

From: [Helen Croxson](#)
To: [Hornsea Project Three](#)
Cc: [Peter Lowson](#); "[Stephen Vanstone](#)"
Subject: RE: Hornsea Project Three Offshore Wind Farm (EN010080)
Date: 30 November 2018 12:18:12
Attachments: [image001.png](#)
[Hornsea 3 Additional Representation .pdf](#)

Dear David,

Further to my previous email below, please find attached our response to Orsted's comments on our feedback to the ExA questions.

If you need anything further clarified or have any questions please do let me know.

Kind regards

Helen



Helen Croxson, Offshore Renewables Advisor
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Maritime & Coastguard Agency
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Please note I currently work Tuesdays, Wednesdays and Thursdays.

From: Helen Croxson
Sent: 26 November 2018 13:34
To: 'Hornsea Project Three' <HornseaProjectThree@pins.gsi.gov.uk>
Cc: Peter Lowson <Peter.Lowson@mcga.gov.uk>; 'Stephen Vanstone' <Stephen.Vanstone@thls.org>
Subject: RE: Hornsea Project Three Offshore Wind Farm (EN010080)

Dear David,

Thank you very much for the invitation to attend the Hornsea Three Hearings. Unfortunately, on this occasion it is not possible to send MCA representation along. We do however have an interest in both the Navigation Hearing on Tuesday 4th December and the Development Consent Order Hearing on Thursday 6th December 2018. We would therefore like to provide further written representation in advance of those meeting if this is acceptable, and we will of course respond to any questions for MCA afterwards.

I look forward to hearing from you with a deadline for our further written representation in advance of the meetings.

Kind regards

Helen



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Please note I currently work Tuesdays, Wednesdays and Thursdays.

From: Hornsea Project Three <HornseaProjectThree@pins.gsi.gov.uk>
Sent: 07 November 2018 13:58
To: Helen Croxson <Helen.Croxson@mcga.gov.uk>
Subject: Hornsea Project Three Offshore Wind Farm (EN010080)

Dear Sir/Madam,

HORNSEA PROJECT THREE OFFSHORE WIND FARM (EN010080)

Your reference: 20010612

Please follow the link below to view the updated notification letter for the Hearings taking place between 3 and 7 December 2018:

<http://infrastructure.planninginspectorate.gov.uk/document/EN010080-001007>

If this link does not open automatically, please cut and paste it into your browser.

Yours faithfully

The Hornsea Project Three Offshore Wind Farm Team
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Web: www.gov.uk/government/organisations/planning-inspectorate (Casework and appeals)

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30th November 2018

Dear Examining Authority

**The Planning Act 2008 – Section 89 and The Infrastructure Planning
(Examination Procedure) Rules 2010 – Rule 8**

Thank you very much for the previous opportunity to provide responses to the questions as detailed in your letter dated 9th October 2018 following the Preliminary meeting. The MCA has now seen Orsted's response to our feedback.

Unfortunately, the MCA is unable to attend the Shipping and Navigation and the Development Consent Order Hearings for Hornsea Three on this occasion, and we would therefore like to provide further information on our position for consideration during the hearings. The additional information to our previous response can be seen in **red text**.

Q1.5.1 Maritime and Coastguard Agency (MCA)

Section 18.2 of the Navigational Risk Assessment [APP-112] describes the collision risk modelling undertaken. The modelled vessel to vessel collision risk in the Hornsea Project Three array area is a major collision return period of 1 in 193 years. Following construction of the proposed array the risk would increase to 1 in 152 years. Paragraph 7.11.2.39 of the ES [APP-067] characterises this as a negligible effect.

Is the MCA in agreement with the approach to collision risk modelling and do you consider the outputs of the modelling to be realistic?

The MCA has considered Orsted's feedback to this question and we have no further comments to make in addition to those previously submitted as per below. This includes our strong recommendation that at least two lines of orientation are included within the layout design



HM Coastguard



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The MCA is content with the approach to the collision risk modelling undertaken as part of the Navigation Risk Assessment for Hornsea Three. We note the 21.4% increase in collision frequency compared to the pre-windfarm result. We further note the cumulative effect assessment which incorporates Hornsea Projects One, Two and Three giving a major collision return period increase of 9.72%, an increase of one in 116 years to one in 105 years.

This increase in risk is only tolerable with the appropriate risk mitigation as detailed in the Navigation Risk Assessment, and a layout of wind turbine generators (and other associated windfarm infrastructure) which is in accordance with our Marine Guidance Note (MGN) 543. The layout is of significant concern for MCA going forward, and the design principles have not yet been agreed by MCA. Although we support the establishment of the design principles, we should not be held to account should we not have considered every possible future eventuality based on the information provided within the current design principles.

Therefore, the MCA requests the option and ability to consider any layout plans on a case by case basis in line with MGN 543. This includes our strong recommendation that at least two lines of orientation are included within the layout design. This is not only for search and rescue purposes; multiple lines of orientation provide alternative options for vessel passage planning. We know that by far the safest way to navigate through a windfarm is when the turbines are in straight lines, with multiple lines of orientation, which gives a clear line of sight of entry and exit. If a master/skipper decides to go through a windfarm, they tend to place themselves equidistant between the turbines on either side, and this helps counter the environmental effects on handling, and this is compromised with a random turbine layout.

Q1.5.4 Maritime and Coastguard Agency (MCA)

The MCA [RR-060] considers that the 150m tolerance referred to in Principle 8 of the Layout Development Principles [APP-091] is excessive and would impede search and rescue (SAR) coverage.

What would the MCA regard as an acceptable tolerance?

The Applicant notes that this question is directed at the MCA but points out that the MCA's relevant representation stated that a 300 m Development Lane (± 150 m of the centreline) would result in 23% of the array not being searchable. **This was based on a simple calculation that 300m every 1300m (1000m spacing + 300m corridor) would result in 23%.** In the Applicant's opinion the statement that a 300 m Development Lane (± 150 m of the centreline) would result in 23% of the array not being searchable is incorrect and takes neither account of the systems fitted to the MCA SAR helicopter **The figure is largely based on visual searching though other forms of searches may be impacted, particularly when time is taken into consideration** nor the widely spaced infrastructure **Widely spaced infrastructure is irrelevant to the issue raised here regarding the 300m lane. A wider spacing would decrease the percentage, but not the area which is impeded by the development lane** (spaced at least 1km apart) as required under condition 2(1)(c) of the dDCO [APP-027].

The Applicant's SAR specialist has provided information on the equipment available on SAR helicopters to allow a close approach and search of the area between the widely spaced turbines within the Development Lanes including:

Star SAFIRE HD- The MCA SAR Helicopters use an Electro-Optical System made by FLIR Systems, the Star SAFIRE HD. Unlike previous systems, this product can combine visual and IR imagery onto a single screen which optimises the search in difficult conditions. This would permit a search of the Development Lanes from the SAR Lanes in all but the poorest visibility. The IR cameras are degraded with any moisture (e.g. mist, rain, spray) so would be limited in far more than just "poorest visibility" and is almost useless in low cloud or fog. In addition, the cameras are generally only used when the aircraft is stationary, though not entirely. If an aircraft is moving while the cameras are searching, it can become disorientating. It may also not be possible to effectively search 'behind' turbines as the aircraft moves past. The systems are undoubtedly a huge benefit to searching, but do have limitations and do not wholly mitigate the lack of access within the development area. Searching with a helicopter inside the windfarm in reduced visibility is an option of last resort and is undertaken only when all other avenues are closed, therefore windfarms have to be able to cater for this occurrence when it may be required. The system can use Merlin software which cues the operator to possible survivors and so enhances the search capability. The system is not currently optimized and therefore not used by aircraft crew.

Radar Honeywell Primus 701A - The S92 is equipped with the Primus 701 radar which has a minimum range of 137m (450 ft). This system enables ground/sea mapping and weather detection optimised for SAR operations. The Primus 701A has a variable pulse width that is automatically optimised for range and mode setting. The system also includes selectable sea clutter reduction and operator modified gain and tilt thereby allowing for optimum search capability. The radar is capable of discriminating between individual turbines and mapping an obstacle free track between turbines. This appears to be a very technical description which doesn't add value to the point in question. In any case, the radar is rarely used for searching in a windfarm but is used for navigation. The aircraft are equipped with top spec radar and these are one of the primary navigation methods for the helicopter operating within a windfarm. While the helicopter crew will use the radar to assist in navigating down a SAR lane, they will not solely rely on this. Also, the radar would not always be used for searching, particularly for a non-electronic search e.g. Person in the Water or certain circumstances with a life raft. These would require a visual (or camera) search and therefore may be limited by the development lane.

Automatic Identification System - The MCA SAR helicopters are equipped with AIS which will allow them to identify any equipped vessels or turbines fitted with AIS. Turbines are not marked with AIS and while Hornsea 3 are proposing some are fitted, it won't be many – if at all.

Navigation systems - The MCA SAR helicopters are equipped with integrated navigation and display systems which will show the crew all obstacles held in the database. As the turbines will be accurately mapped 'Will' is a dangerous assumption – they certainly should but already we have been out at current developments and found structures which are not included, hence why the mapping system is not a

primary navigation tool, the system will provide a clear display of the obstacles. There is the ability to add the turbines to the EGPWS database giving approximately 20 seconds of warning before an obstacle, but this should be balanced against the frequency of nuisance alerts.

Therefore our previous response as per below remains the same:

The MCA request that turbines are constructed in straight lines, with a minimum of two lines of orientation, to maintain the safety of navigation and our search and rescue obligations. Access to windfarms by helicopter and vessels during an emergency situation, and by vessels should they decide to transit through a windfarm, is a complex process, especially in poor weather conditions, and therefore mitigations are required to ensure it is as safe and feasible as possible.

Standard search patterns are linear to allow for an effective coverage of an area, and wind turbines will degrade the search capability by restricting search spacing and increasing crew workload - therefore reducing search effectiveness. Within Principle 8, the developer may build turbines in an irregular layout anywhere within that 300m corridor, which would significantly impact the ability to search and/or rescue.

As a result, the MCA would be content with a tolerance of 50m with the understanding that the developer aims to construct turbines along the centreline and only deviating if conditions/seabed do not allow for a straight line.

Q1.5.5 Maritime and Coastguard Agency (MCA)

The MCA [RR-060] considers that, in the interests of SAR capability, an assessment should be made of the feasibility of providing a helicopter refuge area perpendicular to the turbine development corridors.

A)What would be the advantages and disadvantages of incorporating a helicopter refuge area as suggested by the MCA?

A) For arrays comprised of tightly spaced turbines, a dedicated helicopter refuge area may allow an area for the SAR helicopter to manoeuvre in poor weather or when faced with an emergency. It is noted that this is not the case for Hornsea Three or other current Round Three projects where turbine spacing is at least 1 km in all directions. Spacing in itself does not provide the required elements which a refuge area would. Turbines in HOW03 may well be 1km, but not necessarily aligned in straight lanes. SAR experts have assessed the refuge area requirement as being around 1nm in width to allow sufficient space to turn an aircraft, particularly in poor weather.

The turbine spacing in Hornsea Three of at least 1km gives the helicopters sufficient space to manoeuvre within SAR lanes or between lanes. Not entirely, it depends on weather conditions, turbine position, visibility, safety margins and circumstances. In poorer conditions, or at night, flying within a windfarm is particularly disorientating and therefore predictable layouts with refuge areas are important. A poor weather turn is a threat because the aircraft can drift significantly in turn in higher winds as it adopts the new heading. It has been suggested to the MCA that the conspicuity of some turning points could be enhanced by installing AIS on key turbines as SAR helicopters

are equipped with AIS. It is believed that the widely spaced turbines on Hornsea Three combined with the SAR helicopter equipment, which includes radar, AIS, moving maps, electro-optical sensors and a Terrain (and obstacle) Awareness Warning System will allow the SAR helicopters to clearly identify obstacles without the need for a refuge area. AIS on certain turbines may provide a SAR helicopter with additional awareness of turbines but does not remove the requirement of a refuge area. Straight lines are still required to allow an aircraft to exit, or enter, a windfarm safely and just because turbines are marked by AIS, does not mean it would allow an aircraft to follow a 'path'. All the sensors/systems on the aircraft will be utilized to the best effect, however, the crew will still also rely on visual references where possible.

Critically, to be effective a helicopter refuge area would have to be located where the SAR operation was being conducted and/or where the emergency occurred, which is unlikely and not predictable. Ideally a layout would have two consistent lines of orientation and while a refuge area may still be required to provide a safe and sufficiently sized area to escape to, the multiple lines would give far more options to an aircraft in the first place. The refuge area is not there to account for a SAR operation – it may be used to improve access into an area which does not have a second line of orientation. If an emergency occurred, the aircraft would have to consider what options they had but making their way to a refuge area '1/2 way along' a lane is preferable than transiting the whole length. The SAR refuge area improves SAR Scene access time by reducing the need for super accurate navigation and thus allowing a relatively higher approach speed in poor conditions. Importantly, it also permits a more rapid exit from a large windfarm, allowing quicker critical care access for the patient. A refuge area may also allow a SAR helicopter to conduct relatively unimpeded hoist transfers to a vessel underway if a two-phase rescue has been made (Turbine to Vessel to Helo)

Although the MCA Guidance mentions refuge areas, this requirement does not appear to be necessary in the case of Hornsea Three due to the spacing of turbines. The spacing of the turbines at HOW03 is not sufficient for the purposes of a refuge area and in any case, the proposed layout does not have more than one line of orientation which is another reason for requesting the refuge area.

B) Of publicly available projects only the in-construction Hornsea Project One have SAR lanes of around 10 nm in length.

C) Given the shape of Hornsea One only two lanes are near this 10nm length and no additional mitigations were included (outside of those mentioned in MGN 543 i.e., turbine ID marking). Other projects are of no relevance to HOW03 as the MCA assess projects on a case-by-case basis, particularly as projects become large in size and technology advances. The MCA are very clear that decisions made for one project have no bearing on future projects.

Therefore, there are no changes to make to our original response:

As raised in response to Q1.5.4 access into windfarms is complex, and the MCA must maintain the capability to deliver an effective SAR service anywhere within the UK Search and Rescue Region. A SAR lane which is of significant length (c10nm) is a concern as it limits the manoeuvring options for a helicopter whilst in the lane, e.g. when the aircraft can either climb out of, or transit to the end of the lane before making

a turn and continuing its search. For a lane of 10nm, it would take 12 minutes before the helicopter could change track at ~50kts, which is a significant amount of time during an emergency situation. For Hornsea Three, at least one of the proposed lanes was in excess of 20nm.

Generally, helicopters also have to enter a windfarm from low level and along a SAR lane, rather than dropping down from above, particularly through cloud, and a helicopter refuge area serves a number of key purposes;

- 1) it can allow additional routes into a windfarm improving the access options;
- 2) it allows for an area in which the helicopter can turn along a search leg, so an aircraft doesn't necessarily have to climb out and go back to the start of the next lane; and
- 3) it also allows for a 'safe' area for an aircraft to re-familiarise with the surroundings, re-orientate their position within the windfarm or during an aircraft emergency. This is a fundamental requirement when windfarms are over c10nm and is particularly important when there is less than two lines of orientation.

Are there examples of offshore windfarms with turbine development corridors of a length comparable to this proposal?

There is nothing currently constructed of this scale that has required a refuge area. However as more developments are constructed, refuge areas will continue to be requested where the lanes are sizeable, and they are assessed as being required by SAR and navigation safety specialists.

If there are, what approach was taken to maintaining SAR capability in those examples?

See above.

The MCA would also like to take this opportunity to respond to two further questions seen in The Examining Authority's Written Questions and Requests for Information, where we believe it is necessary for MCA to reply in addition to the applicant:

Q1.13.66 Applicant

Condition 11(1)(a) states that the approval of the MMO shall not be required where the proposed design is in accordance with the design principles. The MMO [RR-085] objects to that approach.

Please comment on the MMO's objection to this aspect of the condition.

The MCA agrees entirely with the MMO's objection to this aspect of the condition. We cannot rely solely on the design principles to deliver an acceptable layout in accordance with MGN 543. The design principles are a tool for the applicant, the layout must still be approved by the MCA, Trinity House and the MMO despite following the design principles.

Q1.13.67 Applicant

Condition 11(1)(a)(v) provides for the indicative layout of the WTGs to be approved.

Why would the layout only be indicative? At what stage (if any) would the MMO approve the actual layout?

The actual layout should be approved by the MMO once the MCA and Trinity House have confirmed that they accept the layout in accordance with MGN 543.

Yours faithfully,

Helen Croxson
Offshore Renewables Advisor
Navigation Safety Branch

Peter Lawson
Offshore Energy Liaison
HM Coastguard, MCA