

Hornsea Project Three
Offshore Wind Farm



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Preliminary Environmental Information Report:
Chapter 8 – Aviation, Military and Communication

Date: July 2017


Hornsea 3
Offshore Wind Farm

DONG
energy

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Preliminary Environmental Information Report

Volume 2
Chapter 8 – Aviation, Military and Communication

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Glossary

Term	Definition
0° Isotherm	The altitude in which the temperature is at 0°C (the freezing point of water) in a free atmosphere.
Flight Level	A standard nominal altitude of an aircraft, in hundreds of feet, based upon a standardised air pressure at sea-level.
Helicopter Main Route (HMR)	Routes which are established to facilitate safe helicopter flights in Instrument Flight Rules (IFR) conditions (i.e., when flight cannot be completed in visual conditions).
The icing level	The icing level is the height at which the air temperature reaches freezing (the 0° isotherm).
Instrument Approach	A procedure used by helicopters for low-visibility offshore approaches to offshore platforms which relies upon an aircraft's on-board weather radar for guidance and as a means of detecting obstacles in the approach path.
Instrument Flight Rules (IFR)	The rules governing procedures for flights conducted on instruments.
Instrument Meteorological Conditions (IMC)	Weather conditions which would preclude flight by the Visual Flight Rules (VFR) (i.e., conditions where the aircraft is in or close to cloud or flying in visibility less than a specified minimum).
Minimum Safe Altitude (MSA)	Under aviation flight rules, the altitude below which it is unsafe to fly in IMC owing to presence of terrain or obstacles within a specified area.
Missed Approach Procedure (MAP)	The actions for the crew of an aircraft to take when an instrument approach procedure is not successful (e.g., the crew are unable to see the runway, approach lights or helideck).
Precision Approach Radar (PAR)	A military instrument approach system which provides both horizontal and vertical guidance for landing from 10 or 20 nautical miles (nm) from the airfield.
Uncontrolled airspace	Airspace in which Air Traffic Control (ATC) does not exercise any executive authority, but may provide basic information services to aircraft in radio contact. In the UK, Class G airspace is uncontrolled.
Visual Flight Rules (VFR)	The rules governing flight conducted visually (i.e., with the crew maintaining separation from obstacles and other aircraft visually).

Acronyms

Acronym	Description
ADR	Air Defence Radar
agl	Above ground level
Amsl	Above mean sea level
AIP	Aeronautical information package
AIS	Aeronautical Information Service
ANSP	Air Navigation Service Provider

Acronym	Description
ARA	Airborne Radar Approach
ASAC	Airspace surveillance and control systems
ATA	Aerial tactics area
ATC	Air Traffic Control
ATS	Air Traffic Services
ATSU	Air Traffic Service Unit
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
Centrica, UK	Centrica North Sea Ltd
Centrica Netherlands	Centrica Production Nederland B.V.
Centrica Resources UK	Centrica Resources Ltd,
CHC	CHC Scotia Helicopters Ltd
CNS	Communication, navigation and surveillance
DfT	Department for Transport
DGC	Defence Geographic Centre
DIO	Defence Infrastructure Organisation
DSC	Digital Selective Calling
Engie E&P	Engie E&P UKCS Ltd
Engie E&P Netherlands	ENGIE E&P Nederland B.V
ERCoP	Emergency Response and Cooperation Plan
Faroe Petroleum	Faroe Petroleum (U.K.) Ltd
FIR	Flight Information Region
FL	Flight Level
GPS	Global Positioning System
HMR	Helicopter Main Route
IFR	Instrument Flight Rules
ILS	Instrument Landing Systems
IMC	Instrument Meteorological Conditions

Acronym	Description
INEOS	INEOS UK SNS Ltd
JRC	The AW4Joint Radio Company Ltd
LOS	Line of Sight
MAP	Missed Approach Procedure
MAPt	Missed Approach Procedure point
MCA	Maritime and Coastguard Agency
MDA	Managed Danger Area
MET	Meteorological
MGN	Maritime Guidance Notice
MOD	Ministry of Defence
MESA	Minimum Enroute Safe Altitude
MSA	Minimum Safe Altitude
NAM	Nederlandse Aardolie Maatschappij B.V.
NATO	North Atlantic Treaty Organisation
NATS	NATS Ltd. (formerly National Air Traffic Services Ltd.)
NHV	Noordzee Helikopters Vlaanderen
NOTAM	Notice to Airmen
OGA	Oil and Gas Authority
OLS	Obstacle limitation surfaces
ORAG	Offshore Renewables Aviation Guidance
OSA	Offshore Safety Area
PAR	Precision Approach Radar
PSR	Primary Surveillance Radar
SARG	Safety and Airspace Regulation Group
Shell	Shell UK Ltd.
SSR	Secondary Surveillance Radar
Third Energy	Third Energy Offshore Ltd
Total, UK	Total E&P UK Ltd
Total, Netherlands	Total E&P Nederland B.V.

Acronym	Description
TRA	Temporary Reserved Airspace
TTA	Technical Training Area
TV	Television
UHF	Ultra High Frequency
UKCS	United Kingdom Continental Shelf
UKHO	United Kingdom Hydrographic Office
UKLFS	UK low flying system
VFR	Visual Flight Rules
VHF	Very High Frequency
Wintershall	Wintershall Holding GmbH

Units

Unit	Description
ft	Feet
km	kilometre
GW	Gigawatt
m	metre
m/s	metre per second
MW	Megawatt
nm	Nautical Mile

8. Aviation, Military and Communication

8.1 Introduction

8.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings to date of the Environmental Impact Assessment (EIA) for the potential impacts of the Hornsea Project Three offshore wind farm (hereafter referred to as Hornsea Three) on aviation, military and communication receptors. Specifically, this chapter considers the potential impact of Hornsea Three during its construction, operation and maintenance, and decommissioning phases.

8.1.1.2 The more detailed technical information which underpins the baseline and impact assessment presented in this chapter is contained within Volume 5, Annex 8.1: Aviation, Military and Communication Technical Report.

8.2 Purpose of this chapter

8.2.1.1 The primary purpose of the Environmental Statement is to support the Development Consent Order (DCO) application for Hornsea Three under the Planning Act 2008 (the 2008 Act). This PEIR constitutes the Preliminary Environmental Information for Hornsea Three and sets out the findings of the EIA to date to support pre-application consultation activities required under the 2008 Act. The EIA will be finalised following completion of pre-application consultation and the Environmental Statement will accompany the application to the Secretary of State for Development Consent.

8.2.1.2 The PEIR will form the basis for Phase 2 Consultation which will commence on 27 July and conclude on 20 September 2017. At this point, comments received on the PEIR will be reviewed and incorporated (where appropriate) into the Environmental Statement, which will be submitted in support of the application for Development Consent scheduled for the second quarter of 2018. In particular, this PEIR chapter:

- Presents the existing environmental baseline established from desk studies, and consultation;
- Presents the potential environmental effects on aviation, military and communication arising from Hornsea Three, based on the information gathered and the analysis and assessments undertaken to date;
- Identifies any assumptions and limitations encountered in compiling the environmental information; and
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

8.3 Study area

8.3.1.1 The aviation, military and communication study area is shown in Figure 8.1 below. This includes the Hornsea Three array area and the offshore cable corridor, which comprises the offshore development footprint, as well as the airspace between the Hornsea Three array area and the UK mainland from Norwich airport to the south and RAF Staxton Wold to the north.

8.3.1.2 Specifically, the Hornsea Three aviation, military and communication study area covers:

- The airspace most likely to be used by helicopters servicing Hornsea Three. It is not yet known which helicopter provider would be used for Hornsea Three or from which airport the helicopter operator would be based, however flights are likely to originate from the east coast of the UK or to come from an offshore base or vessel with helicopter personnel transfer;
- Radars on the east coast of England that could potentially detect 325 m high (blade tip) wind turbines within the Hornsea Three array area;
- Helicopter Main Routes (HMRs) operating within the proximity of the Hornsea Three array area;
- Offshore platforms that have 9 nm consultation zones that overlap with the Hornsea Three array area;
- Low flying areas and military practice areas that intersect or are adjacent to the Hornsea Three array area and offshore cable corridor;
- Microwave links within 30 km from the centre of the Hornsea Three array area; and
- Very high frequency (VHF)/ultra-high frequency (UHF) communications.

8.3.1.3 The aviation, military and communication study area includes Hornsea Project One which was granted development consent by the Secretary of State for Energy and Climate Change in December 2014 and Hornsea Project Two which was granted development consent by the Secretary of State for Business Energy and Industrial Strategy in August 2016. The study area for undertaking the assessment of cumulative effects for radar encapsulates the southern North Sea and adjacent Dutch territorial waters (see Figure 8.1) which also includes other offshore wind farms in the southern North Sea and in Dutch territorial waters that could have potential effects on identified radar receptors.

8.3.1.4 The potential impacts on Search and Rescue helicopter operations are considered in chapter 7: Shipping and Navigation.

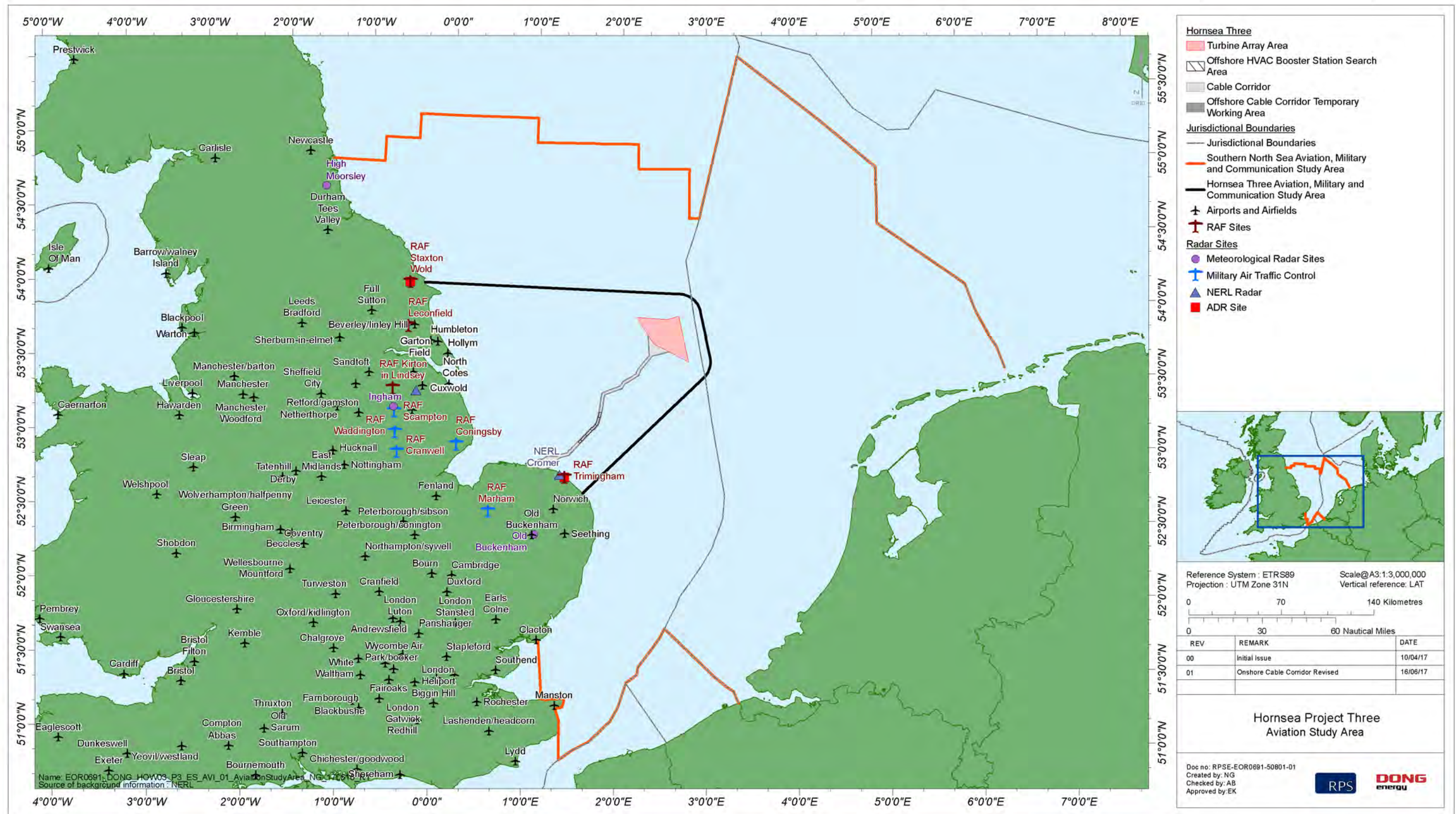


Figure 8.1: Hornsea Three aviation, military and communication study area.

8.4 Planning policy context

8.4.1.1 Planning policy on offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to aviation, military and communication, is contained in the Overarching National Policy Statement (NPS) for Energy (NPS EN-1; DECC, 2011a) and the NPS for Renewable Energy Infrastructure (EN-3, DECC, 2011b).

8.4.1.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 8.1 below.

Table 8.1: Summary of NPS EN-1 provisions relevant to aviation, military and communications.

Summary of NPS EN-1 provision	How and where considered in the PEIR
Where the proposed development may have an effect on civil or military aviation and/or other defence assets an assessment of potential effects should be set out in the Environmental Statement (paragraph 5.4.10 of NPS EN-1).	The Hornsea Three assessment has considered each of these potential effects and provided an assessment of their likely significance, considering each phase of the development process (i.e. construction, operation and decommissioning). See section 8.11 of this chapter.
The applicant should consult the Ministry of Defence (MOD), Civil Aviation Authority (CAA), NATS Ltd (NATS) and any aerodrome – licensed or otherwise – likely to be affected by the proposed development (paragraph 5.4.11 of NPS EN-1).	Consultation with potentially affected stakeholders has been carried out from the early stages of the project (see Table 8.3 of this chapter).
Any assessment of aviation or other defence interests should include potential impacts of the project upon the operation of Communication, Navigation and Surveillance (CNS) infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures. It should also assess the cumulative effects of the project with other relevant projects in relation to aviation and defence (paragraph 5.4.12 of NPS EN-1).	The Hornsea Three assessment has considered each of these potential effects and provided an assessment of their likely significance, considering each phase of the development process (i.e. construction, operation and decommissioning). See section 8.11 of this chapter. Cumulative impacts have been assessed in section 8.13 of this chapter.

8.4.1.3 NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 8.2 below.

Table 8.2: Summary of NPS EN-1 policy on decision making relevant to aviation, military and communications.

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the PEIR
Secretary of State should be satisfied that the effects on civil and military aerodromes, aviation technical sites and other defence assets have been addressed by the applicant and that any necessary assessment of the proposal on aviation or defence interests has been carried out. In particular, it should be satisfied that the proposal has been designed to minimise adverse impacts upon the operation and safety of aerodromes and that reasonable mitigation is carried out (paragraph 5.4.14 of NPS EN-1).	<p>Consultation has involved all relevant aviation, military and communication stakeholders which include but are not limited to:</p> <ul style="list-style-type: none"> • NATS; • CAA; • Regional Aerodromes; • Norwich and Humberside Airports; • Helicopter Operators: Bristow, Noordzee Helikopters Vlaaderen (NHV), Bond, CHC Scotia Helicopters Ltd (CHC); • Oil and Gas operators: Alpha Petroleum, ConocoPhillips, Wintershall Holding GmbH (Wintershall), Perenco, Faroe Petroleum (U.K.) Ltd (Faroe Petroleum), Centrica Resources Ltd (Centrica Resources UK), Third Energy Offshore Ltd (Third Energy), Engie E&P UKCS Ltd (Engie E&P), Ineos UK SNS Ltd (Ineos), Centrica North Sea Ltd (Centrica, UK), Shell UK Ltd (Shell), Total E&P UK Ltd (Total, UK), Centrica Production Nederland B.V. (Centrica, Netherlands), Nederlandse Aardolie Maatschappij B.V. (NAM), Total E&P Nederland B.V. (Total Netherlands), ENGIE E&P Nederland B.V. (Engie E&P Netherlands); • MOD; • Defence Geographic Centre; and • Meteorological office (Met office). <p>Comments from these stakeholders have been fed into the EIA process. It is by this pre-application consultation that the Applicant, along with adhering to relevant legislation/guidance, ensures that the requirements of NPS EN-1 are met in relation to assessing the impact on civil and military aerodromes, aviation technical sites and other defence assets. The impact assessment on aviation, military and communication is presented in section 8.11 of this chapter.</p>
If there are conflicts between the Government's energy and transport policies and military interests in relation to the application, the Secretary of State should expect the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible (paragraph 5.4.15 of NPS EN-1).	<p>The following impact assessment shows that the Applicant has taken steps to avoid or reduce the impact of the development through mitigation and mutually agreed solutions. Mitigation measures for aviation, military and communication receptors are presented in Table 8.12 of this chapter.</p> <p>The impact assessment on aviation military and communication receptors is presented in section 8.11 of this chapter.</p>
Where aviation and navigation lighting is requested on structures that goes beyond statutory requirements by any of the relevant aviation and defence consultees, the Secretary of State should satisfy itself of the necessity of such lighting taking into account the case put forward by the consultees. The effect of such lighting on the landscape and ecology may be a relevant consideration (paragraph 5.4.16 of NPS EN-1).	<p>The developer will propose aviation and navigation lighting through consultation with the CAA and Trinity House that satisfies the requirements of aviation and maritime regulation (CAA, 2016a). The indicative lighting plan is included in chapter 10: Seascape and Visual Resources.</p>

Summary of NPS EN-1 policy on decision making (and mitigation)	How and where considered in the PEIR
<p>Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the Secretary of State considers that:</p> <ul style="list-style-type: none"> a development would prevent a licensed aerodrome from maintaining its licence; the benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs; or the development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training; the development would have an impact on the safe and efficient provision of <i>en route</i> air traffic control services for civil aviation; <p>consent should not be granted (paragraph 5.4.17 of NPS EN-1).</p>	<p>Hornsea Three has been sited to minimise conflicts with aviation, military and communication receptors. In cases where conflict has been highlighted by early consultation, the applicant has, where appropriate, proposed mitigation measures to reduce or negate impacts. Mitigation measures for aviation, military and communications receptors are presented in Table 8.12 of this chapter.</p> <p>The impact assessment on aviation military and communication receptors are presented in section 8.11 of this chapter.</p>
<p>Where a proposed energy infrastructure development would significantly impede or compromise the safe and effective use of civil or military aviation or defence assets and or significantly limit military training, the Secretary of State may consider the use of 'Grampian', or other forms of condition which relate to the use of future technological solutions, to mitigate impacts.</p> <p>Mitigation for infringement of Obstacle Limitation Surfaces (OLS) may include:</p> <ul style="list-style-type: none"> amendments to layout or scale of infrastructure; changes to operational procedures of the aerodromes in accordance with relevant guidance; and installation of obstacle lighting and/or by notification in Aeronautical Information Service publications. <p>For CNS infrastructure, the UK military Low Flying system (including Tactical Training Areas (TTAs)) and designated air traffic routes, mitigation may also include:</p> <ul style="list-style-type: none"> lighting; operational airspace changes; and upgrading of existing CNS infrastructure. <p>Mitigation for effects on radar, communications and navigational systems may include reducing the scale of a project (paragraphs 5.4.18 – 5.4.21 of NPS EN-1).</p>	<p>Hornsea Three has been sited to minimise conflicts with aviation, military and communication receptors. In cases where conflict has been highlighted by early consultation, the Applicant has, where appropriate, proposed mitigation measures to reduce or negate impacts. Mitigation measures for aviation, military and communication receptors are presented in Table 8.12 of this chapter.</p> <p>The impact assessment on aviation military and communication receptors is presented in section 8.11 of this chapter.</p>

8.5 Consultation

8.5.1.1 A summary of the key issues raised during consultation specific to aviation, military and communications is outlined below, together with how these issues have been considered in the production of this PEIR.

8.5.2 Hornsea Project One and Hornsea Project Two consultation

8.5.2.1 Hornsea Three has similarities, both in terms of the nature of the development and its location, to Hornsea Project One and Hornsea Project Two. The matters relevant to Hornsea Three, which were raised by consultees during the pre-application and examination phases of Hornsea Project One and Hornsea Project Two on aviation, military and communications, are set out in volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three.

8.5.3 Hornsea Three consultation

8.5.3.1 Table 8.3 below summarises the issues raised relevant to aviation, military and communications, which have been identified during consultation activities undertaken to date. Table 8.3 also indicates either how these issues have been addressed within this PEIR or how Hornsea Three has had regard to them.

Table 8.3: Summary of key consultation issues raised during consultation activities undertaken for Hornsea Three relevant to aviation, military and communication.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
27 January 2016	JRC pre-application consultation email	The Applicant requested a radio systems assessment from JRC. JRC analyse proposals for wind farms to assess their potential to interfere with radio systems operated by utility companies in support of their regulatory operational requirements. JRC does not foresee any potential problems based on known interference scenarios and the data provided to them at the time of their assessment.	Radio interference is detailed in section 8.7.4.
18 August 2016	Ofcom pre-application consultation email	The Applicant requested an Ofcom search for microwave fixed links within a 30 km radius of a central point within the Hornsea Three array area. Ofcom provided a list of microwave fixed links and advised that the Applicant contact the identified operators if further information was required.	All known microwave fixed links are assessed in paragraph 8.11.2.111.
25 August 2016	Atkins pre-application consultation email	The Applicant requested an assessment of UHF Radio Scanning Telemetry communications used in the region and were advised there were no objections to the project.	Radio interference is detailed in section 8.7.4.
04 October 2016	INEOS – pre-application consultation meeting	Advised that the Windermere platform is not producing and that decommissioning is planned and anticipated to be complete prior to Hornsea Three construction (2023). No decommissioning plans have as yet been submitted to BEIS. Programme can take five years. Advised that the Topaz well has stopped producing and is likely to be decommissioned at same time as Windermere. Advised that at the present time INEOS do not have any exploration plans in the southern North Sea.	Helicopter access to the Windermere platform is assessed in paragraph 8.11.2.75 Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area is assessed in paragraph 8.11.2.102.
24 October 2016	Shell – pre-application consultation meeting	Provided information in regard to helicopter access requirements to the Cutter and Carrack platforms. Shell confirmed that in the short term, no decommissioning activities are planned and that there are no plans for new platforms. Shell confirmed that they had no immediate concerns from an exploration perspective. Advised that Carrack west wellhead has been decommissioned.	As the Cutter platform does not have a helideck, helicopter access to this platform is not assessed. Helicopter access to the Carrack platform is assessed in paragraph 8.11.2.86.
5 April 2017	Shell – pre application consultation meeting	Repeated the consultation previously carried out on 24 October 2016 given the change of staff at Shell. Hornsea Three requested information to assist the aviation assessment however Shell advised this can only be provided once a confidentially agreement has been put in place. This is being progressed.	Not applicable.
10 November 2016	Faroe Petroleum – pre-application consultation meeting	Provided information in regard to helicopter operations to the Schooner and Ketch platforms and the potential decommissioning dates of these platforms being prior to Hornsea Three construction. Advised that further information would be known end of 2017. Advised that Faroe Petroleum were moving towards the use of boats for maintenance programmes as this was more cost effective. Advised that little activity occurred in the licenced areas that are within 9 nm of the Hornsea three array area, and that any activity associated with existing operations would occur within the 500 m safety zones of the Schooner and Ketch platforms. .	Helicopter access to the Schooner A and Ketch platforms is assessed in paragraph 8.11.2.40. Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area is assessed in paragraph 8.11.2.102.
25 November 2016	PINS Scoping Opinion	Agreement that effects on cellular phone coverage can be scoped out as there is no coverage in the vicinity of the proposed wind farm array. Insufficient information to support a decision to scope out the effects on military ATC radar and meteorological radar at this stage. Advised the Applicant to seek agreement from relevant consultees on scoping out these matters.	Consultation on military Air Traffic Control (ATC) radar was held with the MOD which is discussed in Table 8.4 and in paragraph 8.7.5.6 Consultation with regard to meteorological radar was held with the Met Office which is discussed in Table 8.4 and in paragraph 8.7.5.7.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
25 November 2016	MOD Scoping Response	<p>The potential for the offshore development area to contain unexploded ordnance has been identified along with the need to address this hazard.</p> <p>The extent of maritime military practice and exercise areas and use of airspace for defence purposes in the vicinity of the project have been recognised. The Applicant has also specifically identified the potential effect that the wind farm may have upon the effective operation of defence radars and aviation.</p> <p>The need for the proposed development to be fitted with relevant aviation and maritime warning lighting to maintain navigational safety is identified.</p> <p>From a review of the scoping report The MOD does not consider further information is required to take account of national defence interests.</p>	<p>Unexploded ordnance (UXO) within the Hornsea Three array area and offshore cable corridor has been considered in a historical context in chapter 9: Marine Archaeology. The potential hazard related to UXO during construction will be considered in the construction management plan.</p> <p>Military practice and exercise areas are assessed in paragraph 8.11.1.3.</p> <p>Defence radar are considered in paragraph 8.7.5.3.</p> <p>The aviation and maritime warning lighting requirements are identified in Table 8.12.</p>
08 December 2016	Third Energy – pre-application consultation meeting	<p>Advised that all wells in their P2284 licence would be drilled prior to the start of offshore construction and, as there would be no requirement for platforms, no significant issues are anticipated in relation to Hornsea Three at this stage. Discussion was had on the potential extension of the life of the Schooner platform (presently operated by Faroe Petroleum).</p>	<p>Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area is assessed in paragraph 8.11.2.102</p>
21 December 2016	CAA Scoping Response	<p>The CAA confirmed that appropriate statutory aviation consultees (Defence Infrastructure Organisation (DIO)(MOD) / NATS) have been identified; as the impact of wind turbines on aviation may include the potential impact on the communications, navigation and surveillance infrastructure and also that turbines can cause a physical obstruction to aviation, the official position of all aviation stakeholders regarding the proposed development should be established through direct consultation.</p> <p>It is also recommended that Emergency Service Helicopter Support Units (police and air ambulance) are consulted as they may operate in the area of concern and be affected by the introduction of tall obstacles.</p> <p>The CAA requested that any feature/structure 70 feet in height, or greater, above ground level is notified to the Defence Geographic (dvof@mod.uk) including the location(s), height(s) and lighting status of the feature/structure, the estimated and actual dates of construction and the maximum height of any construction equipment to be used, at least 10 weeks prior to the start of construction, to allow for the appropriate notification to the relevant aviation communities.</p> <p>Any structure of 150 m or more must be lit in accordance with the Air Navigation Order and should be appropriately marked.</p>	<p>All relevant aviation stakeholders have been consulted including the DIO/MOD and NATS (Table 8.3).</p> <p>Emergency service helicopter support units are of relevance to onshore wind farms and are therefore not applicable.</p> <p>The lighting, marking and notification requirements in relation to the Hornsea Three wind farm are detailed in Table 8.12.</p>
19 September 2016	Centrica Resources UK – pre-application consultation meeting	<p>Advised ST1 is shut-in and close to being decommissioned.</p> <p>Advised that the Markham complex is managed from Centrica's Hoofddorp office in the Netherlands. Advised that the Markham complex is accessed from Den Helder.</p> <p>Discussed proximity of Chiswick platform to the Hornsea Three array area and difficulties this would create in regard to access/egress and exploration activities.</p>	<p>Helicopter access to the Centrica operated platforms is assessed in paragraph 8.11.2.56.</p>
05 December 2016	Centrica Resources UK – pre-application consultation meeting	<p>Discussed the recently acquired licence P2286 in the 28th licence round. Explained it is a drill or drop licence with a well required to be drilled prior to September 2019 prior to Hornsea Three construction.</p> <p>Discussed the requirement for further consultation at a later stage when further information would be available from both parties,</p>	<p>Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area is assessed in paragraph 8.11.2.102.</p>
14 March 2017	Centrica Resources UK – pre-application consultation meeting	<p>Discussed helicopter operational requirements.</p> <p>Noted the proximity of the Hornsea Three array area to the Markham complex platforms as a concern.</p>	<p>Helicopter access to the Centrica operated platforms is assessed in paragraph 8.11.2.56.</p>

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
24 March 2017	Centrica Resources UK – pre-application consultation meeting email	The Applicant requested further information on Centrica aviation operational requirements to their platforms and licenced acreage within 9 nm of the Hornsea Three array area which was provided.	Helicopter access to the Centrica operated platforms is assessed in paragraph 8.11.2.56.
14 February 2017	MOD pre-application consultation email	The Applicant requested further clarification in regard to the potential effect of Hornsea Three on the MOD ADR and ATC radar. The MOD confirmed that it is unlikely that there will be any detectability from any MOD ADR or ATC radars to the proposed development. This is due to the distance of the proposal offshore, which ensures that the proposed development is beyond radar line of sight.	The effect on defence radar is discussed in paragraph 8.7.5.
01 August 2016	NATS pre-application consultation email	NATS Safeguarding has no objection to this development.	Potential effects on the interests of NATS radar are assessed in paragraph 8.11.2.111.
09 March 2017	NATS pre-application consultation email	The Applicant requested and received clarification of NATS position in respect of Hornsea Three that it anticipates no impact on its own infrastructure and operations. The Applicant requested and received clarification on NATS position with regard to HMRs. NATS reissued their 2012 position statement advising the Oil and Gas Industry and air operators that they should comment on any foreseen impact. NATS Advised to engage with the air operators and industry on the impact on helicopter routes. NATS provided information on how air traffic is controlled and request for Applicant to contact NATS once a helicopter service provider has been selected for the project.	Oil and gas operators have been consulted in relation to potential effects on helicopter routes (Table 8.3). The impact on HMRs is assessed in paragraphs 8.11.1.8 and 8.11.2.9. Increase in air traffic arising from Hornsea Three is assessed in paragraph 8.11.1.19.
03 February 2017	Met Office pre-application consultation email	The Applicant requested information on meteorological radar safeguarding requirements and was advised that the meteorological radar are safeguarded to 20 km.	Meteorological radar is discussed in paragraph 8.7.5.7 of this chapter.
09 March 2017	ConocoPhillips – pre-application consultation email	The Applicant requested information in regard to ConocoPhillips' aviation operations in relation to the Murdoch group of platforms. ConocoPhillips provided information in regard to cross transit flight and use of HMRs. They provided information in regard to flying above wind farms at or above the Minimum Enroute Safe Altitude (MESA), and when aircraft would need to route below cloud in VMC (Visual Meteorological Conditions). They provided information in regard to undertaking airborne radar approaches (ARA) to the Murdoch field and the operational requirements to the field.	The Murdoch platforms are greater than 9 nm away from the Hornsea Three array area and therefore no assessment has been undertaken on the approach to these platforms. Information on the operational requirements in relation to these platforms has been used in the assessments for cross-zone transit in section 8.11.2.21 and in the assessment on HMRs in section 8.11.2.9.
3 April 2017	Total Netherlands – pre application consultation meeting	Total Netherlands advised they had no immediate concerns with regard to the Netherland licence blocks, but that as they take the lead for the Total UK licence they will respond shortly in this regard. Informed the Applicant that the Netherlands work to a 5 nm free zone for helicopter access rather than the UK requirement for a 9 nm consultation zone.	Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area is assessed in paragraph 8.11.2.102.
3 April 2017	Total UK – pre-application consultation email	Total Netherlands advised that the Total UK acreage 49/10b now forms part of the Centrica Markham complex and so consultation should be had with Centrica in this regard.	Helicopter access to subsea infrastructure and licenced acreage within 9 nm of the Hornsea Three array area (including licence block 49/10b) is assessed in paragraph 8.11.2.102.
16 March 2017	Engie, UK	Engie UK advised that they have no immediate concerns with regard to the project at this stage.	Not applicable.
20 April 2017	Centrica /CHC – pre-application consultation telecom	Discussed the operational requirements to Centrica platforms. CHC advised they will fly direct to an unmanned installation if that is required and do not need to go via manned hub platform. CHC advised final approach path is set at 7 nm for their procedures. CHC agreed that a helicopter operators workshop would be a good approach to discuss the potential impact of cross zone helicopter access.	Helicopter access to the Centrica operated platforms is assessed in paragraph 8.11.2.56.

8.6 Methodology to inform the baseline

8.6.1.1 The assessment of environmental impacts for aviation, military and communication was designed and undertaken in accordance with the following guidance documents/references:

- Civil Aviation Publication (CAP) 393 The Air Navigation Order 2016 and the Regulations (CAA, 2016);
- CAP 437 Standards for Offshore Helicopter Landing Areas, Eighth Edition (CAA, 2016);
- CAP 764 CAA Policy and Guidelines on Wind Turbines, Sixth Edition (CAA, 2016);
- CAP 670 Air Traffic Services Safety Requirements, Third Edition, second amendment (CAA, 2014a);
- Marine Guidance Note (MGN) 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2016);
- MGN 372 (M+F) Offshore Renewable Energy Installations (OREIs): Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2008b);
- Wind farms: MOD Safeguarding (MOD, 2014);
- NATS Aeronautical Information Service (NATS, 2017) (<http://www.nats-uk.ead-it.com/public/index.php.html>);
- Ofcom, Wind Farm Coordination Policy (Ofcom, 2017); and
- Offshore Renewables Aviation Guidance (ORAG) Good Practice Guidelines for Offshore Renewable Energy Developments (RenewableUK, 2016)).

8.6.2 Desktop study

8.6.2.1 Information on aviation, military and communication within the Hornsea Three aviation, military and communication study area was collected through a detailed desktop review of existing datasets and through consultation. Data sources are summarised at Table 8.4 below. Point-to-point Line of Sight (LOS) analysis was undertaken using the ATDI ICS LT (Version 3.9.92) tool (see annex 8.1: Aviation, Military and Communication Technical Report).

8.6.2.2 The desk study has identified the potential for impacts arising from Hornsea Three to affect the following stakeholders which are discussed further in section 8.7:

- Civil en-route operations;
- MOD Air Defence operations and training;
- Helicopter support to offshore oil and gas operations; and
- Aircraft using various communication systems.

Table 8.4: Summary of key data sources.

Data	Source
HMRs	NATS Aeronautical Information Service, ENR 6-1-16
Radar	NATS wind farm self-assessment maps
Military Practice Areas	NATS Aeronautical Information Service, ENG_ENR-1-6 Seazone Hydrospatial L072016.0003
Radio and communications	Ofcom, Atkins, JRC, stakeholders
Oil and gas platforms	UKOilandGas: Common Data Access (UK platforms) TNO: Netherlands Oil and Gas Portal (Dutch platforms)
Oil and gas operations	Consultation with applicable platform operators and operators of UK and Dutch licence blocks
Wind speed and direction data	Data recorded at Schooner A platform (<i>supplied during Hornsea Project One consultation with Tullow the operator of the Schooner A platform</i>).

8.7 Baseline environment

8.7.1 Airspace designations

8.7.1.1 The Hornsea Three array area and offshore cable corridor are situated in an area of Class G uncontrolled airspace, which is established from the surface up to Flight Level (FL) 195 (approximately 19,500 ft.) and Class C controlled airspace, which is established above FL 195. Under these classifications of airspace the following applies:

- Class G uncontrolled airspace: any aircraft can operate in this area of uncontrolled airspace without any mandatory requirement to be in communication with an Air Traffic Control (ATC) unit. Pilots of aircraft operating Visual Flight Rules (VFR) in Class G airspace are ultimately responsible for seeing and avoiding other aircraft and obstructions; and
- Class C controlled airspace: all aircraft operating in this airspace must be in receipt of an air traffic service (ATS).

8.7.1.2 In the Hornsea Three array area the Class G uncontrolled airspace below FL 195 (approximately 19,500 ft.) is subdivided into areas with the following aviation stakeholder responsibility (NATS, 2017b):

- Anglia Radar: To enhance flight safety and expedite Search and Rescue in the Southern North Sea Airspace, a Deconfliction Service, Traffic Service, Basic Service and Alerting Service is available from the Air Traffic Service Unit (ATSU) at Aberdeen Airport and employing NATS Primary Surveillance Radar (PSR). These services are available to helicopters operating in support to the offshore oil and gas industry and to civil and military aircraft transiting the area from the surface up to FL 65. The ATSU will provide, within its specified area of responsibility, Deconfliction Service or Traffic Service within the limits of surveillance cover. Outside surveillance cover or in the event of surveillance failure, a Basic Service and Alerting Service will be provided within the limits of VHF; and
- MOD Air Surveillance and Control Systems (ASACS): uses its Air Defence Radar (ADR) resources in support of operational flights within UK airspace and for training exercises. Two Managed Danger Areas (MDAs) are established over the North Sea (Central and Southern MDA). Within the lateral and vertical confines of the MDAs, air combat training, high energy manoeuvres and supersonic flight can be expected. The Southern MDA (EG D323) is located above the Hornsea Three array area and is divided into six distinct areas (A, B, C, D, E and F). EG D323D is located directly above the Hornsea Three array area and, when active, operates from FL 50 up to FL 660. (Note when the Southern MDA is activated, Anglia Radar will restrict offshore helicopter operations to FL 40 and below).

8.7.1.3 The Hornsea Three offshore cable corridor passes through the Wash Aerial Tactics Area (ATA) North, the Wash ATA South, and an Offshore Safety Area (OSA). The ATAs are airspace of defined dimensions designated for air combat training within which high energy manoeuvres are regularly practiced by aircraft formations. Autonomous operations are only permitted within ATAs above FL 195 when the overlying Temporary Reserved Airspace (TRA) is active (NATS, 2017a). The Anglia OSA consists of the airspace from surface to 3,500 ft. above lowest astronomical tide (ALT) within the area shown in Figure 8.2. This is an area where pilots of helicopters are required to contact Anglia Radar and will normally plan to fly at specified en-route altitudes (NATS 2017b).

8.7.1.4 The CAA's Safety and Airspace Regulation Group (SARG) is responsible for the regulation of ATS in the UK; the planning and regulation of all UK airspace, including the CNS infrastructure; and also has the lead responsibility within the CAA for all wind turbine related issues. At all times, responsibility for the provision of safe services lies with the ATS provider or Air Navigation Service Provider (ANSP).

8.7.1.5 The London/Amsterdam Flight Information Regions (FIRs) and delegated areas of responsibility were considered against the mapping data. As shown in Figure 8.2, Hornsea Three is entirely within the UK FIR.

8.7.2 Military Low Flying Operations

8.7.2.1 The UK Low Flying System (UKLFS) used for Military Low Flying activity covers the open airspace over the entire UK land mass and surrounding sea areas generally out to 2 nm from the coastline, from the surface to 2,000 ft. agl (above ground level) or amsl (above mean sea level). The Hornsea Three array area, at a distance of 121 km from the coast, will not therefore affect routine Military Low Flying activity.

8.7.3 Military Exercise and Training Areas

8.7.3.1 There are two submarine practice areas in the vicinity of the Hornsea Three array area (see Figure 8.2). One area lies to the north of the Hornsea Three array area in the Outer Silver Pit location and appears to overlap the northernmost corner of the array area by a distance of 123 m. Hornsea Three is consulting with MOD to verify the boundary. The other area lies 12.4 km to the east in Dutch territorial waters.

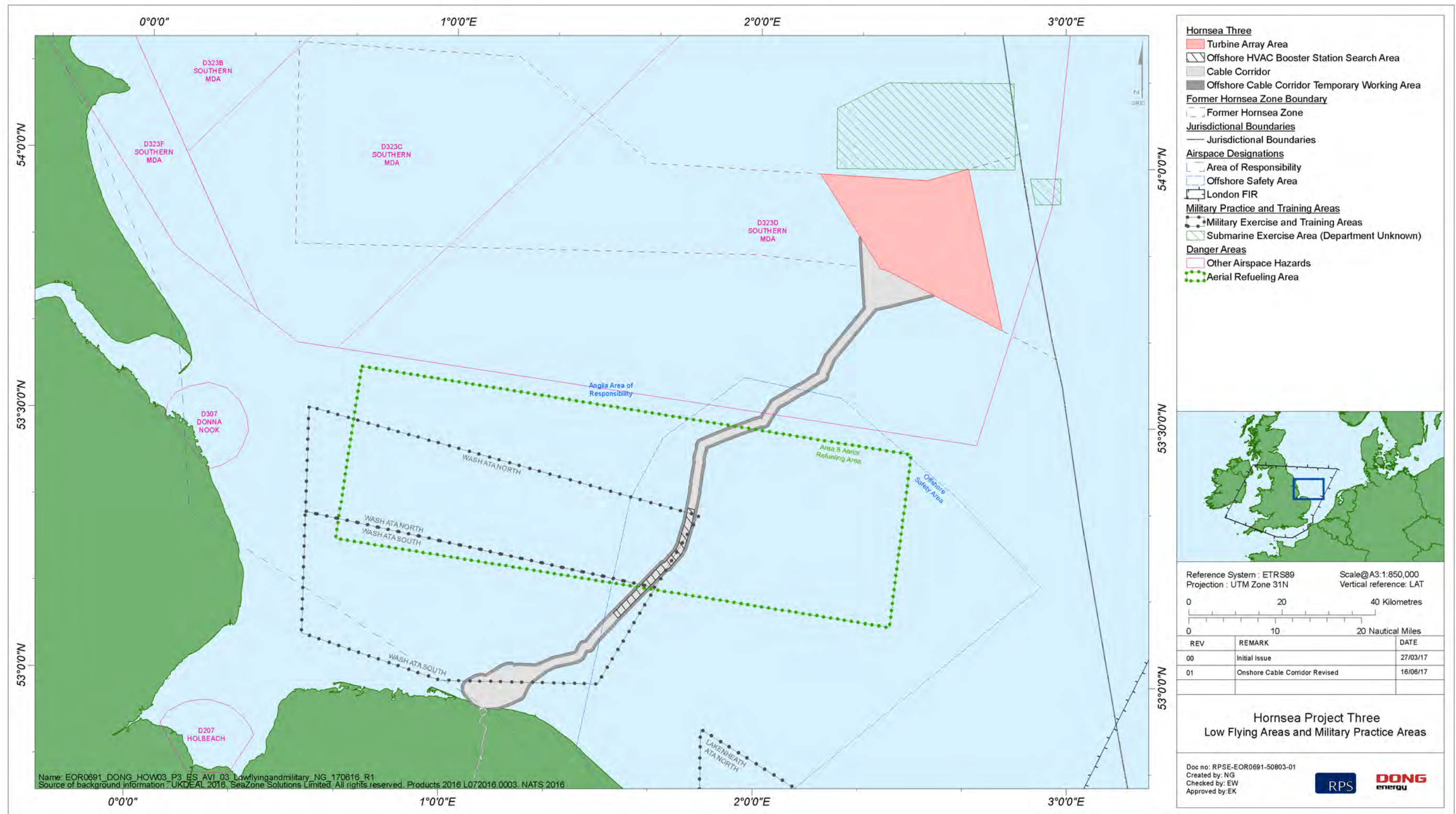


Figure 8.2: Airspace designations and military practice areas.

8.7.4 Civil aviation

- 8.7.4.1 Three UK helicopter companies operate approximately 95 aircraft in support of the oil and gas industry around the UK: Bristow Helicopters Ltd; Bond Offshore Helicopters Ltd; and CHC Scotia Ltd. The main operating bases are: Aberdeen; Sumburgh; Scatsta; Norwich; Humberside; and Blackpool. Three other UK helicopter companies regularly operate to offshore locations on a much smaller scale in support of renewable energy projects and marine navigation facilities. Four Norwegian helicopter companies operate approximately 55 aircraft in support of the oil and gas industry: Bristow Norway; CHC Helikopter Service; Blueway; and Norsk Helikopterservice. The main operating bases are: Stavanger, Bergen, Brønnøysund, Hammerfest, and Kristiansund. In 2014 there were 228 helideck-equipped fixed installations and approximately 50-100 mobile helidecks on the UK continental shelf (UKCS). The CAA reported a total of 86,000 helicopter flight hours for 2012. There were about 100 helideck-equipped fixed installations and approximately 20-40 mobile helidecks on the Norwegian Continental Shelf (NCS) and in 2012, approximately 57,000 flight hours were flown (CAA, 2014b).
- 8.7.4.2 A network of HMRs is established to support the transport of personnel and equipment to offshore oil and gas installations. HMR 2 crosses through the Hornsea Three array area and is used predominantly for transit from Norwich International Airport to oil and gas platforms to the east of the Hornsea Three array area, although it is understood that the majority of these platforms, including the Markham complex operated by Centrica, are predominantly approached from Den Helder, further to the east. The offshore HVAC booster station search area is crossed by HMR 5. The HMR system is shown in Figure 8.3.
- 8.7.4.3 The purpose of an HMR as detailed in CAP 764 is to provide a network of offshore routes as used by civilian helicopters and to effectively provide an obstacle free zone for safe flight when VFR cannot be used. The HMR structure therefore provides both an identification of common flight paths and a safe means of flying to and from offshore locations outside the coverage of air traffic control. Such routes have no separate airspace classification (i.e. they remain Class G, uncontrolled airspace), but they are used by the air navigation service provider (NATS/Anglia Radar) and helicopter operators for flight planning and management purposes (NATS 2017b).
- 8.7.4.4 HMRs have no lateral dimensions, with only the route centre-lines charted (CAA, 2016c). CAP 764 states that there should be no obstacles within 2 nm either side of HMRs but where planned should be consulted upon with the helicopter operators and ANSP. This distance is based upon operational experience, the accuracy of navigation systems and practicality. The 2 nm distance provides time and space for helicopter pilots to descend safely to an operating height below the icing level should such conditions arise.
- 8.7.4.5 Vertically the HMRs over the southern North Sea extend from 1,500 ft. amsl to FL 60 (inclusive) (NATS 2017b) except that:
- (a) Anglia Radar will not normally allocate cruising levels above FL 40 on HMRs in the southern North Sea beneath EG D323B and EG D323C, this area is to the west of the Hornsea Three array area and so is not applicable (see Figure 8.2); and
 - (b) Where helicopter icing conditions or other flight safety considerations dictate, helicopters may be forced to operate below 1,500 ft. amsl. In these circumstances, where possible, pilots should endeavour to follow HMRs and advise the ATSU of the new altitude giving the reason for operating below 1,500 ft. amsl.
- 8.7.4.6 Compliance with the HMR structure is not compulsory. In the general interests of flight safety, however, civil helicopter pilots are strongly encouraged to plan their flights using HMRs wherever possible (NATS 2017b). It should be noted however that the Offshore Renewables Aviation Guidance (ORAG) (RenewableUK, 2016) advises that the HMR routes in the southern North Sea are rarely followed and consultation has advised that they are used more as a point of reference. Other traffic operating in proximity of these routes are advised to maintain an alert look out, especially in the Anglia OSA (NATS 2017b).
- 8.7.4.7 Helicopters must avoid persons, vessels, vehicles and structures by a minimum distance of 500 ft. In visual conditions, pilots may use HMRs or they may opt to fly direct to their destination in open air space. When operating within Instrument Flight Rules (IFR), helicopters require a Minimum Safe Altitude (MSA) of 1,000 ft. height clearance from obstacles within 5 nm of the aircraft. Whilst following an HMR the helicopters operate IFR under Anglia Radar service provision.
- 8.7.4.8 Helicopters are height-banded, so that those outbound to North Sea installations fly at 2,000 ft. and 3,000 ft., whilst those inbound fly at 1,500 ft. and 2,500 ft. This allows for 500 ft. vertical separation between helicopters travelling in opposite directions. A large number of turbines beneath an HMR would result in helicopters flying higher in order to maintain a safe vertical separation from turbines and each other.
- 8.7.4.9 It should be noted that fog and cloud (particularly cumulonimbus cloud) poses meteorological risks and therefore helicopter flights may be restricted in certain weather conditions. In addition, although the sea conditions have no primary impact upon helicopter flight, helicopter offshore operations are generally limited to the lower of Sea State 6 (this is a scale from 0 to 9 of wave height due to wind and swell, used by the World Meteorological Organisation, with 6 denoting a wave height of 4 – 6 m, very rough conditions with high swell) or the capability of the helicopter emergency floatation system due to the ability of recovering personnel from the sea in the event of a forced water landing (RenewableUK, 2016).

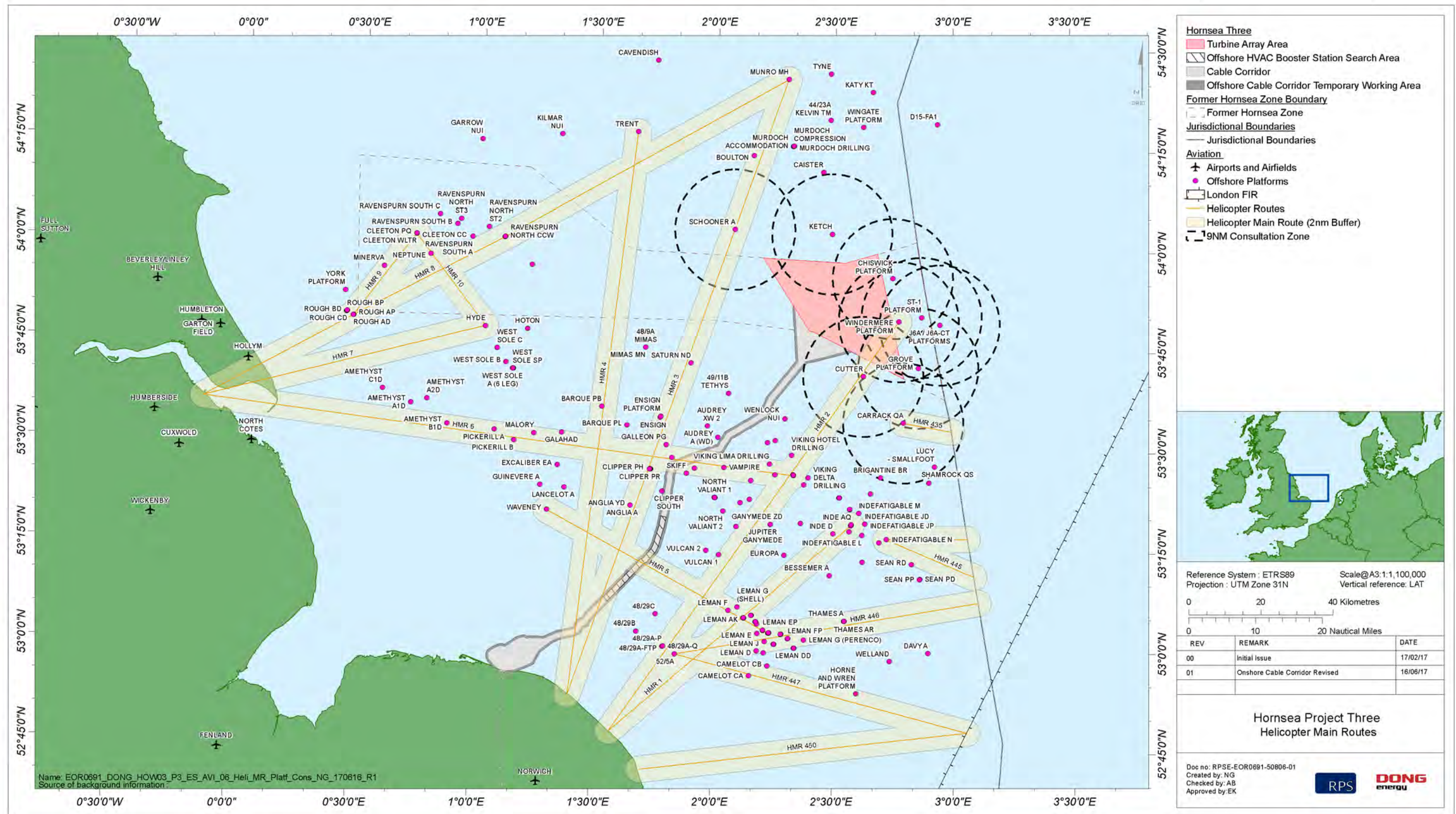


Figure 8.3: Helicopter Main Routes and platform 9 nm consultation zones that intersect with the Hornsea Three array area.

- 8.7.4.10 To help achieve a safe operating environment, a consultation zone of 9 nm radius exists around offshore helicopter destinations (CAA, 2016c). This consultation zone is not considered a prohibition on development within a 9 nm radius of offshore operations but a trigger for consultation with offshore helicopter operators, the operators of existing installations and the holders of oil and gas exploration and development licences to help to ensure safe offshore helicopter operations.
- 8.7.4.11 The basic requirement of the 9 nm consultation zone is to promote consultation that will help to ensure safe instrument approaches in poor weather conditions where a low visibility approach profile is needed. In addition, the consultation helps to ensure that helicopter pilots are able to safely carry out a Missed Approach Procedure (MAP). Such profiles must allow for an acceptable pilot workload, a controlled rate of descent, one engine inoperative performance and obstacle clearance (CAA, 2016c). The Hornsea Three array area extends into the 9 nm consultation zones of nine platforms, as listed in Table 8.5 and shown in Figure 8.3.

Table 8.5: Offshore platforms with 9 nm consultation zone overlapping with the Hornsea Three array area.

Platform	Operator	Helideck	Type of Platform	Status	Distance to Hornsea Three array area boundary	
					nm	km
Schooner A	Faroe Petroleum	Yes	NUI	Active. Potential to be decommissioned by 2021/2022.	5.98	11.07
Ketch	Faroe Petroleum	Yes	NUI	Active. Potential to be decommissioned by 2021/2022.	4.14	7.67
Chiswick	Centrica	Yes	NUI	Active.	1.45	2.69
ST-1	Centrica	Yes	NUI	Production ceased. Decommissioning plans submitted to BEIS, scheduled for 2018-2020 (Centrica, 2016). Not yet approved.	4.48	8.29
J6A/J6A-CT	Centrica	Yes	Manned	Active.	6.90	12.77
Grove	Centrica	Yes	NUI	Active.	2.43	4.50
Windermere	INEOS	Yes	NUI	Production ceased. Due to be decommissioned by 2023.	0.98	1.82
Cutter	Shell	No	NUI	Active.	2.52	4.67
Carrack QA	Shell	Yes	NUI	Active.	6.65	12.31

- 8.7.4.12 The Cutter platform has no helideck and therefore is not considered in the assessment. Wind turbines are considered to be physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft. during IFR (when all helicopters must maintain a vertical separation of 1,000 ft. from any obstacle). Furthermore, during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. The combined effects of maintaining the required distances from any obstacles within the 9 nm consultation zone of an offshore installation may impair the safety of instrument approaches and MAP to and from an offshore installation. This may result in a restriction on helicopter operations to an installation in certain weather conditions, which may have safety implications. Safety implications include a potential impact upon the integrity of offshore platform Safety Cases that are based on the use of helicopters to facilitate evacuation procedures.
- 8.7.4.13 Helicopter access associated with platform decommissioning activities may also be restricted for the reasons in the paragraph above if the 9 nm consultation zone overlaps with the Hornsea Three array. Known decommissioning activity of the platforms (from consultation with the platform operators see Table 8.3 and OGA, 2017) within 9 nm of the Hornsea Three array are listed in Table 8.5.
- 8.7.4.14 Subsurface infrastructure and wells that have not been permanently decommissioned or plugged and abandoned may at some time require from the presence of a rig or vessel that is equipped with a helideck. A 9 nm consultation zone should again be a trigger for consultation with the operators of subsea infrastructure and wells requiring helicopter access (CAA, 2016c). The subsea infrastructure and wells within 9 nm of the Hornsea Three array area are shown in Table 8.6 and Figure 8.4. The licenced areas and associated operators within 9 nm of the Hornsea Three array area where future operations may be required are also shown in Table 8.6 and Figure 8.4.

Table 8.6: Active Licences and subsea infrastructure within 9 nm of the Hornsea Three array area.

Licence Block	Name	Subsea structure	Field/Licence	Status	Operator
43/30a	N/A	N/A	P689	Active	Faroe Petroleum
43/30b	N/A	N/A	P2112	Active	Centrica
44/26a	North West Schooner Subsea	Well head (well: 44/26a-7)	Schooner	Active	Faroe Petroleum
44/27	N/A	N/A	P2284	Active	Third Energy
44/28b	N/A	N/A	P453	Active	Faroe Petroleum
44/29b	N/A	N/A	P454	Active	Engie E&P UK
44/30a	N/A	N/A	P611	Active	Engie E&P UK
48/5a	N/A	N/A	P2112	Extant	Centrica
49/1a	N/A	N/A	P520	Extant	INEOS
49/2a	Well head Topaz	Well head (well: 49/02a-6z)	Topaz / P1013	Not producing – to be decommissioned	INEOS
49/3	N/A	N/A	P2286	Extant	Centrica
49/4a	N/A	N/A	P468	Extant	Centrica
49/4b	N/A	N/A	P1186	Extant	Centrica
49/4c	Kew subsea wellhead	Well head (wells: 49/04c/7z and 49/04c-7Z)	Kew / P1186	Active/Extant	Centrica
49/4d	N/A	N/A	P2286	Extant	Centrica
49/5a	N/A	N/A	P455	Extant	Centrica
49/5b	N/A	N/A	P1186	Extant	Centrica
49/5c	N/A	N/A	P1186	Extant	Centrica
49/8a	N/A	N/A	P523	Extant	Shell
49/9a	N/A	N/A	P132	Extant	Shell
49/9b	N/A	N/A	P524	Extant	INEOS
49/9c	N/A	N/A	P901	Extant	Centrica
49/9d	N/A	N/A	P2286	Extant	Centrica
49/10a	Grove west	Wellhead (well: 49/10a-6Y) and Choke Valve	Grove / P83	Active/Extant	Centrica
49/10b	N/A	N/A	P701	Extant	Total UK
49/10c	Stamford	Well head (Well: 49/10c-7)	Stamford/P1447	Active/ Extant	Centrica

Licence Block	Name	Subsea structure	Field/Licence	Status	Operator
49/10d	N/A	N/A	P1447	Extant	Centrica
49/14b	Carrack West wellhead	Wellhead (well: 49/14b-7)	Carrack / P132	Consultation has advised this wellhead has been decommissioned	Shell
49/15/a	Carrack east wellhead	Wellhead (well: 49/15a-3)	Carrack / P54	Active / Extant	Shell
J03b & J06	N/A	N/A	Unknown	Extant	Centrica Nederland
J03a	N/A	N/A	Unknown	Extant	NAM
K07	N/A	N/A	Unknown	Extant	NAM
K04a	N/A	N/A	Unknown	Extant	Total Nederland
K01a	N/A	N/A	Unknown	Extant	NAM
D18a	N/A	N/A	Unknown	Extant	ENGIE E&P Nederland
J09	N/A	N/A	Unknown	Extant	NAM

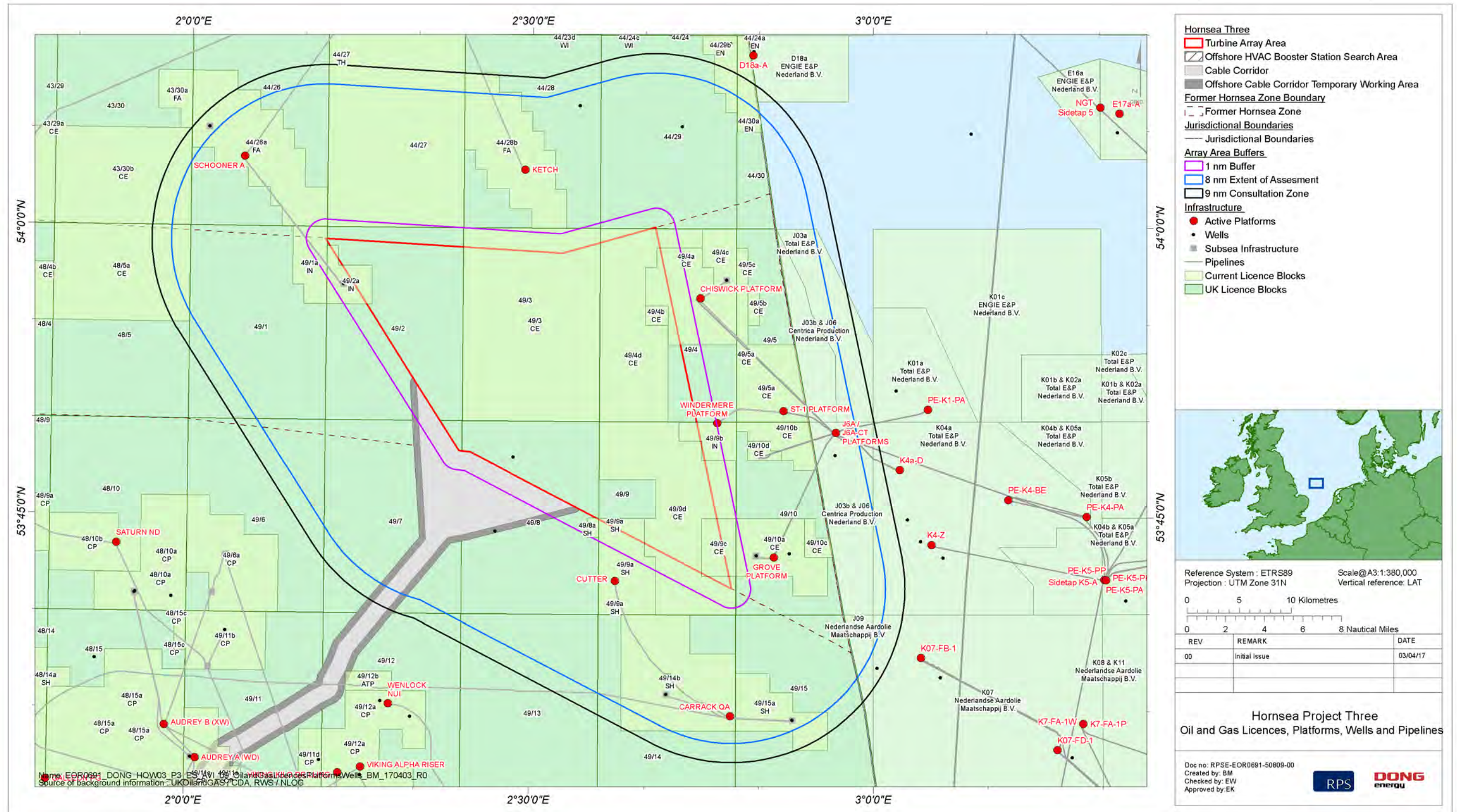


Figure 8.4: Oil and gas licences, platforms and subsea infrastructure within 9 nm of the Hornsea Three array area.

8.7.5 Civil and military radar

- 8.7.5.1 NATS use PSRs based in North Lincolnshire (Claxby) and Norfolk (Cromer) to support their provision of ATC services to aircraft operating between the UK and mainland Europe, and to those overflying the UK FIR in the region of Hornsea Three. Anglia Radar also employs NATS radar to support their provision of services to aircraft of the oil and gas industries within the lateral confines of their area of responsibility over the southern North Sea.
- 8.7.5.2 The Hornsea Three array area is located within the operational range of the NATS Claxby PSR (200 nm). The Hornsea Three array is not located within the operational range of the NATS Cromer PSR (60 nm). The Hornsea Three array area is also within the operational range of the MOD's ASACS Air Defence PSRs located at Staxton Wold and Trimmingham (with a range of over 400 km). The location of these radar installations is provided in Figure 8.5. The figure shows the operational range of the radar and, for the NATS PSR radar, shows the turbine tip height in meters that can be detected by the radar. It should be noted that the dataset provides the detection distance for a 200 m high turbine but in the instance of the Claxby PSR, the operational range extends beyond this.
- 8.7.5.3 Civil airspace and air traffic surveillance and management infrastructure is comprised of the following systems which may be affected by wind farms:
- Primary Surveillance Radar (PSR);
 - Secondary Surveillance Radar (SSR); and
 - Aeronautical Navigation Aids (Nav aids).
- 8.7.5.4 A wide range of systems, including Nav aids such as Instrument Landing Systems (ILS) and VHF Omni-Directional Radio-Range/Distance-Measuring Equipment, together with air-ground communications facilities, could potentially be affected by wind turbine developments.
- 8.7.5.5 Military Air Defence systems are typically more complex than civil communication, navigation and surveillance (CNS) systems. The MOD has a role to provide unimpeded airspace surveillance and early warning of air attack and intrusion into UK airspace. Air Defence Radars have an operational range of over 400 km. In certain circumstances wind turbines will not have the potential to affect radar when, for example there is sufficient geographical terrain, or the curvature of the earth, prevents the turbines from being detected.
- 8.7.5.6 Military air traffic management is supported by military ATC radars. These are typically standard terminal area ATC radars with an instrumented range of 60 nm. Military air traffic management is also supported by military landing aid precision approach radar (PAR) at certain airfields. These have a much shorter instrumented range and are only safeguarded out to 20 nm in certain directions. Analysis of the site boundary and turbine parameters (assuming 325 m maximum tip height) predicts that wind turbines in the Hornsea Three area would not be detectable by Military Air Traffic Control Radars or military landing aids.

- 8.7.5.7 The Met Office radar network currently consists of 16 sites. Consultation with the Met Office advised that they work to wind turbine safeguarding guidelines that stipulate a 20 km separation between any development and a weather radar system. There are no weather radar stations within 20 km of Hornsea Three and these have therefore been screened out of the assessment.

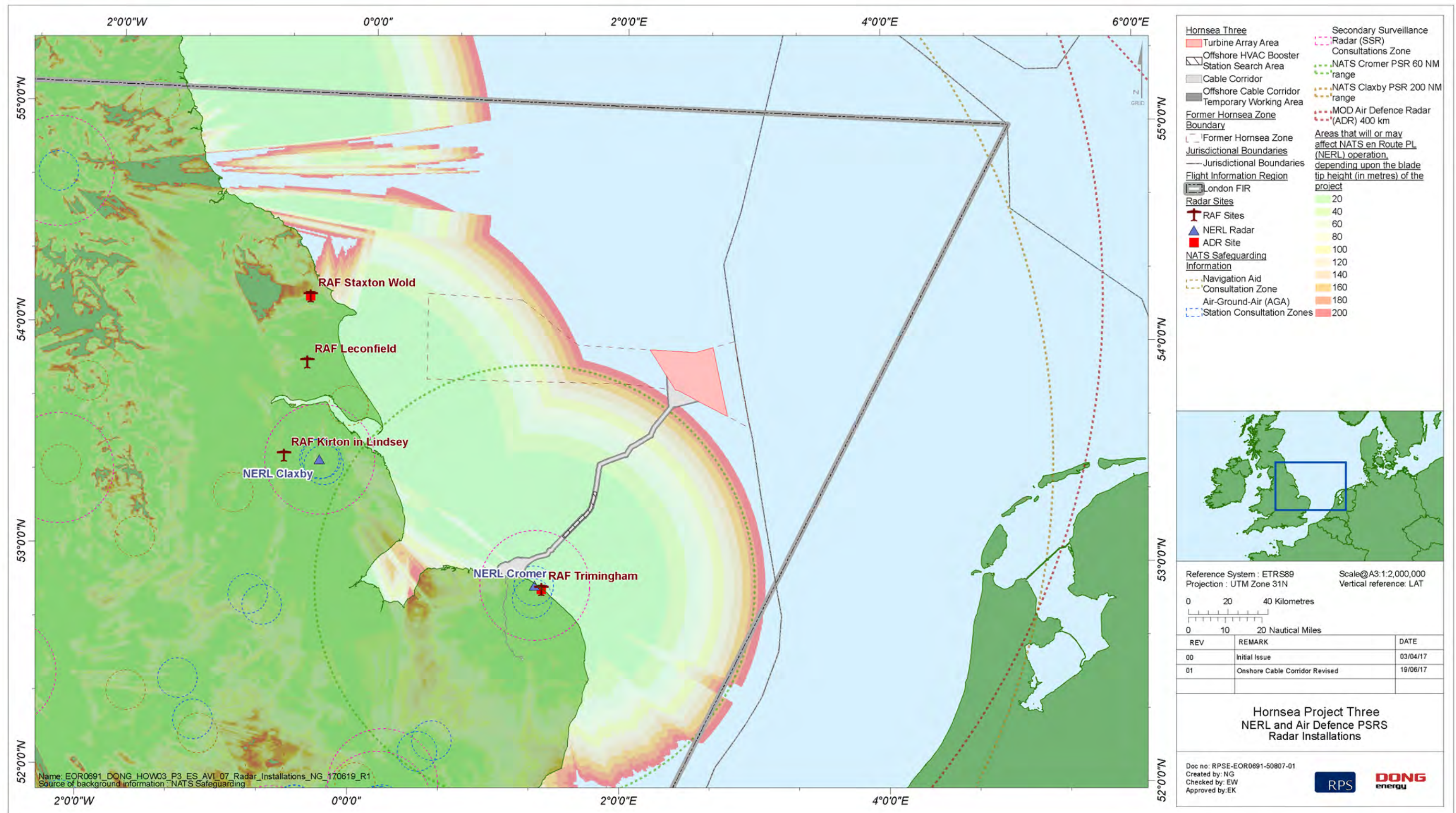


Figure 8.5: NATS PSR, MOD ADR and Meteorological radar.

8.7.6 Communications

- 8.7.6.1 Military and civil aviation rely on CNS infrastructure to support airspace and air traffic management. Military CNS has a crucial role in providing air defence surveillance and control for UK and the North Atlantic Treaty Organization (NATO).
- 8.7.6.2 Subsea telecommunication cables are discussed in chapter 10: Infrastructure and Other Users and are not included within this chapter. Radar interference associated with shipping and vessel navigation is discussed in chapter 7: Shipping and Navigation.
- 8.7.6.3 Maritime communications devices considered within the Hornsea Three EIA include UHF communications, satellite communications, VHF radio, television and offshore microwave fixed links.
- 8.7.6.4 Satellite communications users include surface vessels or rigs/platforms. The Ofcom Tall Structures guidance document indicates that the principal impact of new structures, such as wind turbines, upon satellite television is potential blocking between the receiver and the satellite (Ofcom, 2009). Satellite signals are generally received from a high elevation; this means that disruption to satellite reception is usually limited only to cases where a receiver is very close to a tall structure (for example a ship passing a turbine).
- 8.7.6.5 Trials undertaken for North Hoyle Wind Farm tested Global Positioning System (GPS) performance in the vicinity of the North Hoyle wind turbines, and found there to be no significant impact (DfT, 2004).
- 8.7.6.6 VHF radio is used by large commercial container ships, offshore service vessels, fishing vessels and pleasure craft in the marine band (approx. 156 to 174 MHz) for ship to ship, ship to platform and ship to shore voice communication. The North Hoyle trials referenced above also indicated that wind turbines had no noticeable effects upon any voice communications system, vessel to vessel or vessel to shore station. These included ship borne, shore based and hand held VHF transceivers and mobile telephones. Digital selective calling (DSC) was also satisfactorily tested. The VHF Direction Finding equipment carried in the lifeboats did not function correctly when very close to wind turbines (within about 50 m).
- 8.7.6.7 Offshore microwave links in the vicinity of the Hornsea Three array area have been identified through consultation with oil and gas companies and using Ofcom data. A request was made to Ofcom for known microwave links within a 26.5 km radius of a central point within the Hornsea Three array area boundary. Ofcom provided microwave fixed links in Band range 1.4 GHz to 55 GHz and frequency range MHz 1,350 – 57,000. One identified link is operated by Centrica Production Nederland BV and two links are operated by ConocoPhillips (UK) Limited, as shown in Figure 8.6. No links cross the Hornsea Three array area. Microwave links operate on a 'line of sight' basis.
- 8.7.6.8 A request was made to Atkins Windfarm support (who have responsibility for providing Wind Farm/Turbine support services to the Telecommunications Association of the UK Water Industry) in relation to UHF Radio Scanning Telemetry communications, who responded that they had no objection to the project.
- 8.7.6.9 A request was made to JRC in regard to interference with radio systems operated by utility companies in support of their regulatory operational requirements. A 26 km radius was assessed and JRC confirmed that there are no links within the vicinity.

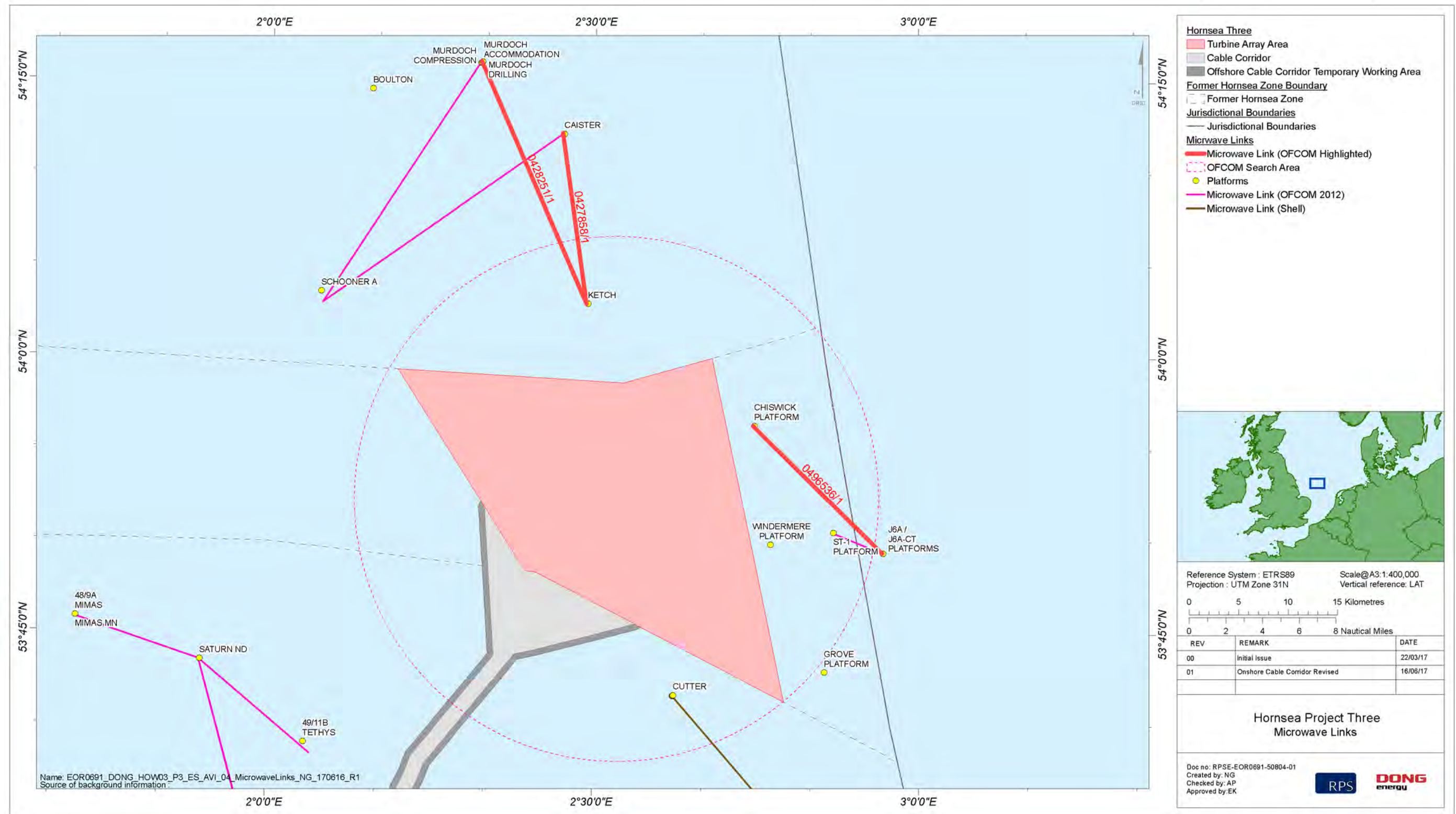


Figure 8.6: Microwave links in vicinity of Hornsea Three.

8.7.7 Future baseline scenario

8.7.7.1 It is difficult to define what the likely evolution of the aviation interests in the southern North Sea will be over the life of the project. In 2016 the OGA reported a continued decline in oil and gas production in the UKCS (continuing a gradual decline seen since the year 2000) (OGA, 2016). While this decline is predicted to continue, they report a range of possible outcomes because the future rate of production is dependent on such a large number of different and unknown factors, including the level of investment and the success of further exploration. Operators continue to find it difficult to predict production accurately as older fields mature and their reliability reduces. A significant share of future oil and gas production is expected to come from new fields and major projects in existing fields. With the recent dramatic fall in oil prices the projections are even less certain than normal. As old fields are decommissioned helicopter use will decline. Consultation has advised that new marine technology using marine service and accommodation vessels equipped with walk-to-work systems is also offering an alternative to helicopters for the oil and gas industry. Helicopter operations are however being used and being planned in the offshore wind industry particularly for routine operation and maintenance purposes. It should be noted that walk-to-work systems are also offering an alternative to helicopters for the offshore wind industry. It is considered a reasonable assumption therefore that helicopter numbers will remain fairly constant but that the providers may gradually shift from servicing one offshore industry (oil and gas) to another (wind) and may in time be reduced due to a shift to walk-to-work systems.

8.7.8 Data limitations

- 8.7.8.1 The data used in this chapter are detailed in section 8.6.2 above. The data used are the most up to date publicly available information which can be obtained from the applicable data sources as cited. Data have also been provided through consultation as detailed in section 8.5 above.
- 8.7.8.2 Given the scale of consultation undertaken on behalf of the former Hornsea Zone in general, for Hornsea Project One, Hornsea Project Two and for Hornsea Three, it is considered that the data employed in the assessment are of a robust nature and are sufficient for the purposes of the impact assessment presented.

8.8 Key parameters for assessment

8.8.1 Maximum design scenario

8.8.1.1 The maximum design scenarios identified in Table 8.7 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (volume 1, chapter 3: Project Description). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), to that assessed here be taken forward in the final design scheme.

8.8.2 Impacts scoped out of the assessment

8.8.2.1 On the basis of the baseline environment and the project description outlined in volume 1, chapter 3: Project Description, a number of impacts are proposed to be scoped out of the assessment for aviation, military and communication. These impacts are outlined, together with a justification for scoping them out, in Table 8.8.

Table 8.7: Maximum design scenario considered for the assessment of potential impacts on aviation, military and communication.

Potential impact	Maximum design scenario	Justification
<i>Construction phase</i>		
Construction activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>Hornsea Three array area:</p> <p>Up to 108 construction vessels in the vicinity of the Hornsea Three array area (making up to 11,026 movements for the construction phase, based on the following total number of construction vessel movements):</p> <ul style="list-style-type: none"> • up to four installation vessels (342 movements), up to 24 support vessels (2,052 movements) and up to 12 transport vessels (1,026 movements) for wind turbine installation; • up to three installation vessels (342 movements), up to 13 support vessels (1,710 movements), up to 12 dredging vessels (1,368 movements) and on average four transport vessels (tugs) (1,368 movements) for wind turbine gravity base foundation installation; • up to two installation vessels (38 movements), up to 12 support vessels (228 movements) and up to four transport vessels (38 movements) for offshore substation foundations installation; and • up to three main cable laying vessels (357 movements), up to three main cable burial vessels (357 movements), support vessels comprising up to four crew boats or SOVs, up to two service vessels, up to two diver vessels, up to two PLGR vessels, and up to two dredging vessels (2,142 movements for support vessels) for array cable installation. <p>500 m safety zones will be applied for around wind turbines and offshore platforms under construction.</p> <p>Advisory safety distances of 1,000 m will be recommended around vessels undertaking construction activities.</p> <p>Construction of the Hornsea Three array area could take up to eleven years over up to three phases.</p>	<p>This is the maximum number of vessels that have been considered for construction of the Hornsea Three array area that may cause potential interference or obstruction to Military Practice Areas due to their proximity.</p> <p>Maximum overall duration of construction activities within the Hornsea Three array area.</p>
Installation of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> • Up to 160 wind turbines with a maximum tip height of 325 m LAT. <p>Construction of the Hornsea Three array area could take up to eleven years over up to three phases.</p> <p>Offshore cable corridor:</p> <ul style="list-style-type: none"> • Up to four offshore HVAC booster stations (tallest element 90 m LAT). <p>Maximum installation duration for the four offshore HVAC booster stations: up to eight months (based on two months per structure).</p>	<p>These parameters represent the maximum design scenario for height of infrastructure within Hornsea Three which has the greatest potential for interference with operations, communications and/or radar systems.</p>

Potential impact	Maximum design scenario	Justification
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Hornsea Three array area:</p> <p>2,157 return trips for the construction phase based on:</p> <ul style="list-style-type: none"> Up to 257 return trips for wind turbine installation Up to 684 return trips for monopile installation Up to 684 return trips for array cables Up to 532 return trips for all offshore substations and accommodation platforms <p>Offshore cable corridor:</p> <p>1,684 return trips for the construction phase based on:</p> <ul style="list-style-type: none"> Up to 1,684 return trips for cable installation, helicopter movements for substation foundations included above. 	The maximum number of helicopter round trips during the construction phase which may affect the available airspace for other users.
Operation phase		
Maintenance activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>O&M vessels in the vicinity of the Hornsea Three array area making up to 2,832 return trips per year, comprised of: jack-up vessels (87 return trips), crew transfer vessels (2,433 return trips) and supply vessels (312 return trips).</p> <p>500 m safety zones will be applied for around manned offshore platforms.</p> <p>500 m safety zones will be applied for around wind turbines and offshore platforms undergoing major maintenance.</p> <p>Advisory safety distances of 1,000 m will be recommended around vessels undertaking major maintenance activities.</p> <p>Anticipated design life of wind farm 25 years.</p>	This is the maximum number of vessels that have been considered for O&M activities within the Hornsea Three array area that may cause potential interference or obstruction to Military Practice Areas due to their proximity.
Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRS.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT. <p>Anticipated design life of wind farm 25 years.</p> <p>Offshore cable corridor:</p> <ul style="list-style-type: none"> Up to four offshore HVAC booster stations (tallest element 90 m LAT). <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines and hoist operations will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT within an area of up to 696 km². Up to 4,902 return helicopter trips/year to wind turbines. <p>Helicopter hoisting platforms may be installed on each of the wind turbine nacelles to enable crews to access the nacelle wind turbine for maintenance.</p> <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the greatest potential for interference with operations, communications and/or radar systems to cross-zone (Hornsea Three array area) helicopter transit below 2,500 ft. Greatest height of infrastructure within the array, the greatest height for hoist operations to take place and the maximum number of helicopter movements.
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Hornsea Three array area:</p> <p>Up to 5,273 return trips/year (comprising 4,902 to wind turbines, 371 to platforms and 780 for crew changes) to and from an onshore helicopter base or from an offshore base or vessel with helicopter personnel transfer.</p> <p>Anticipated design life of wind farm 25 years.</p>	The maximum number of return helicopter flights associated with the greatest number of wind turbines (up to 342 wind turbines).

Potential impact	Maximum design scenario	Justification
Wind turbines will form a physical obstruction and may disrupt helicopter access, including requirements for decommissioning, to the Schooner A and Ketch platforms (Faroe Petroleum).	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT; The maximum area of the Hornsea Three array area within 9 nm of these platforms. <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms (Centrica).	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT; The maximum area of the Hornsea Three array area within 9 nm of these platforms. <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Windermere platform (INEOS).	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT; The maximum area of the Hornsea Three array area within 9 nm of these platforms. <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Carrack QA platforms (Shell).	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT; The maximum area of the Hornsea Three array area within 9 nm of these platforms. <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines will form an aerial obstruction and may disrupt helicopter access to heli-deck equipped drilling rigs and vessels conducting operations at subsea infrastructure and well locations.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT; The maximum area of the Hornsea Three array area within 9 nm of active subsea infrastructure and wells. <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.
Wind turbines may disrupt radar coverage of NATS Claxby PSR and the Military ADR located at Staxton Wold and Trimingham and may interfere with existing microwave and other communication links.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Wind turbines with a maximum tip height of 325 m within an area of up to 696 km²; Up to 12 offshore HVAC collector substations; Up to four offshore HVDC substations; and Up to three offshore accommodation platforms <p>Anticipated design life of wind farm 25 years.</p>	These parameters represent the maximum design scenario for height of infrastructure within the array which has the greatest potential for interference with operations, communications and/or radar systems.

Potential impact	Maximum design scenario	Justification
<i>Decommissioning phase</i>		
Decommissioning activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>Hornsea Three array area: Maximum number of decommissioning vessel movements in the vicinity of the Hornsea Three array area (up to 108 vessels based on construction vessel numbers). 500 m safety zones will be applied for around wind turbines and offshore platforms undergoing decommissioning. Advisory safety distances of 1,000 m will be recommended around vessels undertaking decommissioning activities. Decommissioning of the Hornsea Three array area could take up to 11 years based on construction timeframes.</p>	<p>This is the maximum number of vessels that have been considered for decommissioning of the Hornsea Three array area (based on construction vessel numbers) that may cause potential interference or obstruction to Military Practice Areas due to their proximity. Maximum overall duration of decommissioning activities within the Hornsea Three array area.</p>
Removal of Hornsea Three infrastructure will maintain an aerial obstruction resulting in disruption to helicopters using HMRs.	<p>Hornsea Three array area:</p> <ul style="list-style-type: none"> Up to 160 wind turbines with a maximum tip height of 325 m LAT. <p>Decommissioning of the Hornsea Three array area could take up to 11 years based on construction timeframes.</p> <p>Offshore cable corridor:</p> <ul style="list-style-type: none"> Up to four offshore HVAC booster stations (tallest element 90 m LAT). <p>Maximum decommissioning duration for the four offshore HVAC booster stations: up to eight months based on construction timeframes.</p>	<p>These parameters represent the maximum design scenario for height of infrastructure in Hornsea Three which has the greatest potential for interference with operations, communications and/or radar systems.</p>
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Hornsea Three array area: 2,157 return trips based on construction helicopter numbers.</p> <p>Offshore cable corridor: 1,684 return trips for the construction phase based on: Up to 1,684 return trips for cable installation, helicopter movements for substation foundations included above.</p>	<p>The maximum number of helicopter round trips during the decommissioning phase (based on construction helicopter numbers) which may affect the available airspace for other users.</p>

Table 8.8: Impacts scoped out of the assessment for aviation, military and communication.

Potential impact	Justification
<i>Operation phase</i>	
Impact of physical presence of wind turbines in Hornsea Three array area on fixed wing aircraft.	Commercial air traffic will be at a height that is not affected by the Hornsea Three turbines. Due to the distance offshore recreational fixed wing aircraft are not anticipated in the location of the Hornsea Three array area. Military and surveillance aircraft could be found in the vicinity however any aircraft will be made aware of the location of the project as all structures will appear in UK AIP and will be marked and lit in accordance with the designed in designed in mitigation (Table 8.12). Effects to fixed wing aircraft have therefore been scoped out of the assessment.
Impact of physical presence of wind turbines in Hornsea Three array area on military ATC radar and landing aids.	Military ATC radars have an instrumented range of 60 nm. Military landing aid precision approach radar are only safeguarded out to 20 nm in certain directions. Wind turbines within the Hornsea Three array area (at a distance of 65 nm at the closest point to land) would not be detectable by Military ATC Radars or military landing aids. The MOD confirmed that it is unlikely that there will be any detectability from any MOD ATC radars to the Hornsea Three Array area. This is due to the distance of the Hornsea Three array area offshore, which ensures that it is beyond radar line of sight. This provides the confirmation requested by PINS in their Scoping Opinion in order to justify scoping out effects on military ATC radar (PINS, 2016).
Impact of physical presence of wind turbines in Hornsea Three array area on meteorological radar.	Meteorological radars are land based and have a safeguarding range of 20 km. The Hornsea Three array area, a distance of 65 nm at the closest point to land, would not affect these meteorological radar. The Met Office confirmed that the meteorological radar are safeguarded to 20 km (see Table 8.3). This provides the confirmation requested by PINS in their Scoping Opinion in order to justify scoping out effects on meteorological radar (PINS, 2016).
Impact of physical presence of wind turbines in Hornsea Three array area on cellular telephones.	Cellular telephone providers do not provide coverage for users located in the vicinity of the Hornsea Three array area. In the Scoping Opinion, the Secretary of State agreed that effects on cellular phone coverage can be scoped out as there is no coverage in the vicinity of the Hornsea Three array area (PINS, 2016).
Impact of physical presence of wind turbines in Hornsea Three creating turbulence which may affect aviation.	Turbulence may affect aircraft during critical stages of flight, or those involved in very light sport aviation such as gliding, parachuting, hang-gliding, paragliding or microlight operations. The Hornsea Three array area is not in the vicinity of an aerodrome and at a distance offshore not to anticipate light sport aviation. Effects from turbulence have therefore been scoped out of the assessment.

8.9 Impact assessment criteria

- 8.9.1.1 At the present time there is no recognised industry best practice with regard to the assessment of impact of offshore wind farms upon aviation operations. As such the assessment methodology is one that was developed specifically for Hornsea Project One and Hornsea Project Two and has been employed, with some refinement through consultation (see Table 8.3), for Hornsea Three.
- 8.9.1.2 The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. This section describes the criteria applied in this chapter to assign values to the sensitivity of receptors and the magnitude of potential impacts. The terms used to define sensitivity and magnitude are based on those used in the DMRB methodology, which is described in further detail in volume 1, chapter 5: Environmental Impact Assessment Methodology.
- 8.9.1.3 The criteria for defining sensitivity in this chapter are outlined in Table 8.9 below.

Table 8.9: Definition of terms relating to the sensitivity of the receptor.

Sensitivity	Definition used in this chapter
Very High	Receptor provides a service which is of critical importance to the local, regional or national economy, and/or the receptor is highly vulnerable to impacts that may arise from the project, and/or recoverability is long term or not possible.
High	Receptor provides a service which is of high value to the local, regional or national economy, and/or the receptor is generally vulnerable to impacts that may arise from the project, and/or recoverability is slow and/or costly.
Medium	Receptor provides a service which is of moderate value to the local, regional or national economy, and/or the receptor is somewhat vulnerable to impacts that may arise from the project, and/or has moderate to high levels of recoverability.
Low (or lower)	Receptor provides a service which is of low value to the local, regional or national economy, and/or the receptor is not generally vulnerable to impacts that may arise from the project, and/or has high recoverability.
Negligible	Receptor provides a service which is of negligible value to the local, regional or national economy, and/or the receptor is not vulnerable to impacts that may arise from the project, and/or has high recoverability.

- 8.9.1.4 The criteria for defining magnitude in this chapter are outlined in Table 8.10 below.

Table 8.10: Definition of terms relating to the magnitude of an impact.

Magnitude of impact	Definition used in this chapter
Major	Total loss of ability to carry on activities and/or impact is of extended physical extent and/or long term duration (i.e. total life of project and/or frequency of repetition is continuous and/or effect is not reversible for project).
Moderate	Loss or alteration to significant portions of key components of current activity and/or physical extent of impact is moderate and/or medium term duration (i.e. operational period) and /or frequency of repetition is medium to continuous and/or effect is not reversible for project phase.
Minor	Minor shift away from baseline, leading to a reduction in level of activity that may be undertaken and/or physical extent of impact is low and/or short to medium term duration (i.e. construction period) and /or frequency of repetition is low to continuous and/or effect is not reversible for project phase.
Negligible	Very slight change from baseline condition and/or physical extent of impact is negligible and/or short term duration (i.e. less than two years) and/or frequency of repetition is negligible to continuous and/or effect is reversible.
No change	No change from baseline conditions.

- 8.9.1.5 The significance of the effect upon aviation, military and communication is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The particular method employed for this assessment is presented in Table 8.11. Where a range of significance of effect is presented in Table 8.11, the final assessment for each effect is based upon expert judgement.
- 8.9.1.6 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of the EIA Regulations.

Table 8.11: Matrix used for the assessment of the significance of the effect.

	Magnitude of impact					
		<i>No change</i>	<i>Negligible</i>	<i>Minor</i>	<i>Moderate</i>	<i>Major</i>
Sensitivity of receptor	<i>Negligible</i>	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
	<i>Low</i>	Negligible	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	<i>Medium</i>	Negligible	Negligible or minor	Minor	Moderate	Moderate or major
	<i>High</i>	Negligible	Minor	Minor or moderate	Moderate or major	Major or substantial
	<i>Very high</i>	Negligible	Minor	Moderate or major	Major or substantial	Substantial

8.10 Measures adopted as part of Hornsea Three

8.10.1.1 As part of the project design process, a number of designed-in measures have been proposed to reduce the potential for impacts on aviation, military and communications (see Table 8.12). This approach has been employed in order to demonstrate commitment to measures by including them in the design of Hornsea Three and have therefore been considered in the assessment presented in section 8.11 below. These measures are considered standard industry practice for this type of development. Assessment of sensitivity, magnitude and therefore significance includes implementation of these measures.

Table 8.12: Designed-in measures adopted as part of Hornsea Three.

Measures adopted as part of Hornsea Three	Justification
The DIO will be kept informed of the nature and timing of construction, operation and maintenance and decommissioning activities. This will be implemented through the appropriate distribution of Notices to Mariners.	This will enable construction, operation and maintenance and decommissioning activities and operations within Military Practice Areas to be coordinated.
The UK Hydrographic Office (UKHO) will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of construction and the maximum height of any construction equipment to be used, prior to the start of construction, to allow inclusion on Aviation Charts.	To comply with CAP 764 (CAA, 2016c). Structures with a maximum height of 300 ft. (91.4 m) above ground level or higher shall be promulgated in the UK AIP and charted on civil aviation charts. Accordingly, any such structure is required to be notified to the Defence Geographic Centre (DGC) who provides the source of obstacle data, published in the UK AIP at ENR 5.4. In addition, the developer shall provide the maximum height of any construction equipment required to build the turbines. Removal of turbines is also required to be notified and expected date of removal. While aviation charts are in the process of being updated, developments shall also be notified through the means of a Notice to Airmen (NOTAM). The CAA also requests that any feature/structure 70 ft. (21.3 m) in height, or greater, above ground level is also reported to the DGC. It should be noted that NOTAMs would not routinely be required for structures under 300 ft. (91.4 m) unless specifically requested by an aviation stakeholder.
During the operational phase, the Hornsea Three operator will issue, as necessary, requests to the UK Aeronautical Information Service to submit NOTAMs in the event of any failure of aviation lighting.	To comply with CAP 764 (CAA, 2016c) which contains the CAA policy on actions in the event of the failure of aviation warning lights on offshore wind turbines listed in the UK AIP.
Continued consultation with OGA and oil and gas operators and licensees will promote and maximise cooperation between parties and minimise both spatial and temporal interactions between conflicting activities.	Oil and gas activity will change and licence blocks will be relinquished and acquired by different operators, over the duration of the project life. Continued consultation is required to stay informed of planned activities from both parties in order that there can be continued coexistence.

Measures adopted as part of Hornsea Three	Justification
An Emergency Response and Cooperation Plan (ERCoP) will be in place for the construction, operation and decommissioning phase of Hornsea Three. The ERCoP will detail specific marking and lighting of the wind turbine generators. The requirements for lighting on offshore obstructions is contained in CAP 393 (Article 223) (CAA, 2016a), CAP 764 (CAA, 2016c) and CAP 437 (CAA, 2016b) including to support helicopter hoist operations at the wind farm. The lighting shall meet the current CAA requirements and also be consulted on with MOD and MCA for any additional requirements.	This will ensure appropriate lighting is in place to facilitate aeronautical safety.
Once a helicopter operator/s is selected to service Hornsea Three they will be advised by the Applicant to consult with the NATS Anglia unit in order to fully discuss their intentions and operational requirements in regard to ATC.	To safeguard aviation operations in the southern North Sea.

8.11 Assessment of significance

8.11.1 Construction phase

8.11.1.1 The impacts of the offshore construction of Hornsea Three have been assessed on aviation, military and communication. The environmental impacts arising from the construction of Hornsea Three are listed in Table 8.7 above along with the maximum design scenario against which each construction phase impact has been assessed.

8.11.1.2 A description of the potential effect on aviation, military and communication receptors caused by each identified impact is given below.

Construction activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area

Magnitude of impact

8.11.1.3 A Submarine Exercise Area is situated immediately north of the Hornsea Three array area, in the Outer Silver Pit Location. The Submarine Exercise Area covers a total area of 675 km². The Submarine Exercise Area appears to overlap the Hornsea Three array area by a distance of 123 m (0.03 km²) (see Figure 8.3). The percentage overlap is therefore negligible (0.004%). Hornsea Three is consulting with MOD on the accuracy of this boundary. There is the potential that this negligible area would be restricted from being used as a Submarine Exercise Area. During construction there will be construction vessels operating within the Hornsea Three array area, and around the perimeter of the array area. The advisory safety distances around the vessels operating at the array area perimeter may further infringe on the Submarine Exercise Area. This will be a relatively small area (up to 1,000 m from the Hornsea Three array area boundary) for an intermittent period during the construction period. In addition there will be 500 m safety zones around the wind turbines during construction which, if located at the perimeter of the Hornsea Three array area, will infringe on the Submarine Exercise Area.

8.11.1.4 The impact is predicted to be of negligible spatial extent, short to medium term duration, intermittent and not reversible for the construction phase. It is predicted that the impact will affect the Submarine Exercise Area directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of the receptor

8.11.1.5 It has not been possible to ascertain the exact nature of operations within the Submarine Exercise Area however consultation with the MOD/DIO has not raised any concerns with regard to the proximity of the Hornsea Three array area to this Submarine Exercise Area. Hornsea Three will have further consultation with the MOD to verify the boundaries. The Applicant will advise the DIO of construction activity in the region through Notice to Mariners as detailed in Table 8.12.

8.11.1.6 The Submarine Exercise Area is deemed to be of medium vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effect

8.11.1.7 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Installation of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.

Magnitude of impact

8.11.1.8 HMRs are established to both provide an identification of common flight paths and to facilitate safe helicopter flights when flying in instrument meteorological conditions (IMC) (i.e., when flight cannot be completed in visual conditions). CAP 764 recommends HMRs should ideally be free of obstacles 2 nm either side of the centre line due to the requirement for helicopters to transit below the 0° isotherm level during conditions which pose an icing risk. Helicopters may choose to fly as low as 500 ft. in such conditions when they are within the HMR.

8.11.1.9 When operating under IFR, helicopters require a minimum 1,000 ft. separation from obstacles (CAA, 2016c) which would indicate that whilst operating above wind turbines of the size anticipated for Hornsea Three, helicopters would need to be flown at a minimum altitude of 2,066 ft. amsl. This is the maximum height of the turbine blade when vertical (325 m or 1,066 ft.) plus the 1,000 ft. required clearance. As flights are height banded by 500 ft. in the southern North Sea the minimum required altitude would be 3,000 ft. amsl (inbound) and 2,500 ft. amsl (outbound). The presence of wind turbines in HMR 2 would therefore preclude the use of the route by helicopters in IMC when the weather would require flight at a lower altitude than 2,500 ft. The icing level or 0° isotherm (the level at which the air temperature reaches freezing) may dictate the level at which a helicopter can fly. Flight into known icing conditions can be prohibiting, and is generally time-limited, depending upon the aircraft type. Thus a low freezing level can pose problems for helicopter operations. Aircraft unable to fly in icing conditions would need to route below the icing level. Aircraft already operate under these limitations occasionally, but the higher the MSA, the more frequent will be the days where the freezing level is at or below MSA.

8.11.1.10 The presence of obstructions in HMR 2 means that aircraft would not be able to use this route in IMC when the weather conditions require flight at a lower altitude than 2,500 ft. which could be up to 10% of the time (see details of consultation undertaken with BOND in volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three). This potential impact duration would start from when the turbines are installed onto their foundations in the area of HMR 2.

- 8.11.1.11 Up to four offshore HVAC booster stations of a maximum height of 90 m LAT may be positioned within the offshore HVAC booster station search area within the offshore cable corridor as shown in Figure 8.3. The offshore HVAC booster station search area is crossed by HMR 3 and HMR 5. The maximum height of the tallest element of the offshore HVAC booster station is 90 m or 295 ft. When operating under IFR, a helicopter flying above the offshore HVAC booster stations would need to be flown at a minimum altitude of 2,090 ft amsl.
- 8.11.1.12 There are a considerable number of offshore oil and gas platforms located in HMRs which are of a similar height to the offshore HVAC booster stations (for example the Carrack platform within HMR 435 is 84.7 m high). During consultation for Hornsea Project One (see volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three) NATS advised that obstacles (such as an offshore HVAC booster station) can be present within HMRs just as other oil and gas platforms are and that this is not seen as a safety issue as it is a stationary and identifiable object that can be navigated around. The offshore HVAC booster stations are not considered a prohibition on the use of the HMR but, dependent on their ultimate location and configuration, may require a very minor deviation, in instances where aircraft are required to fly below MSA 1,500 ft. There is available airspace to all sides of the proposed location of the offshore HVAC booster stations.
- 8.11.1.13 The impact on HMR2, HMR 3 and HMR 5 is predicted to be of local spatial extent, short to medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be minor.

Sensitivity of the receptor

- 8.11.1.14 The sensitivity of the helicopter operator using an HMR is governed by the operational requirements at the point of the route destination, the ability to use alternative routes, and the increase in track time required to use alternative routes. HMR 2 leads to the Windermere, ST-1 and J6A platforms. Consultation with the operator of the Windermere platform (INEOS) has advised that the platform is presently serviced by helicopters from the Netherlands that will not routinely utilise HMR 2 and that the platform is due to be decommissioned prior to the start of Hornsea Three construction (2023). Consultation with the operator of the ST-1 platform (Centrica) has advised that this platform is serviced by helicopters from the Netherlands and so will not use HMR 2, and that the platform is due to be decommissioned by the start of Hornsea Three construction (2023). Consultation with the operator of the J6A platform (Centrica) has advised that this platform is serviced by helicopters from the Netherlands and so will not use HMR 2 although this is subject to competitive tendering and therefore may change. The use of HMR 2 for exploration or other operational requirements within the licence blocks in this area will occur although the frequency of use would be much more intermittent. Where a helicopter operator does need to use HMR 2 they will continue to use this route unless weather conditions precludes flight below 2,500 ft., in which case the helicopter operator may require an obstacle free route. Consultation has advised that certain aircraft with an appropriate icing clearance would be

able to fly direct and that certain aircraft can be fitted with icing protection should this become a client requirement.

- 8.11.1.15 An obstacle free route is available as a deviation around the Hornsea Three array area. A suggested deviation is shown in Figure 8.7. It should be noted that an amendment to the HMR is not being proposed but a potential alternative route option for the helicopter operator is indicated. The ability of the helicopter operator to safely undertake the intended journey is therefore not affected. There will be an incremental increase in journey time dependant on the ultimate destination. As an example, the existing HMR 2 from Norwich airfield to the J6A platform is 78.6 nm. The deviation would extend the route to 80.6 nm, an increase of 2.5%.
- 8.11.1.16 There is considered to be operational need for HMR 3 and HMR 5 in certain weather conditions however the HMRs could still be flown with very minor deviations. The location of the offshore HVAC booster stations would be reported to the DGC (as per CAP 764 para 4.9 (2)).
- 8.11.1.17 The ability of the helicopter operator to use the HMR 2, HMR 3 and HMR 5 is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

- 8.11.1.18 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

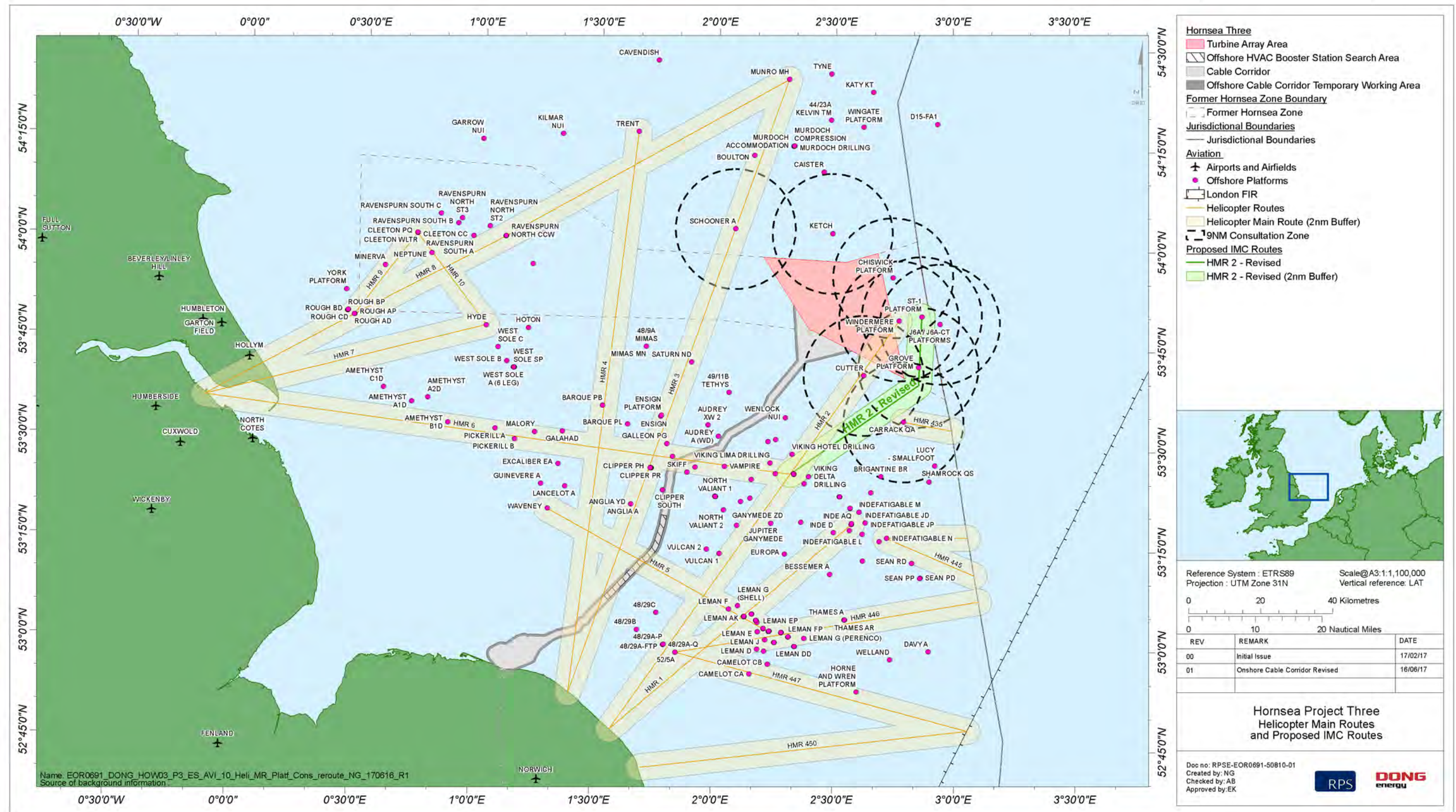


Figure 8.7: Helicopter Main Routes and proposed IMC routes.

Hornsea Three helicopter operations may affect the available airspace for other users.

Magnitude of impact

- 8.11.1.19 The Hornsea Three project may require up to 2,157 helicopter return trips (Hornsea Three array area) and 1,684 helicopter return trips (offshore cable corridor) over the full duration of the construction phase. It is not yet known which helicopter provider would be used or from which airport the helicopter operator would be based, however flights are likely to originate from the east coast of the UK or to come from an offshore base or vessel with helicopter personnel transfer. These flights would be in addition to existing helicopter traffic levels in the southern North Sea at the time of construction.
- 8.11.1.20 The North Sea offshore oil and gas industry is served by some 100 flights a day (Parliament, Helicopter Safety Briefing Document, 2014) which is equivalent to some 36,500 flights a year. It is very difficult to predict how the baseline air traffic will change over the course of the Hornsea Three construction phase. While UKCS oil and gas operations are declining and alternative vessel-based services are becoming available to the oil and gas industry, helicopter operations for the offshore wind industry are increasing. This could see the net effect being similar figures overall to what is seen today. The increase in helicopter requirements for Hornsea Three will however be focused within one area of the southern North Sea which could see a localised increase in helicopter flights in this area.
- 8.11.1.21 The impact is predicted to be of regional spatial extent, short to medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of receptor

- 8.11.1.22 Helicopter flights in the UK are highly regulated. The CAA SARG is responsible for the regulation of ATS in the UK; the planning and regulation of all UK airspace, including the CNS infrastructure, and also has the lead responsibility within the CAA for all wind turbine related issues.
- 8.11.1.23 At all times, responsibility for the provision of safe services lies with the ATS provider or ANSP. Consultation with NATS has advised that there is a mature ATC system provided by NATS in the southern North Sea area that was originally set up to support the offshore oil and gas industry but is available to all users of this airspace. All helicopters flying in these areas are provided with ATC services as they transit to and from offshore installations. Flights to and from Hornsea Three would have the same services available to them. Such services ensure a safe separation distance between aircraft. A CAA review (CAA, 2014b) of air traffic safety advises that over recent years, significant improvements in surveillance radar and radio coverage within the UK North Sea environment have been developed and implemented which has enhanced the service ATC providers are able to deliver during the en-route phase of flight, to and from the oil and gas platforms. Once a helicopter operator is selected for Hornsea Three they would consult with NATS in regard to the ATC service.

8.11.1.24 The same rules of the air and ATC services will continue to apply to helicopter operators within the southern North Sea. The provision of a service to Hornsea Three is not considered to affect the provision of a service to another user of the airspace. Best practice guidance has been developed for the offshore wind energy sector (Renewables UK, 2016) and consideration is being given to the aviation risk profile of the whole offshore wind sector.

8.11.1.25 The ability of the helicopter operator to continue using the southern North Sea airspace is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

8.11.1.26 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Future monitoring

8.11.1.27 No specific monitoring requirements have been identified for the construction phase in relation to aviation, military and communication.

8.11.2 Operational and maintenance phase

8.11.2.1 The impacts of the offshore operation and maintenance of Hornsea Three have been assessed on aviation, military and communication. The environmental impacts arising from the operation and maintenance of Hornsea Three are listed in Table 8.7 along with the maximum design scenario against which each operation and maintenance phase impact has been assessed.

8.11.2.2 A description of the potential effect on aviation, military and communication receptors caused by each identified impact is given below.

Maintenance activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.

8.11.2.3 This impact is a continuation of the potential impact upon operations within the Military Practice Area located in the Outer Silver Pit area during the construction phase (see paragraph 8.11.1.3).

Magnitude of Impact

8.11.2.4 A Submarine Exercise Area is situated immediately north of the Hornsea Three array area as detailed in paragraph 8.11.1.3 and Figure 8.2. There appears to be a negligible percentage overlap with the Hornsea Three array area (0.004%) which may potentially not be able to be used as a Submarine Exercise Area. During operation there will be maintenance vessels operating within the Hornsea Three array area. The maintenance vessels are not considered to be required outside of the Hornsea Three array area however when operating at the perimeter a 1,000 m advisory safety distance around a vessel may infringe on the Submarine Exercise Area. This will be a relatively small area for a short duration on an intermittent basis during the operational phase. In addition there may be 500 m safety zones around wind turbines and offshore platforms on the perimeter of the Hornsea Three array area which would infringe on the Submarine Exercise Area.

8.11.2.5 The impact is predicted to be of local spatial extent, medium term duration, continuous (operational safety zones)/intermittent (temporary safety zones and advisory safety distances) and not reversible for the project phase. It is predicted that the impact will affect the Submarine Exercise Area directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of the receptor

8.11.2.6 It has not been possible to ascertain the exact nature of operations within the Submarine Exercise Area however consultation with the MOD/DIO has not raised any concerns with regard to the proximity of the Hornsea Three array area to this Submarine Exercise Area Hornsea Three will have further consultation with the MOD to verify the boundaries. The Applicant will advise the DIO of maintenance activity in the region through Notice to Mariners as detailed in Table 8.12.

8.11.2.7 The Submarine Exercise Area is deemed to be of medium vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effect

8.11.2.8 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRS.

8.11.2.9 This impact is a continuation of the potential impact upon HMR 2, HMR 3 and HMR 5 during the construction phase (see paragraph 8.11.1.9).

Magnitude of impact

8.11.2.10 HMRS are established to both provide an identification of common flight paths and to facilitate safe helicopter flights when flying in instrument meteorological conditions (IMC) as described in paragraph 8.11.1.8.

8.11.2.11 The presence of obstructions in HMR 2 means that aircraft would not be able to use this route in IMC when the weather conditions require flight at a lower altitude than 2,500 ft. which could be up to 10% of the time. Helicopters would need to deviate around the Hornsea Three array area which could increase the track time from departure to destination.

8.11.2.12 Aircraft unable to fly in icing conditions would need to route below the icing level. Aircraft already operate under these limitations occasionally, but the higher the MSA, the more frequent will be the days where the freezing level is at or below MSA. This impact would apply throughout the operational phase of Hornsea Three.

8.11.2.13 Up to four offshore HVAC booster stations of a maximum height of 90 m LAT may be positioned within the offshore HVAC booster station search area of the offshore cable corridor as shown in Figure 8.3. The offshore HVAC booster station search area is crossed by HMR 3 and HMR 5. There are a considerable number of offshore oil and gas platforms located under HMRS which are of a similar height to the offshore HVAC booster stations. As discussed in 8.11.1.12 the offshore HVAC booster stations are not considered a prohibition on the use of the HMRS but dependent on their ultimate location and configuration may require a very minor deviation, in instances where aircraft are required to fly below MSA 1,500 ft. There is available airspace to all sides of the proposed location of the offshore HVAC booster stations.

8.11.2.14 The impact is predicted to be of local spatial extent, medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of the receptor

- 8.11.2.15 The sensitivity of the helicopter operator using HMR 2 is discussed in paragraph 8.11.1.14. Consultation with the operator of the J6-A platform (Centrica) has advised that this platform will be in use during the Hornsea Three operational phase. This platform is presently serviced by helicopters from the Netherlands and so is not anticipated to use the HMR 2, although this is subject to competitive tendering and therefore may change. The use of HMR 2 for exploration or other operational requirements within the licence blocks in this area could occur although the frequency of use would be much more intermittent.
- 8.11.2.16 The vulnerability of the helicopter operator using HMR 2 is assessed as low on the basis that the helicopter operator will continue to fly the HMR in VFR. When being used in IMC and the isotherm level is at an altitude that precludes flight below 2,500 ft., the helicopter operator may require an obstacle free route. Consultation has advised that certain aircraft with an appropriate icing clearance would be able to fly direct and that certain aircraft can be fitted with icing protection should this become a client requirement.
- 8.11.2.17 An obstacle free route is available as a deviation around the Hornsea Three array area. A suggested deviation is shown in Figure 8.7. It should be noted that an amendment to the HMR is not being proposed but an alternative route option for the helicopter operator. The ability of the helicopter operator to safely undertake the intended journey is therefore not affected.
- 8.11.2.18 There is considered to be a continued operational need for HMR 3 and HMR 5 in certain weather conditions, however the routes can still be flown with very minor deviations. The location of the offshore HVAC booster stations would be reported to the DGC (as per CAP 764 para 4.9 (2)).
- 8.11.2.19 The ability of the helicopter operator to use the HMR 2, HMR 3 and HMR 5 is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

- 8.11.2.20 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Wind turbines will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic.

Magnitude of impact

- 8.11.2.21 Helicopters transiting the Hornsea Three array area will be required to fly 1,000 ft. higher than the wind turbines. Consultation meetings have advised that most helicopter operators choose to fly in IFR conditions regardless of weather conditions. A typical MSA of 1,500 ft. is therefore flown to allow for 1,000 ft. clearance of transiting vessels. The Hornsea Three wind turbines will be 325 m (1,066 ft.) at their maximum height. The present MSA of 1,500 ft. will therefore be required to be raised to 2,066 ft. by the presence of the turbines (1,066 ft. plus 1,000 ft. clearance). As helicopters are height banded in the southern North Sea at 500 ft. intervals this would mean the MSA would be raised to 3,000 ft. (inbound) and 2,500 ft. (outbound). This is an additional 500 ft. climb and descent required per journey.
- 8.11.2.22 The maximum flight path distances across the Hornsea Three array area are shown in Figure 8.8. The maximum flight path across the Hornsea Three array area on a north-south axis is 35 km and on a northwest-southeast diagonal, 51 km. These flight paths are not considered likely based on the location of the airfields in relation to these flight paths. A direct flight path from Norwich airport to the north of the Hornsea Three array area is at its maximum a distance of 27.5 km across the array area, which is a more probable requirement to serve the platforms and licenced acreage to the north of the Hornsea Three array area. The example flight path from Norwich, as shown in Figure 8.8, would require 15% of the total flight distance to be flown at a raised MSA based on the Hornsea Three project alone. A direct flight path from Humberside airport to the east of the Hornsea Three array area is at its maximum a distance of 27.1 km across the array area which would serve the licenced acreage and platforms to the east of the Hornsea Three array area. The example flight path from Humberside airport, as shown in Figure 8.8, would require 13% of the total flight distance to be flown at a raised MSA based on the Hornsea Three project alone.
- 8.11.2.23 The frequency of this impact occurring is based upon the level of cross-zone (meaning across the Hornsea Three array area) transit traffic. Considering the HMR structure (Figure 8.3) there is not considered to be a lot of cross-zone traffic as only HMR 2 crosses the Hornsea Three array area (assessed separately, see paragraph 8.11.2.9). Consultation has advised however that helicopter operators fly direct to their destinations and do not tend to use the HMR structure when weather conditions permit.
- 8.11.2.24 North-south cross-zone traffic may occur from Norwich airport up to some of the platforms and licenced acreage to the north of the Hornsea Three array area. Consultation has advised that the Ketch platform (Faroe Petroleum) is serviced from Norwich, this platform is however likely to be decommissioned prior to Hornsea Three construction. Consultation has advised that the Murdoch group of platforms (ConocoPhillips) are serviced from Norwich.

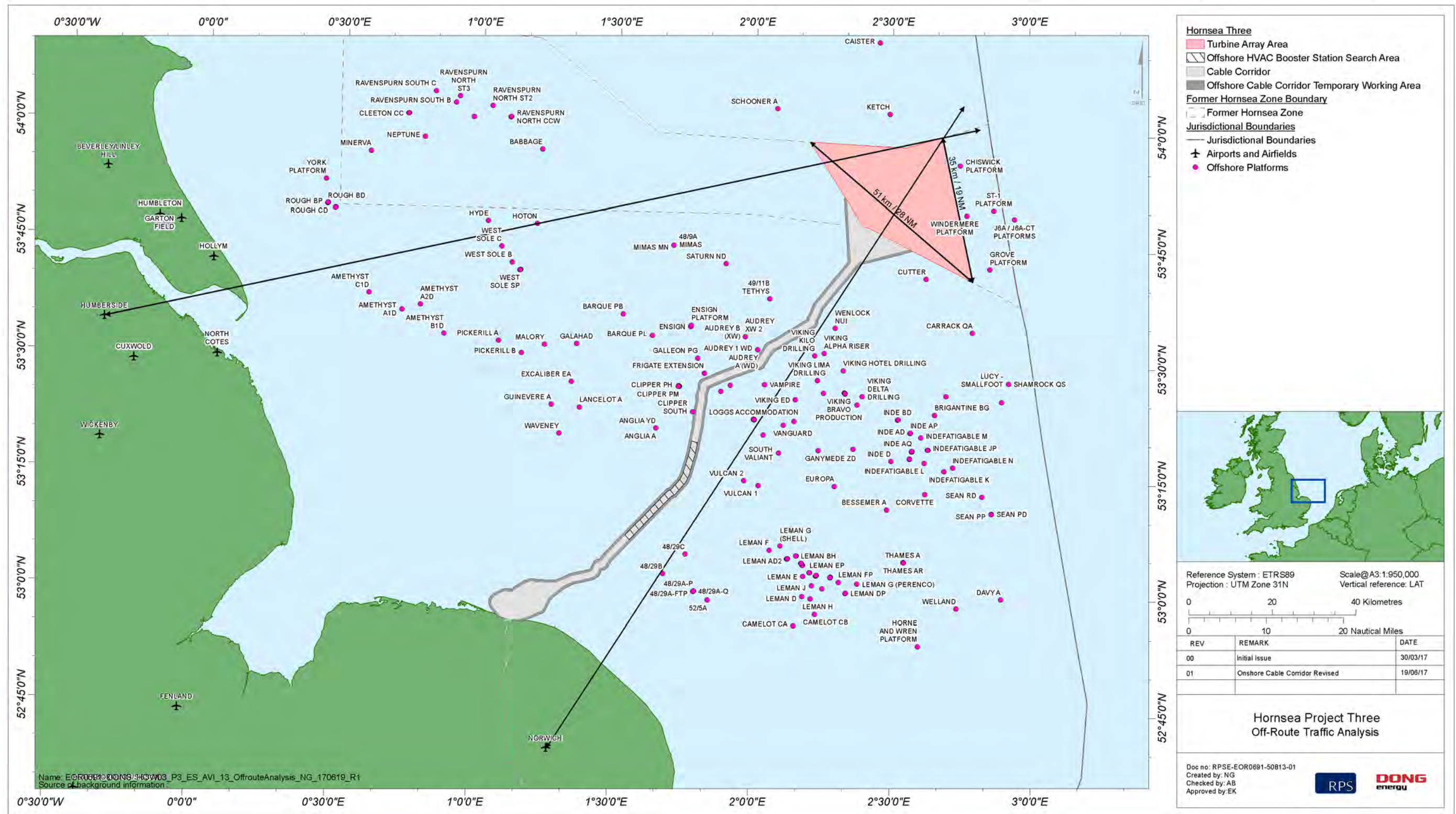


Figure 8.8: Hornsea Three off route traffic analysis.

8.11.2.25 Consultation has advised the platforms and acreage to the east of the Hornsea Three array area are predominantly served from the Netherlands. However, consultation has also advised that whilst it is usual for the industry to use an airfield that flies the shortest route, in some instances this may vary as for example when using a contractor (e.g. when contracting a drilling rig). An east-west route, for helicopters flying from Humberside to east of the Hornsea Three array area should therefore be considered as a possible scenario.

8.11.2.26 Hoist operations are maintenance activities which take place using helicopters lowering personnel and/or equipment to the wind turbines by hoist. Hoist operations may occur on a daily basis but will be restricted to VFR conditions only. Assuming VFR can be flown for 90% (see volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three) of the year and a maximum of up to 4,902 helicopter flights are required a year for both corrective and preventative maintenance within the Hornsea Three array area, there will be approximately 12 helicopters performing hoist operations across the Hornsea Three array area of 696 km² on any one day of the year.

8.11.2.27 When hoist operations are within 434 ft. of the turbines, which will be the majority of the time (considering hoist operations occur within 10 m of the nacelle, and then movement between turbines) no additional height gain will be required as this is within the height band of between 1,066 ft. to 1,500 ft. (plus 1,000 ft. separation raises the MSA to 2,500 ft.).

8.11.2.28 The impact is predicted to be of regional spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

8.11.2.29 Cross-zone transit flights can be flown in visual conditions (i.e. in weather conditions in which pilots will be able to see and avoid obstructions) or in IMC when the icing level is high enough. In these weather conditions, helicopters would be required to transit at a higher MSA over the Hornsea Three array area. Should weather conditions exist whereby either VFR or IFR transits cannot be continued above the Hornsea Three array area, helicopters would reroute to use the HMR network or deviate around the array area. The helicopter operator has low vulnerability as it is able to adapt to an increased MSA, and has alternative routes to use. There may however be an increased journey time due to the requirement to fly at a greater height or to deviate around the array area, which will affect the helicopter operator directly.

8.11.2.30 The sensitivity of the helicopter operator to be able to transit the Hornsea Three array area has therefore been assessed as low vulnerability, high recoverability and high value. The sensitivity is **Low**.

Significance of effect

8.11.2.31 The magnitude of impact has been deemed to be **moderate** and the sensitivity of the receptor **low**. Therefore the significance of effect will be of **minor** adverse significance, which is not significant in EIA terms.

Hornsea Three helicopter operations may affect the available airspace for other users.

8.11.2.32 This impact is a continuation of the potential impact upon available airspace for other users during the construction phase.

Magnitude of impact

8.11.2.33 The Hornsea Three project may require up to 5,273 return helicopter flights per year or approximately 14 flights per day during the operation and maintenance phase. It is not yet known which helicopter provider would be used or from which airport the helicopter operator would be based, however flights are likely to originate from the east coast of the UK or from an onshore helicopter base or from an offshore base or vessel with helicopter personnel transfer. These flights would be in addition to the prevailing helicopter traffic levels in the southern North Sea at the time of Hornsea Three operation.

8.11.2.34 The North Sea offshore oil and gas industry is presently served by some 100 flights a day (Parliament, 2014). Considering a steady state in the aviation baseline (see Paragraph 8.11.1.20) the contribution from Hornsea Three operations may result in a greater number of flights in a focused area.

8.11.2.35 The impact is predicted to be of regional spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

8.11.2.36 Helicopter flights in the UK are highly regulated (see paragraph 8.11.1.23) and their sensitivity within this regulated environment is discussed in paragraph 8.11.1.22.

8.11.2.37 The same rules of the air and ATC services will continue to apply to helicopter operators within the southern North Sea. The provision of a service to Hornsea Three is not considered to affect the provision of a service to another user of the airspace

8.11.2.38 The helicopter operator using the southern North Sea airspace is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

8.11.2.39 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Schooner A and Ketch platforms (Faroe Petroleum).

Magnitude of impact

- 8.11.2.40 Wind turbines are considered as physical obstructions and helicopter operators must maintain the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. These combined effects within a 9 nm consultation zone of an offshore installation may impair the safety of air operations to that installation and affect the installation operators' regulatory requirements with regard to safety of operation. The 9 nm consultation zones of the Schooner A and Ketch platforms (detail provided in Table 8.5) overlap with the Hornsea Three array area.
- 8.11.2.41 If high altitude flights are required during normal weather conditions, flights can be flown under VFR. Instrument approach procedures are used as a low-visibility approach procedure to the platforms, and rely upon an on-board weather radar for obstacle detection and navigation. Helicopters which operate to and from offshore platforms are fitted with airborne weather radar which can be used to conduct an instrument approach in poor visibility. The radar is designed to display weather phenomena, such as rain, as well as obstacles such as oil or gas platforms, or wind turbines. In IMC and in certain wind conditions, which dictate the area of approach to the platform, instrument approach procedures might be restricted due to the proximity of wind turbine structures to the flight approach path.
- 8.11.2.42 Current operational procedures indicate that the optimum descent angle for helicopters on approach to offshore platforms is a descent rate of 300 ft. per minute to 400 ft. per minute (3° to 4° glide path) (CAA, 2016c). When conducting an instrument approach procedure a helicopter must maintain a 1,000 ft. vertical clearance from all obstacles as it lines up its final descent and a 1 nm lateral separation from all radar contacts. It is also required to maintain a suitable distance from its point of destination, such that a MAP can be enacted, if required (see paragraph 8.7.4.11).
- 8.11.2.43 If it is assumed that an acceptable rate of descent is a 3.5° glide path, the minimum distance that a 325 m high turbine can be constructed from a platform is 8 nm before instrument approach procedures have the potential to be restricted. The helicopter descends from the MSA at 8.4 nm avoiding all radar contacts by 1 nm but flying in any wind direction, to the Fixed Approach Point at 7nm (the procedural value set by the helicopter operator and ranging typically from 5 to 7 nm). The helicopter then flies a straight line approach (up to 30° out of wind in either direction) to a minimum descent height of 200 – 300 ft typically at 2 nm (CAA, 2016c). The helicopter then flies to the Missed Approach Point at 0.75 nm where a decision is made either to land or to fly past and conduct a Missed Approach Procedure.
- 8.11.2.44 As the final approach path from the Fixed Approach Point of an instrument approach procedure is required into wind (with up to 30° out of wind variation) for reasons of helicopter stability, instrument approach procedures will be restricted in certain weather conditions by the presence of the Hornsea Three array area. Figure 8.9 shows the constrained approach sectors that would be restricted for instrument approach procedures.
- 8.11.2.45 Due to the presence of wind turbines in the Hornsea Three array area, a volume of airspace would be considered unavailable for instrument approach procedures to these platforms. This would apply in certain weather conditions during high altitude access under instrument approaches. Based on a Fixed Approach Point at 7 nm and allowing a 1 nm separation distance from the wind turbines, it is estimated that 333.3° of airspace surrounding the Schooner A platform, and 212.5° of airspace around the Ketch platform would remain available for instrument approach procedures and MAP requirements.
- 8.11.2.46 The potential number of instrument approach procedures to the Schooner A and Ketch platforms that are likely to be affected by the Hornsea Three array area have been assessed assuming the worst case restricted areas (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report).
- 8.11.2.47 From consultation with helicopter operators and drawing on the operational experience of DONG Energy's helicopter specialist, it is known that due to the frequency of certain weather conditions which dictate IMC, direct instrument approach procedures are conducted to platforms approximately 5% of the time. This assessment assumes an even spread of IMC across the year and uses month averaged wind direction and wind speed data from the Schooner A platform to highlight times of the year when instrument approaches could be restricted.
- 8.11.2.48 The results indicate that the Hornsea Three array area would not prevent instrument approaches to the Schooner A platform. This is because, even though a small portion of airspace is restricted, direct instrument approaches can be flown up to 30° out of wind.
- 8.11.2.49 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the Ketch Platform on approximately 0.27 to 0.36 days per month (up to 3.66 days per year). The greatest impact is seen in the month of May when 1.17% of flights may be precluded. The least impact is seen in October when 0.82% of flights may be precluded. Over the year, less than 2 % of days are restricted which is considered to be a low occurrence.
- 8.11.2.50 It should be noted that under certain weather conditions and sea states flights may be restricted irrespective of Hornsea Three. These restrictions have not been taken into account in this assessment.
- 8.11.2.51 There is no impact to the Schooner A platform. The impact to the Ketch platform is predicted to be of local spatial extent, medium term duration, intermittent in occurrence and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

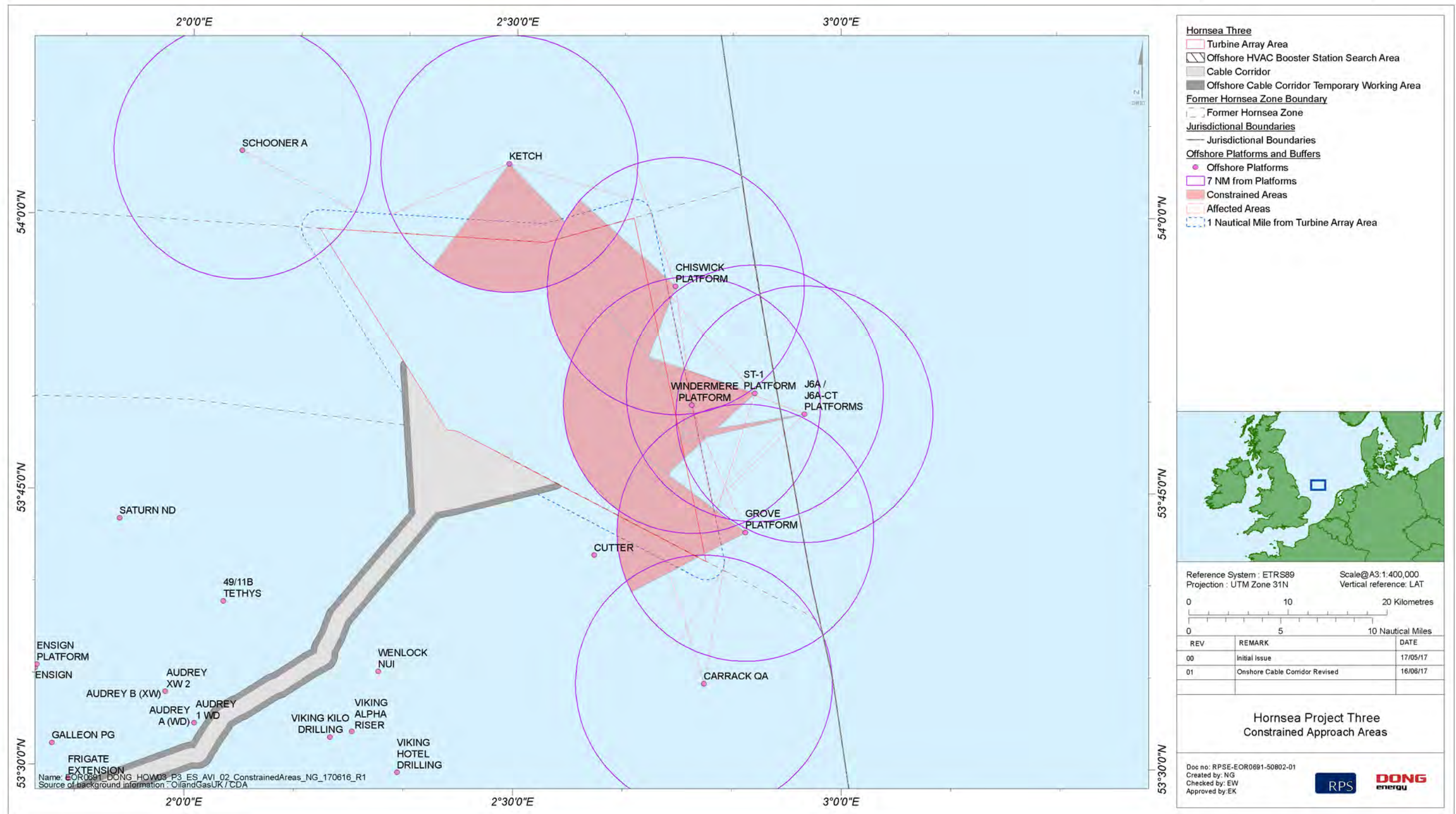


Figure 8.9: Illustration of constrained approach areas under certain conditions for each platform in relation to the Hornsea Three array area.

Sensitivity of receptor

- 8.11.2.52 The sensitivity of the receptor (the platform operator) will depend on the operational requirements of the platform and whether access is required for planned decommissioning. Consultation took place with the operator of the Ketch platform (Faroe Petroleum) and has confirmed that flights to this platform are from Norwich. The platform is a NUI but daily shuttling to the platform is required in the manned phase, which occurs two weeks out of five during the summer and short ad-hoc visits during the winter. Access will be required for these routine maintenance periods and operational emergencies. If high altitude flights are required during normal weather conditions, flights can be flown visually under VFR. The only time access will be restricted is either during maintenance periods when weather conditions require instrument approaches, or during operational emergencies when helicopter flights are required direct to the platform at high altitude and under IMC.
- 8.11.2.53 Consultation has advised that the Ketch platform is likely to be decommissioned in 2021 to 2022 prior to the start of construction of Hornsea Three (2023) however this is not as yet confirmed by an approved decommissioning plan. Consultation advised that Faroe Petroleum were moving towards the use of vessels for maintenance programmes as this can be more cost effective, which may reduce the use of helicopters. Together these factors indicate that there is unlikely to be operational restrictions on access to the Ketch platform or access requirements during platform decommissioning.
- 8.11.2.54 The sensitivity of the platform operator to access the Ketch platform is deemed to be of low vulnerability, high recoverability and moderate value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

- 8.11.2.55 Overall, it is predicted that the sensitivity of the receptor to access the Ketch platform is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms (Centrica).

Magnitude of impact

- 8.11.2.56 As detailed in paragraph 8.11.2.40 wind turbines are considered as physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. These combined effects within a 9 nm consultation zone of an offshore installation may impair the safety of air operations to that installation and affect the installation operators' regulatory requirements with regard to safety of operation. The 9 nm consultation zones of the Chiswick, ST-1, J6A/J6A-CT and Grove platforms, operated by Centrica (platform details provided in Table 8.5) overlap with the Hornsea Three array area.
- 8.11.2.57 If high altitude flights are required during normal weather conditions, flights can be flown under VFR. In IMC and in certain wind conditions, which dictate the area of approach to the platform, instrument approach procedures might be restricted due to the proximity of wind turbine structures to the flight approach path.
- 8.11.2.58 Figure 8.9 shows the constrained approach sectors to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms that would be restricted for instrument approach procedures before any prevailing wind direction/speed is introduced.
- 8.11.2.59 Due to the presence of wind turbines in the Hornsea Three array area, a volume of airspace would be considered unavailable for instrument approach procedures to these platforms. This would apply in certain weather conditions during high altitude access under instrument approaches. Based on a Fixed Approach Point at 7 nm and allowing a 1 nm lateral separation distance from the wind turbines, it is estimated that 190° of airspace surrounding the Chiswick platform, 239.6° around the ST-1 platform, 294.1° around the J6A/J6A-CT platform and 234.9° around the Grove platform would remain available for instrument approach procedures and MAP.
- 8.11.2.60 The potential number of instrument approach procedures to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms that are likely to be affected by the Hornsea Three array area have been assessed assuming the worst case restricted areas (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report).
- 8.11.2.61 From consultation with helicopter operators and drawing on the operational experience of DONG Energy's helicopter specialist, it is known that due to the frequency of certain weather conditions which dictate IMC, direct instrument approaches are conducted to platforms approximately 5% of the time. This assessment assumes an even spread of IMC across the year and uses month averaged wind direction and wind speed data from the Schooner A platform to highlight times of the year when instrument approaches could be restricted.

- 8.11.2.62 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the Chiswick platform on approximately 0.17 to 0.40 days per month (up to 3.49 days per year). The greatest impact is seen in the month of April when 1.35% of flights may be precluded. The least impact is seen in August when 0.56% of flights may be precluded. Over the year less than 2% of days are restricted which is considered to be a low occurrence.
- 8.11.2.63 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the ST-1 platform on approximately 0.07 to 0.22 days per month (up to 1.84 days per year). The greatest impact is seen in the month of April when 0.74% of flights may be precluded. The least impact is seen in August when 0.23% of flights may be precluded. Over the year less than 2% of days are restricted which is considered to be a low occurrence.
- 8.11.2.64 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the J6/J6a-CT platform on approximately 0.01 to 0.06 days per month (up to 0.45 days per year). The greatest impact is seen in the month of April when 0.216% of flights may be precluded. The least impact is seen in August when 0.05% of flights may be precluded. Over the year less than 2% of days are restricted which is considered to be a low occurrence.
- 8.11.2.65 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the Grove platform on approximately 0.12 to 0.25 days per month (up to 2.18 days per year). The greatest impact is seen in the month of April when 0.83% of flights may be precluded. The least impact is seen in August when 0.39% of flights may be precluded. Over the year less than 2% of days are restricted which is considered to be a low occurrence.
- 8.11.2.66 It should be noted that under certain weather conditions and sea states flights may be restricted irrespective of Hornsea Three. These restrictions have not been taken into account in this assessment.
- 8.11.2.67 The impact is predicted to be of local spatial extent, medium term duration, intermittent in occurrence, and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.
- Sensitivity of receptor
- 8.11.2.68 The sensitivity of the receptor (the platform operator) will depend on the operational requirements of the platform. Consultation took place with the operator of the Chiswick, ST-1, J6A/J6A-CT and Grove platforms (Centrica). From this consultation, it is understood that the Chiswick, and Grove platforms are NUI's and access will be required for monthly maintenance flights and operational emergencies.
- 8.11.2.69 From this consultation, it is understood that the J6A platform is manned and requires daily flights and operational emergencies.
- 8.11.2.70 Consultation has advised that the ST-1 platform is due for decommissioning between 2018 and 2020 and the decommissioning plans have been submitted to BEIS but are not yet approved. It is most probable that this platform will be decommissioned prior to the start of Hornsea Three offshore construction (indicatively 2023). Operational access requirements to the ST-1 platform, or during platform decommissioning, are therefore not likely to be affected by Hornsea Three.
- 8.11.2.71 If high altitude flights are required during normal weather conditions, flights can be flown visually under VFR. The only time access will be restricted is when weather conditions require instrument approaches.
- 8.11.2.72 The sensitivity of the platform operator to access these platforms is deemed to be of moderate vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **high** for the Chiswick, J6A and Grove platforms and **low** for the ST-1 platform.
- Significance of the effect
- 8.11.2.73 Overall, it is predicted that the sensitivity of the receptor is considered to be **high** for the Chiswick, J6A and Grove platforms and **low** for the ST-1 platform and the magnitude is deemed to be **minor** for all platforms. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.
- Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Windermere platform (INEOS).**
- Magnitude of impact
- 8.11.2.74 As detailed in paragraph 8.11.2.40, wind turbines are considered as physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. These combined effects within a 9 nm consultation zone of an offshore installation may impair the safety of air operations to that installation and affect the installation operators' regulatory requirements with regard to safety of operation. The 9 nm consultation zone of the Windermere platform, operated by INEOS (platform details provided in Table 8.5) overlaps with the Hornsea Three array area.
- 8.11.2.75 If high altitude flights are required during normal weather conditions, flights can be flown under VFR. In IMC and in certain wind conditions, which dictate the area of approach to the platform, instrument approach procedures might be restricted due to the proximity of wind turbine structures to the flight approach path.
- 8.11.2.76 Figure 8.8 shows the constrained approach sectors to the Windermere platform that would be restricted for instrument approach procedures before any prevailing wind direction/speed is introduced.

- 8.11.2.77 Due to the presence of wind turbines in the Hornsea Three array area, a volume of airspace would be considered unavailable for instrument approach procedures to this platform. This would apply in certain weather conditions during high altitude access under instrument approaches. Based on a Fixed Approach Point at 7 nm and allowing a 1 nm separation distance from the wind turbines, it is estimated that 180° of airspace surrounding the Windermere platform would remain available for instrument approach procedures and MAP.
- 8.11.2.78 The potential number of instrument approach procedures to the Windermere platform that are likely to be affected by the Hornsea Three array area have been assessed assuming the worst case restricted areas (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report).
- 8.11.2.79 From consultation with helicopter operators and drawing on the operational experience of DONG Energy's helicopter specialist, it is known that due to the frequency of certain weather conditions which dictate IMC, direct instrument approaches are conducted to platforms approximately 5% of the time. This assessment assumes an even spread of IMC across the year and uses month averaged wind direction and wind speed data from the Schooner A platform to highlight times of the year when instrument approaches could be restricted.
- 8.11.2.80 The results indicate that the impact of the Hornsea Three array area would be to prevent instrument approaches to the Windermere Platform on approximately 0.19 to 0.43 days per month (up to 3.73 days per year). The greatest impact is seen in the month of April when 1.43% of flights may be precluded. The least impact is seen in August when 0.62% of flights may be precluded. Over the year less than 2 % of days are restricted which is considered to be a low occurrence.
- 8.11.2.81 It should be noted that under certain weather conditions and sea states flights may be restricted irrespective of Hornsea Three. These restrictions have not been taken into account in this assessment.
- 8.11.2.82 The impact is predicted to be of local spatial extent, medium term duration, intermittent in occurrence and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

Sensitivity of receptor

- 8.11.2.83 The sensitivity of the receptor (the platform operator) will depend on the operational requirements of the platform. Consultation took place with the operator of the Windermere platform (INEOS). From this consultation, it is understood that this platform is a NUI and therefore access will be required for routine maintenance and operational emergencies. If high altitude flights are required during normal weather conditions, flights can be flown visually under VFR. The only time access will be restricted is either during maintenance periods when weather conditions require instrument approaches, or during operational emergencies when helicopter flights are required direct to the platform at high altitude and under IMC.

- 8.11.2.84 Consultation has also advised that the Windermere platform is very likely to be decommissioned prior to the start of construction of Hornsea Three (2023) however this is not as yet confirmed by an approved decommissioning plan. This means that there is unlikely to be operational restrictions on access to the Windermere platform or access requirements during platform decommissioning. The sensitivity of the platform operator is deemed to be of low vulnerability, high recoverability and low value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

- 8.11.2.85 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Carrack QA platform (Shell).

Magnitude of impact

- 8.11.2.86 As detailed in paragraph 8.11.2.40 wind turbines are considered as physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. These combined effects within a 9 nm consultation zone of an offshore installation may impair the safety of air operations to that installation and affect the installation operators' regulatory requirements with regard to safety of operation. The 9 nm consultation zone of the Carrack platform (detail provided in Table 8.5) overlaps with the Hornsea Three array area.
- 8.11.2.87 If high altitude flights are required during normal weather conditions, flights can be flown under VFR. In IMC and in certain wind conditions, which dictate the area of approach to the platform, instrument approach procedures might be restricted due to the proximity of wind turbine structures to the flight approach path.
- 8.11.2.88 Figure 8.9 shows the constrained approach sectors to the Carrack platform that would be restricted for instrument approach procedures before any prevailing wind direction/speed is introduced.
- 8.11.2.89 Due to the presence of wind turbines in the Hornsea Three array area, a volume of airspace would be considered unavailable for instrument approach procedures to this platform. This would apply in certain weather conditions during high altitude access under instrument approaches. Based on a Fixed Approach Point of 7 nm, it is estimated that 333.6° of airspace surrounding the Carrack platform would remain available for instrument approach procedures and MAP.
- 8.11.2.90 The potential number of instrument approach procedures to the Carrack platform that are likely to be affected by the Hornsea Three array area have been assessed assuming the worst case restricted areas (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report).

8.11.2.91 From consultation with helicopter operators and drawing on the operational experience of DONG Energy's helicopter specialist, it is known that due to the frequency of certain weather conditions which dictate IMC, direct instrument approaches are conducted to platforms approximately 5% of the time. This assessment assumes an even spread of IMC across the year and uses month averaged wind direction and wind speed data from the Schooner A platform to highlight times of the year when instrument approaches could be restricted.

8.11.2.92 The results indicate that the Hornsea Three array area would not prevent instrument approaches to the Carrack QA platform. This is because, even though a small portion of airspace is restricted, direct instrument approaches can be flown up to 30° out of wind. There is no impact to the Carrack QA platform.

Sensitivity of receptor

8.11.2.93 There is no impact to the Carrack QA platform and so the sensitivity has not been assessed.

Significance of the effect

8.11.2.94 There is no impact to the Carrack QA platform and so the significance of effect has not been assessed.

Wind turbines will form an aerial obstruction and may disrupt helicopter access to drilling rigs and operational vessels for access to subsea infrastructure and wells.

8.11.2.95 The assessment of this potential impact is complicated by the fact that future oil and gas plans have a degree of uncertainty associated with them. This complication feeds into assigning sensitivity to each receptor (in this case, licence blocks). Where consultation with the operators of the licence blocks in proximity to the Hornsea Three array area has demonstrated uncertainty regarding future plans, it is problematic to assign sensitivity without introducing high levels of precaution into the assessment. Where this is the case, sensitivity is not assigned within this PEIR and consultation is ongoing to understand future oil and gas plans (as discussed below) to enable sensitivity to be assigned, and a significance of effect to be concluded, for the Environmental Statement. At the point the Environmental Statement is submitted, it is likely that a level of residual uncertainty will remain regarding the future plans of operators of the licence blocks (for example whether or not an exploitable resource will be found and if so, where any infrastructure associated with this will be located) and as such a level of precaution will be built into the assessment. The level of uncertainty, and hence the level of precaution that is built into the assessment, will change over time as operators' plans become clearer.

Magnitude of impact

8.11.2.96 Subsurface infrastructure and wells, that have not been permanently decommissioned or plugged and abandoned, may at some time require access from a rig or vessel with a helideck. A 9 nm consultation zone exists around offshore helicopter operations (see paragraph 8.7.4.12). A 9 nm consultation zone should again be a trigger for consultation with the operators of subsea infrastructure and wells requiring helicopter access (CAA, 2016c). As discussed in paragraph 8.11.2.40 wind turbines are considered as physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. If high altitude flights are required during normal weather conditions, flights can be flown under VFR. In IMC and in certain wind conditions, which dictate the area of approach to an installation, instrument approach procedures might be restricted due to the proximity of wind turbine structures to the flight approach path.

8.11.2.97 When conducting an instrument approach procedure a helicopter must maintain a 1,000 ft. vertical clearance from all obstacles as it lines up its final descent and a 1 nm lateral separation from all radar contacts. The helicopter lines up predominantly into wind at the Fixed Approach Point at 7 nm (the procedural value set by the helicopter operator and ranging typically from 5 to 7 nm). The maximum distance that a helicopter can be from the Hornsea Three array area before an instrument approach may be affected to an installation is therefore 8 nm (7 nm Fixed Approach Point + 1 nm lateral separation). When flying in VFR a helicopter must maintain a 150 m (500 ft) separation distance from all obstacles. On this basis access requirements in IMC are considered to be potentially affected at a distance of between 1 nm and 8 nm from the Hornsea Three turbines and restricted at a distance of less than 1 nm. Access requirements in VFR are not considered to be affected at a distance of greater than 1 nm from the Hornsea three turbines. At a distance of less than 1 nm access requirements in VFR are considered possible but may be affected when considering other factors such as wind conditions, sea state and turbulence.

8.11.2.98 The subsea infrastructure (excluding subsea tiebacks, shown in Figure 8.4) within 8 nm of the Hornsea Three array area are presented in Table 8.5 and Figure 8.4 together with licence blocks (where future operations may be required) and known infrastructure.

8.11.2.99 The presence of the Hornsea Three array area may in certain weather conditions restrict access to certain locations within the licence blocks listed within Table 8.5. At this stage, the exact locations that may require access in the future is unknown, as this will be based on future exploration and development plans. The magnitude of this impact has therefore been assessed on the basis of the level of restricted access in IMC and VFR (paragraph 8.11.2.96) and the total area of a licence block that is potentially affected. The sensitivity criteria (paragraph 8.11.2.102) considers the present and future access requirements to the licence block. The magnitude has been defined (taking into consideration the results of the assessments on airborne radar approaches to platforms in this chapter) on the following basis:

- Total loss of access in VFR or IMC = major;
- 50 to 100% (array area + 1 nm), remaining % (1 to 8 nm) = moderate;
- 1 to 50% (array area + 1 nm) remaining % (1 to 8 nm) = minor; and
- 0% (array area + 1 nm) + 1 - 100% (1 to 8 nm) = negligible.

8.11.2.100 The area that is affected as a percentage of the total licence block is presented in Table 8.13 below.

8.11.2.101 The magnitude of impact varies for each licence block depending on the proportion of the block within the Hornsea Three array area + 1 nm and the proportion within 8 nm of the Hornsea Three array area. The magnitude is shown for each licence block in Table 8.13.

8.11.2.102 The impact is predicted to be of medium term duration, intermittent and not reversible for the project phase for each licence block. It is predicted that the impact will affect the receptor directly for each licence block. The magnitude is dependent on the spatial extent and is:

- Negligible: 43/30b, 48/5a, 44/29b, 44/30a, k04a, J03a, K07, 49/6, 49/12, 49/13, 49/14, 49/15; 44/28b, 49/10b, 49/10c, 49/4c, 49/5a, 49/5b, 49/5c, 49/10d, J03b and J06, 49/14b, 49/15a, J09, 44/26, 44/30, 49/1, 49/5;
- Minor: 44/26a, 49/10a, 49/4a, 44/27, 49/1a, 49/9a, 44/28, 44/29, 49/7, 49/8, 49/10; and
- Moderate: 49/3, 49/4d, 49/9c, 49/9d, 49/4b, 49/2a, 49/9b, 49/8a, 49/2, 49/4, 49/9.

Sensitivity of the receptor

8.11.2.103 The sensitivity of the operator is dependent on the extent to which their existing infrastructure requiring access is affected (listed in Table 8.13 and subsea tie backs shown in Figure 8.4) and the anticipated future activity in their licence blocks as ascertained through consultation (see Table 8.3) with the present operators of these licences. The sensitivity for each block is listed in Table 8.13. It is noted that this information is based on current knowledge only and that the operator and extent of licences is subject to change.

8.11.2.104 The licence operator is deemed to be of low vulnerability, high recoverability and low value, and is therefore considered to be **low** for Faroe Petroleum, Third Energy, Engie UK, Engie Netherlands, INEOS, Shell, Total UK, Total Netherlands and NAM.

8.11.2.105 The sensitivity of the licence operator has not been assessed for Centrica. Discussions are ongoing between Hornsea Three and Centrica (Table 8.3). There is not enough certainty in relation to Centrica's future plans to assign sensitivity to these licence blocks at this stage and this will be updated for the Environmental Statement.

8.11.2.106 The sensitivity for the unlicensed blocks listed in Table 8.13 is deemed to be of low vulnerability, high recoverability and very low value, and is therefore considered to be negligible.

Significance of effect

8.11.2.107 Overall, it is predicted that the sensitivity of the receptor is negligible for the unlicensed blocks, low for the operators Faroe Petroleum, Third Energy, Engie UK, Engie Netherlands, INEOS, Shell, Total UK, Total Netherlands and NAM (and has not been assessed for the operator Centrica).

8.11.2.108 The magnitude is Negligible for licence blocks: 43/30b, 48/5a, 44/29b, 44/30a, k04a, J03a, K07, 49/6, 49/12, 49/13, 49/14, 49/15, 44/28b, 49/10b, 49/10c, 49/4c, 49/5a, 49/5b, 49/5c, 49/10d, J03b and J06, 49/14b, 49/15a, J09, 44/26, 44/30, 49/1, 49/5; Minor for licence blocks: 44/26a, 49/10a, 49/4a, 44/27, 49/1a, 49/9a, 44/28, 44/29, 49/7, 49/8, 49/10 and Moderate for licence blocks: 49/3, 49/4d, 49/9c, 49/9d, 49/4b, 49/2a, 49/9b, 49/8a, 49/2, 49/4, 49/9.

8.11.2.109 Overall, it is predicted that the effect will be of **negligible** adverse significance for the unlicensed blocks (44/26, 44/28, 44/29, 44/30, 49/1, 49/2, 49/4, 49/5, 49/6, 49/7, 49/8, 49/9, 49/10, 49/12, 49/13, 49/14, 49/15) and for the operators Faroe Petroleum (44/26a, 44/28b) Engie UK (44/29b, 44/30a) Shell (49/9a, 49/14b, 49/15a), Third Energy (44/27), INEOS (49/1a), Total Netherlands (K04a) and NAM (J03a, K07, J09) which is not significant in EIA terms.

8.11.2.110 The predicted effects will be of **minor** adverse significance for the operators, INEOS (49/2a, 49/9b) and Shell (49/8a) which is not significant in EIA terms.

8.11.2.111 Note that the significance of effect has not been assessed for licence blocks currently operated by Centrica as it is not possible to assign sensitivity to this receptor. This will be updated for the Environmental Statement.

Table 8.13: Percentage of licenced acreage within the Hornsea Three array area + 1 nm and within 8 nm of the Hornsea Three array area.

Licence Block	Infrastructure ^a	Area of block (km ²)	Area inside array + 1 nm		Area inside 8 nm		Operator	Magnitude	Sensitivity
			Total area	%	Total area	%			
44/28b	Ketch platform	84.9	0	0	78.0	91	Faroe	Negligible	Low
44/26a	Schooner platform and North West Schooner Subsea Well head (well: 44/26a-7)	99.1	0.8	0.8	70.6	71.2	Faroe	Minor	Low
43/30b	NA	121.5	0	0	7.0	5.8	Centrica	Negligible	On hold, to be updated for Environmental Statement
48/5a	NA	121.7	0	0	11.2	9.2		Negligible	
49/3	NA	243.6	240.6	98.8	243.6	100		Moderate	
49/4d	NA	113.7	109.3	96.1	113.7	100		Moderate	
49/9c	NA	18.35	18.35	100	18.35	100		Moderate	
49/9d	NA	142.6	122.2	85.6	142.6	100		Moderate	
49/10a	Grove platform and Grove west Wellhead (well: 49/10a-6Y) and Choke Valve	46.9	3.4	7.2	46.9	100		Minor	
49/10b	NA	21.2	0	0	21.2	100		Negligible	
49/10c	Stamford Well head (Well: 49/10c-7)	6.9	0	0	6.9	100		Negligible	
49/4a	Chiswick platform	60.9	29.5	48.4	60.9	100		Minor	
49/4b	NA	4.1	4.1	100	4.1	100		Moderate	
49/4c	Kew subsea wellhead wells: 49/04c/7z and 49/04c-7Z)	16.2	0	0	16.2	100		Negligible	
49/5a	ST-1 platform	53.1	0	0	53.1	100		Negligible	
49/5b	NA	4.1	0	0	4.1	100		Negligible	
49/5c	NA	4.1	0	0	4.1	100		Negligible	
49/10d	NA	5.1	0	0	5.1	100	Negligible		
J03b & J06	J6A platform	83.4+42.1	0	0	75.3+42.1	93.5	Negligible		
44/27	NA	242.6	4.4	41.2	174.4	71.9	Third Energy	Minor	Low
44/29b	NA	16.1	0	0	2.8	17.4	Engie UK	Negligible	Low
44/30a	NA	16.1	0	0	6.1	37.9		Negligible	
49/1a	NA	22.3	6.5	29.1	22.3	100	INEOS	Minor	Low
49/2a	Well head Topaz (well: 49/02a-6z)	18.2	16.1	88.5	18.2	100		Moderate	
49/9b	Windermere platform	16.3	10.6	65	16.3	100		Moderate	

Licence Block	Infrastructure ^a	Area of block (km ²)	Area inside array + 1 nm		Area inside 8 nm		Operator	Magnitude	Sensitivity
			Total area	%	Total area	%			
49/8a	NA	2.04	2.0	98	2.04	100	Shell	Moderate	Low
49/9a	Cutter platforms	46.9	15.9	33.9	46.9	100		Minor	
49/14b	Carrack platform and Carrack West wellhead (well: 49/14b-7)	106.3	0	0	100.5	94.5		Negligible	
49/15/a	Carrack east wellhead (well: 49/15a-3)	38.9	0	0	29.4	75.6		Negligible	
K04a	NA	306.7	0	0	7.7	2.5	Total Netherlands	Negligible	Low
J03a	NA	72.2	0	0	32.5	45	NAM	Negligible	Low
K07	NA	407.9	0	0	1.7	0.4		Negligible	
J09	NA	18.4	0	0	10.9	59.2	NAM	Negligible	Low
44/26	NA	144	0	0	79.7	55.3	Unlicenced	Negligible	Negligible
44/28	well 44/28a-6 (suspended)	158	0.5	0.3	91.7	58		Minor	
44/29	Well 44/29-1A	226	9.8	4.3	185.5	82.1		Minor	
44/30	NA	29	0	0	28.7	99		Negligible	
49/1	NA	221	0	0	188.1	85.1		Negligible	
49/2	NA	225	167.2	74.3	225	100		Moderate	
49/4	NA	49	28.7	58.6	49	100		Moderate	
49/5	NA	38	0	0	38	100		Negligible	
49/6	NA	173	0	0	33.9	19.6		Negligible	
49/7	NA	245	13.2	5.4	207.4	84.7		Moderate	
49/8	wells 49/08c-4 (suspended) 49/08b-3 (suspended)	243	104.4	43	243	100		Minor	
49/9	NA	20.4	20.4	100	20.4	100		Moderate	
49/10	NA	81	3.4	4.2	81	100		Minor	
49/12	NA	151	0	0	0.5	0.33		Negligible	
49/13	NA	246	0	0	54.5	22.2		Negligible	
49/14	NA	139	0	0	39.1	28.1	Negligible		
49/15	NA	185	0	0	87.6	47.4	Negligible		

a No infrastructure (excluding subsea tiebacks shown in Figure 8.4) are presently known to be within the licence block.

Wind turbines may disrupt radar coverage of NATS Claxby PSR and the Military ADR located at Staxton Wold and Trimmingham and interfere with existing offshore microwave and other communication links.

- 8.11.2.112 The presence of wind turbines has the potential to interfere with NATS PSRs if their operational range overlaps the Hornsea Three array area. Wind turbine clutter appearing on a radar display can affect the safe provision of air traffic services as it can mask unidentified aircraft from the air traffic controller and/or prevent them from accurately identifying aircraft under their control.
- 8.11.2.113 The Hornsea Three array area is within the operational range of ASACS ADRs located at Staxton Wold and Trimmingham, which have a range of 400 km.
- 8.11.2.114 The other offshore infrastructure associated with Hornsea Three including the offshore HVAC booster stations, offshore HVAC collector substations, offshore HVDC substations and offshore accommodation platforms do not pose any issue to radar systems as radar processing removes stationary objects from the radar display.

Magnitude of impact

- 8.11.2.115 The Hornsea Three array area is within the operational range of the NATS Claxby PSR (the range being 200 nm). Radar Line of Sight analysis (presented in volume 5, annex 8.1: Aviation, Military and Communication Technical Report) for wind turbines with a tip height of 325 m within the Hornsea Three array area are theoretically not detectable by the Claxby PSR system. Consultation with NATS has also advised that they anticipate no impact from Hornsea Three on its own infrastructure and operations. This radar has not been considered further in this assessment.
- 8.11.2.116 Radar Line of Sight analysis for the Staxton Wold radar (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report) indicates that wind turbines within the Hornsea Three array area with a tip height of 325 m are theoretically not detectable by the Staxton Wold ADR. Therefore, this radar has not been considered further in this assessment.
- 8.11.2.117 Radar Line of Sight analysis for the Trimmingham ADR (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report) indicates that wind turbines with a tip height of 325 m would be considered theoretically intermittently detectable by the Trimmingham ADR within a small area along the southwestern boundary of the Hornsea Three array area. Wind turbines in the southwestern section of the Hornsea Three array area are unlikely to be routinely detectable, and turbines in the northeastern section are not predicted to be detectable by the Trimmingham ADR.
- 8.11.2.118 Any identified effect of turbines on the ASACS ADRs that serve the airspace above the Hornsea Three array area would potentially reduce the capability of the ASACS force.

8.11.2.119 As a result of the assessment carried out (volume 5, annex 8.1: Aviation, Military and Communication Technical Report), it is not anticipated that Hornsea Three will have any significant effect on maritime communication devices including satellite communications, VHF radio and television.

8.11.2.120 The existing environment for offshore microwave links was determined through consultation with oil and gas operators and using Ofcom data. There are no microwave links passing through the Hornsea Three array area, although one microwave link crosses the Hornsea Three offshore cable corridor (Figure 8.6). Microwave links are LOS and therefore there will be no impact associated with Hornsea Three.

8.11.2.121 A request was made to Atkins Windfarm support in relation to UHF Radio Scanning Telemetry communications, who responded that no such communication links would be affected by Hornsea Three. A request was made to JRC in regard to interference with radio systems operated by utility companies in support of their regulatory operational requirements, who advised that no links would be affected by Hornsea Three.

8.11.2.122 The impact for the Trimmingham ADR is predicted to be of local spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **minor**.

Sensitivity of receptor

8.11.2.123 Military ADRs are used to protect the security interests of the UK. Their programming will have a certain level of ability to accommodate wind turbine infrastructure. As part of the pre-application consultation process for Hornsea Three, the Applicant has requested the DIO to undertake an assessment of the potential for the Hornsea Three array area to affect any of the radar or communications systems operated or controlled by the MOD. In response to this consultation, they confirmed that it is unlikely that there will be any detectability from any MOD ADR to the Hornsea Three array area due to the distance of the Hornsea Three array area offshore.

8.11.2.124 The MOD, as operator of the Trimmingham ADR, is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

8.11.2.125 Overall, it is predicted that the sensitivity of the receptor (MOD Trimmingham ADR) is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Future monitoring

8.11.2.126 No specific monitoring requirements have been identified for the operation and maintenance phase in relation to aviation, military and communication.

8.11.3 Decommissioning phase

8.11.3.1 The impacts of the offshore decommissioning of Hornsea Three have been assessed on aviation, military and communication. The environmental effects arising from the decommissioning of Hornsea Three are listed in Table 8.7 along with the maximum design scenario against which each decommissioning phase impact has been assessed.

8.11.3.2 A description of the potential effect on aviation, military and communication receptors caused by each identified impact is given below.

Decommissioning activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area

8.11.3.3 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor** adverse (see paragraph 8.11.1.7), which is not significant in EIA terms.

Removal of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.

8.11.3.4 The HMR structure is subject to change due to the operational requirements of the air traffic users within the southern North Sea. Due to the obstacle clearance requirements of an HMR (CAP 764) it is probable that the HMRs will have been redefined by the decommissioning phase.

8.11.3.5 In the event they have not been revised the effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor** adverse (see paragraph 8.11.1.18), which is not significant in EIA terms.

Hornsea Three helicopter operations may affect the available airspace for other users.

8.11.3.6 By the time of Hornsea Three decommissioning it is highly probable that the aviation industry will be fully adapted to servicing the offshore wind industry in the southern North Sea. The decline in provision of a service to the oil and gas sector may have been replaced by an increased requirement from offshore wind. As it is not possible however to make accurate predictions of the future environment at this time, a continued base case has been assumed.

8.11.3.7 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor** adverse (see paragraph 8.11.1.26), which is not significant in EIA terms.

Future monitoring

8.11.3.8 No specific monitoring requirements have been identified for the decommissioning phase in relation to aviation, military and communication.

8.12 Cumulative Effect Assessment methodology

8.12.1.1 The Cumulative Effect Assessment (CEA) takes into account the impact associated with Hornsea Three together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise undertaken as part of the 'CEA long list' of projects (see annex 4.5: Cumulative Effects Screening Matrix and Location of Schemes). Each project on the CEA long list has been considered on a case by case basis for scoping in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

8.12.1.2 In undertaking the CEA for Hornsea Three, it is important to bear in mind that other projects and plans under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside Hornsea Three. For example, relevant projects and plans that are already under construction are likely to contribute to cumulative impact with Hornsea Three (providing effect or spatial pathways exist), whereas projects and plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors. For this reason, all relevant projects and plans considered cumulatively alongside Hornsea Three have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the CEA to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each Tier in the decision making process when considering the potential cumulative impact associated with Hornsea Three (e.g. it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2). An explanation of each tier is included below:

- Tier 1: Hornsea Three considered alongside other project/plans currently under construction and/or those consented but not yet implemented, and/or those submitted but not yet determined and/or those currently operational that were not operational when baseline data was collected, and/or those that are operational but have an on-going impact;
- Tier 2: All projects/plans considered in Tier 1, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has submitted a Scoping Report; and
- Tier 3: All projects/plans considered in Tier 2, as well as those on relevant plans and programmes likely to come forward but have not yet submitted an application for consent (the PINS programme of projects is the most relevant source of information). Specifically, this Tier includes all projects where the developer has advised PINS in writing that they intend to submit an application in the future but have not submitted a Scoping Report.

8.12.1.3 The specific projects scoped into this CEA and the Tiers into which they have been allocated, are outlined in Table 8.14.

- 8.12.1.4 It is noted that Tier 1 includes projects, plans and activities that are operational, under construction, consented but not yet implemented and submitted but not yet determined. The certainty associated with other projects, plans and activities, in terms of the scale of the development and the likely impacts, increase as they progress from submitted applications to operational projects. In particular, offshore wind farms seek consent for a maximum design scenario and the as built offshore wind farm will be selected from the range of consented scenarios. In addition, the maximum design scenario quoted in the application (and the associated Environmental Statement) are often refined during the determination period of the application. For example, it is noted that the Applicant for Hornsea Project One has gained consent for an overall maximum number of turbines of 240, as opposed to 332 considered in the Environmental Statement. Similarly, Hornsea Project Two has gained consent for an overall maximum number of turbines of 300, as opposed to 360 considered in the Environmental Statement.
- 8.12.1.5 It should be noted that the CEA presented in this aviation, military and communications chapter has been undertaken on the basis of information presented in the Environmental Statements for the other projects, plans and activities. The level of impact on aviation, military and communications would likely be reduced from those presented here. In addition, Hornsea Three is currently considering how the different levels of certainty associated with projects in Tier 1 can be reflected in the CEA and an update, in terms to the approach to tiering, will be presented in the Environmental Statement.

8.12.2 Maximum design scenario

- 8.12.2.1 The maximum design scenarios identified in Table 8.15 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative impact presented and assessed in this section have been selected from the details provided in the Hornsea Three project description (volume 1, chapter 3: Project Description), as well as the information available on other projects and plans, in order to inform a 'maximum design scenario'. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope (e.g. different turbine layout), to that assessed here be taken forward in the final design scheme.

Table 8.14: List of other projects and plans considered within the CEA.

Tier	Phase	Project/Plan	Distance from Hornsea Three array area (km)	Distance from Hornsea Three offshore cable corridor (km)	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase	
1	<i>Offshore wind farms</i>								
	Under Construction	Dudgeon	87	11	20 miles off the coast of Cromer, N North Norfolk. 560 MW. 67 WTGs 402 MW	Under construction – 2018	No	Yes	
	Consented	East Anglia One	152	106	714MW (102x7 MW)	Approved: Construction 2017-2019	No	Yes	
	Planned	East Anglia Three	103	87	Up to 1200 MW (up to 172 turbines of up to 7 – 12 MW capacity)	Planned: Construction 2020-20022	No	Yes	
	Under construction	Hornsea Project One	7	7	Project One, the first development in the Zone, will comprise of up to three wind farm arrays. Project One will have a combined capacity of up to 1.2 gigawatts (GW). The offshore wind turbines for Project One will be located in the centre of the Hornsea Zone, covering an area of approximately 407 km ² . Hornsea wind farm zone lies approximately 103 km east of the coast of Yorkshire and covers an area of approximately 4735 km ² . The site has a generating capacity of 4GW to be achieved by 2020. Up to 240 5-8 MW turbines (DCO)	Approved: 2017-2018	No	Yes	
	Consented	Hornsea Project Two	7	18	Up to 300 6-15 MW turbines (DCO)	Approved:2017-2019	No	Yes	
	Operation and Maintenance	Humber Gateway	128	86	Up to 219 MW (73x3 MW turbines)	N/A	No	Yes	
	Operation and Maintenance	Lincs	139	41	270 MW (75x3.6 MW)	N/A	No	Yes	
	Operation and Maintenance	Lynn and Inner Dowsing	147	43	194 MW (54x 3.6 MW Siemens monopiles). Commissioned March 2009. 5 km off the coast of Skegness.	N/A	No	Yes	
	Under Construction	Race Bank	114	28	Up to 580 MW	Under construction - 2017	No	Yes	
Operation and Maintenance	Scroby Sands	132	48	60 MW (30x2 MW turbines)	N/A	No	Yes		
Operation and Maintenance	Sheringham Shoal	109	7	316.8 MW (88x3.6 MW) Sheringham, Greater Wash 17-23 km off North Norfolk	N/A	No	Yes		

Tier	Phase	Project/Plan	Distance from Hornsea Three array area (km)	Distance from Hornsea Three offshore cable corridor (km)	Details	Date of Construction (if applicable)	Overlap of construction phase with Hornsea Three construction phase	Overlap of operation phase with Hornsea Three operation phase	
	Consented	Triton Knoll	100	44	750-900 MW (113-288x8 MW turbines) Greater Wash. 20 miles off the coast of Lincolnshire and 28 miles from the coast of N Norfolk Restriction on installation of 7 m monopiles between 1 September - 16 October during herring spawning season	Consented. Construction 2017-2021	No	Yes	
	Operation and Maintenance	Westermost Rough	132	106	210 MW (35x6 MW)	N/A	No	Yes	
	Commercial Fisheries								
	Operational	Fishing Rights	N/A	N/A	In 2015, the UK fishing industry had 6,187 fishing vessels compared with 6,716 in 2005, a reduction of 8 per cent. The fleet in 2015 comprised 4,863 10 metre and under vessels and 1,324 over 10 m vessels.	Operational	No	Yes	
	Oil and Gas fields								
	Producing	Ketch Gas Field	3	20	Gas Field - Producing	Producing	No	Yes	
	Producing	Schooner Gas Field	2	19	Gas Field - Producing	Producing	No	Yes	
	Cables and Pipelines								
	Active	Norsea com 1 segment 3	0	0	Active telecoms cable	N/A	No	Yes	
	Active	Norsea com 1 segment 2	31	45	Active telecoms cable	N/A	No	Yes	
Proposed	PL0221_PR D18-A to D15-FA-1	19	45	8-inch proposed gas pipeline operated by GDF SUEZ E&P Nederland B.V.	2019-2021	No	Yes		
2	Offshore wind farms								
	Planned	Norfolk Vanguard	73	51	Up to 1800 MW (between 120 - 257 turbines of up to 7 – 15 MW capacity)	Planned. Construction 2020-2022	No	Yes	
3	Offshore wind farms								
	Pre-consent application	East Anglia Two	158	94	Up to 800 MW	Pre-planning application. Construction 2022-2024	Yes	Yes	
	Pre-consent application	Norfolk Boreas	53	64	Up to 1,800 MW	Pre-planning application.	Unknown	Unknown	
	Pre-consent application	Hornsea Project Four	36	47	Unknown	Pre-planning application	Unknown	Unknown	

Table 8.15: Maximum design scenario considered for the assessment of potential cumulative impacts on aviation, military and communication.

Potential impact	Maximum design scenario	Justification
<i>Construction phase</i>		
Construction activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Ongoing commercial fishing activity; Oil and gas activity in Schooner and Ketch fields; Norsea comm 1 cables; Proposed gas pipeline PL0221_PR D18-A to D15-FA-1. <p>Tier 2:</p> <ul style="list-style-type: none"> No additional projects <p>Tier 3</p> <ul style="list-style-type: none"> No additional projects 	<p>This includes other developments/activities within, or moving through the same Military Practice Area during the same time period as the Hornsea Three array area construction.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential interference or obstruction to the Military Practice Area.</p>
Installation of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRS.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two Dudgeon <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3</p> <ul style="list-style-type: none"> Hornsea Project Four 	<p>This includes the presence of other developments which have the potential to affect the operational airspace of helicopters using HMR 2, HMR 3 and HMR 5 during the Hornsea Three construction phase.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential disruption to the use of HMR 2, HMR 3 and HMR 5.</p>
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified. <p>Tier 3:</p> <ul style="list-style-type: none"> No Tier 3 projects/plans identified. 	<p>This includes the presence of other developments which will have the potential to affect the available airspace for other users in the same region.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum use of the regional airspace.</p>

Potential impact	Maximum design scenario	Justification
<i>Operation phase</i>		
Maintenance activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Ongoing commercial fishing activity; Oil and gas activity in licence blocks 44/27, 44/28b, 44/29b and 44/30a; Norsea comm 1 cables; Proposed gas pipeline PL0221_PR D18-A to D15-FA-1. <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3:</p> <ul style="list-style-type: none"> No Tier 3 projects/plans identified 	<p>This includes other developments/activities within, or moving through the same Military Practice Area during the same time period as the Hornsea Three array operation phase.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential interference or obstruction to the Military Practice Area.</p>
Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRS.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two Dudgeon <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3</p> <ul style="list-style-type: none"> Hornsea Project Four 	<p>This includes the presence of other developments which have the potential to affect the operational airspace of helicopters using HMR 2, HMR 3 and HMR 5 during the Hornsea Three operational phase.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential disruption to the use of HMR 2, HMR 3 and HMR 5.</p>
Wind turbines and hoist operations will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3:</p> <ul style="list-style-type: none"> Hornsea Project Four 	<p>This includes other developments which have the potential to affect the operational airspace of helicopter operations identified as being affected by Hornsea Three.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential interference with aircraft operations.</p>

Potential impact	Maximum design scenario	Justification
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified. <p>Tier 3:</p> <ul style="list-style-type: none"> No Tier 3 projects/plans identified. 	<p>This includes the presence of other developments which will have the potential to affect the available airspace for other users in the same region.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum use of the regional airspace.</p>
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Schooner A platform (Faroe Petroleum).	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3:</p> <ul style="list-style-type: none"> No Tier 3 projects/plans identified 	<p>This includes other developments which have the potential to affect access to platforms affected by Hornsea Three. The developments must overlap with the 9 nm consultation zones of the respective platform.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential impact upon access to an individual platform.</p>
Wind turbines will form an aerial obstruction and may disrupt helicopter access to drilling rigs and operational vessels for access to subsea infrastructure and wells.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> No Tier 2 projects/plans identified <p>Tier 3:</p> <ul style="list-style-type: none"> No Tier 3 project/plans identified 	<p>This includes other developments which have the potential to affect helicopter access to licenced acreage and subsea infrastructure already affected by Hornsea Three.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential impact upon helicopter access to licenced acreage and subsea infrastructure.</p>

Potential impact	Maximum design scenario	Justification
Wind turbines may disrupt radar coverage of Military ADR located at Trimmingham.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Hornsea Project One, Hornsea Project Two, East Anglia One, East Anglia Three, Westermost Rough, Sheringham Shoal, Race Bank, Triton Knoll, Dudgeon, Humber Gateway, Lincs, Lynn and Inner Dowsing <p>Tier 2:</p> <ul style="list-style-type: none"> Norfolk Vanguard <p>Tier 3:</p> <ul style="list-style-type: none"> East Anglia Two Norfolk Boreas 	<p>This includes other offshore wind farm projects which are within the operational range of the Military ADR.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential impact upon a single radar.</p>
Decommissioning phase		
Decommissioning activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> Ongoing commercial fishing activity; Oil and gas activity in blocks 44.27, 44/28b, 44/29b and 44/30a; Norsea comm 1 cables; Proposed gas pipeline PL0221_PR D18-A to D15-FA-1. <p>Tier 2:</p> <ul style="list-style-type: none"> No additional projects <p>Tier 3:</p> <ul style="list-style-type: none"> No additional projects 	<p>This includes other developments/activities within, or moving through the same Military Practice Area during the same time period as the Hornsea Three array area decommissioning.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential interference or obstruction to the Military Practice Area.</p>

Potential impact	Maximum design scenario	Justification
Removal of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRS.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> • Hornsea Project One • Hornsea Project Two • Dudgeon <p>Tier 2:</p> <ul style="list-style-type: none"> • No Tier 2 projects/plans identified. <p>Tier 3</p> <ul style="list-style-type: none"> • Hornsea Project Four. 	<p>This includes the presence of other developments in construction which have the potential to affect the operational airspace of helicopters using HMR 2, HMR 3 and HMR 5 during the decommissioning phase of Hornsea Three.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum potential disruption to the use of HMR 2, HMR 3 and HMR 5.</p>
Hornsea Three helicopter operations may affect the available airspace for other users.	<p>Maximum adverse scenario as described for Hornsea Three (see Table 8.7) assessed cumulatively with the full development of the following other proposed or existing marine projects in the region (see Table 8.14):</p> <p>Tier 1:</p> <ul style="list-style-type: none"> • Hornsea Project One • Hornsea Project Two <p>Tier 2:</p> <ul style="list-style-type: none"> • No Tier 2 projects/plans identified. <p>Tier 3:</p> <ul style="list-style-type: none"> • No Tier 3 projects/plans identified. 	<p>This includes the presence of other developments which will have the potential to affect the available airspace for other users in the same region.</p> <p>These projects, when considered alongside Hornsea Three, will lead to the maximum use of the regional airspace.</p>

8.13 Cumulative Effect Assessment

8.13.1.1 A description of the significance of cumulative effects upon aviation, military and communication receptors arising from each identified impact is given below.

8.13.2 Construction phase

Construction activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.

Tier 1

Magnitude of impact

8.13.2.1 A Submarine Exercise Area is situated immediately north of the Hornsea Three array area as detailed in paragraph 8.11.1.3 and Figure 8.2. There appears to be a negligible percentage overlap with the array area (0.004%). During construction there will be construction vessels operating within the Hornsea Three array area, and around the perimeter of the array area. The 1,000 m advisory safety distances around the vessels operating at the array area perimeter will further infringe on the Submarine Exercise Area. In addition there will be 500 m safety zones around wind turbines and offshore platforms during construction which, if at the perimeter of the Hornsea Three array area will infringe on the Submarine Exercise Area. Other activity that will occur in the vicinity during the construction period for Hornsea Three includes any vessel movements associated with the active communications cable and the currently proposed gas pipeline (which is scheduled to be in place prior to Hornsea Three construction) which would be considered to be very infrequent, potential commercial fishing activity and oil and gas activity within the licence blocks that overlap with the Submarine Exercise Area including 44/27, 44/28b and to a lesser extent 44/29b and 44/30a. Consultation with the operator of block 44/28b (Faroe Petroleum) has advised that little activity is anticipated in this licence block outside the 500 m safety zone of the Ketch platform, which is most likely to be decommissioned ahead of Hornsea Three construction. Consultation with the operator of block 44/27 (Third Energy) has advised exploration activities will be finished ahead of the construction period for Hornsea Three and no new infrastructure is planned in this block.

8.13.2.2 The impact is predicted to be of local spatial extent, short to medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the Submarine Exercise Area directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of the receptor

8.13.2.3 It has not been possible to ascertain the exact nature of operations within the Submarine Exercise Area however consultation with the MOD/DIO has not raised any concerns with regard to the proximity of the Hornsea Three array area to this Submarine Exercise Area. Hornsea Three will have further consultation with the MOD to verify the boundaries. The Applicant will advise the DIO of construction activity in the region through Notice to Mariners as detailed in Table 8.12.

8.13.2.4 The Submarine Exercise Area is deemed to be of medium vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of Effect

8.13.2.5 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

8.13.2.6 There are no additional Tier 2 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.2.7 There are no additional Tier 3 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

Installation of wind turbines will form an aerial obstruction resulting in disruption to helicopters using HMRs.

Tier 1

Magnitude of impact

8.13.2.8 HMRs are established to both provide an identification of common flight paths and to facilitate safe helicopter flights when flying in IMC when flight cannot be completed in visual conditions (see paragraph 8.11.1.8).

8.13.2.9 The presence of obstructions in HMR 2 means that certain aircraft would not be able to use this route in IMC when the weather conditions require flight at a lower altitude than 2,500 ft. which could be up to 10% of the time. Helicopters would need to deviate around the Hornsea Three array area which could increase the track time from departure to destination.

8.13.2.10 There are no other offshore wind farms located below HMR 2 and therefore there is no cumulative effect on HMR 2 (Figure 8.10). Considering the Hornsea Project One and Hornsea Project Two wind farms at a distance of 3.9 nm from the western edge of the Hornsea Three array area, there is potential for a cumulative effect on HMR 3. The physical presence of Hornsea Project One and Hornsea Project Two would restrict the use of HMR 3 in certain weather conditions. An obstacle free route for HMR 3 would need to take into account Hornsea Project One, Hornsea Project Two, and Hornsea Three (see Figure 8.10). A potential alternative route for HMR 3 is therefore affected by the presence of Hornsea Three.

8.13.2.11 Consultation with Bristows, the helicopter service provider for ConocoPhillips flying HMR 3 from Norwich to the Murdoch group of platforms, has suggested that alternative routes are available including the potential consideration of a one way system around the Hornsea Three array area utilising the airspace between the Hornsea Three array area and Hornsea Project One and Hornsea Project Two but there would need to be some agreements between all helicopter companies about these procedures.

8.13.2.12 Up to four offshore HVAC booster stations of a maximum height of 90 m LAT may be positioned within the offshore HVAC booster station search area as shown in Figure 8.3. The offshore HVAC booster station search area is crossed by HMR 3 and HMR 5. Hornsea Project One and Hornsea Project Two would also have an effect on HMR 3 and the Dudgeon wind farm would have an effect on HMR 5.

8.13.2.13 There are a considerable number of offshore oil and gas platforms located in HMRs which are of a similar height to the offshore HVAC booster stations (for example the Carrack platform within HMR 435 is 84.7 m high). During consultation for Hornsea Project One (see volume 4, annex 1.1: Hornsea Project One and Hornsea Project Two Consultation of Relevance to Hornsea Three) NATS advised that obstacles (such as an offshore HVAC booster station) can be present within HMRs just as other oil and gas platforms are and that this is not seen as a safety issue as it is a stationary and identifiable object that can be navigated around. The offshore HVAC booster stations are not considered a prohibition on the use of the HMR (see paragraph 8.11.1.12) but dependent on their ultimate location and configuration may require a very minor deviation, in instances where aircraft are required to fly below MSA 1,500 ft.

8.13.2.14 The additional infringement of Dudgeon on HMR 5 is minor and there is available space to deviate the HMR slightly without any significant implications on route distance or height requirements. The cumulative effect on HMR 3 seaward of the offshore HVAC booster station search area has been assessed above (see paragraph 8.13.2.10). There are no additional cumulative effects on HMR 3 landward of the offshore HVAC booster station search area.

8.13.2.15 The impact is predicted to be local to regional in spatial extent, short to medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate** for HMR 3 and **minor** for HMR 5.

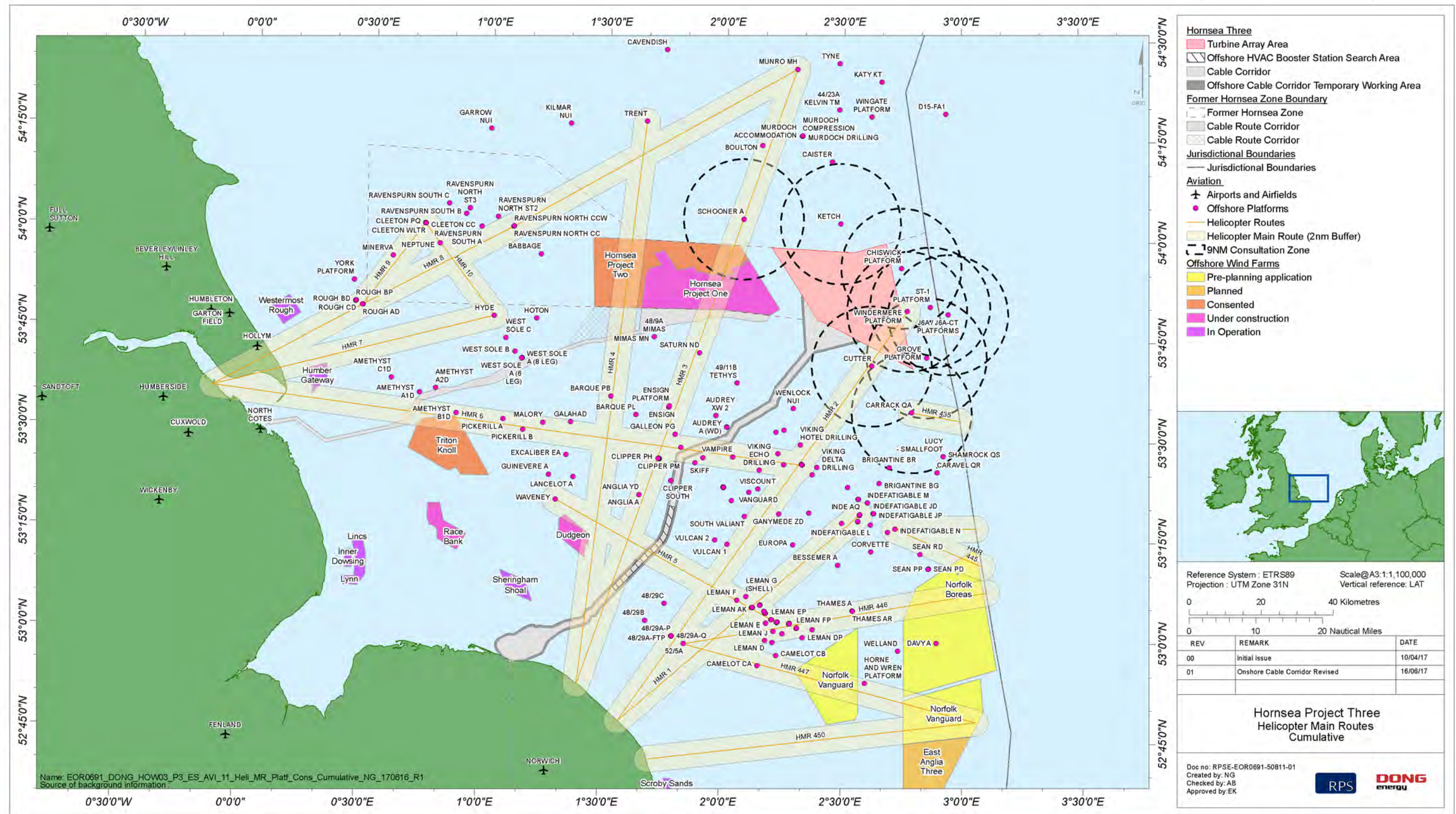


Figure 8.10: The HMRs and offshore wind farms in southern North Sea.

Sensitivity of receptor

- 8.13.2.16 The vulnerability of the helicopter operator using an HMR is assessed as low on the basis that the helicopter operator will continue to fly the HMR in VFR (see paragraph 8.11.2.15). When being used in IMC and the isotherm level is at an altitude that precludes flight below 2,500 ft., the helicopter operator may require an obstacle free route. Consultation has advised that certain aircraft with an appropriate icing clearance would be able to fly direct and that certain aircraft can be fitted with icing protection should this become a client requirement.
- 8.13.2.17 Consultation has advised that there are potential obstacle free routes available as a deviation to HMR 3 (see paragraph 8.13.2.11). As there are alternative options available the ability of the helicopter operator to safely undertake the intended journey is therefore not restricted. The route deviation may result in an increased journey time or height gain, or the requirement to alter operations such as the heliport used.
- 8.13.2.18 Further consultation will be held with the operators of the platforms to the north of the Hornsea Three array area, their helicopter service providers and NATS to validate the alternative route options to HMR 3. Following this consultation, the sensitivity of the operator to use HMR 3 shall be assessed in the Environmental Statement.
- 8.13.2.19 There is considered to be operational need for HMR 5 in certain weather conditions, however the routes can still be flown with very minor deviations. The location of the offshore HVAC booster stations would be reported to the DGC (as per CAP 764 para 4.9(2)).
- 8.13.2.20 The ability of the helicopter operator to use HMR 5 is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor using HMR 5 is considered to be **low**.

Significance of Effect

- 8.13.2.21 The sensitivity of the receptor using HMR 5 is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.
- 8.13.2.22 Note that a significance of effect has not been assessed for HMR 3 and will be assessed in the Environmental Statement, following the further consultation noted above.

Tier 2

- 8.13.2.23 There are no additional Tier 2 developments identified that impact on HMR 2, HMR 3 or HMR 5. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

Magnitude of impact

- 8.13.2.24 The physical presence of Hornsea Project Four would have an additional effect on HMR 3 (in addition to those projects considered under Tier 1). Helicopters opting to deviate to the west of Hornsea Project One and Hornsea Project Two would have to either deviate further west, or potentially utilise the corridor between Hornsea Project One and Hornsea Project Two and Hornsea Three.
- 8.13.2.25 The impact is predicted to be local to regional in spatial extent, short to medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate** for HMR 3.

Sensitivity of receptor

- 8.13.2.26 The sensitivity of the helicopter operator using an HMR is as detailed in paragraph 8.13.2.16 above. Further consultation will be held with the operators of the platforms to the north of the Hornsea Three array area, their helicopter service providers and NATS to validate the alternative route options to HMR 3. Following this consultation, the sensitivity of the operator to use HMR 3 shall be assessed in the Environmental Statement which will be submitted in Quarter 2 of 2018.

Significance of Effect

- 8.13.2.27 The significance of effect has not been assessed for HMR 3 and will be assessed in the Environmental Statement which will be submitted in Quarter 2 of 2018.

Hornsea Three helicopter operations may affect the available airspace for other users.

Tier 1

Magnitude of impact

- 8.13.2.28 The Hornsea Three project may require up to 3,841 helicopter round trips over the duration of the construction phase. It is not yet known which helicopter provider would be used or from which airport the helicopter operator would be based, however flights are likely to originate from the east coast of the UK.
- 8.13.2.29 The offshore oil and gas industry is presently served by some 100 flights a day (Parliament, 2014) which equates to some 36,500 flights a year. Other projects that will contribute to helicopter flights within the southern North Sea include Hornsea Project One and Hornsea Project Two.
- 8.13.2.30 Considering a steady state in the aviation baseline (see paragraph 8.11.1.19) the cumulative increase in helicopter operations from Hornsea Three and the Tier 1 wind farms is noticeable, particularly as flights will be concentrated in a regional area.

8.13.2.31 The impact is predicted to be of regional spatial extent, short to medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

8.13.2.32 Helicopter operations in the UK are highly regulated (see paragraph 8.11.1.22) and their sensitivity within this regulated environment is discussed in paragraph 8.11.1.23.

8.13.2.33 The same rules of the air and ATC services will continue to apply to helicopter operators within the southern North Sea. The provision of a service to Hornsea Three is not considered to affect the provision of a service to another user of the airspace.

8.13.2.34 The helicopter operator using the southern North Sea airspace is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

8.13.2.35 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

8.13.2.36 There are no additional Tier 2 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.2.37 There are no additional Tier 3 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

Future monitoring

8.13.2.38 No specific monitoring requirements have been identified for the construction phase in relation to aviation, military and communication. Further consultation will be held with the operators of the platforms to the north of the Hornsea Three array area and their helicopter service providers to establish an alternative route to HMR 3.

8.13.3 Operation and maintenance phase

Maintenance activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.

8.13.3.1 This impact is a continuation of the potential impact upon operations within the Military Practice Area located in the Outer Silver Pit area during the construction phase.

Tier 1

Magnitude of impact

8.13.3.2 A Submarine Exercise Area is situated immediately north of the Hornsea Three array area as detailed in paragraph 8.11.1.3. There appears to be a negligible percentage overlap with the Hornsea Three array area (0.004%). During operation there will be maintenance vessels operating within the Hornsea Three array area. The maintenance vessels are not considered to be required outside of the Hornsea Three array area however when operating at the perimeter a 1,000 m advisory safety distance around a vessel may infringe on the Submarine Exercise Area. This will be a small area for a short duration on an intermittent basis during the operational phase. In addition there may be 500 m safety zones around wind turbines and offshore platforms on the perimeter of the Hornsea Three array area which would infringe on the Submarine Exercise Area.

8.13.3.3 Other activity that will occur during the operation phase for Hornsea Three within the vicinity of the Submarine Exercise Area includes commercial fishing activity and any vessel movements associated with the active communications cable and the currently proposed gas pipeline (which is scheduled to be in place prior to Hornsea Three operation) which would be considered to be very infrequent, and oil and gas activity within the licence blocks that overlap with the Submarine Exercise Area including 44/27, 44/28b and to a lesser extent 44/29b and 44/30a. Consultation with the operator of block 44/28b (Faroe Petroleum) has advised that little activity is anticipated in this licence block outside the 500 m safety zone of the Ketch platform, which is most likely to be decommissioned ahead of Hornsea Three construction. Consultation with the operator of block 44/27 (Third Energy) has advised exploration activities will be finished ahead of the construction period for Hornsea Three and no new infrastructure is planned in this block.

8.13.3.4 The impact is predicted to be of local spatial extent, medium term duration, continuous (operational safety zones)/intermittent (temporary safety zones and advisory safety distances) and high reversibility. It is predicted that the impact will affect the Submarine Exercise Area directly. The magnitude is therefore, considered to be **minor**.

Sensitivity of the receptor

8.13.3.5 It has not been possible to ascertain the exact nature of operations within the Submarine Exercise Area however consultation with the MOD/DIO has not raised any concerns with regard to the proximity of the Hornsea Three array area to this Submarine Exercise Area. Hornsea Three will have further consultation with the MOD to verify the boundaries. The Applicant will advise the DIO of maintenance activity in the region through Notice to Mariners as detailed in Table 8.12.

8.13.3.6 The Submarine Exercise Area is deemed to be of medium vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of Effect

8.13.3.7 Overall, it is predicted that the sensitivity of the receptor is considered to be **medium** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

8.13.3.8 There are no additional Tier 2 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.3.9 There are no additional Tier 3 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.

8.13.3.10 This impact is a continuation of the potential impact upon HMRs during the construction phase.

Tier 1

Magnitude of impact

8.13.3.11 HMRs are described in paragraph 8.11.2.10. The presence of obstructions in HMR 2 means that certain aircraft would not be able to use this route in IMC when the weather conditions require flight at a lower altitude than 2,500 ft. Helicopters would need to deviate around the Hornsea Three array area which could increase the track time from departure to destination.

8.13.3.12 There are no other offshore wind farms located below HMR 2 and therefore there is no cumulative effect on HMR 2. Considering Hornsea Project One and Hornsea Project Two at a distance of 3.9 nm from the western edge of the Hornsea Three array area, there is potential for a cumulative effect on HMR 3. The physical presence of Hornsea Project One and Hornsea Project Two would restrict the use of HMR 3 in certain weather conditions. An obstacle free route for HMR 3 would need to take into account Hornsea Project One, Hornsea Project Two, and Hornsea Three (see Figure 8.10). A potential alternative route for HMR 3 is therefore affected by the presence of Hornsea Three. As discussed in paragraph 8.13.2.17, alternative routes are available subject to agreement between all Helicopter Companies about the required procedures.

8.13.3.13 Up to four offshore HVAC booster stations of a maximum height of 90 m LAT may be positioned within the offshore HVAC booster station search area of the offshore cable corridor as shown in Figure 8.3. The offshore HVAC booster station search area is crossed by HMR 3 and HMR 5.

8.13.3.14 Hornsea Project One and Hornsea Project Two would also have an effect on HMR 3, and the Dudgeon wind farm would have an effect on HMR 5.

8.13.3.15 There are a considerable number of offshore oil and gas platforms located in HMRs which are of a similar height to the offshore HVAC booster stations. The offshore HVAC booster stations are not considered a prohibition on the use of the HMR (see paragraph 8.11.1.8) but dependent on their ultimate location and configuration may require a very minor deviation, in instances where aircraft are required to fly below MSA 1,500 ft.

8.13.3.16 The additional infringement of Dudgeon on HMR 5 is minor and there is available space to deviate the HMR slightly without any significant implications on route distance or height requirements. The cumulative effect on HMR 3 seaward of the offshore HVAC booster stations has been assessed above (see paragraph 8.13.3.12). There are no additional cumulative effects on HMR 3 landward of the offshore HVAC booster stations.

8.13.3.17 The impact is predicted to be of regional spatial extent, medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate** for HMR 3 and **minor** for HMR 5.

Sensitivity of receptor

8.13.3.18 The vulnerability of the helicopter operator using an HMR is assessed as low on the basis that the helicopter operator will continue to fly the HMR in VFR (see paragraph 8.11.2.15).

8.13.3.19 Consultation has advised that there are potential obstacle free routes available as a deviation to HMR 3 (see paragraph 8.13.2.11). As there are alternative options available, the ability of the helicopter operator to safely undertake the intended journey is therefore not restricted. The route deviation may result in an increased journey time or height gain, or the requirement to alter operations such as the heliport used.

8.13.3.20 Further consultation will be held with the operators of the platforms to the north of the Hornsea Three array area, their helicopter service providers and NATS to validate the alternative route options to HMR 3. Following this consultation, the sensitivity of the operator to use HMR 3 shall be assessed in the Environmental Statement.

8.13.3.21 There is considered to be operational need for HMR 5 in certain weather conditions, however the routes can still be flown with very minor deviations. The location of the offshore HVAC booster stations would be reported to the DGC (as per CAP 764 para 4.9(2)).

8.13.3.22 The ability of the helicopter operator to use HMR 5 is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor using HMR 5 is considered to be **low**

Significance of Effect

8.13.3.23 The sensitivity of the receptor using HMR 5 is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

8.13.3.24 Note that the significance of effect has not been assessed for HMR 3 and will be assessed in the Environmental Statement.

Tier 2

8.13.3.25 There are no additional Tier 2 developments identified that impact on HMR 2, HMR 3 and HMR 5. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

Magnitude of impact

8.13.3.26 The physical presence of Hornsea Project Four would have an additional effect on HMR 3 (in addition to those projects considered under Tier 1). Helicopters opting to deviate to the west of Hornsea Project One and Hornsea Project Two would have either to deviate further west, or potentially utilise the corridor between Hornsea Project One and Hornsea Project Two and Hornsea Three.

8.13.3.27 The impact is predicted to be local to regional in spatial extent, short to medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate** for HMR 3.

Sensitivity of receptor

8.13.3.28 The sensitivity of the helicopter operator using an HMR is as detailed in paragraph 8.13.3.18 above. Further consultation will be held with the operators of the platforms to the north of the Hornsea Three array area, their helicopter service providers and NATS to validate the alternative route options to HMR 3. Following this consultation, the sensitivity of the operator to use HMR 3 shall be assessed in the Environmental Statement which will be submitted in Quarter 2 of 2018.

Significance of Effect

8.13.3.29 The significance of effect has not been assessed for HMR 3 and will be assessed in the Environmental Statement which will be submitted in Quarter 2 of 2018.

Wind turbines and hoist operations will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic.

Tier 1

Magnitude of impact

8.13.3.30 Helicopters transiting the Hornsea Three array area will be required to fly 1,000 ft. higher than the wind turbines. Consultation meetings have advised that most helicopter operators choose to fly in IFR conditions regardless of weather conditions. A typical MSA of 1,500 ft. is therefore flown to allow for 1,000 ft. clearance of transiting vessels. The Hornsea Three wind turbines will be 325 m (1,066 ft.) at their maximum height. The present MSA of 1,500 ft. will therefore be required to be raised to 2,066 ft. by the presence of the turbines (1,066 ft. plus 1,000 ft. clearance). As helicopters are height banded in the southern North Sea at 500 ft. intervals this would mean the MSA would be raised to 3,000 ft. (inbound) and 2,500 ft. (outbound). This is an additional 500 ft. climb and descent required per journey.

8.13.3.31 The maximum flight path distances across the Hornsea Three array area are shown in Figure 8.11. There are no other Tier 1 projects which would result in a cumulative effect on north-south or diagonal cross-zone traffic. Hornsea Project One and Hornsea Project Two would contribute to a cumulative effect on east-west cross-zone traffic, with a combined increase in flight path distance at a raised MSA from these projects together with Hornsea Three of 83 km. This is 39% of the total route distance. This route would be taken for access to oil and gas licenced acreage to the northeast of the Hornsea Three array area. There would be no cumulative effect on access to oil and gas licenced acreage to the east to southeast of the Hornsea Three array area.

8.13.3.32 Hoist operations are maintenance activities which take place using helicopters lowering personnel and/or equipment to the wind turbines by hoist (see paragraph 8.11.2.26). When hoist operations are within 434 ft. of the Hornsea Three wind turbines, which will be the majority of the time, no additional height gain will be required as this is within the height band of between 1,066 ft. to 1,500 ft. (plus 1,000 ft. separation raises the MSA to 2,500 ft.).

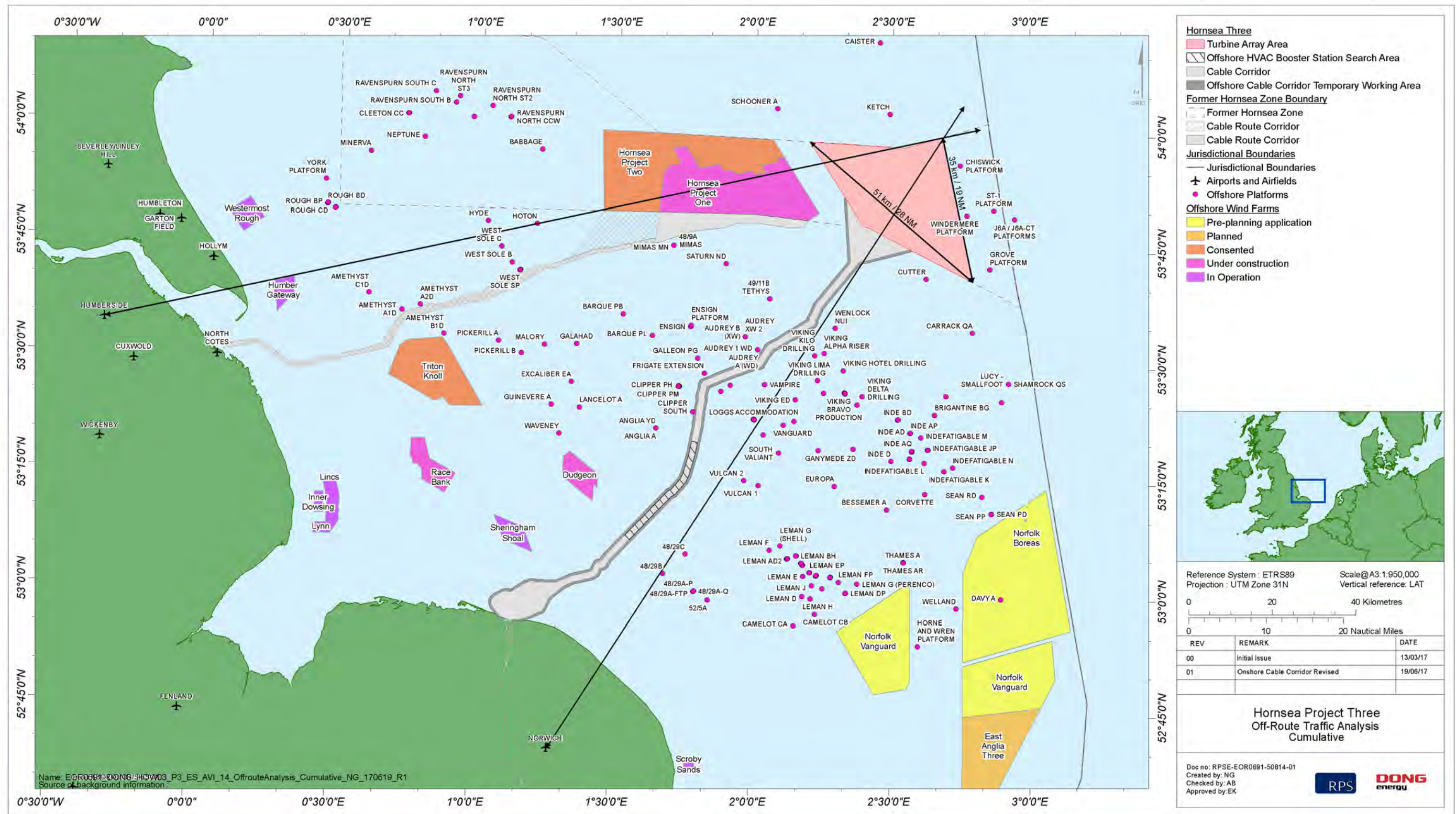


Figure 8.11: Cumulative off route traffic analysis.

8.13.3.33 The frequency of this impact occurring is based upon the level of cross-zone transit traffic. Considering the HMR structure (Figure 8.10) any east-west cross-zone traffic is not considered to be a regular route. Consultation has advised however that helicopter operators fly direct to their destinations and do not tend to use the HMR structure when weather conditions permit. Consultation has advised that the Ketch platform is serviced from Norwich, this platform is however likely to be decommissioned prior to Hornsea Three construction. Consultation has advised the platforms and acreage to the east of the Hornsea Three array area are predominantly served from the Netherlands. Consultation has also advised that whilst it is usual for the industry to use an airfield that flies the shortest route, in some instances this may vary as for example when using a contractor (e.g. when contracting a drilling rig). The east-west route should therefore be considered as a probable scenario.

8.13.3.34 The impact is predicted to be of regional spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

8.13.3.35 Cross-zone transit flights can be flown in visual conditions (i.e. in weather conditions in which pilots will be able to see and avoid obstructions) or in IMC when the icing level is high enough. In these weather conditions, helicopters would be required to transit at a higher MSA over the Hornsea Three array area and Hornsea Project One and Hornsea Project Two. Should weather conditions exist whereby either VFR or IFR transits cannot be continued above the Hornsea Three array area and Hornsea Project One and Hornsea Project Two, helicopters would reroute to use the HMR network or deviate around the project areas. The helicopter operator has low vulnerability as it is able to adapt to an increased MSA, and has alternative routes to use. There may however be an increased journey time due to the requirement to fly at a greater height or to deviate around the project areas, which will affect the helicopter operator directly. The operators of the oil and gas platforms and licenced acreage to the northeast of and within 9 nm of the Hornsea Three array area include Centrica and Total UK (see Table 8.13 for a listing of licence blocks). The sensitivity of the helicopter operator required to fly cross-zone is deemed to be of low vulnerability, high recoverability and moderate value for Centrica and the sensitivity of the receptor is therefore, considered to be **low**.

8.13.3.36 The sensitivity of the helicopter operator required to fly cross-zone is deemed to be of low vulnerability, high recoverability and low value for Total and the sensitivity of the receptor is therefore considered to be **low**.

Significance of effect

8.13.3.37 The magnitude of impact has been deemed to be **moderate** and the sensitivity of receptor **low**. Therefore the significance of effect will be **minor** adverse, which is not significant in EIA terms.

Tier 2

8.13.3.38 There are no additional Tier 2 developments identified that impact on the cross-zone traffic. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.3.39 The physical presence of Hornsea Project Four, (see Figure 8.11) could potentially have a cumulative effect when considered with Hornsea Three, Hornsea Project One and Hornsea Project Two, with regards to east west cross-zone transit. Flights are not however anticipated to be making this east west transit when considering the location of Humberside airfield in relation to the former Hornsea zone.

8.13.3.40 The impact is predicted to be of minimal spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **negligible**.

Sensitivity of receptor

8.13.3.41 The sensitivity of the helicopter operator required to fly cross-zone is deemed to be of low vulnerability, high recoverability and low value for an operator and the sensitivity of the receptor is therefore considered to be **low**.

Significance of effect

8.13.3.42 The magnitude of impact has been deemed to be negligible and the sensitivity of receptor low. Therefore the significance of effect will be **minor** adverse, which is not significant in EIA terms.

Hornsea Three helicopter operations may affect the available airspace for other users.

8.13.3.43 This impact is a continuation of the potential impact upon available airspace for other users during the construction phase.

Tier 1

Magnitude of impact

8.13.3.44 The Hornsea Three project may require up to 5,273 return helicopter flights per year or approximately 14 flights per day during the operation and maintenance phase. It is not yet known which helicopter provider would be used or from which airport the helicopter operator would be based, however flights are likely to originate from the east coast of the UK or from an onshore helicopter base or from an offshore base or vessel with helicopter personnel transfer. These flights would be in addition to the prevailing helicopter traffic levels in the southern North Sea at the time of Hornsea Three operation, discussed in paragraph 8.13.2.29.

8.13.3.45 Other projects that will contribute to helicopter flights within the southern North Sea include Hornsea Project One and Hornsea Project Two:

- Hornsea Project One: Estimate of 41 flights a day (SMart Wind Ltd., 2013). It is noted that this number is probably an overestimate based on Hornsea Project Two estimates; and
- Hornsea Project Two: Estimate of 18 flights a day (SMart Wind Ltd., 2015).

8.13.3.46 The oil and gas industry is changing with more fields now being decommissioned. There has been a gradual decline in oil and gas activity (OGA, 2016) and therefore helicopter requirements are likely to have decreased by the time of the Hornsea Three operation phase. However considering a steady state in the oil and gas sector requirements as a worst case, the cumulative increase in helicopter operations from Hornsea Three and the Tier 1 wind farms is considerable.

8.13.3.47 The impact is predicted to be of regional spatial extent, medium term duration, continuous and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be **moderate**.

Sensitivity of receptor

8.13.3.48 Helicopter flights in the UK are highly regulated (see paragraph 8.11.1.22) and their sensitivity within this regulated environment is discussed in paragraph 8.11.1.23.

8.13.3.49 The same rules of the air and ATC services will continue to apply to helicopter operators within the southern North Sea. The provision of a service to Hornsea Three is not considered to affect the provision of a service to another user of the airspace.

8.13.3.50 The helicopter operator using the southern North Sea airspace is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

8.13.3.51 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

8.13.3.52 There are no additional Tier 2 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.3.53 There are no additional Tier 3 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

Wind turbines will form a physical obstruction and may disrupt helicopter access to the Schooner A platform (Faroe Petroleum).

Tier 1

Magnitude of impact

8.13.3.54 This assessment considers the cumulative impact on the Schooner A platform only. As can be seen in Figure 8.12 there are no Tier 1, Tier 2 or Tier 3 offshore wind farm projects which overlap the 9 nm consultation zone of the Chiswick, ST-1, J6A/J6A-CT, Grove Windermere and Carrack platforms. There are therefore no cumulative effects on these platforms.

8.13.3.55 Wind turbines are considered as physical obstructions and helicopter operators must observe the minimum obstacle clearance criteria of 1,000 ft in IMC. Furthermore during the approach to an installation, all radar contacts (including radar contacts that are turbines) have to be avoided laterally by at least 1 nm. These combined effects within a 9 nm consultation zone of an offshore installation may impair the safety of air operations to that installation and affect the installation operators' regulatory requirements with regard to safety of operation.

8.13.3.56 Due to the presence of wind turbines in the Hornsea Three array area, a volume of airspace would be considered unavailable for instrument approach procedures to the Schooner A platform these. Hornsea Project One and Hornsea Project Two would further reduce the available airspace for instrument approach procedures to this platform (see Figure 8.12), the only platform for which a cumulative effect applies.

8.13.3.57 It is estimated that there would be 241.4° of available airspace surrounding the Schooner A platform for instrument approach procedures and MAP.

8.13.3.58 The potential number of instrument approach procedures to the Schooner A platform that are likely to be affected by the Hornsea Three array area in addition to Hornsea Project One and Hornsea Project Two have been assessed assuming the worst case restricted areas (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report).

8.13.3.59 The results indicate that the impact of Hornsea Three, together with Hornsea Project One and Hornsea Project Two, would be to prevent instrument approaches to the Schooner A platform on approximately 1.12 days per year. Over the year less than 2% of days are restricted which is considered to be a low occurrence.

8.13.3.60 It should be noted that under certain weather conditions and sea states flights may be restricted irrespective of these projects. These restrictions have not been taken into account in this assessment.

8.13.3.61 The impact on the Schooner A platform is predicted to be of local spatial extent, medium term duration, intermittent in occurrence and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **minor**.

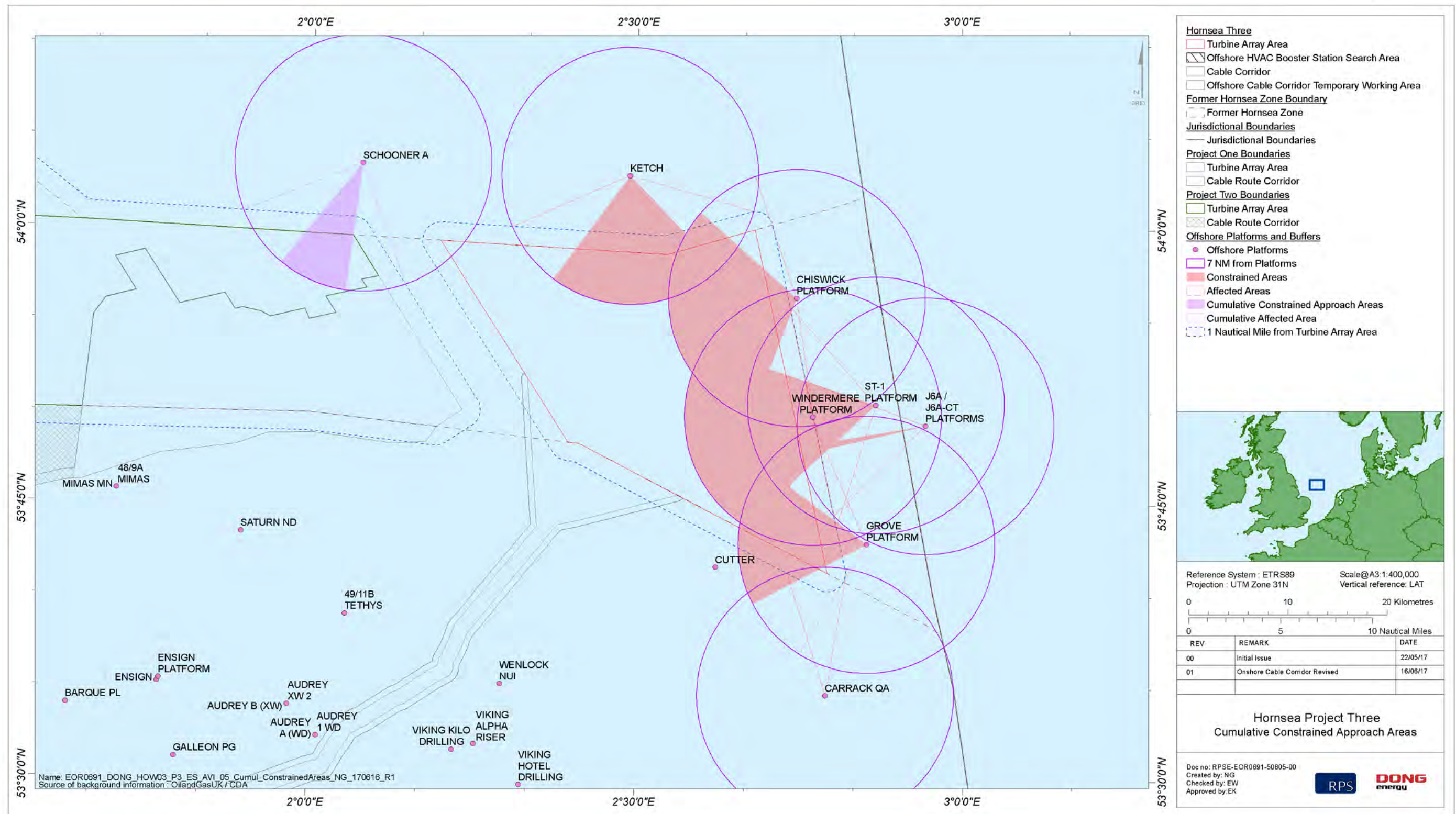


Figure 8.12: Cumulative constrained approach sectors.

Sensitivity of receptor

- 8.13.3.62 The sensitivity of the receptor (the platform operator) will depend on the operational requirements of the platform. Consultation took place with the operator of the Schooner A platform (Faroe Petroleum) and has advised that flights to this platform are from Norwich. The platform is a NUI, however daily shuttling is required in the manned phase, which occurs two weeks out of five during the summer and short ad-hoc visits during the winter. Access will be required for these routine maintenance periods and operational emergencies. If high altitude flights are required during normal weather conditions, flights can be flown visually under VFR. The only time access will be restricted is either during maintenance periods when weather conditions require instrument approaches, or during operational emergencies when helicopter flights are required direct to the platform at high altitude and under IMC.
- 8.13.3.63 Consultation has also advised that the Schooner A platform is likely to be decommissioned prior to the start of construction of Hornsea Three (2023) however this is not as yet confirmed by an approved decommissioning plan. Consultation advised that Faroe Petroleum were moving towards the use of vessels for maintenance programmes as this can be more cost effective, and may reduce the use of helicopters. Together these factors indicate that there is unlikely to be significant operational restrictions on access to the Schooner A platform or access requirements during platform decommissioning.
- 8.13.3.64 The sensitivity of the platform operator is deemed to be of low vulnerability, high recoverability and moderate value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

- 8.13.3.65 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **minor**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

- 8.13.3.66 There are no additional Tier 2 developments identified that impact on the Schooner A platform. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

- 8.13.3.67 There are no additional Tier 3 developments identified that impact on Schooner A platform. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

Wind turbines will form an aerial obstruction and may disrupt helicopter access to drilling rigs and operational vessels for access to subsea infrastructure and wells.

Tier 1

Magnitude of impact

- 8.13.3.68 Subsurface infrastructure and wells that have not been permanently decommissioned or plugged and abandoned may at some time require access from a rig or vessel with a helideck. A 9 nm consultation zone exists around offshore helicopter destinations (see paragraphs 8.7.4.12) and is a trigger for consultation with the operators of subsea infrastructure and wells requiring helicopter access (CAA, 2016c).
- 8.13.3.69 As discussed in paragraph 8.11.2.96 when conducting an instrument approach procedure a helicopter must maintain a 1,000 ft. vertical clearance from all obstacles as it lines up its final descent and a 1 nm lateral separation from all radar contacts. It lines up predominantly into wind at the Fixed Approach Point at 7 nm. The maximum distance that a helicopter can be from the Hornsea Three array area before an instrument approach may be affected to an installation is therefore 8 nm (7 nm Fixed Approach Point + 1 nm lateral separation). In VFR a helicopter requires a separation distance of 150 m (500ft).
- 8.13.3.70 The presence of the Hornsea Three array area may, in certain weather conditions, restrict access to certain locations within the licence blocks listed within Table 8.6.
- 8.13.3.71 The licence blocks within 8 nm of the Hornsea Three array area that are also within 8 nm of Hornsea Project One and/or Hornsea Project Two are listed in Table 8.16 below and are shown in Figure 8.13.
- 8.13.3.72 The physical presence of Hornsea Three together with Hornsea Project One and Hornsea Project Two may in certain weather conditions restrict access to certain locations within the licence blocks listed within Table 8.16. At this stage, the exact locations requiring access in the future is unknown, as this will be based on future exploration and development plans. The magnitude of this impact has therefore been assessed on the basis of the level of restricted access in IMC and VFR (paragraph 8.11.2.96) and the total area of a licence block that is potentially affected. The sensitivity criteria (paragraph 8.13.3.76) considers the present and future access requirements to the licence block. The area that is affected as a percentage of the total licence block is presented in Table 8.16 below.
- 8.13.3.73 The magnitude of impact is considered to be the magnitude from the Hornsea Three assessment together with any increase in magnitude from Hornsea Project One and Hornsea Project Two. The increase in magnitude varies for each licence block depending on the level of restricted access in IMC and VFR and the proportion of the block affected by Hornsea Three together with Hornsea Project One and Hornsea Project Two. The increase in magnitude is shown for each licence block in Table 8.16.

Table 8.16: Percentage of licenced acreage within the Hornsea Three array area +1 nm and within 8 nm of the Hornsea Project One and Hornsea Project Two.

Licence Block	Infrastructure*	Area of block (km ²)	Hornsea Three					Area within 8 nm of Hornsea Project One, Hornsea Project Two		Operator	Cumulative Magnitude (Hornsea Three, Hornsea Project One and Hornsea project Two)	Sensitivity
			Area within array + 1 nm		Area within 8 nm of Hornsea Three		Magnitude (Hornsea Three alone)	Total area	%			
			Total area	%	Total area	%						
44/26a	Schooner platform and North West Schooner Subsea Well head (well: 44/26a-7)	99.1	0.8	0.8	70.6	71.2	Negligible	96.4	95.5	Faroe	Moderate (moderate increase)	Low
49/3	N/A	243.6	240.6	98.8	243.6	100	Moderate	27.2	11.2	Centrica	Moderate (negligible increase)	On hold, to be updated for Environmental Statement
43/30b	N/A	121.5	0	0	7	5.8	Negligible	121.5	100	Centrica	Moderate (moderate increase)	On hold, to be updated for Environmental Statement
48/5a	N/A	121.7	0	0	11.2	9.2	Negligible	121.7	100	Centrica	Moderate (moderate increase)	On hold, to be updated for Environmental Statement
44/27	N/A	242.6	4.4	41.2	174.4	71.9	Minor	49.3	20.3	Third Energy	Minor (negligible increase)	Low
49/1a	N/A	22.3	6.5	29.1	22.3	100	Minor	22.3	100	INEOS	Moderate (moderate increase)	Low
49/2a	Well head Topaz (well: 49/02a-6z)	18.2	16.1	88.5	18.2	100	Moderate	18.2	100		Moderate (moderate increase)	
44/26	NA	144	0	0	79.7	55.3	Negligible	79.9	55.5	Unlicensed	Moderate (moderate increase)	Negligible
49/1	NA	221	0	0	188.1	85.1	Negligible	221	100		Moderate (moderate increase)	
49/2	NA	225	167.2	74.3	225	100	Moderate	205.3	91.2		Moderate (moderate increase)	
49/6	NA	173	0	0	33.9	19.6	Negligible	33.9	19.6		Negligible (negligible increase)	
49/7	NA	245	13.2	5.4	207.4	84.7	Minor	154.8	63.2		Moderate (moderate increase)	
49/8	wells 49/08c-4 and 49/08b-3	243	104.4	43	243	100	Minor	24.5	10.1		Minor (negligible increase)	

*NA: No infrastructure (excluding subsea tie backs shown in Figure 8.4) is presently known to be within the licence block.

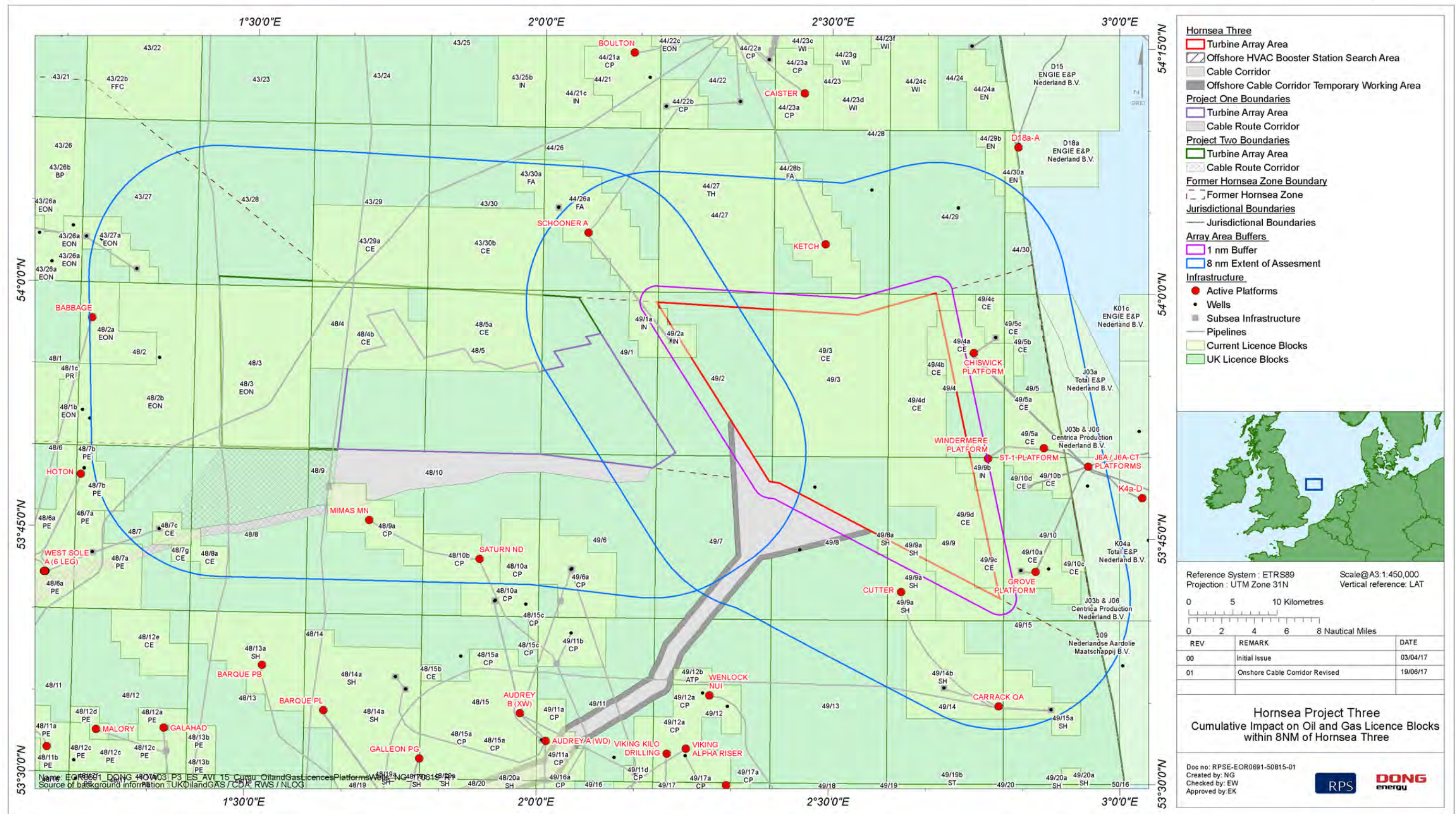


Figure 8.13: Licence blocks within 8 nm of Hornsea Three, Hornsea Project One and Hornsea Project Two.

8.13.3.74 The increase in magnitude is defined as the level of restricted access in IMC and VFR and the percentage of block overlapped by the 8 nm area of assessment of Hornsea Project One, Hornsea Project Two and Hornsea Three where:

- Total loss of access in IMC and VFR = major
- 75 to 100% overlap = moderate;
- 50 to 75% overlap = minor;
- 1 50% overlap = negligible.

8.13.3.75 The impact is predicted to be of local spatial extent, medium term duration, intermittent and not reversible for the project phase for each licence block. It is predicted that the impact will affect the receptor directly for each licence block. The magnitude is:

- Moderate for licence blocks: 43/30b, 48/5a and 49/3, (Centrica) 44/26a (Faroe Petroleum), 49/1a and 49/2a (INEOS) and for the unlicensed blocks 44/26, 49/1, 49/2 and 49/7;
- Minor for licence blocks: 44/27 (Third Energy), and the unlicensed block: 49/8;
- Negligible for the unlicensed block 49/6.

Sensitivity of the receptor

8.13.3.76 The sensitivity of the operator is dependent on the extent to which their existing infrastructure requiring access is affected (listed in Table 8.16 and subsea tie backs shown in Figure 8.13) and the anticipated future activity in their licence blocks as ascertained through consultation (see Table 8.3) with the present operators of these licences. The sensitivity for each block is listed in Table 8.16. It is noted that this information is based on current knowledge only and that the operator and extent of licences is subject to change.

8.13.3.77 The licence operator is deemed to be of low vulnerability, high recoverability and low value, and is therefore considered to be **low** for Faroe Petroleum, Third Energy and INEOS.

8.13.3.78 The sensitivity of the licence operator has not been assessed for Centrica. Discussions are ongoing between Hornsea Three and Centrica (Table 8.3). There is not enough certainty in relation to Centrica's future plans to assign sensitivity to these licence blocks at this stage and this will be updated for the Environmental Statement.

8.13.3.79 The sensitivity for the unlicensed blocks listed in Table 8.13 is deemed to be of low vulnerability, high recoverability and very low value, and is therefore considered to be negligible.

Significance of effect

8.13.3.80 Overall, it is predicted that the sensitivity of the receptor is **low** for the operators Faroe Petroleum, Third Energy and INEOS and **negligible** for the unlicensed blocks, and the magnitude is **moderate** for licence blocks: 43/30b, 48/5a and 49/3 (Centrica), 44/26a (Faroe Petroleum), 49/1a and 49/2a (INEOS) and for the unlicensed blocks 44/26, 49/1, 49/2 and 49/7; **minor** for licence blocks: 44/27 (Third Energy), and the unlicensed block: 49/8; and **negligible** for the unlicensed block 49/6.

8.13.3.81 The effect will, therefore, be of **minor** adverse significance for the operators Faroe Petroleum (44/26a), INEOS (49/1a and 49/2a) and the unlicensed block (, 49/2, and) which is not significant in EIA terms; and **negligible** adverse significance for Third Energy (44/27) and the unlicensed blocks (44/26, 49/1, 49/6, 49/7, and 49/8) which is not significant in EIA terms.

8.13.3.82 Note that the significance of effect has not been assessed for licence blocks currently operated by Centrica as it is not possible to assign sensitivity to this receptor. This will be updated for the Environmental Statement.

Tier 2

8.13.3.83 There are no additional Tier 2 developments identified that will overlap a 9 nm zone around the Hornsea Three array area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.3.84 There are no additional Tier 3 developments identified that will overlap a 9 nm zone around the Hornsea Three array area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Wind turbines may disrupt radar coverage of Military ADR located at Trimmingham.

Tier 1

Magnitude of impact

8.13.3.85 Radar Line of Sight analysis for the Trimmingham ADR (see volume 5, annex 8.1: Aviation, Military and Communication Technical Report) indicates that Hornsea Three wind turbines with a tip height of 325 m would be considered theoretically intermittently detectable by the Trimmingham ADR within a small area along the southwestern boundary of the Hornsea Three array area. Wind turbines in the southwestern section of the Hornsea Three array area are unlikely to be routinely detectable, and turbines in the northeastern section are not predicted to be detectable by the Trimmingham ADR.

8.13.3.86 Other offshore wind farms that are considered likely to be detected by the Trimmingham ADR include Hornsea Project One, Hornsea Project Two, East Anglia One, East Anglia Three, Westermost Rough, Sheringham Shoal, Race Bank, Triton Knoll, Dudgeon, Humber Gateway, Lincs, and Lynn and Inner Dowsing. The potential cumulative effect will be to add to the radar clutter and possibly an increase in the signal processing demands of the Trimmingham ADR.

8.13.3.87 The impact is predicted to be of regional spatial extent, medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **moderate**.

Sensitivity of receptor

8.13.3.88 Military ADRs are used to protect the security interests of the UK. Their programming will have a certain level of ability to accommodate wind turbine infrastructure. As part of the pre-application consultation process, Hornsea Three has requested the DIO to undertake an assessment of the potential for the Hornsea Three array area to affect any of the radar or communications systems operated or controlled by the MOD. In response to this consultation, they confirmed that it is unlikely that there will be any detectability from any MOD ADR to the Hornsea Three array area due to the distance of the Hornsea Three array area offshore.

8.13.3.89 The MOD, as operator of the Trimmingham ADR, is deemed to be of low vulnerability, high recoverability and medium value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

8.13.3.90 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 2

Magnitude of impact

8.13.3.91 Radar Line of Sight analysis for the Trimmingham ADR (see paragraph 8.13.3.85) indicates that Hornsea Three wind turbines would be theoretically intermittently detectable by the Trimmingham ADR within a small area along the southwestern boundary, unlikely to be routinely detectable in the southwestern section and not detectable in the northeastern section of the Hornsea Three array.

8.13.3.92 Other Tier 1 offshore wind farms that are considered likely to be detected by the Trimmingham ADR include Hornsea Project One, Hornsea Project Two, East Anglia One, East Anglia Three, Westermost Rough, Sheringham Shoal, Race Bank, Triton Knoll, Dudgeon, Humber Gateway, Lincs, and Lynn and Inner Dowsing.

8.13.3.93 In addition, East Anglia Two may be detectable by the Trimmingham ADR. The cumulative effect will be to add a small degree of radar clutter and possibly an increase in the signal processing demands of the Trimmingham ADR.

8.13.3.94 The impact is predicted to be of regional spatial extent, medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **moderate**.

Sensitivity of receptor

8.13.3.95 The MOD, as operator of the Trimmingham ADR, is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

8.13.3.96 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

Tier 3

Magnitude of impact

8.13.3.97 Radar Line of Sight analysis for the Trimmingham ADR (see paragraph 8.13.3.85) indicates that Hornsea Three wind turbines would be theoretically intermittently detectable by the Trimmingham ADR within a small area along the southwestern boundary, unlikely to be routinely detectable in the southwestern section and not detectable in the northeastern section of the Hornsea Three array.

8.13.3.98 Other Tier 1 and Tier 2 offshore wind farms that are considered likely to be detected by the Trimmingham ADR include Hornsea Project One, Hornsea Project Two, East Anglia One, East Anglia Three, Westermost Rough, Sheringham Shoal, Race Bank, Triton Knoll, Dudgeon, Humber Gateway, Lincs, Lynn and Inner Dowsing, and East Anglia Two.

8.13.3.99 In addition, Norfolk Vanguard and Norfolk Boreas may be detectable by the Trimmingham ADR. The cumulative effect will be to add to the radar clutter and possibly an increase in the signal processing demands of the Trimmingham ADR.

8.13.3.100 The impact is predicted to be of regional spatial extent, medium term duration, intermittent and not reversible for the project phase. It is predicted that the impact will affect the receptor directly. The magnitude is considered to be **moderate**.

Sensitivity of receptor

8.13.3.101 The MOD, as operator of the Trimmingham ADR, is deemed to be of low vulnerability, high recoverability and high value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

8.13.3.102 Overall, it is predicted that the sensitivity of the receptor is considered to be **low** and the magnitude is deemed to be **moderate**. The effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

8.13.4 Decommissioning phase

[Decommissioning activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area](#)

Tier 1

8.13.4.1 The effects of decommissioning activities are expected to be the same or less to the effects from construction. The significance of effect is therefore **minor** adverse (see paragraph 8.13.2.1), which is not significant in EIA terms.

Tier 2

8.13.4.2 There are no additional Tier 2 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.4.3 There are no additional Tier 3 developments identified that coincide with the Submarine Exercise Area. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

[Removal of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.](#)

8.13.4.4 The HMR structure is subject to change due to the operational requirements of the air traffic users within the Southern North Sea. Due to the obstacle clearance requirements of an HMR (CAP 764) it is probable that the HMRs will have been redefined by the decommissioning phase.

8.13.4.5 Assuming that it has not been revised, the other Tier 1 projects which may have a cumulative effect on HMR 3 and HMR 5 remain the same as for the construction phase (Hornsea Project One and Hornsea Project Two).

8.13.4.6 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor** adverse for HMR 5 (see 8.13.2.21 which is not significant in EIA terms. Note the significance of effect for HMR 3 will be assessed in the Environmental Statement.

Tier 2

8.13.4.7 There are no additional Tier 2 developments identified that will have an effect on HMR 3 and HMR 5 The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.4.8 The other Tier 3 projects which may have a cumulative effect on HMR 3 remain the same as for the construction phase (Hornsea Project Four).

8.13.4.9 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect for HMR 3 will be assessed in the Environmental Statement.

[Hornsea Three helicopter decommissioning activities may affect the available airspace for other users.](#)

Tier 1

8.13.4.10 By the time of Hornsea Three decommissioning it is highly probable that the aviation industry will be fully adapted to servicing the offshore wind industry in the southern North Sea. The decline in provision of a service to the oil and gas sector may have been replaced by an increased requirement from the offshore wind industry. It is not possible to make predictions of the future environment at this time, and so a continued base case has been assumed.

8.13.4.11 The effects of decommissioning activities are expected to be the same or similar to the effects from construction. The significance of effect is therefore **minor** adverse (see paragraph 8.13.2.35), which is not significant in EIA terms.

Tier 2

8.13.4.12 There are no additional Tier 2 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 2 therefore remains the same as for Tier 1 above.

Tier 3

8.13.4.13 There are no additional Tier 3 developments identified that would result in increased helicopter numbers in shared airspace with Hornsea Three. The assessment for Tier 3 therefore remains the same as for Tier 1 above.

Future monitoring

8.13.4.14 No specific monitoring requirements have been identified for the decommissioning phase in relation to aviation, military and communication.

8.14 Transboundary effects

8.14.1.1 A screening of transboundary impacts has been carried out and is presented in annex 5.5: Transboundary Impacts Screening Note. This screening exercise identified that there was the potential for significant transboundary effects with regard to aviation, military and communication from Hornsea Three upon the interests of other EEA States.

8.14.1.2 Potential transboundary impacts that have been identified relate to the following impacts:

- Wind turbines and hoist operations will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic. The affected licenced acreage is operated by Centrica Netherlands. The impact is assessed in paragraph 8.11.2.21. The significance of effect will be of minor adverse significance, which is not significant in EIA terms;
- Wind turbines will form a physical obstruction and disrupt helicopter access to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms. These platforms form part of the Markham complex operated by Centrica Netherlands. The impact is assessed in paragraph 8.11.2.56. The significance of effect will be of minor adverse significance, which is not significant in EIA terms; and
- Wind turbines will form an aerial obstruction and may disrupt helicopter access to drilling rigs and operational vessels for access to subsea infrastructure and wells. This impact may affect Dutch licenced acreage operated by Centrica Netherlands. The sensitivity of the operator has not been assessed for Centrica. Discussions are ongoing between Hornsea Three and Centrica. There is not enough certainty in regard to future plans to assign sensitivity (and therefore significance of effect) at this stage and will be updated at the Final Environmental Statement.

8.15 Inter-related effects

8.15.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the project (construction, operational and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three key project stages (e.g. subsea noise effects from piling, operational turbines, vessels and decommissioning); and
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on the operator of an offshore oil and gas platform such as restriction on helicopter access during IMC, restriction on ability to conduct MAPs, alteration to helicopter journey time, etc.), may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

8.15.1.2 A description of the likely inter-related effects arising from Hornsea Three on aviation, military and communication is provided in chapter 11: Inter-Related Effects (Offshore).

8.16 Conclusion and summary

8.16.1.1 Consultation has taken place with aviation stakeholders, including helicopter operators, oil and gas operators, and regulators, as presented in section 8.5. The assessment methodology applied in this chapter has been discussed through the consultation process (Table 8.3).

8.16.1.2 A summary of the findings of the assessment completed to date for aviation, military and communication is presented in Table 8.17 below. Overall it is concluded that there will be no significant effects arising from Hornsea Three during the construction phase, operational phase and decommissioning phase.

8.16.1.3 It should be noted that the sensitivity of the operator Centrica to impacts potentially affecting their licenced acreage has not been assessed. Discussions are ongoing between Hornsea Three and Centrica. There is not enough certainty in regard to future plans to assign sensitivity (and therefore significance of effect) at this stage and the applicable impact assessments will be provided within the Environmental Statement which will be submitted in Quarter 2 of 2018.

8.16.1.4 Overall it is concluded that there will be no significant effects arising from Hornsea Three during the construction phase, operational phase and decommissioning phase when considered alongside other projects/plans. It should be noted that the potential effect from the installation, operation, and decommissioning of Hornsea Three infrastructure forming an aerial obstruction resulting in disruption to helicopters using HMRs, considered alongside other Tier 1 projects has not been assessed. Further consultation is to be held with the operators of the platforms to the north of the Hornsea Three array area, their helicopter service providers and NATS to validate the alternative route options to enable the assessment. The impact assessment will be provided within the Environmental Statement which will be submitted in Quarter 2 of 2018.

8.17 Next steps

8.17.1.1 Further consultation is required to better refine the impacts related to the aviation requirements of oil and gas operations. This consultation shall continue during the preparation of the final Environmental Statement such that the most up to date information can be used within the assessments. Ongoing consultation is planned with Centrica to define the operational requirements of their licenced acreage. Consultation is planned with the helicopter service provider for Centrica (CHC) who presently fly to the Markham complex platforms to refine the assessments on access to the Centrica licenced acreage.

8.17.1.2 Further consultation is proposed with NATS and helicopter operators flying the HMR route 3 to refine the cumulative assessments of the effect of Hornsea Three on HMRs.

Table 8.17: Summary of potential environment effects, mitigation and monitoring.

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Construction Phase							
Construction activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	The DIO will be kept informed of the nature and timing of construction activities. This will be implemented through the appropriate distribution of Notices to Mariners.	Minor	Medium	Minor (not significant in EIA terms)	None	n/a	None
Installation of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.	The UK Hydrographic Office (UKHO) will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of construction and the maximum height of any construction equipment to be used, prior to the start of construction, to allow inclusion on Aviation Charts. An ERCoP will be in place for the construction, phase. The ERCoP will detail specific marking and lighting of the wind turbine generators. The requirements for lighting on offshore obstructions is contained in CAP 393 (Article 223) (CAA, 2016a), CAP 764 (CAA, 2016c) and CAP 437 (CAA, 2016b) including to support helicopter hoist operations at the wind farm. The lighting shall meet the current CAA requirements and also be consulted on with MOD and MCA for any additional requirements.	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None
Hornsea Three helicopter operations may affect the available airspace for other users.	Once a helicopter operator/s is selected to service Hornsea Three they will be advised by the Applicant to consult with the NATS Anglia unit in order to fully discuss their intentions and operational requirements.	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None
Operation Phase							
Maintenance activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	During the operation phase the DIO will be kept informed of maintenance vessel activity through regular Notices to Mariners.	Minor	Medium	Minor (not significant in EIA terms)	None	n/a	None
Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.	The UK Hydrographic Office (UKHO) will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of construction and the maximum height of any construction equipment to be used, prior to the start of construction, to allow inclusion on Aviation Charts. An ERCoP will be in place for the operation phase. The ERCoP will detail specific marking and lighting of the wind turbine generators. The requirements for lighting on offshore obstructions is contained in CAP 393 (Article 223) (CAA, 2016a), CAP 764 (CAA, 2016c) and CAP 437 (CAA, 2016b) including to support helicopter hoist operations at the wind farm. The lighting shall meet the current CAA requirements and also be consulted on with MOD and MCA for any additional requirements.	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Wind turbines and hoist operations will form an aerial obstruction resulting in disruption to cross-zone transit helicopter traffic.	During the operational phase, the Hornsea Three operator will issue, as necessary, requests to the UK Aeronautical Information Service to submit NOTAMS in the event of any failure of aviation lighting. An ERCoP will be in place for the operation phase. The ERCoP will detail specific marking and lighting of the wind turbine generators. The requirements for lighting on offshore obstructions is contained in CAP 393 (Article 223) (CAA, 2016a), CAP 764 (CAA, 2016c) and CAP 437 (CAA, 2016b) including to support helicopter hoist operations at the wind farm. The lighting shall meet the current CAA requirements and also be consulted on with MOD and MCA for any additional requirements.	Moderate	Low	Minor (not significant in EIA terms)	None	n/a	None
Hornsea Three helicopter operations may affect the available airspace for other users.	Once a helicopter operator/s is selected to service Hornsea Three they will be advised by the Applicant to consult with the NATS Anglia unit in order to fully discuss their intentions and operational requirements in regard to ATC.	Moderate	Low	Minor (not significant in EIA terms)	None	n/a	None
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Schooner A and Ketch platforms (Faroe Petroleum).	None	No impact (Schooner A platform) Minor (Ketch platform)	Low (Ketch platform)	Minor (Ketch platform) (not significant in EIA terms)	None	n/a	None
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Chiswick, ST-1, J6A/J6A-CT and Grove platforms (Centrica)	None	Minor	High (Chiswick, J6A/J6A-CT and Grove platforms) Low (ST-1 platform)	Minor (not significant in EIA terms)	None	n/a	None
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Windermere platform (INEOS).	None	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None
Wind turbines will form a physical obstruction and may disrupt helicopter access including requirements for decommissioning to the Carrack QA platforms (Shell).	None	No impact	No Impact	No impact	None	n/a	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Wind turbines will form an aerial obstruction and may disrupt helicopter access to drilling rigs and operational vessels for access to subsea infrastructure and wells.	Continued consultation with OGA and oil and gas operators and licensees will promote and maximise cooperation between parties and minimise both spatial and temporal interactions between conflicting activities.	Negligible (43/30b, 48/5a, 44/29b, 44/30a, k04a, J03a, K07, 49/6, 49/12, 49/13, 49/14, 49/15, 44/28b, 49/10b, 49/10c, 49/4c, 49/5a, 49/5b, 49/5c, 49/10d, J03b and J06, 49/14b, 49/15a, J09, 44/26, 44/30, 49/1, 49/5); Minor (44/26a, 49/10a, 49/4a, 44/27, 49/1a, 49/9a, 44/28, 44/29, 49/7, 49/8, 49/10); and Moderate (49/3, 49/4d, 49/9c, 49/9d, 49/4b, 49/2a, 49/9b, 49/8a, 49/2, 49/4, 49/9).	Negligible for the unlicensed blocks; Low for the operators Faroe Petroleum, Third Energy, Engie UK, Engie Netherlands, INEOS, Shell, Total UK, Total Netherlands and NAM; Hold for the operator Centrica.	Negligible (not significant in EIA terms) for the unlicensed blocks (44/26, 44/28, 44/29, 44/30, 49/1, 49/2, 49/4, 49/5, 49/6, 49/7, 49/8, 49/9, 49/10, 49/12, 49/13, 49/14, 49/15) and for the operators Faroe Petroleum (44/26a, 44/28b) Engie UK (44/29b, 44/30a) Shell (49/9a, 49/14b, 49/15a), Third Energy (44/27), INEOS (49/1a), Total Netherlands (K04a) and NAM (J03a, K07, J09) and Minor (not significant in EIA terms) for the operators INEOS (49/2a, 49/9b) and Shell (49/8a). Hold for Centrica licences	None	n/a	None
Wind turbines may disrupt radar coverage of NATS Claxby PSR and Military ADR located at Staxton Wold and Trimmingham and may interfere with existing offshore microwave and other communication links.	None	No impact for NATS Claxby PSR and Staxton Wold ADR, and microwave and communication links. Minor for Trimmingham ADR.	No impact for NATS Claxby PSR and Staxton Wold ADR and microwave and communication links. Low for Trimmingham ADR.	No impact for NATS Claxby PSR and Staxton Wold ADR and microwave and communication links. Minor for Trimmingham ADR (not significant in EIA terms).	None	N/a	None
Decommissioning Phase							
Decommissioning activity and associated vessel movements may interfere with operations within the Military Practice Area located in the Outer Silver Pit area.	The DIO will be kept informed of the nature and timing of decommissioning activities. This will be implemented through the appropriate distribution of Notices to Mariners.	Minor	Medium	Minor (not significant in EIA terms)	None	n/a	None
Removal of Hornsea Three infrastructure will form an aerial obstruction resulting in disruption to helicopters using HMRs.	The UK Hydrographic Office (UKHO) will be informed of the locations, heights and lighting status of the wind turbines, including estimated and actual dates of construction and the maximum height of any construction equipment to be used, prior to the start of construction, to allow inclusion on Aviation Charts. An ERCoP will be in place for the decommissioning phase. The ERCoP will detail specific marking and lighting of the wind turbine generators. The requirements for lighting on offshore obstructions is contained in CAP 393 (Article 223) (CAA, 2016a), CAP 764 (CAA, 2016c) and CAP 437 (CAA, 2016b) including to support helicopter hoist operations at the wind farm. The lighting shall meet the current CAA requirements and also be consulted on with MOD and MCA for any additional requirements.	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None

Description of impact	Measures adopted as part of the project	Magnitude of impact	Sensitivity of receptor	Significance of effect	Additional measures	Residual effect	Proposed monitoring
Hornsea Three helicopter operations may affect the available airspace for other users.	Once a helicopter operator/s is selected to service Hornsea Three they will be advised by the Applicant to consult with the NATS Anglia unit in order to fully discuss their intentions and operational requirements in regard to ATC.	Minor	Low	Minor (not significant in EIA terms)	None	n/a	None

8.18 References

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