

A photograph of an offshore wind farm with several white wind turbines on a blue sea under a clear blue sky. The turbines are arranged in a line across the horizon.

# APPENDIX *FF*

## AIR TRAFFIC FLOW ANALYSIS

# Beacon Wind Project

AECOM

*Offshore Massachusetts*

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*Air Traffic Flow Analysis*

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Capitol Airspace Group

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## Introduction

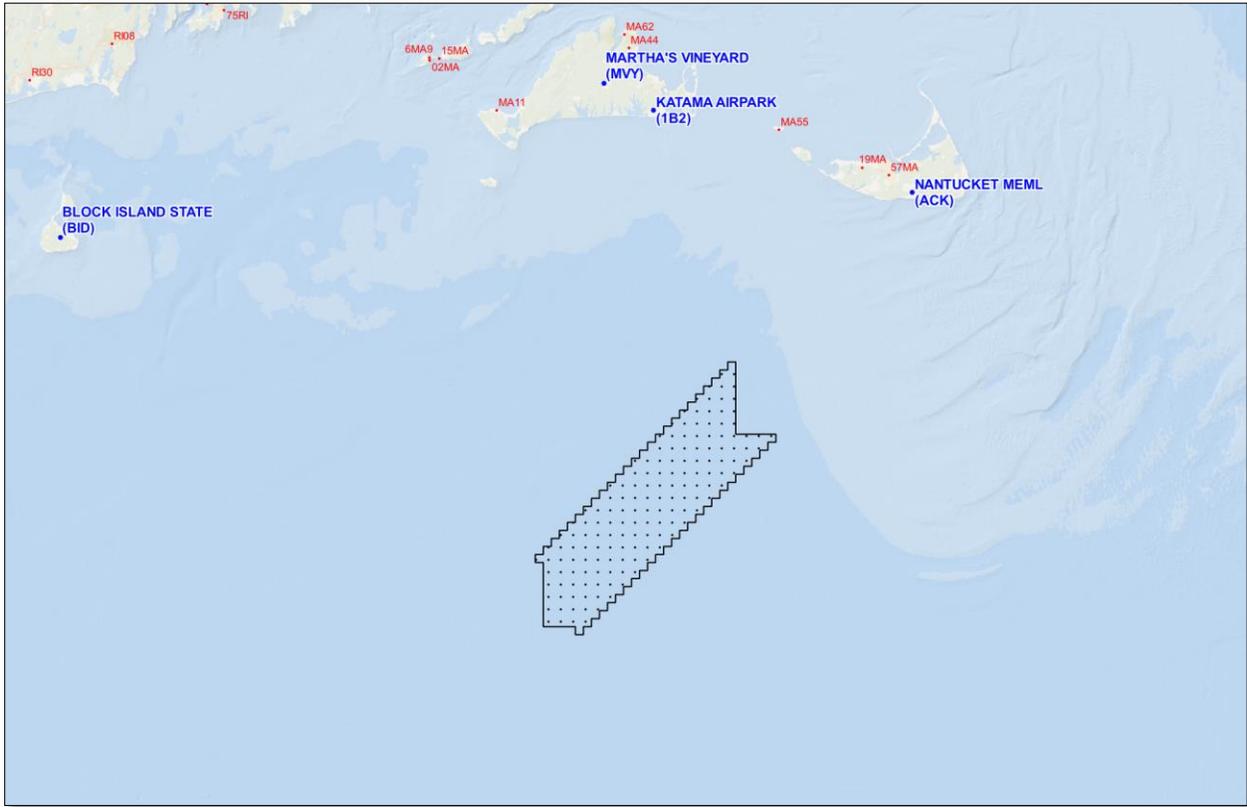
The Federal Aviation Administration (FAA) conducts aeronautical studies to ensure that proposed structures do not affect the safety of air navigation and the efficient utilization of navigable airspace by aircraft. Proposed structures undergoing aeronautical study that exceed obstacle clearance surfaces will be identified as having an adverse effect. If the FAA determines that the adverse effect would impact a significant volume of operations, it could be used as the basis for determinations of hazard. For visual flight rules (VFR) operations the threshold is one flight per day. For instrument flight rules (IFR) operations the threshold is one flight per week.

Capitol Airspace has previously conducted an obstruction evaluation and airspace analysis for the Beacon Wind project (black outline, **Figure 1**). This analysis determined that 1,116-foot tall (340.2 meter) wind turbines<sup>1</sup> (black points, **Figure 1**) would require an increase to Terminal Radar Approach Control (TRACON) minimum vectoring altitudes (MVA). If these IFR impacts would affect as few as one operation per week, it could be used as the basis for determinations of hazard.

In order to determine the number of IFR operations potentially affected by proposed wind turbines, Capitol Airspace conducted an air traffic flow analysis for the Beacon Wind project. This analysis is an assessment of historical flight tracks that can be used to determine the likelihood of airspace impacts affecting a significant volume of future operations.

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<sup>1</sup> This analysis was initiated prior to the Project's PDE reduction. The current maximum PDE is a 1,083 ft (330 meter) turbine.



**Figure 1: Public-use (blue) and private-use (red) airports in proximity to the Beacon Wind project**



## Methodology

Capitol Airspace evaluated FAA National Offload Program (NOP) flight tracks in proximity to the Beacon Wind project for the 2019 calendar year. Flight tracks from the 2019 dataset were assessed since it contained a greater number of flights in the affected airspace than the 2020 dataset. The FAA NOP data contained radar returns associated with flights receiving air traffic control services.<sup>2</sup> Each flight that had at least one radar return within the affected airspace was analyzed for altitude and direction trends to determine its likely operation.

### **Minimum Vectoring Altitudes**

In order to accommodate proposed wind turbines, the FAA must modify MVA sector boundaries or establish isolation areas with an increased MVA. Depending on the type of MVA chart, the modifications would implement either a three or five nautical mile (NM) buffer around wind turbines exceeding the MVA sector's obstacle clearance surface. Flights that maintained one or more specific headings within the affected volume of airspace operated in a manner consistent with receiving radar vectoring services. These flights also maintained or climbed/descended to maintain an altitude within the affected airspace. The historical presence of these flights is an indicator that the required MVA sector modifications could affect future air traffic control operations.

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<sup>2</sup> NOP data excludes certain military flights due to the sensitive nature of some operations.



## Findings

### **Boston Consolidated (A90) TRACON**

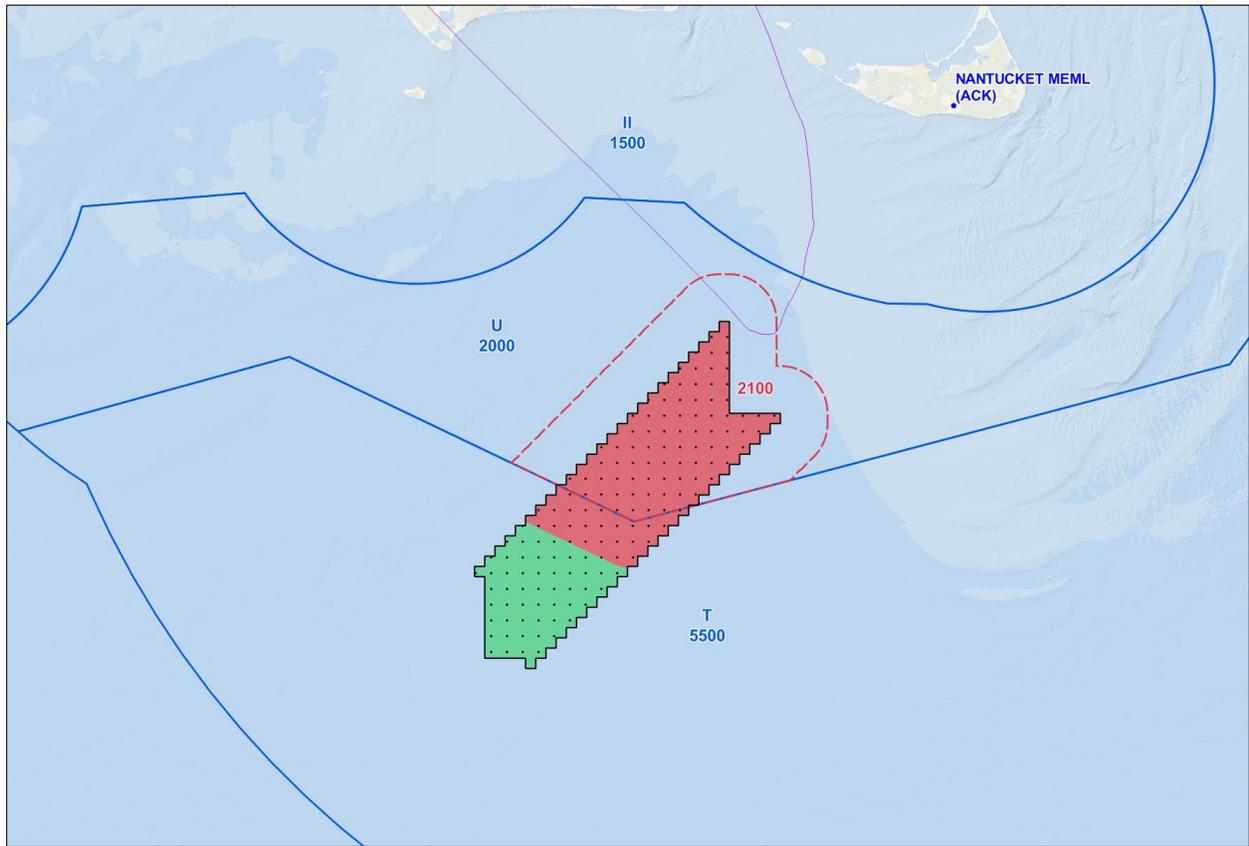
#### *A90\_MVA\_FUS3\_2021*

The Sector U MVA is 2,000 feet above mean sea level (AMSL) and the associated obstacle clearance surface is 1,049 feet AMSL. At 1,116 feet tall (340.2 meter), proposed wind turbines in the central and northern sections of the study area (red area, **Figure 2**), including 105 proposed locations, would exceed this surface. Proposed wind turbines in this area would require an increase to the Sector U MVA from 2,000 to 2,100 feet AMSL.

Flight track data indicates that only one flight (purple track, **Figure 2**) operated within the airspace affected by 1,116-foot tall (340.2 meter) wind turbines (dashed red outline, **Figure 2**). This flight total represents an average of *0.02 flights per week* which is well below the FAA's threshold for a significant volume of operations<sup>3</sup>. Additionally, it is not likely that this flight was receiving radar vectoring services. As a result of these findings, it is possible that Boston Consolidated (A90) TRACON would not object to modifying Sector U to accommodate 1,116-foot tall (340.2 meter) wind turbines.

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<sup>3</sup> If the FAA determines that the adverse effect would impact a significant volume of operations, it could be used as the basis for determinations of hazard. For visual flight rules (VFR) operations the threshold is one flight per day. For instrument flight rules (IFR) operations the threshold is one flight per week.



**Figure 2: Historical flight track (purple) that operated within the 3 NM isolation area required by 1,116-foot tall (340.2 meter) wind turbines (dashed red outline)**

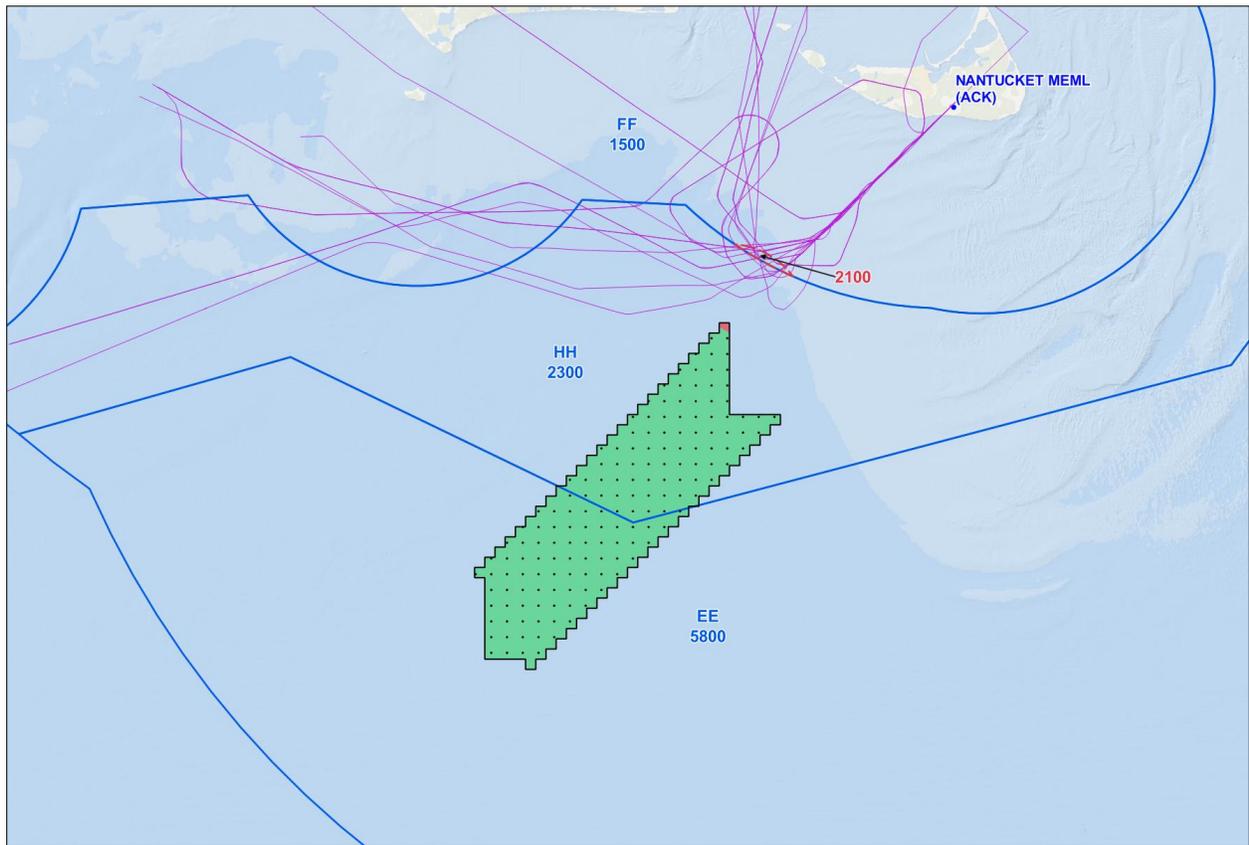


### Boston Consolidated (A90) TRACON - continued

A90\_MVA\_FUS5\_2021

The Sector FF MVA is 1,500 feet AMSL and the associated obstacle clearance surface is 549 feet AMSL. At 1,116 feet tall (340.2 meter), proposed wind turbines in the northern corner of the study area (red area, **Figure 3**) would exceed this surface. Proposed wind turbines in this area would require an increase to the Sector FF MVA from 1,500 feet AMSL to 2,100 feet AMSL. However, none of the proposed wind turbine locations are in this area.

Flight track data indicates that 15 flights (purple tracks, **Figure 3**) operated within the airspace affected by 1,116-foot tall (340.2 meter) wind turbines (dashed red outline, **Figure 3**). This flight total represents an average of *0.29 flights per week* which is well below the FAA's threshold for a significant volume of operations<sup>4</sup>. Additionally, it is not likely that all of these flights were receiving radar vectoring services. As a result of these findings, it is possible that Boston Consolidated (A90) TRACON would not object to modifying Sector FF to accommodate 1,116-foot tall (340.2 meter) wind turbines.



**Figure 3: Historical flight tracks (purple) that operated within the 5 NM isolation area required by 1,116-foot tall (340.2 meter) wind turbines (dashed red outline)**

<sup>4</sup> If the FAA determines that the adverse effect would impact a significant volume of operations, it could be used as the basis for determinations of hazard. For visual flight rules (VFR) operations the threshold is one flight per day. For instrument flight rules (IFR) operations the threshold is one flight per week.



## Conclusion

Capitol Airspace assessed historical FAA radar track data covering the period of one year to determine the number of operations that could be affected by 1,116-foot tall (340.2 meter) wind turbines.

### **Boston Consolidated (A90) TRACON**

#### *A90\_MVA\_FUS3\_2021*

Proposed wind turbines in the central and northern sections of the study area would require an increase to the Sector U MVA from 2,000 to 2,100 feet AMSL. Only one flight (*0.02 per week*) operated within the isolation area required by 1,116-foot tall (340.2 meter) wind turbines. This frequency of operations is well below the threshold for a significant volume of IFR operations (*one per week*).

#### *A90\_MVA\_FUS5\_2021*

Proposed wind turbines in the northern corner of the study area would require an increase to the Sector FF MVA from 1,500 to 2,100 feet AMSL. Only 15 flights (*0.29 per week*) operated within the potential isolation area required by 1,116-foot tall (340.2 meter) wind turbines. This frequency of operations is well below the threshold for a significant volume of IFR operations (*one per week*).

As a result of these findings, it is possible that Boston Consolidated (A90) TRACON would not object to modifying the affected MVA sectors in order to accommodate 1,116-foot tall (340.2 meter) wind turbines. This mitigation option is subject to FAA approval prior to receiving favorable Determinations of No Hazard.

Please contact **Dan Underwood** or **Candace Childress** at (703) 256-2485 with any questions regarding the findings of this analysis.



Photo credit: Matt Goldsmith, Equinor