
Proposed UK Offshore Renewable Energy Installations (OREI) - Guidance on Navigational Safety Issues.

Notice to Other UK Government Departments, Offshore Renewable Energy Developers, Shipowners, Mariners, Fishermen and recreational sailors.

SUMMARY

The purpose of this guidance note is to highlight issues that need to be taken into consideration when assessing the impact on navigational safety from offshore renewable energy developments, proposed for United Kingdom waters.

Key Points

- The recommendations contained within this guidance note should be used, primarily, by offshore renewable energy installation developers, seeking consent to undertake marine works.
- Specific annexes address issues covering; site position, structures and safety zones (Annex 1), developments, navigation, collision avoidance and communications (Annex 2), examples of additional routing safety measures (Annex 3), search and rescue matters (Annex 4) and Article 60 UNCLOS (Annex 5)

Introduction:

1.1 Offshore Renewable Energy Installations (OREI) include offshore wind farms, marine current turbines, wave generators and any other installation with the potential to affect marine navigation and safety.

1.2 The Maritime and Coastguard Agency recommendations contained within this guidance note should be used by offshore renewable energy installation

developers seeking consent for marine works from the Secretary of State and / or devolved assemblies, under such consenting requirements as, for example,

The Electricity Act 1989 -Sections 36 & 37

The Food & Environment Protection Act 1985 - Section 5

The Coast Protection Act of 1949 - Section 34

The Water Resource Act 1991 - Section 109

1992 The Transport & Works Act
EIA Directive (97/11/EC)
Strategic Environmental
Assessment Directive (2001/42/EC)

1.3 The considerations and criteria contained in the attached annexes are intended to address the navigational impact of OREI proposed for U.K. sites. Their development necessitates the establishment of a clear consents process to deal with potential detrimental effects. The consent regime must take account of local factors, national standards and international aspects which could influence the establishment of an OREI.

1.4 The recommendations are a product of the Maritime and Coastguard Agency (MCA), an executive agency of the Department for Transport (DfT). They have been developed in consultation with the Offshore Renewables Consents Unit (ORCU) of the Department of Trade & Industry (DTI), the devolved government authorities, mariners in the commercial, military, fisheries and recreational sectors, relevant associations and port authority representatives, the General Lighthouse Authority (GLA) and emergency services such as the Royal National Lifeboat Institution (RNLI).

2. How the recommendations should be used.

2.1 The recommendations should be used by OREI developers and their contracted environmental and risk assessors in the preparation of

Scoping Reports (SR), Environmental Impact Assessments (EIA) and resulting Environmental Statements (ES).

2.2 These should evaluate all navigational possibilities, which could reasonably be foreseeable, by which the siting, construction, establishment and decommissioning of an OREI could cause or contribute to an obstruction of, or danger to, navigation or marine emergency services. They should also be used to assess the most favourable options to be adopted.

2.3 Potential navigational or communications difficulties caused to any mariners or emergency services using the site area and its environs should be assessed. Those which could contribute to a marine casualty leading to injury, death or loss of property, either at sea or amongst the population ashore, should be highlighted as well as those affecting emergency services. Consultation with local and national search and rescue authorities should be initiated and consideration made of the types of vessels and equipment which might be used in emergencies. This should include the possible use of OREI structures as emergency refuges.

2.4 General navigational difficulties might include such considerations as the necessity to deviate from normal routes or to increase passage times on routes. Assessment should be made of any factors which might lead to recreational craft having to enter major shipping routes.

2.5 *In terms of navigational priority, these recommendations do not differentiate between any types of seagoing water craft, operations, or mariners.*

3. Annexes:

3.1 The recommendations are contained in the appended Annexes. These highlight some of the considerations and criteria which should be considered with respect to all OREIs.

3.2 They are not exclusive in content and appropriate consideration should be given to the particular characteristics of individual sites, which might require additional investigation according to their position and the marine traffic mix in that area. Where other OREI, of any type and whether operating, consented or still at the planning stage, are adjacent to or close to the proposed site, the potential cumulative effects of all such sites should be included in the Environmental Impact Assessment and Environmental Statement.

3.3 *These recommendations apply to all sites, whether within the jurisdiction of port limits or in open sea areas. However, port authorities may require developments to comply with their own specific criteria.*

3.4 Sites should comply with the recommendations during all phases of their planning, construction, operation and decommissioning.

3.5 Information concerning their navigational aspects should be promulgated in ample time to all relevant mariners, organisations

and authorities during these four phases.

3.6 Contingency arrangements to deal with marine casualties in, or adjacent to sites, including responses to environmental pollution, should have been planned, and practised to test their efficiency.

3.7 The following annexes contain recommendations on:

Annex 1: Considerations on site position and structure

Annex 2: Navigation, collision avoidance and communications

Annex 3: Examples of additional marine routeing safety measures to establish in association with wind farms during operation

Annex 4: 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.

Annex 5: Article 60 UNCLOS - Artificial islands, installations and structures in the exclusive economic zone

3.8 **Note:** *The MCA reserves the right to vary or modify these recommendations on the basis of experience or in accordance with internationally recognised standards in the interest of safety of life at sea and protection of the marine environment. As other types of offshore renewable energy installations are developed, new annexes to this document will be introduced.*

Hydrography, Meteorology & Ports Branch
Bay 2/30 Spring Place
Maritime and Coastguard Agency
105 Commercial Road
Southampton SO15 1EG

Tel: 02380 329135
Fax: 02380 329204

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Annex 1 - Considerations on Site Position, Structures and Safety Zones

3. Traffic Survey

An up to date traffic survey of the area concerned should be undertaken. This should include all vessel types and is likely to total at least four weeks duration but also taking account of seasonal variations in traffic patterns. These variations should be determined in consultation with representative recreational and fishing vessel organisations. The survey should assess:

- a. Proposed OREI site relative to areas used by any type of marine craft.
- b. Numbers, types and sizes of vessels presently using such areas.
- c. Non-transit uses of the areas, e.g. fishing, day cruising of leisure craft, racing, aggregate dredging, etc.
- d. Whether these areas contain transit routes used by vessels on passage.
- e. Alignment of the site relative to adjacent shipping lanes.
- f. Whether the nearby area contains prescribed routeing schemes.
- g. Whether the site lies on or near a prescribed or conventionally accepted separation zone between two opposing routes.
- h. Proximity of the site to areas used for anchorage, safe haven, or port approaches.
- i. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.
- j. Proximity of the site to areas used for any marine military purposes.
- k. Proximity of the site to existing or proposed offshore oil / gas platform, aggregate dredging or other exploration/exploitation sites.
- l. Aids to navigation in the area.

4. OREI Structures

It should be determined:

- a. Whether any features of the OREI, outside the main generator site itself but including its cabling to the shore, could pose any type of difficulty or danger to vessels underway, performing normal operations, or anchoring.

Such dangers would include clearances of wind turbine blades above the sea surface, the least depth of current turbine blades, the burial depth of cabling, etc.

Note: Recommended minimum safe (air) clearances between sea level conditions at mean high water springs (MHWS) and wind turbine rotors are that they should be suitable for the vessels types identified in the traffic survey but generally not less than 22 metres. Depths, clearances and similar features of other OREI types which might affect marine safety should be determined on a case by case basis.

- 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)
- c. How rotor blade rotation and power transmission, etc., will be controlled by the designated services when this is required in an emergency.

Note: Annexe 4 of this document details HM Coastguard recommended standards and procedures for the use of an Active Safety Management System (ASMS) in the event of an incident in or around an offshore wind farm.

3. 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 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.
- b. or, if deemed necessary and through relevant legislation, navigation in and/or near the site should be :
 - i. prohibited in all areas or directions, or
 - ii. prohibited in specified areas or directions, or
 - iii. prohibited in specified tidal or weather conditions, or simply
 - iv. recommended to be avoided.
- c. and, if so, whether exclusion from the site could cause navigational, safety or routing problems for vessels operating in the area.
- d. NOTE : Relevant information concerning a decision to seek "safety zone" orders for a particular site during any point in its construction, operation or decommissioning, should be promulgated to MCA and other interested parties without delay.

Annex 2 - Navigation, collision avoidance and communications

1. The Effect of Tides and Tidal Streams :

It should be determined whether or not:

- i. Current maritime traffic flows and operations in the 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.
- ii. Set and rate of the tidal stream, at any state of the tide, has a significant affect on vessels in the area of the OREI site.
- iii. Maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.
- iv. Set crosses the major axis of the layout at any time, and, if so, at what rate.
- v. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream.
- vi. Structures themselves could cause changes in the set and rate of the tidal stream.
- vii. Structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water depths in the area.

2. Weather :

To determine if:

- i. Site, in normal or bad weather conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.
- ii. Structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.

3. Visual Navigation and Collision Avoidance :

To assess the extent to which:

- i. Structures could block or hinder the view of other vessels under way on any route.
- ii. Structures could block or hinder the view of the coastline or of any other navigational feature such as buoys, lights, promontories, etc.

4. Communications, Radar and Positioning Systems :

To provide researched opinion concerning whether or not:

- i. 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 or ashore.
- ii. Structures could produce radar reflections, blind spots or shadow areas:
 - a. Vessel to vessel;
 - b. Vessel to shore;
 - c. VTS radar to vessel;
 - d. Racon to/from vessel.
- iii. OREI, in general, would comply with current recommendations concerning electromagnetic interference.
- iv. Structures and generators might produce sonar interference affecting fishing, industrial or military systems used in the area.
- v. Site might produce acoustic noise which could mask prescribed sound signals.
- vi. Generators and the seabed cabling within the site and onshore might produce electro-magnetic fields affecting compasses and other navigation systems.

5. Marking :

To determine:

- i. How the overall site would be marked by day and by night.
- 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.
- iii. If the site would be marked by a racon and/ or,
- iv. If the site would be marked by an Automatic Identification System (AIS) transceiver, and if so, the data it would transmit.
- v. If the site would be fitted with a sound signal, and where the signal or signals would be sited.
- vi. Whether the proposed site and/or its individual generators would comply in general with markings for such structures, as required or recommended both by the relevant Lighthouse Authority and the Maritime and Coastguard Agency.

Annex 3 - Examples of additional marine routeing safety measures recommended to establish in association with wind farms during operation

Measures should be consistent with international standards contained in SOLAS Chapter V, IMO Resolution A.572(14) and Resolution A.671(16).

1. Lower risk wind farms

- i. All of the structures situated in areas with less than 3 metres of water below chart datum and away from all shipping routes, channels, recognised fairways and significant levels of other maritime activity including recreational craft and fishing vessels.

Associated Routeing Measures:

- ii. Dissemination and promulgation of information through radio-warnings and notices to mariners, including details of the nature of activities that should not be carried out within a specified range of the structures and any adverse effects upon navigational systems.

2. Medium risk wind farms

- i. All of the structures situated in areas with less than 7 metres of water below chart datum and away from all shipping routes, channels, recognised fairways, but may be associated with other maritime activity including recreational craft and fishing vessels.

Associated Routeing Measures:

- ii. Dissemination and promulgation of information through radio-warnings and notices to mariners. Safety zones up to 50 metres from the structures with monitoring by radar and a continuous watch by multi-channel VHF including Digital Selective Calling (DSC). Appropriate measures to notify and provide evidence of infringements of safety zones.

3. Higher risk wind farms

- i. Structures situated in areas with more than 7 metres of water below chart datum and close to or across shipping routes, channels and recognised fairways.

Associated Routeing Measures:

- ii. Dissemination and promulgation of information through radio-warnings and notices to mariners.

- iii. Safety zones up to 50 metres from the structures with monitoring by radar, AIS transponders at the extremities and a continuous watch by multi-channel VHF including DSC.
- iv. Use of a guardship or guardships to provide a visible indication of the limits of a safety zone, to alert other mariners when they may be running into danger and to share in the task of monitoring the safety of the wind farm.
- v. Area to be avoided (ATBA) around the whole of the wind farm and up to 500 metres from the extremities preventing access to a range of craft (e.g. vessels of over 300 GT, of over 25 metres in registered length or carrying dangerous or polluting goods) and marine activities.
- vi. Continuous vessel monitoring/information service using radar/AIS and radar by appropriately training staff.
- vii. Closure of nearby shipping routes where there are suitable alternatives (subject to consultation)
- viii. Other routeing measures will be considered where warranted by traffic patterns. Appropriate procedures in place to notify and provide evidence of infringements ATBAs or safety zones.

Annex 4 - 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 wind farm should be designed and constructed to satisfy the following design requirements for emergency rotor shut-down in the event of either a search and rescue (SAR), counter pollution or salvage operation in or around a wind farm:

- i. All wind turbine generators (WTGs) will be marked with clearly visible unique identification characters. The identification characters shall each be illuminated by a low-intensity light visible from the sea at a suitable distance away from the structure. The size of the identification characters in combination with the lighting should be such, under normal conditions of visibility, as to be clearly readable by an observer stationed 3 metres above sea level under all known tidal conditions, and equal to at least twice the range at which significant interference with VHF communications might be predicted. 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).
- ii. All WTGs should be equipped with control mechanisms that can be operated from the Central Control Room of the wind farm.
- iii. The WTG control mechanisms should allow the Control Room Operator to shut down any or all of the WTGs within 60 seconds of initiating the shutdown procedure. Shutdowns shall be limited to those WTGs in the immediate vicinity of an emergency and for as short a period as is safely practicable to do so.
- iv. The WTG control mechanisms should allow the Control Room Operator to fix and maintain the position of the WTG blades:
 - a. in the case of three-bladed turbines to within 5 degrees of either the 12/4/8 or 10/2/6 o'clock positions ("Emergency Shut-Down Positions"); or
 - b. in the case of two-bladed turbines, either in the 12/6 or 3/9 o'clock positions;
 - c. as determined by the Maritime Rescue Co-ordination Centre or Maritime Rescue Sub Centre (MRCC/SC).
- v. Nacelle hatches 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.
- vi. Access ladders for use in emergency or refuge should be placed in the optimum position taking into account the prevailing wind, wave and tidal conditions. In many cases this it likely to be on the usual down-weather side of the WTG tower.

2. Operational Requirements

- i. The Central Control Room should be manned 24 hours a day.
- ii. The Central Control Room operator should have a chart indicating the WTG identification numbers and the GPS positions of each of the WTGs in the wind farm.
- iii. All MRCC/SCs will be advised of the contact telephone number of the Central Control Room.
- iv. All MRCC/SCs will have a chart indicating the GPS position of each of the WTGs in all wind farms.

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, the MRCC/SC will establish the position of the vessel and the identification numbers of any WTGs which are visible to the vessel. The position of the vessel and identification numbers of the WTGs will be passed immediately to the Central Control Room.
- ii. The control room operator should immediately initiate the shut-down procedure for those WTGs as requested by the MRCC/SC, and will maintain the WTG in the appropriate shut-down position again as requested by the MRCC/SC until receiving notification from the MRCC/SC that it is safe to restart the WTG.
- iii. Communication and shutdown procedures should be tested satisfactorily at least twice a year

Annex 5 - Article 60 UNCLOS - Artificial islands, installations and structures in the exclusive economic zone

1. In the exclusive economic zone, the coastal State shall have the exclusive right to construct and to authorize and regulate the construction, operation and use of:
 - a. artificial islands;
 - b. installations and structures for the purposes provided for in article 56 and other economic purposes;
 - c. installations and structures which may interfere with the exercise of the rights of the coastal State in the zone.
2. The coastal State shall have exclusive jurisdiction over such artificial islands installations and structures, including jurisdiction with regard to customs fiscal health, safety and immigration laws and regulations.
3. Due notice must be given of the construction of such artificial islands, installations or structures, and permanent means for giving warning of their presence must be maintained. Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment and the rights and duties of other States. Appropriate publicity shall be given to the depth, position and dimensions of any installations or structures not entirely removed.
4. The coastal State may, where necessary, establish reasonable safety zones around such artificial islands, installations and structures in which it may take appropriate measures to ensure the safety both of navigation and of the artificial islands, installations and structures.
5. The breadth of the safety zones shall be determined by the coastal State taking into account applicable international standards. Such zones shall be designed to ensure that they are reasonably related to the nature and function of the artificial islands, installations or structures, and shall not exceed a distance of 500 metres around them, measured from each point of their outer edge, except as authorized by generally accepted international standards or as recommended by the competent international organization. Due notice shall be given of the extent of safety zones.
6. All ships must respect these safety zones and shall comply with generally accepted international standards regarding navigation in the vicinity of artificial islands, installations, structures and safety zones.
7. Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.

8. Artificial islands, installations and structures do not possess the status of islands. They have no territorial sea of their own, and their presence does not affect the delimitation of the territorial sea, the exclusive economic zone or the continental shelf.