Annex P Application for Planning Permission for the Proposed Development ACP Case Ref. ABP-319864-24, EIAR Volume III - Appendix 15.2: Shipping and Navigation Safety Justification (Revised March 2026)



Arklow Bank Wind Park 2

Environmental Impact Assessment Report

Volume III, Appendix 15.2: Shipping and Navigation Safety Justification (RFI March 2026)

sse Renewables

Arklow Bank Wind Park 2
SAR Safety Justification

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Abbreviations Table

Abbreviation	Definition
ABWP1	Arklow Bank Wind Park 1
ABWP2	Arklow Bank Wind Park 2
ACP	An Coimisiún Pleanála
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
ALB	All-Weather Lifeboat
BBC	British Broadcasting Corporation
CCTV	Closed Circuit Television
COLREGs	Convention on the International Regulations for Preventing Collisions at Sea
CRBI	Community Rescue Boats Ireland
CTV	Crew Transfer Vessel
DMR	Digital Mobile Radio
DoT	Department of Transport
DVE	Degraded Visual Environment
EEZ	Exclusive Economic Zone
ERCoP	Emergency Response Cooperation Plan
ERP	Emergency Response Plan
FRB	Fast Rescue Boat
FSA	Formal Safety Assessment
HMCG	His Majesty's Coastguard
HNS	Hazardous and Noxious Substances
HTAWS	Helicopter Terrain Awareness Warning System
ID	Identification
IFR	Instrument Flight Rules
ILB	Inshore Lifeboat
IMO	International Maritime Organization
IRCG	Irish Coast Guard
LoD	Limit of Deviation
LTE	Long Term Evolution
m	Metre

Abbreviation	Definition
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MOB	Man Overboard
MRCC	Marine Rescue Coordination Centre
nm	Nautical Mile
NMOC	National Maritime Operations Centre
NVG	Night Vision Goggles
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OT	Operational Technology
OWF	Offshore Wind Farm
PLB	Personal Locator Beacon
POD	Probability of Detection
RIB	Rigid Inflatable Boat
RNLI	Royal National Lifeboat Institution
ROV	Remotely Operated Vehicle
SAR	Search and Rescue
SCADA	Supervisory Control and Data Acquisition
SLoO	Single Line of Orientation
SOLAS	International Convention for the Safety of Life at Sea
SOV	Service Operations Vessel
SPL	Sure Partners Limited
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
US	United States
UXO	Unexploded Ordnance
VFR	Visual Flight Rules
VTS	Vessel Traffic Service
WTG	Wind Turbine Generator

1 Introduction

Sure Partners Limited (SPL) (hereafter 'the Developer'), a wholly owned subsidiary of SSE plc (SSE), is the developer of Arklow Bank Wind Park 2 (ABWP2), a planned Offshore Wind Farm (OWF) located in Irish waters off the coast of County Wicklow. The offshore components of ABWP2 are hereafter referred to as the Proposed Development. The Proposed Development's planning permission application seeks consent for 2 two different Wind Turbine Generator (WTG) rotor diameters ('Project Design Option 1' and 'Project Design Option 2').

The Department of Transport (DoT) Guidance on Safety of Navigation & Emergency Response: Offshore Renewable Energy Installations (OREI) (DoT, 2025a) states that *"In compliance with safety of navigation and search and rescue requirements developers of every offshore renewable energy project with ~ surface piercing devices should undertake a thorough appraisal of the safety benefits afforded by two consistent lines of orientation and based on this, either implement such layouts or, where appropriate, consider alternatives".*

Following detailed consideration of the site conditions for the Proposed Development, including consideration of numerous WTG layouts for each Design Option, it was determined that consideration of alternatives to two lines of orientation was required and therefore both layout options have sections where only a Single Line of Orientation (SLoO) is available.

In line with the DoT Guidance (DoT, 2025a) a Safety Justification is required to support the planning application given the guidance states "*The DoT will not consider any layout proposals with just one line of orientation, without supporting documentation which fully justifies the proposed layout to the satisfaction of the DoT".*

This Search and Rescue (SAR) Safety Justification has therefore been prepared by the Developer for the IRCG to demonstrate that in the case of the Proposed Development, hazards associated with emergency response for a SLoO layout are As Low As Reasonably Practicable (ALARP). The SAR Safety Justification builds on work conducted as part of the Navigation Risk Assessment and the mitigations identified as part of that process.

This SAR Safety Justification will consider risk relating to the IRCG remit of emergency response and not general navigation safety.

The SAR Safety Justification structure and key aims and objectives are as follows:

- Explanation as to why a SLoO is required i.e., why a grid layout is not possible (Section 1.1).
- Description of the SAR Safety Justification process (Section 1.2).
- Profiles of key Authors (Section 1.3).
- Overview of the relevant guidance and risk assessment methodology (Section 2).
- Project description (Section 3).
- Identification of likely users of the Array Area i.e., potential casualties that may require emergency response (Section 4).

- Risk assessment (Section 5):
  - Identification of potential scenarios resulting in a need for emergency response.
  - Mitigations.
  - Risk assessment Formal Safety Assessment (FSA).
- Conclusion and ALARP statement (Section 6).

The following supporting appendices are also included:

- Appendix A: SAR Lane coverage and Operations.
- Appendix B: SAR Supporting Operational Technology Systems.
- Appendix C: Precedent examples of OWF vessels assisting in emergency response incidents.

1.1 Overview of Need for Alternative Layout – a Single Line of Orientation

The proposed layouts have been developed through consideration of geological features, ground conditions, constraints (such as available water depth for installation vessels), the narrow width of the Array Area and environmental considerations such as avoidance of archaeological exclusion zones.

As part of early layout assessment work, the Developer began by looking at various layout options and determined that the site conditions, constraints and turbine spacing requirements meant a regular grid layout was not achievable. Furthermore the achievable viable layouts do not facilitate two consistent lines of orientation, hence a SLoO layout is therefore required. Further details on this have been provided to the Irish Coast Guard (IRCG) in previous meetings notably in April 2024, and therefore these have not been repeated within this document.

1.2 Layout Process – Now and Post Consent

This SAR Safety Justification has been prepared on the basis of the revised Project Design Option 1 and Project Design Option 2 layouts included in the Developer's submission to An Coimisiún Pleanála (ACP) in response to the Request for Further Information (ACP, 2025) issued on the 10th April 2025.

These layouts have evolved from those presented in the Developers initial planning application dated 4th June 2024 so as to take on board specific feedback made by the IRCG via their observations on the planning applications and so as to facilitate refinement/improvement of SAR aspects facilitated by additional site characterisation data. Changes to layouts for each of the Design Options are summarised as follows:

- Design Option 1:
  - Reduction in the number of WTGs from 56 to 53 improving SAR access.
  - Repositioning of both OSPs so as align with WTGs, opening up SAR lanes to their north and south (as requested by the IRCG).

    - Repositioning to some WTGs to facilitate additional SAR lanes.
- Design Option 2:
    - Repositioning of both OSPs so as align with WTGs, opening up SAR lanes to their north and south (as requested by the IRCG).
    - Repositioning to some WTGs to facilitate additional SAR lanes.

The Developer has sought in its planning application the ability of move each offshore infrastructure position by up to 100m through use of a Limit of Deviation (LoD) i.e., a radius within which the Developer can move a structure from its intended position. A LoD is necessary due to the possibility of:

- Additional site investigation work pre-construction identifying additional site constraints;
- Unforeseen on-site circumstances during foundation installation;
- Installation tolerances.

For this reason, the SAR Safety Justification is considered a live document that may require updates should layout positions change. Further details of LoD are provided in Section 3.1.2, and it is noted that commitments have been made to reduce the impact of LoD on SAR lane widths.

1.3 Profiles of Authors

1.3.1 Adam Foster

Adam is Head of Renewables and a Principal Risk Analyst at Anatec Ltd and has over a decade of experience in offshore marine risk. His speciality is in OWFs, and he has led on numerous layout approval processes including SLoO layouts. This includes working with developers to achieve safe layouts and liaising with relevant regulators to agree suitable mitigation such that associated hazards are ALARP.

1.3.2 Sam Westwood

Sam is a Director of Anatec and has over 28 years' experience within the marine industry including in the Merchant Navy, as a Vessel Traffic Service (VTS) operator and at the Maritime and Coastguard Agency (MCA) before moving into offshore renewables consulting 15 years ago. Sam specialises in offshore renewables including navigation risk assessments and post consent supporting including layout design.

1.3.3 Mark Prior

Mark is a highly experienced aviation professional with a wide range of expertise in certification, safety analysis, investigation, operations, technical issues and regulations. He has over 40 years' experience as a pilot, initially in the Royal Air Force then a civil pilot with Search and Rescue (SAR) trials and certification experience. He was a licensed civil pilot with concurrently 20+ years of experience as a military and then civil experimental test pilot. Since

2003 he has been an industry representative on a number of rule-making, operational and research groups. He has been an independent consultant since 2016.

2 Guidance and Methodology

2.1 Guidance

The principal guidance documents that have been considered and applied in the drafting of the SAR Safety Justification are as follows:

- DoT Guidance on Safety of Navigation & Emergency Response: Offshore Renewable Energy Installations (OREI) (DoT, 2025a);
- Standard Operating Procedure 07-2025 Offshore Renewable Energy Installations (OREI): Guidance and Operational Considerations for SAR and Emergency Response (DoT, 2025b); and
- Revised Guidelines for Formal Safety Assessment (FSA) for Use in the International Maritime Organization (IMO) Rule-Making Process. MSC-MEPCC.2/Circ.12/Rev.2. IMO, 2018)

The guidance on Safety of Navigation & Emergency Response (DoT, 2025a) references the IMO FSA (IMO, 2018) which is a marine standard for risk assessment. The FSA has therefore been applied within this SAR Safety Justification.

2.2 Risk Assessment Methodology

The FSA process considers five main steps:

1. **Identification of hazard** scenarios building on the work of the Navigation Risk Assessment and in relation to the proposed SLoO layouts.
2. **Risk Analysis** including consideration of embedded mitigations. This will be identified as consequence versus frequency. Severity and frequency ranking are defined in Table 2-1 and Table 2-2.
    a. This will separately consider risks in relation to the proposed SLoO.
3. **Identification of further mitigations** required to reduce the risk to ALARP – if required.
4. **Cost benefit analysis** – if required.
5. **Statement of Risk** and determination of ALARP status. Overall significance of each impact is determined using a tolerability matrix as defined in Table 2-3. As per the FSA, the risk of a hazard is defined as Broadly Acceptable (low risk), Tolerable with Mitigation (intermediate risk) or Unacceptable (high risk).

Unacceptable risks are not considered to be ALARP and will need additional mitigation.

Table 2-1 Severity of Consequence Ranking Definitions

Rank	Definition			
	Description	People	Property	Environment
1	Negligible	No adverse health effects	No perceptible impact	No perceptible impact
2	Minor	Minor injury / First-aid injury	Minor damage to property, for instance, superficial damage	Tier 1 local assistance required
3	Moderate	Medical treatment injury	Damage not critical to operations	Tier 2 limited external assistance required
4	Serious	Lost time injury	Damage resulting in critical impact on operations	Tier 2 regional assistance required
5	Major	Permanent injury, disability, fatality	Total loss of property	Tier 3 national assistance required

Table 2-2 Frequency of Occurrence Ranking Definitions

Rank	Description	Definition
1	Negligible	Highly unlikely to occur in the lifetime of the Proposed Development
2	Extremely unlikely	Could happen in the lifetime of the Proposed Development
3	Remote	May occur once within each Phase
4	Reasonably probable	Likely to happen on annual basis
5	Frequent	Likely to happen more than once a year

Table 2-3 Tolerability Matrix and Risk Rankings

Severity of Consequence						
	5					
	4					
	3					
	2					
	1					
		1	2	3	4	5
		Frequency of Occurrence				

	Unacceptable (high risk)
	Tolerable (intermediate risk)
	Broadly Acceptable (low risk)

2.3 Existing Assessment Summary

The assessment within this Safety Justification is considered standalone, and considers the specific issues of relevance to emergency response. However, it is noted that a Navigation Risk Assessment (NRA) has been undertaken for the Proposed Development (Anatec, 2024) which found that all relevant hazards to shipping and navigation users within the NRA remit were ALARP assuming the identified mitigation was applied, both for the Proposed Development in isolation, and cumulatively with other possible developments. This includes the nearby proposed Dublin Array and Codling Wind Park developments.

The hazards deemed to be ALARP include:

- Displacement of Routeing and Vessel Traffic;
- Increased Collision Risk;
- Increased Allision Risk; and
- Diminished Emergency Response Capability.

2.4 Treatment of Existing ABWP1 WTGs

There are seven existing WTGs within the Array Area, owned and operated by a separate company, Arklow Energy Limited. Hereafter these seven WTGs are referred to as Arklow Bank Wind Park 1 (ABWP1).

Arklow Energy Limited has commenced pre-application consultation (Case Reference OC27.321635) with the appropriate local authorities to decommission ABWP1, which has reached the end of its operating life.

The ABWP1 team has begun engaging with the Maritime Area Regulatory Authority (MARA) and is working closely with An Coimisiún Pleanála to agree on the details of the decommissioning and removal works. Based on the fact that the ABWP1 team has commenced the pre-application process for decommissioning the Developer expects ABWP1 to be fully decommissioned before commencement of operation of ABWP2.

In the very unlikely event that ABWP1 is not removed prior to commencement of the Proposed Development, the Developer will work with IRCG to ensure that any existing infrastructure still in situ is factored into the Emergency Response Cooperation Plan (ERCoP) between the IRCG and the Developer to ensure appropriate dedicated SAR plans can be put in place for the small section of the Array Area impacted.

3 Project Description

3.1 Layout Options

The Proposed Development is a long, narrow site situated close to the eastern Irish coast (approximately 6 nautical miles (nm) from Arklow). It is located on the Arklow Bank, which includes very shallow areas of water.

The ABWP1 WTGs along with the ABWP1 Existing Met Mast located in the southern area of the ABWP1 Array Area are expected to be removed by the time that the Proposed Development has been constructed (see Section 2.3) but are shown in the baseline figures for reference.

Figure 3-1 and Figure 3-2 present Project Design Option 1 (53 WTGs) and Project Design Option 2 (47 WTGs) respectively. The ABWP1 structures are included in both figures. Both Project Design Options include two Offshore Substation Platforms (OSP) which are also shown.

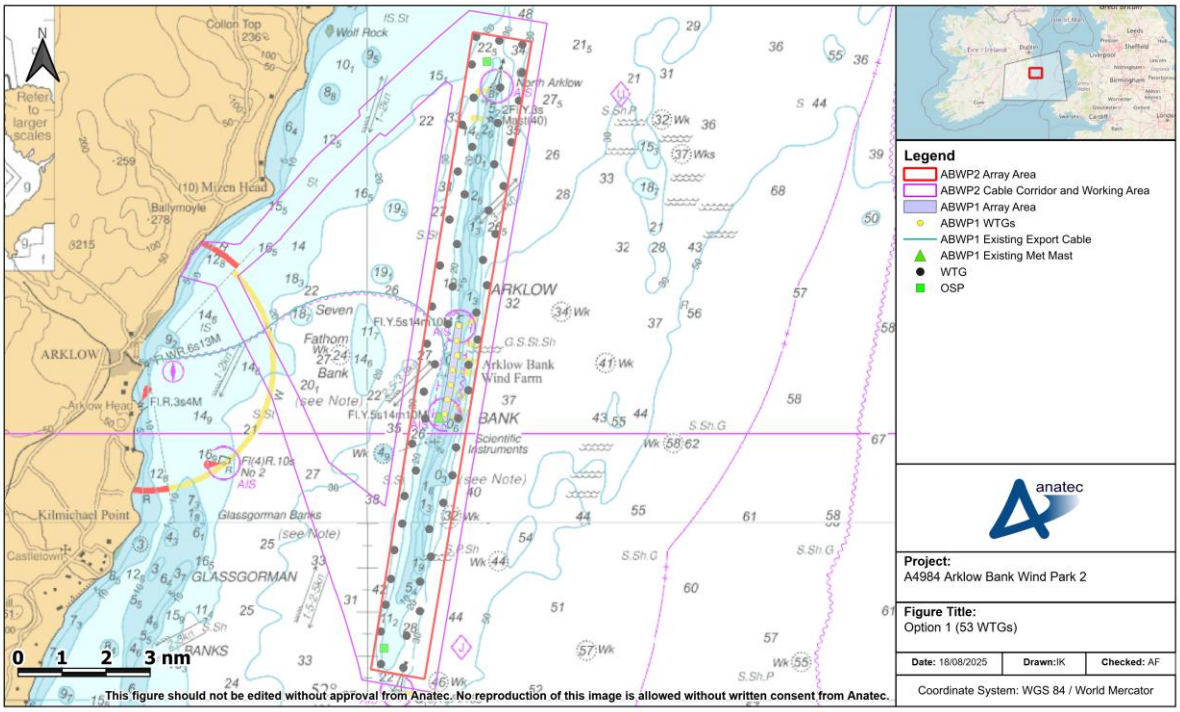

Figure 3-1 Overview of Project Design Option 1 (53 WTGs)

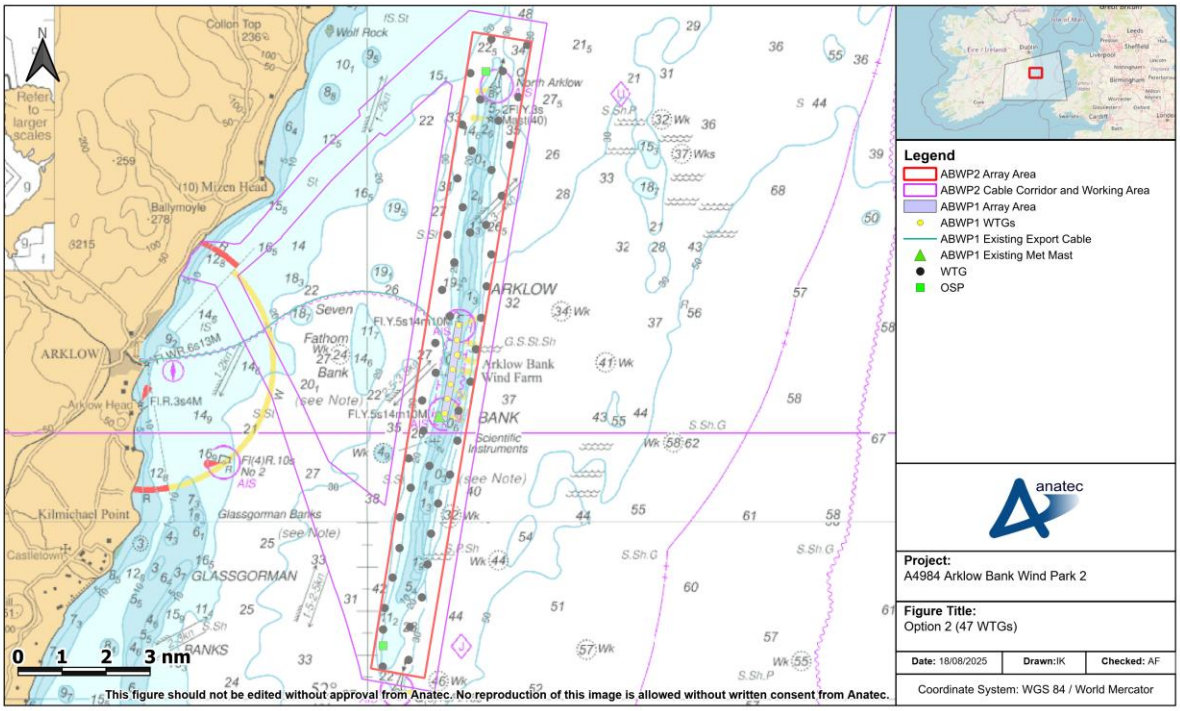

Figure 3-2 Overview of Project Design Option 2 (47 WTGs)

3.1.1 SAR Lanes for the Proposed Development

For the purposes of maximising Probability of Detection (POD), both Project Design Options have been designed and refined in liaison with IRCG to ensure SAR Access lanes are available in at least one line of orientation in every part of the Array Area.

The SAR lanes have been defined using the methodology described in the SOP 07 2025 OREI Guidance and Operational Considerations for SAR and Emergency Response (DoT, 2025b) i.e., all are at least 500 metres (m) in width tip to tip (or tip to OSP topside).

As required[1] under the Guidance on Safety of Navigation & Emergency Response: Offshore Renewable Energy Installations (OREI) (DoT, 2025a), available secondary lines of orientation have also been identified.

Full details and illustration of the 500m SAR lane coverage (both primary and secondary) are provided in Appendix A. Also included in Section A.3 is a summary of how helicopter operations could be undertaken relative to the Array Area and considering the SAR lanes available.

3.1.2 Limits of Deviation

Although one of the two layouts presented will be used as a final layout, the individual structures within each layout could be sited in a position up to 100 m from that presented

[1] "Where a project proposes just one line of orientation, this discussion should include any potential secondary lines".

(termed the LoD). The details of the as-built structures will be promulgated to all relevant bodies including the IRCG and the United Kingdom Hydrographic Office (UKHO) to allow marking on appropriately scaled Admiralty charts.

Use of 100m LoD will mitigate the risk of unexpected ground conditions or other unforeseen circumstances arising as part of final site investigations. The Developer has made specific commitments around application of LoD such that impacts on SAR access as defined in Appendix A are minimised:

- The LoD will not reduce the number of SAR lanes; or
- Result in the reduction of any SAR lane width to below 500m tip-to-tip (or tip to OSP topside).

These commitments ensure that suitable SAR access will remain while still providing the necessary flexibility required during construction operations due to ground conditions or other unforeseen circumstances.

3.2 Project Vessels

During each phase of the Proposed Development, various Project vessels will transit to and from the Proposed Development and undertake numerous activities within the Array Area.

During the construction phase, the following vessel types are expected to be on-site during certain periods:

- Main installation vessels;
- Cargo barges;
- Support vessels;
- Tug/anchor handlers;
- Cable installation vessels;
- Guard vessels;
- Survey vessels;
- Crew Transfer Vessels (CTV);
- Scour/cable protection installation vessels;
- Pre-installation boulder removal/clearing vessels;
- Sandwave clearance vessels; and
- Unexploded Ordnance (UXO) clearance vessels.

During the operation and maintenance phase, the following vessel types are expected to be on-site where required:

- CTVs;
- Survey vessels;
- Remotely Operated Vehicles (ROV);
- Scour protection vessels;
- Jack-up vessels;

- Cable vessels; and
- Shallow barges.

All Project vessels will broadcast positions via Automatic Identification System (AIS) data, and project personnel will wear Personal Locator Beacons (PLB) at all times.

Project vessel(s) may be able to respond or react to maritime emergencies (e.g. pollution or a drifting vessel) which presents an actual or possible threat to the safety of life or property. Project vessels will be well equipped and be crewed by well trained professional mariners, and therefore are likely to be well placed to assist in SAR operations if requested by IRCG. Appendix C provides a list of instances of wind farm vessels responding to emergency incidents.

3.3 Construction Phase

During the construction phase, the Developer will establish a Marine Coordination Centre (MCC) which will be used during the construction and decommissioning phases. This will represent a central control base with overarching responsibility for managing and monitoring project vessels and personnel. Marine coordination will be in place 24/7 during construction. Key responsibilities will include tracking vessel movements within the Array Area (project vessel and 3rd party), and tracking project personnel locations.

3.4 O&M

The location of the Proposed Development will be in close proximity to the consented Operations and Maintenance Facility (OMF) in Arklow South (located 6nm west of the Array Area) as shown in Figure 3-3.

The MCC will be based on the 3rd floor of the OMF and will have full visual coverage over the array area. A representative view of the Proposed Development from the MCC is provided in Figure 3-4. Following this, a visualisation of the OMF is provided in Figure 3-5.

A total of four CTVs will be utilised throughout the operations and maintenance phase, which will take approximate 20-minutes to reach the Proposed Development. Marine coordination and operational control will be monitored 24/7.

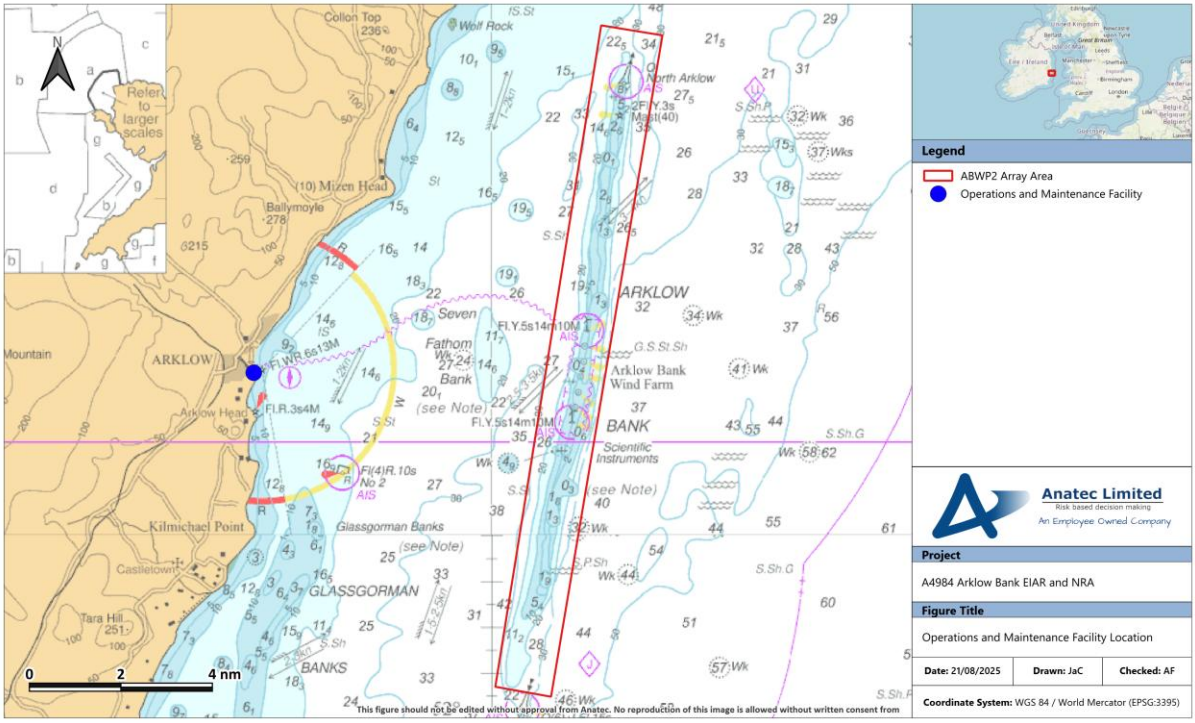

Figure 3-3 Operations and Maintenance Facility Location

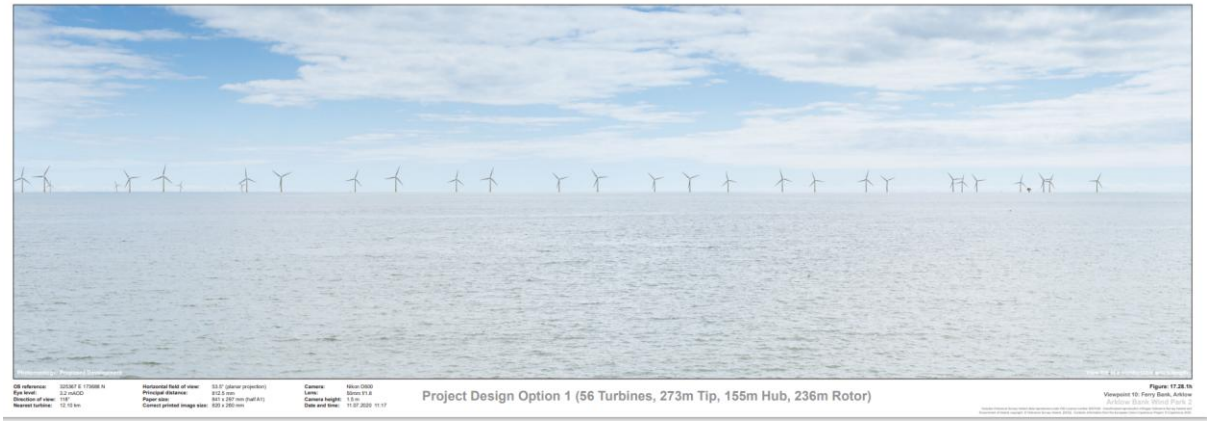

Figure 3-4 Representative view showing visibility of Proposed Development from Operations and Maintenance Facility Location (viewpoint is taken at Ferrybank c.800m away)



Figure 3-5 Visualisation of the operations and maintenance facility

The WTGs will be remotely monitored and controlled by a central Supervisory Control and Data Acquisition (SCADA) system, which will be connected via fibre optic link. This will facilitate remote operation of the WTGs. Each WTG has its own control system which can enable, for example, yaw control and shut down in high wind speeds. Each WTG also can be manually controlled from within the WTG itself.

The principal windfarm management and marine coordination systems will be located at the OMF. This will include an emergency response control centre. CCTV systems will also be installed offshore to provide coverage and visibility of the assets offshore, with anticipated line of sight coverage and specifications shown in Appendix B.

3.5 Operational Technology Systems (SAR Usage)

Various Operational Technology (OT) systems shall be used to support the agreed SAR strategies, activities and emergency response. Table 3-2 below introduces theses OT systems and provides an overview of their high-level operational requirement and SAR relevance.

Table 3-1 SAR OT System Overview

Operational Requirement	System	SAR Relevance
Remote Situational Awareness	WTG SCADA	Remote control/shutdown of WTGs
	CCTV System	Remote visual monitoring of the site
	Marine Control System	Remote tracking of vessels and personnel
	Weather Systems	Provides weather and oceanographic site conditions to the weather portal/MCS
Remote Communications	VHF Marine Radio	Vessel communications to the OMF
	Hardwired Telephones	Personnel communications to the OMF
	Mobile Radios	Personnel communications to the OMF
	Data Communications	Personnel and vessel internet access
	Public address and general alarm system (PAGA)	Broadcast voice an alarm announcements the OSP to warn and instruct personnel during both normal operations and emergencies.

Since these systems perform safety-critical functions, they will be designed to the relevant safety requirements. The systems shall operate reliably on demand with the appropriate redundancy, fail-safe design, and high availability.

Further details on these systems can be found in Appendix B, which includes the following:

- WTG SCADA System Concept – illustrating the overall design and functionality of the wind turbine SCADA system.
- CCTV System Layout – showing camera coverage and fields of view across the windfarm accessible to the IRCG.
- Marine Coordination Setup – outlining the facilities used to manage vessel and personnel and offshore operations including radio network coverage and propagation plots.
- Marine Coordination System HMI Screens – providing a typical example of the marine control system HMI that will be accessible to the IRCG, enabling them to establish situational awareness in the field.

3.6 Site Location relative to Existing SAR Resources

Figure 3-6 shows the locations of the IRCG SAR bases alongside the Marine Rescue Coordination Centres (MRCC) in Ireland relative to the Array Area.

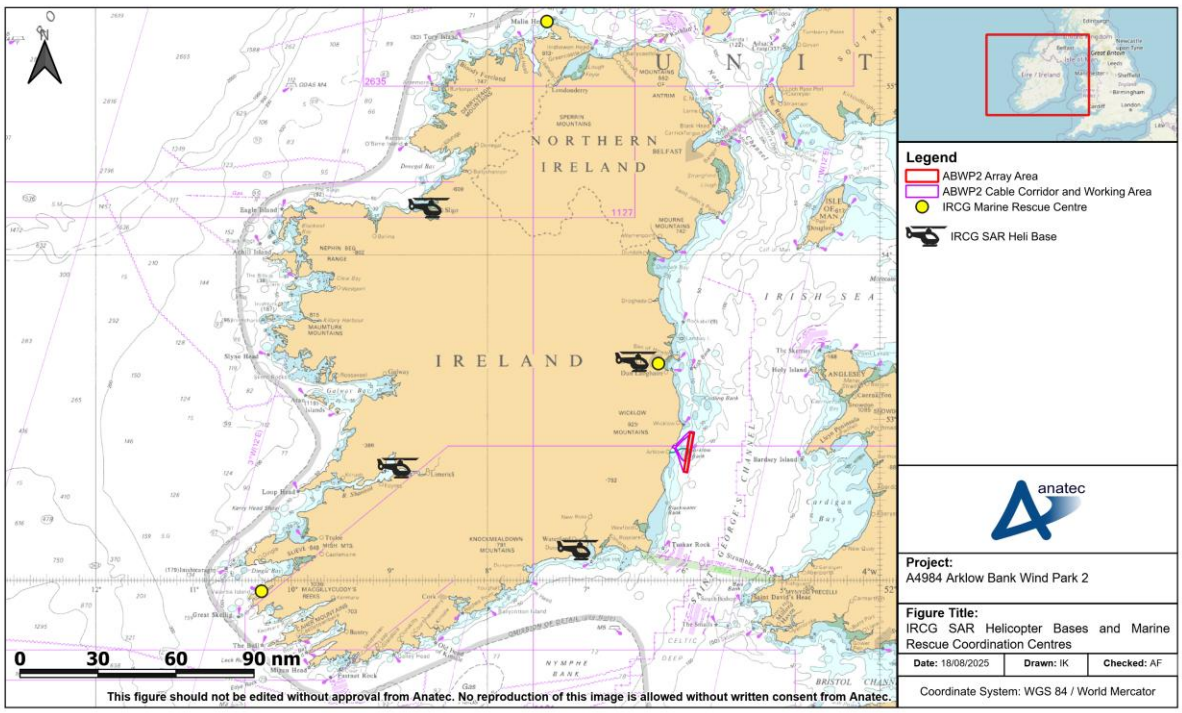

Figure 3-6 IRCG SAR Helicopter Bases and Marine Rescue Coordination Centres

The IRCG has four SAR helicopter bases around the country located at Weston, as well as at Waterford, Sligo, and Shannon. These bases are transitioning towards Bristow operations, from the previous operators CHC. This involves upgrading to AW189 helicopters from the Sikorsky S-92s, with Shannon the first to do so and the others to change later in 2025.

The closest IRGC SAR base to the Array Area is located at Weston Airport, approximately 33 nm northwest.

The IRCG operates three MRCCs around Irish waters, based in Dublin, Malin Head, and Valentia Island. The locations of these bases are presented in Figure 3-6. The closest of these centres to the Array Area is Dublin (a National Maritime Operations Centre (NMOC)) which provides marine SAR response services and co-ordinates the response to marine casualty incidents within the Irish Exclusive Economic Zone (EEZ).

The IRCG manages 44 Coast Guard Units throughout Ireland. These are volunteer cells which provide a localised focus for coastal search operations, with some units also capable of providing cliff rescues, boat rescues, and unmanned aerial vehicles searches. Of particular relevance to the Project are the Wicklow, Arklow, and Courtown Coast Guard Units, which are situated approximately 5nm, 6nm, and 8nm from the Array Area respectively.

Figure 3-7 presents the locations of Royal National Lifeboat Institution (RNLI) stations in proximity to the Proposed Development. Following this, Table 3-2 summarises the types of lifeboat operated by the RNLI out of these stations and the minimum distance from each station to the Proposed Development. Although a helicopter may be used for SAR operations within the Proposed Development, it is noted that there are RNLI stations located in closer proximity, notably at Arklow which means surface assets are well located nearby. Annex I to DoT Guidance on Safety of Navigation & Emergency Response: OREI (DoT, 2025a) states that:

"*Surface vessels, in most circumstances, will be the most appropriate means of rescue from within wind farms or close to other OREI*".

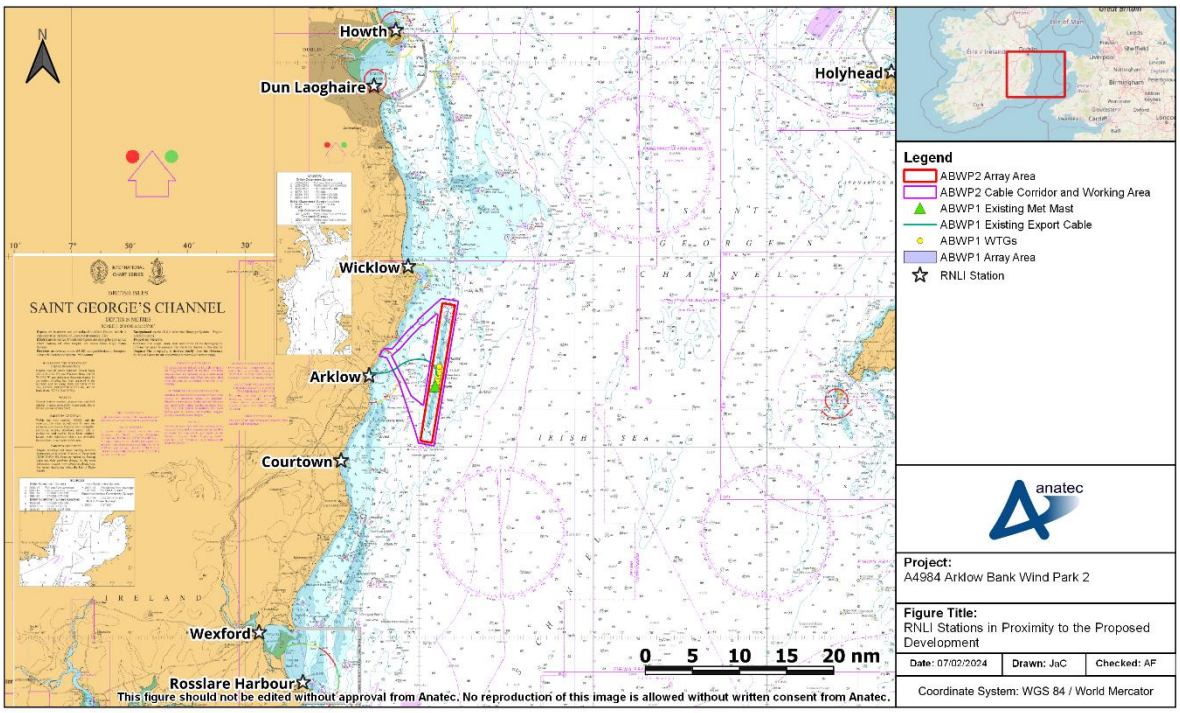

Figure 3-7 RNLI Station Locations in Proximity to the Proposed Development

Table 3-2 Types of Lifeboat Held at RNLI Stations in Proximity to the Proposed Development

Station	Lifeboat(s)	All-Weather Lifeboat (ALB) Class	Inshore Lifeboat (ILB) Class	Minimum Distance to Array Area (nm)
Wicklow	ALB and ILB	Shannon	D Class	5.2
Arklow	ALB	Trent	–	6.3
Courtown	ILB	–	D Class	8.6
Dun Laoghaire	ALB and ILB	Trent	D Class	23.7
Wexford	ILB (×2)	–	D Class (×2)	26.4
Rosslare Harbour	ALB	Severn	–	28.4
Howth	ALB and ILB	Trent	D Class	28.7
Holyhead	ALB and ILB	Severn	D Class	51.5

Also available to IRCG are Community Rescue Boats Ireland (CRBI), a group of independent volunteer rescue craft able to respond to emergencies in their vicinity. At present CRBI boats are based at Ballinskelligs County Kerry, Ballybunion County Kerry, Ballyheigue County Kerry, Banna County Kerry, Bantry County Cork, Bonmahon County Waterford, Cahore County Wexford, Corrib/Mask Lakes County Galway, Derrynane County Kerry, Drogheda County Louth, Limerick City (River Shannon), Mallow County Cork, Tramore County Waterford, Waterford City River Rescue, and Waterford Marine Search & Rescue. Based on location it is considered that an RNLI asset would be more likely to respond to an incident in the Array Area than a CRBI asset.

4 Users of the Array Area

This section assesses 12 months of AIS data (2022) and ten years of RNLI incident data (2015-2024) to identify likely users of the Array Area i.e., parties which may require an emergency response. These datasets have been assessed within a 10nm buffer of the Array Area (the 'study area').

4.1 Third Party Vessels

The shallows of the Arklow Bank upon which the Array Area is located mean the vast majority of vessels in the area already avoid the area where the WTGs will be located. This is illustrated in Figure 4-1 which shows 12 months of AIS[2] data collected over the entirety of 2022 colour coded by vessel type. As shown, vessels generally pass either inshore or offshore of the Arklow Bank.

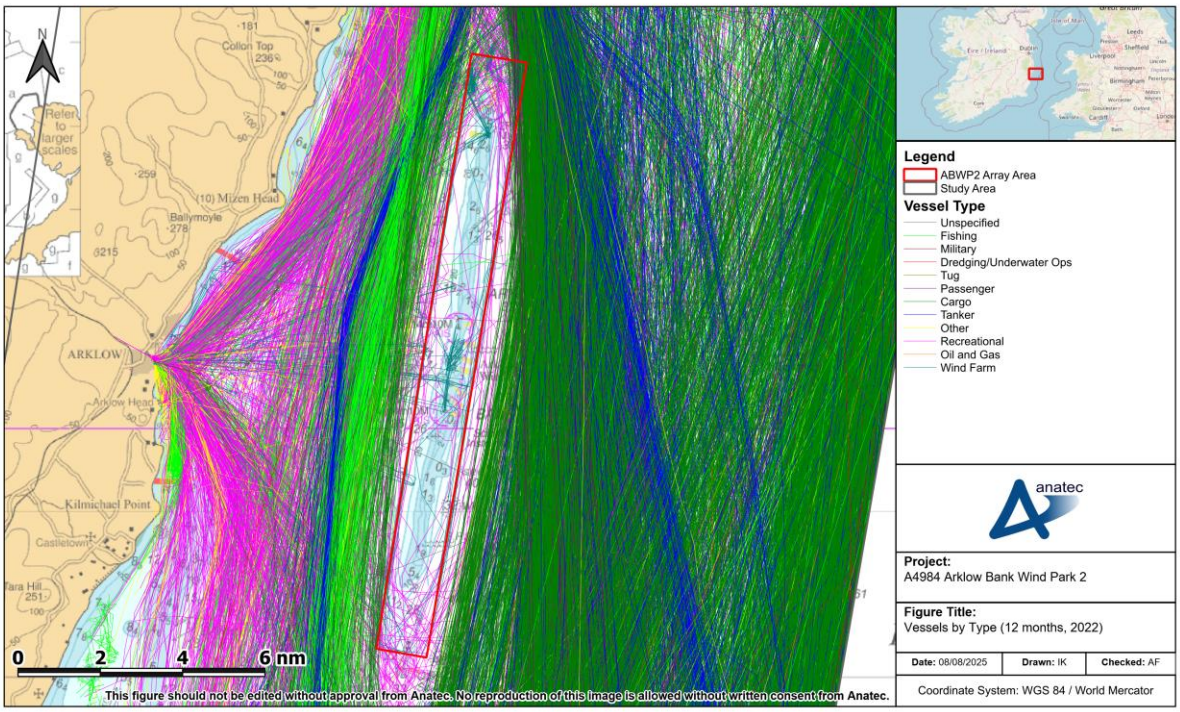

Figure 4-1 Vessels by Type (12 Months)

Transits on the bank were largely from recreational vessels, fishing vessels and CTV transits to the existing WTGs. These are therefore the most likely vessels to be within the Array Area and require an emergency response in the event of an incident. It is considered extremely unlikely that a larger vessel would deliberately choose to transit through the Array Area given the presence of Arklow Bank shallows and also the structures associated with the Proposed Development.

[2] AIS data may underrepresent certain vessel types, notably fishing vessels less than 15m and recreational vessels.

This aligns with a study of ten years of RNLI incident data from 2015 and 2024, which showed a total of three incidents within the Array Area with two from fishing vessels and one from a recreational vessel. The logged visibility was either “fair” or “good” for these incidents.

A figure highlighting the RNLI incidents by vessel type in proximity to the Array Area is presented in Figure 4-2. The vast majority of incidents were associated with either fishing or recreational vessels.

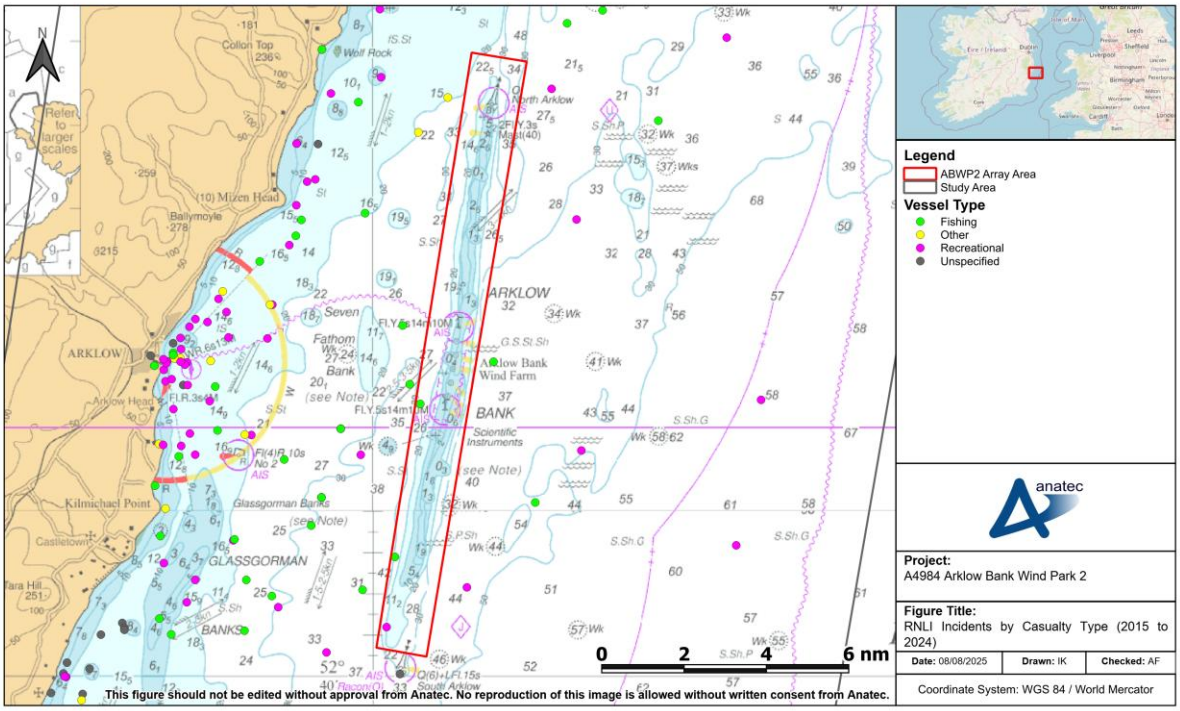

Figure 4-2 RNLI Incidents by Casualty Type (2015 to 2024)

4.2 Project Vessels

As per Section 3.2, there will be various Project vessels on site during all phases of the Proposed Development. These vessels will need to be in the Array Area to undertake the necessary works and therefore may require an emergency response within the Array Area in the event of an incident.

4.3 Water Sports

In addition to vessel transits, there may be users engaged in water sports requiring SAR assistance in the vicinity of the Array Area. Figure 4-3 presents the locations of incidents within the RNLI dataset during activities classed as water sports (jet skiing, kayak/canoeing, kitesurfing, paddleboarding, use of an inflatable, and surfboarding) in proximity to the Array Area during a ten-year period from 2015 to 2024.

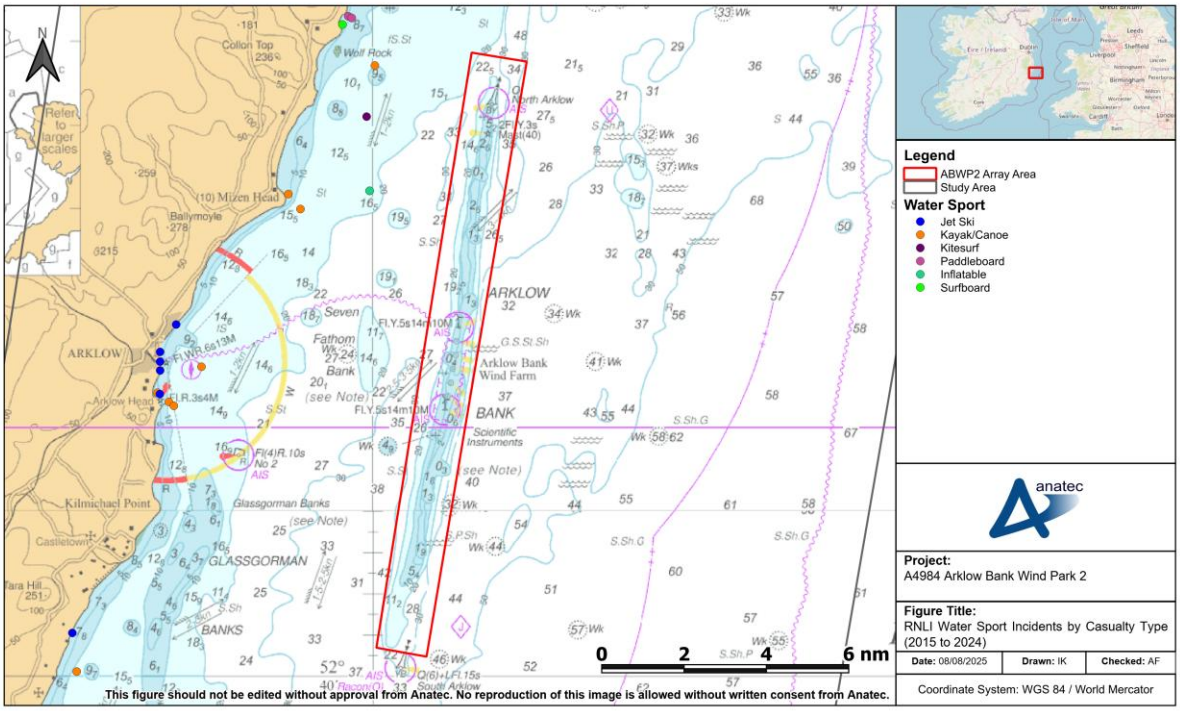

Figure 4-3 RNLI Water Sport Incidents by Casualty Type (2015 to 2024)

There were no water sports incidents within the Array Area from 2015 to 2024, with the closest being an inflatable swept out to sea 1.9nm to the west.

Based on the distance from shore, and lack of recorded incidents within the Array Area, it is considered likely that water sports activities will be a very rare occurrence within the Array Area. When they do occur, they are likely to be undertaken when visibility conditions are good. This aligns with the RNLI data which shows the water sports incidents in the study area all occurred in “good”, “fair”, or “excellent” visibility.

4.4 Swimmers and Divers

Figure 4-4 presents the locations of incidents involving either a swimmer or diver in proximity to the Array Area during a ten-year period from 2015 to 2024.

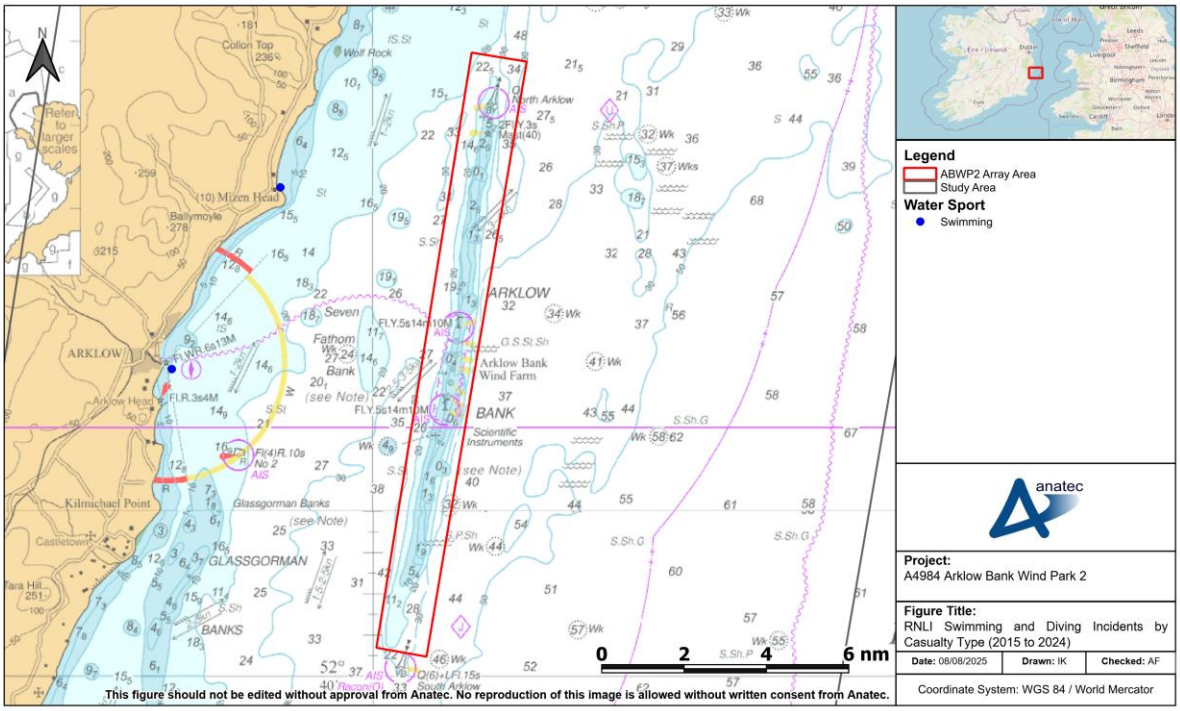

Figure 4-4 Swimming and Diving Incidents by Casualty Type (2015 to 2024)

There were no incidents involving a diver within the study area and no incidents involving a swimmer in the Array Area from 2015 to 2024, with the closest being a swimmer at shore near Mizen Head, 4.0nm to the west. This is as would be expected given the distance offshore of the Array Area. The two swimming incidents both occurred in "good" visibility based on the RNLI data.

Based on the distance from shore, and lack of recorded incidents within the Array Area, it is therefore considered likely that individuals swimming or diving within the Array Area will be a very rare occurrence.

5 Risk Assessment

5.1 Hazard Identification

Based on the findings of Section 4, the following hazards have been identified as potentially occurring in or near the Array Area and therefore requiring an emergency response that may be impacted by a SLoO layout:

- **Person in the water**
  - Project personnel or crew member;
  - from 3rd party vessel; or
  - 3rd party water sports, swimmer or diver.
- **Vessel Capsize in Array Area**
  - Project Vessel; or
  - 3rd Party Vessel.
- **Oil spill**
  - Project vessel; or
  - 3rd party vessel.
- **Vessel grounding**
  - Project vessel; or
  - 3rd party vessel.
- **Injured person requiring extraction from Array Area**
  - Project personnel.
- **Drifting vessel**
  - Project vessel; or
  - 3rd party vessel.
- **Fire**
  - WTG or OSP; or
  - On vessel.
- **Salvage operation**

This section applies the FSA (Section 2.2) to these hazards.

5.2 Embedded Mitigation

This section summarises the mitigation in place deemed of relevance to the SAR Safety Justification. It is noted that other mitigations are in place to reduce the frequency of an on-site incident occurring (e.g., charting of infrastructure, marine Aids to Navigation), however this section focuses on the mitigations in place that are of direct relevance to assisting an emergency response scenario i.e., assuming an incident has already occurred.

The Project will have capability of responding to Tier 1 incidents, Tier 2 and Tier 3 incidents which may require support in line with the National Maritime Oil/ HNS Spill Contingency Plan (DoT, 2020a).

The mitigations are provided in Table 5-1. The mitigations shown are not intended to replace the SAR checklist process which will be undertaken at the appropriate time post consent.

Table 5-1 Embedded Mitigations

Embedded Mitigation Measure	Description
Application of LoD Commitments	▪ LoD will not reduce the number of SAR lanes or result in the reduction of any SAR lane width to below 500m tip-to-tip.
Emergency Response Cooperation Plan (ERCoP)	▪ An ERCoP will be produced pre-construction that details the communication and cooperation procedures that will be in place between the Developer and IRCG. ▪ Will include an emergency contact list. ▪ This will be in IRCG template.
Project CCTV	▪ 100% external coverage of the windfarm, including perimeter monitoring, WTGs, and boat landings providing views capable of monitoring personnel activities. ▪ Specifications and coverage are provided in Appendix B. ▪ Remote access to CCTV system will be provided to IRCG (via internet browser) to provide live views of the site
Emergency Response Plan (ERP) and Self Help	The Developer will have its own internal response procedures in place via its ERP that will include: ▪ Roles and responsibilities; ▪ Facilities; ▪ Medical needs assessment and equipment; ▪ Reporting and Investigation; ▪ Media contacts; ▪ Next of Kin procedure; ▪ Procedures by incident type including escape and evacuation; and ▪ Flow diagram for when an incident exceeds Tier One capability.
Fire Fighting Equipment	▪ Project vessels, WTGs and OSPs will be equipped with firefighting equipment.
Layout Design and Refinement	▪ Both layouts have been designed and refined to maximise east/west SAR coverage as far as practicable. ▪ Inherent narrowness of the Array Area and the orientation of SAR lanes means that all primary and secondary lane edges are only bordered by a

Embedded Mitigation Measure	Description
	maximum of three WTGs with the majority only being bordered by two WTGs. ▪ Available SAR lane coverage is provided in Appendix A.
Lighting and Marking	▪ All WTGs will be fitted with SAR lights that emit in the infra-red. The lighting will be visible to a SAR helicopter's infra-red camera and the crew's Night Vision Goggles (NVG). ▪ All structures will have lit Identification (ID) boards. ▪ All structures will have navigational aids ▪ Selected structures will broadcast AIS positions.
Medical Advice	▪ The project will undertake a medical needs assessment and ensure that relevant first aid resources are in place. This may include the need for offshore medics.
OSP Telephones	▪ Hardwired telephones in the mariner's cage on the OSP will be available for third-party use, capable of inbound and outbound external calls without being onboard the OSP asset. *Note – the mariners cage will have its own CCTV camera to check occupancy.* ▪ If there's an incident on the OSP, hardwired telephones are also available internally.
OSP Life Rafts	▪ OSP equipped with life rafts with locator beacons.
PLBs	▪ All project personnel will be required to be fitted with PLB and a database will be maintained of their ownership.
Pollution Contingency Planning	▪ Project Oil/HNS Spill Contingency Plan. ▪ National Maritime Oil/HNS Spill Contingency Plan (DoT, 2020a). ▪ SOP 01-202 - Assessment and notification of a pollution incident (DoT, 2020b).
Pollution Kits on Vessels	▪ All project vessels will be equipped with pollution kits. ▪ Pollution kits also available on structures.
OMF Marine Coordination System (MCS)	▪ Dedicated marine site monitoring and tracking from O&M for vessel, aircraft (TBA) and personnel ▪ Dedicated shore to vessel (marine VHF) and personnel communications (mobile radio, LTE and fixed handsets) ▪ MCS manned from the OMF when any working windfarm/Eirgrid working party offshore

Embedded Mitigation Measure	Description
	▪ Remote access to MCS system will be provided to IRCG (via internet browser) to provide live site traffic and weather/sea conditions
Project Vessel Location Monitoring	▪ All project vessels will broadcast positions via AIS to the MCS. ▪ All non-AIS broadcasting vessel's positions tracked by the MC via vessel radars.
Personnel Location Monitoring	▪ All personnel locations vessels will broadcast positions via AIS and non-AIS broadcasting vessel's locations monitored by vessel radars.
Project vessel compliance with international marine regulations	▪ Compliance from all project vessels with Irish Law, international maritime regulations as adopted by the relevant flag state including the Convention on the International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1972/77) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974). ▪ Assistance under SOLAS undertaken in liaison with IRCG. ▪ Provision of project vessel(s) and other assets to respond or react to other maritime emergencies e.g. pollution or a drifting vessel which presents an actual or possible threat to the safety of life or property. As per Section 4, 3rd party transits through the Array Area are likely to be rare, however project vessels will be well equipped and be crewed by well trained professional mariners, and therefore likely to be well placed to assist in SAR operations if requested by IRCG. ▪ Appendix C provides a list of instances of wind farm vessels responding to emergency incidents.
Remote WTG Control	▪ WTGs remotely controllable (i.e., on a full windfarm basis, individually, or predefined routes). WTG
Security Plan	▪ Will include details of how security will be maintained throughout all phases of the development.
Self Help Capability	Provision of project vessel(s) and other assets to respond or react to other maritime emergencies associated with the Project.
Wireless Communications	▪ Long Term Evolution (LTE) handsets shall enable the operators to have communications capability inside the WTG and outside the WTG. There are two forms of infrastructure (Wi-Fi/Wireless LTE pico) used by

Embedded Mitigation Measure	Description
	these handsets inside WTGs to ensure redundant communications. ▪ Outdoor Locations: LTE and Digital Mobile Radio (DMR) radios will be carried within the working parties.
Weather Monitoring	▪ Sea state is monitored by the MCS via wave radars on WTGs and OSPs ▪ Current and weather forecasts provided by the MCS

5.3 FSA

The risk assessment undertaken via the FSA is presented in Table 5-2.

Table 5-2 Risk Assessment

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
Person in the water – project personnel	▪ ERCoP ▪ ERP including Man Overboard (MOB) protocols ▪ Lighting and Marking ▪ Medical Advice ▪ Operation and Maintenance Facility which will monitor all works on site ▪ OSP Telephones ▪ PLBs ▪ Project CCTV ▪ Remote WTG Control if helicopter requires access ▪ Self Help Capability including project vessels trained for personnel recovery ▪ Wireless Communications	Noted that project personnel will have PLBs reducing the frequency at which a search (and therefore use of SAR lanes) may be required. If SAR lanes are required, as per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to maximise the POD in a search operation and allow access to all parts of the Array Area if an extraction is required. The Array Area is also very narrow, meaning helicopters would only be exposed to WTGs for short periods in any given pass through the wind farm, and POD can also be achieved via flying over or around the Array Area and using the helicopter's onboard sensors.	Extremely Unlikely *Project vessels considered most likely marine user of the Array Area based on the data studied (Section 4) however project personnel will have PLBs.*	Minor	Broadly acceptable	n/a
Person in the water – 3rd party overboard from vessel	▪ ERCoP ▪ ERP ▪ Layout Design and Refinement ▪ Lighting and Marking ▪ ERCoP	The most likely 3rd party vessel users in the Array Area expected to be smaller fishing or recreational vessels. Recreational vessels in particular are more likely to be out in good visibility	Extremely unlikely *3rd party vessel transits over*	Major	Tolerable	▪ Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV) through SAR

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	▪ ERP including MOB protocols if project vessels are on site ▪ Lighting and Marking ▪ Medical Advice ▪ Operation and Maintenance Facility with emergency response protocol and to coordinate, work with other responders ▪ Project CCTV ▪ Remote WTG Control if helicopter requires access	meaning 500m SAR lanes may not be required. If SAR lanes are required, as per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to maximise the POD in a search operation and allow access to all parts of the Array Area if an extraction is required. The Array Area is also very narrow, meaning helicopters would only be exposed to WTGs for short periods in any given pass through the wind farm, and POD can also be achieved via flying over or around the Array Area and using the helicopter's onboard sensors. However, SAR operations may be more complex due to the areas where only a SLoO is available.	*the bank are likely to be minimal and no records of person overboard within Array Area in RNLI data studied i.e., frequency low (Section 4.1).*			Checklist process, noting appropriate maintenance and testing procedures will be in place.
Person in the water – 3rd party water sports, swimmer or diver	▪ ERCoP ▪ ERP ▪ Layout Design and Refinement ▪ Lighting and Marking ▪ ERCoP	Water sports in the Array Area are considered to be a very rare occurrence and if they do occur are likely to be undertaken when conditions in particular visibility are good and	Negligible *No records requiring emergency response in*	Major	Tolerable	▪ Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV)

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	▪ ERP including MOB protocols if project vessels are on site ▪ Lighting and Marking ▪ Medical Advice ▪ Operation and Maintenance Facility to coordinate, work with other responders ▪ Project CCTV ▪ Remote WTG Control if helicopter requires access	therefore the 500m SAR lanes may not be required (Section 4.3). If SAR Lanes are required, as per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to maximise the POD in a search operation and allow access to all parts of the Array Area if an extraction is required. The Array Area is also very narrow, meaning helicopters would only be exposed to WTGs for short periods in any given pass through the wind farm, and POD can also be achieved via flying over or around the Array Area and using the helicopter's onboard sensors. However, SAR operations may be more complex due to the areas where only a SLoO is available.	*or near the Array Area in RNLI data studied i.e., frequency low.*			through SAR Checklist process, noting appropriate maintenance and testing procedures will be in place.
Vessel Capsize in Array Area – Project Vessel	▪ ERCoP ▪ ERP ▪ Layout Design and Refinement ▪ Medical Advice and shore reception facilities	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to maximise the POD in a search operation if required following a capsize and allow access to all parts of the Array Area for	Extremely Unlikely *Project vessels considered*	Major	Tolerable	▪ Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV)

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	▪ Operation and Maintenance Facility which will monitor the site ▪ PLBs if MOB ▪ Pollution Contingency Planning ▪ Pollution Kits on Vessels ▪ Project CCTV ▪ Project Vessel AIS ▪ Project vessel compliance with international marine regulations ▪ Remote WTG Control if helicopter requires access ▪ Self Help Capability	air and surface assets to reach the vessel. Noted that project vessels will have AIS and personnel will have PLBs reducing the area of the search and therefore time inside the Array Area (Section 3.2).	*most likely marine user of the Array Area based on the data studied (Section 4)*			through SAR Checklist process, noting appropriate maintenance and testing procedures will be in place. ▪ Plans for salvage operations for project vessels if required.
Vessel Capsize in Array Area – 3rd Party Vessel	▪ ERCoP ▪ ERP ▪ Medical Advice and shore reception facilities if required ▪ Operation and Maintenance Facility with emergency response protocols ▪ Pollution Contingency Planning ▪ Project CCTV ▪ Project Vessel AIS so they can be tracked/deployed ▪ Remote WTG Control if helicopter requires access	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to maximise the POD in a search operation if required following a capsize and allow access to all parts of the Array Area for air and surface assets to reach the vessel.	Negligible *3rd party vessel transits over the bank are likely to be minimal and no records of capsize within Array Area in RNLI data studied i.e.,*	Major	Tolerable	• Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV) through SAR Checklist process, noting appropriate maintenance and testing procedures will be in place.

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
			frequency low (Section 4.1).			
Oil spill – project vessel	▪ ERCoP ▪ ERP and Self Help ▪ Fire Fighting Equipment ▪ Operation and Maintenance Facility which will monitor all works on site ▪ Pollution Contingency Planning ▪ Pollution Kits on Vessels ▪ Project CCTV ▪ Project vessel compliance with international marine regulations ▪ Self Help Capability	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area allowing access to all parts of the Array Area for air and surface assets to reach the oil spill. Search operations not required and therefore additional mitigation for a SLoO is not necessary.	Remote *Project vessels considered most likely marine user of the Array Area based on the data studied (Section 4)*	Minor	Broadly acceptable	n/a
Oil spill – 3rd party vessel	▪ ERCoP ▪ ERP ▪ Operation and Maintenance Facility with emergency response protocol and to coordinate, work with other responders ▪ Pollution Contingency Planning ▪ Pollution Kits on Vessels ▪ Project CCTV	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area allowing access to all parts of the Array Area for air and surface assets to reach the oil spill. Search operations not required and therefore additional mitigation for a SLoO is not necessary.	Extremely Unlikely *3rd party vessel transits over the bank are likely to be minimal i.e., frequency*	Serious	Tolerable	n/a

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
			low (Section 4.1).			
Vessel grounding – project vessel	▪ ERCoP ▪ ERP and Self Help ▪ Medical Advice and shore reception facilities ▪ Operation and Maintenance Facility monitoring the sire ▪ PLBs if MOB ▪ Pollution Contingency Planning ▪ Pollution Kits on Vessels ▪ Project CCTV ▪ Project Vessel AIS ▪ Project vessel compliance with international marine regulations ▪ Remote WTG Control ▪ Security Plan ▪ Self Help Capability ▪ Wireless Communications	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the vessel.	Extremely unlikely *Project vessels considered most likely marine user of the Array Area based on the data studied (Section 4)*	Minor	Broadly acceptable	n/a
Vessel grounding – 3rd party vessel	▪ ERCoP ▪ ERP ▪ Operation and Maintenance Facility with emergency response protocol and to	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the vessel.	Remote *3rd party vessel transits over the bank are likely to be*	Minor	Tolerable	• Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV) through SAR Checklist process,

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	coordinate, work with other responders ▪ Pollution Contingency Planning ▪ Project CCTV ▪ Remote WTG Control ▪ Security Plan		*minimal and no record of grounding in the RNLI data studied*.			noting appropriate maintenance and testing procedures will be in place.
Injured person requiring extraction – project personnel	▪ ERCoP ▪ ERP and Self Help including own medical evacuation procedure ▪ Lighting and Marking ▪ Medical Advice and shore reception facilities ▪ Operation and Maintenance Facility which will monitor the site and coordinate ▪ OSP Telephones ▪ PLBs ▪ Project CCTV ▪ Project Vessel AIS ▪ Remote WTG Control ▪ Self Help Capability ▪ Wireless Communications	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the casualty. This hazard assumes location of personnel known i.e., search operations not required and therefore additional mitigation for a SLoO is not necessary.	Reasonably probable *Project vessels considered most likely marine user of the Array Area based on the data studied (Section 4)*	Moderate	Tolerable	n/a
Drifting vessel - project vessel	▪ ERCoP ▪ ERP and Self Help (vessels own ERP)	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to	Remote	Minor	Broadly Acceptable	n/a

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	▪ Operation and Maintenance Facility which will monitor site ▪ PLBs MOB ▪ Pollution Contingency Planning if any damage ▪ Project CCTV ▪ Project Vessel AIS ▪ Project vessel compliance with international marine regulations ▪ Remote WTG Control if SAR helicopter required ▪ Self Help Capability ▪ Wireless Communications	allow access to all parts of the Array Area for air and surface assets to reach the vessel. Search operations not required and therefore additional mitigation for a SLoO is not necessary.	*Project vessels considered most likely marine user of the Array Area based on the data studied (Section 4)*			
Drifting vessel - 3rd party vessel	▪ ERCoP ▪ Vessel own ERP ▪ Operation and Maintenance Facility which can coordinate ▪ Pollution Contingency Planning if any damage ▪ Project CCTV ▪ Remote WTG Control if SAR helicopter required	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the vessel. Search operations not required and therefore additional mitigation for a SLoO is not necessary.	Extremely Unlikely *3rd party vessel transits over the bank are likely to be minimal, however vessels may drift from outside the Array*	Major	Tolerable	n/a

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
			towards the WTGs.			
Fire on WTG or OSP	▪ ERCoP ▪ ERP and Self Help ▪ Fire Fighting Equipment ▪ Medical Advice and reception facilities ▪ Operation and Maintenance Facility to monitor the site ▪ OSP Telephones ▪ PLBs if personnel need to be located/evacuated ▪ Pollution Contingency Planning ▪ Pollution Kits on Vessels ▪ Project CCTV ▪ Remote WTG Control to isolate the structure ▪ Self Help Capability ▪ Wireless Communications	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the structure. Search operations not required and therefore additional mitigation for a SLoO is not necessary.	Remote	Minor	Broadly acceptable	n/a
Fire on project vessel	▪ ERCoP ▪ ERP and Self Help including vessels own capability ▪ Fire Fighting Equipment ▪ Medical Advice and reception facilities	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the vessel. Search operations not	Extremely Unlikely	Serious	Tolerable	n/a

Hazard Scenario	Embedded Project Mitigation	Does a SLoO Mean Additional Mitigation is Required	Likely Frequency	Likely Consequence	Significance of Risk	Are Additional Mitigation Required for ALARP as a result of SLoO
	▪ Operation and Maintenance Facility	required and therefore additional mitigation for a SLoO is not necessary.				
Salvage operations	▪ ERCoP ▪ ERP	As per Appendix A the layouts have been defined such that a SLoO is available in all parts of the Array Area to allow access to all parts of the Array Area for air and surface assets to reach the salvage item (e.g., vessel). Search operations not required and therefore additional mitigation for a SLoO is not necessary.	Negligible	Major	Tolerable	• Plans for salvage operations for project vessels if required.

6 Summary and Conclusion

The site conditions and constraints present make regular placement of WTGs challenging in the case of the Proposed Development and therefore a grid layout is not possible. This SAR Safety Justification has been prepared by the Developer to demonstrate that in the case of the Proposed Development, hazards associated with a SLoO layout are ALARP.

A SAR lane analysis has shown that all parts of the Array Area maintain at least a Single Line of Orientation i.e., SAR lanes of at least 500m in width (tip to tip, or tip to OSP topside). Further details are provided in Appendix A.

AIS and RNLI incident datasets have been analysed to determine likely users of the Array Area and therefore the potential casualties that may require an emergency response. An FSA has then been applied (assuming the existing ABWP1 WTGs are removed) to show that all identified hazards are ALARP assuming the following additional mitigations are applied:

- Agreement with IRCG on access procedures for site monitoring (AIS, Radar, CCTV) through SAR Checklist process, noting appropriate maintenance and testing procedures will be in place. Further details of Operational Technology is provided in Appendix B.
- Plans for salvage operations for project vessels if required.

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Appendix A SAR Access Lanes and SAR Operations

This appendix provides the SAR access lanes that have been identified based on the current layouts. The SAR lanes have been defined using the methodology described in the SOP 07 2025 OREI Guidance and Operational Considerations for SAR and Emergency Response (DoT, 2025b) i.e., all are at least 500m in width tip to tip.

Primary SAR lanes are shown in Section A.1, and secondary lanes are shown in Section A.2. These assume that the existing ABWP1 WTGs are removed.

A.1 Primary SAR Lanes

For Project Design Option 1 and 2, an overview of the SAR lane coverage is presented in Figure A.1 and Figure A.2 respectively.

A.2 Secondary Coverage

An overview of the secondary coverage of SAR access for Project Design Option 1 and Project Design Option 2 is provided in Figure A.3 and Figure A.4 respectively.

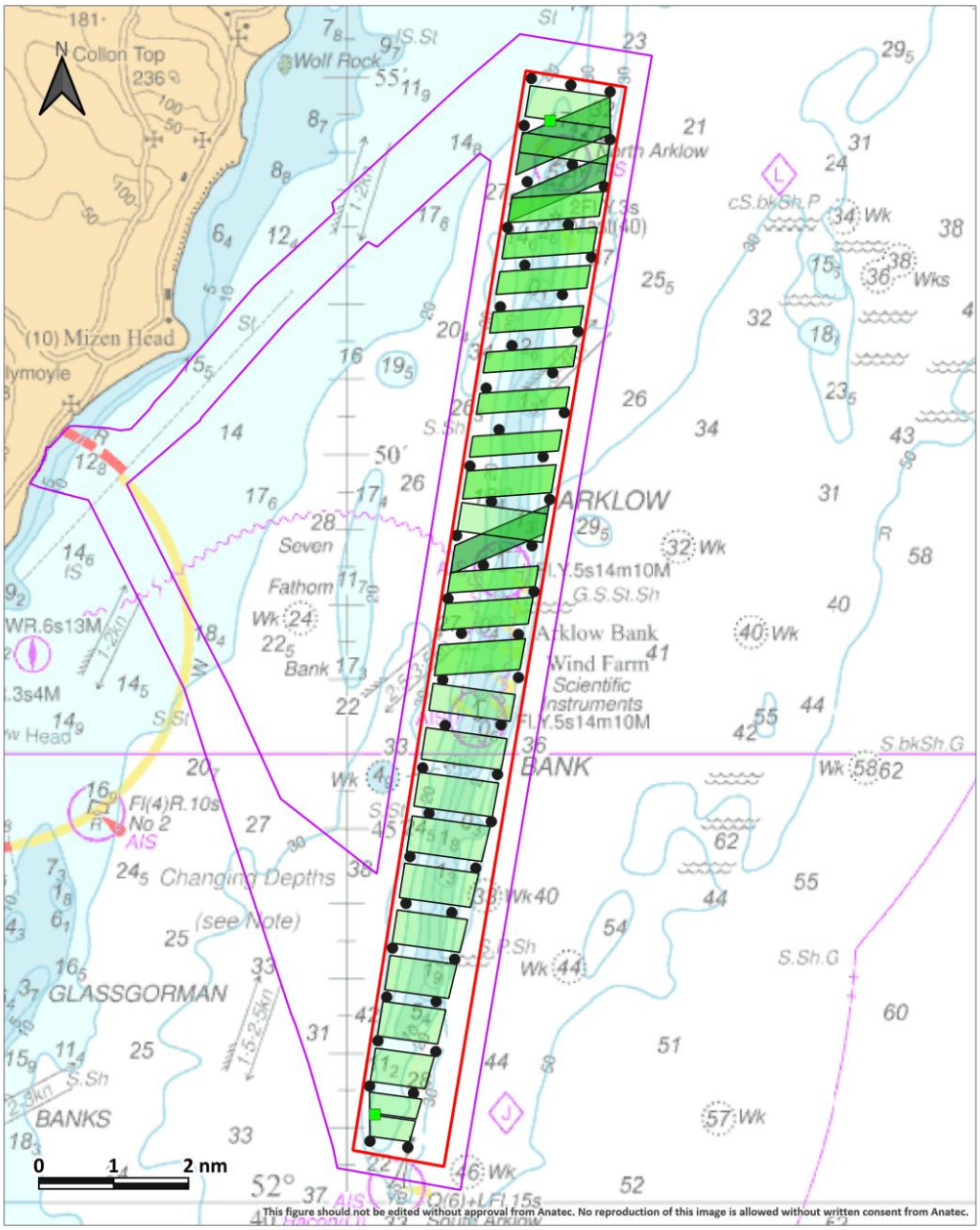
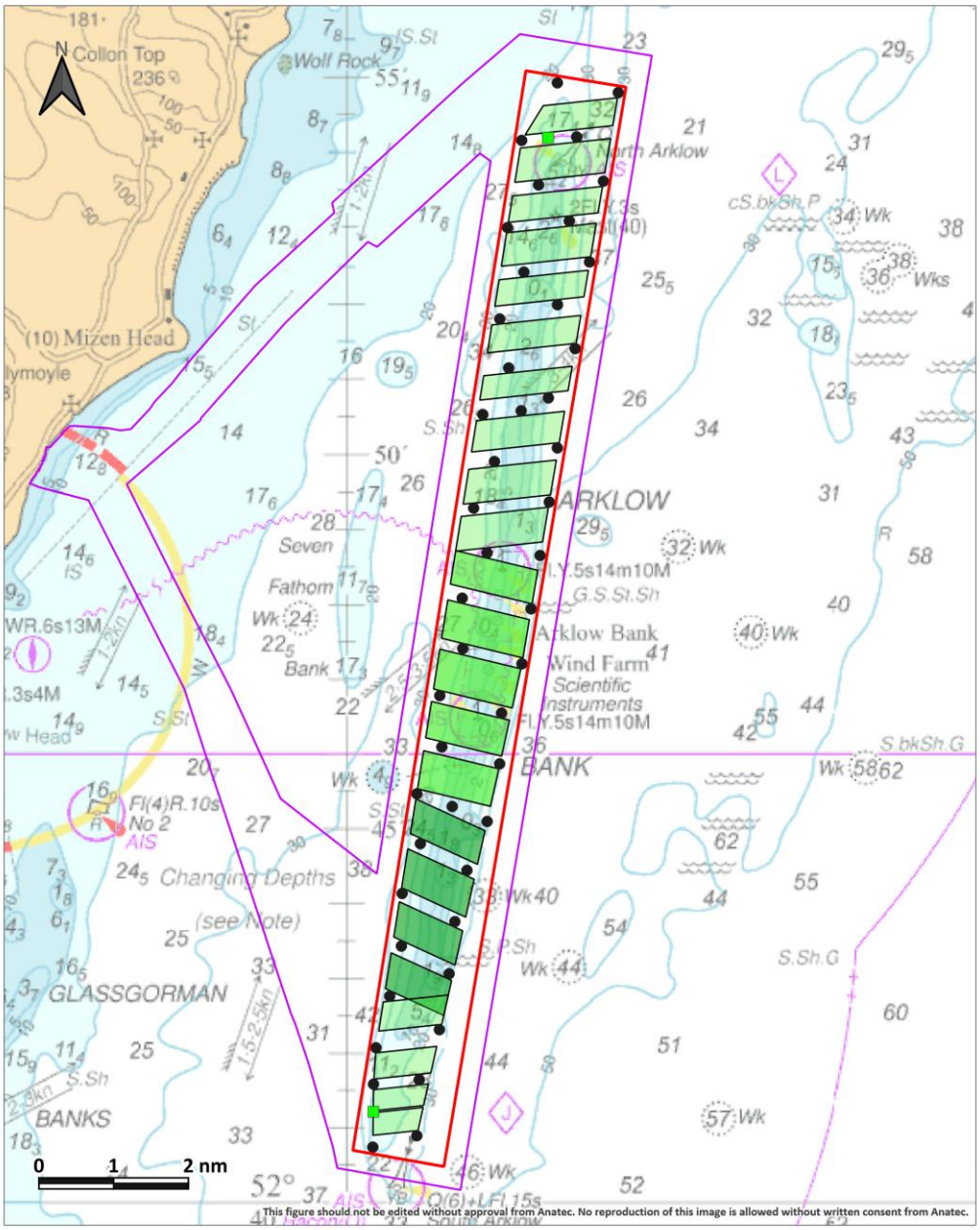


Figure A.1 SAR Access (Project Design Option 1)



Legend

- ABWP2 Array Area
- ABWP2 Cable Corridor and Working Area
- WTG
- OSP

SAR Access

- SAR Lane (83.9°)
- SAR Lane (103.6°)
- SAR Lane (114.7°)



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Project	Figure Title	Date: 21/08/2025	Drawn: DS	Checked: AF
A4984 Arklow Bank Support	Overview of the Project Design Option 2 SAR Lanes	Coordinate System: WGS 84 / World Mercator (EPSG:3395)		

Figure A.2 SAR Access (Project Design Option 2)

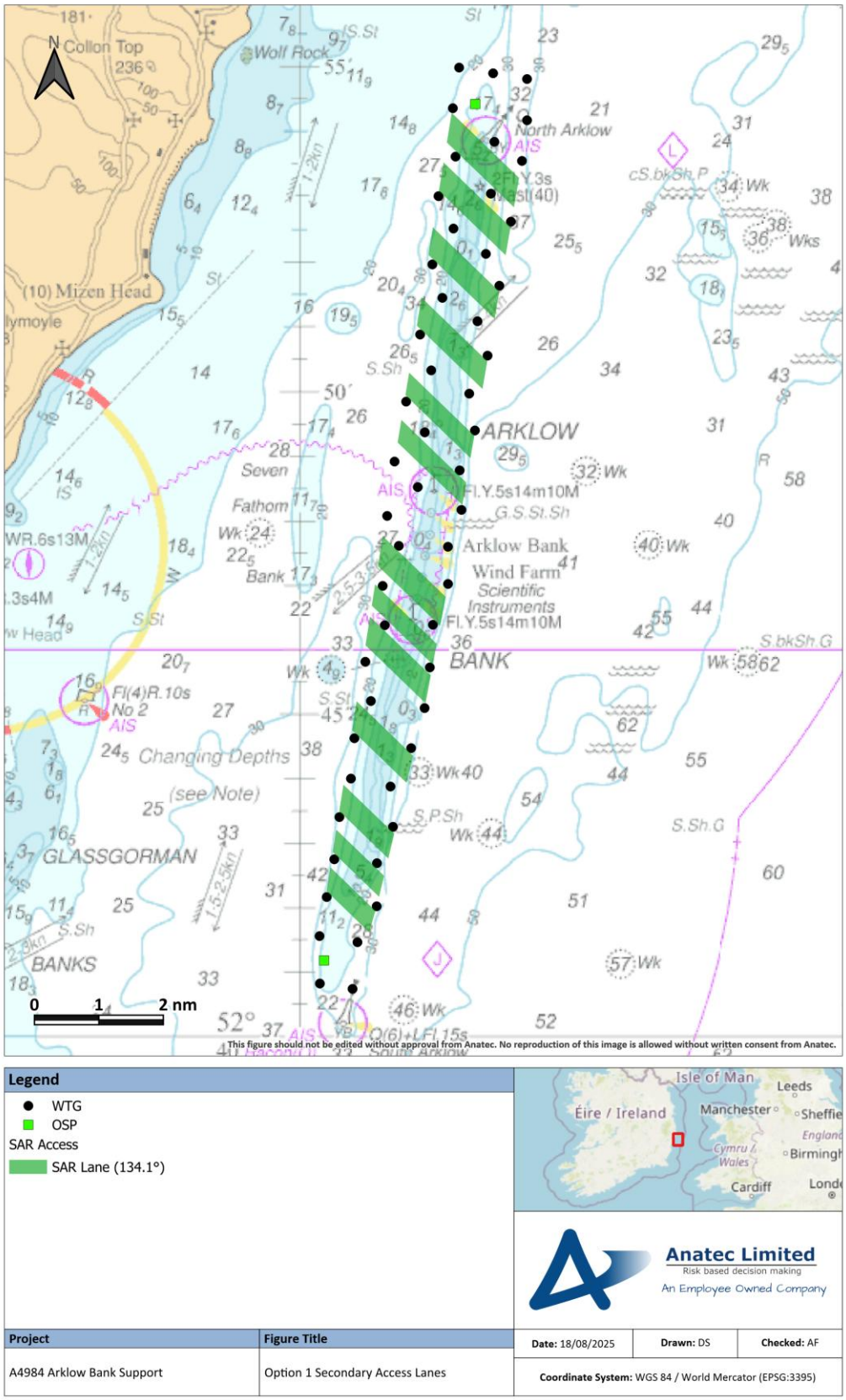
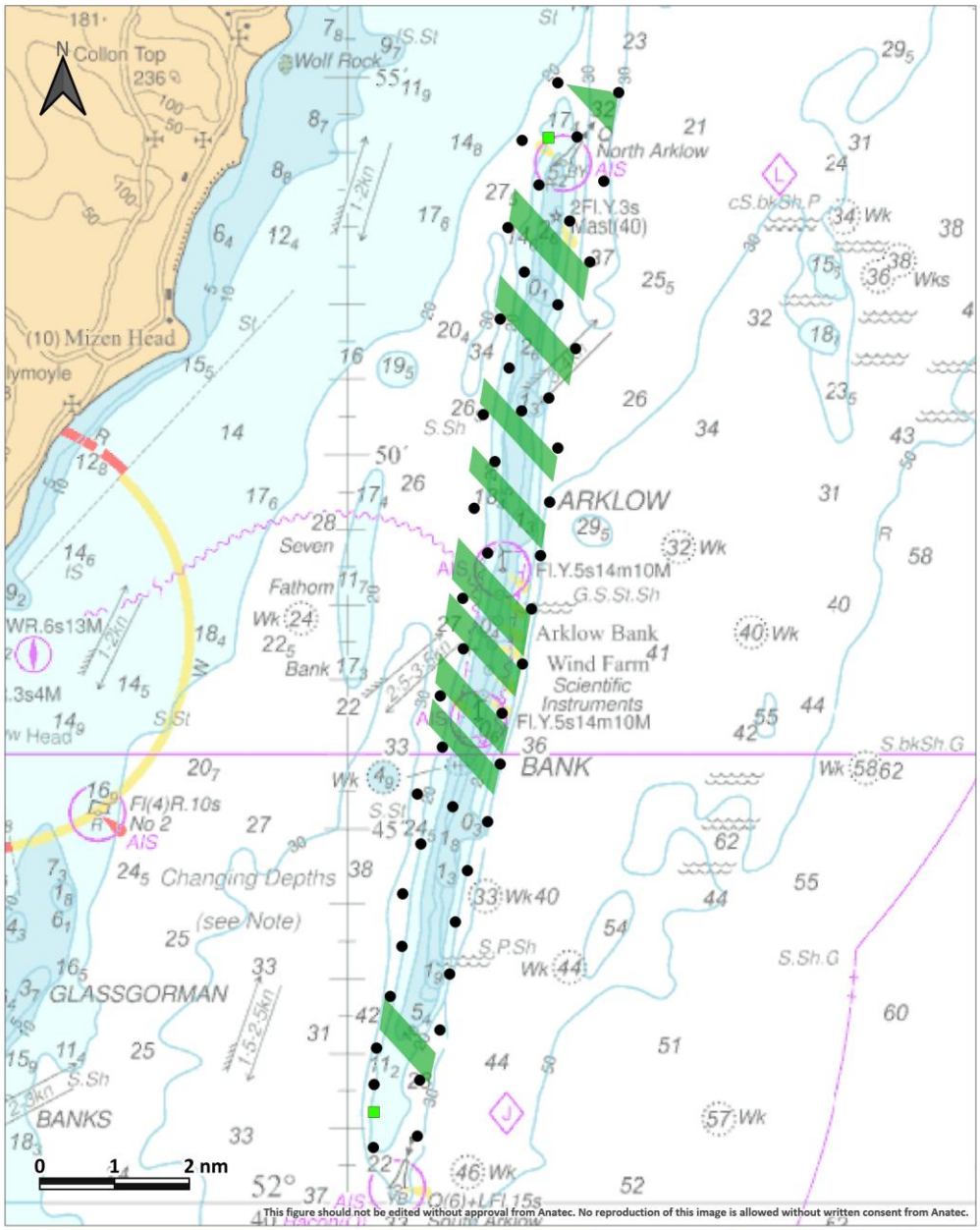


Figure A.3 SAR Secondary Access (Project Design Option 1)



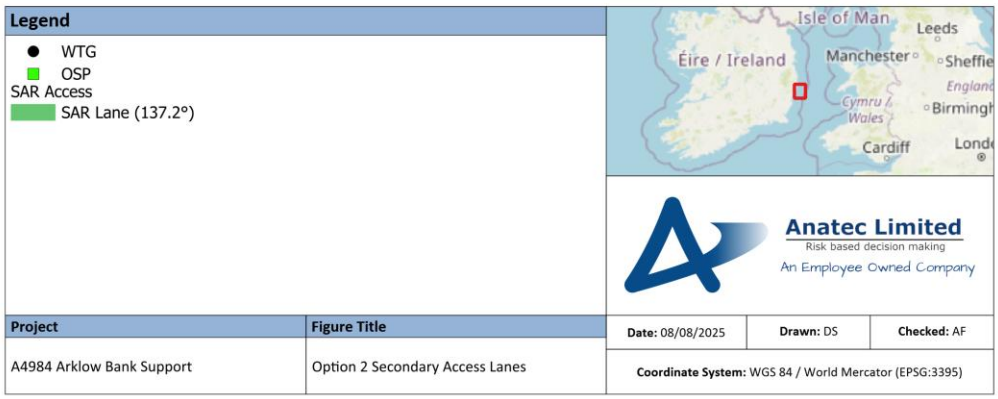


Figure A.4 SAR Secondary Access (Project Design Option 2)

A.3 SAR Operation Overview

A.3.1 SAR Aviation Assets

The primary SAR aviation assets will be the SAR helicopters located at the four bases identified in Figure 3-6. When project construction commences, it is anticipated that all four bases will have transitioned to using the AW189 helicopter. In addition to helicopters, the IRCG can task their King Air 200 fixed wing to assist in searching, environmental monitoring, or to coordinate more complex rescues.

A.3.2 SAR Lanes

Section 1.1 identifies why a Single Line of Orientation is required for this project. The Primary SAR Lanes are shown in Figure A.1 and Figure A.2 and Secondary SAR Lanes shown in Figure A.3 and Figure A.4. The SAR Lanes provide a passageway that is a minimum of 500m wide between WTG blade tips at their worst-case orientation. Due to the length of the Array Area being long north to south (14.6nm) and short east to west (1.3nm), SAR Lanes perpendicular (north-south) to the proposed SAR Lanes would not increase access, as the shortest distance to any point inside the Array Area will always be via the proposed east-west SAR Lanes.

A.3.3 Rescue Scenarios

Incidents that occur to the east of the Array Area can be accessed by overflying the WTGs. In good weather, the transit could be flown 500ft above the WTGs under Visual Flight Rules (VFR). In poor weather, the transit over the Array Area would be made at a minimum of 1,000ft above the WTGs under Instrument Flight Rules (IFR). As the SAR helicopters are equipped for flight in Full Icing Conditions, the WTGs would not impose any additional restrictions on an IFR transit to an incident. Under either VFR or IFR a transit over the WTGs would not require a deviation from a direct track and so the Array Area would have no impact on SAR operations to the east of Arklow Bank.

Section 4 identifies previous incidents in the Array Area, using historical evidence. Section 5 identifies likely rescue scenarios inside the Array Area during construction and operation of the wind farm, as well as incidents to 3rd party users of the area. Historically, the incidents in the Array Area have occurred in fair to good visibility, where a SAR helicopter could likely enter the array under day VFR.

A.3.4 Night and Poor Weather Operations

Using historical evidence, it is Extremely Unlikely that a SAR helicopter will be required to conduct a rescue from Arklow Bank in a Degraded Visual Environment (DVE), such as at night or in poor visibility. However unlikely, a rescue in DVE is considered below.

Section 5 identifies that for most rescue scenarios, the location of the incident would likely be known due to an emergency call or personnel wearing Personal Locator Beacons. Therefore, the Search element of a SAR mission would be minimal, with the helicopter transiting direct to the survivor's location and so minimising their exposure to the WTGs. This

minimises the requirement for the helicopter to fly search patterns inside the Array Area. If the location of a survivor is not known, for example a fishing boat is reported overdue, then in addition to using the SAR Lanes, the Array Area could be searched from outside the WTGs, as the area is narrow east to west (1.3nm). Furthermore, the radar and other sensors installed on the IRCG King Air could have a role in searching the area from overhead.

When entry into the Array Area is required under DVE the following mitigations are available:

- The SAR lighting will emit in the infra-red and so will be visible to the electro-optical turret fitted to the SAR helicopter. Imagery from the EO turret is available to the Technical Crew in the cabin and may be displayed to the pilots in the cockpit. In addition, the lighting will be visible to all crew members wearing Night Vision goggles (NVGs).
- The location of WTGs will be made available to the IRCG during construction of the Array. The location of each WTG can be added to aviation terrain and obstacle databases. The location of each WTG can be added to the obstacle database installed on the helicopter's Mission Management System. This will permit the Technical Crew to correlate the position of the WTGs with other sensor data and so ensure that situational awareness is maintained during flight inside and adjacent to WTGs. In addition, the position of the WTGs may be added to the Helicopter Terrain Awareness Warning System (HTAWS), providing a study confirms this will not result in a high Nuisance Alert[3] rate. HTAWS can be displayed in the cockpit and provides an aural warning of an impending collision to all crew members.
- In DVE it is anticipated that the SAR crew will make optimum use of the helicopter's automation in order to maintain a track along a SAR Lane.
- In the unlikely event of a helicopter malfunction, including an engine failure, it is a short distance to exit the array either to the east or the west.

A.3.5 Summary

The following points were considered:

- The low probability of an incident occurring in DVE;
- The short transit distance east-west;
- The equipment installed on SAR helicopters, including a SAR autopilot;
- The position of each WTG being made available to a SAR crew inflight, on their obstacle and terrain database(s);
- The integrated sensor data available to the crew, permitting them to correlate WTG positions with other sensor data; and
- Infra-red emitting SAR lighting installed on each WTG.

When the combination of factors are taken into account, it is considered that in the case of the Array Area for the Proposed Development, SAR Lanes with a single line of orientation will

[3] In aviation, a nuisance alert refers to an alert generated by a system that is functioning correctly but is inappropriate or unnecessary for the specific situation. These alerts can be distracting and reduce a crew's confidence in the alerting system, potentially delaying responses to legitimate alerts.

provide satisfactory access, which will not be significantly increased by adding a second perpendicular line of orientation, running north-south.

Appendix B SAR Supporting Operational Technology Systems

B.1 WTG SCADA System

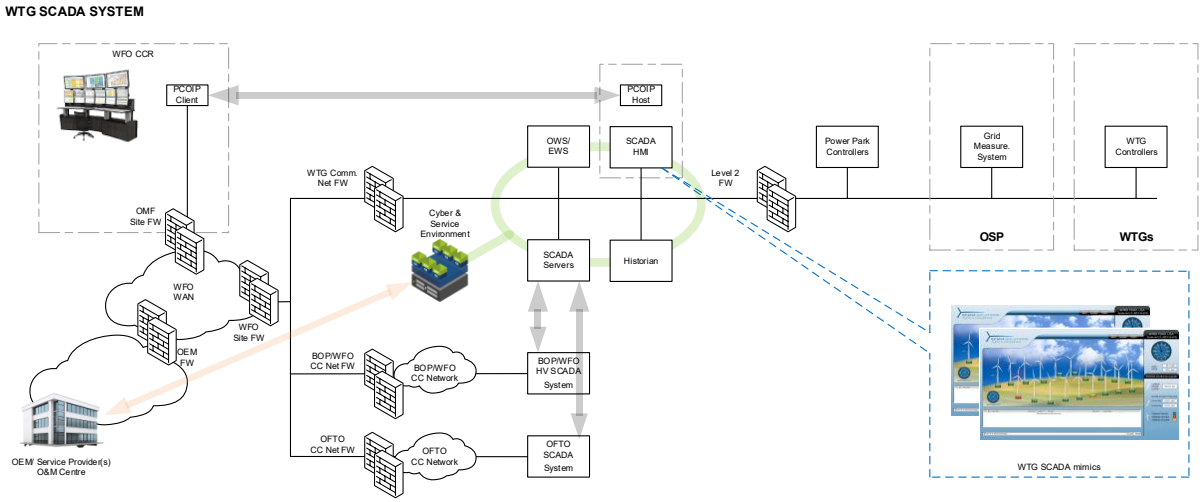


Figure B.1 WTG SCADA System Concept

B.2 CCTV System

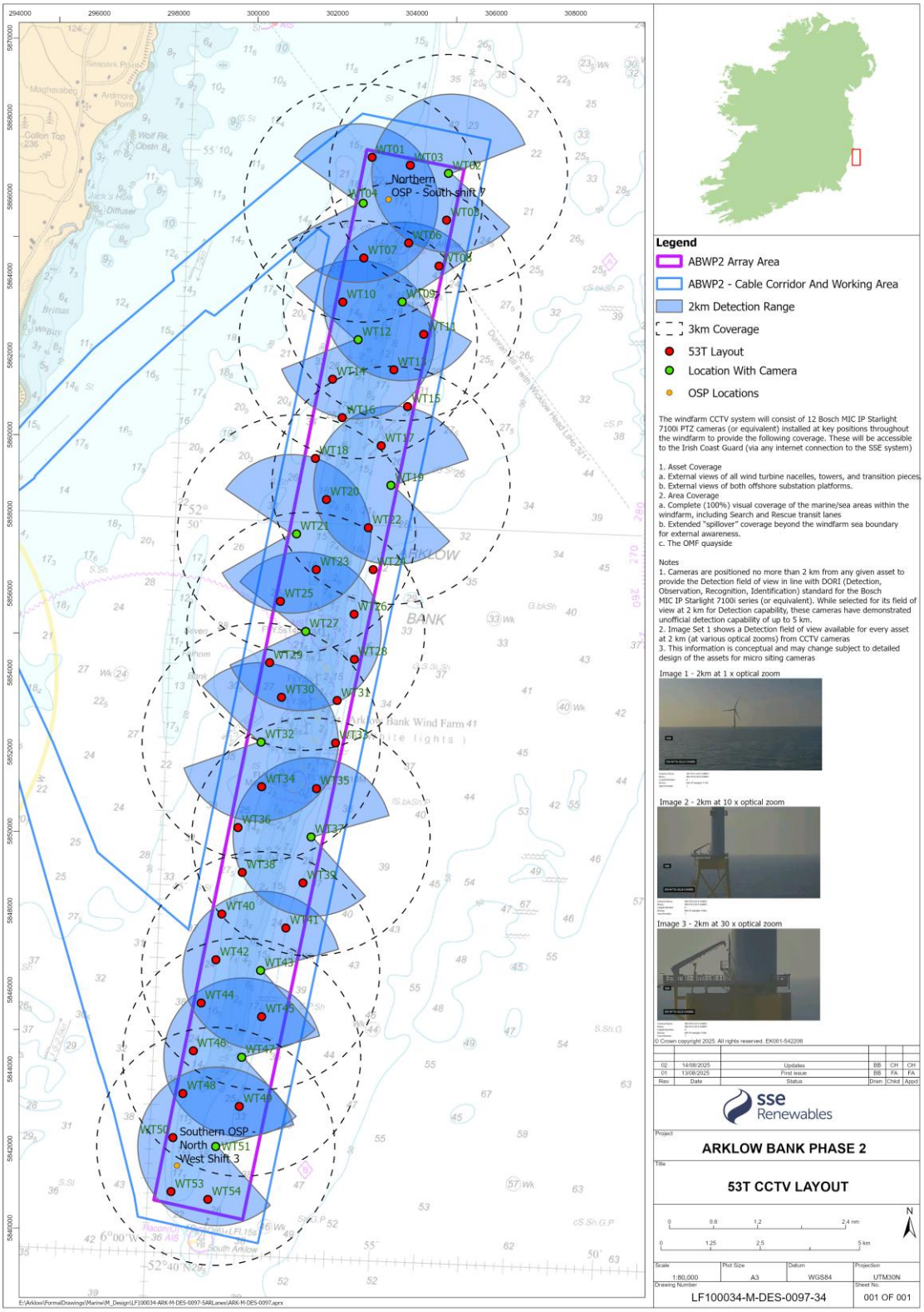


Figure B.2 CCTV Layout – Project Design Option 1

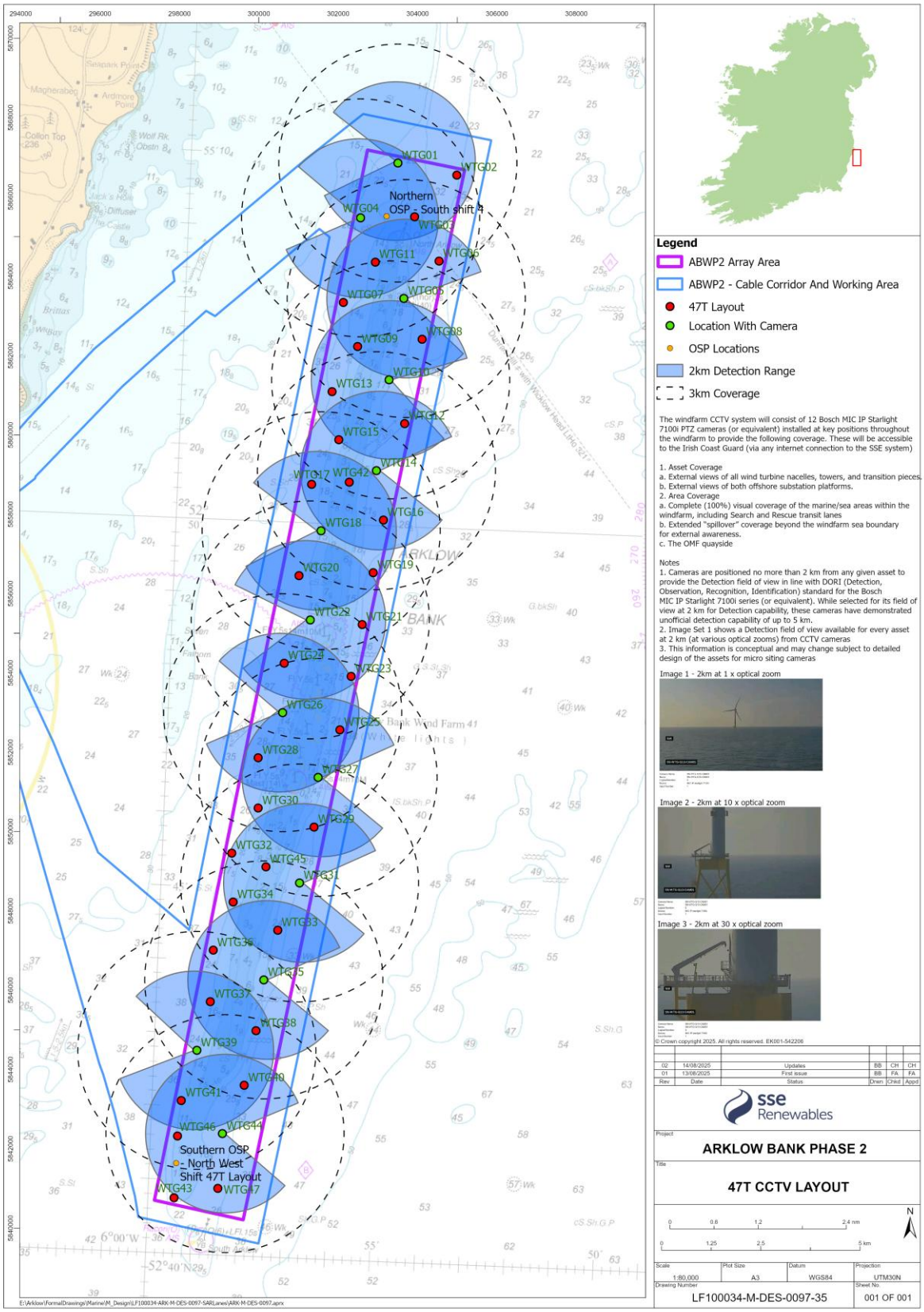


Figure B.3 CCTV Layout – Project Design Option 2

B.3 Marine Coordination Set Up

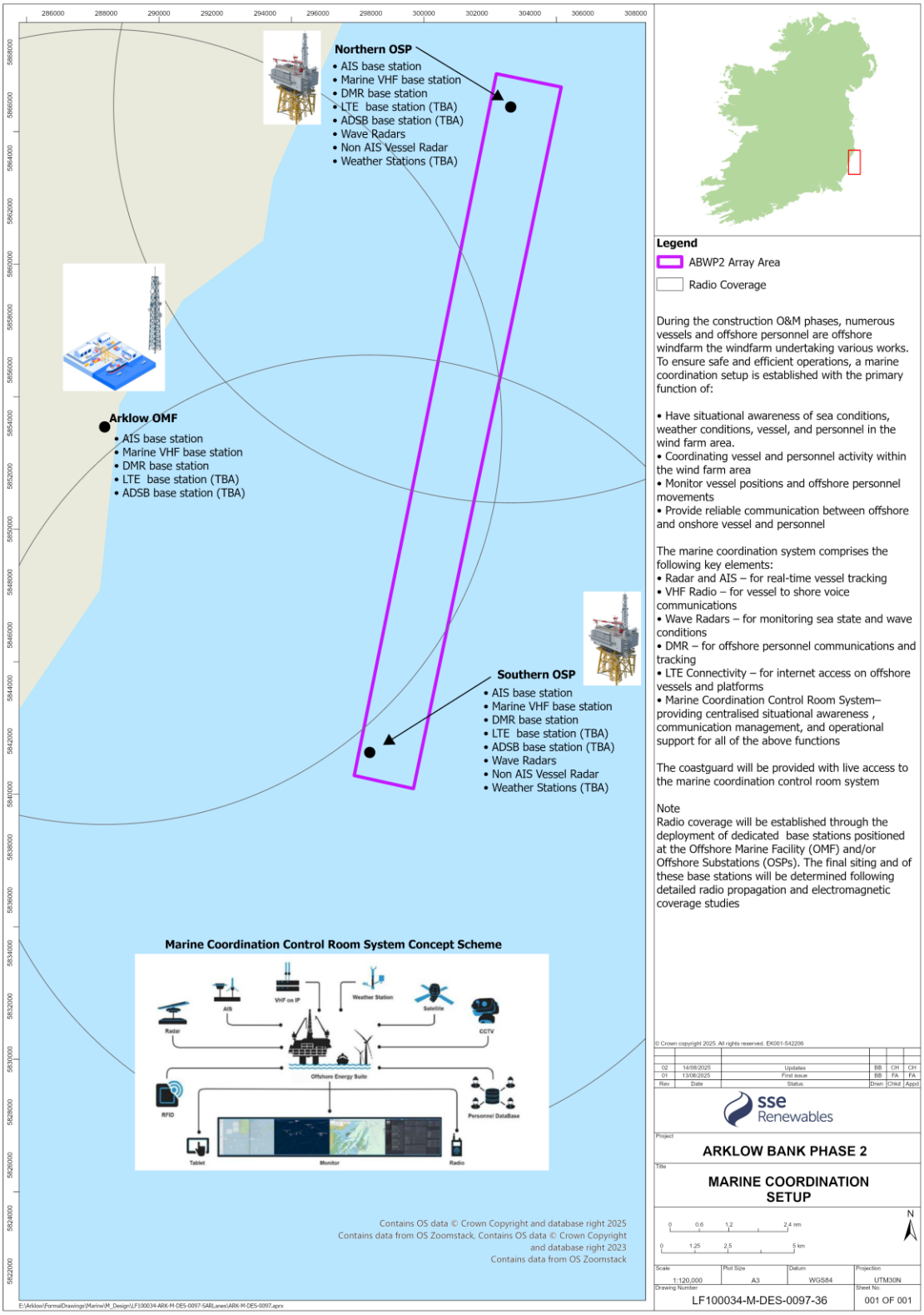


Figure B.4 Marine Coordination Set Up

B.4 Marine Coordination System HMI Screens

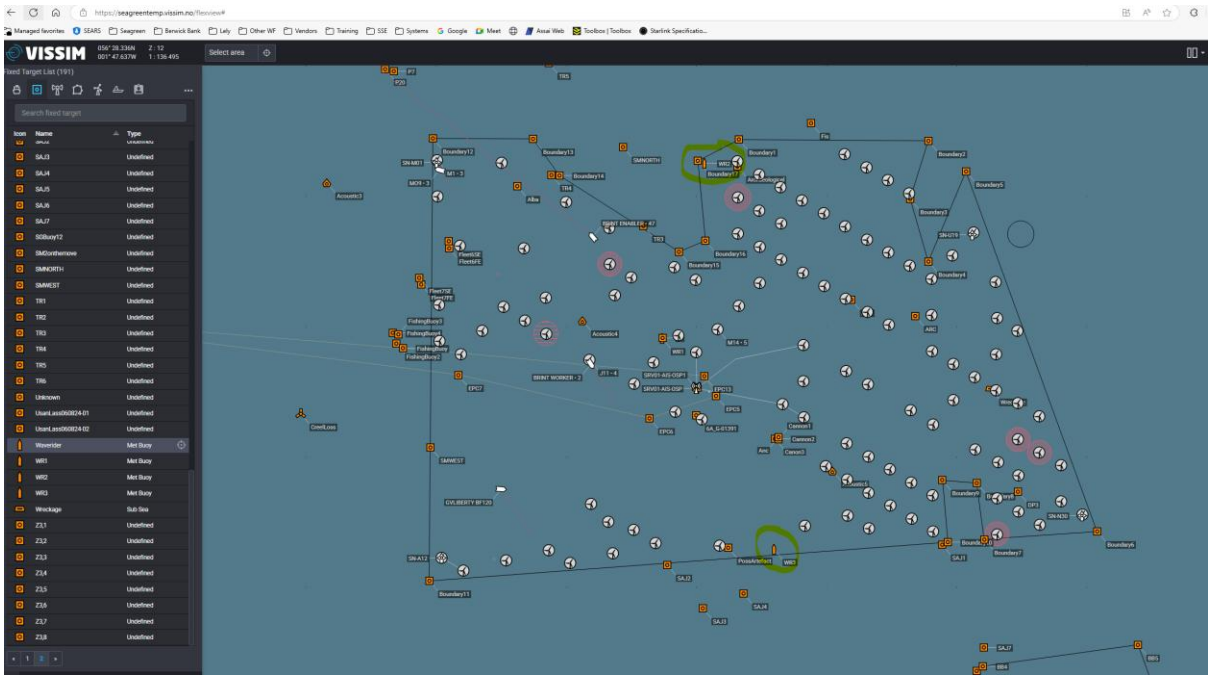


Figure B.5 Vessel and Personnel Tracking

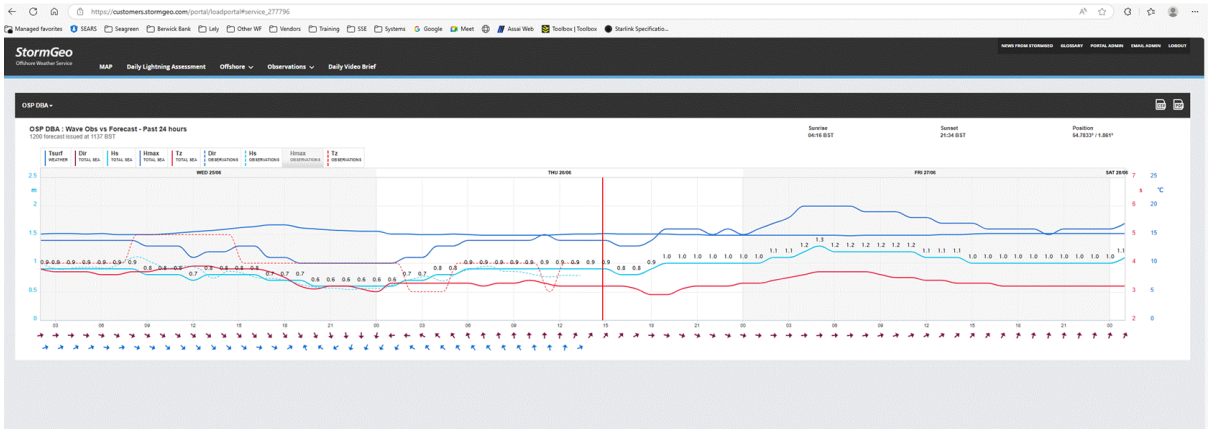


Figure B.6 Wave Height Measurements

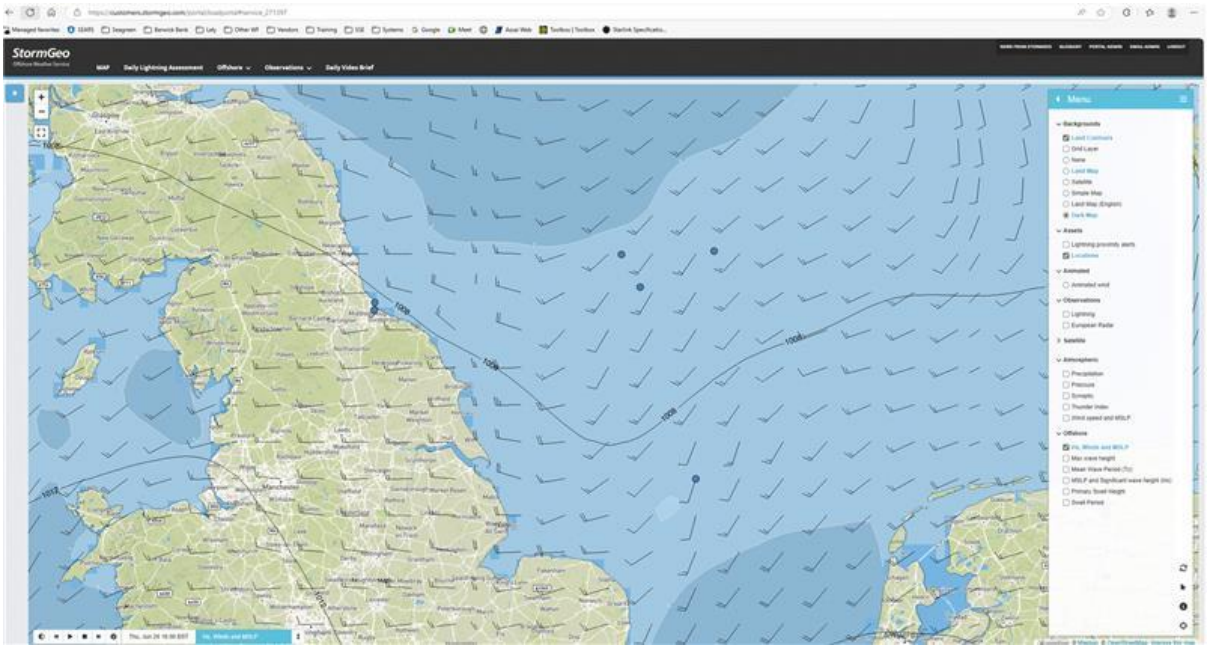


Figure B.7 Weather Measurements

Appendix C Project Vessel Response Precedent

Companies operating offshore typically have resources including vessels, helicopters, and other equipment available for normal operations that can assist with emergencies offshore. All vessels under IMO obligations set out in SOLAS (IMO, 1974) as amended, are required to render assistance to any person or vessel in distress if safely able to do so.

Table C.1 presents details of incidents which have occurred within the United Kingdom (UK) where a vessel associated with a nearby OWF has rendered assistance. It is noted that the initial cause of these incidents is not related to the OWF in question.

Table C.1 Incidents Responded to by Vessels Associated with UK OWFs

Incident Type	Date	Related Development	Description of Incident	Source
Capsize	21 June 2018	Walney	His Majesty's Coastguard (HMCG) issued mayday relay broadcast following trimaran capsize. Support vessel for Walney arrived and recovered two persons from the water who were then winched onboard a Coastguard helicopter.	Web search (4C Offshore, 2018)
Capsize	5 November 2018	Race Bank	Fishing vessel capsized resulting in two persons in the water. Vessel operating at the nearby Race Bank reported to have assisted with the rescue which also involved a Belgian military helicopter and the RNLI.	Web search (British Broadcasting Corporation (BBC), 2018)
Vessel in distress	15 May 2019	London Array	Yacht in difficulty sought shelter by tying up to a WTG but suffered damage and a person in the water. Support vessel for London Array identified and secured the casualty vessel and recovered the person in the water. The support vessel raised the alarm to the Coastguard. The Coastguard later instructed the support vessel to return to port and seek medical assistance for the casualty vessel's occupant.	Web search (The Isle of Thanet News, 2019)
Drifting	7 July 2019	Gwynt y Môr	Speedboat suffered mechanical failure stranding four persons. Support vessel for Gwynt y Môr responded to an 'all-ships' broadcast from the Coastguard and prevented the casualty vessel drifting into the Gwynt y Môr array. The support vessel later towed the casualty vessel back towards port.	Web search (Renews, 2019)

Incident Type	Date	Related Development	Description of Incident	Source
Machinery failure	28 September 2019	Race Bank	Fishing vessel suffered mechanical failure and launched flares. Guard vessel and Service Operations Vessel (SOV) for Race Bank both immediately offered assistance until the MCA's arrival on-scene.	Internal daily progress report received by Anatec
Vessel in distress	13 December 2019	Race Bank	Passing vessel got into difficulty and guard vessel for Race Bank was requested to assist. The Coastguard later requested that the guard vessel tow the casualty vessel into port.	Internal daily progress report received by Anatec
Search	21 May 2020	Walney	Coastguard contacted guard vessel for Walney reporting red flare sighting at the OWF. Guard vessel proceeded to undertake search but did not find anything to report.	Internal daily progress report received by Anatec
Aircraft crash	15 June 2020	Hornsea Project One	United States (US) jet crashed into sea during routine flight. CTVs and SOVs for Hornsea Project One joined the search for the missing pilot.	Web search (4C Offshore, 2020)
Fire / explosion	15 December 2020	Dudgeon	Fishing vessel experienced explosions on board with crew injured. SOV for Dudgeon deployed its Fast Rescue Boat (FRB) and evacuated the casualty vessel.	Web search (Offshore WIND, 2020)
Persons in distress	10 July 2021	Unknown (East Irish Sea)	Two swimmers were in difficulty near to Talacre beach and raised the alarm. An RNLI lifeboat was launched from West Kirkby although the swimmers were recovered from the water by a commercial wind farm vessel.	Web search (RNLI, 2021)
Drifting	17 July 2021	Neart na Gaoithe	Small dinghy with two children aboard drifted offshore due to strong winds. A guard vessel associated with Neart na Gaoithe was able to retrieve the children.	Web search (Edinburgh Evening News, 2021)

Incident Type	Date	Related Development	Description of Incident	Source
Machinery failure	1 September 2022	Rampion	A recreational motorboat experienced power failure and anchored near to an OWF. The anchor could not then be recovered and assistance was requested from the Coastguard. A CTV for the OWF responded and towed the vessel back to port.	Marine Accident Investigation Branch (MAIB) (Case ID 9900)
Machinery failure	1 December 2022	Unknown	A survey vessel suffered an engine failure and was towed back to port by an OWF Rigid Inflatable Boat (RIB).	MAIB (Case ID 10215)
Persons in distress	12 July 2024	Stromar	A deckhand on a fishing vessel became entangled in a creel rope and was pulled overboard. The vessel's crew alerted HM Coastguard and manoeuvred to attempt a rescue. The deckhand was recovered on board and attempts to revive were supported by a paramedic from a HM Coastguard helicopter, an RNLI lifeboat and crew from a nearby survey vessel for the Stromar OWF. The deckhand could not be revived and was declared deceased.	Web search (BBC, 2024)