WEST OF ORKNEY WINDFARM

Offshore EIA Report, Volume 3, Outline Plan 5: Outline Aids to Navigation Plan

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Approved by S. Kerr
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West of Orkney Windfarm

Values Teamwork Empowerment Commitment

Document Role

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OWPL Revision History

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1	16/06/2023	Issued for review
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Revision Record

Revision Number	Revised Section	Description of Changes
2	Throughout	Addressing comments on revision 1.
3	Throughout	Finalisation of document for use.

Contents

Summary

This outline Aids to Navigation Management Plan (ANMP) has been prepared by Offshore Wind Power Limited (OWPL), hereafter referred to as 'the Developer' to support the Offshore Environmental Impact Assessment (EIA) Report for the West of Orkney Windfarm offshore infrastructure (hereafter referred to as 'the offshore Project').

The purpose of this outline ANMP is to provide details of the Aids to Navigation (AtoN), including maintenance and repair of AtoN, associated with the offshore Project, in accordance with relevant guidance, during construction and operation and maintenance. Once approved, the ANMP will represent a 'live document' and will be revised as relevant to ensure the information is kept up to date, at intervals agreed with Scottish Ministers.

This outline ANMP covers the following:

- Section 1 – Introduction;
- Section 2 - Project background;
- Section 3 – Consultation;
- Section 4 – Marine Aids to Navigation;
- Section 5 - Aviation Lighting;
- Section 6 - Maintenance of Aids To Navigation;
- Section 7 - Emergency procedures;
- Section 8 – Decommissioning;
- Section 9 – References;
- Section 10 – Abbreviations; and
- Section 11 – Glossary of terms.

All Developer personnel, Contractors and Subcontractors involved in the offshore Project must comply with the ANMP.

The location of copies of the ANMP is yet to be determined but will likely include:

- The West of Orkney Windfarm Office;
- All Site offices (including Contractors and Subcontractors); and
- All construction, operation, and maintenance vessels.

1. Introduction

1.1 Purpose

The Outline Aids to Navigation Management Plan (ANMP) has been prepared by Xodus Group (Xodus) and Anatec on behalf of Offshore Wind Power Limited (OWPL) hereafter referred to as 'the Developer', to support the Offshore Environmental Impact Assessment (EIA) Report for the offshore elements of the West of Orkney Windfarm hereafter referred to as 'the offshore Project'. As this is an outline document, further information will be provided post-consent.

The information provided in this document is based on the current understanding of the baseline environment and how the offshore Project will be constructed and operated using the best available technologies, in compliance with current legislation and best practice at the time of writing. Information contained within this document is accurate at the time of submission and will be reviewed as required and updated if necessary.

1.2 Objectives

The ANMP provides details of the Aids to Navigation (AtoN), including maintenance and repair of AtoN, associated with the offshore Project, in accordance with relevant guidance, during construction and operation and maintenance. The ANMP is anticipated to be required through the Section 36 Consent and Marine Licences as consent conditions and therefore will be submitted to Marine Directorate – Licensing Operations Team (MD-LOT) for approval. This plan will be developed in accordance with relevant guidelines and the best practice including:

- International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) R139 Recommendations on the Marking of Man-made Offshore Structures (IALA, 2021 (a)) and G1162 Guidance on the Marking of Man-made Offshore Structures (IALA, 2021 (b));
- Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 and Annexes – Offshore Renewable Energy Installation (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021); and
- Article 223 of the Air Navigational Order 2016 (as amended) (UK Government, 2016).

Decommissioning of the offshore Project will be under a separate Marine Licence. Details of AtoN for the decommissioning stage of the offshore Project are yet to be finalised, this plan will be updated ahead of decommissioning and in line with any conditions of the relevant consent and the approved Decommissioning Programme.

1.3 Consent compliance

The ANMP fulfils the consent conditions for the preparation of a ANMP as outlined in Table 1-1. Details of where in this document specific requirements of the consent conditions are addressed are also provided in Table 1-1.

Table 1-1 Consent Conditions Relevant to the ANMP

Consent reference	Condition	Relevant section
[To be added post-consent]		

1.4 Relevant other documents and plans

This ANMP provides details of the marine aids to navigation for the offshore Project. It will form part of a set of approved documents (which includes other consent plans required under the offshore consents) that provides the framework for the construction and operation and maintenance stages of the offshore Project.

The connection of this ANMP with other consent plans listed in the offshore consent conditions is detailed in Table 1-2 below.

Table 1-2 Links with other consent plans

Consent plan / document	Linkage with AtoN plan
[To be added post-consent]	

1.5 Structure of the plan

This ANMP has the following outline structure:

- Section 1 – Introduction;
- Section 2 - Project background;
- Section 3 – Consultation;
- Section 4 – Marine Aids to Navigation;
- Section 5 - Aviation Lighting;
- Section 6 - Maintenance of Aids To Navigation;
- Section 7 - Emergency procedures;
- Section 8 – Decommissioning;
- Section 9 – References;
- Section 10 – Abbreviations; and
- Section 11 – Glossary.

1.6 Location of the plan

Details on where copies of the ANMP are located will be included within the final ANMP. At this stage, it is envisaged that copies will be located at:

- The West of Orkney Windfarm Office;
- All Site offices (including Contractors and Subcontractors); and
- All construction, operation, and maintenance vessels.

1.7 Document control

It is acknowledged that there may be a requirement for the ANMP to be revised and updated on occasion throughout each stage of the offshore Project (construction, operation and maintenance), to ensure the information is kept up to date. Any revisions will be submitted to MD-LOT. In general, as approved documents and plans are updated, there will be a review of inter-linkages with other consent plans to ensure these are also updated as relevant. The Developer has ultimate responsibility for ensuring that Health, Safety and Environment (HSE) related documents are revised in accordance with the relevant timescales.

2. Project background

The Developer, is proposing the development of the West of Orkney Windfarm ('the Project'), an Offshore Windfarm (OWF), located at least 23 kilometres (km) from the north coast of Scotland and 28 km from the west coast of Hoy, Orkney.

The offshore Project will comprise of Wind Turbine Generators (WTGs) and all infrastructure required to transmit the power generated by the WTGs to shore. The key offshore components of the offshore Project will include:

- Up to 125 WTGs with fixed-bottom foundations (monopile, piled jacket or suction bucket jacket);
- Up to five High Voltage Alternating Current (HVAC) Offshore Substation Platforms (OSPs);
- Up to 500 km of inter-array cables;
- Up to 150 km of interconnector cables; and
- Up to five offshore export cables to landfalls at Greeny Geo and/or Crosskirk at Caithness, with a total length of up to 320 km (average of 64 km per offshore export cable).

The offshore Project boundary (Figure 2-1) includes the array area and the offshore Export Cable Corridor (ECC). Therefore, the offshore Project boundary encompasses:

- Option Agreement Area (OAA) – where the WTGs and associated foundations and supporting structures, inter-array cables, interconnector cables, the OSPs (including offshore export cable connections) will be located;
- Offshore ECC – within which the offshore export cables will be located; and
- Landfall (up to Mean High Water Spring (MHWS)) – where the offshore export cables come ashore and interface with the onshore Project.

[Section to be updated post-consent with final details of offshore Project]

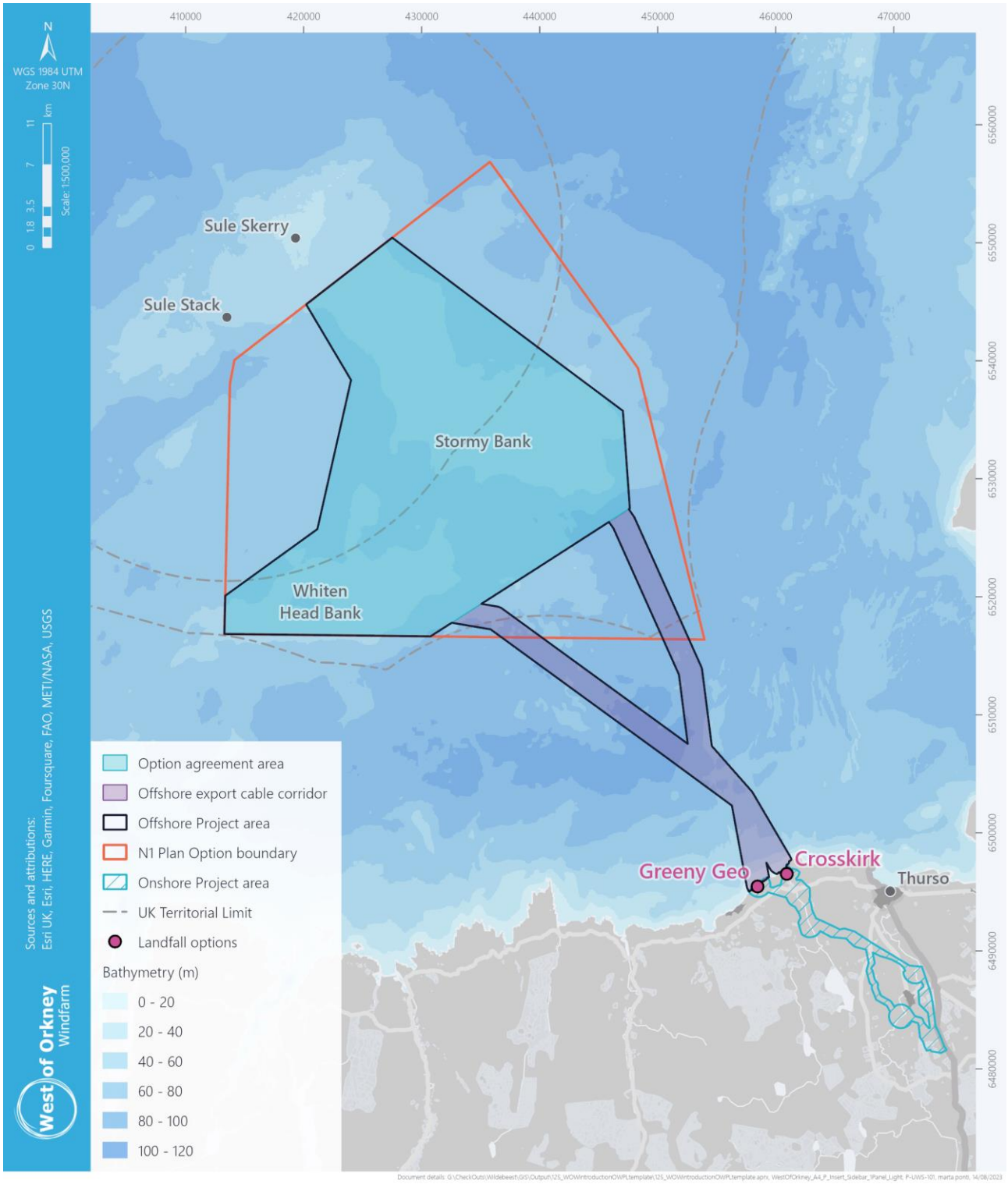

Figure 2-1 Offshore Project boundary

3. Consultation

Details of the consultation that will be held to inform the ANMP will be described in this section post-consent.

4. Marine Aids to Navigation

The Navigation Directorate at the Northern Lighthouse Board (NLB) will be contacted by the Developer through the AtoN Reporting system with any requirements or notifications in relation to AtoN, including contact to sanction or remove AtoN, and to report availability [email address to be included post-consent].

4.1 Construction

The following sections summarise information on AtoN and lighting during the construction stage. The information provided is in line with the content of the Outline Lighting and Marking Plan (LMP) (see Outline Plan (OP) 6: Outline Lighting and Marking Plan) [Further information will be provided post-consent and when the LMP is finalised].

4.1.1 Aids to Navigation

The construction buoys as illustrated in Figure 4-1 and detailed in Table 4-1 will be established prior to construction commencing [number of weeks prior to construction to be confirmed post-consent]. The construction buoyage will meet the following standard specifications:

[Specifications to be added post-consent]

Table 4-1 Construction stage wind turbines marine lighting and marking summary

Buoy	ID	Location		Light and top mark specifications
		Latitude	Longitude	
[To be added post-consent]				

4.1.2 Temporary lights

4.1.2.1 Placement

Partially constructed wind turbines and OSPs, and completed structures prior to NLB sign off will display [lighting type to be added post consent] with the following specifications:

[Specifications to be added post-consent]

4.1.2.2 Removal of temporary lights

NLB must be notified before temporary lights are removed. [Further details will be added post-consent].

[Hold for figure to be added post-consent]

Figure 4-1 Construction buoyage

4.2 Operation and maintenance

The following sections summarise information on AtoN, lighting and marking during the operation and maintenance stage. The information provided is in line with the content of the Outline LMP (see OP6: Outline Lighting and Marking Plan). [Further information will be provided post-consent when the LMP is finalised].

4.2.1 Lighting and sound signals

The marine lighting and marking to be employed for wind turbines during the operation and maintenance stage of the offshore Project are detailed in Table 4-2 and presented in Figure 4-2.

Table 4-2 Operation and Maintenance stage Wind Turbines Marine Lighting and Marking Summary

Requirement	Guidance document	Offshore structure	Details
Lighting	[to be completed post-consent]	[to be completed post-consent]	[to be completed post-consent]
Marking	[to be completed post-consent]	[to be completed post-consent]	[to be completed post-consent]
Hazard Warning Signals	[to be completed post-consent]	[to be completed post-consent]	[to be completed post-consent]

4.2.2 Paint marking

The wind turbines and OSPs will be marked as per the LMP.

[Summary of WTG and OSPs platform paint marking information to be included post-consent].

4.2.3 Aids to Navigation

[If required by NLB details of buoyage requirements during the operation and maintenance stage of the offshore Project will be included here post-consent].

[Hold for figure to be added post-consent]

Figure 4-2 Navigational lighting and marking for the operation and maintenance stage of the offshore Project

5. Aviation lighting

5.1 Construction

There will be no specific aviation lighting and marking during the construction stage of the offshore Project. Any temporary obstacles, associated with the pre-assembly port (where WTGs, foundations and other infrastructure will be stored, part-assembled and transported to the OAA) or within the OAA of more than 91.4 m in height (e.g. construction infrastructure such as cranes), will be alerted to the aviation community by means of the Notice to Airmen (NOTAM) system.

The Developer will circulate the relevant information to the appropriate aviation authorities and stakeholders prior (e.g., Highlands and Islands Airports Limited (HIAL) and Civil Aviation Authority (CAA)) to and during the construction stage [to be confirmed post-consent].

5.2 Operation and maintenance

The following sections summarise information on lighting and marking during the operation and maintenance stage. The information provided is in line with the content of the Outline LMP (see OP6: Outline Lighting and Marking Plan). [Further information will be provided post-consent when the LMP is finalised].

5.2.1 Normal operations

Table 5-1 and Figure 5-1 present details of the aviation lighting to be implemented during the normal operation of the offshore Project. Aviation lighting will be remotely controlled by the Supervisory Control and Data Acquisition (SCADA) system.

Table 5-1 Aviation lighting during normal operation of the offshore Project

Lighting and marking aspect	Relevant structures	Specifications	Relevant guidance
[To be added post-consent]			

5.2.2 Search and rescue

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 (definition of night/day as per Civil Aviation Publication (CAP) 393 (CAA, 2021) Schedule 1 (Interpretation). SAR lights will only be turned on at the MCAs request or if required for SAR operations. SAR lights may be dual function 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 stage of the offshore Project is summarised in Table 5-2 and Table 5-3.

Table 5-2 Wind turbine operation and maintenance SAR aviation lighting

Lighting and marking aspect	Relevant structures	Specifications	Relevant guidance
[To be added post-consent]			

Table 5-3 OSPs/Offshore Converter Station Platforms operation and maintenance SAR aviation lighting

Lighting and marking aspect	Relevant structures	Specifications	Relevant guidance
[To be added post-consent]			

[Hold for figure to be added post-consent]

Figure 5-1 Aviation lighting during operation and maintenance of the offshore Project

6. Maintenance of Aids to Navigation

The following sections detail any required maintenance associated with the AtoN that will be installed at the offshore Project. It is the responsibility of the Developer or windfarm Operator to maintain the AtoN.

6.1 Monitoring

6.1.1 Aids to Navigation on structures

AtoN on offshore Project structures will be monitored during construction, operation and maintenance for functionality and availability.

SCADA will be used to monitor downtime during the construction stage of the offshore Project. During the operation and maintenance stage downtime will be monitored visually by a Project vessel (e.g. guard vessel) on a weekly basis. [Details to be confirmed post-consent].

This monitoring will allow the determination of overall availability (see section 6.3). Monitoring shall include general maintenance to ensure functionality is not impacted.

6.1.2 Aids to Navigation - buoyage

During construction of the offshore Project, 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.

6.2 Testing

Once commissioned, all AtoN will be tested at least once annually, including sounds signals.

6.3 Availability

In order to meet the required IALA availability standards of any given marine AtoN, remote monitoring shall be used to ensure that any faults are resolved as soon as possible and that overall availability standards are adhered to. For navigational buoyage visual confirmation of availability will also be undertaken by on-site vessels (where possible). 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

Any AtoN failure will be reported by the Developer or windfarm Operator to the NLB. 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 utilised.

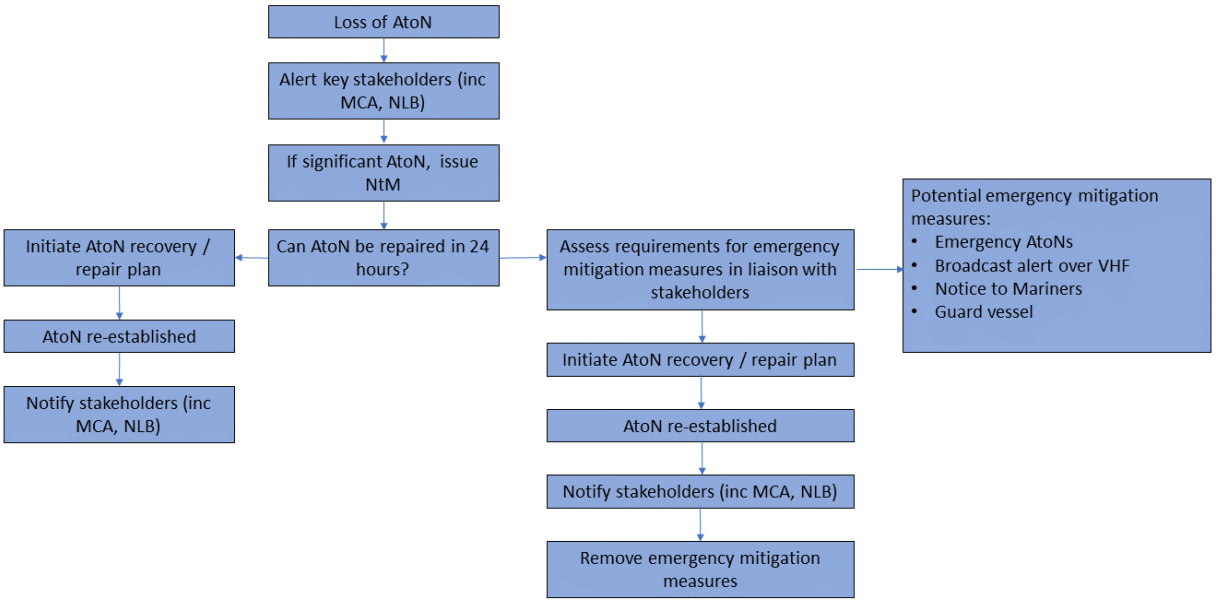

Figure 7-1 Protocol to be employed for the loss of an AtoN

7.1.2 Guard vessel trigger points

It is the responsibility of the windfarm Operator to maintain the AtoN and provide any required back-up solutions in the event of an AtoN failure. This could include:

- Repair of a broken AtoN;
- Replacement of a lost AtoN; and
- Provision of a guard vessel.

Guard vessels can be deployed to mark hazards, provide temporary navigational aids, or assist vessels in navigating through areas where AtoN are not functioning. The specific circumstances and criteria for deploying guard vessels would depend on the nature and severity of the AtoN failure, as well as the potential impact on maritime safety and other factors e.g., metocean conditions at the time. Consultation would be undertaken with the NLB and the MCA to assess the situation and make the decision to deploy guard vessels accordingly.

Details of the emergency mitigation measures which will be in place, including the party that will be responsible for the repair or replacement of AtoN (including those on structures and navigational buoys) are presented in Table 7-1.

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-consent]					

7.1.3 Aviation lighting

Article 223 (7) of the Air Navigation Order 2016 (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.” It is accepted that in the case of Offshore Obstacles there may be occasions when meteorological or sea conditions prohibit the safe transport of staff for repair tasks. In such cases International Standards and Recommended Practices require the issue of a NOTAM. The CAA considers the Operator of an OWF is responsible for the request of a NOTAM relating to the lighting of their windfarm. Should the anticipated outage be greater than 36 hours, the windfarm Operator shall request a NOTAM to be issued by informing the NOTAM section (operating 24 hours) of the UK Aeronautical Information Service (AIS) by telephoning +44 (0) 20 8750 3773/3774 as soon as possible. AIS will copy the details of the NOTAM to the windfarm operator and to the CAA.

Once any remedial works are completed the UK AIS shall be notified as soon as possible to enable a cancellation to be issued. 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.

8. Decommissioning

The requirements for lighting and marking in the decommissioning stage of the Offshore Project are yet to be finalised. The requirements will be discussed and agreed with the NLB and the CAA at least six months prior to decommissioning commencing.

9. References

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

IALA (2021a). G1162 the marking of offshore man-made structures. Available online at: https://www.iala-aism.org/product/g1162/ [Accessed 31/08/2023].

IALA (2021b). R0139 the marking of offshore manmade structures, Available online at: https://www.iala-aism.org/product/r0139/ [Accessed 31/08/2023].

MCA (2021). Marine Guidance Note (MGN) 654 and Annexes – Offshore Renewable Energy Installation (OREIs) –Guidance on UK Navigational Practice, Safety and Emergency Response

UK Government (2016). Article 223 of the Air Navigational Order 2016 (as amended) (UK Government, 2016).

10. Abbreviations

Acronym	Definition
AIS	Aeronautical Information Services
AtoN	Aid to Navigation
ANMP	Aids to Navigation Management Plan
ANO	Air Navigation Order
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
EIA	Environmental Impact Assessment
ECC	Export Cable Corridor
HIAL	Highlands and Islands Airports Limited
HVAC	High Voltage Alternating Current
HSE	Health Safety and Environment
IALA	The International Association of Marine Aids to Navigation and Lighthouse Authorities
km	kilometre
LMP	Lighting and Marking Plan
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate - Licensing Operations Team
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
NLB	Northern Lighthouse Board
NOTAM	Notice to Airmen
OAA	Option Agreement Area
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OWF	Offshore Windfarm
OWPL	Offshore Wind Power Limited
SAR	Search and Rescue
SCADA	Supervisory Control and Data Acquisition
WTG	Wind Turbine Generator

11. Glossary of terms

Term	Definition
[to be included post-consent]	

West of Orkney
Windfarm