**THE INFRASTRUCTURE PLANNING (EXAMINATIONS PROCEDURE) RULES 2010**

**HORNSEA PROJECT FOUR OFFSHORE WIND FARM**

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# WRITTEN REPRESENTATION ON BEHALF OF NEO ENERGY (SNS) LIMITED

**and**

# ANSWERS TO THE EXAMINING AUTHORITY'S FIRST SET OF QUESTIONS (ExQ1)

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**WRITTEN REPRESENTATION ON BEHALF OF NEO ENERGY (SNS) LIMITED**

## 1. INTRODUCTION

1.1 NEO Energy (SNS) Limited ("**NEO**") (Company Number SC291165 and having its registered office at The Silver Fin Building (9th Floor), 455 Union Street, Aberdeen, United Kingdom, AB11 6DB) owns and operates oil and gas assets located in the UK Continental Shelf, including the Southern North Sea. NEO owns and operates the producing Babbage Field (the "**Babbage Field**"), which is located 4.3km from the site which is the subject of an application by Orsted (the "**Applicant**" or "**Orsted**") for a development consent order ("**DCO**") for the Hornsea Project Four Offshore Wind Farm (the "**Development**").

1.2 NEO Energy (SNS) Limited ("**NEO**") made a relevant representation in this matter on 15 December 2021 in order to protect the Babbage Field. NEO does not object in principle to the Development; however, it does object to the Development being carried out in close proximity to the Babbage Field unless and until suitable protective provisions, and related agreements regulating the position, have been secured to their satisfaction.

1.3 NEO holds a seaward production licence (no. P.456) under the Petroleum Act 1988 and is required to comply with the terms of its licence in the delivery of its statutory responsibility. NEO, and its joint venture partner Dana Petroleum (E&P) Limited, in collaboration with Offshore Design Engineering Limited ("**ODE**"), as Duty Holder, Installation and Pipeline Operator, must ensure that its activities and assets continue to operate safely.

1.4 NEO maintains that, in the absence of suitable protective provisions and secured mitigation, the Development will adversely impact its ability to operate the Babbage Field in a safe and efficient manner and in compliance with the terms of its licence on the following grounds:

1.4.1 aviation (helicopter) impacts; and

1.4.2 shipping and navigation impacts.

1.5 Additionally, the Development may prejudice future exploration of oil and gas resources from, and future development at, the Babbage Field, which prevents NEO from meeting its central obligations under the Oil & Gas Authority ("**OGA**") Strategy, namely:

1.5.1 taking the necessary steps to secure that the maximum value of economically recoverable oil and gas is recovered from UK waters; and

1.5.2 taking appropriate steps to assist the Secretary of State in meeting the Net Zero target.

1.6 NEO has also responded to the Examining Authority's first set of questions ("**ExQ1**") at section 8 below.

## 2. THE BABBAGE FIELD

2.1 The Babbage Field is located in licence P.456 Block 48/2 as shown in Figure 1. This area is governed by the Babbage joint operating agreement ("**JOA**"). NEO is Licence Operator for the Babbage hub and owns 60% equity with partner Dana owning the remaining 40% in the Joint Venture ("**JV**").

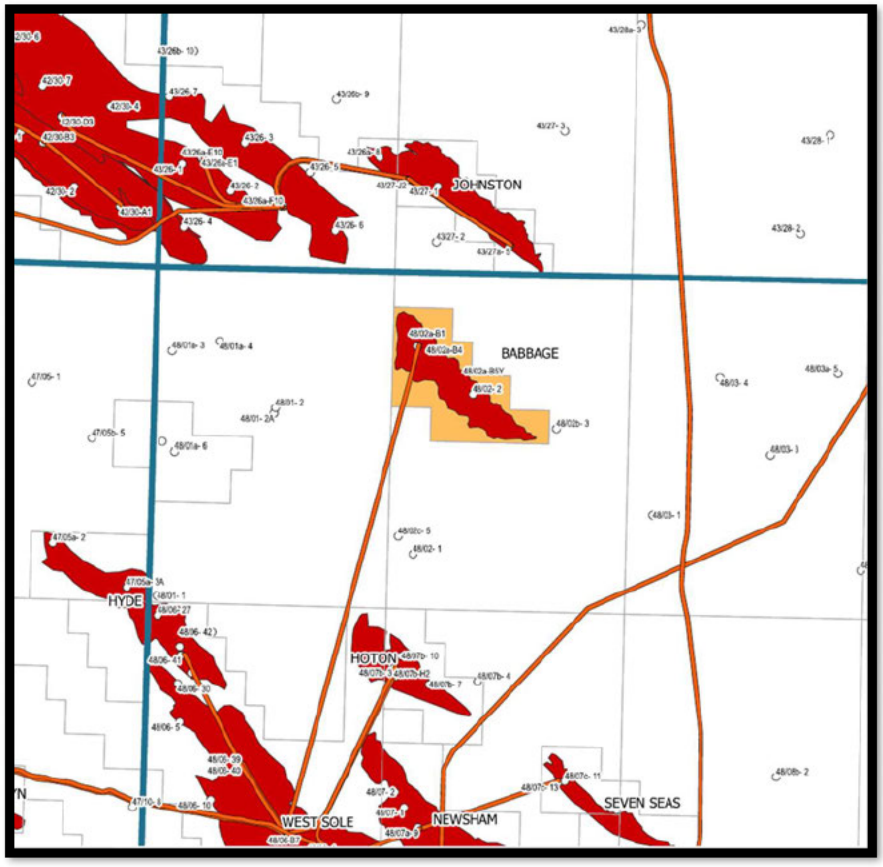


*Figure 1 - Licence Area Map*

2.2 The Babbage Field is in the northwest area of the UK Southern North Sea ("**SNS**"), approximately 80 km northeast of Dimlington (Easington) as shown in Figure 2. It is located in the Sole pit sub-basin of the southern Gas Basin in a water depth of 40-45 m. The nearest platforms are Ravenspurn North ~12 km to the north west, and West Sole Bravo platform ~28 km to the south east.

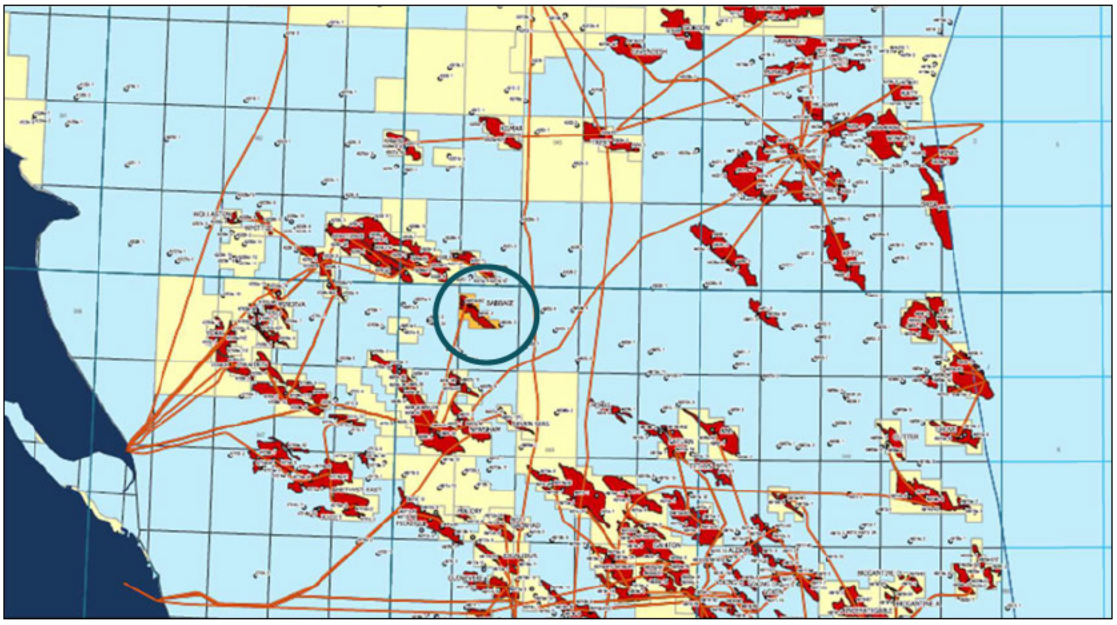

*Figure 2 – Map showing Babbage field location*

2.3 As referenced at 1.3 above, NEO use an Operated-outsourced model for Babbage with ODE as Duty Holder, Installation and Pipeline Operator, responsible for all operations and maintenance activities under an Integrated Services Agreement. Fraser Well Management are Well Operator, responsible for well integrity and maintenance activities under a Well Services Agreement (see summary in Table 1).

**Table 1: Babbage Asset Operating Model**

| Installation | Licenced Operator | JV Partners | Installation Operator | Pipeline Operator | Well Operator |
|---|---|---|---|---|---|
| Babbage | NEO ENERGY | dana PETROLEUM | ode | ode | Fraser |

2.4 The Babbage Field was developed by means of horizontal production wells in 2009 and production has been online since 2010 and produced 137 bcf of sales gas as of year end 2021. The Babbage Field is expected to produce in the range of ~3000 boe/d (17 mmscf/d) on average during 2022. There are five production wells (48/2a-B1, 48/2a-B2z, 48/2a-B3, 48/2a-B4 and 48/2a-B5y) currently producing gas, together with four spare well slots available for future expansion.

2.5 Produced gas is exported via a 28km, 12" pipeline to the West Sole Bravo subsea tie-in structure which is tied back to the West Sole System (see Figure 1). From here, the gas enters a 68km, 24" pipeline to Perenco Easington Terminal and flows onwards to Dimlington Gas Terminal for processing to National Grid specifications before export into the National Transmission System.

2.6 The Babbage platform (Figure 3) was initially operated as a manned facility in support of well hydraulic fracturing and clean-up operations of the drilled platform wells. In early 2017 the platform transitioned to a Not Permanently Attended Installation ("**NPAI**"), and maximum personnel on board ("**POB**") is 30. Planned intervention visits to perform maintenance and production optimisation activities are undertaken approximately once a month by ODE as Installation Operator. The platform is operated from the remote control room based at Perenco Dimlington Terminal.

2.7 The topsides consist of three levels and contain test separation, metering and export facilities. In addition to this, there is power generation onboard, crane and helideck along with utilities and accommodation for thirty people. Within its context, the platform has minimal environmental impact (local venting only, no flare, low power requirements, water exported with gas) with carbon intensity significantly below the OEUK average.


*Figure 3: Babbage Platform*

## 3. LEGISLATIVE AND REGULATORY FRAMEWORK

3.1 As the holder of a licence under the Petroleum Act 1998 (the "**Act**"), NEO is required to comply with the terms of its licence in the delivery of its statutory responsibility. NEO, and its joint venture partner Dana Petroleum (E&P) Limited, in collaboration with ODE as Duty Holder, Installation and Pipeline Operator, must ensure that its activities and assets continue to operate safely.

3.2 The oil and gas industry is highly regulated, with operators required to comply with obligations under health and safety legislation, offshore safety regulations and environmental legislation, amongst others.

3.3 The Health and Safety at Work etc Act 1974 places general duties on all employers to ensure, so far as is reasonably practicable, the health and safety of their employees and of others who might be affected by their undertaking. Accordingly, NEO, together with its JV and operational partners, has a duty to ensure that any risks associated with the operation of the Babbage Field are "as low as reasonably practicable" both for its own employees as well as any others who might be affected.

3.4 This duty must be read in the context of the wider body of offshore safety legislation, including the Offshore Installations and Pipeline Works (First-Aid) Regulations 1989, the Offshore Installations (Prevention of Fire and Explosion, Emergency Response) Regulations 1995, the Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995, and the Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015.

3.5 In terms of these regulations, an operator must, *inter alia*:

3.5.1 demonstrate that they have the ability and means to control major accident risks effectively in a safety case accepted by HSE;

3.5.2 operate an installation in compliance with arrangements described in the current safety case;

3.5.3 maintain the integrity of an installation's structure, process plant, temporary refuge and all other equipment;

3.5.4 maintain the integrity of wells and pipelines throughout their lifecycle; and

3.5.5 prepare a plan for dealing with an emergency should one occur.

3.6 At a policy level, the current Overarching National Policy Statement for Energy ("**EN-1**") sets out the need for more oil and gas infrastructure and a diverse range of oil and gas supply capacity.[1] In respect of gas supplies, it is noted that, while secure gas supplies have been assured in the past, production of gas from the UK Continental Shelf is in decline, with the UK expected to remain a net importer in future as demand outstrips supply. EN-1 states that "although our reliance on fossil fuels will fall, the transition will take some time, and gas will continue to play an important part in the UK's fuel mix for years to come."[2]

3.7 Draft National Policy Statements for Energy were issued for consultation in September 2021. These recognise the further move away from fossil fuels, although the drafts still emphasise the ongoing roles that oil and gas will play in energy usage and the transition to Net Zero:

> "The use of unabated natural gas and crude oil fuels […] will still be needed during the transition to a net zero economy. This will enable secure, reliable, and affordable supplies of energy as we develop the means to address the carbon dioxide and other greenhouse gases associated with their use, including the development and deployment of low carbon alternatives. The UK's oil and gas sector recognises the demand for oil and gas will be much reduced in the future, but also recognise the key role that it can play in helping the UK meet its net zero commitment. […] Some limited residual use of unabated natural gas and crude oil may even be needed beyond 2050 to meet our energy objectives."[3]

3.8 Additionally, National Policy Statement for Renewable Energy Infrastructure ("**EN-3**") sets out the principles which should govern the co-existence of offshore wind with other offshore activities. Where a proposed offshore wind farm potentially affects other offshore infrastructure or activity, the Secretary of State should take a pragmatic approach which expects the offshore wind promoter to "minimise negative impacts and reduce risks to as low as reasonably practicable."[4]

3.9 Further, the Secretary of State should "not consent applications which pose unacceptable risks to safety after mitigation measures have been considered" and should give substantial weight to any adverse effects on the "future viability or safety" of existing offshore infrastructure or activities.[5] As discussed below, it is NEO's position that, in the absence of suitable protective provisions and secured mitigation, the Development will impact its ability to operate the Babbage Field in a safe and efficient manner and will have an adverse effect on the future viability of the Babbage Field.

3.10 Under section 9A of the Act, the OGA is required to prepare a strategy enabling the "principal objective," which is to maximise the economic recovery of UK petroleum, to be met (the "**OGA Strategy**"). The OGA Strategy was revised on 11 February 2021, with amendments made to the previous strategy (the "MER UK Strategy") to reflect the transition to Net Zero and the role which the oil and gas industry can play in assisting the Secretary of State to meet the Net Zero by 2050 target.

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[1] Sections 3.8 and 3.9.

[2] Para. 3.8.1

[3] Draft Overarching National Policy Statement for Energy (EN-1), paras. 2.3.8-2.3.9.

[4] Para. 2.6.183.

[5] Paras. 2.6.184-2.6.185.

3.11 The OGA Strategy sets out a "central obligation" which is binding on relevant persons, including owners and operators of oil and gas infrastructure, to:

3.11.1 take the necessary steps to secure that the maximum value of economically recoverable oil and gas is recovered from UK waters; and

3.11.2 take appropriate steps to assist the Secretary of State in meeting the Net Zero target.

3.12 The OGA Strategy also sets out supporting obligations and required actions, which are binding on relevant persons, including:

3.12.1 the licensee of an offshore licence must apply good and proper governance at all times;

3.12.2 the owners and operators of infrastructure must ensure that it is maintained in such a condition and operated in such a manner that it will:

(a) achieve optimum levels of performance, including production efficiency, energy efficiency and cost efficiency, for the expected duration of production;

(b) reduce as far as reasonable in the circumstances greenhouse gas emissions resulting from sources such as flaring and venting, and power generation; and

(c) achieve optimum potential for the reuse or re-purpose of that infrastructure taking account of the Secretary of State meeting the net zero target, taking into consideration the stage of field, reservoir and asset development, technology and geological constraints;

3.12.3 the owners and operators of infrastructure must ensure that it is operated in a way that facilitates the recovery of the maximum value of economically recoverable petroleum; and

3.12.4 relevant persons must, where there is, or is a reasonable prospect of, any such project being developed, have due regard to carbon capture and storage projects when complying with their obligations under the OGA Strategy including:

(a) collaborating with those persons planning and carrying out carbon capture and storage projects;

(b) negotiating access to infrastructure for carbon capture and storage projects in a timely fashion and in good faith; and

(c) permitting access to the relevant infrastructure to be used for the carbon capture and storage projects on fair, reasonable and non-discriminatory terms.

## 4. AVIATION

4.1 NEO are in ongoing discussions with the Applicant to understand the impact of the Development on helicopter operations to the Babbage Field. It is clear that given the proximity of the Babbage Field to the Development (2.3nm (4.3km)), as shown in Figure 4, helicopter operations are almost certain to be affected.

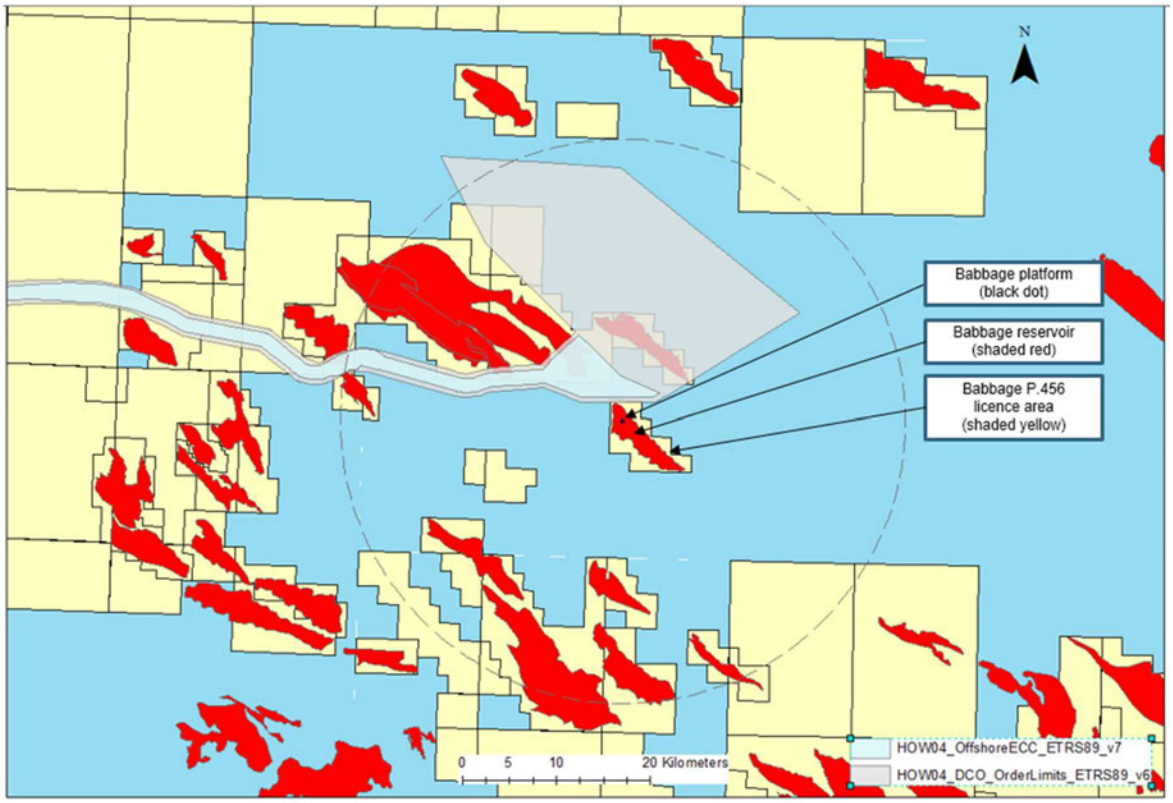


*Figure 4: Map showing the Babbage Field in relation to the Hornsea Four proposed array (Black dot is Babbage platform, dashed circle is 30 km radius from the platform, grey shaded area is Hornsea Four DCO Order Limits as per Orsted shape file data for Hornsea Four project received in February 2021)*

4.2 NEO relies on helicopter access to the Babbage platform for both routine operational matters and emergency evacuations[6], including search and rescue helicopter access.

4.3 Helicopter visits are required in order to carry out essential maintenance work to ensure the safety of the asset and efficient operations and production. Alternative methods of accessing the platform such as the use of "walk to work" vessels would require capital modifications to the platform and result in increases in annual operating expenditure associated with chartering such vessels. This would also be a fundamental change to the current operating and maintenance philosophy and change to the Safety Case[7]. The response times in the event of unplanned production shutdowns would be longer than were it possible to fly personnel to the platform and as a result there would be reductions in annual production. The combination of reduced production revenues, higher operating costs (therefore lower margins) and the need for capital investments could render the remaining production uneconomic and lead to an early cessation of production. Such an outcome would be contrary to MER UK.

[6] For completeness, NEO notes that emergency response is beyond the scope of the Helicopter Access Report and the assessment carried out by the Applicant as part of the Environmental Statement.

[7] The Safety Case is a substantial document that identifies any Major Accident Hazards (MAH) affecting the facility and operations and for each such MAH identifies mitigation measures in order to reduce the risk to ALARP. The Safety Case also includes the overall Safety Management System including all policies and procedures governing work. As noted at section 3 above, the Safety Case is a requirement imposed on licence holders by various legislation, including the Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015.

4.4 Ideally, the windfarm would be located at least 7 nautical miles from the Babbage platform. NEO is engaging with the Applicant regarding possible solutions to accommodate the Development. However, NEO wish to ensure that the minimum distance to the nearest turbine is sufficient to:

4.4.1 ensure that the one engine inoperative ("**OEI**") manoeuvre can be safely executed using the industry standard procedures that SNS helicopter operators train and maintain, and

4.4.2 that the number of flights to the asset is not substantially increased.

4.5 To meet these requirements, a minimum distance of 7 nautical miles is generally required as per the industry standard.[8] This distance differs to that presented by the Applicant in its Helicopter Access Report[9] for the following reasons, as evidenced by the expert technical reports prepared in response to the Applicant and included as Appendices A and B to these written representations[10]:

4.5.1 Use of Supplement 97 Enhanced Offshore Profile

(a) The Applicant considers the use of the Supplement 97 Enhanced Offshore Profile to be valid for the Babbage Field. However, no operator in the UK SNS uses the enhanced profile as prescribed in Supplement 97 of the AW139 RFM.

(b) Similarly, the alternative one-engine inoperative (OEI) profile proposed would be a fundamentally different normal, and OEI, profile to the industry standard procedures that SNS operators train and maintain. NEO are aligned with helicopter operators in that NEO would be extremely reluctant to make a major change to offshore normal and emergency procedures, with the associated safety implications/considerations.

(c) NEO would therefore reject the use of this single path OEI profile, in favour of the currently practised 2 path OEI profile. Subsequently, the take-off and turn distances required from Babbage in Table 3.11 (pg. 34/35 of Platform Specific Data report) are not deemed acceptable for the Babbage Field and should be disregarded.

4.5.2 Helicopter Payload Assumption resulting in Additional Flights

(a) Table 3.10 (pg. 32/33 of Platform Specific Data report) considers a take-off and turn distance required from Babbage on the basis of a payload of 6,400 kg and 6.800 kg.

(b) NEO consider that the payload basis of 6,400 kg is inappropriate as an assumption in this calculation as this would have an impact on risk and cost for the Babbage Field.

(c) Helicopter weight at take-off from Norwich can be 7,000 kg, dropping to 6,800 kg for landing at Babbage (in line with the helideck weight limit) once fuel burned is accounted for. Therefore, conservatism is already being applied in the weight being used in the calculation by reducing helicopter weight

[8] NEO considers that there may be scope for this minimum distance to reduce and will continue to discuss with the Applicant with a view towards reaching agreement.

[9] APP-087; Hornsea Project Four: Environmental Statement (ES), Appendix A of ES Annex 11.1: Helicopter Access Report, A4481-ORS-TN-01 Rev 09, Tables 3.10 and 3.11.

[10] Appendix A (Response to Helicopter Access Report, 24-02-21) and Appendix B (Response to Helicopter Access Report rev 9, 16-09-21).

assumption from 7,000 kg to 6,800 kg which NEO feel is a reasonable compromise.

(d) A further reduction in payload of 400 kg, reducing it from 6,800 kg to 6,400 kg, is significant as this is equivalent to a reduction in passenger numbers from approximately 12 to 8.

(e) This would lead to a likely increase in the number of flights required each time the platform is manned and de-manned, and additional flights would add to the risks to which personnel are exposed. Although helicopters are a very safe mode of travel, they nevertheless constitute one of the riskier aspects of working offshore and accordingly NEO seeks to reduce rather than increase such risks.

(f) Additional flights would also be likely to extend the duration of offshore trips due to the time involved in landing and take-off of an increased number of helicopters, which all has to be managed by the core crew trained in this specialist area. Additional flights would also result in an associated cost increase from a logistics and manning perspective.

(g) In addition, as the Babbage platform does not have an automatic firefighting system fitted, the number of flights are limited to 120 landings per year in accordance with CAP 437 to reduce the exposure to risk. During current operations, NEO do not expect to reach this limit based on current operations, but this is an important requirement which drives the need to ensure that the number of flights to and from the platform is minimised, and therefore assuming additional flights will be required is not an acceptable basis for calculation.

4.5.3 Path 2 OEI Climb Assumption

(a) Table 3.10 (pg. 32/33 of Platform Specific Data report) considers a take-off and turn distance required from Babbage on the basis of a payload of 6,400 kg and 6.800 kg.

(b) NEO contend that the Path 2 OEI climb from 200ft to 1000ft should be calculated at the mid-point of the climb (600 ft) to determine the average rate of climb over 800ft, and the full value of the 10 kt wind should be applied, as the graph has already factored the wind. This results in an increase to the calculated total distance required from 3.03 nm to 3.14 nm.

4.5.4 Temperature assumption

(a) The calculation has been performed using a temperature assumption of 20°C, whereas this was previously agreed in a workshop to be 30°C[11]. Higher temperatures cause a reduction in the density of the air, resulting in lower aerodynamic performance. Additionally, higher temperatures result in reduced engine performance. The required distance increases by approximately 100 metres if the temperature assumption is 30°C as previously agreed. This would result in the overall required minimum distance being 3.20nm.

[11] APP-087; Hornsea Project Four: Environmental Statement (ES), Appendix A of ES Annex 11.1: Helicopter Access Report, A4481-ORS-TN-01 Rev 09, Clause 72, pg. 31

4.6 In the Helicopter Access Report,[12] the Applicant refers to the benefits of installing Limited Icing Protection Systems ("**LIPS**"). NEO believe this is of limited use and cost and payload implications are prohibitive, which is borne out by the fact that no airframe currently operating in the SNS has LIPS installed. The statements in the Helicopter Access Report (Section 8.2, clauses 99 and 100 (pg. 41)) are therefore not considered to be applicable to Babbage and such a system is not viewed as a solution which would increase the ability to fly to the asset in the presence of the windfarm.

4.7 The Helicopter Access Report is based on the assumption that the aircraft in use is the AW139 which is the best in class. In order to provide a rounded view, NEO believe that consideration should be given to aircraft types other than the AW139 as any report based solely on this airframe would likely provide insufficient safety margins for the use of other types which are required for flexibility in SNS operations.

4.8 In general, NEO believe that further consideration needs to be given to current proven methods employed by UK operators in the SNS along with a broader approach to encompass the use of other aircraft that also operate within the SNS, albeit with less frequency.

4.9 NEO would like to be clear that safety will never be compromised.

4.10 NEO intends to seek protective provisions to deal with these matters by way of an amendment to the DCO, if granted, to facilitate the co-existence of the Development with the Babbage Field. As discussed further at section 6 below, it is currently in discussions with Orsted regarding the proposed wording of such protective provisions.

## 5. SHIPPING AND NAVIGATION

5.1 ODE, as Duty Holder of the Babbage Field, have conducted a technical review of the Application and Environmental Statement[13] in so far as it relates to shipping and navigation impacts relevant to Babbage. The findings of this report, included as Appendix C to these written representations,[14] can be summarised as follows:

5.1.1 The key risk associated with the wind farm development is proximity and the Applicant has deemed this to be "Tolerable with Mitigation". In order to mitigate the risk:

(a) Live monitoring equipment (AIS) will be required on the Babbage platform – the costs (supply, installation and maintenance) associated with this would require to be paid for by the Applicant;

(b) Aids to Navigate ("**AtoN**") may be required by Trinity House. If so, Orsted will be responsible to arrange, install and maintain and the associated costs for such AtoN;

(c) The Applicant should approach the relevant authorities, and any recommendations to mitigate the navigation risks to the Babbage platform including appropriate notifications, emergency response arrangements, etc, should be implemented and paid by the Applicant.

[12] APP-087; Hornsea Project Four: Environmental Statement (ES), Appendix A of ES Annex 11.1: Helicopter Access Report, A4481-ORS-TN-01 Rev 09, Section 8.2, clauses 99 and 100 (pg. 41)

[13] APP-087; Hornsea Project Four: Environmental Statement (ES), Appendix C of ES Annex 11.1: Allision Technical Report, A4481-ORS-OGA-3 Rev 003b

[14] Appendix C (Babbage Platform Allision Avoidance, Document No. 384401-BAB-OPS-ODE-RP-MA-0001 Rev A, 18/06/2021)

(d) For the sake of clarity, any impact on Babbage that could not reasonably be foreseen at this stage, shall be to the account of the Applicant.

5.1.2 By increasing the distance between Babbage and the array, this risk could be further mitigated. However, it is recognised by NEO that a commercial solution is possible in this case and therefore in a collaborative and compromising manner, discussion is ongoing with the Applicant to reach a commercial solution.

5.1.3 Subject to the above commercial solution being agreed, and any new information being made available, NEO Energy does not have any objection from a marine perspective.

5.2 In further detail, the findings in the ODE Report following a review of the Application and Environmental Statement are as follows:

5.2.1 With regard to allision risk, Babbage is classified as a Tier 2 asset in Table 7.2 (pg. 42) with an increase of one vessel per day within 2 nm which is deemed by Orsted to be 'broadly acceptable'.

5.2.2 With regard to deviation risk, Babbage is classified as a Tier 2 asset in Table 8.1 (pg. 49) and the impact is deemed by Orsted to be 'broadly acceptable' on the assumption that the majority of vessels are from Lowestoft or Great Yarmouth, and as such will approach from the south. The potential for a limited impact to any vessels visiting from other ports is noted, however.

5.2.3 With regard to proximity risk, Babbage is classified as a Tier 2 asset in Table 8.2 (pg. 56) and the Orsted impact assessment concludes that the risk is "Tolerable with Mitigation". Orsted recognise in section 8.3.2.2, clause 129 (pg. 54) that ongoing liaison would be necessary to ensure cooperation in terms of simultaneous operations and appropriate protocols should therefore be agreed. By increasing the distance between Babbage and the array, this risk could be further mitigated.

5.2.4 The Babbage platform in its current configuration sits well within the boundaries of acceptable navigational and notification of position limitations as set out by the authorities and is in line with best industry standard practice.

5.2.5 The addition of a large wind farm operated by others near Babbage places the obligation and responsibility of mitigation to ALARP with the Applicant (Orsted). Any requirement for additional AtoN shall be addressed directly by Orsted. Moreover, ODE-AM shall reserve the right of appeal if not satisfied with the outcome.

5.2.6 It is not the responsibility of NEO or ODE-AM to install navigation aides to enhance a sea-lane or to mark an exclusion area. If it is deemed required by Trinity House, then the provision and ongoing maintenance of same will be entirely to the Applicant's account.

5.2.7 Orsted have been in consultation for three years to date and the authorities are aware of the plans. The guidance makes it clear that the addition of live monitoring equipment (AIS), is recommended and addresses ALARP, they will be required to meet installation and maintenance costs for the life of the project.

5.2.8 Trinity House are the applicable General Lighthouse Authority (GLA) and in the UK Navigation Directorate for England and Wales, (Trinity House) instructions: "Provision and Maintenance of Local Aids to Navigation Marking Offshore Renewable Energy Installations", make it clear that:

(a) The responsibility to state Availability Targets for local AtoN established to mark renewable energy installations rests with them.

(b) These availability targets are based on IALA guidelines and will normally form part of the consent issued to the developer/operator by the appropriate consenting authority.

(c) The responsibility to accomplish these availability targets and lay down response priorities for the individual AtoN to achieve these targets rests with the developer/Operator.

5.2.9 With reference to the IALA International Association of Marine Aids to Navigation and Lighthouse Authorities) O-139 The Marking of Man-Made Offshore Structures above, ODE-AM as Duty Holder has satisfied itself that the current markings satisfy the safety case regulations as per current plan. However, it shall be noted that the introduction of a wind park in proximity of Babbage platform introduces additional risks requiring mitigation to reduce to ALARP.

5.2.10 MCA Marine Guidance Note MGN 543 (M+F) Annex 4 states that: Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the Environmental Impact Assessment (EIA). The specific measures to be employed will be selected in consultation with the MCA's Navigation Safety Branch and will be listed in the developer's Environmental Statement (ES)" Annex 4 of this document provides recommendations for appropriate notifications; of those provided, the most suitable potential options for Babbage platform are:

(a) Promulgation of information and warnings through notices to mariners and other appropriate maritime safety information (MSI) dissemination methods.

(b) Safety zones of appropriate configuration, extent, and application to specified vessels.

(c) Designation of the site as an area to be avoided (ATBA).

(d) Provision of AtoN as determined by the GLA.

(e) Implementation of routeing measures within or near to the development.

(f) Monitoring by radar or AIS.

(g) Creation of an Emergency Response Cooperation Plan with the MCA's Search and Rescue Branch for the construction phase onwards

(h) MGN 543 is specifically written to provide appropriate guidance to renewable energy operators and the above recommendations (Annex 4) would be within the remit of the wind energy developer to provide.

5.2.11 Of the above options, the significant majority are essentially revisions to existing charts, and the provision of notices to mariners. Three required physical additions in terms of equipment, management, and maintenance are as follows:

(a) The first is emergency response arrangements and for now NEO must assume this is in the process of being worked up.

(b) Second has already been covered above, i.e., should Trinity House decide AtoN are required, then this will be for the Applicant to arrange, install and maintain.

(c) Finally, monitoring by Radar or AIS would be the only addition to the Babbage platform required. Given the findings of the Allision report, it is a recommendation, however in accordance with the MCA guidance and the current platform Safety Case, as this aide is required to mitigate the new risk, the costs associated with this would sit with the Applicant.

5.3 In conclusion, subject to a commercial solution being agreed which ensures appropriate mitigation of the additional risk introduced by the wind farm, and any new information being made available, NEO does not have any objection from a marine perspective. However, it is noted that increasing the distance between the Babbage platform and the wind farm would mitigate the proximity risk which is currently assessed by the Applicant as being 'tolerable with mitigation'

## 6. FUTURE PROJECTS

6.1 The Strategy vision statement for the Babbage Hub notes that: "*The Babbage JV will strive to maximise economic recovery of the Babbage field through safe, efficient and optimised operations to allow the life of the asset to be maximised through innovation and being open to Third Party business*."

6.2 NEO are committed to investing in the asset to improve operational efficiency, reduce emissions and enhance production. The wind farm presents the following challenges which should be considered, these are longer term and of a more strategic nature, compared to the more immediate helicopter and marine aspects which have been the main focus of discussions with Orsted up to this point.

6.2.1 Decommissioning activities may be impacted in terms of logistics e.g. accessibility for platform removal & well P&A.

6.2.2 Near-field developments – development of any near-field targets may not be possible due to being unable to acquire further seismic data and/or being unable to access targets due to wind farm array

6.2.3 Third party tieback options could be reduced due to location of wind farm impeding pipeline routing for example. Non-disclosure agreements are in place with two third parties interested in producing via the Babbage and there are other potential field tieback opportunities identified in the area.

6.2.4 Wind farm could prevent future reuse of Babbage infrastructure e.g. for carbon capture & storage (CCS).

## 7. PROTECTIVE PROVISIONS

7.1 NEO considers it necessary for the protection and continued safe operation of the Babbage Field that protective provisions be included within the DCO, and it has commenced discussion with Orsted as to the content and form of proposed protective provisions. It is NEO's position that these protective provisions are necessary and reasonable to avoid an adverse impact on and serious detriment to NEO's existing (and future) operations and to ensure that the Babbage Field can be operated safely and in compliance with all regulatory and licence obligations.

7.2 Separate discussions with Orsted are ongoing with a view towards reaching a commercial agreement that would further mitigate the impacts of the Development on the Babbage Field. As this engagement continues, it may be that NEO can reach an appropriate agreement with Orsted which would allow it to withdraw some (or all) of its objection to the Development.

## 8. RESPONSE TO EXAMINING AUTHORITY QUESTIONS

8.1 In response to the Examining Authority's first set of questions (ExQ1), NEO would note:

8.1.1 ExQ1 INF.1.12 (Notification Period):

(a) NEO's position is that a minimum of 14 days' notice of installation activities during construction is insufficient and that a period of 28 days' notice would be more reasonable and realistic, as well as more aligned with industry standard.

(b) As noted above in NEO's written representations (at paragraph 2.3 and Table 1), the operating model for the Babbage Field involves various parties, including NEO as licensed operator, Dana Petroleum as JV partner, ODE as Duty Holder, Installation and Pipeline Operator, and Fraser Well Management as Well Operator.

(c) A notification period of 14 days would give insufficient time for NEO to notify other parties involved with the Babbage Field and for other parties to respond to the notification and take any required actions in connection with the installation activities. 28 days would provide a more reasonable period.

8.1.2 ExQ1 INF.1.13 (Emergency Activities):

(a) NEO refers to its written representations (as above).

**CMS Cameron McKenna Nabarro Olswang LLP**

**29 March 2022**

## Appendix A

## Response to Helicopter Access Report, 24-02-21

[redacted]

www.[redacted]be

23rd February 2021

**[redacted] Report on Anatec Helicopter Access Report Version A**

Upon consideration of the Helicopter Access Report (HAS) prepared for Orsted by Anatec, there are two areas identified by [redacted] which warrant further discussion.

Section 5.5 of the report deals with calculation of the take-off distance required in the event of one engine inoperative (OEI) and the subsequent climb to 1000ft prior to turning.

The enhanced profile used pertaining to supplement 97 of the A139 RFM, is not to our knowledge used by any operator in the southern North Sea (SNS). Reasons for this vary, however it allows for departures of aircraft with a maximum all up mass of above 6.8 tonnes up to and including 7 tonnes, hence is of most benefit for this (latest) 7 tonne model of the A139. [redacted] is currently the only operator of this type in the SNS. Amongst other aspects of the profile, it is currently not used due to the requirement for 25%PI (power) available prior to lift, and the need for a protracted nose down attitude upon departure from an elevated installation. The profile used by all operators, and which has been used since the introduction of the A139 to the SNS, is laid out in supplements 12 and 50 of the A139 RFM. Calculations made by us at [redacted] demonstrate that the distance required to climb to 1000ft from the Babbage is approximately 0.5nm further than that calculated in the HAS, and it is this distance of 1.93nm (not 1.42nm) that should be used when considering the effect of the proposed wind turbine farm on flight operations to the Babbage.

This finding was discussed with Mark Prior in a meeting with myself on 15 January, and resulted in my gaining access to the HAS. At the time Mark suggested that the hover out of ground effect (HOGE) needed to be considered when using the standard offshore departure profile. [redacted] have been granted authority by the UK CAA to operate to performance class 2 enhanced (PC2E) criteria. As such HOGE is not required to be calculated as there is no planned exposure time for this procedure as specified in section 9 of the A139 RFM. Despite this we did make a calculation for HOGE using the same environmental model as that employed in the HAS. At 30 degrees C with 10 knots of headwind, HOGE limited the maximum take off weight of the A139 to 6750kg, 50kg short of the maximum useable payload for the Babbage. For temperatures below 25 degrees C, HOGE no longer had a limiting effect, and therefore would likely be no factor for most climatic conditions found in the North Sea.

The second aspect of the HAS that needs to be considered closely, relates to section 8.2 helicopter icing. It is accepted that raising the minimum safe altitude

[redacted]

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from 1500ft to 2300ft will increase the period of the year in which icing will become a limiting factor on flights to the Babbage. In mitigation the HAS suggests the limited icing protection be fitted to the A139. At present to my knowledge, no operators have this system fitted to any of their aircraft flying the SNS, furthermore, after discussion with my opposite number at Bristow, they estimate the cost of fitting such a system to the airframe to be in the region of £600,000, per aircraft. There would also be weight penalties to consider with the retrofit, increasing fuel consumption by approximately 55kg/hr, and reducing rates of climb by 600 to 1050 feet per minute which would in turn affect calculations made in section 5 of the HAS.

Finally, supplement 76 of the A139 RFM clearly states that a 500ft band of positive air (temperature above 0 degrees C) is still required for aircraft fitted with LIPS. This requirement is no different or any less limiting than those aircraft not fitted with LIPS.

Yours Sincerely

[redacted]

Chief Pilot

[redacted]Norwich

[redacted]

[redacted]

## Appendix B

## Response to Helicopter Access Report rev 9, 16-09-21

[redacted]

www.[redacted]be

16 September 2021

**[redacted] Assessment of Anatec Helicopter Access Report Revision 09**

Upon consideration of the Helicopter Access Report (HAS) Revision 9 prepared in June 2021 for Orsted by Anatec, there are certain aspects of the report that warrant further discussion as outlined below.

**En route descent minima:** *(App A, Page 9, Para 1.3)* The standard daytime en-route descent minima of visibility 4km and cloud base of 600ft has been taken to determine when an ARA should be performed to any given platform. This therefore gives the number of days in a year that ARA's would be required when cross compared with historical data. However, if access to a platform involves direct overflight of wind turbine generators (WTG) prior to descent, then cloudbreak would have to be achieved above the MSA of the field which in the case of the Hornsea 4 is 2300ft not 600ft. If this cannot be achieved, then the aircraft would have to alter its direction of approach prior to descent. This practice of indirect approach to achieve cloudbreak has become an almost daily occurrence, when approaching the Schooner Platform from Norwich due to the proximity of the Hornsea 2 field. Whilst the Hornsea 4 field does not lie between the Babbage and Norwich, consideration should be given to all approach directions for any given platform prior to determining cloudbreak minima as 600ft.

**Limited Icing Protection of the AW139:** *(App A, Page 10, Para 1.6.7)* Mention has again been made of the possibility of fitting the AW139 with a limited icing protection system (LIPS). This was discussed with Mark Prior in February at the Hornsea 4 update meeting, where it was agreed that whilst LIPS can be fitted, it was of very limited use as a positive air band of 500 feet would still be required when considering icing conditions (Supplement 76 AW139 RFM). Furthermore, the cost and payload implications of retrofitting LIPS to pre-existing airframes is prohibitive, and goes someway in explaining why not a single airframe currently operating in the SNS has LIPS installed.

**ARA minima:** *(App A, Page 12, Para 2.2.6.21)* The minima applied for ARA and considered at the planning stage is not raised to the practical limits mentioned in this paragraph, and remains 200ft for daylight operations. The decision therefore to go, will be based on the lower cloudbase taking into account customer requirements, and it should be this minima that is used for statistical analysis.

[redacted]

[redacted]

[redacted]

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**Babbage windspeed limitation:** *(App A, Page 13, Para 2.2.7.23)* The Babbage does not currently have a 30kt windspeed limitation and thereby is less restrictive with regards to no fly conditions.

**Supplement 97 Enhanced Offshore Profile:** *(App A, Page 38, Para 5.5.69)* Referring to the February [redacted] summary of the Anatec Report (revision 06), no operator on the UK SNS uses the enhanced profile as prescribed in Supplement 97 of the AW139 RFM. This is due to nature of the profile and the power margin requirement.

A similar argument arises out of the use of the single path climbout *(App A1, Page 43, Para 5.6.3.82)* that has now been proposed in Anatec's latest revision. The single path climbout profile as prescribed within the RFM Supplement 50, requires use of 160% power with narrower margins. In the words of [redacted] s head of flight training:

*"As the alternative OEI profile proposed by Mark Prior requires a 2.5 min power OEI climb at 60kts to 1000ft (i.e. top of the amber band all the way to 1000ft at 60kts instead of reducing to top of the green MCP once acceleration to Vy achieved at 200ft) it would require us to adopt a fundamentally different normal and OEI profile to the industry standard procedures that we, and the other offshore rotary operators, train and maintain (our normal profiles would also have to change as the alternative procedure has both normal and OEI elements). Consequently I'm extremely reluctant to make a major change to our offshore normal and emergency procedures, with the associated safety implications/considerations."*

[redacted] would therefore reject the use of this single path OEI profile, in favour of the currently practised 2 path OEI profile along with the performance calculations given in the [redacted] February report and previously agreed with Mark Prior.

**Aircraft performance:** In discussion with both Bristow and CHC Chief pilots regarding the proximity of wind turbine farms, there appears to be little or no consideration given to any aircraft type other than the AW139 as is the case with the Anatec report. Whilst the argument is that this is the type currently used within the SNS, it gives little scope for the use of any other aircraft type to be used such as the H175, or EC155. As the performance of the AW139 is exceptionally good for its class, any report based solely on this airframe would likely provide insufficient safety margins for the use of other types. As such these margins should if anything be expanded to provide some flexibility in the use of aircraft other than the AW139 in the SNS.

[redacted]

[redacted]

[redacted]
www.[redacted]be

**Summary:** Anatec's report provides an in depth analysis supporting the close proximity of the Hornsea Project Four WTF to the Babbage. Whilst based on sound practical application of helicopter performance and practices outlined by the manufacturer's recommendations, further consideration needs to be given to current proven methods employed by UK operators in the SNS along with a broader approach to encompass the use of other aircraft that also operate within the SNS, albeit with less frequency.

*References:*


- *Hornsea Project Four: Environmental Statement (ES): Appendix A of ES Annex 11.1: Helicopter Access Report – Revision Number 09 – Dated 19 August 2021*
- *Appendix A1 – Platform Specific Data for ARA to Gas Installations Adjacent to Hornsea Project Four – Revision Number 2 - Dated 03 August 2021*
- [redacted] *Report on Anatec Helicopter Access Report Version A- Dated 23 February 2021*
- *AW139 Rotorcraft Flight Manual – Revision 27 – Dated 27 May 2021*


[redacted]

[redacted]

**Appendix C**

**Babbage Platform Allision Avoidance, Document No. 384401-BAB-OPS-ODE-RP-MA-0001 Rev A, 18/06/2021**

ode Asset Management

NEO ENERGY

| Project Title | Project Number | Page |
|---|---|---|
| Babbage Platform Allision Avoidance | N/A | 1 of 9 |

**CLIENT: NEO ENERGY**

**DOCUMENT TITLE: BABBAGE PLATFORM ALLISION AVOIDANCE**

**DOCUMENT NUMBER: 384401-BAB-OPS-ODE-RP-MA-0001**

| *Author:* | *Checked:* | *Approved by:* |
|---|---|---|
| Name: Paul McQueen | Name: Sam Lawson | Name: Stuart Rees |
| Job Title: Marine TA | Job Title: Marine Logistics | Job Title: Operations Manager |
| Signature: [redacted] | Signature: Dean Boast Digitally signed by Dean Boast Date: 2021.06.21 12:35:19 +01'00' | Signature: Stuart Rees |
| | | Date: 18/06/2021 |

| Rev No | Date | Status | Issued By | Checked By | Approved By |
|---|---|---|---|---|---|
| A | 18/06/2021 | IDC | PMcQ | SAL | STR |
| | | | PMcQ | SAL | STR |

## DISCLAIMER



| Rev | Purpose | List of Updated/Modified Sections |
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| A | IDC | |
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**CONTENTS**

## 1.0 INTRODUCTION

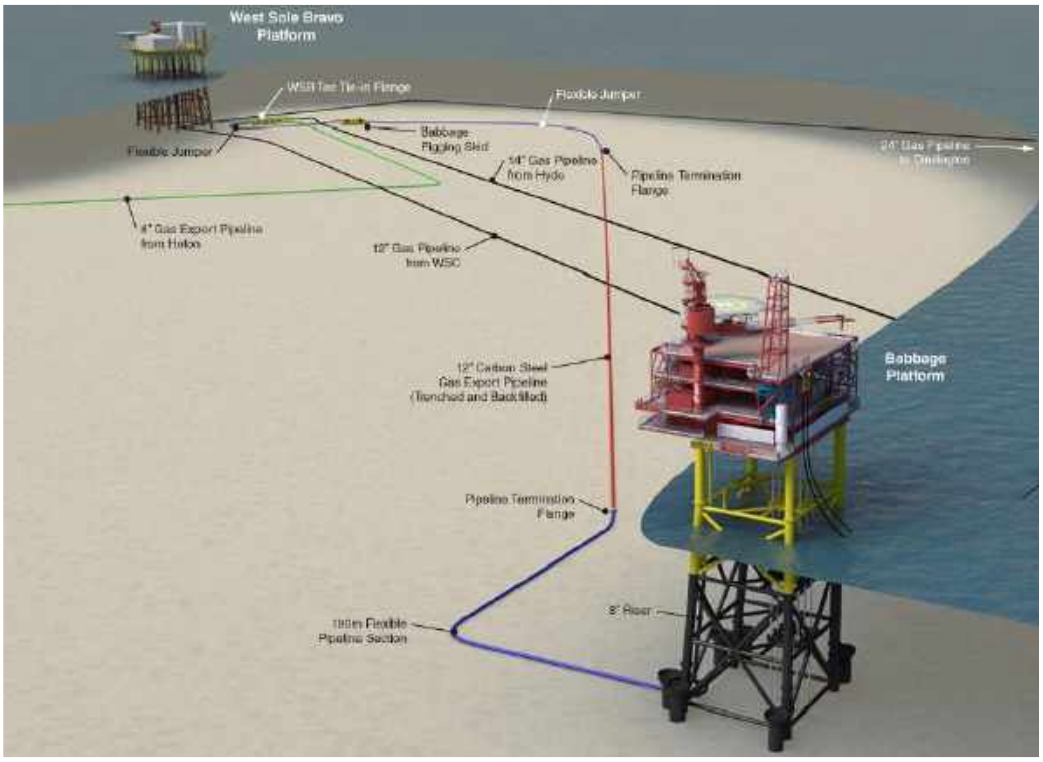
Orsted Hornsea Project Four Limited intends to construct and operate the proposed Hornsea Project Four Offshore Wind Farm (hereafter Hornsea Four) located within the former Hornsea Zone. There is a possibility that the construction and operation of Hornsea Four will impact oil and Gas (O&G) assets in the vicinity.

This report addresses additional risk impact upon the Babbage platform owned by NEO Energy and operated by ODE-AM.

### 1.1 Babbage Field Description

The Babbage field produces high-quality gas from five horizontal multi-fracced wells. The Babbage platform is operated as a Not Permanently Attended Installation (NPAI) with temporary living quarters for up to 30 persons on board during well interventions operations, maintenance, or annual shutdowns. The platform is controlled remotely from Dimlington.

The field is northwest of the UK SNS in UK Block48/2, Licence P456, approximately 80 kilometres northeast of Dimlington (Easington). It is in the Sole Pit sub-basin of the Southern Gas Basin in 40-45 metres of water and is approximately 12 km southeast of Perenco operated Ravenspurn North platform, and 28 km Northwest of the Perenco operated West Sole Bravo platform. The Babbage development involves five producing and one suspended well, supported on Minimum Facility Platform (MFP) tied back to the West Sole System (WSS). Produced gas is exported via a 12” pipeline to the West Sole B tie-in structure. The Babbage platform has recently assumed Not Permanently Attended Installation (NPAI) status. G



## 2.0 REFERENCES

| Title | Number/Source | Rev |
|---|---|---|
| Provision and maintenance of local aids to navigation marking offshore renewable energy installations. | Trinity House | N/A |
| The marking of man-made offshore structures | IALA - R0139 | 2.1 |
| Safety of navigation: offshore renewable energy installations (OREIS) - guidance on UK navigational practice, safety, and emergency response. | MCA - MGN 543 (M+F) | N/A |
| Prevention of fire and explosion, and emergency response on offshore installations | L65 | 3 |
| The offshore marine operations inspection guide | HSE- CM9:2019/313637 | 3.3 |
| Effective collision risk management for offshore installations | HSE – OTO 1999 052 | |
| Guidelines for ship/installation collision avoidance | OGUK | 2 |
| The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015. | L154 | 1 |
| Assessment of the Impact of Hornsea Four on Offshore Oil and Gas Installations (Allision & Vessel/Rig Access) Redacted Version for Neo Energy Review | A4481-ORS-OGA-02b | 2b |

## 3.0 HORNSEA FOUR CONSULTATION PROCESS

Commencing in November 2018, Orsted has been engaged in consultation with the relevant UK authorities before submitting development application, whilst others have been made party to the consultation process, the salient UK authorities and affected parties are:

- UK Maritime & Coastguard Agency (MCA)
- Trinity House
- NEO Energy Ltd (Babbage Owners)
- ODE-AM Ltd (Babbage Operator)

During this period, over 20 separate meetings and clarification forums have taken place, much work has been done regarding the additional risk to navigation the proposed Hornsea Four development introduces.


## 4.0 ALLISION REPORT SUMMARY

Reference is made to Assessment of the Impact of Hornsea Four on Offshore Oil and Gas Installations (Allision & Vessel/Rig Access) *Redacted Version for Neo Energy Review* A4481-ORS-OGA-02b Rev 2b.

The above report commissioned by Orsted, specifically addresses the perceived additional risk to navigation using predominantly AIS data as a primary source of research data.

The redacted version supplied, reached the conclusion that Allision and Deviation are “broadly acceptable, and in regard of proximity, “Tolerable with Mitigation”.

Table 9.1 Impact Assessment Summary

| Asset | Allision | Deviations | Proximity |
|---|---|---|---|
| Tier 1 | | | |
| n/a | n/a | n/a | n/a |
| Tier 2 | | | |
| Babbage | Broadly Acceptable | Broadly Acceptable | Tolerable with Mitigation |
| Tier 3 | | | |
| n/a | n/a | n/a | n/a |

## 5.0 ODE-AM REVIEW FINDINGS

ODE-AM have undertaken a thorough and in-depth review of the work presented by Orsted; the summary of those findings is addressed below.

### 5.1 Trinity House - Navigation Marking Babbage Platform

In accordance with the UK Navigation Directorate for England and Wales, (Trinity House) instructions: “Provision and Maintenance of Local Aids to Navigation Marking Offshore Renewable Energy Installations”.

Trinity house are the applicable General Lighthouse Authority (GLA); their instructions make it clear that:

- *The responsibility to state Availability Targets for local AtoN established to mark renewable energy installations rests with them.*
- *These availability targets are based on IALA guidelines and will normally form part of the consent issued to the developer/operator by the appropriate consenting authority.*
- *The responsibility to accomplish these availability targets and lay down response priorities for the individual AtoN to achieve these targets rests with the developer/Operator.*

### 5.2 IALA Notifications & MCA Guidance

In accordance with IALA International Association of Marine Aids to Navigation and Lighthouse Authorities) O-139 The Marking of Man-Made Offshore Structures

With reference to the above, ODE-AM has satisfied itself that the current markings satisfy the safety case regulations as per current plan. However, it shall be noted that the introduction of a wind park in proximity of Babbage platform introduces additional risks requiring mitigation to reduce to ALARP.

MCA Marine Guidance Note MGN 543 (M+F) Annex 4 states that.

- *Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the Environmental Impact Assessment (EIA). The specific measures to be employed will be selected in consultation with the MCA’s Navigation Safety Branch and will be listed in the developer’s Environmental Statement (ES)”*

Annex 4 of this document provides recommendations for appropriate notifications; of those provided, the most suitable potential options for Babbage platform are:

- Promulgation of information and warnings through notices to mariners and other appropriate maritime safety information (MSI) dissemination methods.
- Safety zones of appropriate configuration, extent, and application to specified vessels.
- Designation of the site as an area to be avoided (ATBA).
- Provision of AtoN as determined by the GLA.
- Implementation of routeing measures within or near to the development.
- Monitoring by radar or AIS.
- Creation of an Emergency Response Cooperation Plan with the MCA's Search and Rescue Branch for the construction phase onwards.

MGN 543 is specifically written to provide appropriate guidance to renewable energy operators and the above recommendations (Annex 4) would be within the remit of the wind energy developer to provide.

Of the above options, the significant majority are essentially revisions to existing charts, and the provision of notices to mariners. Three require physical additions in terms of equipment, management, and maintenance.

- The first is emergency response arrangements and for now we must assume this is in the process of being worked up.

- Second has already been covered above, i.e., should TH decide AtoN are required, then this will be for the developers to arrange, install and maintain.

- Finally, monitoring by Radar or AIS would be the only addition to the Babbage platform required, given the findings of the Allision report, it is a recommendation, however in accordance with the MCA guidance and the current platform safety case, as this aide is required to mitigate the new risk, the costs associated with this would appear to sit with the renewable energy operator.

## 5.3 Conclusions

The Babbage platform in its current configuration sits well within the boundaries of acceptable navigational and notification of position limitations as set out by the authorities and is in line with best industry standard practice.

The addition of a large wind farm operated by others near Babbage places the obligation and responsibility of mitigation to ALARP with the developer (Orsted). Any requirement for additional AtoN shall be addressed directly by Orsted. Moreover, ODE-AM shall of course reserve the right of appeal if not satisfied with the outcome.

1. It is not the responsibility of NEO or ODE-AM to install navigation aides to enhance a sea-lane or to mark an exclusion area, if it is deemed required by Trinity House, then the provision and ongoing maintenance of same will be entirely to developer account.

2. Orsted have been in consultation for three years to date and the authorities are aware of the plans. The guidance makes it clear that the addition of live monitoring equipment (AIS), is recommended and addresses ALARP, they will be required to meet installation and maintenance costs for the life of the project.

## 6.0 APPENDIX 1 – ALLISION REPORT


# Hornsea Project Four: Environmental Statement (ES)

# Appendix C of ES Annex 11.1: Allision Technical Report

| | |
|---|---|
| **Prepared** | Anatec Ltd. 28 October 2020 |
| **Checked** | Dawn Dickinson, Orsted. 26 August 2020 |
| **Accepted** | Eleni Antoniou, Orsted. 19 October 2020 |
| **Approved** | Julian Carolan, Orsted. 20 October 2020 |

A5.11.1
Version A

# Assessment of the Impact of Hornsea Four on Offshore Oil and Gas Installations (Allision & Vessel/Rig Access)

## *Redacted Version for Neo Energy Review*

| | |
|---|---|
| **Prepared by** | Anatec Limited |
| **Presented to** | Orsted Hornsea Project Four Limited |
| **Date** | 08/03/2021 |
| **Revision Number** | 2b |
| **Document Reference** | A4481-ORS-OGA-02b |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| Revision Number | Date | Summary of Change |
|---|---|---|
| 00 | 19/08/2020 | First Issue of V2 |
| 01 | 01/10/2020 | Revisions based on initial comments |
| 02 | 28/10/2020 | Final Version |
| 02b | 08/03/2021 | Redacted version for NEO Energy Review |

# Table of Contents

## Table of Figures



## Table of Tables

# Glossary of Terms

| Term | Definition |
|---|---|
| Access | Means by which vessels can transit to and operate at terminus installation. |
| Allision | Allision has been used in this report to describe contact between a ship and an offshore installation |
| Automatic Identification System (AIS) | A system by which vessels automatically broadcast their identity, key statistics including location, destination, length, speed, and current status, e.g., under power. Most commercial vessels and European Union (EU) fishing vessels over 15 meters (m) length are required to carry AIS. |
| Design Envelope | A description of the range of possible elements that make up the Hornsea Four design options under consideration, as set out in detail in **Volume A1, Chapter 4: Project Description**. This envelope is used to define Hornsea Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach. |
| Deviation | Change in established vessel routeing arising as a result of an offshore development. |
| Environmental Statement (ES) | A document reporting the findings of the EIA and produced in accordance with the EIA Directive as transposed into United Kingdom (UK) law by the EIA Regulations. |
| Formal Safety Assessment (FSA) | A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity. |
| Former Hornsea Zone | The former Hornsea Zone was one of nine offshore wind generation zones around the UK coast identified by The Crown Estate (TCE) during its third round of offshore wind licensing. In March 2016, the Hornsea Zone Development Agreement was terminated and project specific agreements, Agreement for Leases (AfLs), were agreed with The Crown Estate for Hornsea Project One Offshore Wind Farm, Hornsea Project Two Offshore Wind Farm, Hornsea Project Three Offshore Wind Farm and Hornsea Four. The Hornsea Zone has therefore been dissolved and is referred to throughout as the former Hornsea Zone. |
| Hornsea Project Four Offshore Wind Farm | The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four. |
| Main Route | Defined transit route (mean position) of commercial vessels identified within the specified shipping and navigation study area. |
| Marine Guidance Note (MGN) | A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping at sea, and to prevent or minimise pollution from shipping. |
| Mitigation | A term used interchangeably with Commitment(s). Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA process (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or the Environmental Statement (ES)). |
| Maximum Design Scenario (MDS) | The maximum design parameters of each Hornsea Four asset (both on and offshore). |

| Term | Definition |
|---|---|
| Navigational Risk Assessment (NRA) | A document which assesses the overall impact to shipping and navigation of a proposed Offshore Renewable Energy Installation (OREI) based upon Formal Safety Assessment (FSA). |
| Ørsted Hornsea Project Four Limited. | The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO). |
| Subsea | Situated or occurring beneath the surface of the sea. |
| Unique Vessel | An individual vessel identified on any particular calendar day, irrespective of how many tracks were recorded for that vessel on that day. This prevents vessels being over counted. Individual vessels are identified using their Maritime Mobile Service Identity (MMSI). |

## Abbreviations Table

| Abbreviation | Definition |
|---|---|
| AfL | Agreement for Lease |
| AIS | Automatic Identification System |
| CEA | Cumulative Effect Assessment |
| DCO | Development Consent Order |
| ECC | Export Cable Corridor |
| ERRV | Emergency Response and Rescue Vessel (traditionally known as standby vessel) |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| EU | European Union |
| FSA | Formal Safety Assessment |
| GOMO | Guidelines for Offshore Marine Operations |
| HLV | Heavy Lift Vessel |
| HVAC | High Voltage Alternating Current |
| HVDC | High Voltage Direct Current |
| IMO | International Maritime Organization |
| km | Kilometres |
| $km^2$ | Square Kilometre |
| m | Metre |
| MCA | Maritime and Coastguard Agency |
| MDS | Maximum Design Scenario |
| MGN | Marine Guidance Note |
| MMO | Marine Management Organisation |

| Abbreviation | Definition |
|---|---|
| MMSI | Maritime Mobile Service Identity |
| MRP | Mean Route Position |
| nm | Nautical miles |
| $nm^2$ | Square Nautical Mile |
| NRA | Navigational Risk Assessment |
| NtM | Notice to Mariners |
| NUI | Normally Unmanned Installation |
| O&G | Oil and Gas |
| OREI | Offshore Renewable Energy Installation |
| PEIR | Preliminary Environmental Information Report |
| REWS | Radar Early Warning System |
| SEAL | Shearwater to Bacton |
| TCE | The Crown Estate |
| UK | United Kingdom |
| WTG | Wind Turbine Generator |

# 1 Introduction

1. Orsted Hornsea Project Four Limited (the Applicant) is intending to construct and operate the proposed Hornsea Project Four Offshore Wind Farm (hereafter Hornsea Four) located within the former Hornsea Zone. The construction and operation of Hornsea Four may impact on Oil and Gas (O&G) assets in the vicinity of Hornsea Four. These impacts will be assessed in full as part of the Environmental Statement (ES) which will be submitted to the Planning Inspectorate as part of the Hornsea Four Development Consent Order (DCO) application. The main assessments will take place in **Volume A5, Annex 11.1: Offshore Installation Interfaces,** which feeds into the relevant ES Chapter (**Volume A2, Chapter 11: Infrastructure and Other Users**).

2. Anatec Ltd have been commissioned to undertake a dedicated vessel/rig access and allision assessment as an appendix to **Volume A5, Annex 11.1: Offshore Installation Interfaces,** focussing on the impact of allision risk and access as a result of Hornsea Four.

3. On this basis, the output of this assessment is a significance ranking for each O&G asset assessed in terms of allision risk, routine access deviations, and spacing / proximity concerns. Significance has been determined via the International Maritime Organization (IMO) Formal Safety Assessment (FSA) approach (IMO, 2018), in line with the approach undertaken within the Navigation Risk Assessment (NRA) (**Volume A5, Annex 7.1**). Full details of the methodology utilised to ascertain significance and the associated definitions are provided within Section 3 of this report.

4. Reference within this assessment is made to the NRA (**Volume A5, Annex 7.1**), which provides full assessment of impacts to shipping and navigation users that may be affected by the presence of Hornsea Four and the associated works. In particular, marine traffic data collected as required under the Maritime and Coastguard Agency's (MCA's) Marine Guidance Note (MGN) 543 as part of the NRA process is utilised as a primary input into this assessment. Full assessment and background of the marine traffic data utilised can be found within the NRA, which will be available within the DCO application.

5. It is noted that this version of the report has been produced for the review of NEO Energy, and as such only contains the results for the Babbage platform (the only NEO Energy asset of relevance to this report). The full version of the report for all screened in assets regardless of operator will be included within the DCO application.

# 2 Consultation

6. Consultation undertaken to date to which NEO Energy were party to in relation to this assessment is summarised in Table 2.1. Only points deemed relevant to either allision or access have been included. A full summary of consultation with all operators will be included in the full report included within the DCO application.

### Table 2.1 Consultation Summary

| Consultation Aspect | Relevant Points Raised | Where Addressed |
|---|---|---|
| Hazard Workshop 28th May 2020<br><br>(Perenco, NEO Energy, and Premier Oil represented) | Queries raised over whether changes to the array area would be assessed in terms of allision risk to the Babbage platform. | Allision has been assessed in Section 7. |
| NEO Energy Meeting – 29th July 2020 | Queries raised over changes in density within the vicinity of Babbage, and over potential increases in wind farm vessel activity. | Traffic patterns and changes post wind farm relative to Babbage are assessed in Section 7. Wind farm activity (and how this will be managed) is discussed in Section 8. |

# 3 Asset Screening

## 3.1 CEA Screening Overview

7. For the purposes of this assessment, each O&G asset included in the Cumulative Effect Assessment (CEA) (see **Volume A4, Annex 5.3: Offshore Cumulative Effects**) has been assigned an assessment tier based on the criteria provided in Table 3.1.

8. Tiering for the NEO asset of relevance (i.e., the Babbage platform) is summarised in Table 3.2 and Section 3.2. The full list of O&G assets considered is provided in the CEA, and tiering of all screened in assets will be available in the full report.

9. Assets that are planned (as opposed to consented, constructing, or operational) are not included within this assessment, however discussions will be ongoing with the relevant operators.

**Table 3.1 Asset Screening Methodology**

| Tier | Criteria | Assessment Approach |
|---|---|---|
| 1 | ▪ Pre-existing asset within Hornsea Four array area. | Impacts associated with allision and access assessed, including access impacts to associated subsea infrastructure (e.g., pipelines). |
| 2 | ▪ Surface asset outside of Hornsea Four array area but within 10nm; **or**<br>▪ Surface asset within 10nm of the High Voltage Alternating Current (HVAC) booster station search area. | Impacts associated with allision and access assessed. |
| 3 | ▪ Asset not within 10nm but raised during consultation by a relevant stakeholder; **or**<br>▪ Asset not within 10nm but route to asset will require deviation as a result of Hornsea Four array area. | Impacts associated with allision and access assessed[1] |

**Table 3.2 Asset Screening Process – NEO Energy**

| Project | Operator | Status | Distance (nm) | | Tier |
|---|---|---|---|---|---|
| | | | Array | HVAC | |
| Babbage | NEO Energy | Active | 2.3 | > 10 | 2 |

## 3.2 Tier Summary

10. As per Section 3.1, the Babbage asset has been classed as Tier 2 based on its proximity to the Hornsea Four Array area (i.e., within 10nm), as shown in Figure 3.1. For

[1] Assessment approach differs from Tier 2 in that marine traffic data utilised within NRA does not extend beyond 10nm from Hornsea Four array area.

reference and context, Figure 3.1 also includes those Tier 2 assets that are not operated by NEO Energy.

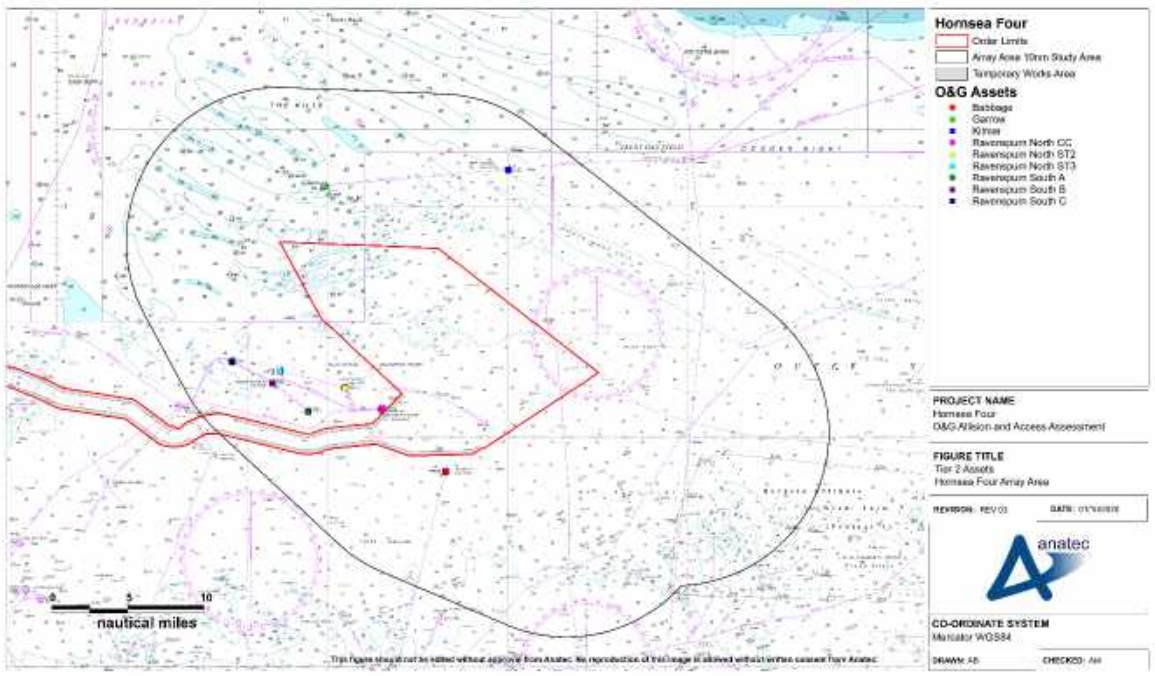



**Figure 3.1 Tier 2 Assets**

# 4 Methodology

## 4.1 Impacts Assessed

11. This assessment has focussed on impacts associated with allision and vessel access to O&G assets, identified during consultation and as part of the Infrastructure and Other Users chapter of the Preliminary Environmental Information Report (PEIR) (Ørsted, 2019). Separate studies are being carried out with respect to the impact on Radar Early Warning Systems (REWS) (**Appendix B of Volume A5, Annex 11.1**) and helicopter operations (**Appendix A of Volume A5, Annex 11.1**).

12. On this basis, impacts assessed within this assessment are as follows:

- Wind turbines and associated works may result in deviations to routine support vessel routeing to O&G platforms;
- Proximity of wind turbines and associated works may restrict / hamper access to O&G platforms and subsurface infrastructure during certain periods (e.g., allowable weather); and
- Potential allision risk to O&G platforms due to vessels being deviated from existing routes due to the presence of the Hornsea Four infrastructure.

## 4.2 Assessment Methodology

13. This assessment is intended to inform **Volume A5, Annex 11.1: Offshore Installation Interfaces** which is being undertaken as part of the Infrastructure and Other Users Chapter (**Volume A2, Chapter 11: Infrastructure and Other Users**) of the Hornsea Four ES. On this basis, it does not seek to replace the subsequent impact assessment of the ES. Instead, it serves as an initial screening and assessment to inform **Volume A5, Annex 11.1: Offshore Installation Interfaces**.

14. Within **Volume A5, Annex 11.1: Offshore Installation Interfaces**, impacts to each asset considered will be assigned a “consequence” and “probability” ranking, which will then be used to assess significance.

15. This aligns with the FSA (IMO, 2018) approach undertaken within the NRA, and as such this assessment has utilised the FSA approach, meaning the outputs can be adapted to feed into in **Volume A5, Annex 11.1: Offshore Installation Interfaces**.

16. The FSA approach within the NRA uses probability (frequency) and consequence to determine the significance of each impact as being either broadly acceptable, tolerable, or unacceptable for each asset screened in. Impacts that are determined to

be unacceptable must be reduced to within broadly acceptable or tolerable parameters via additional mitigation over that considered embedded at present.

17. It should be considered that the output of this assessment considers impacts associated with allision and access only, and as such will not supersede the asset rankings that will be determined in **Volume A5, Annex 11.1: Offshore Installation Interfaces**, which will consider all impacts, and forms the primary input to **ES Volume A2, Chapter 11: Infrastructure and Other Users**.

18. On this basis, methodologies for assessing the significance of allision and access impacts are provided in Sections 4.2.1 and 4.2.2. It is noted that a tiered approach to assessment has been undertaken, with each asset considered assigned into one of three assessment tiers, as defined in Table 3.1, depending on location and status. Further details are provided in Section 3.

### 4.2.1 Allision

19. It should be considered that proximity between offshore installations and passing traffic is a primary factor affecting allision risk. On this basis, the assessment of allision risk undertaken within this assessment has focused on changes to traffic patterns passing within 2 nm of the relevant assets as a result of Hornsea Four. This has been based on the pre- and post-wind farm routes as identified within the NRA (**Volume A5, Annex 7.1**). Consideration has also been given to any routeing restrictions which may increase allision risk (e.g., searoom between assets).

20. The significance of allision risk has then been assessed on a qualitative basis as per the criteria given in Table 4.1. It is noted that the definitions of these rankings must be considered in conjunction with the assumptions detailed in Section 4.4.

**Table 4.1 Allision Assessment Significance Criteria**

| Significance | Description | Criteria |
|---|---|---|
| Broadly Acceptable | Beneficial (potential decrease in allision risk) | Decrease in vessel numbers in proximity to asset |
| | No impact | No or negligible change in vessel numbers in proximity to asset |
| | Adverse – low (potential for low or possible increase in allision frequency) | Low change in vessel numbers in proximity to asset |
| Tolerable with Mitigation | Adverse – moderate (potential for possible or high increase in allision frequency) | Moderate to high change in vessel numbers in proximity to asset but available searoom for transit |
| Unacceptable | Adverse – High (potential for high or very high increase in allision frequency) | High change in vessel numbers with limited searoom for transit |

### 4.2.2 Vessel/Rig Access

21. Impacts associated with access have been separated into two categories as follows:

- Deviations required for routine offshore support vessel visits (e.g., supply and standby) to assets as a result of Hornsea Four, i.e., impact on surface navigation only; and
- Hornsea Four structures or works restricting or hampering the ability to carry out O&G operations at assets within the Hornsea Four array area, or nearby, e.g., rig work.

22. Deviations have been assessed by identifying baseline vessel routeing to screened in assets via the use of marine traffic data (see Section 6) and Anatec's internal routeing database (Anatec, 2020). This has then been compared against likely post wind farm deviations (Section 7.3), which have been primarily based on the findings of the NRA. In any cases where routes to relevant assets were not defined within the NRA (i.e., such routes were not reflected within the marine traffic data), these have been defined via Anatec's internal routeing database (Anatec, 2020).

23. Impacts associated with the potential for operations at O&G assets to be restricted or hampered have been assessed based on the proximity of the assets to the Hornsea Four structures, which is illustrated in Table 3.2. The available space (i.e., distance between the asset and Hornsea Four array area) has been assessed against existing cases of O&G operations occurring in the vicinity of constructing or operational wind farms, with consultation undertaken for Hornsea Four with the relevant operators in regards to spacing needs (see Section 2) taken into consideration. The space available, and relevant existing examples are discussed in Section 8.

24. Significance is then assessed on a qualitative basis according to the criteria detailed in Table 4.2. It is noted that the definitions of these rankings must be considered in conjunction with the assumptions detailed in Section 4.4.

**Table 4.2 Access Assessment Significance Criteria**

| Significance | Description | Assessment Criteria | |
|---|---|---|---|
| | | Deviations | Restriction / Hampering of O&G Operations |
| Broadly Acceptable | No impact | Route to asset unaffected by Hornsea Four structure | No impact on operations |
| | Adverse – low | Minimal deviation required with limited impact on transit distance / time | Limited impact on O&G operations |
| Tolerable with Mitigation | Adverse – moderate | Moderate deviation required with potential for notable impact on transit distance / time | Potential for moderate restriction / hampering of O&G operations |

| Significance | Description | Assessment Criteria | |
|---|---|---|---|
| | | Deviations | Restriction / Hampering of O&G Operations |
| Unacceptable | Adverse - High | Deviation not possible without unacceptable impacts on vessel safety | Wind farm structures prevent practicable access to asset by a rig / vessel required to undertake an operation at that asset |

## 4.3 Maximum Design Scenario

25. The Maximum Design Scenario (MDS) within which impacts have been assessed is summarised as follows, noting that further details are provided within the NRA (**Volume A5, Annex 7.1**) which holds the same MDS:

- Maximum extent of buoyed construction / decommissioning area during the construction and decommissioning phases, and maximum extent of the Hornsea Four array area within the operational phase (maximum deviations, and lowest proximity to O&G assets outside of the array); and
- Maximum number of structures - 190 locations (maximum site build out and minimum spacing within the array).

## 4.4 Assumptions

### 4.4.1 Assessment Approach

26. Given that Anatec is not privy to individual O&G operator's Safety Cases, it is not possible to determine whether impacts to the relevant assets are "tolerable" within the context of those Safety Cases. It should therefore be considered that the assessment output is based on whether the direct hazards / impacts assessed as part of the scope of this particular assessment (i.e., allision and access) are considered to be tolerable considering the known mitigations assumed to be in place (see Section 4.4.2). On this basis, cumulative tolerability of all potential hazards that personnel on the installations are exposed to has not been considered.

### 4.4.2 Mitigation

27. Impacts have been assessed on the assumption that known embedded mitigations will be in place, both on the part of the Applicant and the relevant O&G operators. On this basis, where an impact has been assessed as being within tolerable parameters, key measures assumed to be in place include the following:

- The Applicant will consider local O&G assets and associated operational requirements, where appropriate (i.e., assets which may be affected in terms of access), within their site design, and continue to consult and liaise with relevant operators in this regard;

- O&G operators will continue to provide suitable Collision Risk Management measures for their assets (e.g., Emergency Response and Rescue Vessel (ERRV), REWS, etc.) taking into account fluctuations in local passing traffic levels over time;
- Promulgation of information including to regular commercial vessel operators in the area to ensure they are aware of Hornsea Four, ensuring they can passage plan taking into account both the Hornsea Four array area and the existing O&G assets;
- The Applicant will promulgate information regarding Hornsea Four as required to relevant O&G vessel operators, who will utilise this information to passage plan to minimise deviations to routes to local assets; and
- Consultation with Trinity House to determine appropriate lighting and marking taking into consideration the existing O&G assets.

# 5 Project Description

## 5.1 Overview

28. The Hornsea Project Four Agreement for Lease (AfL) is located approximately 35 nm (65 kilometres (km)) east of the United Kingdom (UK) coast, at Flamborough Head, East Riding of Yorkshire. The total area of the Array considered at the point of DCO application is approximately 143 Square Nautical Miles ($nm^2$) (492 Square Kilometres ($km^2$)).

29. There are three other Hornsea developments in proximity to Hornsea Four, specifically Hornsea One (Operational), Hornsea Two (Construction) and Hornsea Three (Recommendation and Decision).

30. Figure 5.1 presents the location of Hornsea Four relative to the other Hornsea projects.

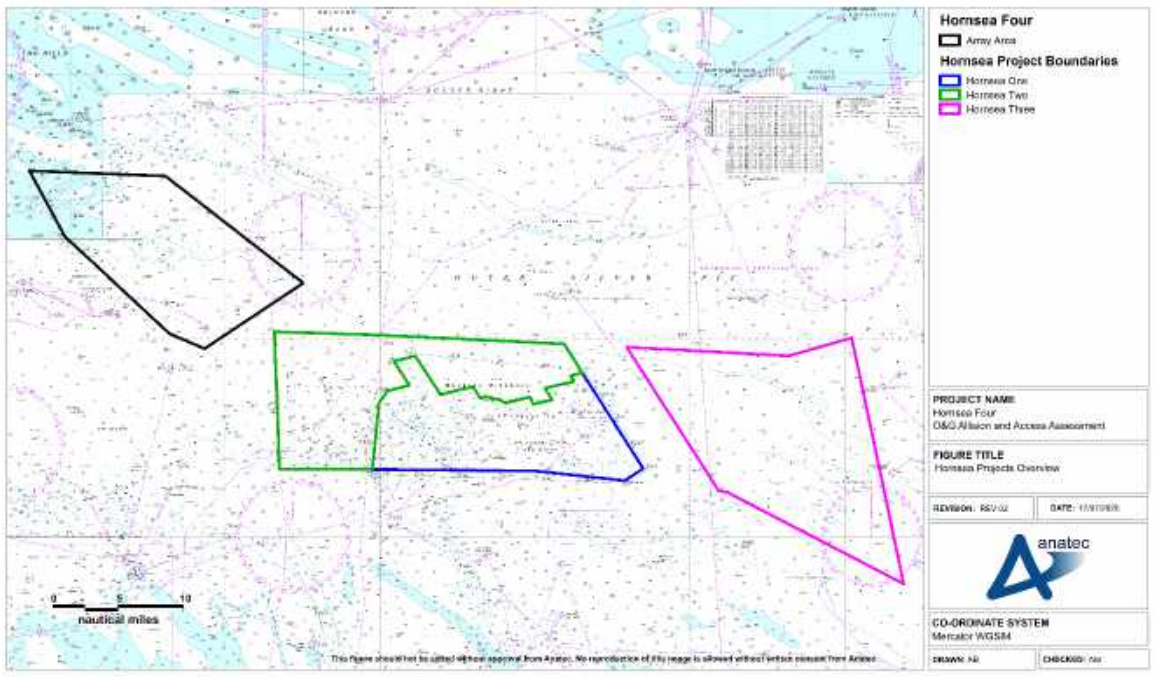



**Figure 5.1 Hornsea Projects Overview**

31. The project design envelope includes up to three HVAC booster stations, which will be located within the HVAC booster station search area within the offshore Export Cable Corridor (ECC) as shown in Figure 5.2. It is noted that should a High Voltage Direct Current (HVDC) transmission option be selected, then no HVAC booster stations will be required.

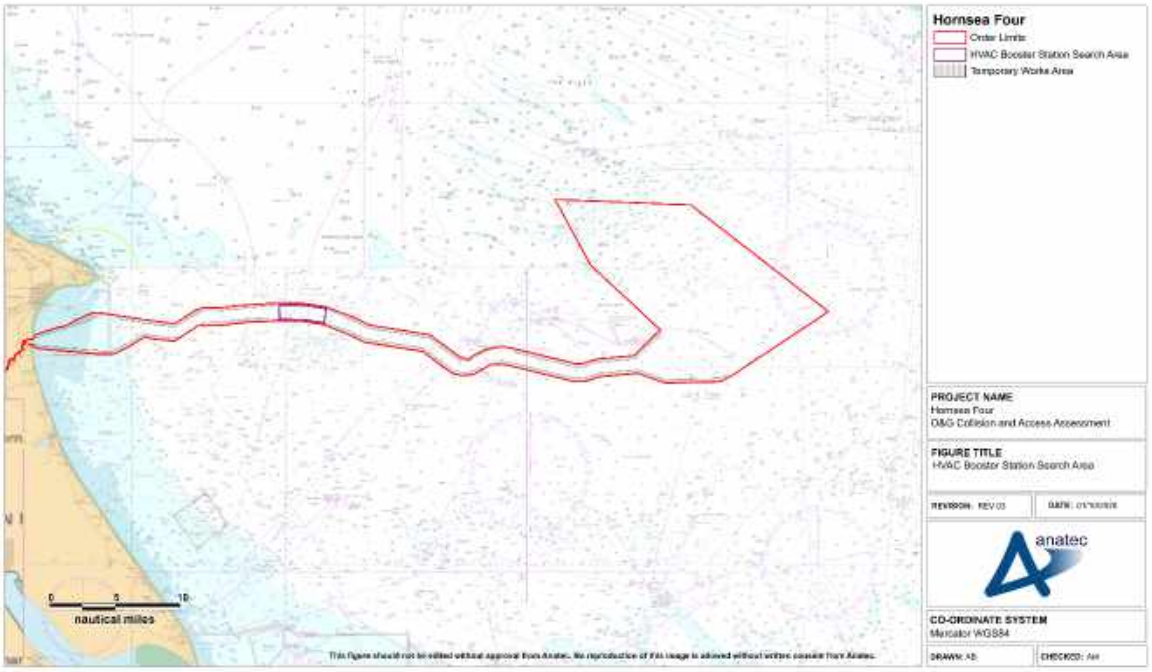



**Figure 5.2 HVAC Booster Station Search Area**

## 5.2 Layout

32. An indicative layout has been utilised for the purposes of this assessment, as shown in Figure 5.3, noting that this is also the layout assessed within the NRA. It is noted that locations for substations and the accommodation platform have not yet been defined so these structures have been placed according to a MDS for shipping and navigation. Further details are provided within the NRA (**Volume A5, Annex 7.1).**

33. It should be considered when viewing this layout that it is not necessarily reflective of the final layout(s) that will be agreed with the Marine Management Organisation (MMO) post-consent in consultation with the MCA and Trinity House and is presented purely for the purposes of illustration within this assessment. The Applicant will agree a set of Layout Principles (**Volume A4, Annex 4.7: Layout Principles**) with MCA and Trinity House, and the final layout will comply with the agreed principles.

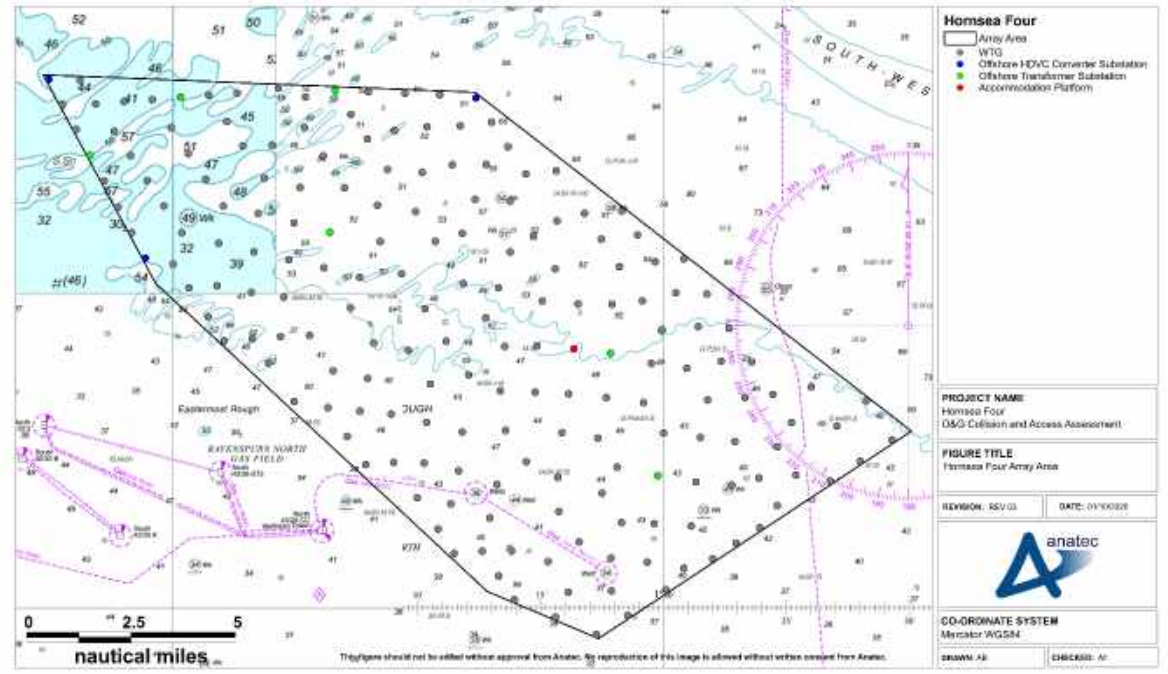



**Figure 5.3 Hornsea Four Array Area Illustrative Layout**

# 6 Marine Traffic Assessment

## 6.1 Survey Methodology

34. As part of the NRA process, Hornsea Four collected 28 days of marine traffic survey data via dedicated vessel based on-site surveys, full details are contained within the NRA (**Volume A5, Annex 7.1**), with data recorded via Automatic Identification System (AIS), radar, and visual observations. The inclusion of radar and visual observation data in line with MCA requirements under MGN 543 (MCA, 2016) meant all vessel types within the study area during the survey periods were recorded.

35. The survey periods were chosen to account for seasonal variations, and were as follows:

- 11th January to 1st February 2019; and
- 19th July to 2nd August 2019.

36. In line with standard shipping and navigation assessments, the data collected was considered within a study area defined via a minimum 10nm buffer around the Hornsea Four array area (see NRA, **Volume A5, Annex 7.1** for full details), which ensured good data quality within the area studied. It also ensured relevant passing traffic was captured while still remaining site specific to Hornsea Four. It should be considered that any vessels deemed as representing non-routine traffic (e.g., surveys) have been excluded from the assessment.

## 6.2 Data Overview

37. The 28 days of data collected is shown relative to the Hornsea Four array area and the local Tier 2 O&G assets (see Section 3) in Figure 6.1.

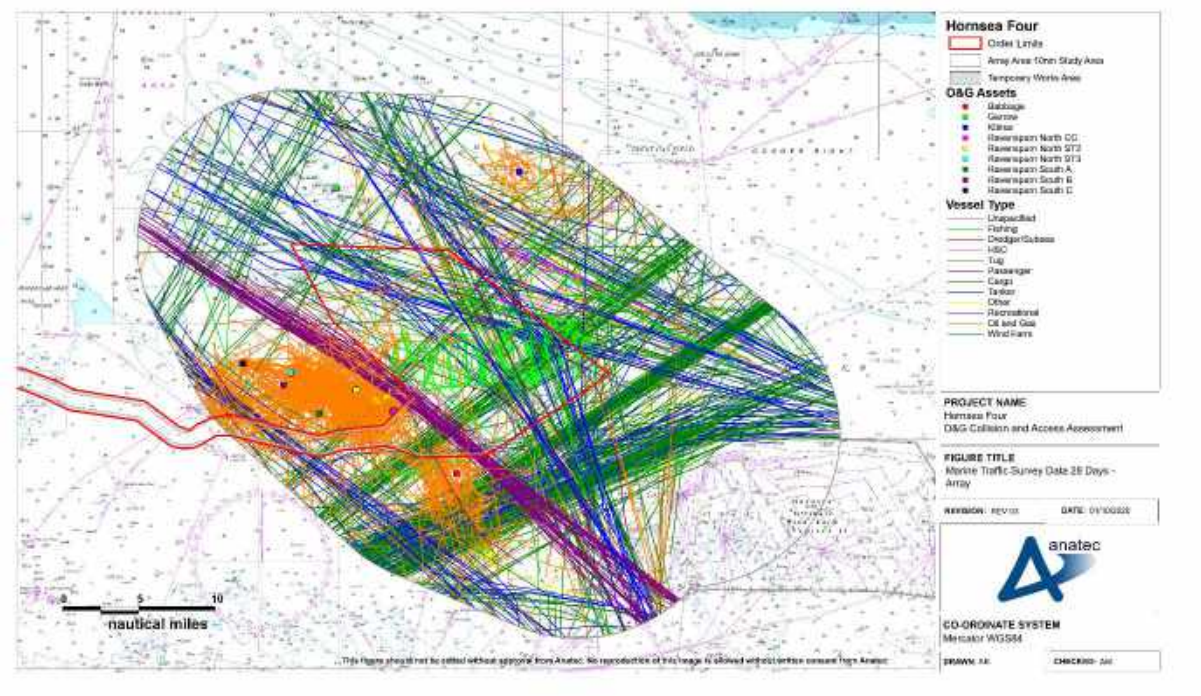



**Figure 6.1 Marine Traffic Survey Data 28 Days – Array**

38. An average of 27 unique vessels per day were recorded within the study area over the 28 days of marine traffic survey data studied, with the most commonly recorded vessels being commercial vessels (cargo and tankers) which accounted for approximately 61% of traffic. O&G support traffic levels were also notable, accounting for approximately one quarter of all vessels recorded.

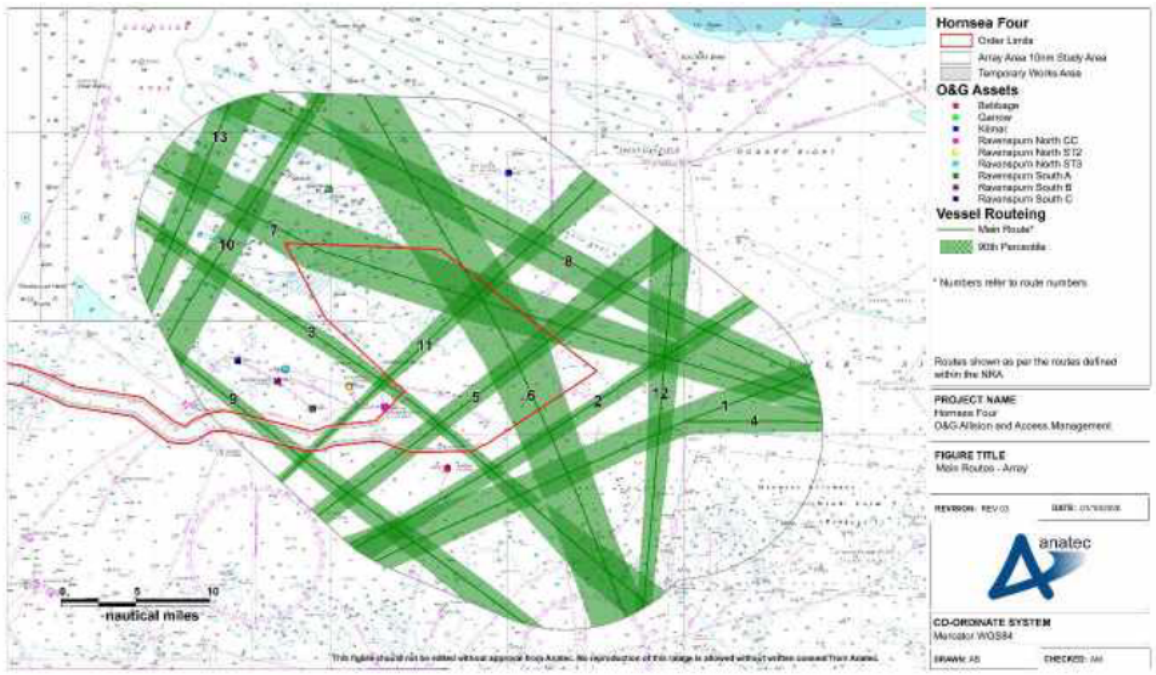
## 6.3 Commercial Vessels

39. An average of approximately six commercial vessels were recorded per day transiting through the Hornsea Four array area. The busiest day was the 1st of August 2019 with 14 unique commercial vessels transiting through, while only one transit was recorded on the 1st of February 2019 which was the quietest day

40. The marine traffic data (see Section 6.2) was used to identify the main routes within the study area using the principles set out in MGN 543 (MCA, 2016). A total of 13 main routes were identified on this basis. The identified routes are shown relative to the Hornsea Four array area and the screened in assets (as per Section 3) in Figure 6.2. In line with MGN 543, 90th percentiles for the sections of routes within the study area were produced as part of the NRA process. These are included in Figure 6.2.

41. Further details of the routes in terms of vessel numbers and origin / terminus ports are provided in Table 6.1. It should be considered that the origin / terminus ports have

been identified via common destinations transmitted by vessels recorded on any given route. As such, vessels on a route within the study area will not necessarily be associated with the ports listed.




## Figure 6.2 Main Routes

## Table 6.1 Summary of Main Route Details

| Route Number | Average Transits per Day | Description (main ports, also may include alternative ports) |
|---|---|---|
| 1 | 2 to 3 | Immingham ((UK) to Esbjerg (Denmark). Route 1 is generally used by cargo vessels (90%) and tankers (10%) and is a DFDS Seaways commercial ferry route. The main vessels operating on this route are the *Ark Dania* and *Ark Germania*. |
| 2 | 2 to 3 | Immingham to Gothenburg (Sweden). Route 2 is generally used by cargo vessels (95%) and tankers (5%) and is a DFDS Seaways commercial ferry route. The main vessels operating on this route are the *Magnolia Seaways*, *Ficaria Seaways* and *Primula Seaways*. |
| 3 | 2[2] | Newcastle (UK) to Amsterdam (Netherlands). Route 3 is generally used by passenger vessels and is a DFDS Seaways passenger ferry route between North Shields (UK) and Ijmuiden (Netherlands). The main vessels operating on this route are the *King Seaways* and *Princess Seaways*. |
| 4 | 1 to 2 | Immingham to Hamburg (Germany). Route 4 is generally used by cargo vessels (55%) and tankers (45%). |

[2] From the vessel traffic survey data, the average transits per day on this route was lower; however DFDS Seaways confirmed during consultation that the King Seaways was in dry dock during the majority of the winter survey period. Therefore, the number given above is reflective of a typical transit activity on this route.

| Route Number | Average Transits per Day | Description (main ports, also may include alternative ports) |
|---|---|---|
| 5 | 1 to 2 | Immingham to Baltic ports. Route 5 is generally used by cargo vessels (95%) and tankers (5%) and is a Finnlines commercial ferry route between Hull (UK) and Helsinki (Finland). |
| 6 | 1 to 2 | Grangemouth (UK) to Rotterdam (Netherlands). Route 6 is generally used by cargo vessels (50%), tankers (30%), offshore vessels (15%) and passenger vessels (5%). |
| 7 | 1 to 2 | Tees (UK) to Rotterdam. Route 7 is generally used by cargo vessels (60%) and tankers (40%). |
| 8 | 1 to 2 | Tees to Amsterdam. Route 8 is generally used by tankers (45%), cargo vessels (40%) and offshore vessels (15%). |
| 9 | 1 | Tees to Rotterdam. Route 9 is generally used by tankers (70%) and cargo vessels (30%). |
| 10 | 0 to 1 | Immingham to southern Norway ports. Route 10 is generally used by cargo vessels (80%) and tankers (20%) and is a Sea-Cargo and Finnlines commercial ferry route between Immingham and Tananger (Norway). |
| 11 | 0 to 1 | Immingham to Baltic ports. Route 11 is generally used by cargo vessels and is a DFDS Seaways commercial ferry route between Immingham and Oslo (Norway). |
| 12 | 0 to 1 | Great Yarmouth (UK) to Trent gas field. Route 12 is generally used by O&G support vessels. |
| 13 | 0 to 1 | Immingham to northern Norway ports. Route 13 is generally used by cargo vessels (50%) and tankers (50%). |

## 6.4 Oil and Gas Support Vessels

42. The O&G support vessels recorded during the study period are presented in Figure 6.3. For reference, transits confirmed as being associated with the Babbage platform are colour coded separately, and all relevant assets are shown for context.

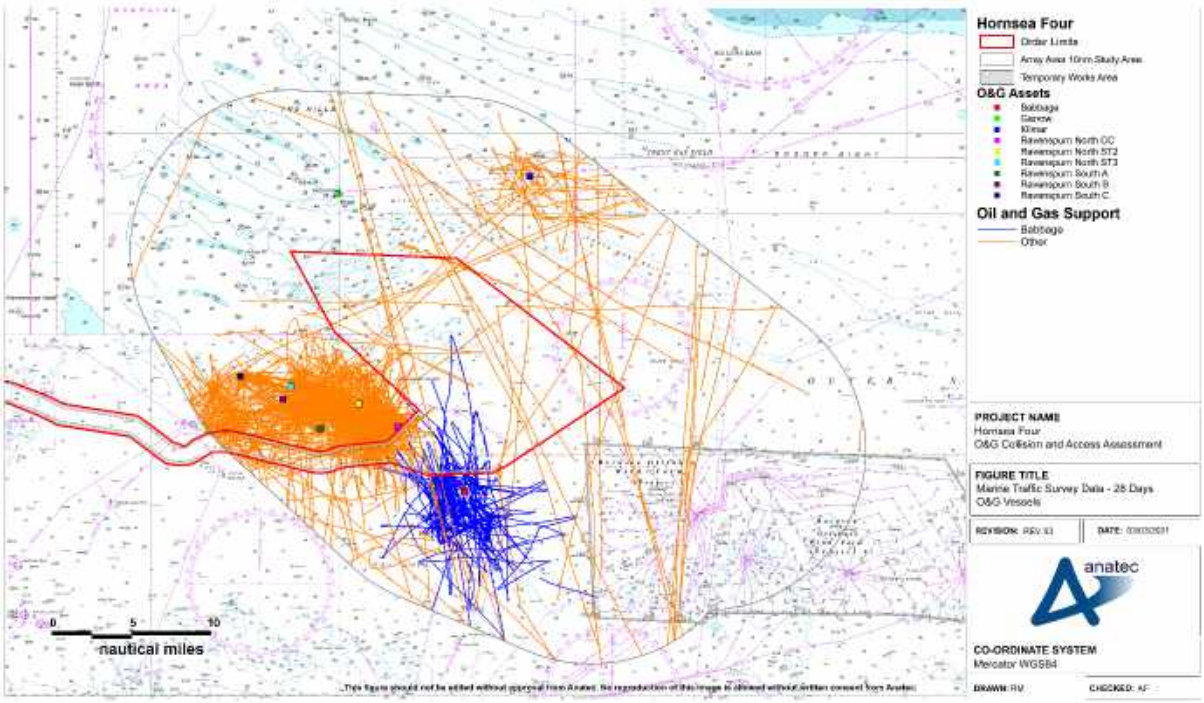



**Figure 6.3 O&G Support Vessels within the Array Area Study Area**

43. There was an average of six O&G support vessels per day recorded during the study period within 10nm of the Hornsea Four array area. The busiest day was 29th January 2019 with nine O&G support vessels detected. The quietest day was the 23rd January 2019 and the 19th July 2019 with three O&G support vessels recorded.

44. The majority of O&G support vessels were observed to be associated with the Ravenspurn assets, noting that vessels were also recorded at the Babbage and Kilmar platforms. Transits to platforms outside of the study area were also recorded, including to Clipper South, Colter, and Trent.

45. It is observed that the significant majority of baseline activity associated with the surface platforms in the area remained outside of the Hornsea Four array area.

46. Routes to the Babbage platform were not defined within the NRA given the period studied did not provide sufficient vessel numbers to do so. Therefore, for the purposes of this assessment, an indicative route has been created based on Anatec's in-house routeing database (Anatec, 2020), as shown in Figure 6.4.

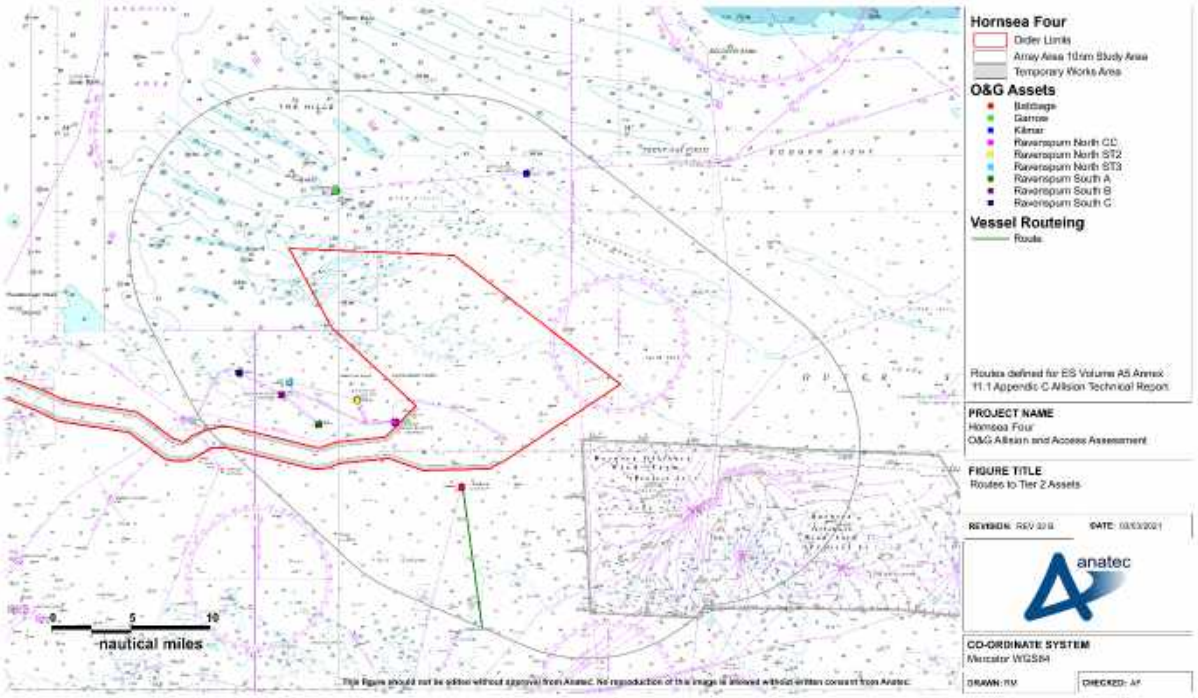



**Figure 6.4 Routes to Tier 2 Assets**

## 6.5 Fishing Vessels

47. The fishing vessels recorded both on AIS and on radar during the study period are presented in Figure 6.5. Approximately 68% of the total was recorded via AIS, with radar comprising the remaining 32%.

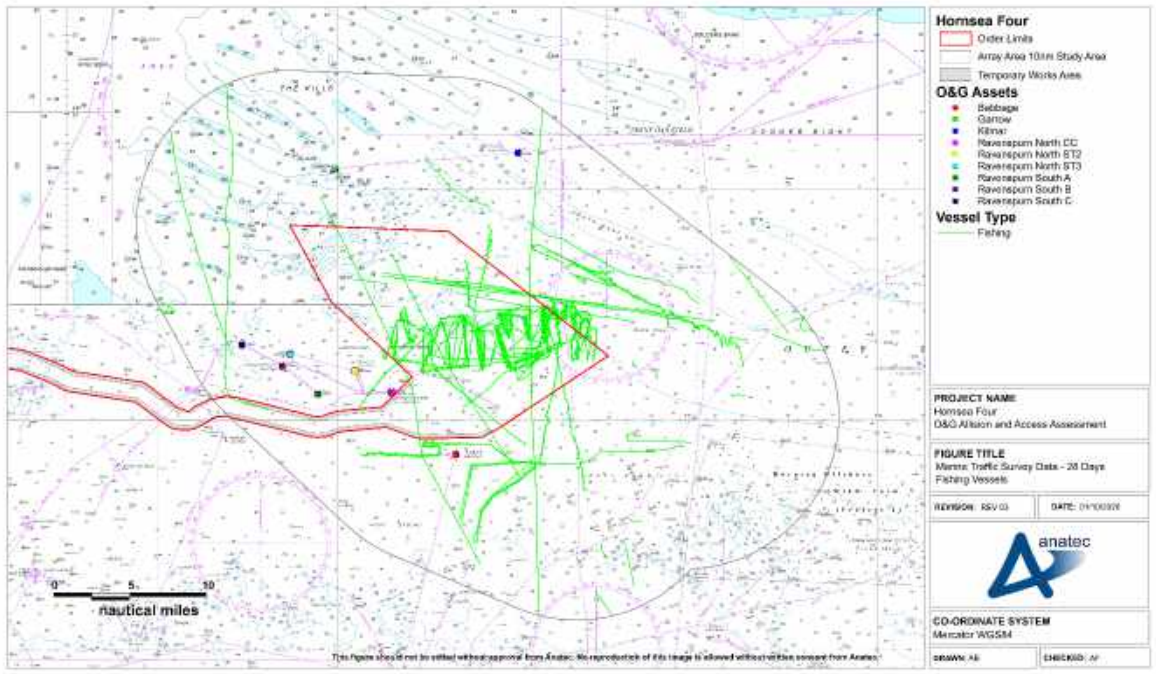



**Figure 6.5 Fishing Vessels within the Array Area Study Area**

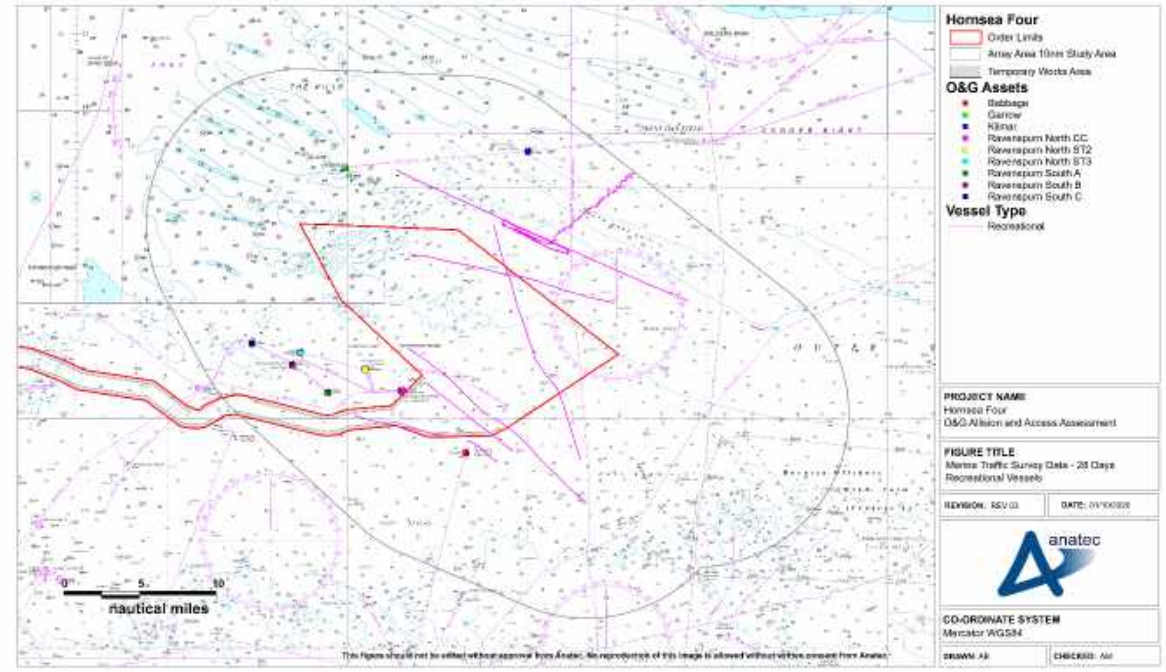
48. There was an average of between one and two unique fishing vessels per day recorded within the study area. The busiest day was the 20th July 2019 when five unique fishing vessels were recorded. It should be considered that 82% of the fishing vessels were recorded during the summer study period (noting that the offshore location of the Hornsea Four array area meaning that fishing vessel levels would be expected to reduce during periods of less favourable weather conditions).

49. Fishing vessels were observed actively fishing within the Hornsea Four array area, but generally avoided the surface O&G platforms, noting the presence of 500 Metre (m) safety zones around the surface assets.

50. In terms of gear type, the majority of activity recorded was observed to be associated with beam / demersal trawling.

## 6.6 Recreational Vessels

51. The recreational vessels recorded during the study period are presented in Figure 6.6. It is noted that all transits were recorded via AIS. Recreational transits were observed to be limited, which is to be expected given the distance offshore of the Hornsea Four array area.




## Figure 6.6 Recreational Vessels within the Array Area Study Area

# 7 Impact on Oil and Gas Platform Allision Risk

## 7.1 Introduction

52. This section assesses potential impacts in relation to allision risk to the Babbage platform, that may arise as a result of the construction and operation of Hornsea Four. Changes between baseline vessel activity (see Section 6) and the predicted future case have then been used to assess the significance of the potential impact.

## 7.2 Identification of Oil and Gas Facilities Potentially Impacted

53. Details of asset screening are provided in Section 3. In summary ,the Babbage platform has been classed as Tier 2 given its proximity to the Hornsea Four array area.

## 7.3 Future Case Shipping

54. Changes in allision risk will primarily be based on changes in routeing that arise as a result of the construction and operation of Hornsea Four. Full details as to how post wind farm routeing has been defined are provided in the NRA (**Volume A5, Annex 7.1**). In summary, given that it is not possible to consider all potential alternative routeing options for commercial traffic, worst case alternatives have been considered where possible in consultation with operators.

55. Therefore, key assumptions for re-routeing include:

- All alternative Mean Route Positions (MRP) maintain a minimum distance of 1nm from offshore installations and existing Wind Turbine Generators (WTGs) boundaries in line with the MGN 543 Shipping Route Template (MCA, 2016) – note that this approach assumes vessel transits are distributed around the MRP, and as such certain vessels will still pass closer than 1nm to assets; and
- All routes take into account sandbanks and known routeing preferences.

56. Post wind farm routeing as identified within the NRA is shown relative to the Tier 2 assets within 10nm of the Hornsea Four array area in Figure 7.1. Noting the presence of Hornsea One and Two (see Figure 5.1), it is considered likely that the majority of commercial vessels on affected routes will pass between Hornsea Four and Hornsea Two.

57. Further details as to changes in vessel levels within close proximity to Babbage are provided in Section 7.4.

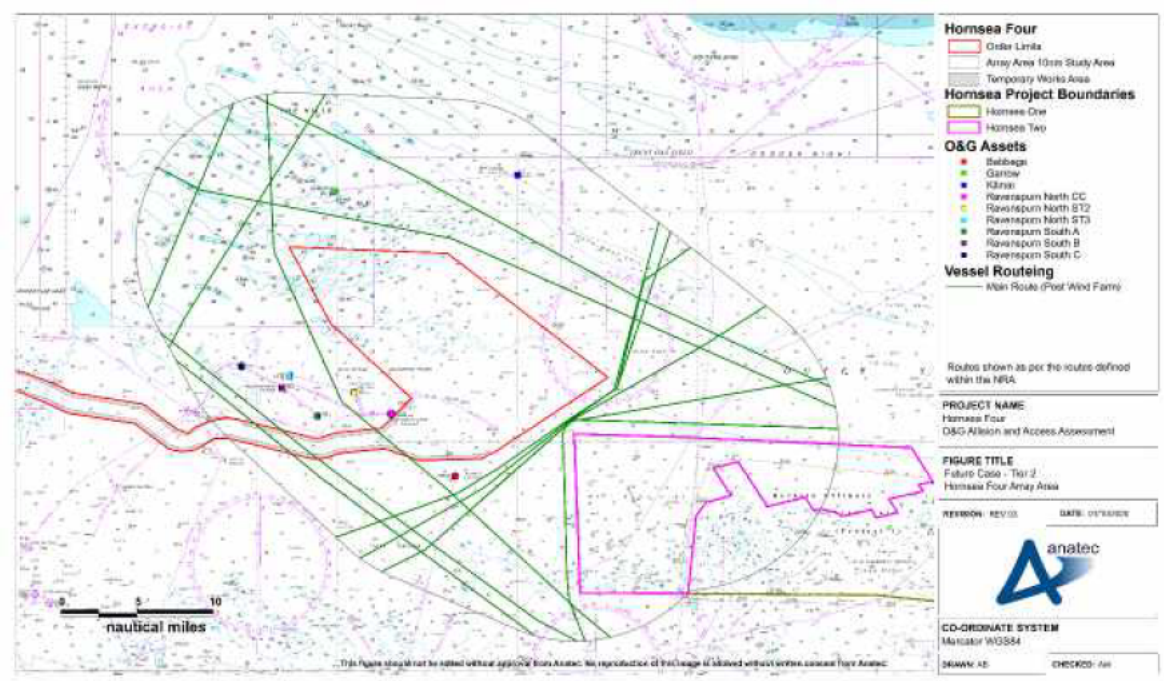



**Figure 7.1 Future Case – Tier 2 Assets**

## 7.4 Proximity Assessment

58. As per Section 4.2.1, assessment of the potential change in traffic levels within 2nm of the Babbage platform has been undertaken. The results of this assessment are provided in Table 7.1.

**Table 7.1 Change in Vessel Numbers within 2nm of Assets**

| Asset | Change in Vessel Numbers per Day within 2nm |
|---|---|
| **Tier 1** | |
| n/a | n/a |
| **Tier 2** | |
| Babbage | 2 |
| **Tier 3** | |
| n/a | n/a |

## 7.5 Impact Assessment

59. As can be seen from the proximity assessment in Section 7.4, it is predicted that vessel numbers within 2nm of Babbage will increase by up to (approximately) two vessels per day. It is important to note that these are based on the worst-case deviations

assessed within the NRA, and as such in reality vessels may choose alternate routes, including passing further from the assets given there is searoom available to do so.

60. It is noted that during consultation with NEO Energy (see Table 2.1), queries were raised over a potential rise in allision risk associated with deviated vessels passing in proximity to the asset. As per the proximity assessment (see Section 7.4), there will be an increase of two vessels per day. However, it is noted that based upon the worst case NRA deviations, no deviated routes are expected to make passage between Babbage and the Hornsea Four array area (see Section 7.3). It should be considered that there would be no restrictions on vessels taking such passage. However, such transits are considered likely to be an extremely unlikely occurrence, noting the presence of the Hornsea One and Two sites to the east (see Figure 5.1) making it more likely that any vessels not passing between Hornsea Four and Hornsea Two will pass south of the Hornsea projects altogether. This is discussed further in Section 7.3, and is considered to be beneficial in terms of allision risk to the Babbage platform.

61. Given at most low increases in vessel numbers predicted within 2nm, significance in terms of allision risk for the Babbage platform is considered to be **broadly acceptable**.

## 7.6 Risk Ranking

62. Based on the assessment within this allision section, the significance of allision risk (including collision for Tier 1) to each of the assets assessed is summarised in Table 7.2.

### Table 7.2 Allision Impact Assessment Summary

| Asset | Significance |
|---|---|
| **Tier 1** | |
| n/a | n/a |
| **Tier 2** | |
| Babbage | Broadly Acceptable |
| **Tier 3** | |
| n/a | n/a |

## 7.7 Risk Mitigation

63. Allision impacts to the Babbage platform are considered **broadly acceptable** and as such no additional mitigation measures are necessary above those considered embedded (see Section 4.4.2).

# 8 Impact on Oil and Gas Access (Rigs & Vessels)

## 8.1 Introduction

64. This section assesses potential access/ proximity impacts in relation to the Babbage platform that may arise as a result of the construction and operation of Hornsea Four. As described in Section 4.2.2, both deviations to routine support vessel routeing and spacing / proximity issues relative to the Hornsea Four structures have been considered.

## 8.2 Identification of Oil and Gas Facilities Potentially Impacted

65. Table 8.1 summarises relevant details of the Babbage platform in relation to access and proximity. This includes the manning status of the platform (e.g., manned, Normally Unmanned Installation (NUI)) as well as the distance from the wind farm boundary.

66. Based on consultation and a review of the destination information transmitted within the marine traffic data studied (see Section 6), the majority of support vessels making routine visits to the surface assets in the area will originate from either Great Yarmouth or Lowestoft. Routeing has been defined on this basis as per Section 6.4.

67. Minimum potential proximity to the nearest Hornsea Four structure (i.e., either Hornsea Four array area or HVAC booster station search area) has been included as this will inform the proximity / spacing assessment.

**Table 8.1 Assets assessed in terms of Access Impacts**

| Asset Name | Status | Minimum Potential Distance from nearest Hornsea Four structure (nm) | Deviation Required for Routine Visits | Estimated Additional Transit Distance |
|---|---|---|---|---|
| **Tier 1** | | | | |
| n/a | n/a | n/a | n/a | n/a |
| **Tier 2** | | | | |
| Babbage | Not Permanently Attended Installation | 2.3 | No | n/a |
| **Tier 3** | | | | |
| n/a | n/a | n/a | n/a | n/a |

## 8.3 Impact Assessment

### 8.3.1 Deviations

68. As per Section 8.2, supply vessels visiting assets in proximity to the Hornsea Four array area are observed to mobilise from Great Yarmouth or Lowestoft. On this basis the Hornsea Four array area will not impact upon routine transits to Babbage, given the platform is located to the south.

69. Regardless, details of Hornsea Four would be promulgated in advance via the usual means (e.g., Notice to Mariners (NtM)), including directly to the relevant operators as identified within this assessment and consulted with to date. This will facilitate advanced passage planning, ensuring any deviations are minimal, and will allow the locations of completed or partially completed structures to be accounted for.

70. On this basis, the deviation impact to the Babbage platform is considered to be **broadly acceptable**, noting the potential for a limited impact to any vessels visiting from ports other than Lowestoft or Great Yarmouth.

### 8.3.2 Proximity (Vessels / Rigs)

71. Access to the Babbage platform has been discussed with NEO Energy as part of consultation (see Table 2.1), with the platform being located approximately 2.3nm from the Hornsea Four array area. Discussions around marine access are ongoing, and it is noted that based on marine traffic analysis (see Section 6.4), activity associated with the Babbage platform remained outside of the Hornsea Four array area.

72. Experience at other wind farms that have been constructed within close proximity to O&G assets shows that large operations can still occur within limited searoom. A relevant example is the Walney Extension Offshore Wind Farm located within the Irish Sea, where three wells (an exploration, appraisal, and development well) are present inside the Walney extension array area. The nearest WTGs to these wells are at a distance of 0.86nm from the exploration well, and 1.3nm from the development and appraisal wells. Despite periodic intervention being required (typically every few years), to date there have been no reported issues.

73. Similarly, Heavy Lift Vessel (HLV) activities associated with wind farm construction has occurred within arrays. An example would be the Stanislav Yudin HLV (with anchor spread) which has carried out operations in the Dudgeon and Beatrice Wind Farms, as well as O&G decommissioning operations where there are other platforms in proximity.

74. These operations are able to be undertaken noting the available industry experience and guidance, such as the Guidelines for Offshore Marine Operations (GOMO) (2020). This guidance facilitates effective planning of these types of operations, taking into account restrictions, to help ensure safe and efficient operations even when searoom is limited.

75. Regardless, ongoing liaison would be necessary to ensure cooperation in terms of simultaneous operations particularly in relation to works associated with export cable installation, noting that the offshore cable corridor is in proximity to the Babbage platform (approximately 1.35nm). Appropriate protocols should therefore be agreed.

76. On this basis, given proximity of the Babbage platform to the Hornsea Four array area and offshore cable corridor, the impact is assessed as being **tolerable with mitigation**.

## 8.4 Risk Ranking

77. Based on the assessment within this access section, the significance of deviation and proximity impacts to each of the assets assessed is summarised in Table 8.2.

### Table 8.2 Access Impact Assessment Summary

| Asset | Significance - Deviations | Significance - Proximity |
|---|---|---|
| **Tier 1** | | |
| n/a | n/a | n/a |
| **Tier 2** | | |
| Babbage | Broadly Acceptable | Tolerable with Mitigation |
| **Tier 3** | | |
| n/a | n/a | n/a |

## 8.5 Risk Mitigation

78. Noting that impacts associated with proximity are **tolerable with mitigation** for the Babbage platform, the following additional mitigation measures should be considered for implementation in terms of reducing effects to within As Low As Reasonably Practicable parameters:

- Focused / targeted promulgation of information to relevant O&G operators; and
- Cooperation and liaison agreements between Hornsea Four and relevant O&G operators in terms of simultaneous operations to ensure any access issues are minimised.

# 9 Summary

79. This assessment has assessed potential allision risk and access issues that may arise to the Babbage platform as a result of the construction and operation of Hornsea Four. The assessment has primarily been informed via marine traffic data collected within the vicinity of the Hornsea Four array area as part of the NRA process, which has been used to identify the baseline (including in terms of O&G activity) and to assess routeing changes that may arise following construction of Hornsea Four.

80. A summary of the findings of the assessment are provided in Table 9.1. These rankings are designed to feed into **Volume A5, Annex 11.1: Offshore Installation Interfaces,** which forms the technical assessment to the relevant ES Chapter (**Volume A2, Chapter 11: Infrastructure and Other Users**).

**Table 9.1 Impact Assessment Summary**

| Asset | Allision | Deviations | Proximity |
|---|---|---|---|
| **Tier 1** | | | |
| n/a | n/a | n/a | n/a |
| **Tier 2** | | | |
| Babbage | Broadly Acceptable | Broadly Acceptable | Tolerable with Mitigation |
| **Tier 3** | | | |
| n/a | n/a | n/a | n/a |

# 10 References

Anatec (2020). Anatec ShipRoutes Database. Aberdeen: Anatec.

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