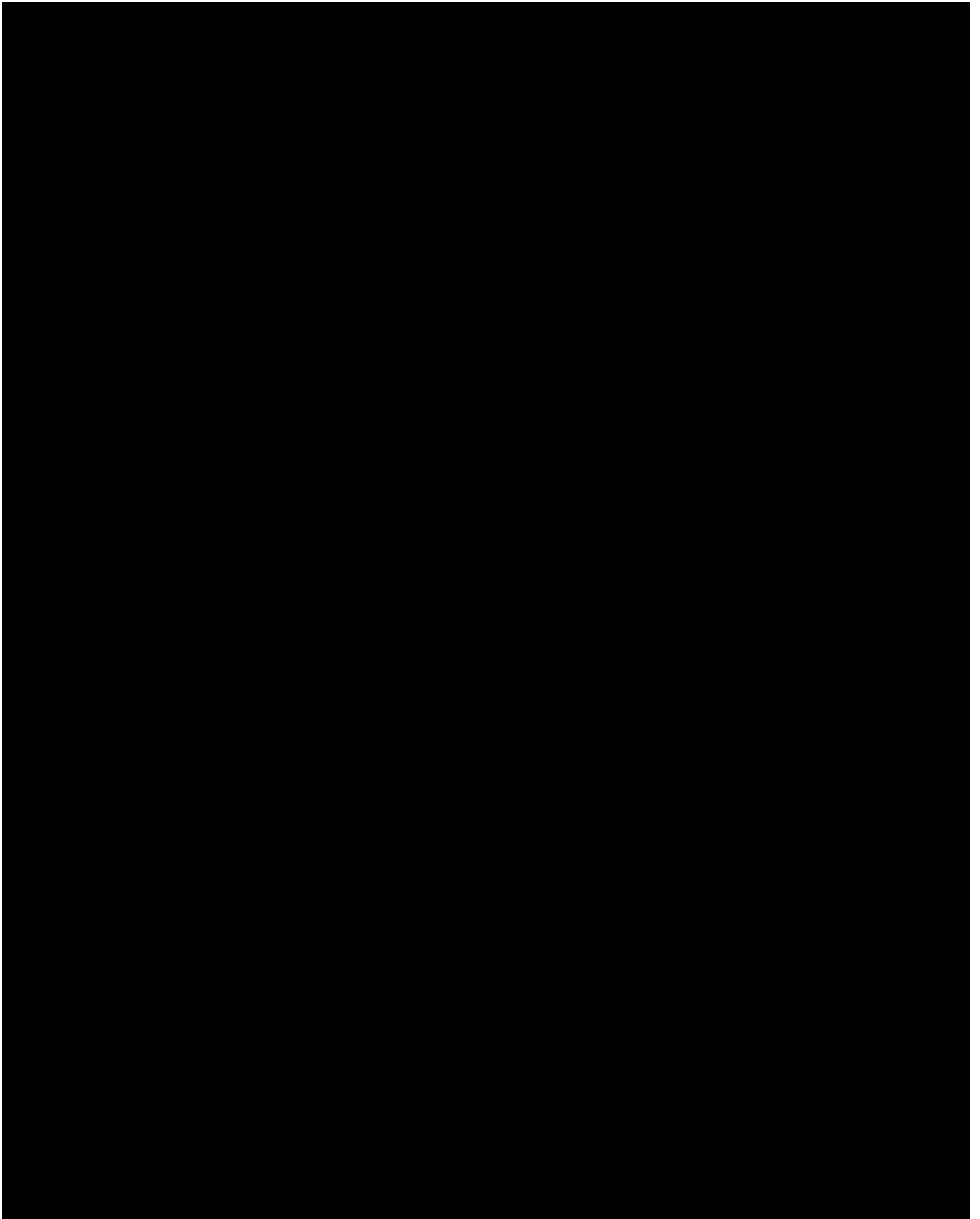
**MAYFLOWER WIND KEY PERSONNEL**

As illustrated in **Figure 5.2-4** in **Section 5.2**, the Mayflower Wind Project is overseen by the Managing Committee of six individuals across the two sponsors.

Below provides a description of the Managers, Executive Committee, and key personnel who bring significant experience to execute the Mayflower Wind Project. CVs are provided in **Attachment 12.3-1**.

**MANAGING COMMITTEE**





## EXECUTIVE COMMITTEE

### **John Hartnett:** *Project Director*

John Hartnett is President of Mayflower Wind Energy LLC and VP of Shell New Energies Offshore Wind Development. He is responsible for the overall management of the venture and leading a team of energy professionals to develop and execute the venture's offshore activities. Mr. Hartnett has been in the energy business for the past 30 years, working in project development, finance, business development, and sales. He has been with Shell for the past 16 years with a primary focus in power development, trading, and marketing business. His overall responsibilities include all commercial activity, including management, negotiation, and execution for the venture. Mr. Hartnett also brings extensive experience in Northeast U.S. power markets, including conventional and renewable power generation and transactions, transmission services, and customer-based solutions. Prior to his role in Shell New Energies, LLC, Mr. Hartnett managed Shell Energy North America's business development in the Northeast U.S. and served as the Director of Utility Marketing, in which he was responsible for all power-related transactions with utilities, municipalities, and co-operatives in the Northeast region.

### **Michael Brown:** *Director of Procurement and Finance*

Michael Brown is the CFO for Mayflower Wind and joined the team in early 2019. Michael has been with EDP Renewables since 2010. Michael was the Finance Director for EDP Renewables in the UK, including the Moray East Project, a 100 WTG, 950 MW offshore project in the Outer Moray Firth off the coast of Aberdeen, Scotland. Michael led the CfD bidding process, which resulted in Moray East winning a UK Contract for Difference at a record low price of £57.50/WMh in 2017, and he continued to lead the finance team through to financial close in December 2018.

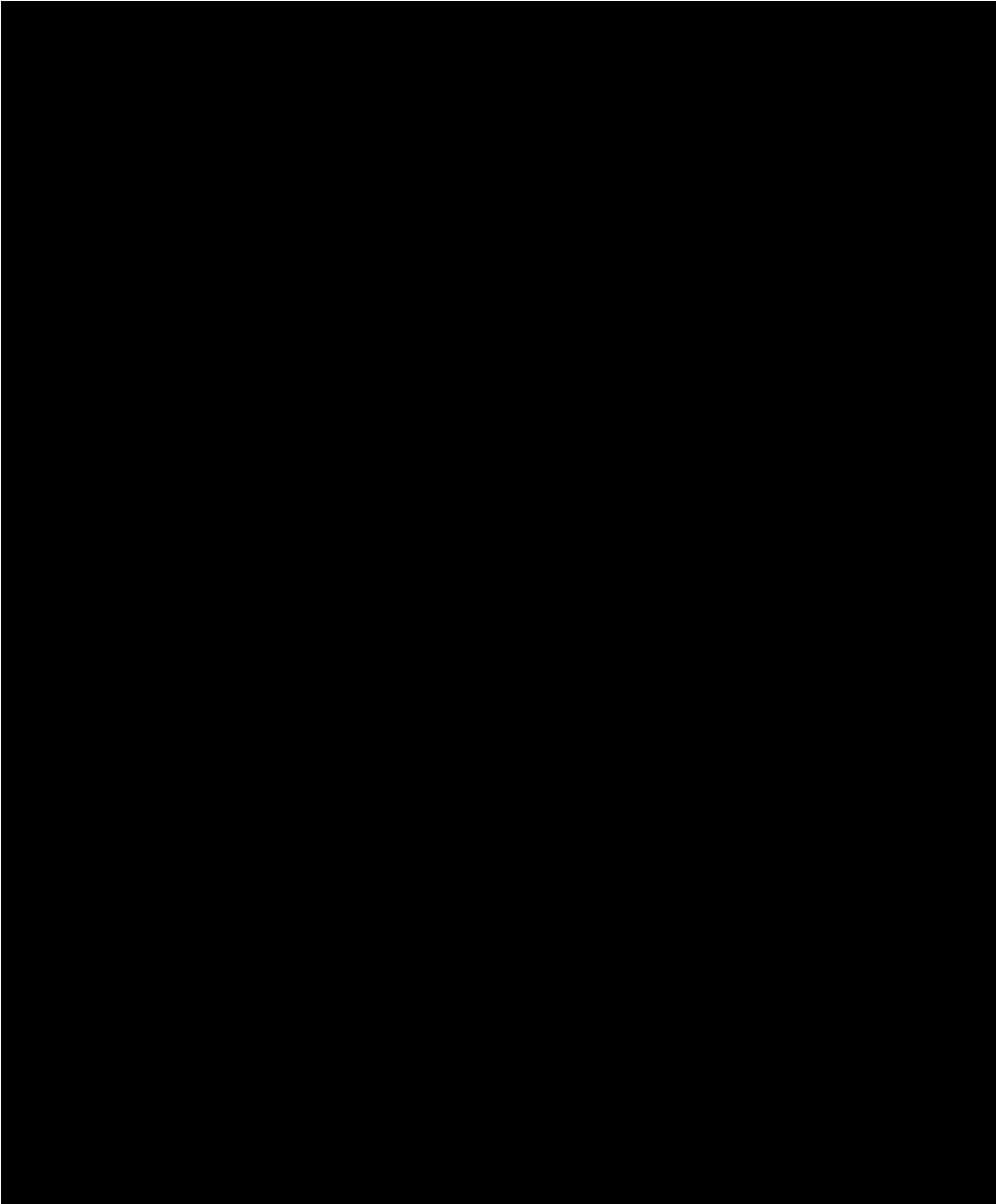
### **Michiel Bekker:** *Technical Director*

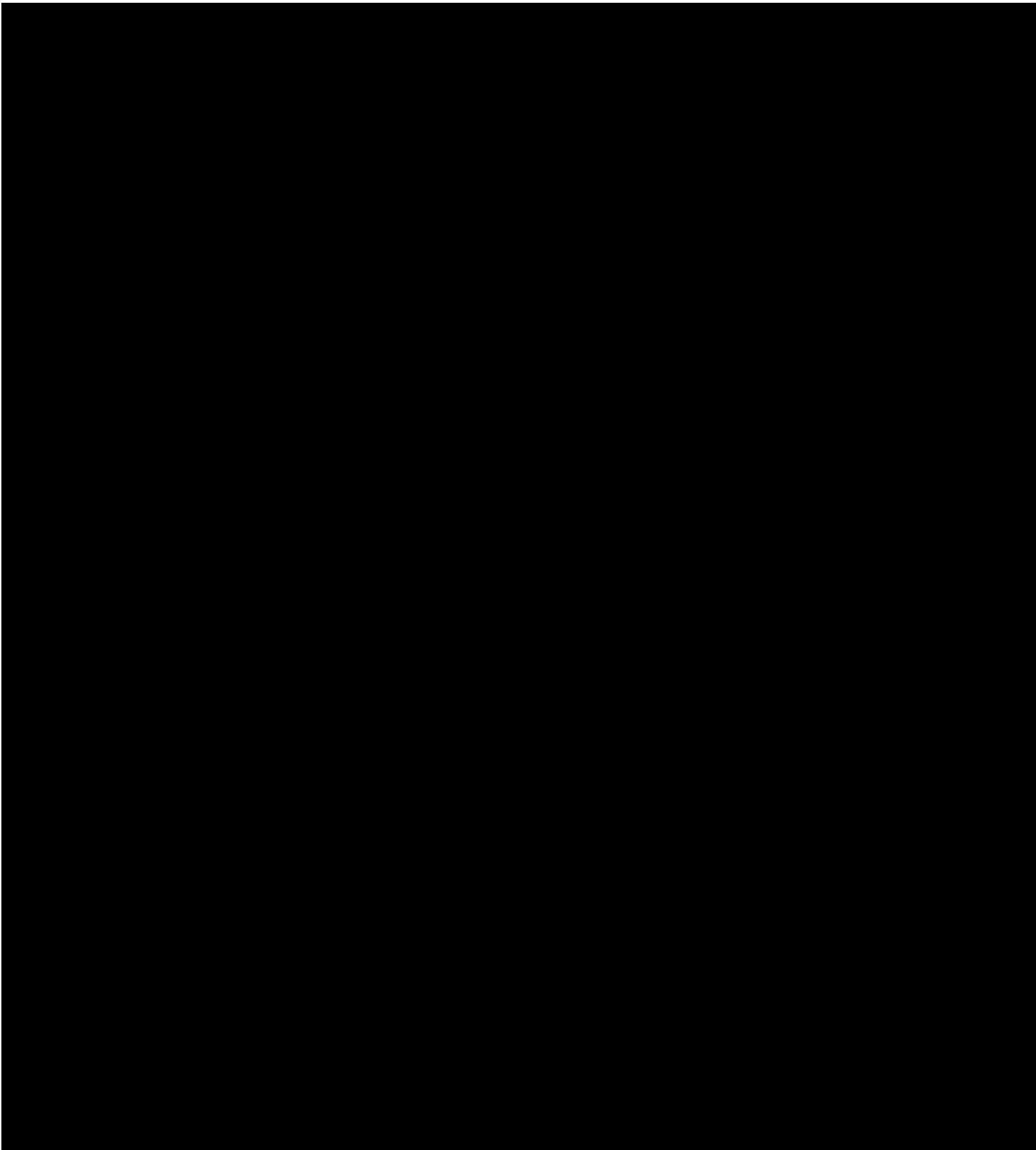
Michiel is the Technical Director for Mayflower Wind and joined the team in early 2019. Michiel has worked in the energy industry since 2003 in various roles as an operations and project manager in the UK, Russia, Brazil, and the U.S. He is a certified project management expert, specialized in leading complex, large offshore projects with novel technology. He has managed large EPC contracts for installation of offshore structures, cables, and pipelines. Through his broad experience working on offshore installation assets, such as production platforms and installation vessels, Michiel has demonstrated health, safety, security, and environmental (HSSE) leadership. Michiel is passionate about building the offshore wind industry in the U.S. to lead the world in offshore HSSE and implementation of new technology.

### **Seth Kaplan:** *Director of Permitting and Development*

Seth Kaplan is the Director of Development and Permitting for Mayflower Wind and joined the team in early 2019. Seth has been with EDP Renewables since 2014. Previously, Seth managed Government and

Regulatory Affairs for EDP Renewables NA across the Eastern U.S., and before that he worked at the Conservation Law Foundation, where his last assignment was as Vice President for Climate Policy. Seth has extensive experience with local, state and federal permitting schemes, including FERC regulation of the wholesale electricity market. He was extensively involved in the stakeholder process around the Cape Wind project and served on the Federal advisory committee that planned the creation and launch of the Bureau of Ocean Energy Management.





## 12.4 SUCCESSFUL DEVELOPMENT AND OPERATION

- 12.4 Provide a listing of all projects the project sponsor has successfully developed or that are currently under construction. Provide the following information as part of the response:
- Name of the project
  - Location of the project
  - Project type, size and technology
  - Commercial operation date
  - Estimated and actual capacity factor of the project for the past three years
  - Availability factor of the project for the past three years
  - References, including the names and current addresses and telephone numbers of individuals to contact for each reference.

**Table 12.4-1** details offshore wind projects under development, construction, and operations by Mayflower Wind's Sponsors. A full list of Mayflower Wind's Sponsor's assets in the U.S. can be found in **Attachment 12.2-1**.

### OFFSHORE WIND EXPERIENCE

Project	Location	Project Type	Project Capacity, MW	Commercial Operation Date	Financing Type	Current Status
Moray East	Scotland	Offshore Wind	950 MW			Construction
Moray West	Scotland	Offshore Wind	850MW			Permitted
Dieppe Le Tréport	France	Offshore Wind	496 MW			Development
Iles d'Yeu et de Noirmoutier	France	Offshore Wind	496 MW			Development
Les Eoliennes Flottantes du Golfe du Lyon	France	Floating Offshore Wind	24MW			Development
WindFloat 1	Portugal	Floating Offshore Wind	2MW			Decommissioned
WindFloat Atlantic	Portugal	Floating Offshore Wind	25MW			Construction
NoordZee Wind	Netherlands	Offshore Wind	108 MW			Operating

Project	Location	Project Type	Project Capacity, MW	Commercial Operation Date	Financing Type	Current Status
Borssele 3 & 4	Netherlands	Offshore Wind	731.5 MW			Construction
Atlantic Shores	New Jersey, U.S.	Offshore Wind	2,400 MW			Development

**TABLE 12.4-1: OFFSHORE WIND EXPERIENCE**

Project-specific operational characteristics may be provided upon request to;

[REDACTED]

## 12.5 EXTERNAL ENTITIES SUPPORTING THE PROJECT

12.5 With regard to the bidder's project team, identify and describe the entity responsible for the following, as applicable:

- i. Construction Period Lender
- ii. Operating Period Lender and/or Tax Equity Provider
- iii. Financial Advisor
- iv. Environmental Consultant
- v. Facility Operator and Manager
- vi. Owner's Engineer
- vii. Transmission/Delivery Consultant
- viii. Legal Counsel

Mayflower Wind and its Sponsors have a long list of contacts and access to companies that will fill the roles listed in this subsection. Engagement with most of these companies is contingent on the award and execution of a long-term Power Purchase Agreement. Upon award, Mayflower Wind will contract with the best companies for the further development of the Project.

- i. Construction Period Lender – [REDACTED]
- ii. Operating Period Lender and/or Tax Equity Provider – [REDACTED]
- iii. Financial Advisor – [REDACTED]
- iv. Environmental Consultant – [REDACTED]
- v. Facility Operator and Manager – [REDACTED]
- vi. Owner's Engineer – [REDACTED]



vii. Transmission Consultant – [REDACTED]

viii. Legal Counsel – [REDACTED]

[REDACTED]

## SECTION 13 OF APPENDIX A TO THE RFP EMISSIONS

### 13.1 EMISSIONS ESTIMATES

- 13.1 Provide emissions estimates based on available data from the unit manufacturer. Alternatively, provide actual emissions data determined in accordance with the paragraph above for a similar facility built within the past 3 years. Include copies of supporting documentation for all emissions estimates.

As the Mayflower Wind Project's sole fuel source is wind, it will generate zero emissions, as presented below in **Table 13.1-1**.

Source of Information	Date of Test (If Applicable)	Greenhouse Gases (All Except Methane) Expressed as Carbon Dioxide Equivalent (CO <sub>2</sub> E)	Nitrogen Oxides (NO <sub>x</sub> )	Sulfur Oxides (SO <sub>x</sub> )	Carbon Monoxide (CO)	Particulate Matter (PM 2.5)	Methane (CH <sub>4</sub> )
Greenhouse Gas Emissions Reduction Study prepared by [REDACTED]	N/A	0	0	0	0	0	0

**FIGURE 13.1-1: PROJECT ANTICIPATED EMISSIONS, EXPRESSED IN POUNDS/MEGAWATT-HOUR (LBS/MWH)**

### 13.2 EMISSION IMPROVING INVESTMENTS

- 13.2 Describe any past investments that will or have been made to your facility to improve its emissions profile or any planned future investments made to your facility in order to improve its emissions profile.

As described in the response in Section 13.1, the Mayflower Wind Project's emissions profile, as defined by the Commonwealth, is already zero, because all energy is generated from the power of wind, a renewable resource with no greenhouse gas emissions.

Future investments to improve the Project's emissions profile are not related directly to the generation of electricity. Mayflower Wind has committed to installing a solar-powered LiDAR buoy at the project site, as described in Section 4. This will eliminate the use of diesel generators to power wind data collection devices.

To further improve the facility's overall emissions profile, Mayflower Wind is also evaluating the use of battery hybrid electric crew transfer vessels (CTVs) and service operation vessels (SOVs) to reduce emissions related to the transportation of technicians, equipment, and spare parts to and from the site. Operation and maintenance costs can represent [REDACTED] of an offshore wind farm's life cycle costs. The majority of such costs are associated with the transportation of technicians, equipment, and spare parts via CTVs and SOVs. Switching from traditional diesel-powered vessels to battery hybrid electric-powered vessels may achieve greater fuel efficiency related to transportation and reduce emissions over the life of the project. Battery hybrid SOVs and CTVs would normally be able to leave port under electric power and switch

over to diesel-only as needed when traveling at sea. This would result in near-zero-emissions near inhabited areas during operations within the port and harbor. We cannot currently quantify the expected improvement in our emissions profile but believe it would be significant, and we are committed to fully exploring the feasibility and benefits of battery hybrid CTVs and SOVs.

13.3 CONTRIBUTION TO 2008 GWSA

13.3 Describe how your project will contribute to the Massachusetts 2008 Global Warming Solutions Act (GWSA) and the 2010 Clean Energy and Climate Plan for 2020, updated in 2015. Describe how your project will contribute to the Commonwealth’s 2030, 2040 and 2050 GHG emission targets and any benefits associated with an earlier operational date.

The Mayflower Wind Project will deliver 2.1% of the Commonwealth’s GWSA total GHG reduction goal by 2030, 1.5% of the 2040 target, and 1.1% of the 2050 target. The Project would be one of the Commonwealth’s single highest-impact contributors to achieving the goals outlined in the GWSA and the 2010 Clean Energy and Climate Plan for 2020, updated in 2015. Beginning in 2026, Mayflower Wind will reduce CO2 emissions by [REDACTED] annually, which will result in a total CO2 emissions reduction of [REDACTED] over the life of the project. This represents a significant contribution to the targets established under the GWSA and the Commonwealth’s 2030, 2040 and 2050 GHG emission targets. Mayflower Wind’s greenhouse gas (GHG) emissions reduction study is included as Attachment 13.3-1, which was conducted for an 804 MW project. For this proposal we have assumed approximately 50% of the benefits.

The emissions reductions were estimated using the 2016 version of the EPA’s Emissions & Generation Resource Integrated Database (eGRID). Based on the displaced fossil-fuel electricity generation, an emissions reduction estimate was made in line with the requirements of the GWSA and the 2015 update to the 2010 Clean Energy and Climate Plan for 2020.

To ensure an accurate assessment of the total emissions reductions on the grid resulting from the Project, the study considered six scenarios, each derived using a slightly different methodology. The results from all six scenarios are generally equal, providing a high level of confidence in the estimate. The emissions reductions that can be expected due to the installation of the Mayflower Wind Project are detailed in Table 13.3-1. Non-baseload emission rates were used, as these are recommended by the EPA and represent the emissions from the units that would likely be displaced by the Project.

Emissions Group	Estimated Annual Reduction (MT / MT CO2E)	Estimated Total Reduction (MT / MT CO2E)
GHG other than CH4	[REDACTED]	[REDACTED]
NOx		
SOx		
CH4		
Total CO2e		

**FIGURE 13.3-1: ESTIMATED GREENHOUSE GAS REDUCTIONS**

## HELPING MEET MASSACHUSETTS GWSA EMISSIONS TARGETS

The GWSA requires Massachusetts to reduce annual GHG emissions by 25% from 1990 levels by 2020 and by at least 80% by 2050. As further detailed in **Table 13.3-2**, Mayflower Wind will provide an annual reduction of [REDACTED]. As a result, Mayflower Wind will contribute 1.1% of all emissions reductions required to meet the 2050 target.

	2030	2040	2050
GWSA Target (reduction)	[REDACTED]		
Emission Reduction from Mayflower Wind Project	[REDACTED]		
Percentage Reduction from Mayflower Wind Project	2.1%	1.5%	1.1%

**FIGURE 13.3-2: MAYFLOWER WIND CONTRIBUTIONS TO GWSA EMISSION REDUCTION TARGETS, IN MILLIONS**

## MASSACHUSETTS GHG EMISSION REDUCTION SAVINGS

The economic benefit to Massachusetts associated with the estimated GHG reductions is approximately [REDACTED] and [REDACTED] over the [REDACTED] expected project lifetime.

Economic benefits of GHG reductions were calculated using a direct calculation of GWSA attributable GHG reductions valued at RPS Class I pricing, annually updated and published by DOER for the calculations of Alternative Compliance Payments. The RPS Class I value is for the 2018 rate<sup>[1]</sup>, and has been inflated to [REDACTED] based on an assumed [REDACTED] as the Project's first full year of operations is expected to occur in 2026. These inputs were used to calculate first-year economic benefits.

The Mayflower Wind Project will produce emissions-free energy for the duration of its [REDACTED]. For total lifetime GHG reductions and associated value, an applied a [REDACTED] was used to calculate the lifetime net present value over the life of the project.

Full details of the emissions analysis are included in **Attachment 13.3-1**.

<sup>[1]</sup> <https://www.mass.gov/service-details/alternative-compliance-payments-acp-rates-and-information>

## SECTION 14 OF APPENDIX A TO THE RFP

### DEMONSTRATED, VERIFIABLE COMMITMENT TO CREATE AND FOSTER EMPLOYMENT AND ECONOMIC DEVELOPMENT AND OTHER DIRECT BENEFITS

#### 14.1 JOB CREATION IN MASSACHUSETTS

- 14.1 Please provide an estimate of the number of jobs to be created directly during project development and construction, and during operations, and a general description of the types of jobs created, estimated annual compensation, the employer(s) for such jobs, and the location. Employment impacts should be broken out by state and the region as a whole and highlight any impacts in economically distressed areas. Please treat the development, construction, and operation and maintenance periods separately in your response. All information provided must be measurable.

The economic benefits to Massachusetts and the region are summarized in the Economic Development Summary Sheet, in **Attachment 14.1-1**, which identifies the employment and economic investment throughout development, construction and operations – of which [REDACTED] are targeted at Economically Distressed Areas (EDAs)

Mayflower Wind is committed to creating and fostering innovation, employment and economic development. Our approach to economic development is focused on the following elements:

1. Adopting a local-first supply chain strategy
2. Investment in ports and infrastructure
3. Workforce development and health and safety
4. Investment in innovation to drive economic competitiveness
5. Applied research partnership with local institutions
6. Marine Science research to enhance scientific knowledge and support fact-based decisions
7. Community-based programs targeting low-income households

The measurable impacts on employment and economic development associated with the local-first element are presented in this **Section 14.1**, while the other aspects are further described in **Section 14.2**.

Mayflower Wind commissioned [REDACTED] to conduct a detailed analysis, **Attachment 14.1-2**, utilizing; Mayflower Wind's financial model, assumptions from supply chain engagement, and industry trends and forecasts, to identify how the Project would generate investment and employment for the Commonwealth and surrounding region.

[REDACTED] has modeled economic benefits under two scenarios: a Base Case and a Stretch Case. The Base Case represents the base minimum of what will be delivered, whereas the Stretch Case highlights the benefits that will be achieved with further investment in Massachusetts supply chain development.

The Base Case scenario includes spending of [REDACTED] in the Commonwealth over the life of the project and a further [REDACTED] in other parts of the region.

[REDACTED] estimates that the Mayflower Wind project will create 5,115 jobs (FTE years) in Massachusetts under the base case scenario, with 60 during development, 1,160 during construction and 3,860 over [REDACTED] of operation (with decommissioning). An additional 5 in development, 545 in construction and 915 in operations will be created elsewhere in the region. During construction, the biggest source of employment in Massachusetts will be from component staging.

Throughout the Project lifecycle, direct, indirect and induced employment will be created in both Massachusetts and the greater region. **Table 14.2-1** shows that employment will peak in 2024, the year preceding COD.

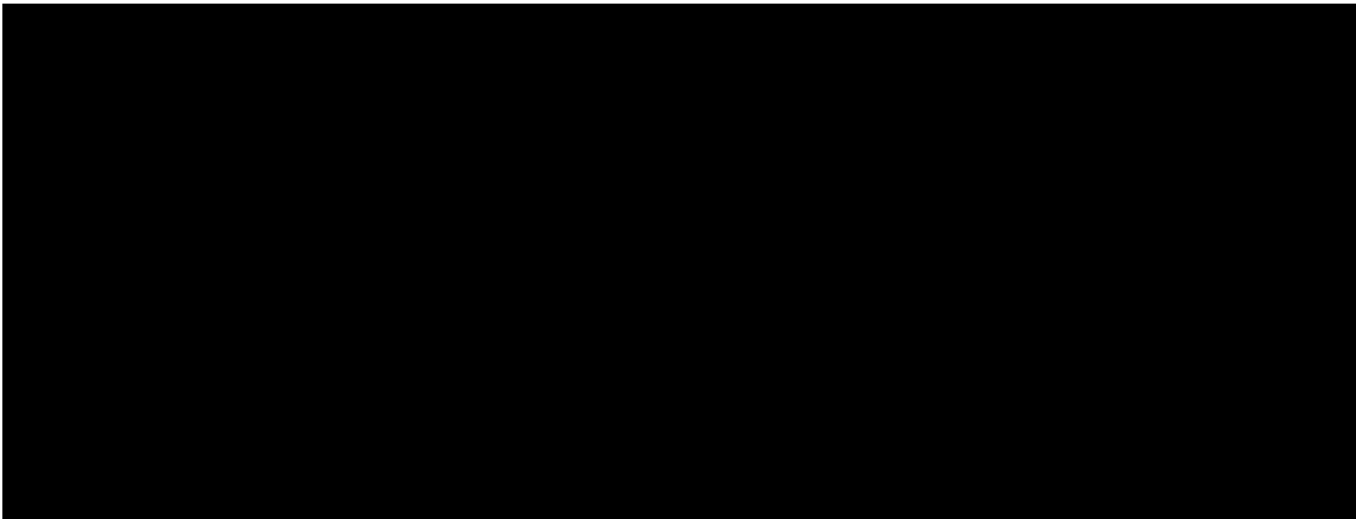


FIGURE 14.1-1: TOTAL ESTIMATED EMPLOYMENT

Table 14.2-1 and 14.1-2 present the different types of employment the Project would create.

	Direct	Indirect	Induced	Total
Development	30	10	20	60
Construction	540	280	340	1,160
Operation (annual)	2,175 (73)	580 (20)	1,105 (37)	3,860 (129)
Decommissioning	15	10	10	35
Total	2,760	880	1,475	5,115

TABLE 14.1.1: TABLE DIRECT, INDIRECT AND INDUCED FULL-TIME EQUIVALENT JOBS CREATED IN MASSACHUSETTS IN THE BASE CASE FOR EACH PROJECT STAGE

	Direct	Indirect	Induced	Total
Development	30	15	20	65
Construction	670	500	5,035	1,705
Operation (annual)	2,510 (84)	765 (26)	1,500 (500)	4,775 (160)
Decommissioning	15	15	10	40
Total	3,225	1,295	2,065	6,585

TABLE 14.1-2: DIRECT, INDIRECT AND INDUCED FULL-TIME EQUIVALENT JOBS CREATED IN THE REGION IN THE BASE CASE FOR EACH PROJECT STAGE.

From the employment creation, [REDACTED] estimates \$345 million of gross earnings will be made in Massachusetts under the Base Case scenario, with a further \$85 million will be earned elsewhere in the region.

A DIVERSIFIED PORTFOLIO CREATES FURTHER ECONOMIC BENEFITS BEYOND THE PROJECT

[REDACTED] notes that increasing the number of project developers with contracted projects can have a significant impact on the competitiveness of the Massachusetts supply chain, enabling the Commonwealth to attract investment by businesses that enable them to supply wind farms across the region. When there is only one active developer, that company is able to exert control of the supply chain, making it harder for competitors to enter the market. Even if successful suppliers are in Massachusetts, the lack of competition in the market will make them less able to compete successfully for business across the region. For Massachusetts, this can mean that its supply chain is ultimately less sustainable. If Massachusetts has three active developers, this lowers the investment risk for potential suppliers given the larger customer pool. [REDACTED] analyzed the offshore wind market dynamics in the region and concluded more potential customers (developers) could lead to investment by suppliers of:

- Offshore wildlife surveys
- Vessel operator
- Safety and training
- Rope access services
- Blade repair
- Foundation and
- Cable inspection and repair.

Based on experience in the European market, this could result in employing directly 100 FTEs annually on a long-term basis, with a total employment impact of 250 FTEs annually. Because these companies will be supplying several wind farms in the region, it will have a major contribution to offshore wind employment in Massachusetts.

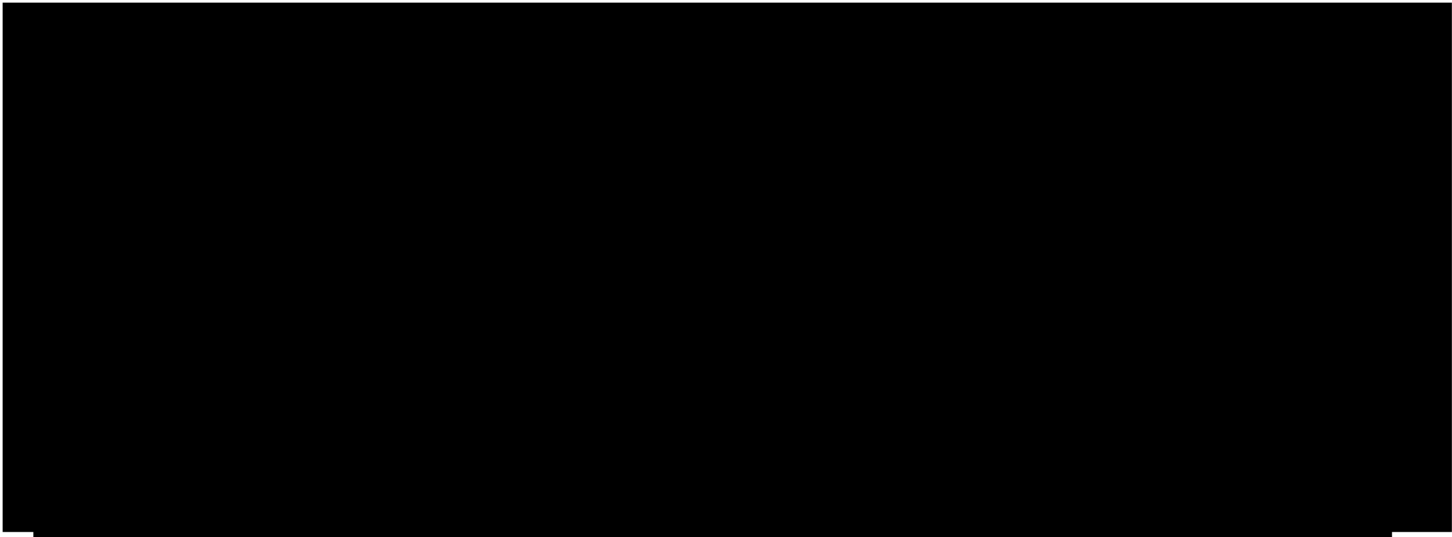


TABLE 14.1-2: IMPACT OF DEVELOPER COMPETITION ON OFFSHORE WIND EMPLOYMENT IN MASSACHUSETTS



14.2 Please describe and quantify any other economic activity or development expected to result directly from the proposed project. Impacts should be broken out by state and the region as a whole and highlight any impacts in economically distressed areas. Direct economic activity/development will be evaluated based on scale, credibility and firmness. Commitments that secure long-term benefits are preferred. Commitments will be evaluated by the degree or extent to which the asserted benefits are contractually committed to by the bidder. Specific commitments to economic activity or development should include (but are not limited to):

- Investment in supply chain and infrastructure improvements to support the offshore wind industry, for example, commitment to contribute to the Offshore Wind Accelerator Fund that supports the economic development activities for the offshore wind industry;
- Investment in workforce development and environmental research facilities to support the offshore wind industry;
- Commitment to utilize port facilities and office space during project development, deployment during construction, and operation and maintenance of the project.

Please describe the status of any contractual commitments with respect to economic development and provide any pertinent agreements that have been executed.

Mayflower Wind is committing to invest at least [REDACTED], as detailed below, in ensuring Massachusetts becomes a national hub for offshore wind development and incubating a culture of entrepreneurship and innovation to make that vision reality. Building this culture and infrastructure of offshore wind innovation will not only create jobs and attract investment – it will also drive down the cost of offshore wind technology for electric distribution companies and ratepayers and lay the foundation for a vibrant new export sector.

Massachusetts has a history of incubating new industries and technologies, built on our high-quality, highly-educated workforce, world-class educational and research institutions, and forward-looking public policies. Mayflower Wind is committed to building on this history with a comprehensive, cost-effective plan that supports a durable, growing offshore wind industry cluster in the Commonwealth that can serve the nation and compete throughout the world.

Our plan includes investments in community, environmental, and economic initiatives that reflect the core values of Mayflower Wind: human and environmental safety first and always; innovation and talent development to drive sustained economic advances; and working as a partner with communities to maximize the positive impact of our Project. One of the initiatives about which we are especially excited and describe in greater detail below is a partnership with a leading European offshore wind contractor, The DEME Group, to place Massachusetts and New England workers as interns on DEME wind farm construction projects in Europe to give them real-world training and experience in offshore wind work and begin to build a highly trained Massachusetts workforce for this industry.

We will pursue these goals by collaborating with and building upon proven initiatives and institutions to enhance local capacity, through direct financial investment and the engagement of our staff and access to Sponsor assets. Mayflower Wind believes the sturdy model of MassCEC acting as the lead agency transparently administering and managing these efforts, including much of the direct funds disbursement, is well-proven as the best way to execute Mayflower Wind's vision and maximize the opportunities presented by the emerging offshore wind industry in Massachusetts. We envision MassCEC, with appropriate support from Mayflower Wind staff, taking the lead in refining and administering the programs below to ensure they are responsive to evolving local needs and deliver the most positive impact and return on investment. We will work with MassCEC to ensure that the funds are deployed in a manner that yields the highest long-term economic benefits to Southeastern Massachusetts



Our vision includes the following six elements, which are consistent with existing MassCEC efforts and will be refined through collaboration with MassCEC and local stakeholders, including the electric distribution companies.

#### ELEMENT 1: PORTS AND INFRASTRUCTURE

Investing in the ports and coastal industrial infrastructure of Southeastern Massachusetts will literally build the foundation for the offshore wind industry. Through collaboration between MassCEC, local stakeholders, institutions, and developers like Mayflower Wind, port and industrial investment can lower the cost of offshore wind projects and foster the development of local businesses poised to provide goods and services to the emerging multi-billion dollar offshore wind industry.

Our plan to deploy [REDACTED] for port upgrades and general infrastructure improvements, which would flow through MassCEC with an explicit focus on South Coast communities and facilities. This effort will lift up the industry generally and provide deep benefits to communities that have been designated as “economically distressed.” Mayflower Wind fully agrees with the observation, in the public letter dated June 19, 2019, from South Coast elected representatives and business leaders that “specific dollar investments in public infrastructure in the region that would directly support the offshore industry yield the highest long-term economic benefits to Southeastern Massachusetts.”

#### ELEMENT 2: WORKFORCE DEVELOPMENT, WITH A SAFETY EMPHASIS

In identifying entities that can nurture the development of a skilled offshore wind workforce, Mayflower Wind recognizes the strong group of educational institutions on the South Coast and Cape Cod including Bristol Community College and the Massachusetts Maritime Academy. After looking into the excellent programs and facilities of these institutions, we have determined that the best course of action is to invest [REDACTED] in funding grants awarded through a MassCEC program, which could attract matching and/or complementary from other private or public sources.

This partnership with local institutions and coordination with efforts now underway is the best way to train and equip Massachusetts’ offshore wind workforce. The granting process will ensure that a significant portion of these funds flow to the benefit of local communities, including Tribes and residents of communities that are economically distressed and/or home to substantial low-income populations. We also note, that in addition to direct funding, Mayflower Wind sees a wide range of opportunities to bring our experts with deep experience in the Gulf of Mexico with the Robert Training Center to engage in and support local training and education efforts in the Commonwealth for years to come.

In addition to the financial investment noted above, Mayflower Wind is committed to working upstream to aid in the development of a trained workforce for future construction of the wind farms. To accomplish this, Mayflower is partnering with a leading offshore European wind farm installation contractor, DEME Offshore US LLC, on development of a “global training bridge” as described in DEME’s July 30, 2019, letter to the Massachusetts Department of Energy Resources, filed with this bid response as **Attachment 14.2-1**. This collaboration will place workers from Massachusetts and other parts of New England and the U.S. as interns on DEME installation vessels being deployed to build out wind farms in Europe and other international markets, to gain real-world experience with state-of-the-art wind farm installation processes. As DEME states: “This hands-on experience in the construction of offshore wind farms will aid in creating U.S. local workers who will have acquired, in advance of the start of construction, important skills, and experience. Creating this opportunity will prepare the local workforce to be able to safely and productively execute the Mayflower project and the many offshore wind projects that are in the pipeline.” The DEME Group, which draws on more than 140 years of overall experience in more than 90 countries and on more than 100 main vessels, has successfully completed a vast portfolio of offshore wind construction, including more than 1,300 piles, 165 jackets, 130 cables, 500 scour protections, and 1,500 installed WTGs. Mayflower Wind is excited to work with MassCEC to establish a task force supporting this invaluable training partnership with DEME,

which will include the Massachusetts Maritime Academy (MMA), Bristol Community College (BCC), trade unions, leaseholders, OEMs, and supply-chain representatives.

### ELEMENT 3: SUPPORT FOR MASSACHUSETTS OFFSHORE WIND INDUSTRY INNOVATION, WITH A SOUTH COAST FOCUS

For centuries, Massachusetts' economic history has been defined by technological breakthroughs and innovations that create not just new products and services, but entirely new industry sectors and thousands of jobs: whaling, the telephone, mutual funds, venture capital, minicomputers, and today's bio/pharma/life sciences businesses born of the genomic revolution are just some of the many examples.

Mayflower Wind believes the Commonwealth has all the elements here for offshore wind to join this list of transformative industries that boom in Massachusetts and change the world. To fulfill that vision, we will commit [REDACTED] over the term of the Contract to a MassCEC-led program supporting innovation and growth in offshore wind. These funds could be used for grants or loans to companies incubating new technologies and businesses or for the kind of entrepreneurial competition, like a Mass Challenge or MIT Clean Energy Prize, that has spurred the development and deployment of exciting new technologies. Our hope, based on the Commonwealth's past experience with open-ended support for finding the transformational ideas of tomorrow, is that the [REDACTED] investment can unleash breakthroughs we can't even imagine today: Perhaps a venture that develops an entirely new technology to analyze conditions around an operating offshore wind farm to improve output and safety, or a startup that develops software for future unmanned underwater vehicles that prove to have applications far beyond the offshore wind industry.

We believe it is essential for MassCEC, Mayflower Wind, and others putting this [REDACTED] investment to work to collaborate with and build on existing institutions and efforts, such as Greentown Labs, the largest cleantech incubator in the U.S., with which Mayflower Wind (through Shell) and MassCEC already partner. Other organizations that could be engaged in this effort by or along with MassCEC could include the emerging New Bedford Ocean Cluster, a partnership of the Iceland Ocean Cluster and New Bedford Harbor Development Commission, and Sea Ahead, the Boston-based "benefit corporation" supporting new venture development at the intersection of innovation, sustainability, and the oceans, including offshore alternative energy and greener shipping and ports. Mayflower Wind commits to actively advising and supporting MassCEC in administering these programs.

As shown by the many letters of support in this bid for the Mayflower Wind Project from offshore wind contractors, consultants, and suppliers, Mayflower Wind can also bring to our support for innovation research a large network of offshore wind contractors and suppliers, creating enormous opportunities for researchers and entrepreneurs to learn directly about the real-world challenges the industry most urgently needs addressed. These project endorsers include many of the contractors most active in offshore wind construction today, including [REDACTED] as well as many of the subsea cable manufacturers and installers, turbine platform and foundation fabricators, consulting engineers, and other key suppliers and consultants they work with.

### ELEMENT 4: AUGMENTING AND FUELING PRACTICAL RESEARCH BY LOCAL INSTITUTIONS

One of Massachusetts' greatest assets is the intellectual capital of our research centers and universities, specifically in science, engineering, and public policy disciplines that drive critical knowledge-creation and the innovation essential to advancing the offshore wind sector. MassCEC has for several years supported the leadership of the Massachusetts Research Partnership in Offshore Wind (MRP), which includes the University of Massachusetts campuses in Amherst, Boston, Dartmouth, and Lowell, Tufts and Northeastern Universities and the Woods Hole Oceanographic Institution. The MassCEC has funded MRP multi-disciplinary collaborative activities and provided matching funds for research proposals at MRP member institutions.

MRP has helped researchers win multiple grants from the DOE, BOEM, and National Science Foundation, many of these leading to research partnerships with industry international academic experts, including the Massachusetts-led national Partnership for Offshore Wind Energy Research (POWER-US).

Mayflower Wind is committing [REDACTED] to accelerate these MassCEC/MRP efforts to support research, collaboration, and academic-capacity-building efforts at MRP-affiliated institutions to support the training of the professional offshore wind workforce. In addition, Mayflower Wind will appoint a research/academic liaison to connect Shell and EDP Renewables experts with Massachusetts universities for joint research, technical and academic lectures, and internship programs.

#### ELEMENT 5: DIRECT SUPPORT FOR MARINE SCIENCE

As discussed in **Section 7.4** above, Mayflower Wind's scientists have been working closely with fishing organizations and government agencies to identify pathways to standardize monitoring, minimize duplication of effort, and maximize the effectiveness of research for fulfilling fisheries regulatory requirements. The Massachusetts Department of Marine Fisheries and stakeholders have also identified opportunities for Mayflower Wind and developers conducting site characterizations and impact assessment research to coordinate and leverage our resources across the Commonwealth's wind energy lease areas.

In this context, Mayflower Wind is committing [REDACTED] to fund specific scientific efforts through organizations including the Responsible Offshore Science Alliance and the New England Aquarium's Anderson Cabot Center of Ocean Life in its Fisheries Science and Emerging Technologies program. Our funding will provide support for the following:

- cutting-edge acoustic and tagging technologies to provide resource managers with data to improve species, fisheries, and ecosystem management
- research into how certain migratory species may respond to acute or long-term stressors, including installation and operations of the Project's offshore wind turbines, and how they could be avoided, minimized, and mitigated
- improving the overall understanding of the effects of wind energy development on fisheries and the ocean ecosystems on which they depend

[REDACTED] As discussed in **Section 7.5** above, to leverage the value of the [REDACTED] investment described here, Mayflower will convene a series of workshops with [REDACTED] These workshops' focus will be to identify and share researchers' and industry's understanding of the offshore, nearshore, and coastal environmental impacts throughout the development process, integrate findings into Project permitting, and identify the additional information, monitoring, and assessment required to develop the most effective mitigation strategies and tactics for the Project and offshore wind development generally.

#### ELEMENT 6: INNOVATIVE EFFORTS TO REDUCE ELECTRIC BILLS FOR LOW-INCOME RATEPAYERS

As articulated in **Section 14.5**, Mayflower will provide, over the first [REDACTED] of project operations, [REDACTED] to the Cape Light Compact, the energy services organization operated by the 21 towns on Cape Cod and Dukes County (Martha's Vineyard). This [REDACTED] will be applied to reducing electric bills for low-income households, specifically those with annual incomes of less than 80 percent of the state median income. Mayflower Wind will fund Cape Light initiatives to optimize customers' energy usage and lower their bills through solar PV, behind-the-meter battery storage, and incentives to switch from heating oil, propane, or electric baseboard heat to high-efficiency cold-climate air source heat pumps. The goal of the program is to reduce overall energy usage while offsetting increased use of electricity for heat pumps by sourcing that power from renewable energy and providing storage to shave demand at high-cost peaks and bolster home energy resiliency.

## 14.3 EMPLOYMENT AND ECONOMIC DEVELOPMENT TRACKING

- 14.3 Please describe any tracking or reporting mechanisms, such as an annual report(s) of milestones achieved and jobs created to verify the contributions to employment and economic development identified in 14.1, 14.2.

Mayflower Wind will track, report, and verify our job creation and economic development impact through a template provided in **Attachment 14.3-1**, which identifies contributions to employment and economic development through the different phases of the project as well as the benefit to Economically Distressed Areas. These indirect jobs are created in a wide range of services, often for limited durations or as a fraction of an individual worker's total output. Indirect employment will be tracked through a multiplier of project spend, specific to different activities, as calculated by [REDACTED] in **Attachment 14.1-2**. We will use this data to continually readjust our support for workforce development programs to maximize our impact in making the offshore wind industry an economic pillar of the Commonwealth.

## 14.4 FACTORS LISTED IN RFP SECTION 2.3.2.I

- 14.4 To the extent not already specified elsewhere in your response, please address the factors listed in RFP Section 2.3.2.i and describe any benefits or impacts associated with the proposed project.

All of the factors listed in Section 2.3.2.i are addressed in this section, as well as in **Sections 10 and 11**.

## 14.5 BENEFITS TO LOW-INCOME RATEPAYERS

- 14.5 Please demonstrate any benefits to low-income ratepayers in the Commonwealth, and the impact, if any, those benefits will have on the cost to the project. Please provide any agreements to effectuate those benefits.

As described in **Section 14.2** above, we are committing over the first ten years of project operations [REDACTED] to the Cape Light Compact JPE, the energy services organization operated by the 21 towns on Cape Cod and Dukes County (Martha's Vineyard). This [REDACTED] will be applied to reducing electric bills for low-income households, specifically those with annual incomes of less than 80 percent of the state median income. Mayflower Wind will fund Cape Light initiatives to optimize customers' energy usage and lower their bills through solar PV, behind-the-meter battery storage, and incentives to switch from heating oil, propane, or electric baseboard heat to high-efficiency cold-climate air source heat pumps.

The goal of the program is to reduce overall energy usage while offsetting increased use of electricity for heat pumps by sourcing that power from renewable energy and providing storage to shave demand at high-cost peaks and bolster home energy resiliency. Cape Light has determined that there are at least 9,849 low-income households on Cape Cod and Martha's Vineyard eligible to participate in the strategic electrification program described above. Based on analysis by Synapse Energy Economics for Cape Light, we expect that every dollar invested by Mayflower Wind in this initiative will drive several dollars of ratepayer benefits for years to come. Specifically, Synapse has determined that the program will generate over [REDACTED] in benefits for low-income households. The program above is memorialized in the Memorandum of Understanding in **Attachment 14.5-1**.

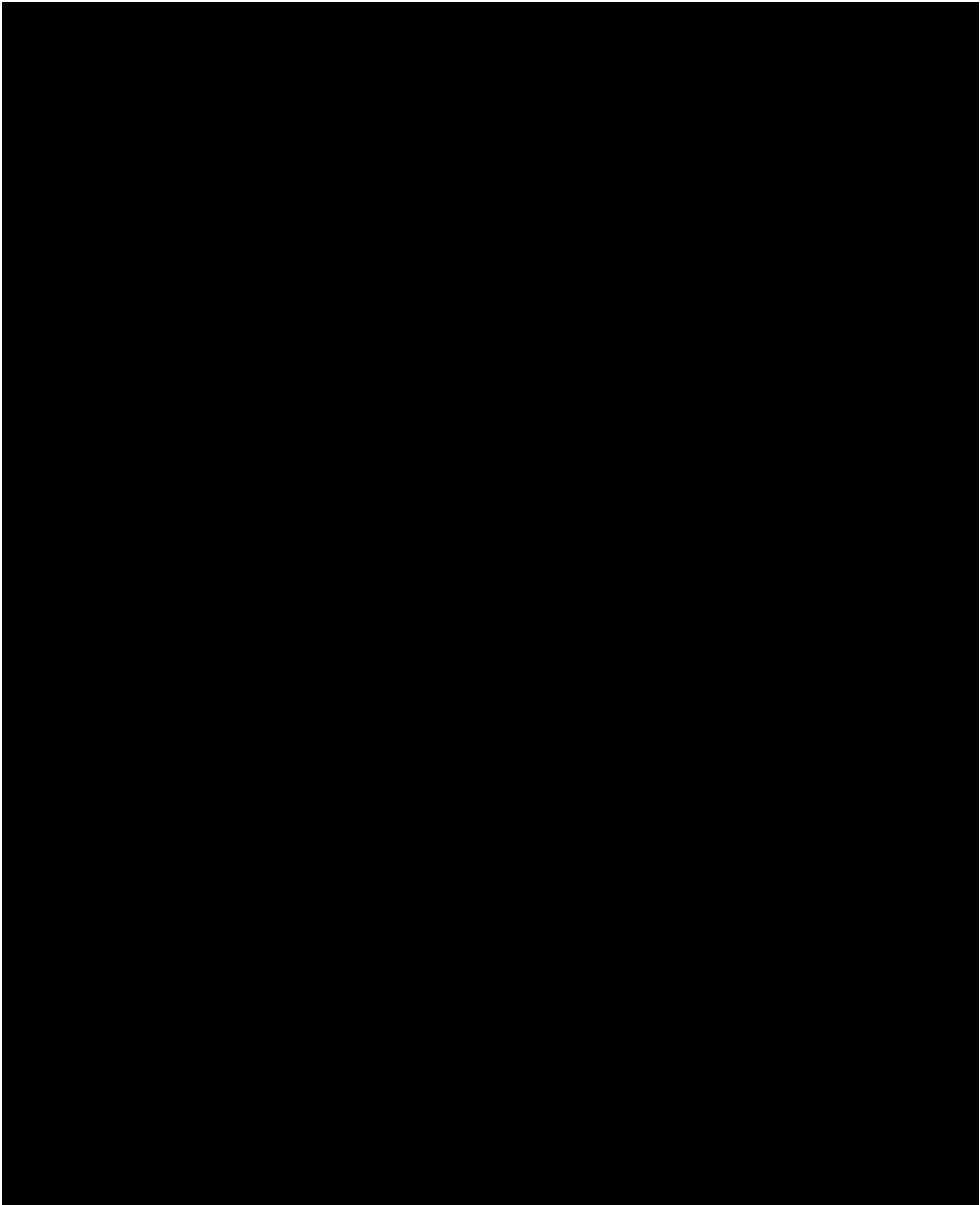
Mayflower Wind is also committed to exploring, separately, if and how we and our staff could assist Cape Light's existing efforts, working with Habitat for Humanity, to build net-zero homes for low-income households.

## SECTION 15 OF APPENDIX A TO THE RFP EXCEPTIONS TO FORM PPA

Please attach an explanation of any exceptions to the Form PPA set forth in Appendices B-1 and B-2. Comments to the proposed Form PPA must include any specific alternative provisions in a redline format to the Form PPA. If the bidder is proposing a two-phased project with each phase covered by a separate contract, the bidder should provide two separate contracts with specific alternative provisions to the Form PPA in redline format.

**Bidders are discouraged from proposing material changes to the Form PPA.**

The PPA redlines, included as Appendices B-1 and B-2 for the National Grid version PPA and the Eversource/Unitil version PPA, respectively propose certain changes for discussion/negotiation between Mayflower Wind and the EDCs. The below is intended as a summary of the material, substantive changes. Please refer to the PPA redlines for the comprehensive proposal of all exceptions to the form PPAs.







## SECTION 16 OF APPENDIX A TO THE RFP EXCEPTIONS TO FORM COMMITMENT AGREEMENT

Please attach an explanation of any exceptions to the Commitment Agreement set forth in **Appendix G**. Comments to the proposed Commitment Agreement must include any specific alternative provisions in a redline format to the Commitment Agreement.

**Bidders are discouraged from proposing material changes to the Commitment Agreement.**