Appendix 14.3

MCA MGN 371 Checklist

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Tidal Lagoon Swansea Bay

(Appendix 14.3)

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B1. Introduction

1.1.0.1 This report presents the Maritime and Coastguard Agency (MCA) checklist based on the requirements set out in Marine Guidance Note (MGN) 371 which was the guidance set by the MCA during the NRA preparation.

1.1.0.2 Reference notes/remarks made within Table 1 in Section C2 are based on which sections of the Navigational Risk Assessment or other documents, address the issue noted in the MGN 371 checklist.

B2. MGN 371 Compliance Checklist

Table C2.1 MGN 371 Compliance Checklist for Swansea Bay Tidal Lagoon

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
Annex 1 : Considerations on Site Position, Structures and Safety Zones			
1. Site and Installation Co-ordinates: Developers are responsible for ensuring that formally agreed variations in the co-ordinates of site perimeters and individual OREI structures are made available, on request, to interested parties at all project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System (GIS) data, preferably in Environmental Systems Research Institute (ESRI) format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided in latitude/ longitude formats.			
2. Traffic Survey			
All vessel types	✔		***Section 9: Marine Traffic Survey.*** *Assessment of all vessel types was achieved by survey, recording AIS and radar data, supplemented by visual observations.*
Four weeks duration, within 12 months prior to submission of the Environmental Statement	✔		***Section 9: Marine Traffic Survey.*** *Survey period comprised 14 days assessment of AIS/radar/visual observations in August 2013.This shorter duration of survey was agreed in advance with MCA, in consideration of the scale and locality of the development.*
Seasonal variations	✔		***Section 8: Marine Traffic Analysis.*** *The baseline took into account summer (28 days July 2012) and winter (28 days October 2012) AIS data, to take account of seasonal variations in traffic patterns.* ***Section 9: Marine Traffic Survey.*** *This was improved upon with a 14 day survey (August 2013).*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
Recreational and fishing vessel organisations	✔		***Section 9: Marine Traffic Survey.*** *Consultation carried out during the NRA indicated the traffic survey is representative of fishing and recreational vessel traffic levels. Recreational vessel traffic was influenced by the weather conditions, fair conditions and associated traffic was measured during the survey. Fishing vessel transits are less predictable through the year, as they vary according to external factors such as quotas. Fishing vessel traffic levels were consistent in the data.*
Port and navigation authorities	✔		***Section 9: Marine Traffic Survey.*** *Consultation carried out during the NRA indicated the traffic survey data is considered representative of present day traffic levels.*
Assessment			
a. Proposed OREI site relative to areas used by any type of marine craft.	✔		***Section 9: Marine Traffic Survey.*** *Tracking of all vessel types was achieved by recording AIS and radar data supplemented by visual observations. This was analysed to provide a detailed examination of the marine traffic present within the bay and transiting the lagoon development site.* ***Section 10: Hazard Workshop.*** *Vessel activity in the area discussed during stakeholder consultation with MCA, THLS, RYA, Chamber of Shipping, Cruising Association, Welsh Yachting Association, ABP, Neath Port Authority, Swansea Dry Docks, City and County of Swansea, South West Wales Fisheries Committee, Swansea Marina , Swansea Port Health Authority, Neath Estuary Group, Mumbles Motorboat and Fishing Club, Monkstone Sailing and Cruising Club, Tawe Boat Club, local fishermen.*
b. Numbers, types and sizes of vessels presently using such areas	✔		***Section 9: Marine Traffic Survey.*** Each type of navigational receptor was analysed.

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
c. Non-transit uses of the areas, e.g. fishing, day cruising of leisure craft, racing, aggregate dredging, etc.	✔		***Section 9: Marine Traffic Survey.*** *Summarises the results of the traffic survey.* ***Section 11: Consultation.*** *Non-transit uses of the area discussed during stakeholder consultation.*
d. Whether these areas contain transit routes used by coastal or deep-draught vessels on passage.	✔		***Section 4: Baseline Environment.*** *Reviews navigational features in the vicinity.* ***Section 9: Marine Traffic Survey.*** *Determines whether these areas contain transit routes used by coastal or deep-draught vessels on passage, by examination of draught details in traffic survey data.*
e. Alignment and proximity of the site relative to adjacent shipping lanes	✔		***Section 9: Marine Traffic Survey.*** *This section identifies and assesses the alignment and proximity of the site relative to adjacent shipping lanes, by analysis of maritime traffic survey data.*
f. Whether the nearby area contains prescribed routeing schemes or precautionary areas	✔		***Section 4: Baseline Environment.*** *Based on review of Admiralty Charts and IMO Ship Routeing report.* ***Section 8: Marine Traffic Analyses.*** *Details the recreational cruising routes in the locality.* ***Section 9: Marine Traffic Survey.*** *Determines whether vessels follow prescribed routeing schemes and avoid precautionary areas by examination of vessel tracks.*
g. Whether the site lies on or near a prescribed or conventionally accepted separation zone between two opposing routes	✔		***Section 4: Baseline Environment.*** *Reviews prescribed zones based on Admiralty Charts and IMO Ship Routeing Report.* ***Section 9: Marine Traffic Survey.*** *Reviews actual traffic behaviour based on real-time data.*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
h. Proximity of the site to areas used for anchorage, safe haven, port approaches and pilot boarding or landing areas.	✔		***Section 4: Baseline Environment.*** *Examines the proximity of the site to areas used for anchorage, safe haven, port approaches and pilot boarding or landing areas, from analysis of Admiralty Charts and Sailing Directions (NP37).* ***Section 9: Marine Traffic Survey.*** *Reviews actual traffic behaviour and provides information on the proximity and speeds of vessels to the site.*
i. Whether the site lies within port limits, etc. jurisdiction of a port and/or navigation authority.	✔		***Section 4: Baseline Environment.*** *Examines whether the site lies within port limits of jurisdiction of a port and/or navigation authority using information from Admiralty Charts and Sailing Directions (NP37).*
j. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✔		***Section 8: Marine Traffic Analyses.*** ***Section 9: Marine Traffic Survey.*** *Reviews the fishing vessel activity at the proposed development area based on the maritime traffic survey and the latest available Government surveillance (sightings and satellite) data.*
k. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✔		***Section 4: Baseline Environment.*** *Analysis of Admiralty Charts, Admiralty Sailing Directions NP37 and PEXA Charts to determine proximity to military areas.*
l. Proximity of the site to existing or proposed offshore oil / gas platform, marine aggregate dredging, marine archaeological sites or wrecks, or other exploration/exploitation sites	✔		***Section 4: Baseline Environment.*** *Uses Admiralty Charts and published oil & gas infrastructure data to assess proximity to oil/gas platforms. Analyses GIS files based on published data from The Crown Estate to determine proximity to marine aggregate dredging sites. Analysed Hydrographic Charts for positions of wrecks in the area.*
m. Proximity of the site relative to any designated areas for the disposal of dredging spoil	✔		***Section 4: Baseline Environment.*** *Examined positions of dredging spoil grounds taken from Hydrographic Charts.*
n. Proximity of the site to aids to navigation and/or Vessel Traffic Services (VTS) in or adjacent to the area and any impact thereon.	✔		***Section 4: Baseline Environment.*** *Examined Admiralty Charts and Sailing Directions (NP37) for positions of navigational aids and proximity to VTS.*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
o. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density.	✔		*Not applicable.*
p. Type(s) of simulation used in analysis Limitation of system(s)	✔		*Not applicable.*
3. OREI Structures			
a. Whether any features of the OREI, including auxiliary platforms outside the main generator site and cabling to the shore, could pose any type of difficulty or danger to vessels underway, performing normal operations, or anchoring.	✔		***Section 6: Emergency Response Overview and Assessment*** *Summarises the Search and Rescue features of the area.* ***Section 7: Maritime Incidents.*** *Reviews the maritime incidents that have occurred in the vicinity of the OREI over the last 10 years, using both MAIB and RNLI data.* ***Section 9: Marine Traffic Survey.*** *Considers whether any features of the OREI could pose a danger to vessels underway, performing normal operations or anchoring.* ***Section 10: Hazard Workshop.*** *Reviews the navigational hazards associated with the OREI based on the baseline data analysis, stakeholder consultation and discussions at the Hazard Workshop held for the project.* ***Section 11: Consultation.*** *Vessel activity in the area discussed during consultation with a number of relevant stakeholders.*
Clearances of wind turbine blades above the sea surface *not less than 22 metres*	✔		*Not applicable.*
Least depth of current turbine blades	✔		*Turbines contained within concrete housing*
The burial depth of cabling	✔		*Not applicable.* *The cable works are embedded in the seawall.*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
b. Whether any feature of the installation could create problems for emergency rescue services, including the use of lifeboats, helicopters and emergency towing vessels (ETVs)	✔		***Section 6: Emergency Response Overview and Assessment.*** *Summarises the SAR features of the area.* ***6.2 Search and Rescue (SAR) Helicopters.*** *Summarises SAR helicopter assets in the vicinity of the Project.* ***6.4 RNLI Lifeboats.*** *Summarises RNLI lifeboat stations in the vicinity and their distance of their vessels to development.* ***6.3 Emergency Towing Vessels.*** *Examines options for salvage in the vicinity of the project.*
c. With respect to specific OREI devices, how rotor blade rotation, other exposed moving mechanical parts and/or power transmission, etc., will be controlled by the designated services when this is required in an emergency.	✔		***Section 6: Emergency Response Overview and Assessment.*** ***6.5 Search and Rescue Liaison.*** *Developers will be required to consult and liaise with the local RNLI stations and the Coastguard about the devices utilised and provide any further information requested to assist SAR efforts.*
4. Assessment of Access to and Navigation Within, or Close to , an OREI: To determine the extent to which navigation would be feasible within the OREI site itself by assessing whether:			
a. Navigation within or close to the site would be safe:			
i. by all vessels, or ii. by specified vessel types, operations and/or sizes. iii. in all directions or areas, or iv. in specified directions or areas. v. in specified tidal, weather or other conditions	✔ ✔ ✔ ✔ ✔		***Section 6: Emergency Response Overview and Assessment.*** *Summarises the Search and Rescue features of the area.* ***Section 7: Maritime Incidents.*** *Reviews the maritime incidents that have occurred in the vicinity of the OREI over the last 10 years.* ***Section 9: Marine Traffic Survey.*** *Reviews the traffic survey to determine whether navigation within the site would be safe. Appraising the maritime traffic survey data in detail. Both in a 5nm buffer of the lagoon and within the lagoon development itself.* ***9.8 Recreational Vessel Activity.*** *Examines recreational vessel activity within the area based on the available desktop information.*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
			9.9 Fishing Vessel Activity. *Reviews fishing vessel activity in the area based on the survey data and surveillance (sightings and satellite) data.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Reviews the navigational hazards associated with the lagoon development, based on the baseline data analysis, stakeholder consultation and discussions at the Hazard Workshop held for the project.* ***Section 11: Consultation.*** *Feasibility of navigation discussed during consultation with a number of relevant stakeholders.* ***Section 12: Formal Safety Assessment.*** *Reviews the navigational impacts identified by the formal safety assessment.* ***Section 13: Cumulative and In-Combination Impacts.*** *Considers potential cumulative and in-combination impacts of the Project, along with other proposed projects in the area and the impacts on navigation within and close to the site.*

Issue: OREI RESPONSE	Yes	No	Reference notes/Remarks
b. Navigation in and/or near the site should be:			
i. prohibited by specified vessels types, operations and/or sizes. ii. prohibited in respect of specific activities, iii. prohibited in all areas or directions, or iv. prohibited in specified areas or directions, or v. prohibited in specified tidal or weather conditions, or simply vi. Recommended to be avoided.	✔ ✔ ✔ ✔ ✔ ✔		*Relevant sections are cross-referenced under point a. (above).* *Navigation around and within the lagoon development will be accessible except for the marked exclusion area around the turbine/sluice housing, where the hazard is greatest*.
c. Exclusion from the site could cause navigational, safety or routeing problems for vessels operating in the area. e.g. by causing a vessel or vessels to follow a less than optimum route.	✔		*Relevant sections are cross-referenced under point a. (above).*
Relevant information concerning a decision to seek a "safety zone" for a particular site during any point in its construction, operation or decommissioning should be specified in the Environmental Statement accompanying the development application	✔		***Section 12: Formal Safety Assessment.*** *Safety zones are considered, when appropriate, during construction/maintenance phases.*

Annex 2 : Navigation, collision avoidance and communications			
1. The Effect of Tides and Tidal Streams : *It should be determined whether:*			
i. Current maritime traffic flows and operations in the general area are affected by the depth of water in which the proposed installation is situated at various states of the tide i.e. whether the installation could pose problems at high water which do not exist at low water conditions, and vice versa.	✔		***Section 4: Baseline Environment.*** *States water depth of the channels in proximity to the lagoon development.* ***Section 5: Metocean Data.*** *Examines the general situation and various states of the tide in the area.* ***Section 9: Marine Traffic Survey.*** *Assesses current maritime traffic flows and operations in the general area. Reviewing the maritime traffic survey data in detail.* Both *in a 5nm buffer of the lagoon and within the lagoon development itself.* ***Section 7: Maritime Incidents.*** *Reviews maritime incidents that have occurred in the vicinity of the Project over the last 10 years including those related to the water depth.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Reviews maritime traffic flows and operations in the general area with specific focus on water depths based on the baseline data analysis, stakeholder consultation and discussions at the Hazard Workshop held for the project.*
ii. The set and rate of the tidal stream, at any state of the tide, has a significant effect on vessels in the area of the OREI site.	✔		*Relevant sections are cross-referenced under point i. (above).*
iii. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✔		***Section 5: Metocean Data.*** *Assesses tidal stream in the area.*
iv. The set is across the major axis of the layout at any time, and, if so, at what rate.	✔		***Section 5: Metocean Data.*** *Assesses tidal stream in the area.*
v. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream.	✔		***Section 5: Metocean Data.*** *Assesses tidal stream in the area.*
vi. The structures themselves could cause changes in the set and rate of the tidal stream.	✔		*Refer to coastal processes study (Chapter 6).*

vii. The structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water depths in the wind farm area or adjacent to the area	✔		*Refer to coastal processes study (Chapter 6).*
2. Weather: *It should be determined whether:*			
i. The site, in normal, bad weather, or restricted visibility conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.	✔		***Section 4: Baseline Environment.*** *States water depth of the channels in proximity to the lagoon development.* ***Section 5: Metocean Data.*** *Presents Metocean data for the area.* ***Section 9: Marine Traffic Survey.*** *Assesses routeing of vessels which pass in close proximity to the Project based on conditions experienced during the Marine Traffic Survey.* ***Section 7: Maritime Incidents.*** *Reviews maritime incidents that have occurred in the vicinity of the Project over the last 10 years including those related to bad weather or restricted visibility.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Weather conditions at the site were discussed during the Hazard Workshop.*
ii. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✔		*Not applicable.*
iii. In general, taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set such as referred to in 2.1 (v) above	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Drifting vessels discussed during the Hazard Workshop.*

3. Visual Navigation and Collision Avoidance: *It should be determined whether:*			
i. The structures could block or hinder the view of other vessels under way on any route.	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Visual navigation discussed during the Hazard Workshop and ranking.*
ii. The structures could block or hinder the view of the coastline or of any other navigational feature such as aids to navigation, landmarks, promontories, etc.	✔		***Section 4: Baseline Environment.*** *Assesses details of the site, including existing aids to navigation, noting other navigational features within a 5nm buffer.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Danger of obstruction of existing light and potential mitigation discussed.* ***Section 11: Consultation.*** *Navigational features discusses with stakeholders.*
4. Communications, Radar and Positioning Systems : *To provide researched opinion of a generic and, where appropriate, site specific nature concerning whether:*			
i. The structures could produce radio interference such as shadowing, reflections or phase changes, with respect to any frequencies used for marine positioning, navigation or communications, including Automatic Identification Systems (AIS), whether ship borne, ashore or fitted to any of the proposed structures.	✔		*Not applicable - No impact assessed as structure is sea level/low level.*
ii. The structures could produce radar reflections, blind spots, shadow areas or other adverse effects: a. Vessel to vessel; b. Vessel to shore; c. VTS radar to vessel; d. Racon to/from vessel.	✔		*Not applicable - No impact assessed as structure is sea level/low level.*
iii. The OREI, in general, would comply with current recommendations concerning electromagnetic interference.	✔		*Not applicable.* *No impact considered or assessed.*
iv. The structures and generators might produce sonar interference affecting fishing, industrial or military systems used in the area.	✔		*Not applicable.* *No impact considered or assessed.*
v. The site might produce acoustic noise which could mask prescribed sound signals.	✔		*Not applicable.* *No impact considered or assessed.*

vi. Generators and the seabed cabling within the site and onshore might produce electro-magnetic fields affecting compasses and other navigation systems.	✔		*Not applicable.* *No impact considered or assessed.*
5. Marine Navigational Marking : *It should be determined:*			
i. How the overall site would be marked by day and by night taking into account that there may be an ongoing requirement for marking on completion of decommissioning, depending on individual circumstances.	✔		***Section 4: Baseline Environment.*** *Assesses details of the site, including existing aids to navigation, noting other navigational features within a 5nm buffer.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Marking and lighting discussed at Hazard Workshop.* ***Section 11: Consultation*** • ***Port authorities*** *Discussion on existing and future lighting and marking of the lagoon.* • ***THLS/MCA*** *Discussion on existing and future lighting and marking of the lagoon.* *Consultation sought advice on lighting and marking of the development. The final navigational markings will be agreed with the THLS. IALA guidance will be followed.*
ii. How individual structures on the perimeter of and within the site, both above and below the sea surface, would be marked by day and by night.	✔		*Relevant sections are cross-referenced under point i. (above).*
iii. If the specific OREI structure would be inherently radar conspicuous from all seaward directions (and for SAR and maritime surveillance aviation purposes) or would require passive enhancers.	✔		*Relevant sections are cross-referenced under point i. (above).* *No plans for passive enhancers.*
iv. If the site would be marked by one or more radar beacons (Racons).	✔		*Relevant sections are cross-referenced under point i. (above).* *No plans for Racons.*
v. If the site would be marked by an Automatic Identification System (AIS) transceiver, and if so, the data it would transmit.	✔		*Relevant sections are cross-referenced under point i. (above).* *No plans for AIS.*
vi. If the site would be fitted with a sound signal, and where the signal or signals would be sited	✔		*Relevant sections are cross-referenced under point i. (above).* *No plans for sound signals.*

vii. If the structure(s) would be fitted with aviation marks, and if so, how these would be screened from mariners or potential confusion with other navigational marks and lights resolved	✔		*Relevant sections are cross-referenced under point i. (above).* *No plans for aviation marks.*
viii. Whether the proposed site and/or its individual generators would comply in general with markings for such structures, as required by the relevant General Lighthouse Authority (GLA) or recommended by the Maritime and Coastguard Agency, respectively.	✔		*Relevant sections are cross-referenced under point i. (above).*
ix. The aids to navigation specified by the GLAs are being maintained such that the 'availability criteria', as laid down and applied by the GLAs, is met at all times. Separate detailed guidance is available from the GLAs on this matter.	✔		*Relevant sections are cross-referenced under point i. (above).*
x. The procedures that need to be put in place to respond to casualties to the aids to navigation specified by the GLAs, within the timescales laid down and specified by the GLAs.	✔		*Relevant sections are cross-referenced under point i. (above).*
6. Hydrography: In order to establish a baseline, detailed and accurate hydrographic surveys are required to IHO Order 1a standard multibeam bathymetry with final data being supplied as a digital full density data set, and erroneous soundings flagged as deleted but include in the data set. A full report detailing survey methodology and equipment should accompany the surveys.			
Annex 3: MCA template for assessing distances between wind farm boundaries and shipping routes			
Annex 4: Safety and mitigation measures recommended for OREI during construction, operation and decommissioning.			

Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the Environmental Impact Assessment (EIA).The specific measures to be employed will be selected in consultation with the Maritime and Coastguard Agency and will be listed in the developer's Environmental Statement (ES). These will be consistent with international standards contained in, for example, the Safety of Life at Sea (SOLAS) Convention - Chapter V, IMO Resolution A.572 (14)3 and Resolution A.671(16)4 and could include any or all of the following:	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Identified hazards and mitigation methods* ***Section 12: Formal Safety Assessment.*** *Reviewed mitigation and safety measures appropriate to the impact and development.*
i. Promulgation of information and warnings through notices to mariners and other appropriate media.	✔		*Relevant sections are cross-referenced above at beginning of Annex 4.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Promulgation of information and warnings through notices to mariners and other appropriate media discussed as mitigation during Hazard Workshop.*
ii. Continuous watch by multi-channel VHF, including Digital Selective Calling (DSC).	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Discussed at Hazard Workshop.*
iii. Safety zones of appropriate configuration, extent and application to specified vessels	✔		***Section 12: Formal Safety Assessment.*** *Discusses safety zones. Mitigation is considered for the construction phase.*
iv. Designation of the site as an area to be avoided (ATBA).	✔		*Not applicable.*
v. Implementation of routeing measures within or near to the development.	✔		*Not applicable.*
vi. Monitoring by radar, AIS and/or closed circuit television (CCTV).	✔		*Not yet confirmed.*
vii. Appropriate means to notify and provide evidence of the infringement of safety zones or ATBA's.	✔		*Not applicable.*
viii. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✔		*Relevant sections are cross-referenced above at beginning of Annex 4.* ***Section 11: Consultation.*** *Measures and procedures discussed with stakeholders.*

ix. Creation of an Emergency Response Cooperation Plan with the relevant Maritime Rescue Coordination Centre (from construction phase onwards)	✔		***Section 11: Consultation.*** *ERCoP will meet MCA requirements and be developed/ agreed pre construction.* ***Section 12: Formal Safety Assessment.*** *ERCoP discussed during impact assessment.*
Annex 5: Standards and procedures for wind turbine generator shutdown in the event of a search and rescue, counter pollution or salvage incident in or around a wind farm.			
1. Design Requirements: The OREI should be designed and constructed to satisfy the following design requirements for emergency rotor shut-down in the event of a search and rescue (SAR), counter pollution or salvage operation in or around a wind farm or other OREI site:			
i. All wind turbine generators (WTGs) and other OREI individual structures will each be marked with clearly visible unique identification characters which can be seen by both vessels at sea level and aircraft (helicopters and fixed wing) from above.	✔		*The final navigational markings will be agreed with the THLS and the Local Lighthouse Authorities.*
ii. The identification characters shall each be illuminated by a low-intensity light visible from a vessel thus enabling the structure to be detected at a suitable distance to avoid a collision with it. The size of the identification characters in combination with the lighting should be such that, under normal conditions of visibility and all known tidal conditions, they are clearly readable by an observer, stationed 3 metres above sea levels, and at a distance of at least 150 metres from the turbine. It is recommended that lighting for this purpose be hooded or baffled so as to avoid unnecessary light pollution or confusion with navigation marks. (Precise dimensions to be determined by the height of lights and necessary range of visibility of the identification numbers)	✔		*The final navigational markings will be agreed with the THLS and the Local Lighthouse Authorities.*

iii. For aviation purposes, OREI structures should be marked with hazard warning lighting in accordance with CAA guidance and also with unique identification numbers (with illumination controlled from the site control centre and activated as required) on the upper works of the OREI structure so that aircraft can identify each installation from a height of 500ft (150 metres) above the highest part of the OREI structure.	✔		*The final navigational markings will be agreed with the THLS and the Local Lighthouse Authorities.*
iv. Wind Turbine Generators (WTG) shall have high contrast markings (dots or stripes) placed at 10 metre intervals on both sides of the blades to provide SAR helicopter pilots with a hover reference point.	✔		*Not applicable.*
v. All OREI generators and transmission systems should be equipped with control mechanisms that can be operated from the OREI Central Control Room or through a single contact point.	✔		***Section 6: Emergency Response Overview and Assessment.*** ***6.5 Search and Rescue Liaison.*** *Developers will require to consult and liaise with the local RNLI stations and the Coastguard about the devices to be deployed and provide any further information requested to assist SAR efforts.*
vi. Throughout the design process for an OREI, appropriate assessments and methods for safe shutdown should be established and agreed, through consultation with MCA Navigation safety Branch, Search and rescue Branch and other emergency support services.	✔		***Section 6.5: Search and Rescue Liaison*** ***Section 12: Formal Safety Assessment.*** *Developers will require to consult and liaise with the local RNLI stations and the Coastguard about the devices to be deployed and provide any further information requested to assist SAR efforts.*
vii. The OREI control mechanisms should allow the Control Room Operator to fix and maintain the position of the WTG blades, nacelles and other appropriate OREI moving parts to configurations determined by the Maritime Rescue Co-ordination Centre (MRCC). This same operator must be able to immediately effect the control of offshore substations and export cables.	✔		*Not applicable.*

viii. Nacelle hatches and other OREI enclosed spaces in which personnel are working should be capable of being opened from the outside. This will allow rescuers (e.g. helicopter winch-man) to gain access to the tower if tower occupants are unable to assist and when sea-borne approach is not possible.	✔		*Not applicable.*
ix. Access ladders, although designed for entry by trained personnel using specialised equipment and procedures for turbine maintenance in calm weather, could conceivably be used, in an emergency situation, to provide refuge on the turbine structure for distressed mariners. This scenario should therefore be considered when identifying the optimum position of such ladders and take into account the prevailing wind, wave and tidal conditions.	✔		*Not applicable.*
x. Although it may not be feasible for mariners in emergency situations to be able to use wave or tidal generators as places of refuge, consideration should nevertheless be given to the provision of appropriate facilities.	✔		*Not applicable.*
2. Operational Requirements			
i. The Central Control Room, or mutually agreed single point of contact, should be manned 24 hours a day.	✔		*Design will meet MCA requirements.*
ii. The Central Control Room, or mutually agreed single point of contact, should have a chart indicating the Global Positioning System (GPS) position and unique identification numbers of each of the WTGs in the wind farm, or individual devices in other types of OREI.	✔		*Design will meet MCA requirements.*
iii. All MRCCs will be advised of the contact telephone number of the Central Control Room, or mutually agreed single point of contact.	✔		*Design will meet MCA requirements.*

iv. All MRCCs will have a chart indicating the GPS position and unique identification number of each of the WTGs in all wind farms or all devices in other types of OREI.	✔		*Not applicable.*
v. All search and rescue helicopter bases will be supplied with an accurate chart of all the OREI and their GPS positions.	✔		*Design will meet MCA requirements.*
vi. The Civil Aviation Authority shall be supplied with accurate GPS positions of all OREI structures for civil aviation navigation charting purposes	✔		*Not applicable.*
3. Operational Procedures			
i. Upon receiving a distress call or other emergency alert from a vessel which is concerned about a possible collision with a WTG or is already close to or within the wind farm, or when the MRCC receives a report that persons are in actual or possible danger in or near a wind farm and search and rescue aircraft and/or rescue boats or craft are required to operate over or within the wind farm, the MRCC/SC will establish the position of the vessel and the identification numbers of any WTGs which are visible to the vessel. This information will be passed immediately to the Central Control Room, or single contact point, by the MRCC. A similar procedure will be followed when vessels are close to or within other types of OREI site.	✔		*Design will meet MCA requirements.*
ii. The control room operator, or single point of contact, should immediately initiate the shut-down procedure for those WTGs as requested by the MRCC and maintain the WTG in the appropriate shut-down position, again as requested by the MRCC, or as agreed with MCA Navigation Safety Branch or Search and Rescue Branch for that particular installation, until receiving notification from the MRCC that it is safe to restart the WTG.	✔		*Design will meet MCA requirements.*

iii. The appropriate procedure to be followed in respect of other OREI types, designs and configurations will be determined by these MCA branches on a case by case basis, in consultation with appropriate stakeholders, during the Scoping and Environmental Impact Assessment processes	✔		*Design will meet MCA requirements.*
iv. Communication procedures should be tested satisfactorily at least twice a year. Shutdown and other procedures should be tested as and when mutually agreed with the MCA	✔		*Design will meet MCA requirements.*

Offshore Renewable Energy Installations

Methodology for Assessing the Marine Navigational Safety Risks of Offshore Wind Farms (Compliance with recommended DTI Methodology)

General Comments:

Section	Yes	No	Reference notes/Remarks
A1: Overview and guidance on navigation safety issues.	✔		***Section 1: Introduction.*** ***Section 2: Guidance***
A2: Overview of FSA.	✔		***Section 1: Introduction.***
A3: Lessons learned.	✔		*Lessons learned during other renewable energy projects have been considered throughout the NRA.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Takes into account stakeholder experience and lessons learned.*
B1: Base case traffic densities and types.	✔		***Section 4: Baseline Environment.*** *Summarises the results of the marine traffic analysis.*
B2: Future traffic densities and types.	✔		***Section 9: Marine Traffic Survey.*** *Summarises the results of the maritime traffic survey.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Discusses future traffic levels.* ***Section 11: Consultation.*** ***Section 12: Formal Safety Assessment.*** *Reviews how traffic may change in the future.*
B3: The marine environment :			
B3.1 Technical & operational analysis	✔		***Section 4: Baseline Environment.***
B3.2 Generic TOA	✔		***Section 1: Introduction.***
B3.3 Potential accidents	✔		***Section 10: Hazard Workshop.*** ***Section 11: Consultation.*** ***Section 12: Formal Safety Assessment.*** *Discuss navigational hazards associated with the development.*

Section	Yes	No	Reference notes/Remarks
B3.4 Affected navigational activities	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Discusses navigational activities which may be affected by the development.*
B3.5 Effects of wind farm structures	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Discusses potential effects of devices.*
B3.6 Development phases	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Discusses development phase of the Project.*
B3.7 Other structures & features	✔		***Section 1.2: Site Overview.*** *Reviews associated structures.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Other structures and features discussed at Hazard Workshop.*
B3.8 Vessel types involved	✔		***Section 1.3: Construction Traffic.*** *Details potential vessel types involved.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** *Possible vessel types discussed at Hazard Workshop.*
B3.9 Conditions affecting navigation	✔		***Section 5: Metocean Data.*** *Discusses meteorological conditions in the vicinity.* ***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Mentions conditions affecting navigation in the vicinity of the site.*
B3.10 Human actions	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** *Discusses potential human actions in vicinity.*
C1: Hazard Identification	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
C2: Risk Assessment	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
C3: Hazard log	✔		***Appendix 14.2 – Hazard Log***

Section	Yes	No	Reference notes/Remarks
C4: Level of risk	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** ***ES Chapter 14: Navigation and Marine Transport Assessment.***
C5: Influences on level of risk	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** ***ES Chapter 14: Navigation and Marine Transport Assessment.***
C6: Tolerability of residual risk	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** ***ES Chapter 14: Navigation and Marine Transport Assessment.***
D1 : Appropriate risk assessment	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
D2 : MCA approval for assessment tools and techniques	✔		***Section 2: Guidance.*** The assessment methodology principally followed the Department of Energy and Climate Change (DECC) Risk Assessment Methodology and the Maritime and Coastguard Agency's (MCA) Marine Guidance Notice 371 (MGN 371).
D3: Demonstration of results	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
D4 : Area traffic assessment	✔		***Section 8: Marine Traffic Analyses.*** *Summarises the results of the maritime traffic analysis and survey.*
D5 : Specific traffic assessment	✔		***Section 9: Marine Traffic Survey.*** *Analysis the results of the marine traffic survey, both in a 5nm buffer of the lagoon and within the lagoon development itself. This examines activity for commercial shipping, recreational vessels and fishing vessels.*
E1 : Risk control log	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
E2 : Cost benefit assessment	✔		*Cost benefit assessment will be carried out if required.*

Section	Yes	No	Reference notes/Remarks
E3 : Assessment of equity to stakeholders	✔		*Assessment of equity to stakeholders will be carried out if required.*
F1: Tolerability of risk claim	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.*** ***ES Chapter 14: Navigation and Marine Transport Assessment.***
G1 : Hazard identification checklist	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
G2 : Risk control checklist	✔		***Section 10: Hazard Workshop. (Appendix 14.2 – Hazards and Impacts).*** ***Section 12: Formal Safety Assessment.***
G3 : MCA MGN 371 compliance checklist	✔		***Appendix 14.3 – MGN Checklist.***