



Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

The Applicant's Comments on Perenco's Deadline 6 Submission

Revision A

Deadline 7

July 2023

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Table of Contents

1 The Applicant's Comments on Perenco Deadline 6 Submission.....4

Table of Tables

Table 1.1 Applicant's Comments on Perenco's Deadline 6 Submission: Response to 18.13 Waveney Helicopter Access Supplementary Analysis 5

Table 1.2 Applicant's Comments on Perenco's responses to Third Written Questions..... 16

Table 1.3 Part 1: Considering flights to Waveney Platform with current rules 20

Table 1.4 Considering Flights to a non-producing installation (NPI) at Waveney 22

Table 1.5 Part 1: Considering Flights to Waveney Platform with proposed CAA Limitations near windfarms 24

Table 1.6 Part 2: Considering Flights to a non-producing installation (NPI) at Waveney with proposed CAA Limitations near windfarms..... 26

Table 1.7 Perenco's Indicative Compensation Calculations for Waveney 28

1 The Applicant's Comments on Perenco Deadline 6 Submission

1. This document presents the Applicant's comments on Perenco's Deadline 6 submission [REP6-034].

Table 1.1 Applicant's Comments on Perenco's Deadline 6 Submission: Response to 18.13 Waveney Helicopter Access Supplementary Analysis

Report Ref:	Report Statement	Statement Accepted / Not Accepted by Perenco	Stakeholder Comment	Applicant Response
			Introductory comment: The positioning of Anatec within the "Waveney Helicopter Access Supplementary Analysis" is incorrect. The report gives the impression that Anatec are neutral reporters overseeing the Applicant's and Perenco's aviation specialists. The Applicant's aviation specialist is contracted by Anatec who are contracted by Equinor.	Page 2 of the document states "This study has been carried out by Anatec Ltd on behalf of Equinor New Energy Limited ("the Applicant")".
1. Introduction				
Paragraph 1	Following the Dudgeon Extension Project (DEP) Issue Specific Hearing on 31 March 2023 that addressed helicopter access to the Waveney Platform in relation to Environmental Statement Chapter 16 – Petroleum Industry and Other Marine Users [APP-109], the Examining Authority's Second Written Questions (WQ2) [PD-012] were published. This note addresses Questions Q2.21.1.2 and Q2.21.1.4.	Accepted		Noted
Paragraph 2	Question 2.21.1.2 asked: The Applicant's submitted Helicopter Access Study [APP205, Paragraph 54] states that - "If an obstacle free circle of circa 1nm could be provided, then approaches and take-off under Day VMC conditions could be conducted safely. That would increase the daylight access from approximately 14.6% to 92.3% (2020) of day conditions". Given the disagreement between parties at ISH6 [EV-086] [EV-090], over the accuracy of these figures, provide a set of jointly produced comparative calculations based on current guidance and restrictions.	Accepted	Perenco agreed to provide a set of jointly produced comparative calculations based on current guidance and restrictions.	Noted
Paragraph 3	For Question 2.21.1.2, there are two main issues to address: firstly, the distance required for an approach and take-off which is addressed in Section 2.3.4 and Section 2.3.5 respectively; and secondly, the helicopter access to the Waveney platform under the current Commercial Air Transport Regulations (CAT) (Section 3.1.1).	Accepted	Perenco agrees that these are the two main issues in determining the safe proximity of wind turbine generators to the Waveney platform.	Agreed
Paragraph 4	Question 2.21.1.4 asked Provide detail on any emerging guidance relating to helicopter access to installations such as that at Waveney from the CAA or that involved with Hornsea Project 4, as referred to in ISH6 [EV-086] [EV-090].			As previously discussed at both Issue Specific Hearing 6 and Issue Specific Hearing 7 (see Recording of Issue Specific Hearing 6 – Part 3 [EV-086] and Recording of Issue Specific Hearing 7 – Session 3 [EV-097]), both parties are aware of the CAA's draft changes. Following a CAA consultation, any change in regulation will have to be agreed with the DfT. As there is a backlog in aviation regulatory updates, this change will not be completed before this Examination ends. The draft changes are agreed by both parties as: <ul style="list-style-type: none"> • Only Day VMC operations within 3nm of a windfarm. • The minimum day cloud base increasing from 600ft to 700ft. • The minimum day visibility increasing from 4,000m to 5,000m.
Paragraph 5	Question 2.21.1.4 addresses the potential for the Civil Aviation Authority (CAA) to impose slightly higher weather limits for flights close to wind farms. As both the Applicant's aviation specialist and Perenco's aviation specialist have seen a draft of the		Perenco has considered the draft proposals developed by the helicopter operators in conjunction with the CAA. Perenco's comments are provided at Paragraph 23 below.	The Applicant has already included the draft proposals in their Deadline 4 submission. See Waveney Helicopter Access Supplementary Analysis [REP4-039] .

Report Ref:	Report Statement	Statement Accepted / Not Accepted by Perenco	Stakeholder Comment	Applicant Response												
	CAA proposals, the impact of this change can also be considered. The result of these calculations are provided in Section 3.1.2.			<p>Applying the changes to Perenco supplied meteorological data results in a small reduction in Day VMC as shown below.</p> <table border="1"> <thead> <tr> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>93.2%</td> <td>94.5%</td> <td>95.4%</td> </tr> <tr> <td>90.8%</td> <td>93.3%</td> <td>94.7%</td> </tr> <tr> <td>2.4%</td> <td>1.2%</td> <td>0.7%</td> </tr> </tbody> </table>	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	93.2%	94.5%	95.4%	90.8%	93.3%	94.7%	2.4%	1.2%	0.7%
2020 Dataset 1	2021 Dataset 2	2022 Dataset 2														
93.2%	94.5%	95.4%														
90.8%	93.3%	94.7%														
2.4%	1.2%	0.7%														
Paragraph 6	A meeting was held between the Applicant's aviation specialist and Perenco's aviation specialist on 26 April 2023. The Perenco specialist was representing Bond Helicopters, which will commence the Perenco aviation contract from January 2024, replacing the incumbent, Bristow Helicopters. Prior to the meeting additional data and working assumptions had been exchanged between the parties	Accepted	Prior to the meeting, information had been shared with the applicant in terms of 'flight' and 'meteorological' data.	Agreed												
2. Data and Working Assumptions																
Section 2.1, Paragraph 7	Meteorological Data Previously Perenco had provided the Applicant with meteorological data from the West Sole Alpha platform. The data had been sampled at 10-minute intervals between 15 January 2020 and 16 July 2021, resulting in 78,790 samples in total. The results from the analysis of that data are reported in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. This set of data will be referred to as dataset 1.	Accepted	Perenco also refer to this data as dataset 1.	Agreed												
Section 2.1, Paragraph 8	Prior to the specialists' meeting, Perenco provided additional data from the West Sole Alpha covering the period 1 January 2021 to 31 December 2022. This second tranche of data was recorded on an hourly frequency, resulting in 17,477 samples in total. This set of data will be referred to as dataset 2. It was agreed that the different sampling frequency made it difficult to merge the data and so they would be assessed as separate data sets.	Accepted	Perenco also refer to this data as dataset 1.	Agreed												
Section 2.2, Paragraph 9	Indicative layouts Two indicative layouts for DEP were provided to Perenco by the Applicant. These showed potential layouts for 15MW and 26MW wind turbines as illustrated in Environmental Statement Appendix 13.1 – Navigation Risk Assessment [APP-198] and Environmental Statement Chapter 15 Figures – Seascape and Visual Impact Assessment – Part 2 of 18 [APP-136] .	Accepted	<p>The Applicant states that two indicative layouts were provided to Perenco. These layouts were helpful in discussions, but as they are only indicative they cannot be relied upon as a basis for agreeing turbine placement.</p> <p>During discussions, the Applicant was asked whether they could commit to a layout before completion of the DCO Examination. The Applicant advised they could not. Perenco asked whether they could be part of the approval of a final layout and the Applicant said that this would not be acceptable to them.</p> <p>The Applicant's DCO incorporates flexibility in the placement, spacing and size of wind turbine generators. Accordingly, the Rochdale Envelope methodology applies to the DCO examination process and a "cautious worst case" must be assumed.</p>	Noted												
Section 2.3.1, Paragraph 11	Rate of Turn to be Applied A Rate 1 Turn, that results in a turn rate of 3° per second would be applied to all turns.	Accepted		Agreed												

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Section 2.3.2, Paragraph 12	<p>Approach and Departure Speed</p> <p>The approach speed to the stabilisation point on approach and post take-off was agreed at 80 kts. The combination of rate of turn and aircraft speed determines the distance necessary to make a turn.</p>	Accepted		Agreed
Section 2.3.3, Paragraph 11	<p>Stabilisation Point on Approach</p> <p>A number of accidents have occurred both in commercial airlines and offshore helicopters due to unstable approaches. The helicopter operators have adopted aviation industry best practice and apply stabilised approach criteria during an approach. Basically, this requires the crew to be on the correct flightpath, at a fixed airspeed and power, with all checks complete at a fixed distance before landing. The helicopter industry collaborated through their trade body, HeliOffshore, to develop Flightpath Management Guidance¹. The latest stabilisation point in the guidance is shown as 0.5nm, which is also the distance used by Perenco's current helicopter contractor, Bristow Helicopters. During the meeting it was stated that Bond Helicopters use a stabilisation point at 0.75nm due to the minimum range of their radar. The radar is used to cross check the distance to the landing point against the navigation system to confirm the correct deck is being approached. World-wide, a number of incidents have occurred where a helicopter has landed on the wrong helideck. However in the case of Waveney there are no nearby platforms and so the risk of a "wrong deck landing" is extremely remote. Therefore, during the meeting it was agreed that a stabilisation point at 0.5nm could be applied, as it is line with Perenco's current operator. By adopting a 0.5nm stabilisation point Bond Helicopters would require a change to their draft Operations Manual and some additional crew training.</p>	Not Accepted	<p>The Applicant states that the "stabilisation point in the guidance is shown as 0.5nm". It is important to recognise that this is a minimum distance at which the criteria for a stabilised approach have already been met otherwise the approach should not continue. The criteria for a flight being stabilised are given in the guidance as:</p> <ol style="list-style-type: none"> The aircraft is on the correct flight path and the correct navigational data has been confirmed as entered into the navigation system for final approach to the desired airport, heliport, helideck, or other landing site. Only small changes in heading, track, and power are required to maintain the correct flight path. It is recognised that certain environmental conditions will require larger power changes than normal. All briefings and checklists have been completed, except for the final landing check. The aircraft is in the correct landing configuration. In addition to previously mentioned landing gear, approach speed, and power criteria, there may be other unique, aircraft-specific configuration requirements that should be addressed e.g., rotor speed selection. The sustained rate of descent is no greater than 700 fpm upon arrival at the stabilised approach gate, or as recommended by the instrument procedure. If an approach requires a rate of descent greater than 700 fpm, this should be clearly briefed, with a focus on procedures to address the higher-than normal rate of descent. Once the final approach minimum is reached, confirmation of the correct airport, heliport, helideck, or landing site must be made. <p>Perenco further notes that, to meet criteria a. and b., the aircraft must already have come out of its turn and be on a straight-line approach to the helideck. Thus, adding the length of the final approach track to the radius of turn is an underestimate of the distance required.</p> <p>The Applicant observes that Perenco's helicopter Operator's approved offshore approach procedures require an approach to be stabilised by 0.75nm.</p> <p>In order to ensure the safety of its passengers and crew, each helicopter operator maintains procedures for its pilots that comply with policy, guidance, industry best practice,</p>	<p>The CAA does not state a minimum distance. Industry guidance is promulgated through HeliOffshore (attached in Appendix A.11 of Supporting Documents for the Applicant's Responses to the Examining Authority's Fourth Written Questions).</p> <p>The authors included representatives from helicopter operators flying in the Southern North Sea, as well as oil and gas operators. The guidance shows a minimum stabilisation point of 0.5nm. This distance is applied by Perenco's current helicopter operator, Bristow Helicopters. Perenco intends to use Bond Helicopters from January 2024. Bond helicopters stated that their minimum stabilisation point is 0.75nm due to the limitations of the radar they have chosen to install on the AW139 helicopter.</p> <p>The stabilisation criteria stated by Perenco are agreed. However, they are the outcome of being "on the correct flightpath, at a fixed airspeed and power, with all checks complete", as stated by the Applicant at paragraph 11 of the Waveney Helicopter Access Supplementary Analysis [REP4-039].</p>

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			<p>and draw on its own experience. Operations manuals are approved by the CAA on a case by case basis, it cannot be assumed that two operators will be given identical approvals as the size, experience and operational arrangements all differ. Pilots fly to many different destinations, so ensuring consistency is of the utmost importance for safe operations. Perenco's helicopter operator (Bond) requires a stabilised approach to be established no less than 0.75nm from the destination helideck. The stabilised approach distance is derived from the industry stabilisation guidance and the minimum effective range of the helicopter radar required to ensure that the destination waypoint and radar return are coincident, a requirement of wrong deck landing prevention protocols. As noted by the Applicant, one reason for this is that the airborne radar carried by all North Sea operators of AW139 helicopters has a minimum range of 0.75nm and the radar is used to cross check the distance to the landing point (this is the offshore helicopter variant, Search and Rescue AW139 are fitted with a different radar). This minimum range of the radar is not unique to Bond. Another reason for Bond requiring the stabilisation point to be no less than 0.75nm from the destination is that this provides a consistent operating rational for all Offshore Standard Approach Procedures in the Bond Operations Manual enhancing operational safety for and providing pilots with a standard procedure irrespective of weather, approach type, or destination.</p> <p>The Applicant suggests that "during the meeting it was agreed that a stabilisation point at 0.5nm could be applied". This is incorrect. It is possible that an exception to the normal procedures, subject to other safeguards, could be made, but there is no guarantee of this, nor in the view of Perenco would it be advisable, to ask their helicopter operator to deviate from their standard practice – especially given the proven links between standardisation and safety.</p>	<p>The CAA assesses the operator's Operations Manual. As Perenco's current operator uses a stabilisation distance of 0.5nm, then it must be recognised that distance is acceptable to the CAA, as the safety regulator.</p> <p>It is noted that consistency of procedures is highly desirable. However, onshore destinations often vary and there are industry procedures to cater for unusual or demanding airports and approaches. This flexibility is applied industry wide and so would assist in mitigating any potential loss of access to the Waveney Platform without a significant reduction in safety. It is noted that any additional training is likely to incur a time and cost penalty.</p> <p>Wrong deck landing can occur where there are two or more platforms in close proximity. This is not relevant to Waveney as there are no other platforms nearby.</p> <p>This is incorrect. Some AW139 operators have installed a radar with a smaller minimum range, such as Perenco's current operator Bristow Helicopters.</p> <p>It is assumed that Perenco is content that their current helicopter operator is flying their staff in a safe manner. Then it can also be assumed that operating to a minimum stabilisation distance of 0.5nm is currently safe.</p>
Section 2.3.4, Paragraph 14	Approach Distance Required: Applying a stabilisation point at 0.5nm, and the agreed turn and speed criteria, the minimum approach distance required was calculated as 1.01nm. This is the distance between the platform helideck and the closest wind turbine tip. The distance to the closest turbine tip should be used for determining the obstacle free environment as this is independent of the size of wind turbine eventually installed.	Not accepted	Perenco is not applying a stabilisation point of 0.5nm, as the Helicopter Operator (Bond) uses a stabilisation point of 0.75nm. Refer to response to in Section 2.3.3, Paragraph 13 above.	Noted. This is a change from Perenco's current helicopter operator.
Section 2.3.5, Paragraph 15	Take-off Distance Required The take-off distance must take into account the remote possibility of an engine failure during the take-off; this is known as a One Engine Inoperative (OEI) condition. A worse case assumption is that the engine fails immediately on rotation from the helideck. The take-off performance will vary with the ambient wind temperature and pressure, with higher pressure and lower temperature improving performance	Accepted		Agreed

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Section 2.3.5, Paragraph 16	The two aviation specialists agreed that the AW139 maximum offshore take-off mass from Waveney of 6,800kg should be the basis for the take-off distance assessment. However, it should be noted that a lower take-off mass is usually sufficient to provide a full payload of 12 passengers from Waveney to Norwich Airport. The relevant performance graphs from Supplement 50 in the AW139's Rotorcraft Flight Manual were agreed	Not Accepted	Perenco seeks to maximise the payload (passengers and freight) on all flights, therefore it is not true to say that a lower take-off mass is usually sufficient. The relevant performance graphs were agreed as stated by the Applicant.	As the flight time to Norwich Airport has been agreed as circa 20 minutes, a full passenger load is usually available at a take-off mass less than 6800kg.
Section 2.3.5, Paragraph 17	For his OEI calculations, the Applicant's specialist used a pressure of 1013 hPa and a temperature of 20°C. Perenco's specialist chose a lower pressure of 993 hPa and a temperature of 20°C. In the opinion of the Applicant's specialist 993 hPa and 20°C is an extreme case. Dataset 1 contained pressure data, which dataset 2 did not. Dataset 1 contained 78,790 samples, of which only one single 10- minute period had a pressure as low as 993 hPa with a temperature as high as 20°C. In comparison, there were 36,652 10-minute periods when the pressure was 1013 hPa or higher. The Mean pressure over the 18 months of data was 1010 hPa. Therefore, the Applicant's calculations are considered to be conservative based on the historical data	Not Accepted	It should be noted that it is the operators duty to ensure that all calculations are made in the safe sense, 1013 is the international mean pressure, 993 is a low but not extreme pressure, and while it was only seen once in the 18 months of data recorded in dataset 1, it is certainly possible that a combination of low pressure and an air temperature of 20° may be seen, and more so as global temperature variations increase. The difference between the calculated performance at the temperatures (20°C) and pressures (1013hPa and 993hPa) chosen by the Applicant and Perenco are a continued take-off distance difference of 4 meters, a drop-down difference of 16 feet, a path 1 difference of 24 meters and path 2 to 500 ft of zero, the total difference is 28 meters for a turn at 500ft overall difference of 1.9%. For context 28 meters equates to a delay in turning by the pilot of 0.7 seconds.	Under extreme conditions, such as a pressure of 993hPa, a light westerly wind and 20°C, a loss of payload may result, depending on the distance to any turbines in the take-off flightpath. However, under typical North Sea conditions the loss of payload will be minimal. Additionally, the Perenco Vantage data indicates that a full load of 12 passengers is not usually flown to the Waveney NUI. Therefore, any loss of required payload is only likely when flying to an NPI located at Waveney. Even in this case, a full load of passengers may still be carried due to the proximity of Norwich Airport.
Section 2.3.5, Paragraph 18	Applying the Applicant's environmental conditions of 1013 hPa and 20°C the OEI distance required, followed by a 30° turn away from any obstacle was 0.97nm. The Applicant's aviation specialist chose a 30° turn as that is sufficient to avoid a turbine in the take-off flightpath. The Perenco distance, using 993 hPa and 20°C, followed by a turn of 90° resulted in a distance of 1.32nm. The Perenco aviation specialist applied a turn of 90° as his calculations were conducted prior to the meeting, without the benefit of seeing the indicative DEP turbine layout	Not Accepted	The Applicant's comments imply that a 30o turn was agreed as sufficient to avoid wind turbine generators and make an approach to the Waveney helideck. This was not agreed. It is true that, in the two specific indicative layouts presented, no more than a 30o turn would be required. However, (as amplified in our response to Section 2.2, paragraph 9 above), Perenco cannot rely on the indicative layouts and a Rochdale Envelope approach needs to be used. Basing the minimum distance to the nearest wind turbine generator on a 90o turn would ensure access irrespective of the actual turbine layout ultimately chosen.	Due to the turbine spacing, even alternative layouts will not need a 90° turn to avoid a turbine. As with current operations to the nearby Hornsea One and Two windfarms and Blythe NUI, safe operations that take into account OEI continued take-offs are conducted on a daily basis with safety oversight from the CAA.
Section 2.3.5, Paragraph 19	It was agreed that if the final wind turbine layout was similar to the DEP indicative turbine layouts provided by the Applicant (realistic worst case scenarios for 15MW and 26MW wind turbines respective to navigation risk and seascape and visual impacts illustrated in Environmental Statement Appendix 13.1 – Navigation Risk Assessment [APP-198] and Environmental Statement Chapter 15 Figures – Seascape and Visual Impact Assessment – Part 2 of 18 [APP-136]), then OEI distance required was not a factor as the wind turbines were spaced sufficiently to be avoided. These layouts were provided to aid discussion and discussion is ongoing about how an agreement may be reached	Not Accepted	The Applicant suggests that One Engine Inoperable (OEI) take-off distance is not a factor in determining the minimum separation between wind turbine generators and the Waveney platform. This statement has again been made based on indicative layouts and cannot be taken as a general statement applying to the Application. The minimum separation between wind turbine generators has been given by the Applicant as 1.05km in ES Vol 1, Table 4.10, pg 79 (APP-090). Thus, if the Waveney platform were between rows, or between turbines in a row, the distance to the nearest turbine would at best be 0.742km which is less than the OEI take-off distance of 1.32nm (or even that of 0.97nm suggested by the Applicant).	The Applicant has already committed to a 1.01nm buffer free from surface structures around the Waveney Platform. This is secured in Protective Provisions for Perenco which have been included in Part 15 of Schedule 14 of the draft Development Consent Order (Revision J) [document reference 3.1]. The nearest turbine tip to Waveney would be no closer than 1.01nm. The Applicant has also committed within the Protective Provisions for Perenco to a 1km wide corridor centred on the Durango to Waveney Platform which extends to the southwest. Finally, there is a minimum turbine spacing of 1.05km (Table 4.5 of ES Chapter 4 Project Description (Revision C) (Clean) [REP5-021]).

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			The OEI take-off distance is therefore a factor in determining the minimum separation between wind turbine generators and the Waveney platform	<p>The statement that turbines could be placed 0.743km from the Waveney Platform is false.</p> <p>Due to the turbine spacing, even alternative layouts will not need a 90° turn to avoid a turbine.</p> <p>As with current operations to the nearby Hornsea One and Two windfarms and Blythe NUI, safe operations that take into account OEI continued take-offs are conducted on a daily basis with safety oversight from the CAA.</p>
3. Weather Dependant Helicopter Access				
Paragraph 20	The Waveney platform is only approved for daytime operations. It is assumed in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205] that only operations under Visual Meteorological Conditions (VMC) will be permitted after DEP is constructed. At present flights to Waveney can be flown under both VMC and Instrument Meteorological Conditions (IMC), so the potential loss of access under IMC will be assessed. During decommissioning, a Non-Productive Installation (NPI), such as a jack-up platform, will be positioned over Waveney; these installations are usually equipped with a helideck approved for night flying. Therefore, for any period of time when a NPI is located at Waveney, the potential loss of night flying should be considered	Accepted		Agreed
Paragraph 21	<p>Dataset 2 for 2021 and 2022 recorded hourly data. It was agreed between the Applicant and Perenco that the following parameters would be used to calculate VMC, IMC and no-fly conditions:</p> <ul style="list-style-type: none"> • Timestamp – date and time • Visibility- recorded in metres • Windspeed – recorded in kts • Cloud height1- lowest cloud (cloud base) recorded in ft • Wind direction 2 – recorded in degrees • Air temperature – recorded in degrees Celsius • Dew point - recorded in degrees <p>The current day VMC conditions require a cloud base of 600ft or higher and a visibility of 4,000m or higher. IMC are when the weather is below VMC limits. No-fly conditions exist when the cloud base and visibility are too low for an Airborne Radar Approach, there are icing conditions present at the lowest available transit height, or the wind speed exceeds 60 kt. A more detailed explanation of no-fly conditions is given in Section 2.2.6 of Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. A sea state with the Significant Wave Height above 6m is also a limit for the AW139 helicopter but was not applied as dataset 1 was missing that parameter.</p>	Accepted	<p>The parameters used in analysis of the met-ocean data were agreed to be those stated by the Applicant.</p> <p>The limits for day VMC, IMC and no-fly conditions are agreed.</p>	Agreed
3.1 Day VMC and IMC				

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Section 3.1.1, Paragraph 22	<p>Current Limitations</p> <p>For operations to the Waveney platform only day conditions need to be considered. The Day VMC results for 2020 are shown in Environmental Statement Appendix 16.2 – Helicopter Access Study [APP-205]. Following the exchange of dataset 2, the Applicant and Perenco specialists compared their results, and it was agreed they were very similar. The Applicants figures are shown in Table 3.1.</p> <table border="1" data-bbox="329 636 1308 894"> <thead> <tr> <th>Condition</th> <th>2020^{Note} Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Day VMC</td> <td>92.3%</td> <td>94.5%</td> <td>95.4%</td> </tr> <tr> <td>Day IMC</td> <td>7.7%</td> <td>5.5%</td> <td>4.6%</td> </tr> <tr> <td>Day No-Fly Conditions</td> <td>4.6%</td> <td>1.9%</td> <td>3.1%</td> </tr> <tr> <td>Day Usable IMC (IMC minus No-Fly)</td> <td>3.1%</td> <td>3.6%</td> <td>1.5%</td> </tr> </tbody> </table>	Condition	2020 ^{Note} Dataset 1	2021 Dataset 2	2022 Dataset 2	Day VMC	92.3%	94.5%	95.4%	Day IMC	7.7%	5.5%	4.6%	Day No-Fly Conditions	4.6%	1.9%	3.1%	Day Usable IMC (IMC minus No-Fly)	3.1%	3.6%	1.5%	Not accepted	<p>Since the datasets being analysed were the same, it is not surprising that, where the same methodology was used, similar results were generated. Perenco confirm that the percentages of data points for Day VMC, Day IMC and no-fly conditions are similar to those presented by the Applicant. However, the Applicant has undertaken an over-simplified methodology that does not give a fair representation of the impact on flight operations to/from the Waveney field.</p> <p>Throughout this and the following sections, the Applicant presents the % of data points that fulfil the relevant conditions (e.g. for Day VMC). The impact of DEP on flights to Waveney is assumed by the Applicant to simply be the differences between these percentages calculated currently and post-DEP. This is a gross over-simplification. The majority of work on the Waveney platform is carried out by dropping a crew off at the platform and collecting them later in the day. This requires two flights within the same day separated by enough time for work to be accomplished. As the Waveney platform has no accommodation other than strictly for emergency use, a crew would not be flown to the platform unless there was high confidence that they could be collected again by another flight later in the day. As set out in Section 3 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), Perenco's analysis considers this aspect in determining the likely impact of DEP on undertaking work on the Waveney platform.</p> <p>In order for a flight to take place, it is not sufficient for there to be an isolated data point with the right conditions. A flight would not leave Norwich unless there was high confidence that the conditions at Waveney would permit a landing and subsequent take-off. As set out in Section 3 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), Perenco's analysis considers this aspect in determining the likely impact of DEP on undertaking work on the Waveney platform.</p>	<p>The Applicant has used Perenco supplied meteorological and Vantage data to assess the actual historic loss of access that would have occurred if DEP had been in place at the time of those flights. This provides a realistic assessment of the actual impact that would have occurred. Perenco has not commented on the Helicopter Access Study (Environmental Statement Volume 3 Appendix 16.2 - Appendix A [APP-205]) but merely made comment on the meteorological assessment.</p> <p>By using Perenco's own Vantage data, the access assessment has taken into account the actual flight patterns and rosters used by Perenco. This methodology is far more robust than the hypothetical examples used by Perenco.</p> <p>The Vantage analysis shown in the Helicopter Access Study (Environmental Statement Volume 3 Appendix 16.2 - Appendix A [APP-205]) takes these factors into account, as it measures the potential impact on Perenco's historic flights.</p> <p>The two aviation experts agreed that the approach distance required was either 1.01nm or 1.26nm depending on the stabilisation point chosen. There was no agreement on the distance of 1.5nm and so it is not clear why it is included in Perenco's analysis.</p>
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Section 3.1.2, Paragraph 23	<p>Proposed New CAA Limitations The CAA is consulting on operational limits within 3nm of wind farms. The Applicant and Perenco aviation specialists have seen the draft proposal and agree the following should be applied to this analysis: • Day VMC only operations within 3nm of a wind farm; and • Within 3nm of a wind farm, the VMC limits are increased from a minimum cloud base of 600ft to 700ft with the visibility increased from a minimum of 4,000m to 5,000m.</p>	Accepted	<p>Perenco agree that the anticipated revised operational limits for flying within 3nm of a windfarm resulting from the CAA's consultation with windfarm operators are likely to be as stated by the Applicant in Paragraph 23 (Section 3.1.2).</p> <p>It should however be noted that the consultation process is still ongoing and further restrictions may also come into effect. For example, the CAA, in their letter to the Secretary of State in the context of the Hornsea 4 DCO</p>	Noted																				

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			Application refer to "changes to CAP764 policy and guidance in respect of Helicopter Main Routes".																					
Section 3.1.2, Paragraph 24	<p>Table 3.2 shows the difference between the current VMC and proposed VMC access</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Current Day VMC Cloud base >=600ft AND Visibility >=4000m</td> <td>93.2%</td> <td>94.5%</td> <td>95.4%</td> </tr> <tr> <td>Draft Day VMC Limitations Cloud base >=700ft AND Visibility >=5000m</td> <td>90.8%</td> <td>93.3%</td> <td>94.7%</td> </tr> <tr> <td>Loss of DAY VMC</td> <td>2.4%</td> <td>1.2%</td> <td>0.7%</td> </tr> </tbody> </table>	Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	Current Day VMC Cloud base >=600ft AND Visibility >=4000m	93.2%	94.5%	95.4%	Draft Day VMC Limitations Cloud base >=700ft AND Visibility >=5000m	90.8%	93.3%	94.7%	Loss of DAY VMC	2.4%	1.2%	0.7%	Not accepted	Perenco confirm that the percentages of data points for Day VMC, and Draft Day VMC are similar to those presented by the Applicant. However, as discussed in Perenco's response to Section 3.1.1, Paragraph 22, the Applicant has undertaken an over-simplified methodology that does not give a fair representation of the impact on flight operations to/from the Waveney field.	As previously stated, Perenco has not taken account of the assessment using Vantage data. The Helicopter Access Study (Environmental Statement Volume 3 Appendix 16.2 - Appendix A [APP-205]) takes full account of DEP on historic flights.				
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Section 3.1.2, Paragraph 25	<p>Under the proposed CAA change, the percentage of day VMC access will reduce slightly, the percentage of IMC will increase slightly, the percentage of no-fly conditions will remain unchanged. Table 3.3 updates the figures shown in Table 3.1 to reflect this change.</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Day VMC</td> <td>90.8%</td> <td>93.3%</td> <td>94.7%</td> </tr> <tr> <td>Day IMC</td> <td>9.2%</td> <td>6.7%</td> <td>5.3%</td> </tr> <tr> <td>Day No-Fly Conditions</td> <td>4.6%</td> <td>1.9%</td> <td>3.1%</td> </tr> <tr> <td>Day Usable IMC (IMC minus No-Fly)</td> <td>4.6%</td> <td>4.8%</td> <td>2.2%</td> </tr> </tbody> </table>	Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	Day VMC	90.8%	93.3%	94.7%	Day IMC	9.2%	6.7%	5.3%	Day No-Fly Conditions	4.6%	1.9%	3.1%	Day Usable IMC (IMC minus No-Fly)	4.6%	4.8%	2.2%	Not accepted		The Applicant notes that this is stated as not accepted by Perenco but no reason has been provided by Perenco to enable the Applicant to respond.
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Section 3.1.2, Paragraph 26	The increased weather limits will have a minor impact on day helicopter access to the Waveney platform.	Not accepted	Overall Perenco calculates that on average there will be a reduction of 7% to times when work can be carried out on the Waveney platform. The impact varies from month to month, with some periods of the year seeing up to a 16% reduction. It is incorrect to describe this as "a minor impact".	<p>The proposed CAA change will have a minor impact on Day VMC access, as explained in paragraph 3.1.2 of the Waveney Helicopter Access Supplementary Analysis [REP4-039, document reference 18.13].</p> <p>Perenco has not provided any rationale behind their comment that "on average there will be a reduction of 7% to times when work can be carried out on the Waveney platform."</p> <p>The CAA draft proposal only makes a small change to Day VMC, with an increase to the cloud base by 100ft from 600ft to 700ft, and the visibility by 1,000m from 4,000m to 5,000m.</p>																				
3.2 Night VMC and IMC																								
Section 3.2, Paragraph 27	Due to a lack of specific equipment installed, flights to the Waveney platform are constrained to day operations. A NPI located over Waveney would normally be equipped for night operations and so the loss of night access needs to be considered. This is a logistic issue which can usually be overcome, as flights can be scheduled to take place in daylight. Any emergency flights for sick or injured personnel would be flown by MCA helicopters who operate under Civil Aviation Publication 999, permitting greater flexibility and lower day and night weather limits.	Not Accepted	In discussing the loss of night flying due to the proposed windfarm, the Applicant dismisses the impact by stating: "This is a logistic issue which can usually be overcome, as flights can be scheduled to take place in daylight." This is a gross oversimplification. In Table 3.4, the Applicant records the number of hours in each year that are night (i.e. not daylight) and those that fall within the Norwich Airport operating hours. The Applicant's statement that "only 24.7% of all night hours in 2022 are actually available	It is agreed that these operations can take place in both Summer and Winter. However, most flights to NPI's are generally scheduled to take place in the middle of the day during daylight. It would be useful if Perenco could present Vantage data for previous decommissioning operations which would show the times of day that flights actually took place to substantiate the percentages presented.																				

Report Ref:	Report Statement	Statement Accepted / Not Accepted by Perenco	Stakeholder Comment	Applicant Response																										
			<p>for flights to Waveney” is an annual average. The main impact of loss of night flying would be on winter operations. A non-producing installation (NPI) such as a rig would typically be deployed for a period of 1-3 months which could occur at any time of year. If we consider the impact on a one-month programme, the night hours currently available that would become unavailable due to the proximity of the proposed windfarm would be as given in Table 1 below.</p> <table border="1" data-bbox="1486 716 2056 1131"> <thead> <tr> <th>Month</th> <th>Currently available night hours (% of all night hours)</th> </tr> </thead> <tbody> <tr><td>January</td><td>39%</td></tr> <tr><td>February</td><td>32%</td></tr> <tr><td>March</td><td>26%</td></tr> <tr><td>April</td><td>12%</td></tr> <tr><td>May</td><td>3%</td></tr> <tr><td>June</td><td>0%</td></tr> <tr><td>July</td><td>0%</td></tr> <tr><td>August</td><td>8%</td></tr> <tr><td>September</td><td>18%</td></tr> <tr><td>October</td><td>28%</td></tr> <tr><td>November</td><td>37%</td></tr> <tr><td>December</td><td>40%</td></tr> </tbody> </table> <p>Should work be required between October and March, the impact of being unable to fly outside of daylight hours is much greater than stated by the Applicant and can lead to as much as 40% of airport operating hours being unavailable</p>	Month	Currently available night hours (% of all night hours)	January	39%	February	32%	March	26%	April	12%	May	3%	June	0%	July	0%	August	8%	September	18%	October	28%	November	37%	December	40%	
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Section 3.2, Paragraph 28	<p>CAT flights to a NPI would be limited by the Norwich Airport opening times, promulgated as 06:00 to 21:30. It was agreed by the Applicant and Perenco that the earliest flight arrival at Waveney would be the airport opening time plus 30 minutes (06:30hrs) and the latest take-off time from Waveney would be the airport closing time minus 30 minutes (21:00hrs). Table 3.4 shows the time when nights flights can currently be conducted to any NPI over Waveney, before DEP is constructed</p> <table border="1" data-bbox="335 1524 1255 1766"> <thead> <tr> <th>Condition</th> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Total Hours of Night</td> <td>3582^{Note 1}</td> <td>3822</td> <td>3816</td> </tr> <tr> <td>Hours of Available Night (Norwich Airport Open +30 mins Closed -30 mins)</td> <td>721^{Note 2}</td> <td>941</td> <td>941</td> </tr> <tr> <td>Current Percentage of Night Operating Hours Available</td> <td>20.1%</td> <td>24.6%</td> <td>24.7%</td> </tr> </tbody> </table>	Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	Total Hours of Night	3582 ^{Note 1}	3822	3816	Hours of Available Night (Norwich Airport Open +30 mins Closed -30 mins)	721 ^{Note 2}	941	941	Current Percentage of Night Operating Hours Available	20.1%	24.6%	24.7%	Accepted	<p>Norwich Airport operating hours and an assumed 30-minute flight time, giving an earliest arrival at Waveney of 06:30 and a latest departure from Waveney of 21:00 were agreed with the Applicant as recorded in Paragraph 28 (Section 3.2).</p> <p>As noted in Perenco's response to Section 3.2, paragraph 27 above, the Applicant has presented annual averages in Table 3.4 when in fact seasonal variations must be considered.</p>	<p>The Applicant would like to clarify that the flight time was agreed as being 20 minutes. An additional 10 minutes was added to allow for start-up and taxi in the morning, and taxi and shutdown in the evening, both of which are done within the airport opening hours.</p> <p>Therefore 20 minutes flying time plus 10 minutes for ground operations, a total of 30 minutes, was factored into the opening time calculations.</p>										
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Section 3.2, Paragraph 29	Night VMC limits are a minimum cloud base of 1200ft and a minimum visibility of 5,000m	Accepted		Agreed																										

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Section 3.2, Paragraph 30	Even with a suitably equipped NPI located over Waveney, the number of available night operating hours to Waveney is constrained by the Norwich Airport opening times; for example, only 24.7% of all night hours in 2022 are actually available for flights to Waveney.	Not accepted	As noted in Perenco's response to Section 3.2, paragraph 27 above, the Applicant's 24.7% in 2022 is an annual average. Seasonal variations must be considered.	Accepted, such as no impact during the summer months.																
Section 3.2.1, Paragraph 31	The draft CAA regulations will prohibit night flights within 3nm of a wind farm. The current Dudgeon wind farm is within 3nm of Waveney, with the closest turbine 2.7nm away, as shown in Figure 3.1. If the CAA implements the new regulations in full, then no night CAT operations will be possible to a NPI over Waveney and so DEP will have no material impact on night access.	Accepted	The draft CAA regulations will prohibit night flights within 3nm of a wind farm. The current Dudgeon wind farm is within 3nm of Waveney, with the closest turbine 2.7nm away, as shown in Figure 3.1. If the CAA implements the new regulations in full, then no night CAT operations will be possible to a NPI over Waveney and so DEP will have no material impact on night access.	Agreed. The closest turbine is currently 2.7nm from Waveney with two other also within 3nm.																
Section 3.2.1, Paragraph 32	Historically, the CAA has provided dispensations to operators, providing they are supported by a safety case. Based on previous cases, it is possible that the CAA will provide a limited dispensation for night operations.	Accepted	Given that there is only a single wind turbine within 3nm and it is nearly 3nm away, it is highly likely that the CAA would grant a dispensation such that the anticipated new rules concerning flights within 3nm of a windfarm would not preclude night flying to Waveney.	To clarify, there are three existing turbines within 3nm of the Waveney Platform, not one as indicated here. It is possible that a dispensation may be granted.																
Section 3.2.1, Paragraph 33	<p>Potential Night Operations Under a CAA Dispensation</p> <p>If a dispensation from day only operations was granted by the CAA, then some limited night operations might be possible to an NPI located at Waveney. It was agreed that, subject to a CAA dispensation, approaches when the wind was from 110° clockwise to 240° could be conducted safely. These approaches would be flown into wind, i.e. from the reciprocal of the wind direction, and permit a night stabilised approach point at 2nm or greater. The percentage of time when a Night VMC approach could be conducted, with the wind from the appropriate direction, and Norwich Airport open is shown in Table 3.5</p> <table border="1" data-bbox="329 1236 1110 1570"> <thead> <tr> <th>Condition</th> <th>2020 Dataset 1</th> <th>2021 Dataset 2</th> <th>2022 Dataset 2</th> </tr> </thead> <tbody> <tr> <td>Total Night Hours</td> <td>3582^{Note 1}</td> <td>3822</td> <td>3816</td> </tr> <tr> <td>Hours of Night VMC Approaches post DEP Available Night AND VMC AND Wind from the safe arc</td> <td>335</td> <td>335</td> <td>421</td> </tr> <tr> <td>Percentage of Available Night Access Dependant on a CAA dispensation</td> <td>46.5%</td> <td>35.6%</td> <td>44.7%</td> </tr> </tbody> </table>	Condition	2020 Dataset 1	2021 Dataset 2	2022 Dataset 2	Total Night Hours	3582 ^{Note 1}	3822	3816	Hours of Night VMC Approaches post DEP Available Night AND VMC AND Wind from the safe arc	335	335	421	Percentage of Available Night Access Dependant on a CAA dispensation	46.5%	35.6%	44.7%	Accepted	Perenco shares the Applicant's view, as set out in Paragraph 33 (Section 3.2.1), that following construction of DEP night operations to a non-producing installation (NPI) at Waveney may be a restricted to when the wind is from 110° clockwise to 240°. For the avoidance of doubt, this restriction would not apply prior to construction of DEP. Perenco agree with the Applicant's calculations of the percentage of available night access.	Agreed
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4. Summary																				
Paragraph 34	The distance necessary for an approach was agreed as 1.01nm	Not Accepted	The Applicant states that the "distance necessary for an approach was agreed as 1.01nm". This was not agreed. As set out in Section 3.8 of Perenco's 'Summary of Oral Submission at ISH6' (REP3-154), the distance to wind turbine rotor tip required for an approach is 1.26nm (or as stated in the document 1.34nm to turbine base, assuming a wind turbine rotor diameter of 300m)	It was agreed at the experts meeting that 1.01nm or 1.26nm would be required. The distance depends on the stabilisation point chosen by the operator. Perenco's current operator applies a stabilisation distance of 0.5nm and so if DEP was currently in place it is reasonable to assume that they would operate to a minimum distance of 1.01nm.																

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Paragraph 35	The Applicant's calculation of the OEI take-off distance required was 0.97nm and Perenco's distance was 1.32nm. The Applicant believes that their temperature and pressure assumptions are sufficiently conservative whilst Perenco's are excessively conservative. Notwithstanding this difference, both parties agreed that if, for example, the final wind turbine layout is similar to the indicative drawings provided, the OEI take-off distance required will not reduce helicopter access. These example layouts were provided to aid discussion which is ongoing about how an agreement may be reached	Not Accepted	Comments against temperature and pressure assumptions have been clarified in paragraph 17 above. The indicative layouts were provided to Perenco. These layouts were helpful in discussions, but as they are only indicative, they cannot be relied upon as a basis for agreeing turbine placement.	Noted. See the Applicant's response to Paragraph 17.
Paragraph 36	The meteorological data supplied by Perenco demonstrates that the impact of DEP on operations to the Waveney platform will be minor. See Table 3.1	Not Accepted	As set out in Figure 3 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), the likely impact of DEP on undertaking work on the Waveney platform is not minor, resulting in losses of up to 16%.	A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
Paragraph 37	The updated meteorological limits proposed by the CAA will only have a minor impact of day access to the Waveney platform. For example, the day VMC access in 2021 reduced from 94.5% to 93.3%.	Not Accepted	As set out in Figure 3 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), the likely impact of DEP (which arises primarily from the reduction in day VMC access under the updated meteorological limits proposed by the CAA) on undertaking work on the Waveney platform is not minor, resulting in losses of up to 16%.	
Paragraph 38	The existing Dudgeon wind farm has wind turbines within 3nm of Waveney. If the CAA implements their draft regulations in full, then all future flights to any helideck located over Waveney will be day VMC only (including any NPI operations). In this case DEP will have no additional impact on night operations, as they will already be forbidden. The CAA may issue a helicopter operator with a dispensation from the regulations, when supported by a safety case. If a dispensation is provided, then some limited night operations to a helideck at the Waveney site may be possible.	Accepted	Given that there is only a single wind turbine within 3nm and it is nearly 3nm away, it is highly likely that the CAA would grant a dispensation such that the anticipated new rules concerning flights within 3nm of a windfarm would not preclude night flying to Waveney, other than within the existing limitations of night flights.	Noted. However, there are three turbines within 3nm of Waveney currently operational at the existing Dudgeon Offshore Wind Farm. The closest of these three turbines is 2.7nm.
Paragraph 39	Subject to a CAA dispensation, when a NPI is located at Waveney, some night access, subject to Norwich Airport opening times, will be available. Table 3.4 shows the available night access when Norwich Airport is open: the access varies between 20.1% and 24.7%.	Accepted		Agreed
Paragraph 40	A CAA dispensation might also allow night operations after DEP is constructed. Both parties agreed that safe approaches could be made when the wind is from an arc 110° clockwise to 240°. This access is reported in Table 3.5: of the available hours of night access based on Norwich Airport opening hours, the access varies between 35.6% and 44.7%.	Not Accepted	As set out in Figure 2 of Perenco's 'Technical Note on the impacts of accessing the Waveney installation with DEP turbines within 1.5nm' (REP4-050), the likely impact of DEP on undertaking work on an NPI stationed at Waveney is far from minor, resulting in losses of up to 48%.	No rationale is provided for the distance of 1.5nm or a loss of 48%. A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 (document reference 21.5).

Table 1.2 Applicant's Comments on Perenco's responses to Third Written Questions.

PINS Question Number	Question is addressed to	Question	Perenco Response	Applicant Comments
Q3.21. Oil, Gas and Other offshore infrastructure and activities				
Q3.21.1 Helicopter Access				
Q3.21.1.1	Perenco	<p>Impact of existing turbines</p> <p>The Applicant's Waveney Helicopter Access Supplementary Analysis [REP4-039, Paragraph 31] states that the current Dudgeon wind farm is within 3nm of Waveney, with the closest turbine 2.7nm away. Do you agree that this means that the proposal of DEP would have no difference on night flights as the CAA restrictions would already be imposed?</p>	<p>Perenco confirms that one of the Dudgeon windfarm turbines is 2.7nm from the Waveney platform. Should the CAA impose the anticipated new rules for flying in proximity to windfarms, unless a dispensation were granted by CAA, night flights would not be permitted to an installation at Waveney with a suitably rated helideck. Without such a dispensation it is correct to state that DEP would introduce no further restrictions to night flights.</p>	Agreed
Q3.21.1.2	Perenco	<p>CAA dispensation</p> <p>The Applicant has suggested that there may be CAA dispensation to allow for night flights from certain directions, such as with decommissioning of the platform. Provide comment on this?</p>	<p>Perenco believes that the CAA is highly likely to provide a dispensation in respect of the one Dudgeon windfarm turbine within 3nm . With such a dispensation, night time visual approaches prior to construction of DEP may still need to be restricted to when winds are from a southerly direction (i.e. approach is from a northerly arc.)</p>	<p>Partially agree.</p> <p>There are three existing Dudgeon windfarm turbines within 3nm of Waveney.</p> <p>Approaches from the south (with a northerly wind) would be restricted, as a flightpath in close proximity to the current Dudgeon wind farm must be avoided.</p>
Q3.21.1.3	Perenco Applicant	<p>IMC Access</p> <p>For clarity, would there be any possible day IMC access to Waveney platform if</p>	<p>Perenco does not consider that this is possible.</p>	Agreed

PINS Question Number	Question is addressed to	Question	Perenco Response	Applicant Comments
		DEP was constructed with the 1nm buffer?		
Q3.21.1.4	Perenco Applicant	<p>One Engine Inoperative Take Off Condition</p> <p>The Applicant states that their temperature and pressure assumptions are sufficiently conservative, whilst Perenco's are excessively conservative. Notwithstanding this difference, if the final wind turbine layout is similar to the indicative drawings provided, the One Engine Inoperative take-off distance required will not reduce helicopter access [REP4-039, Paragraph 15].</p> <p>A) Perenco, confirm whether you agree with Applicant that with the indicative layout there would be no required reduction in helicopter access?</p> <p>B) Perenco and Applicant, if based on the indicative drawings the One Engine Inoperative take-off distance required would not reduce helicopter access, what would be the consequence if there was a final change to the layout from these indicative drawings in the area of the Waveney Platform?</p>	<p>a) Perenco confirm that the indicative layout would permit helicopter operations with limited (but not no) reduction in helicopter access .</p> <p>b) If changes were made to the 'indicative' wind farm array layouts, this could make the Waveney platform inaccessible by helicopter under the majority or all weather conditions.</p>	<p>The Applicant response to this question is provided in Deadline 5 Submission - 19.2 The Applicant's response to the Examining Authority's Third Written Questions [REP5-049].</p> <p>Since that response The Applicant has committed to a 1.01nm buffer free from surface structures around the Waveney Platform. This is secured in Protective Provisions for Perenco which have been included in Part 15 of Schedule 14 of the draft Development Consent Order (Revision J) [document 3.1]. The nearest turbine tip to Waveney would be no closer than 1.01nm.</p> <p>The Applicant has also committed within the Protective Provisions for Perenco to a 1km wide corridor centred on the Durango to Waveney Platform which extends to the southwest.</p> <p>Finally, there is a minimum turbine spacing of 1.05km (Table 4.5 of ES Chapter 4 Project Description (Revision C) (Clean) [REP5-021]).</p>

PINS Question Number	Question is addressed to	Question	Perenco Response	Applicant Comments
Q3.21.1.5	Perenco	<p>Night flights from Norwich Airport</p> <p>How would Norwich Airport opening times effect future night flights to a supporting rig at Waveney?</p>	<p>Night flights (i.e. flights when it is not daylight) could occur within Norwich airport operating hours through most of the year. See comparative table for detailed information.</p>	Noted
Q3.21.1.6	Perenco Applicant	<p>Comparative tables of information regarding helicopter access</p> <p>To ensure a full understanding of the differences and agreements between the parties, please each provide a set of tables setting out Day VMC, IMC and No Fly Conditions, based on the agreed datasets for the last few years. This should be done with one set of tables applying the CAA Draft Limits, with and without DEP, and another based on current CAA limits and restrictions, with and without DEP. When setting out the figures based on DEP being in place, please use the 1nm buffer as proposed by the Applicant.</p>	<p>See Table submitted as a separate document</p>	Noted
Q3.21.1.9	Perenco Applicant	<p>Joint Statement</p> <p>Provide a joint statement from both parties to set out what is a mutually agreeable position for helicopter access to Waveney, and how that can be secured in the dDCO.</p>	<p>Perenco is working with the Applicant to try to establish a mutually agreeable position that could be secured in the dDCO. Meetings have taken place. The Applicant has been provided an economic impact analysis from Perenco which has been submitted to the Examiners as a separate document</p>	<p>A joint statement has been provided in response to Q4.21.1.4. See Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].</p>

PINS Question Number	Question is addressed to	Question	Perenco Response	Applicant Comments
			along with these answers to the Examiners' written questions.	

Comparative tables of information regarding helicopter access

Table 1.3 Part 1: Considering flights to Waveney Platform with current rules

Item	Applicant		Perenco		Perenco Comments	Applicants Comments
	Without DEP	With DEP	Without DEP	With DEP		
Day No Fly (% of day data points)	3.1%	5.1%	4%	93%	Perenco has considered sea state and icing in determining No fly conditions, the Applicant has not considered either.	A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
Day VMC (% of day data points)	95.0%	95.0%	94%	7%	With wind turbine rotor tips at 1nm or less from the helideck, Perenco view is that Day VMC would only be possible when the wind is from the east or from the west (80-100 degrees or 260-280 degrees). Where the wind turbine rotor tips are at least 1.26nm away (or 1.34nm to wind turbine base with a 300m diameter wind turbine rotor), Day VMC would be 94% of day data points.	The met data is a matter of historical record, provided by Perenco. The Applicant did include icing as a factor for no-fly conditions, however sea state data was not provided by Perenco. This meteorological data is then sorted by the CAA limits to be classified as IMC, IMC (no-fly), and VMC.
Day IMC (% of day data points)	2.6%	0%	2%	0%	With wind turbine rotor tips at 1nm or less, Applicant and Perenco agree that IMC approaches would not be possible.	Only changing the weather limits (as per new CAA guidance) can change the percentages in these columns. The presence of a turbine within 3nm does not change a historical data point which was VMC, to IMC or IMC no-fly or vis versa. Perenco's percentage for 'with DEP' suggests that the presence of turbine changes the conditions. It does not. Notwithstanding the above, both the Applicant and Perenco agree that available flight time during IMC would be lost if turbines were placed within 3nm of Waveney. This is 2.6% under current CAA rules, or 2% as shown by Perenco in the 'without DEP' Day IMC. These numbers increase to 4.6% (2020) and 4.8% (2021) when applying proposed new CAA limits. As stated at Issue Specific Hearing 7 (@26:45 of Recording of Issue Specific Hearing 7 – Session 3 [EV-097]), the main difference between the parties is the distance needed to approach the helideck in the remaining VMC conditions (minus the small proportion of time when an east-west approach can be made). Perenco calculate this distance to be 1.26nm and the Applicant 1.01nm. Perenco's requirement for an additional 0.25nm is due to the changing of the current 0.5nm stabilisation point used by their current operator to 0.75nm by their future operator.
Considering realistic impact on helicopter logistics (i.e. a 2hr window of suitable conditions is assumed necessary for a flight to leave Norwich and 90% of operations at the Waveney platform require 2 flights within the available day with at least 5hrs between them):						The Environmental Statement Volume 3 Appendix 16.2 – Helicopter Access Study - Appendix A [APP-205] uses Perenco supplied flight data (from the Vantage POB system) to identify the number of historic flights that would have been lost if day VMC only access to Waveney was available. This is a robust approach that uses Perenco supplied meteorological and flight data to measure the

Item	Applicant		Perenco		Perenco Comments	Applicants Comments
	Without DEP	With DEP	Without DEP	With DEP		
						<p>true impact on historic flights. Perenco do not appear to have commented on Appendix A [APP-205] and only made comment on the main meteorological assessment.</p> <p>The assessment conducted by the Applicant, using actual Perenco flight and meteorological data, is more robust than the weather window approach taken by Perenco in paragraph 3 of their Technical Note submitted at Deadline 4 (see Deadline 4 Submission [REP4-050]) and reused here.</p> <p>A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].</p>
Operations possible at Waveney platform (% of daylight airport hours)						
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Annual Average						

Table 1.4 Considering Flights to a non-producing installation (NPI) at Waveney

Item	Applicant		Perenco		Perenco's Comments	Applicant's Comments
	Without DEP	With DEP	Without DEP	With DEP		
Night hours available during Norwich Airport operating times (% of night data points)	24.7%	24.7%	24%	24%		
Night hours available during Norwich Airport operating times (% of night data points) by month:						
January	Omitted	Omitted	39%	39%		
February	Omitted	Omitted	32%	32%		
March	Omitted	Omitted	26%	26%		
April	Omitted	Omitted	12%	12%		
May	Omitted	Omitted	3%	3%		
June	Omitted	Omitted	0%	0%		
July	Omitted	Omitted	0%	0%		
August	Omitted	Omitted	8%	8%		
September	Omitted	Omitted	18%	18%		
October	Omitted	Omitted	28%	28%		
November	Omitted	Omitted	37%	37%		
December	Omitted	Omitted	40%	40%		
Night No Fly (% of available night data points)	Omitted	100.0%	5%	100%		
Night VMC (% of available night data points)	Omitted	Omitted	85%	0%	With wind turbine rotor tips at 1nm or less, Perenco view is that Night VMC would only be possible when the wind is from the east or from the west (80-100 degrees or 260-280 degrees). Where the wind turbine rotor tips are at least 1.32nm from the Waveney platform (or 1.4 nm to turbine base with 300m diameter rotor), night VMC would be 8% of available night data points. Note: these distances include a provision for the 100m typical offset between the NPI helideck and the wellheads.	The CAA's rule change would prohibit night operations without a dispensation. A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
Night IMC (% of available night data points)	Omitted	Omitted	10%	0%	With turbines at 1nm or less, Applicant and Perenco agree that IMC approaches would not be possible.	Agreed
By simple calculation fom the above, Day & Night within Norwich Airport Operating Hours:	Omitted	Omitted			Where the wind turbine rotor tips are at least 1.32nm from the Waveney platform (or 1.4nm to turbine base with 300m diameter wind turbine rotor), the Perenco "With DEP" figures would be:	As previously agreed, all distances should be with reference to the blade tips. A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
No Fly (% of <u>day & night</u> airport hours)	Omitted	Omitted	4%	94%	20%	

Item	Applicant		Perenco		Perenco's Comments	Applicant's Comments
	Without DEP	With DEP	Without DEP	With DEP		
VMC (% of <u>day & night</u> airport hours)	Omitted	Omitted	93%	6%	80%	
IMC (% of <u>day & night</u> airport hours)	Omitted	Omitted	3%	0%	0%	
Considering realistic impact on helicopter logistics (i.e. a 2hr window of suitable conditions is assumed necessary for a flight to leave Norwich:						
Operations possible at a Non-producing installation stationed at the Waveney platform (% of <u>day & night</u> of airport hours)						
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						
Annual Average						

Table 1.5 Part 1: Considering Flights to Waveney Platform with proposed CAA Limitations near windfarms

* Both Applicant and Perenco have assumed that a dispensation from CAA wrt the one Dudgeon wind turbine that is just within 3nm of Waveney is likely to be granted.

Item	Applicant		Perenco		Perenco's Comments	Applicants Comments
	Without DEP	With DEP	Without DEP	With DEP		
Day No Fly (% of day data points)	3.1%	6.0%	4%	93%	Perenco has considered sea state and icing in determining No fly conditions, the Applicant has not considered either.	The met data is a matter of historical record, provided by Perenco. The Applicant did include icing as a factor for no-fly conditions, however sea state data was not provided by Perenco.
Day VMC (% of day data points)	95.0%	94.0%	94%	7%	Where wind turbine rotor tips are at 1nm or less from the helideck, Perenco view is that Day VMC would only be possible when the wind is from the east or from the west (80-100 degrees or 260-280 degrees). Where the wind turbine rotor tips are at least 1.26nm away (or 1.34nm to wind turbine base with a 300m diameter wind turbine rotor), Day VMC would be 92% of day data points.	<p>The Applicant presented daylight VMC as being 92.3% in 2020, 94.5% in 2021 and 95.4% in 2022 (Table 3.1 of the Waveney Helicopter Access – Supplementary Assessment [REP4-039]).</p> <p>As previously stated by Perenco at section 5 of their Technical Note submitted at Deadline 4 (see Deadline 4 Submission [REP4-050]), both agree that daylight VMC is around 94% . <i>“A simple count of all daylight times when visual flight rules (VFR) are possible yields the same result (94% of daylight hours) as presented by the Applicant in Anatec’s Helicopter Access Report”.</i></p> <p>Under the proposed new CAA weather limits the proportion of daylight VMC decreases and the proportion of Daylight IMC increases. The Applicant presented daylight VMC under new CAA limits as being 90.8% in 2020, 93.3% in 2021 and 94.7% in 2022 (Table 3.2 of the Waveney Helicopter Access – Supplementary Assessment [REP4-039]).</p> <p>A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].</p>
Day IMC (% of day data points)	3.5%	0%	2%	0%		A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
Considering realistic impact on helicopter logistics (i.e. a 2hr window of suitable conditions is assumed necessary for a flight to leave Norwich and 90% of operations at the Waveney platform require 2 flights within the available day with at least 5hrs between them):						
Operations possible at Waveney platform (% of daylight airport hours)					Where the wind turbine rotor tips are at least 1.26nm from the helideck (or 1.34nm to wind turbine base with a 300m diameter rotor), the Perenco "With DEP" figures would be:	
January	Omitted	Omitted	65%	6%	61%	A comparison of the technical positions is presented in the Joint Position Statement, Appendix A.7 for Question 4.21 [document reference 21.5].
February	Omitted	Omitted	61%	6%	54%	
March	Omitted	Omitted	62%	4%	55%	
April	Omitted	Omitted	77%	2%	75%	
May	Omitted	Omitted	78%	3%	73%	
June	Omitted	Omitted	78%	2%	73%	
July	Omitted	Omitted	72%	2%	67%	
August	Omitted	Omitted	77%	3%	75%	
September	Omitted	Omitted	74%	4%	71%	

Item	Applicant		Perenco		Perenco's Comments	Applicants Comments
	Without DEP	With DEP	Without DEP	With DEP		
October	Omitted	Omitted	71%	2%	66%	
November	Omitted	Omitted	66%	3%	62%	
December	Omitted	Omitted	60%	2%	54%	
Annual Average	Omitted	Omitted	71%	3%	67%	

Table 1.6 Part 2: Considering Flights to a non-producing installation (NPI) at Waveney with proposed CAA Limitations near windfarms

Item	Applicant		Perenco		Perenco's Comments	Applicant's Comments
	Without DEP	With DEP	Without DEP	With DEP		
Night hours available during Norwich Airport operating times (% of night data points)	24.7%	24.7%	24.0%	24.0%		
Night hours available during Norwich Airport operating times (% of night data points) by month:						
January	Omitted	Omitted	39%	39%		
February	Omitted	Omitted	32%	32%		
March	Omitted	Omitted	26%	26%		
April	Omitted	Omitted	12%	12%		
May	Omitted	Omitted	3%	3%		
June	Omitted	Omitted	0%	0%		
July	Omitted	Omitted	0%	0%		
August	Omitted	Omitted	8%	8%		
September	Omitted	Omitted	18%	18%		
October	Omitted	Omitted	28%	28%		
November	Omitted	Omitted	37%	37%		
December	Omitted	Omitted	40%	40%		
Night No Fly (% of available night data points)	Omitted	Omitted	51%	100%		
Night VMC (% of available night data points)	40.2%	0.0%	39%	0%		
Night IMC (% of available night data points)	Omitted	Omitted	10%	0%		
By simple calculation from the above, Day & Night within Norwich Airport Operating Hours:					Where the wind turbine rotor tips are at least 1.32nm from the Waveney platform (or 1.4nm to turbine base with 300m diameter rotor), the Perenco "With DEP" figures would be:	
No Fly (% of day & night airport hours)	Omitted	Omitted	12%	94%	24%	
VMC (% of day & night airport hours)	Omitted	Omitted	84%	6%	76%	
IMC (% of day & night airport hours)	Omitted	Omitted	3%	0%	0%	
Considering realistic impact on helicopter logistics (i.e. a 2hr window of suitable conditions is assumed necessary for a flight to leave Norwich:						
Operations possible at a Non-producing installation stationed at the Waveney platform (% of day & night of airport hours)						
January	Omitted	Omitted	92%	7%	65%	
February	Omitted	Omitted	80%	8%	64%	
March	Omitted	Omitted	76%	5%	64%	
April	Omitted	Omitted	91%	4%	89%	
May	Omitted	Omitted	91%	6%	86%	
June	Omitted	Omitted	91%	4%	86%	
July	Omitted	Omitted	85%	5%	79%	

August	Omitted	Omitted	91%	5%	89%
September	Omitted	Omitted	90%	7%	83%
October	Omitted	Omitted	90%	3%	81%
November	Omitted	Omitted	90%	6%	70%
December	Omitted	Omitted	86%	3%	62%
Annual Average	Omitted	Omitted	88%	5%	77%

Table 1.7 Perenco's Indicative Compensation Calculations for Waveney

Scenario	Assumption	Calculated Cost	Applicant's Comments
Operational Scenarios			
<p>Windfarm Triggers Early Decommissioning – Scenario One</p> <p>We have assessed that a discounted value of lost production minus costs and acceleration of decommissioning. We have assumed that DEP SEP triggers decommissioning in 2025.</p> <p>We can provide calculations if decommissioning occurs later.</p>	<p>Shut in (i.e. more than one turbine within 1.5nm compared with 3nm – no restriction)</p> <ul style="list-style-type: none"> • PUK Budget Profiles - Nov 22 • Gas prices used between 50p/th and 150p/th • £2.0M opex per annum and • £20M abex • Calculation on delta between NPV of current production and no production and accelerated decomm 	<p>The value we have calculated ranges between £13.8M and £43.1M.</p>	<p>This distances here reference 1.5nm with more than one turbine closer. This is not a position the Applicant recognises.</p> <p>The critical distance at which access would be limited is less than 1.01nm (based on a 0.5nm stabilised approach used by Perenco's current operator) or 1.26nm based upon a 0.75nm stabilised approach (used by Perenco's future helicopter operator).</p>
<p>Windfarm Effects Accessibility to Platform – Scenario Two</p> <p>We calculated the value for reduced access.</p> <p>We assume that reduced access starts in 2025.</p>	<p>Restricted access (i.e. no more than one turbine within 1.5nm compared with 3nm – no restriction)</p> <ul style="list-style-type: none"> • PUK Budget Profiles - Nov 22 • Gas prices used between 50p/th and 150p/th • £2.0M opex per annum and • £20M abex <p>Percentage downtime applied to production</p>	<p>For a 20% restriction on access the value we have calculated ranges between £2.9M and £8.8M.</p>	<p>Both the Applicant and Perenco agree an impact will be loss of access during IMC conditions (minus no-fly conditions). Based on historic metrological data provide by Perenco this equates to 4.6% in 2020, 4.8% in 2021 and 2.2% in 2022 under the new stricter CAA rules.</p> <p>The Applicant therefore consider the use of a 20% restriction an over estimation of the impact.</p> <p>The Applicant's analysis is based on actual flight access to the platform, and represents days on which</p>

Scenario	Assumption	Calculated Cost	Applicant's Comments
			<p>Perenco chose to fly, rather than applying hypothetical weather windows. This analysis is provided in Environmental Statement Volume 3 Appendix 16.2 - Appendix A - Helicopter Access Study [APP-205].</p> <p>From this analysis we see that 2 out of 72 flights would have been affected in 2020 and only 1 out of 64 in 2021. There were sufficient times on each of these occasions for flights to either be brought forward or delayed, effectively mitigating in full any impact on platform operations. Loss of working time would have been 2 hours and 22 minutes across the two years of flight access.</p> <p>It has not been justified or substantiated by Perenco how a very limited loss of access time of an hour or two a year could lead to loss in the range of £2.9-£8.8 million over a period after 2025.</p> <p>This claim seems disproportionately high, especially as Woodmac market intelligence (being the industry-leading oil & gas industry research firm) suggest in their analysis that the Waveney platform / field is at the end of its economic lifetime and uneconomic after 2025 using</p>

Scenario	Assumption	Calculated Cost	Applicant's Comments
			<p>recently updated market and economic assumptions.</p> <p>Even when applying a favourable production decline curve and assuming a long-term sustained high gas price of 110p/therm from 2025 onwards, the Waveney platform would not create a total post-tax cashflow of more than £0.5 million per year after 2025. Beyond 2031 the Waveney platform, even with these very optimistic assumptions, would become uneconomic and would be shut-in for decommissioning.</p> <p>A claim of several millions as made by Perenco, assessed to be higher than the total post-tax cash flows after 2025 earned by Perenco from the Waveney platform, whilst using very favourable assumptions, does not represent in the opinion of the Applicant a true and proportionate compensation claim for losses caused by a very limited loss of access time due to the windfarm.</p>
Decommissioning Scenarios			
<p>Impact on Decommissioning – Scenario Three</p> <p>We calculated the value for reduced access.</p>	<p>Restricted access – day and night flights</p> <ul style="list-style-type: none"> £200k rig spread daily cost – June 2023 	<p>For a 20% restriction on access the value we have calculated £5.6M</p>	<p>No justification is given for the 20% reduction on access.</p>

Scenario	Assumption	Calculated Cost	Applicant's Comments
	<ul style="list-style-type: none"> Total decommissioning programme is estimated at 141 days Extension of the programme by 28 days for flying restriction 		<p>Perenco makes an unsubstantiated and questionable assumption that a 20% reduction on access would lead to a 20% extension of the programme (i.e. rig time cost).</p> <p>As stated in section 3 of Perenco's Technical Note submitted at Deadline 4 (see Deadline 4 Submission [REP4-050])</p> <p><i>"these flights would not be dependent on one another. For the purposes of this analysis, as long as one flight can be made during the day, no impairment to operations is assumed."</i></p> <p>If that is the case loss of night access would not be an issue so long as a flight was still possible during daylight hours.</p>