RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Appendix 15-3 Helicopter Access Report (Revision 2) (Tracked)

April 2025

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Dogger Bank South
OFFSHORE WIND FARM

Helicopter Access Report

Prepared by	Anatec Limited
Presented to	Royal HaskoningDHV
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03	17 July 2024	Updated based on comments from the MCA
04	03 September 2024	Updated based on client comments
05	27 March 2024	Updated based on comments from the MCA

Table of Contents

Abbreviations Table

Abbreviation	Definition
°	Degrees Magnetic
°C	Degrees Celsius
AW139	AgustaWestland 139
ARA	Airborne Radar Approach
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CAT	Commercial Air Transport
ft	Foot
GPS	Global Positioning System
HCA	Helicopter Certification Agency
Hs	Significant Wave Height
IMC	Instrument Meteorological Conditions
iSAR	Integrated Search and Rescue
kt	Knot
m	Metre
MAP	Missed Approach Point
MCA	Maritime and Coastguard Agency
MDH	Minimum Descent Height
MGN	Marine Guidance Notice
nm	Nautical Mile
NOGEPA	Nederlandse Olie en Gas Exploratie en Productie Associatie
NUI	Normally Unmanned Installation
OEI	One Engine Inoperative
Radar	Radio Detection and Ranging
SAR	Search and Rescue
SPA HOFO	Specific Approval for Helicopter Offshore Operations
TEMPSC	Totally Enclosed Motor Propelled Survival Craft
UK	United Kingdom
POB	Person On Board

Abbreviation	Definition
VMC	Visual Meteorological Conditions

1 Executive Summary

1. This report assesses the impact that the Dogger Bank South (DBS) Offshore Wind Farms would have on adjacent oil and gas infrastructure. It will identify the baseline helicopter access and then any changes to the access with DBS constructed.

2. Commercial Air Transport (CAT) Regulations have been applied to identify the current helicopter access. The access is then updated to take account of DBS. The report applies a worse case assumption that wind turbines are built up to the proposed boundaries.

1.1 Meteorological Data

3. Neptune Energy provided meteorological data from the Cygnus Alpha Platform, covering the period 22 September 2016 to 1 December 2022. The data was sampled at a 10-minute frequency, resulting in 325,149 data points over the period.

1.2 Analysis

4. The impact on helicopter CAT access to the installations within 9 nautical miles (nm) have been assessed. For an Airborne Radar Approach (ARA), an obstacle free approach sector of 9nm is assumed. In poor weather sufficient distance must be available for a single engine continued take-off; for recent wind farm projects an IMC take-off distance of 2.8nm has been agreed.

5. Access to the Cygnus A platform would be unaffected by DBS, due to the platform being 9.2nm from the closest DBS boundary.

6. Due to the location of Cygnus B in relation to DBS, it is assessed there would be no impact on helicopter access. Cygnus B is also located 8nm from the Dogger Bank A wind farm. It is assessed that the cumulative effect of these two wind farms would have minimal to no impact on helicopter access.

7. The Cavendish and Munro Platforms are undergoing decommissioning. If decommissioning work is still required at those sites when DBS is built, then access to the Cavendish area would be under day VMC only, with access to Munro similar to the baseline case.

8. Other platforms and wells around the 9nm boundary from DBS are discussed. It is assessed that the helicopter access to those assets would not be affected by DBS.

9. In addition to impacting helicopter access to a specific location, DBS could require helicopters to route around the arrays under certain meteorological conditions. This would increase the transit time from Norwich Airport to Cygnus A in particular. Vantage data, showing the dates and times of flights to the Cygnus field, was superimposed on the meteorological data to determine if a direct flight could be made in the prevailing conditions. The data provided indicates that an average of 27% of flights could potentially

require helicopters to route around the arrays, adding five minutes to both the inbound and return leg to Cygnus A, 10 minutes in total per flight.

1.3 Safety Considerations

10. The Search and Rescue (SAR) helicopters operated on behalf of the Maritime and Coastguard Agency (MCA) are not constrained by CAT meteorological limits. All fixed installations are located outside Dogger Bank South and so SAR access would be unimpaired. SAR helicopters would normally be tasked for major incidents, accidents, and urgent medevacs, rather than CAT helicopters. CAT helicopters may have a supporting role to play but are constrained by regulations, weather limitations and operating hours. In the case of a precautionary down manning, for example due to a loss of installation power and consequent welfare issues, CAT helicopters may have a role to play where the weather permits and helicopters are available during their standard operating hours~~. These events are not time critical. Therefore, any reduction in CAT helicopter access would result in a logistic impact on the installation operator, rather than a safety impact~~.

11. Stretcher patients, or those requiring medical support are not carried in crew change helicopters. Offshore CAT helicopters have restrictions on who they can medevac, with injured, impaired or infectious patients only carried after a risk assessment and following senior management approval. The process results in a delay, so CAT helicopters are not suitable for urgent medevacs.

2 Introduction

~~10.~~12. This report was produced as part of the Applicant's obligations under Civil Aviation Publication (CAP) 764 (Ref i), where the operator of any offshore helicopter destination within 9nm of a wind farm must be consulted at the planning stage of a wind farm.

~~11.~~13. The location of the Dogger Bank South (DBS) Offshore Wind Farms would potentially impose operational restrictions on some of the nearby oil and gas installations. These restrictions could adversely impact on the ability to fly routine crew change flights to support crewed platforms, NUIs, drilling rigs and other vessels working over well heads. In this report any restrictions are identified and quantified.

2.1 Background

~~12.~~14. The methodology used to assess the operational impact has been accepted by helicopter operators and oil and gas operators on previous wind farm projects. Meteorological data from the Cygnus Alpha Platform, covering the period 22 September 2016 to 1 December 2022, was provided. The data was sampled at a 10-minute frequency, resulting in 325,149 data points over the period.

2.2 Commercial Air Transport Regulations (CAT)

~~13.~~15. CAT flights, such as crew change flights to gas platforms, are regulated under the following requirements.

2.2.1 Offshore Approval

~~14.~~*16.* Offshore operations are regulated under Specific Approval for Helicopter Offshore Operations (SPA.HOFO) (Ref ii):

~~15.~~17. "Offshore operation" means a helicopter operation that has a substantial proportion of any flight conducted over open sea areas to or from an offshore location. An offshore operation includes, but is not limited to, a helicopter flight for the purpose of:

- *support of offshore oil, gas and mineral exploration, production, storage and transport;*
- *support of offshore wind turbines and other renewable-energy sources; or*
- *support of ships including sea pilot transfer.*

2.2.2 Meteorological Limits

~~16.~~18. The limitations presented within this section, based on CAT Regulations, have been applied to the Cygnus A data to identify when DBS would affect helicopter access to the infrastructure presented in Table 3.1.

2.2.3 En-Route Descent

~~17.~~19. An en-route descent, where a helicopter may descend from Instrument Meteorological Conditions (IMC) into Visual Meteorological Conditions (VMC), and so make a visual approach to the platform, is permitted when:

- **Day** – cloud base ≥600ft and visibility ≥4,000m.
- **Night** – cloud base ≥1,200ft and visibility ≥5,000m.

2.2.4 Proposed New CAA Limits

~~18.~~20. The CAA is consulting on limiting take-off and landing on helidecks within 3nm of a windfarm to Day VMC only. In addition, the Day limits shown in 2.2.3 will be increased:

- cloud base increased from ≥ 600ft to ≥700ft
- visibility increased from ≥4,000m to ≥5,000m

At present there is no indication if and when these new limitations will be imposed. As a worse case assumption, these increased limits have been applied in this report.

2.2.5 Instrument Meteorological Conditions

~~19.~~21. IMC conditions are assumed to exist when the weather limits are below those for flight under VMC.

2.2.6 Airborne Radar Approach

~~20.~~22. An Airborne Radar Approach (ARA) is flown to a platform when the weather conditions are below the VMC limits. The minima for an ARA are:

- A descent to a Minimum Descent Height (MDH) of 200ft by day or 300ft by night (or deck height plus 50ft if higher); and
- A Missed Approach Point (MAP) no closer than 0.75nm (1,390m) from the installation; this distance is based on the limitations of the Radio Detection and Ranging (Radar) in mapping mode and how it is displayed to the crew.

~~21.~~23. As the helicopter has to be below cloud and in sight of the installation before proceeding visually beyond the MAP, in practical terms this results in the following minimum weather conditions:

- Day – cloud base ≥300ft and visibility ≥1390m
- Night – cloud base ≥400ft and visibility ≥1390m

2.2.6.1 ARA Profile

~~22.~~24. The ARA profile is shown in Figure 2.1 and Figure 2.2. The helicopter's Radar is used as the primary means of navigation and obstacle avoidance, supported by Global Positioning System (GPS).

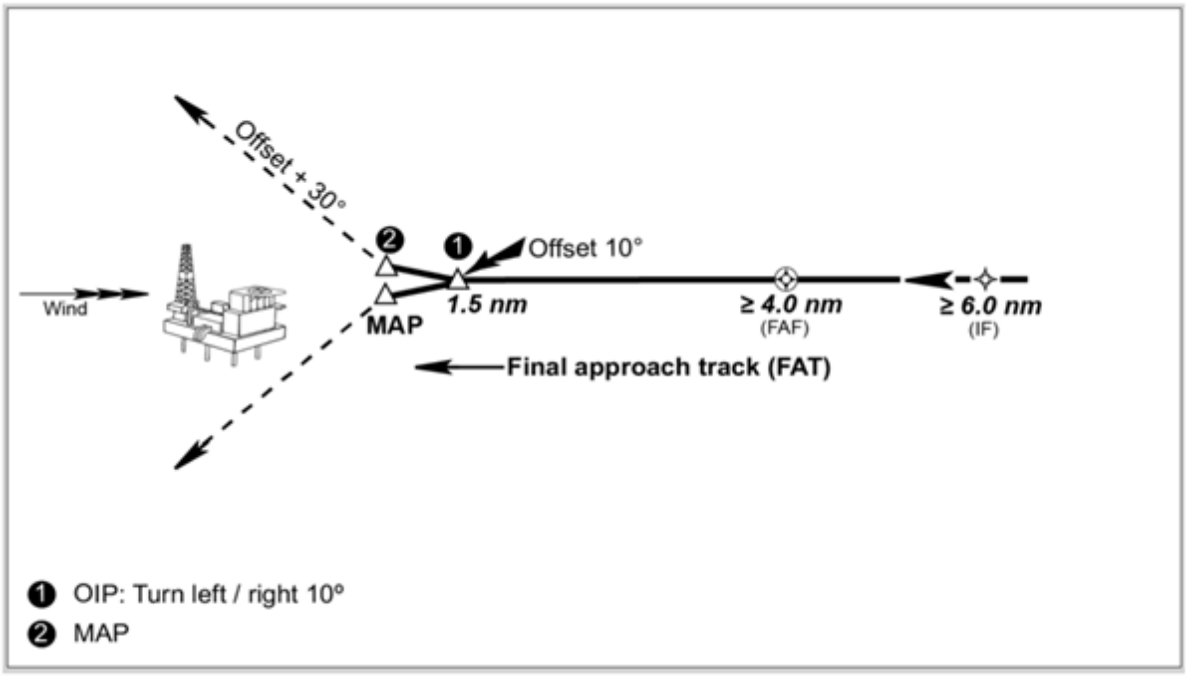

Figure 2.1: ARA Horizontal Profile

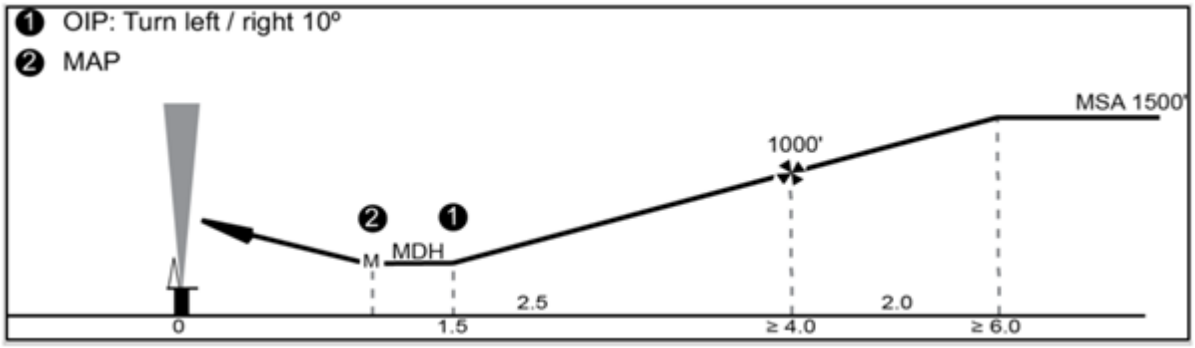

Figure 2.2: ARA Vertical Profile

~~23.~~25. For the purposes of this assessment, it is assumed a 9nm approach sector clear of obstructions is required for an ARA. This distance would allow a helicopter to conduct a direct approach, descending from the Minimum Safe Altitude overhead the wind turbines to achieve the Initial Approach Fix at 1,500ft, or to conduct an arc approach maintaining a 1nm lateral separation distance from the wind turbines.

2.2.7 No-Fly Conditions

~~24.~~26. Any of the following conditions would result in flights being cancelled, or being unable to land at an offshore installation:

- Sea State (significant wave height) ≥6m;
- wind speed ≥60 knots (kt); this is a general limit, but it should be noted that some NUIs have values as low as 30kt due to reduced deck friction;

- unable to land from an ARA – cloud base <200ft by day or <300ft at night or visibility <1,390m;
- forecast Triggered Lightning;
- for a helicopter lacking an approval for flight in icing conditions, icing conditions occurring at 500ft by day and 1,000ft at night are assessed.

~~25.~~27. It is noted that icing conditions are defined as an air temperature below 0 degrees Celsius (°C), with an inflight visibility less than 1,000m and visible moisture present.

~~26.~~28. Forecasts of Triggered Lightning[1] are not recorded in the data, and so the actual percentage of no-fly conditions will be higher than calculated.

[1] https://publicapps.caa.co.uk/docs/33/CAA%20PAPER%202000-2%20A%20FURTHER%20STUDY%20OF%20LIGHTING%20STRIKES%20TO%20HELICOPTERS%20OVER%20THE%20NORTH%20SEA.pdf

3 Methodology

~~27.~~29. This assessment has applied the CAT weather limits, as a series of filters, to the meteorological data provided in order to understand the potential operational impact on the gas infrastructure within 9nm of the wind farms. Initially it will assess the baseline access restrictions from operational wind farms and wind farms currently under construction. It will then assess the additional impact of wind farms at the planning stage.

~~28.~~30. Any obstructions within a radius of 9nm are taken into account in this assessment. Obstructions outside 9nm may not have an impact on the ability to fly an approach or departure but may still require a change to the aircraft's routing and so result in longer flights and more fuel burned, so they are also assessed.

~~29.~~31. The assessment is focused on identifying any reduced access when operating under CAT Regulations, but access under SAR Regulations is also considered.

3.1 Assumptions

~~30.~~32. The following assumptions were used:

- as the exact locations and height of the turbines is not yet known, it is assumed that the boundary of the wind farms forms a solid wall of turbines and they are greater than 1,000ft high;
- for an ARA, an approach arc clear of obstacles out to 9nm is required. This will allow a circling approach to a Final Approach Fix at 6nm;
- an approach up to 30° out of wind may be made providing the resulting angle of drift is no more than 10°.

3.2 Infrastructure Assessed

~~31.~~33. The infrastructure assessed is shown in Table 3.1.

Table 3.1: Details of Assessed Infrastructure

Installation Name	Type	Operator	Status	Distance to DBS East (nm)	Distance to DBS West (nm)
Cavendish Platform	Platform	Ineos Industries	Decommissioning	1.9	6.7
Dogger Bank A Boundary	Wind Farm	SSE Renewables/Equinor	Under Construction	5.4	4.0
Munro MH Platform	Platform	Harbour Energy	Decommissioning	6.0	22.7

Installation Name	Type	Operator	Status	Distance to DBS East (nm)	Distance to DBS West (nm)
Cygnus B (BWHP) Platform	Platform	Neptune E&P	Active	7.0	15.9
Hawksley EM Well	Well	Harbour Energy	Decommissioning	8.6	24.1
McAdam MM Well	Well	Harbour Energy	Decommissioning	8.6	27.3
Trent Well	Well	Unknown	Unknown	8.6	14.9
Trent Platform	Platform	Perenco Oil & Gas	Decommissioning	9.2	14.8
Cygnus A (APU) Platform	Platform	Neptune E&P	Active	9.2	19.6
Cygnus A (AWHP) Platform	Platform	Neptune E&P	Active	9.3	19.6

3.3 Meteorological Data Provided

~~32.~~34. Neptune Energy provided meteorological data from the Cygnus Alpha Platform, covering the period 22 September 2016 to 1 December 2022. The data was sampled at a 10-minute frequency, resulting in 325,149 data points over the period.

3.3.1 Meteorological Parameters

~~33.~~35. The following parameters were used:

- Timestamp – year/month/day/hour/minute/second
- Visibility – m
- Cloud base – ft
- Wind direction (10-minute average) – °
- Wind speed (10-minute peak) – m/s converted to kt
- Air temperature - °C
- Maximum wave height (Hmax) - m

3.3.2 Data Anomalies

~~34.~~36. The data provided did not record the Significant Wave Height (Hs) that is usually applied to helicopter ditching limitations. Hs is the average of the largest 33% of waves and is the wave parameter used for helicopter ditching certification and UK operational flight limits. The main helicopter types used on the North Sea are certified for ditching in 6m Hs. Additionally, a relatively high proportion of the wave data was recorded as being not a number (NaN), i.e. was invalid. Due to these two factors, the maximum wave height (Hmax) was used to identify no fly conditions, with no-fly conditions due to wave height calculated separately from the main no-fly conditions.

3.4 Meteorological Analysis

~~35.~~37. The meteorological limits, defined in the Regulations and shown in Sections 2.2.3 – 2.2.6, were applied as a series of filters to the data. The filters identified when the conditions were:

- Day VMC
- Night VMC
- Day IMC
- Night IMC
- No-fly, when the conditions were below offshore limits and so an ARA could not be flown.

~~36.~~38. The data was then summarised in a series of tables and graphs to identify if and when CAT flights might have reduced access.

4 Operational Restrictions

~~37.~~39. This section will use the methodology described in Section 3 and apply it to the operational helicopter environment. Following this, Section 6 onwards will identify any restrictions on helicopter access specific to the facilities shown in Table 3.1.

4.1 Approach Limitations

~~38.~~40. Applying the meteorological limits described in Section 2.2.3 – 2.2.6 to the meteorological data provides the percentage of occasions when each approach type is permitted or required.

~~39.~~41. Table 4.1 shows the percentage of day and night VMC access, i.e., when an en-route descent into visual conditions can be made, and a visual approach and take-off to/from a platform is available. This takes no account of any obstructions within 9nm.

Table 4.1: Cygnus A - Day and Night VMC Access

Year	Day VMC	Day IMC	Night VMC	Night IMC
2016	94.2%	5.8%	85.6%	14.4%
2017	92.7%	7.3%	84.7%	15.3%
2018	89.7%	10.3%	81.8%	18.2%
2019	94.8%	5.2%	85.9%	14.1%
2020	95.0%	5.0%	87.8%	12.2%
2021	93.5%	6.5%	84.2%	15.8%
2022	97.1%	2.9%	91.5%	8.5%
Mean[Note]	**93.8%**	**6.2%**	**79.9%**	**14.0%**

Note: 2016 data is excluded from the average as it only included 4 months of data

~~40.~~42. Previous analysis using larger meteorological data sets for the Southern North Sea, sampled at a 10-minute interval, provided similar results.

~~41.~~43. Table 4.1 does not consider when the conditions did not permit flying, i.e., the conditions identified in Section 2.2.7. Table 4.2 shows an average of 1.3% of daylight IMC did not permit flying, so leaving an average of 4.9% (6.2% minus 1.3%) of usable IMC. For night conditions, an average of 1.6% were unusable, leaving 12.4% (14.0% minus 1.6%) usable. When considering the loss of access, the usable IMC figures should be applied and not all IMC periods. The implication is that even if only VMC access was available, the loss of access compared to today would be an average loss of 4.9% by day and 12.4% at night.

~~42.~~44. Due to the data anomalies, identified in 3.3.2, the no fly conditions shown in Table 4.2 do not include wave data. Applying the maximum wave height in the data (Hmax) and taking no account of the missing datapoints, indicated that approximately 1% of day and

night would be lost due to high sea states being outside the certified helicopter ditching parameters. High sea states can occur in both VMC and IMC, so do not affect the ratio of VMC to IMC.

Table 4.2: Cygnus A - Usable IMC Access

Year	Usable IMC Day	Day IMC	Day No Fly	Usable IMC Night	Night IMC	Night No Fly
2016	4.6%	5.8%	1.2%	12.7%	14.4%	1.7%
2017	5.9%	7.3%	1.4%	13.5%	15.3%	1.8%
2018	6.7%	10.3%	3.6%	14.6%	18.2%	3.6%
2019	4.7%	5.2%	0.5%	13.6%	14.1%	0.5%
2020	4.1%	5.0%	0.9%	11.1%	12.2%	1.1%
2021	5.3%	6.5%	1.2%	13.7%	15.8%	2.1%
2022	2.9%	2.9%	0.5%	7.7%	8.5%	0.8%
Mean[Note]	**4.9%**	**6.2%**	**1.3%**	**12.4%**	**14.0%**	**1.6%**

Note: 2016 data is excluded from the average as it only included 4 months of data

5 Emergency Conditions

~~43.~~45. The methodology used so far in this Report addresses helicopter access under CAT Regulations. Emergency evacuation of any installation, critical Medevacs and SAR are not constrained by CAT Regulations as these flights are generally flown by the Coastguard SAR aircraft operating under CAP 999 (Ref iii). The Coastguard helicopters are operated as State Aircraft under National Regulations and are not constrained by the higher weather limits in CAT Regulations. Also, commercial SAR can be flown with some alleviations from CAT Regulations. Such SAR arrangements have existed in the United Kingdom, Norway and the Netherlands for decades and include SAR coverage provided by the Integrated Search and Rescue (iSAR) Consortium in Aberdeen (formerly Jigsaw Aviation), SAR helicopters based in the Ekofisk Field, and SAR helicopters under contract to Nederlandse Olie en Gas Exploratie en Productie Associatie (NOGEPA), the Dutch equivalent of Oil & Gas UK.

~~44.~~46. CAP 999 defines the SAR operating minima as:

> *Operating minima for the dispatch and continuation of a SAR operational flight are at the discretion of the aircraft commander. However, he is to consider the urgency of the task, crew and aircraft capability and the requirement to recover the aircraft safely.*

~~45.~~47. In the case of Dogger Bank South, all the fixed installations are located outside the wind farm and so SAR access will not be impaired. Although SAR and CAT helicopters are usually the preferred means for an emergency evacuation, they cannot be the primary means of an emergency evacuation in all cases. For example, helicopters cannot be used when the approach, take-off, or helideck are affected by a hydrocarbon release, fire or explosion. In the event of an emergency on the platform resulting in an explosion, fire or release of hydrocarbons, helicopters would be unable to land and so other means of evacuation, such as Totally Enclosed Motor Propelled Survival Craft (TEMPSC) or Seascape escape systems would be required.

~~46.~~48. In the case of a precautionary down manning, for example due to a loss of installation power and consequent welfare issues, CAT helicopters may have a role to play where the weather permits and helicopters are available during their standard operating hours. These events are not time critical.

~~47.~~49. Medevacs are frequently conducted by Coastguard SAR helicopters, or the iSAR specialist helicopter based in Aberdeen. For example, Coastguard SAR helicopters conducted 261 medevacs in 2021 and 337 medevacs in 2022 (Ref iv). Medevacs may be conducted by CAT helicopters. Offshore CAT helicopters do not carry stretcher patients or those requiring a medical attendant, so are limited in scope. Impaired, non-stable or infectious patients, or those who cannot wear standard survival equipment, require a risk assessment and senior management approval: if approved these flights are restricted to day only. Apart from restrictions on who they can carry, the risk assessment process also

introduces delays to a medevac flight, resulting in a service only responsive to minor injuries and infections.

~~48.~~50. In summary, although a reduction in helicopter access under CAT Regulations would impose a logistic restriction on an oil and gas installation, it would not result in a reduced level of safety, as SAR helicopters would still have full access due to the installations being located outside Dogger Bank South.

6 Infrastructure Specific Access

~~49.~~51. This section will now identify if helicopter operations would be constrained by current and future wind farms. It will be done in two parts: firstly, identifying baseline access taking account of any restrictions due to current wind farms; secondly, it will identify any additional restrictions imposed by the DBS offshore wind farms.

~~50.~~52. Figure 6.1 shows the proposed boundaries of the wind farms, the locations of the adjacent wind farms and gas infrastructure.

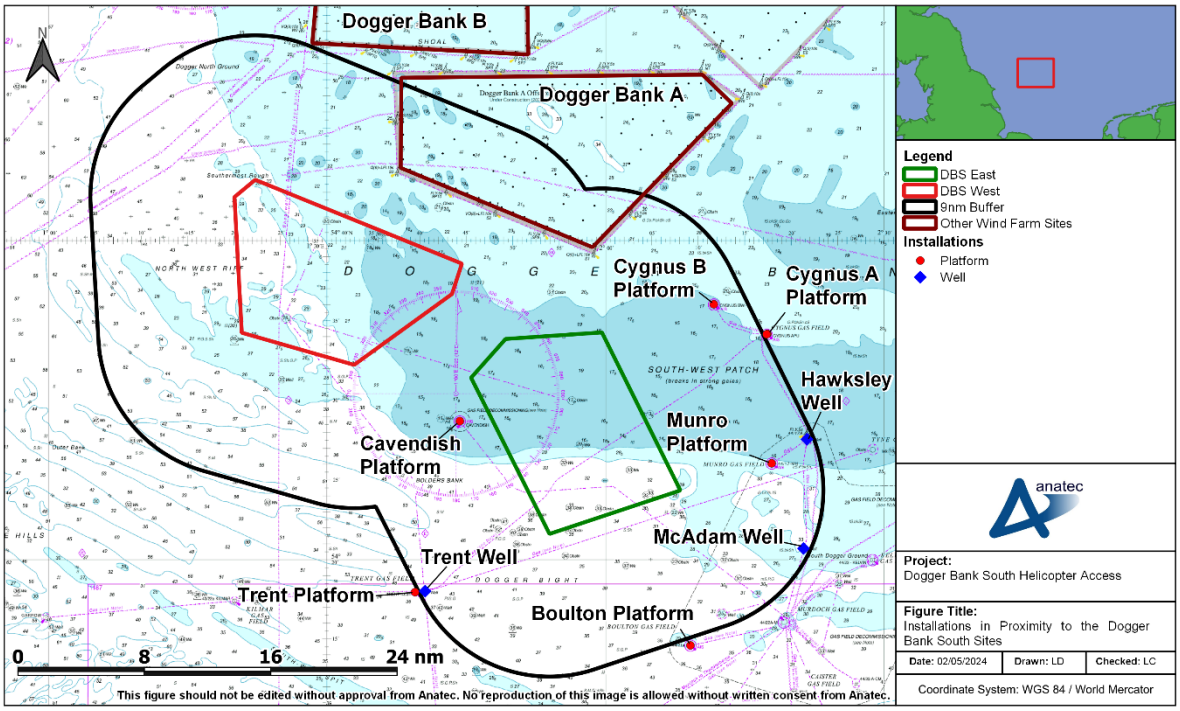

Figure 6.1: Dogger Bank South, Gas Installations and Adjacent Wind Infrastructure

~~51.~~53. Due to performance and handling requirements, helicopters will normally approach to land and take-off facing into the prevailing wind. Approaching with a slight crosswind when at a safe speed is acceptable, but at speeds below 50kts the helicopter should be orientated into wind. The requirement to approach and depart a platform into wind results in restrictions if either is obstructed by obstacles, such as a wind turbine.

~~52.~~54. Another factor which must be considered is the take-off distance required in the event of an engine failure during take-off, known as a One Engine Inoperative (OEI) take-off. Under VMC a distance of approximately 1nm to the closest object is sufficient to climb to 500ft and then turn away from obstacles whilst continuing the climb. Under IMC, the climb will be continued to 1,000ft before turning. Additionally, in IMC a 1nm buffer between the flight path and any obstacle must be included, and so the total distance required will be larger, typically greater than 2.5nm for current types, such as the AW139 helicopter.

6.1 Cygnus Alpha

~~53.~~55. The Cygnus A Platform details are shown below. The Platform is approved for day and night operations. Cygnus A is located 9.2nm from the DBS East boundary.

HCA Helideck Certification Agency		HELIDECK INFORMATION PLATE			
HELIDECK Elev **177 ft**	VAR **Check**	POSITION **N54 34.1 E002 17.2**	EGJF **Cygnus Alpha**		
HEIGHT OF INSTALLATION: **350ft** HIGHEST OBSTACLE WITHIN 5NM: **Cygnus B**			VHF **122.230**	NDB **N/A**	Issue Date **11/10/22**
FUELLING INSTALLATION: **Yes** STARTING EQUIPMENT: **Yes**			Operating Company **Neptune Energy**		Issued By **Helideck Certification Agency**
HELIDECK D value: **22.25** P/R/H Category: **F** Max Weight: **12.6** Circle & H Lights: **Yes**					
					
Wind (T°)	**Kts**	**Limitation /Comment**			
		Manned platform • Table 1(T) if overflight of 5:1 infringements unavoidable • Possible turbulence from turbine exhaust east of helideck Turbulence reports requested.			
		Non Compliance			
5:1		East and west access platforms			

Figure 7.1: Cygnus Alpha Platform Information Plate

6.1.1 Baseline Access

~~54.~~56. Cygnus A is located more than 9nm from any current wind farm and so there are no current access restrictions.

6.1.2 Future Access

6.1.2.1 Flight Under Visual Flight Conditions

~~55.~~57. To permit helicopter access in VMC, sufficient space has to be provided for approaches and take-off. Current VMC operations in and around wind farms show day operations require an obstacle free radius of 1nm or less. At night an obstacle free radius of 3nm is required. In VMC there would be no impact on day or night operations as sufficient space is available for any type of VMC approach and departure. Therefore, the VMC figures in Table 4.1 would apply.

6.1.2.2 Flight Under Instrument Flight Conditions

~~56.~~58. To permit helicopter access in IMC, sufficient space must be provided for approaches and take-off that take account of regulatory requirements. The minimum requirement in IMC is approximately 2.8nm clear of obstacles for take-off and 9nm for an ARA. Cygnus A is located 9.2nm from the boundary of DBS East and so there would be no impact on helicopter access under IMC. The access remains unaltered from the baseline condition: Table 4.1 shows the VMC access available, and Table 4.2 shows the additional usable IMC access available.

6.1.2.3 Icing Conditions

~~57.~~59. In IMC aircraft must transit at or above the Minimum Safe Altitude, i.e. 1,000ft above obstacles. This has led to an increase in transit altitude over wind farms, typically 2,000ft or higher, compared to the current offshore Minimum IMC altitude of 1,500ft. Most helicopters operated on the Southern North Sea are not equipped for flight in airframe icing conditions. In winter this may require helicopters to route around wind farms rather than making a direct transit to their destination. Taking a more circuitous route would increase flying time, thereby increasing the cost of the flight and possibly reducing the available client payload.

6.1.3 Cygnus Alpha Summary

~~58.~~60. Due to the location of Cygnus A in relation to DBS, there would be no impact on helicopter access.

~~59.~~61. In icing conditions, the position of DBS in relation to Cygnus A could result in the transit distance and time being increased, as a direct transit over DBS might not be possible. This additional routing would increase the cost of the flight and might result a slight loss of client payload.

6.2 Cygnus Bravo

~~60.~~62. The Cygnus B Platform details are shown below. The Platform is a NUI approved for day and night operations. Cygnus B is located 7.0nm from the DBS East boundary.

<table>
<tr><td colspan="2">  </td><td colspan="4">HELIDECK INFORMATION PLATE</td></tr>
<tr><td>HELIDECK
Elev 140 ft</td><td>VAR
0</td><td>POSITION
054° 35’ 58.900”N
002° 11’ 42.700”E</td><td colspan="3">EGJG Cygnus Bravo</td></tr>
<tr><td colspan="3">HEIGHT OF INSTALLATION: 196ft HIGHEST OBSTACLE WITHIN 5NM: Check</td><td>VHF
122.230</td><td>NDB
Nil</td><td>Issue Date
17/5/2023</td></tr>
<tr><td colspan="3">FUELLING INSTALLATION: No STARTING EQUIPMENT: No</td><td rowspan="2">Operating Company

Neptune</td><td rowspan="2" colspan="2">Issued By
Helideck Certification Agency</td></tr>
<tr><td colspan="3">HELIDECK D value: 22.25
P/R/H Category: F
Max Weight: 12.6 Circle & H Lights: Yes</td></tr>
<tr><td colspan="6">  </td></tr>
<tr><td>Wind (T°)</td><td>Kts</td><td colspan="4">Limitation /Comment</td></tr>
<tr><td></td><td></td><td colspan="4">NUI
• Table 1(T) if overflight of 5:1 infringements unavoidable</td></tr>
</table>

	Non Compliance
5:1	East and west access platforms extend 4.6m from edge of SLA

6.2.1 Baseline Access

~~61.~~63. Cygnus B is located 8nm south east of the Dogger Bank A wind farm. Due to the distance and orientation of Dogger Bank A from Cygnus B, it is not anticipated that helicopter access would be affected.

6.2.2 Future Access

6.2.2.1 Flight Under Visual Flight Conditions

~~62.~~64. To permit helicopter access in VMC, sufficient space has to be provided for approaches and take-off. Current operations in and around wind farms show day operations require an obstacle free radius of 1nm or less. At night an obstacle free radius of 3nm is required. In VMC there would be no impact on day or night operations as sufficient space is available for any type of VMC approach and departure. Therefore, the VMC figures in Table 4.1 would apply.

6.2.2.2 Flight Under Instrument Flight Conditions

~~63.~~65. To permit helicopter access in IMC, sufficient space has to be provided for approaches and take-off. The minimum requirement in IMC is approximately 2.8nm clear of obstacles for take-off and 9nm for an ARA. Previously the helicopter operators have accepted that ARAs may be flown up to 30^{o} out of wind providing the drift angle is less than 10^{o}. As Cygnus B is located 7.0nm from the DBS East boundary, then a slight adjustment of the approach direction would permit an obstacle free approach to be flown. There would be no restrictions on take-off in IMC. It is assessed that the access remains unaltered from the baseline condition: Table 4.1 shows the VMC access available, and Table 4.2 shows the additional usable IMC access available.

6.2.2.3 Icing Conditions

~~64.~~66. In IMC aircraft must transit at or above the Minimum Safe Altitude, i.e. 1,000ft above obstacles. This has led to an increase in transit altitude over wind farms, typically 2,000ft or higher, compared to the current offshore Minimum IMC altitude of 1,500ft. In winter this may require helicopters to route around wind farms rather than making a direct transit to their destination. Taking a more circuitous route would increase flying time, thereby increasing the cost of the flight and possibly reducing the available client payload.

6.2.3 Cygnus Bravo Summary

~~65.~~67. Due to the location of Cygnus B in relation to DBS, it is assessed there would be no impact on helicopter access.

~~66.~~68. In icing conditions, the position of DBS in relation to Cygnus B could result in the transit distance and time being increased, as a direct transit over DBS might not be possible. This additional routing would increase the cost of the flight and might result a slight loss of client payload.

6.3 Cavendish Platform

~~67.~~69. The Cavendish Platform is undergoing decommissioning. It is located 1.9nm from the boundary of DBS East.

6.3.1 Baseline Access

~~68.~~70. Currently there are no limitations on access to the Cavendish Platform area due to wind farms. The current access under VMC is shown in Table 4.1 and the additional access in usable IMC shown in Table 4.2.

6.3.2 Future Access

~~69.~~71. If Cavendish and its associated infrastructure has not been decommissioned when DBS is built, then a Non Productive Installation (NPI) such as a jack-up rig might have to work over the location. Only day VMC access would be available due to the proximity of the wind farm. The available daytime access would be an average of 93.8% (Table 4.1). Other decommissioning campaigns to NPIs have shown that approximately 4 flights per week are flown to the location and these are predominantly flown during daytime. It is assessed that decommissioning operations are unlikely to be impaired due to the location of DBS.

~~70.~~72. As SAR helicopters operate under different operational regulations, emergency flights at night or in IMC would not be affected by the proximity of Cavendish to DBS.

6.3.3 Summary

~~71.~~73. Access to the Cavendish Platform area would only be available under day VMC.

6.4 Munro Platform

~~72.~~74. The Munro Platform is undergoing decommissioning. It is located 6.0nm from the boundary of DBS East.

6.4.1 Baseline Access

~~73.~~75. Currently there are no limitations on access to the Munro Platform area due to wind farms. The current access under VMC is shown in Table 4.1 and the additional access in usable IMC shown in Table 4.2.

6.4.2 Future Access

6.4.2.1 Flight Under Visual Flight Conditions

~~74.~~76. If Munro and its associated infrastructure has not been decommissioned when DBS is built, then a NPI such as a jack-up rig might have to work over the location. As Munro is 6.0nm from DBS East, day and night VMC access would be available to the area.

6.4.2.2 Flight Under Instrument Flight Conditions

~~75.~~77. To permit helicopter access in IMC, sufficient space has to be provided for approaches and take-off. The minimum requirement in IMC is approximately 2.8nm clear of obstacles for take-off and 9nm for an ARA. Previously the helicopter operators have accepted that ARAs may be flown up to 30^{o} out of wind providing the drift angle is less than 10^{o}. As Munro is located 6.0nm from DBS East, then a slight adjustment of the approach direction would normally permit an obstacle free approach to be flown. There would be no restrictions on take-off in IMC. It is assessed that the access remains similar to the baseline condition: Table 4.1 shows the VMC access available, and Table 4.2 shows the additional usable IMC access available.

6.4.3 Summary

~~76.~~78. It is assessed that access to the Munro area would remain similar to the baseline condition: Table 4.1 shows the VMC access available, and Table 4.2 shows the additional usable IMC access available.

6.5 Other Platforms and Wells

6.5.1 Trent

~~77.~~79. The Trent NUI and Trent Well are situated 9.2nm and 8.6nm respectively from the boundary to DBS East. Due to these distances and the unobstructed access to the area, it is assessed that helicopter access would be unimpaired.

6.5.2 McAdam Well

~~78.~~80. The McAdam Well is located 8.6nm from the boundary to DBS East. Due to this distance and its location to the south east of DBS, it is assessed that a NPI working over that location would have unimpaired helicopter access.

6.5.3 Hawksley Well

~~79.~~81. The Hawksley Well is located 8.6nm from the boundary to DBS East. Due to this distance and its location to the east of DBS, it is assessed that a NPI working over that location would have unimpaired helicopter access.

7 Cumulative Assessment

~~80.~~82. The Dogger Bank A wind farm boundary is located 5.4nm north of DBS at its closest point. The only gas installation within 9nm of Dogger Bank A is Cygnus B, located at a distance of 8nm. Due to the distances and orientation of both Dogger Bank A and DBS in relation to Cygnus B, it is assessed that minimal to no cumulative impact on access would occur.

~~81.~~83. In icing conditions, the location of DBS and other wind farms in the region could result in helicopters routing around wind farms, rather than over them. This would increase flight times and the cost to the helicopter operators' clients.

7.1 Rerouting Assessment

~~82.~~84. Flights to the Cygnus A Platform can currently route direct from Norwich Airport. If DBS is built, direct flights would not be possible in some meteorological conditions, requiring flights to make a dog leg to the south of the array and then route north east to the Platform. Four conditions have been assessed where a direct overflight of the array can be made: day VMC and IMC transits; then night VMC and IMC transits.

7.1.1 Day VMC Transit

~~83.~~85. A direct VMC transit overhead DBS could be made if the helicopter can overfly 500ft above the turbines, while remaining at least 200ft below the cloud base. Assuming the turbines will be up to 1,000ft high, then a minimum cloud base of 1,700ft would be required. Additionally, applying the proposed CAA visibility limits within 3nm of a wind farm, the minimum visibility must be at least 5,000m.

7.1.2 Day IMC Transit

~~84.~~86. A direct IMC transit overhead DBS could be made if the helicopter can overfly 1,000ft above obstacles (Minimum Safe Altitude). Assuming a turbine height of 1,000ft, then the minimum transit height will be 2,000ft. The majority of helicopters used on the Southern North Sea are not equipped for flight in airframe icing conditions, so icing is a consideration for IMC flights. Applying the Dry Adiabatic Lapse Rate of 3°C per 1,000ft, a surface temperate of 6°C or less indicates the potential for icing in cloud at 2,000ft or higher.

7.1.3 Night VMC Transit

~~85.~~87. A night VMC overflight of DBS requires the same meteorological conditions and transit height as a day VMC transit. Additionally, the limited operating hours of Norwich Airport (Humberside Airport has similar operating hours) must be taken into account. Norwich Airport is open between 06:00 and 21:00, allowing for a 30 minute transit to Cygnus A means that the operating envelope in the DBS area is between 06:30 and 20:30.

7.1.4 Night IMC Transit.

~~86.~~88. A Night IMC transit has the same requirements as a day IMC transit but is constrained by the operating hours of Norwich Airport.

7.2 Vantage Assessment

~~87.~~89. Vantage data showing the dates and times of flights to the Cygnus field was provided by Neptune Energy. The data covered the period 2019 to 2022. The flights recorded in Vantage were superimposed on the meteorological data to identify the meteorological conditions existing at the time of a flight. Knowing the conditions when a flight occurred, and by applying the criteria in section 7.1, allowed a determination to be made if a direct flight could occur, or if a dog leg was necessary. Table 7.1 shows the annual number of flights and the percentage when a dog leg around the south east corner of DBS may have been necessary.

Table 7.1 Count of Total Annual Flights and the Percentage When a Dog Leg was Required

Year	Count of Annual Flights	Percentage of Flights Requiring a Dog Leg
2019	320	28%
2020	297	32%
2021	337	28%
2022	299	19%
Mean	**313**	**27%**

~~88.~~90. When a direct overflight cannot be made, then the helicopter would have to route around to the south of DBS and then north east towards Cygnus A. It is estimated that the dog leg would add 10 track nm and so extend both the outbound and inbound flight by 5 minutes each. The data provided indicates that an average of 27% of flights would require a dog leg, adding five minutes to both the inbound and return leg to Cygnus A, 10 minutes in total per flight.

7.3 SAR Helicopter Access

~~89.~~91. SAR helicopter access is not constrained by icing considerations as MCA SAR helicopters are certified and equipped for Full Icing Conditions[2].

[2] Certified in accordance with CS29.1419 and CS 29 Appendix C

8 Conclusion

~~90.~~92. An assessment has been carried out with respect to the potential impact of the Dogger Bank South Offshore Wind Farms on helicopter access to the oil and gas assets in the vicinity. This includes the existing Cygnus field and its associated installations. Both meteorological and Vantage helicopter flight data supplied by Neptune has been utilised within the assessment.

~~91.~~93. It was assessed that access to the Cygnus A and B platforms would be unaffected by DBS due to the distances available.

~~92.~~94. The Cavendish and Munro Platforms are undergoing decommissioning. If decommissioning work is still required at those sites when DBS is built, then access to the Cavendish area would be under day VMC only, with access to Munro similar to the baseline case. For other platforms and wells around the 9nm boundary from DBS, it was assessed that the helicopter access would not be affected by DBS due to the distances available.

~~93.~~95. The analysis of the Vantage data shows when overlaid on the meteorological data that during certain meteorological conditions some flights would require to deviate by circa five minutes per leg. Based on historical data this could occur for circa 27% of flights per annum.

9 References

i CAA (2016). CAP 764 Policy and Guidelines on Wind Turbines. Sixth Edition. Gatwick: CAA.

ii CAA (2018). Guidance for Specific Approval for Helicopter Offshore Operations (SPA.HOFO). Gatwick: CAA. https://www.caa.co.uk/Commercial-industry/Aircraft/Operations/Types-of-operation/SPA-HOFO---Specific-approval-for-helicopter-offshore-operations/

iii CAA (2014). CAP 999 Helicopter Search and Rescue (SAR) in the UK National Approval Guidance. Second Edition. Gatwick: CAA.

iv OEUK Health, Safety and Environmental Report 2023