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Your ref: EN010079

DIO ref. 10040016

Ms Karen Ridge
Lead Member of the Panel of Examining Inspectors
The Planning Inspectorate
National Infrastructure Directorate
Temple Quay House
Temple Quay
Bristol
BS1 6PN

Dear Ms Ridge,

The Norfolk Vanguard Offshore Wind Farm

Application for a Development Consent Order under Section 56 of the Planning Act 2008,

I write to provide the response of the Ministry of Defence (MOD) to the written questions raised by the Examining Authority in relation to the above application. Please accept my apologies for the lateness of this response. We did not become aware of these questions until after the assigned deadline for responding had passed. We have reviewed this occurrence and will ensure that all further requirements for the MOD to provide comment or information will be completed in accordance with the required timescales.

The Examining Authority's written question 17.1 - states:

> *The Project comprises up to 200 wind turbines, up to 350m in height (to blade tip) to be located in the North Sea potentially in two distinct development zones (Vanguard East and Vanguard West) the latter approximately 47km east of the Norfolk- coast. You state in your letter of 4 October 2018 [AS-005] that the turbines and some of the tall ancillary offshore structures will affect military low flying training activities conducted in this area and these structures should be fitted with appropriate aviation warning lighting to maintain the safety of military air traffic.*
> *Please specify which offshore ancillary structures you consider will affect training activities and how? Have specifications for the desired warning lighting been agreed with the Applicant?*

In response, I can advise that, military aircraft engaged in low flying training may use this area flying as low as 250 feet (76.2m) above the surface. In areas where this type of low flying training may be conducted, the MOD will request that that tall and, or, narrow profile structures that are 50 metres or greater in height are marked on aviation charts and fitted with low intensity aviation warning lighting (or equivalent infra-red beacons) to optimise military aviation safety.

The description of the proposed development includes: up to 2 accommodation platforms, up to 2 offshore electrical platforms and up to 2 meteorological masts. These are all likely to take the form of tall and, or, narrow profile structures which may be 50 metres or greater in height, above mean sea level (AMSL). The need for any of these structures, that are included in the development scheme implemented, to be lit for military avation will depend on their height and position relative to the wind turbines which will be lit in accordance with the standards contained in the Air Navigation Order 2016 (ANO). Applicable tall or narrow

profile structures located within the wind farm may not need MOD accredited aviation lighting where surrounding taller structures are fitted with lighting required under the ANO.

Specifications for any aviation warning lighting that may be required by the MOD have not been discussed with the applicant. Both parties have agreed that this matter (as identified in question 17.1) will be addressed post consent and are working to finalise a suitable condition to implement this requirement.

The Examining Authority's written question 17.3 - states:

> *You state in your letter of 4 October 2018 that the potential scale and location of turbines may be in line of sight and detectable to the air defence radar at RAF Trimingham; turbine proliferation in a specific locality can result in unacceptable degradation of the radar's operational integrity, and the proposed wind farm "will cause unacceptable and unmanageable interference to the effective operation of this air defence radar."*
> *Explain, with reference also to your letter of 6 December 2018, what is the basis of the mitigation measures contemplated that may enable you to agree a Requirement and/or condition to be included in any DCO/DML issued. Please state how this would differ from Requirements 12 and 13 in the dDCO and whether any DML condition (or Requirement) contemplated would replace or be additional to those Requirements.*

I can confirm that, at the time of the MOD objection of 6 December 2018, the applicant had not submitted a mitigation proposal to identify that they are able to provide an operationally acceptable and technically achievable mitigation for the purposes of agreeing a Requirement.

The technical mitigation proposal that has since been offered, and now accepted by the MOD, will entail the applicant providing separate radar(s) located to provide infill coverage to the air defence radar at Trimingham over the area of its coverage that will be degraded by the proposed wind farm.

The MOD has offered the applicant a replacement version of Requirement 13 to account for the need for technical mitigation to be in place prior to any of the wind turbines being allowed to turn on their horizontal axis's. Both parties are currently engaged in discussions with the aim of establishing a mutually acceptable wording for the revised condition.

Requirement 12 included in the draft DCO relates the application of lighting to maintain aviation safety and is therefore not applicable to the impact of the turbines upon the air defence radar.

The Examining Authority's written question 17.4 - states:

> *Explain why Requirement 13(1) would not be an adequate safeguard to the continued effective operation of Remote Radar Head (RRH) Trimingham.*

At the time the MOD registered its objection to the DCO application (6 December 2018), the applicant had not submitted a mitigation proposal that identified that they are able to provide an operationally acceptable and technically achievable mitigation.

Requirement 13(1) included in the draft DCO relates to wind turbines within radar line of sight. No development plans have been established and agreed between the applicant and the MOD which would serve to define which turbines, or areas of the development zones, will be in radar line of sight (relative to the size(s) of wind turbines that could be constructed under the consent proposed) for the purposes of enforcing this requirement. Without a clear and agreed definition of which turbines will be in radar line of sight the MOD cannot accept such a reference being included in a requirement. The absence of such clarity would likely affect the discharge of any such condition.

The MOD has identified that due the size of the wind turbine rotors that would be permitted in the proposed consent order, radar technical mitigation will need to be applied before the rotor blades on any of the wind turbines are permitted to rotate on their horizontal axis's. The proposed requirement for the implementation of technical mitigation is therefore insufficient.

The Examining Authority's written question 17.5 - states:

Do you agree with the methodology for the assessment of impacts in Environmental Statement Chapter 16, Aviation and Radar [APP-340] and if not why not?

I can confirm that the MOD does agree with the methodology employed. Please refer to the State of Common Ground on Aviation and Radar produced by the applicant and the MOD.

The Examining Authority's written question 17.6 - states:

[APP-340] at Paragraph 6 states that no onshore construction infrastructure is expected to breach aviation stakeholder radar or airfield safeguarded surfaces.
Do you agree, having regard to the 3rd paragraph of your letter of 4 October 2018, or if not why?

Yes, on assessment of the proposed onshore development defined in the application, it was established that it will not entail the development of structures that will exceed the height consultation thresholds of the affected MOD statutory safeguarding zones. The MOD response of 4 October 2018 confirms that we maintain no objection to this element of the scheme. The MOD has agreed with the applicant's assessment of this part of the scheme and that it will not affect MOD onshore statutory safeguarding requirements. Please refer to the State of Common Ground on Aviation and Radar produced by the applicant and the MOD.

The Examining Authority's written question 17.7 - states:

Paragraph 19 of ES Chapter 16 [APP-340] refers to an MoD assessment of Operational Impact. Can this be made available to the Examining Authority or a redacted version?

Yes, attached is the text of the response that was made by RAF Air 1 Group Battlespace Management (1 Gp BM) Safeguarding to the Defence Infrastructure Organisation on 7 December 2017 that confirms the findings of their operational assessment of the effect of the proposed wind farm development upon the air defence radar at Remote Radar Head (RRH) Trimingham:

NORFOLK VANGUARD (DIO10040016) WIND FARM DEVELOPMENT PROPOSAL - OBJECTIONS

1. DIO requested that 1Gp BM Safeguarding provide comments regarding the proposal to erect a 90 x 350m turbine wind farm at TG 89519 46336. Following a detailed examination of the proposal and the anticipated impact on Air Defence (AD) radars it has been shown by DE&S that several of the turbines would be in Radar Line-of-Sight (RLOS) to RRH Trimingham.

2. It has been shown that when RLOS to AD radars, wind-turbines will appear as genuine aircraft targets and can mask aircraft responses. The radar may also be desensitised by its clutter processing within the sector containing wind turbines meaning that aircraft may disappear from radar screens. Shadowing of aircraft at similar radar-to-target elevation angles as the wind turbines may also occur, further degrading radar performance and therefore AD capability.

3. An operational assessment has been conducted by an AD SME who weighed the proposed development against a number of operational factors including:

a) Detectability of the turbine(s).

b) Position of the development.

c) Quantity of turbines within the development.

d) Other developments within the vicinity.

e) Loss of coverage due to the development's electromagnetic shadow.

4. HQ 1 Gp has taken all of these factors into consideration in assessing the Norfolk Vanguard development.

Location	*Affected Radar*	*Operations Affected?*	*DIO No.*
TG 89519 46336	*RRH Trimingham*	*Yes*	*10040016*

5. Close examination of the proposal has indicated that the proposed turbine(s) would have a significant and detrimental affect on AD operations. The MOD therefore has concerns with the development at TG 89519 46336. The reasons for this objection include, but are not limited to:

a) Several of the turbines within the development being RLOS.

b) The quantity of the turbines visible to the radar at RRH Trimingham would exceed our 'cumulative effect' thresholds.

6. Research into technical mitigation solutions is currently ongoing and the developer may wish to consider investigating suitable mitigation solutions.

Please note the reference to DE&S relates to Defence Equipment & Support – Air Defence & Electronic Warfare Systems, which is the MOD organisation responsible for completing technical assessments of how proposed wind farms will affect the operation of radars and other types of technical assets. This operational assessment is based on the technical assessment that was produced by DE&S on 4 December 2017. This report is a restricted document which cannot be released because of the information it contains on the performance attributes of the air defence radar.

Also, note that both the technical and operational assessments completed have assessed the boundary points of the proposed development area (Rochdale envelope) in which the offshore wind turbines would be constructed.

The Examining Authority's written question 17.8 - states:

Paragraphs 98 and 99 deal with the capability of the Trimingham TPS77.
Do you agree with this assessment and please explain in particular the enhanced signal processing capability and how this might, if at all, mitigate unwanted tracks on the radar at Trimingham in relation to the proposed turbines when in operation?

The MOD has agreed with the applicant that the content of Chapter 16 of the Environmental Statement appropriately identifies and accounts for air defence assets and requirements (please refer to the statement of common ground).

With respect to 'enhanced signal processing capability' this relates to the inbuilt capability of the TPS77 radar to employ Non Automatic Initiation Zones (NAIZs). NAIZs are intended to prevent the radar from automatically creating tracks from any potential returns, such as those that can be caused by wind turbines, that originate within the volume of airspace contained within a NAIZ. Tracks which have been formed from returns originating outside a NAIZ, such as from a transiting aircraft, will still be tracked.

In May 2015, the Applicant commissioned SERCO (the appointed authority for modelling the application of NAIZs for MOD air defence radars) to evaluate the technical feasibility of devising a technical mitigation using NAIZs to contain the Norfolk Vanguard Offshore Wind Farm. SERCO determined that a configuration of NAIZs could be technically achieved to contain the proposed wind farm and produced a mitigation proposal which was submitted to the MOD by SERCO. The MOD evaluated the technical and operational implications of the mitigation submitted. Subsequently, on 26 September 2016 the MoD held a meeting with the Applicant at which it was explained that the combined effect of the proposed NAIZs would remove a massive volume of air defence radar coverage and cause severe degradation of the probability of detection of genuine aircraft targets achievable by the Trimingham radar. Therefore, the MoD advised that proposed technical mitigation using NAIZs would not be acceptable because of the operational impact.

The Examining Authority's written question 17.8 - states:

> *Relevant representation [RR-261] dated 16 September 2018 from Susannah Spain states that in 1996 there was an F16 plane crash that contaminated the cable run route selected by Vattenfall to the National Grid substation at Necton, referring to "MoD documentation" that the alleged contamination contains radioactive substances.*
> *Please comment, providing information available to you, in redacted form if necessary, that describes the incident and identifies the exact location of the crash and the actual or assumed position of all potentially contaminated substances and what action has been taken as a result.*

This question has been passed to the relevant MOD department and a response will be made as quickly as possible.

I trust the responses provided above suitably address the questions raised. Please do not hesitate to contact me should you wish to consider any of these points further. I will write to you again to convey the MOD reply to question 17.8 as soon as this is available.

Yours sincerely,

Jon Wilson

Senior Safeguarding Officer