



BERWICK BANK WIND FARM OFFSHORE ENVIRONMENTAL IMPACT ASSESSMENT

APPENDIX 26: OUTLINE AIDS TO NAVIGATION MANAGEMENT PLAN



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1. INTRODUCTION

1.1. PURPOSE

1. The Aids to Navigation Management Plan (ANMP) has been prepared by RPS and Berwick Bank Wind Farm Limited (BBWFL), a wholly owned subsidiary of SSE Renewables (SSER) Limited hereafter referred to as 'the Applicant', to support the Offshore Environmental Impact Assessment (EIA) Report for the Berwick Bank Wind Farm offshore infrastructure (hereafter referred to as 'the Proposed Development')
2. The ANMP provide the details of the aids to navigation associated with the Proposed Development, in accordance with relevant guidance, during construction and operation. The ANMP is likely to be required through Section 36 Consents and the Marine Licence as consent conditions and therefore will be submitted to MS-LOT for approval

1.2. PROJECT OVERVIEW

3. The Proposed Development is an offshore wind farm located in the outer Firth of Forth and Firth of Tay, approximately 37.8 km east of the Scottish Borders coastline (St. Abb's Head) and 47.6 km to the East Lothian coastline (see Figure 1.1).
4. The Proposed Development covers an area of approximately 1,178.1 km² comprising 1,010.2 km² for the Proposed Development array area and 167.9 km² for the Proposed Development export cable corridor. It comprises up to 307 wind turbines, up to ten OSPs/Offshore converter station platforms and up to eight offshore export cables which extend from the Proposed Development array area to the Skateraw Landfall on the East Lothian coast, and a network of inter-array and interconnector cables.

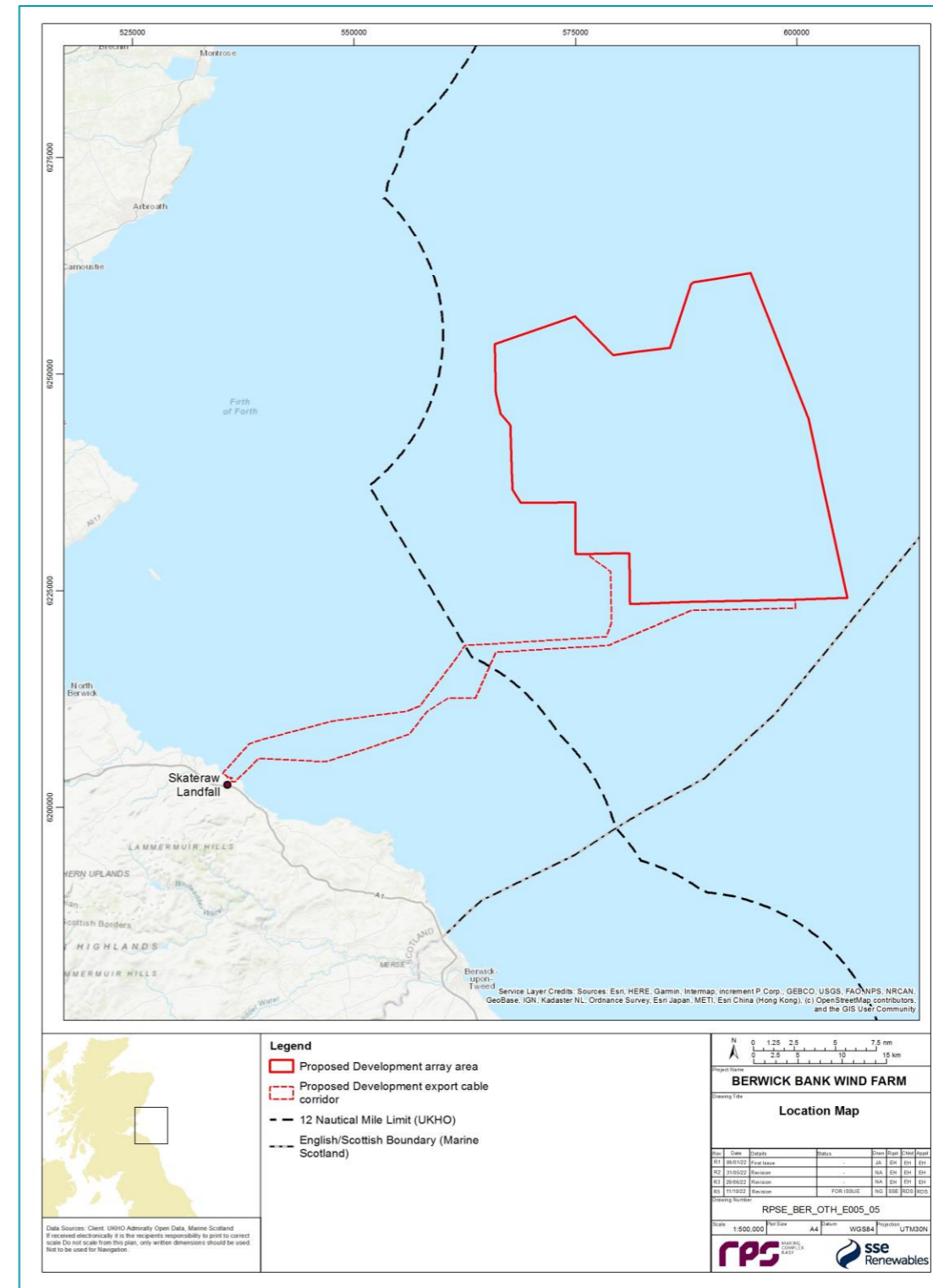


Figure 1.1: Location of the Proposed Development Offshore Infrastructure

1.3. RELEVANT DML CONDITIONS

5. [Additional, and project specific, relevant deemed marine licences (dMLs) information to be included post application, for example the number, purpose and location and the details on dMLs conditions relating to AtoN Management.]

2. MARINE AIDS TO NAVIGATION – CONSTRUCTION PHASE

6. The Navigation Directorate at the Northern Lighthouse Board (NLB) should be contacted with any issues or concerns with Aids to Navigation (AtoN), including contact to sanction or remove AtoN – [email address to be included post application].

2.1. AIDS TO NAVIGATION

7. The following sections summarise the content of the Lighting and Marking Plan (LMP).
8. The construction buoys as illustrated in Figure 2.1 and detailed in Table 2.1 will be established eight weeks prior to construction commencing [number of weeks prior to construction to be confirmed post application]. Section 2.2, as well as Table 2.1, details the lighting for partially and fully constructed structures during the construction phase.
9. The construction buoyage will meet the following standard specifications:
 - [Specifications to be added post application]

Table 2.1: Construction Phase Marks Positions and Specifications [To be Inserted Post Application]

Buoy	ID	Location		Light and Top Mark Specifications
		Latitude (Degrees Decimal Minutes (DDMM.mm))	Longitude (DDDMM.mm)	

2.2. TEMPORARY LIGHTS

10. All construction of partially constructed wind turbines and offshore substation platforms (OSPs)/Offshore convertor station platforms will display [lighting type to be added post application] with the following specifications:
 - [Specifications to be added post application]

2.3. REMOVAL OF TEMPORARY LIGHTS

11. The following text was agreed with NLB in relation to the removal of temporary lights. NLB must be notified before temporary lights are removed [further details to be added post application].

[Construction Buoyage figure to be added post application]

Figure 2.1: Construction Buoyage

3. MARINE AIDS TO NAVIGATION – OPERATION AND MAINTENANCE PHASE

3.1. LIGHTING AND SOUND SIGNALS

- 12. The marine lighting and marking to be implemented for wind turbines during the operation and maintenance phase is summarised in Table 3.1 and presented in Figure 3.1 and is as per the LMP.

Table 3.1: Operation and Maintenance Phase Wind Turbines Marine Lighting and Marking Summary

Lighting and Marking Aspect	Relevant Structures	Specifications	Relevant Guidance
[To be added post application]			

3.1.1. SOUND SIGNALS

- 13. The wind turbines that have sound signals installed (see Table 3.1) will be as per the LMP. [Visibility (fog) metre information to be included post application].

3.2. PAINT MARKING

- 14. The wind turbines and OSPs/Offshore convertor station platforms will be marked as per the LMP. [Summary of wind turbine and OSPs/Offshore convertor station platforms paint marking information to be included post application].

3.3. BUOYAGE

- 15. [Details on buoyage requirements during operation and maintenance agreed with NLB to be included post application (if required by NLB)].



[Operation and Maintenance navigation lighting and marking figure to be added post application]

Figure 3.1: Operation and Maintenance Phase Navigational Lighting and Marking

4. AVIATION LIGHTING

4.1. CONSTRUCTION PHASE

16. [It is noted that there will be no specific aviation lighting and marking implemented during the construction phase, however relevant information for the Proposed Development will be promulgated to aviation stakeholders as required under the relevant Civil Aviation Authority (CAA) guidance [to be confirmed post application].

4.2. OPERATION AND MAINTENANCE PHASE – NORMAL OPERATIONS

17. Aviation lighting to be implemented during normal operations is summarised in Table 4.1 and presented in Figure 4.1. Aviation lighting will be remotely controlled by the Supervisory Control and Data Acquisition (SCADA) system and will be visible at night and turned off during the day¹.

Table 4.1: Aviation Lighting (Normal Operations)

Lighting and Marking Aspect	Relevant Structures	Specifications	Relevant Guidance
[To be added post application]			

4.2.2. OFFSHORE SUBSTATION PLATFORMS

18. As the OSPs/Offshore convertor station platform will be located internally within the Proposed Development array area they will not require any operational aviation warning lights.

4.3. OPERATION AND MAINTENANCE PHASE – SEARCH AND RESCUE

19. Each of the individual aviation Search and Rescue (SAR) lights will be controlled and monitored by the SCADA system. The SAR lights will be turned off by default, during day and night. The SAR lights will be turned on only if required for SAR operations or at the MCA's request. The SAR lights will be dual-purpose for use as green heli-hoist lights to indicate when it is safe to conduct heli-hoist operations. SAR marine lighting and marking to be implemented during the operation and maintenance phase is summarised in Table 4.2 (wind turbines) and Table 4.3 (OSPs/Offshore convertor station platforms).

Table 4.2: Wind Turbine Operation and Maintenance SAR Aviation Lighting

Lighting and Marking Aspect	Relevant Structures	Specifications	Relevant Guidance
[To be added post application]			

Table 4.3: OSPs/Offshore Convertor Station Platforms Operation and Maintenance SAR Aviation Lighting

Lighting and Marking Aspect	Relevant Structures	Specifications	Relevant Guidance
[To be added post application]			

¹ Definition of night/day as per Civil Aviation Publication (CAP) 393 (CAA, 2021) Schedule 1 (Interpretation).

[Aviation Operation and Maintenance lighting to be added post application]

Figure 4.1: Aviation Operation and Maintenance Lighting

5. CUMULATIVE MARKING OF PROPOSED DEVELOPMENT

20. [Details/information regarding cumulative lighting and marking requirements (following discussion with NLB) to be confirmed post application]

6. MAINTENANCE OF AIDS TO NAVIGATION

21. The following subsections summarise the maintenance associated with the AtoN that will be installed at the Proposed Development.

6.1. MONITORING OF AIDS TO NAVIGATION ON STRUCTURES

22. Monitoring of AtoN on structures for both the functionality and availability of AtoN shall be undertaken throughout the construction and operation and maintenance phases. Downtime shall be monitored remotely during the operation and maintenance phase (via the SCADA system) and visually² during the construction phase. From this the overall availability shall be calculated (see section 6.4). Monitoring shall include general maintenance to ensure marine growth etc. does not impact functionality.

6.2. MONITORING OF AIDS TO NAVIGATION ON BUOYAGE

23. During construction, remote monitoring shall alert the operative to the failure of a marine AtoN. Upon discovery of an extinguished AtoN, the emergency procedures outlined in section 7 shall be initiated.

6.3. TESTING

24. Following the commissioning of all marine AtoN, they shall all be tested at least once per annum. Sound signals shall be equipped with functionality whereby they can be manually overridden in order to carry out annual testing.

6.4. AVAILABILITY

25. To assist in meeting the required International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) availability standards of any given marine AtoN, remote monitoring shall be used to ensure that any faults can be rectified as soon as possible.
26. For navigational buoyage visual confirmation shall be undertaken by on-site vessels (where possible).
27. The data collected through remote monitoring of AtoN shall be used to calculate the overall availability of AtoN to ensure that IALA availability standards are being adhered to. Availabilities will be reported to the NLB via their AtoN Reporting Online Portal (<https://nlbhq.nlb.org.uk/latonsonline>).

7. EMERGENCY PROCEDURES

7.1. LOSS OF AIDS TO NAVIGATION

7.1.1. MARINE AIDS TO NAVIGATION

28. Upon discovery of the loss of an AtoN which includes marine navigation lights, fog signals or buoys (or part thereof), the protocol illustrated in Figure 7.1 shall be initiated.

² Undertaken weekly likely be a guard vessel or Crew Transfer Vessel (CTV).

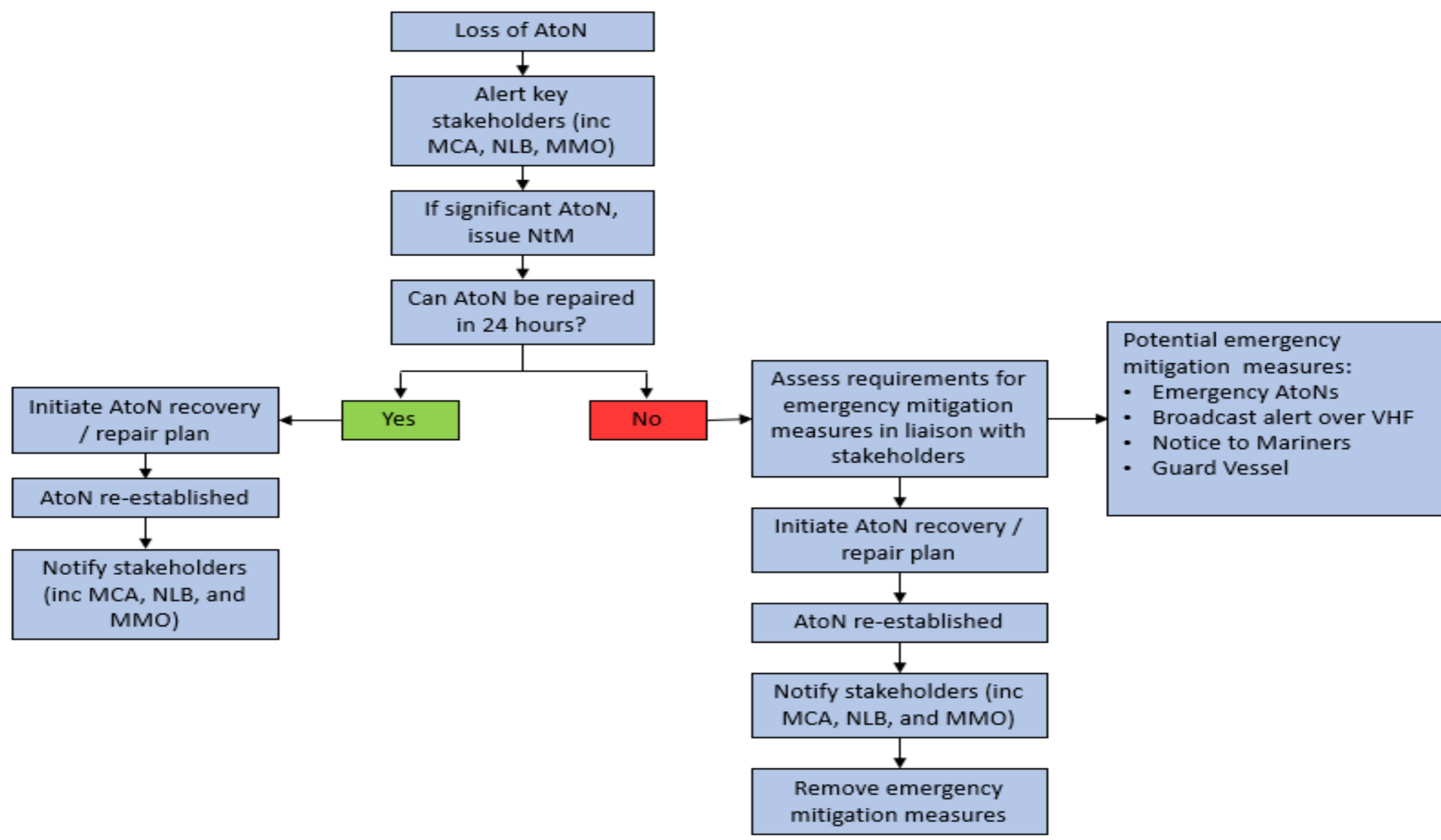


Figure 7.1: Protocol for the Loss of an Aid to Navigation

29. A requirement of AtoN management within United Kingdom (UK) waters is to report navigational failures to the NLB. This is done through the NLB online reporting system (see section 6.4). This is an online database administrated by NLB in order to assist wind farm operators (as the local authority for the wind farm AtoN) to fulfil their responsibility to maintain records of AtoN availability and to provide summaries of these to NLB. This should be undertaken by The Applicant marine coordination centre in the event of any failures or loss of availability.
30. In the rare event of a significant loss of one or more AtoN, a guard vessel may be required to maintain navigational safety. Section 7.2 provides an indicative list of the trigger points that would require the Applicant to liaise with the NLB and potentially implement additional emergency mitigations which may also require informing the MCA.

7.2. GUARD VESSEL TRIGGER POINTS

31. It is the responsibility of the operator to maintain the AtoN and provide any back-up solutions in the event of an AtoN failure. This will include:
 - repair of a broken AtoN;
 - replacement of a lost AtoN; and
 - provision of a guard vessel.
32. Table 7.1 summarises the Emergency Mitigation Measure Provision Agreement in place, which identifies the party that will be responsible for the repair or replacement of AtoN (including those on structures and navigational buoys).

Table 7.1: Summary of Emergency Mitigation Measures

Emergency Mitigation Measure	Organisation Responsible for Providing the Required Mitigation Measure	Address	Relevant Contact Details		Service Provision
			Phone	Fax	
[To be added post application]					

33. The following list summarises trigger points which have been deemed to require consultation with the NLB in which further mitigation may be required should a key navigational aid fail. These trigger points are in line with those identified for Berwick Bank Wind Farm in consultation with the NLB. It should be noted that the following list of trigger points is not intended to be exhaustive but is to provide broad expectations for the requirement of additional protection measures to be taken.
 - loss of key (i.e., Significant Peripheral Structure (SPS)) navigational light (navigational mark or fixed structure) for greater than 72 hours;
 - failure of sound signal for greater than 120 hours;
 - loss of station of cardinal navigational mark, including significant delay (greater than 72 hours) to it being restored;
 - AtoN repeatedly failing to meet IALA availability standards;

- deployment of an emergency buoy due to an unmarked hazard within the Proposed Development array area or along the offshore export cable route (the guard vessel would be required to monitor vessel awareness of the buoy and may then be demobilised); and
- throughout significant maintenance works where an increase in navigational risk is posed (i.e., should a key SPS light have to be removed due to wind turbine maintenance).

7.3. AVIATION LIGHTING

34. The Air Navigation Order (ANO) states “in the event of the failure of any light which is required by this article to be displayed by night the person in charge must repair or replace the light as soon as reasonably practicable.”
35. It is accepted that there may be occasions when meteorological or sea conditions prohibit the safe transport of personnel for repair tasks. Furthermore, there may be fault conditions that are wider ranging and would take longer to diagnose or repair. In such cases, international standards and recommended practices require the issue of a Notice to Airmen (NOTAM).
36. The CAA’s Directorate of Airspace Policy considers the operator of an offshore wind farm as an appropriate person for the request of a NOTAM relating to the lighting of their wind farm. Should the anticipated outage be greater than 36 hours, the Applicant shall request a NOTAM to be issued by informing the NOTAM section of the UK Aeronautical Information Service as soon as possible via the CAA’s Airspace Regulation – **AROps@caa.co.uk/0207 453 6599**.
37. Upon completion of the remedial works, the Aeronautical Information Service shall be notified as soon as possible to enable a cancellation to be issued.
38. If an outage is expected to last longer than 14 days, then the CAA shall also be notified directly to discuss any issues that may arise and longer-term strategies.
39. In order to expedite the dissemination of information during active aviation operations the Applicant may also establish a direct communication method with aviation operators in the area. The information provided shall be the same as the information provided in the NOTAM and where possible include a NOTAM reference.

8. DECOMMISSIONING

40. The lighting and marking requirements throughout the decommissioning phase have not yet been finalised, i.e., what navigational lights shall be employed. However, it is agreed that the required lighting and marking of the Proposed Development during, and following decommissioning, shall be agreed in consultation with the NLB and the CAA at least six months prior to the decommissioning works.



9. REFERENCES

CAA (2021). *CAP 393 Regulations Made Under Powers in the Civil Aviation Act 1982 and the Air Navigation Order 2016*. London: CAA.

