

2.15



Volume 2, Chapter 15

# Civil and Military Aviation



# Contents

<b>15.</b>	<b>Civil and military aviation</b>	<b>3</b>
15.1	Introduction	3
15.2	Relevant legislation, policy and other documentation	4
	Introduction	4
	Legislation and national planning policy	4
	Other relevant information and guidance	7
15.3	Consultation and engagement	8
	Overview	8
	Scoping opinion	9
	Informal consultation and engagement	15
15.4	Scope of the assessment	15
	Overview	15
	Spatial scope and study area	15
	Temporal scope	17
	Potential receptors	17
	Potential effects	18
	Activities or impacts scoped out of assessment	19
15.5	Methodology for baseline data gathering	22
	Overview	22
	Desk study	22
	Data limitations	22
15.6	Baseline conditions	23
	Current baseline	23
	Future baseline	25
15.7	Basis for PEIR assessment	25
	Maximum design scenario	25
	Embedded environmental measures	28
15.8	Methodology for PEIR assessment	34
	Introduction	34
	Current baseline	34
	Radar modelling	34
	Impact assessment methodology	35
15.9	Preliminary assessment: Construction phase	36
	Creation of an aviation obstacle environment	36
	Increased air traffic in the area related to wind farm activities	37
15.10	Preliminary assessment: Operation and maintenance phase	38
	Creation of an aviation obstacle environment	38
	Increased air traffic in the area related to wind farm activities	39
	Physical presence of WTGs leading to impacts on published Instrument Flight Procedures	39
	WTGs causing permanent interference on civil and military radars	40

15.11	Preliminary assessment: Decommissioning phase	41
	Creation of an aviation obstacle environment	42
	Increased air traffic in the area related to wind farm activities	42
15.12	Preliminary assessment: Cumulative effects	43
	Approach	43
	Cumulative effects assessment	43
15.13	Transboundary effects	43
15.14	Inter-related effects	44
15.15	Summary of residual effects	44
15.16	Further work to be undertaken for ES	46
	Introduction	46
	Baseline	46
	Assessment	47
	Consultation and engagement	47
15.17	Glossary of terms and abbreviations	47
15.18	References	54

---

Table 15-1	National planning policy relevant to civil and military aviation	5
Table 15-2	PINS Scoping Opinion responses – civil and military aviation	9
Table 15-3	Stakeholder scoping responses – civil and military aviation	13
Table 15-4	Receptors requiring assessment for civil and military aviation	17
Table 15-5	Potential effects on civil and military aviation receptors scoped in for further assessment	18
Table 15-6	Activities or impacts scoped out of assessment	20
Table 15-7	Data sources used to inform the civil and military PEIR assessment	22
Table 15-8	Maximum assessment assumptions for impacts on civil and military aviation	25
Table 15-9	Relevant civil and military aviation embedded environmental measures	32
Table 15-10	Impact significance definitions	36
Table 15-11	Summary of preliminary assessment of residual effects	44
Table 15-12	Further consultation and engagement	47
Table 15-13	Glossary of terms – civil and military aviation	47

### Volume 3: Figures

Figure 15.1 Civil and military aviation Study Area

### Volume 3: Appendices

Appendix 15.1 Airspace analysis and radar modelling

## 15. Civil and military aviation

### 15.1 Introduction

15.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary results of the assessment of the likely significant effects of Rampion 2 with respect to civil and military aviation, including the aviation interests of the United Kingdom (UK) Civil Aviation Authority (CAA), Ministry of Defence (MoD), regional airports, local aerodromes, NATS (that currently comprises NATS (En Route) plc (NERL) and NATS (Services) Limited (NSL)), and other UK aviation stakeholders. It should be read in conjunction with the project description provided in **Chapter 4: The Proposed Development** and the relevant parts of the following chapters:

- **Chapter 7: Other marine users** (which considers military activities);
- **Chapter 13: Shipping and navigation** (due to marine activities associated with Search and Rescue operations); and
- **Chapter 16: Seascape, landscape and visual** (due to the effect of aviation lighting).

15.1.2 This chapter describes:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 15.2: Relevant legislation, planning policy, and other documentation**);
- the outcome of consultation engagement that has been undertaken to date, including how matters relating to civil and military aviation within the Scoping Opinion received in August 2020 have been addressed (**Section 15.3: Consultation and engagement**);
- the scope of the assessment for civil and military aviation (**Section 15.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 15.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 15.6: Baseline conditions**);
- embedded environmental measures relevant to civil and military aviation and the relevant maximum design scenario (**Section 15.7: Basis for PEIR assessment**);
- the assessment methods used for the PEIR (**Section 15.8: Methodology for PEIR assessment**);
- the assessment of civil and military aviation effects (**Section 15.9 - 15.11: Preliminary assessment** and **Section 15.12: Preliminary assessment: Cumulative effects approach**);
- consideration of transboundary effects (**Section 15.13: Transboundary effects**);

- consideration of Inter-related effects (**Section 15.14: Inter-related effects**);
- a summary of residual effects for civil and military aviation (**Section 15.15: Summary of residual effects**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 15.16: Further work to be undertaken for ES**);
- a glossary of terms and abbreviations is provided in **Section 15.17: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 15.18: References**.

- 15.1.3 The chapter includes a description of the potential impacts on aviation activities with respect to impacts on radar and UK airspace predicted due to the physical presence of Wind Turbine Generators (WTGs) during the construction, operation and maintenance, and decommissioning phases of Rampion 2. An assessment of the potential effects arising from these impacts is undertaken and, where applicable, details of any proposed mitigation measures are provided.
- 15.1.4 This chapter is supported by a Technical Appendix (**Appendix 15.1 Airspace analysis and radar modelling, Volume 4**), which identifies the radar liable to detect the Rampion 2 WTGs and gives details of the Radar Line of Sight (RLoS) analyses, including a technical analysis of the radar subject to assessment and consideration of radar mitigation options. **Appendix 15.1** also sets out a detailed assessment of the airspace occupied by the offshore part of the Rampion 2 PEIR Assessment Boundary. The chapter then goes on to outline the modus operandi of Air Navigation Service Providers (ANSPs) in the area and summarises the effects that the Proposed Development is likely to have on aviation activities in the vicinity.
- 15.1.5 Guidance on the issues to be assessed for potential effects on aviation interests from offshore renewable energy developments in general has been obtained through reference to the National Policy Statement (NPS): NPS EN-1 and EN-3.

## 15.2 Relevant legislation, policy and other documentation

### Introduction

- 15.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to civil and military aviation. Further information on policies relevant to the EIA and their status is provided in **Chapter 2: Policy and legislative context** of this PEIR.

### Legislation and national planning policy

- 15.2.2 **Table 15-1** lists the national planning policy relevant to the assessment of the effects on civil and military aviation receptors.

Table 15-1 National planning policy relevant to civil and military aviation

Policy description	Relevance to assessment
<b>EN-1 Overarching NPS for Energy</b>	
<p>Paragraphs 5.4.10 to 5.4.13: If the proposed development could have an effect on civil and military aviation, then the assessment should:</p> <ol style="list-style-type: none"> <li>1) Consult the MOD, CAA, NATS and any aerodrome – licensed or otherwise – likely to be affected by the proposed project in preparing an assessment of the proposal on aviation or other defence interests;</li> <li>2) Include potential impacts of the project upon the operation of CNS [Communications, Navigation &amp; Surveillance] infrastructure, flight patterns (both civil and military), other defence assets and aerodrome operational procedures; and</li> <li>3) Assess the cumulative effects of the project with other relevant projects in relation to aviation and defence.</li> </ol>	<p>Effects on civil and military aviation during the construction, operation and maintenance, and decommissioning phases are assessed and presented in <b>Sections 15.9 to 15.11</b>. Cumulative effects are assessed in <b>Section 15.12</b>.</p>
<p>Paragraph 5.4.15: If there are conflicts between the Government's energy and transport policies and military interests in relation to the application, the decision maker should expect the relevant parties to have made appropriate efforts to work together to identify realistic and pragmatic solutions to the conflicts. In so doing, the parties should seek to protect the aims and interests of the other parties as far as possible.</p>	<p>See <b>Section 15.10</b> and <b>Appendix 15.1, Volume 4</b>. The MoD have confirmed that the Proposed Development will have no impact on military Air Traffic Control or Air Defence radars, however they note that the western boundary overlaps Danger Area D037 and further consultation with MoD will be undertaken to resolve this matter.</p>
<p>Paragraph 5.4.16: There are statutory requirements concerning lighting to tall structures. Where lighting is requested on structures that goes beyond statutory requirements by any of the relevant aviation and defence consultees, the decision maker should satisfy itself of the necessity of such lighting taking into account the case put forward by the consultees. The effect of</p>	<p>Marking and lighting requirements are discussed in <b>paragraphs 15.7.9 to 15.7.14</b>.</p>

## Policy description

## Relevance to assessment

such lighting on the landscape and ecology may be a relevant consideration.

Paragraph 5.4.17:

Where, after reasonable mitigation, operational changes, obligations and requirements have been proposed, the decision maker considers that:

- 1) A development would prevent a licensed aerodrome from maintaining its licence;
- 2) The benefits of the proposed development are outweighed by the harm to aerodromes serving business, training or emergency service needs, taking into account the relevant importance and need for such aviation infrastructure; or
- 3) The development would significantly impede or compromise the safe and effective use of defence assets or significantly limit military training;
- 4) The development would have an impact on the safe and efficient provision of en route air traffic control services for civil aviation, in particular through an adverse effect on the infrastructure required to support communications, navigation or surveillance systems;

consent should not be granted.

The Proposed Development has the potential to generate clutter on radar displays and thus have an impact on the safe and efficient provision of en route air traffic control services for civil aviation. However, mitigation options are available, as discussed in **Section 15.10** and set out in detail in **Appendix 15.1, Volume 4**.

## EN-3 NPS for Renewable Energy Infrastructure

Paragraph 2.6.183:

Where a wind farm potentially affects other infrastructure or activity, a pragmatic approach should be employed by the decision maker. The decision maker should expect the applicant to minimise negative impacts and reduce risks to as low as reasonably practicable (ALARP).

Potential effects during the various phases are assessed in **Sections 15.9 to 15.12**.

Paragraph 2.6.184:

The decision maker should be satisfied that the site selection and design of the wind farm has avoided or minimised disruption or economic loss or any adverse

A number of embedded environmental measures have been adopted to reduce the potential impacts on civil and military aviation, as detailed in **paragraphs 15.7.3 to 15.7.18**.

## Policy description

## Relevance to assessment

effects on safety to other offshore industries. The decision maker should not consent applications which pose unacceptable risks to safety after mitigation measures have been considered.

Paragraph 2.6.186:  
Where schemes have been carefully designed and the necessary consultation has been undertaken at an early stage, mitigation measures may be possible to negate or reduce effects on other offshore infrastructure to a level sufficient to enable the decision maker to grant consent.

Adopted embedded environmental measures are detailed in **paragraphs 15.7.3 to 15.7.18** and possible mitigation measures for radar impacts are outlined in **Section 15.10**.

Paragraphs 2.6.187 to 2.6.188:  
Detailed discussions between the applicant and the relevant consultees should have progressed as far as reasonably possible prior to the submission of an application. As such, appropriate mitigation should be included in any application and ideally agreed between relevant parties. In some circumstances, the decision maker may wish to consider the potential to use conditions involving arbitration as a means of resolving how adverse impacts on other commercial activities will be addressed.

It is intended to engage further with all affected aviation stakeholders using this chapter and **Appendix 15.1** as a basis for those discussions.

Paragraph 2.6.107:  
Aviation and navigation lighting should be minimised to avoid attracting birds, taking into account impacts on safety.

See **paragraphs 15.7.9 to 15.7.14** for proposed lighting.

## Other relevant information and guidance

- 15.2.3 A summary of other relevant information and guidance relevant to the assessment undertaken for civil and military aviation is provided here:
- Civil Aviation Publication (CAP) 168: Licensing of Aerodromes sets out the standards required at UK licensed aerodromes relating to management systems, operational procedures, physical characteristics, assessment and treatment of obstacles and visual aids. (CAA, 2019);
  - CAP 2038A00: Air Navigation Order (ANO) 2016 sets out the Rules of the Air and includes the application of lighting to Wind Turbine Generators (WTGs) in UK territorial waters (Articles 222 and 223). (CAA, 2021);



- CAP 764: Policy and Guidelines on Wind Turbines provides assistance to aviation stakeholders to help understand and address wind energy related issues, thereby ensuring greater consistency in the consideration of the potential impact of proposed wind farm developments. (CAA, 2016);
- CAP 670: Air Traffic Services Safety Requirements sets out the safety regulatory framework and requirements associated with the provision of an Air Traffic Service (ATS). (CAA, 2019);
- CAP 1616: Airspace Change explains the CAA's regulatory process for changes to airspace. (CAA, 2021);
- CAP 437: Standards for offshore helicopter landing areas provides the criteria applied by the CAA in assessing helicopter landing areas for worldwide use by helicopters registered in the UK and includes winching area 'best practice' design criteria for wind turbine platforms. (CAA, 2018);
- CAP 032: UK Aeronautical Information Publication (AIP) is the main resource for information and flight procedures at all licensed UK airports, as well as airspace, en route procedures, charts and other air navigation information. (CAA, 2021);
- UK Military AIP is the main resource for information and flight procedures at all military aerodromes. (MoD, 2021);
- Military low flying in the United Kingdom: the essential facts. (MoD, 2017);
- MoD Obstruction Lighting Guidance details MoD requirements for the lighting of offshore developments. (Low Flying Operations Flight, 2020);
- Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 543 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response highlights issues to consider when assessing navigational safety and emergency response, caused by offshore renewable energy installations. (MCA, 2016);
- MCA guidance document Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for Search and Rescue and Emergency Response. (MCA, 2018); and
- International Civil Aviation Organisation (ICAO) Annex 14: Aerodrome Design and Operations includes recommendations for marking and lighting of wind turbines. (ICAO, 2018).

## 15.3 Consultation and engagement

### Overview

- 15.3.1 This section describes the outcome of, and response to, the Scoping Opinion in relation to civil and military aviation assessment. An overview of engagement undertaken can be found in **Section 1.5 of Chapter 1: Introduction**.

## Scoping opinion

- 15.3.2 Rampion Extension Development Limited (RED) submitted a Scoping Report (RED, 2020) and request for a Scoping Opinion to the Secretary of State (administered by the Planning Inspectorate (PINS)) on 2 July 2020. A Scoping Opinion was received on 11 August 2020. The Scoping Report set out the proposed civil and military aviation assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. **Table 15-2** sets out the comments received in Section 4 of the PINS Scoping Opinion ‘Aspect based scoping tables – Offshore’ and how these have been addressed in this PEIR. A full list of the PINS Scoping Opinion comments and responses is provided in **Appendix 5.1: Response to the Scoping Opinion, Volume 4**. Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report. These comments are set out and addressed in **Table 15-3**.
- 15.3.3 The information provided in the PEIR is preliminary and therefore not all the Scoping Opinion comments have been able to be addressed at this stage, however all comments will be addressed within the ES.

Table 15-2 PINS Scoping Opinion responses – civil and military aviation

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
4.11.1	The Inspectorate agrees that significant aviation effects from construction and operation of the offshore cabling are unlikely and can be scoped out of further assessment.	Aviation effects from construction and operation of the offshore cabling have been scoped out of the assessment (see also <b>Table 15-6</b> ).
4.11.2	On the basis that WTG rotors will be static during construction and would not interfere with radar systems, the Scoping Report suggests that there is no impact pathway during construction. The Inspectorate agrees that this can be scoped out on this basis and on the basis that the operational assessment effectively encompasses consideration of any significant effects during construction.	Acknowledged. Impact of static WTG rotors on radar systems during construction and decommissioning has been scoped out of the assessment (see also <b>Table 15-6</b> ).
4.11.3	On the basis that there are no licensed airfields with a surveillance radar within 30km of any part of the WTG array area, the Applicant seeks to scope this matter out of further assessment. Whilst the	Farnborough Airport, Gatwick Airport and Southampton Airport are included in the assessment. RLoS modelling shows that there is no possibility of their radars being

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
	<p>Applicant is proposing additional consultation with stakeholders as to the scope of the assessment, the Inspectorate does not consider it appropriate to agree to scoping this matter out on the basis of an arbitrary 30km distance at this stage. The Inspectorate does not consider that sufficient justification has been provided to exclude effects beyond 30km (for example with reference to defined consultation zones). The ES should assess this matter where significant effects are likely to occur.</p>	<p>affected by Rampion 2 (see also <b>Table 15-6</b>).</p>
4.11.4	<p>On the basis that there are no no-radar licensed aerodromes within or close to the relevant 12 and 17km consultation distances set out, the Inspectorate agrees that this matter can be scoped out of further assessment.</p>	<p>Physical presence and operation of the WTGs leading to impacts on no-radar licensed aerodromes has been scoped out of the assessment (see also <b>Table 15-6</b>).</p>
4.11.5	<p>Given the location of the WTGs at least 12km offshore, the Scoping Report identifies that there will be no effects on light aircraft landing strips, gliding sites, microlight sites or parachute sites. The Inspectorate agrees that significant effects during operation are unlikely and can be scoped out of further assessment on this basis.</p>	<p>Physical presence and operation of the WTGs leading to impacts on other civil aviation activities (excluding Search and Rescue (SAR)) has been scoped out of the assessment (see also <b>Table 15-6</b>).</p>
4.11.6	<p>The Scoping Report seeks to rely on an Emergency Response and Cooperation Plan (ERCOP) and appropriate lighting, marking and notification, in line with CAA regulations (to be applied and secured for the Proposed Development) to exclude significant effects. In absence of the detail of an ERCOP and the other measures proposed, the Inspectorate cannot</p>	<p>Impact on SAR considered as part of the assessment of the various phases of the Proposed Development (see <b>Sections 15.9 to 15.11</b>).</p>

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
	<p>rely on their content as justification for scoping this matter out of the ES. The Inspectorate also notes the potential combined effect on SAR of the construction and operation of the Proposed Development and Rampion 1 and this should be assessed within the ES.</p>	
4.11.7	<p>Based on the information provided in paragraphs 5.12.31 – 5.12.34, the Scoping Report suggests that it is “evident” that there is sufficient distance from the Proposed Development to rule out significant effects on MoD facilities. Paragraph 5.12.55 also states that there are no air defence radars within a “relevant distance of Rampion 2” although such a distance is not defined. The Inspectorate does not consider sufficient technical and evidence based information has been provided to agree that effects on MoD facilities entirely, not least because the Applicant refers to further consultation with the MoD as part of the scoping process (and potentially beyond). The ES should assess these matters where significant effects are likely to occur.</p>	<p>The nearest air defence radars are at Trimmingham, 267km to the north-east, and at Portreath, 329km to the west. Neither of these radars will have RLoS of Rampion 2 turbines.</p> <p>Further consultation will be initiated with the MoD regarding the overlap of Danger Area D037 with the Rampion 2 PEIR Assessment Boundary (see also <b>Table 15-12</b>).</p>
4.11.8	<p>On the basis that the nearest Met Office radar systems are located at c. 85km from the Proposed Development (in excess of the 20km safeguarded zone around each), the Inspectorate agrees that significant effects are not likely to occur and that this matter can be scoped out of the ES.</p>	<p>Effects on Met Office radar systems have been scoped out of the assessment (see also <b>Table 15-6</b>).</p>
4.11.9	<p>The Scoping Report relies on the requirement for aviation lighting (with differentiation between aviation and maritime lighting) to be put in</p>	<p>Noting the comment, construction, operation and decommissioning effects on civil and military flight operations have all been scoped</p>

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
	<p>place and secured as part of the design of the Proposed Development to justify scoping out this matter.</p> <p>In absence of the detail of these measures (and the need for further consultation in this regard), the Inspectorate cannot rely on their content as justification for scoping this matter out of the ES at this stage. The Inspectorate also notes the potential combined effect of the construction and operation of the Proposed Development and Rampion 1 and this should be assessed as part of the ES.</p>	<p>into the assessment; see <b>Sections 15.9 to 15.12</b>.</p> <p>The adjacent Rampion 1 offshore wind farm is an existing operational project and is therefore considered as part of the existing baseline. Possible cumulative effects arising from the presence of Rampion 1 are considered in <b>Section 15.7</b> and assessed in <b>Sections 15.9, 15.10 and 15.11</b>.</p>
4.11.10	<p>Figure 5.12.1 does not actually depict the proposed study area, and does not provide a key making it difficult to depict and identify the features set out on the complex basemap (and which are then described listed in the baseline conditions section).</p> <p>The ES should provide a clear definition of the study area (including if / how it varies across the various matters considered in the assessment (ie civil and military aviation receptors). Supporting figures should more clearly identify the location(s) of these receptors.</p>	<p>The updated study area figure (<b>Figure 15.1, Volume 3</b>) clearly identifies the locations of civil and military aviation receptors as detailed in <b>Section 15.4</b>.</p>
4.11.11	<p>The Applicant explains that “significance criteria for aviation impacts are typically difficult to establish”, and that further details of the assessment of significance will be provided in the PEIR and ES. The Inspectorate is therefore not able to make any comments on the proposed approach, but expects that the Applicant would define such criteria so that they are compatible with the approach and terminology</p>	<p>The significance criteria used for the assessment are discussed in <b>paragraph 15.8.11</b> and defined in <b>Table 15-10</b>.</p>

PINS ID number	Scoping Opinion comment	How this is addressed in this PEIR
	as set out in section 4 and figure 4.1 of the Scoping Report.	
4.11.12	<p>The Inspectorate refers the Applicant to the comments of NATS En Route PLC and the potential effects identified by them on radar infrastructure at Pease Pottage and both the “London Area Control Centre” and “London Terminal Control Centre” Air Traffic Control Centres (ATC).</p> <p>The Inspectorate notes that further consultation will be required in order to enable suitable mitigation (paragraph 5.12.37). The ES should set out how the design and / or other measures secured as part of the Proposed Development propose to mitigate assess these effects.</p>	<p>The impact on Pease Pottage has been confirmed by RLoS modelling, see <b>Appendix 15.1, Volume 4</b>. Mitigation options have been explored in <b>Appendix 15.1, Volume 4</b> and will inform further consultation with NERL (see also <b>Table 15-12</b>).</p>

Table 15-3 Stakeholder scoping responses – civil and military aviation

Stakeholder	Date	Comment	Response
MoD	4 August 2020	We have reviewed the development against current operational assets and requirements and this proposed development will have no impact on military Air Traffic Control or Air Defence Radars.	Noted.
MoD	4 August 2020	At 5.12.21 (Aviation baseline) the proposed wind farm is described as being just to the east of D037 however, the MOD assesses that the development would overlap the Danger Area boundary for D037 and therefore could impact on Military training. The MOD would have concerns with any turbines or structures being erected in Danger Area D037 as they would impact on the Navy’s freedom to exercise within the Danger Area and cause physical obstructions.	Noted. Further consultation with MoD will be undertaken to resolve this matter.

Stakeholder	Date	Comment	Response
MoD	4 August 2020	In the interests of air safety, the MOD would request that the development be fitted with MOD accredited aviation safety lighting in accordance with the Civil Aviation Authority, Air Navigation Order 2016.	Appropriate lighting will be fitted, as detailed in <b>paragraph 15.7.14.</b>
MoD	4 August 2020	In relation to the onshore element of the proposed development, the extent of the corridor which will contain the onshore cable route is included in the Scoping Report (Figure 1.1 Scoping Boundary). The corridor proposed does not occupy any MOD Land Parcels or MOD statutory safeguarding zones. I can confirm that the MOD does not have any concerns, but we would need to be consulted should the applicant decide to route the cable across or go near any MOD land parcel. MOD Safeguarding wishes to be consulted and notified about the progression of this proposal and any subsequent application(s) that may be submitted relating to it to verify that it will not adversely affect defence interests.	Noted.
NATS	21 July 2020	Predicted Impact on Pease Pottage RADAR: Using the theory as described in Appendix A and development specific propagation profile it has been determined that the terrain screening available will not adequately attenuate the signal, and therefore this development is likely to cause false primary plots to be generated. A reduction in the RADAR's probability of detection, for real aircraft, is also anticipated.	Impact confirmed by modelling and discussed in <b>paragraphs 15.10.11 to 15.10.17.</b>
NATS	21 July 2020	No impact is anticipated on NATS' navigation aids. No impact is anticipated on NATS' radio communications infrastructure.	Noted.

## Informal consultation and engagement

### Overview

#### *Informal consultation – January / February 2021*

- 15.3.4 RED carried out an Informal Consultation exercise for a period of four weeks from 14 January 2021 to 12 February 2021. This Informal Consultation exercise aimed to engage with a range of stakeholders including the prescribed and non-prescribed consultation bodies, local authorities, Parish Councils and general public with a view to introducing the Proposed Development and seeking early feedback on the emerging designs.
- 15.3.5 Further detail about the results of the Informal Consultation exercise can be found in the **Informal Consultation Analysis**.

## 15.4 Scope of the assessment

### Overview

- 15.4.1 This section sets out the scope of the PEIR assessment for civil and military aviation. This scope has been developed as the Rampion 2 design has evolved and responds to feedback received to date as set out in **Section 15.3**. As outlined in the Planning Inspectorate's (PINS) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Version 7, the Planning Inspectorate, 2020), information presented in the PEIR is preliminary, therefore this scope will be reviewed and may be refined as Rampion 2 evolves through ongoing design work and as a result of ongoing consultation.
- 15.4.2 The assessment is based on a desktop study of the available information and the potential impact arising from Rampion 2 on international and national Standards and Recommended Practices (SARPs) which will then be followed by subsequent consultation with the relevant statutory bodies and interested organisations. A logical and proven methodology, detailed in **Appendix 15.1, Volume 4** and based on the requirements of CAP 764, was used to assess the potential effects of the establishment of the Proposed Development on radars. The outputs of that assessment have then been used in this chapter to consider the consequences of any radar impacts on the airspace in the vicinity of Rampion 2.

## Spatial scope and study area

### Overview

- 15.4.3 The spatial scope of the civil and military aviation assessment is defined as the wind farm array area of the PEIR Assessment Boundary, an area of 315km<sup>2</sup> to the south east and west of the existing Rampion 1 project between 13km and 25km from the coastline together with the Zones of Influence (ZOIs) that have formed the basis of the study area described in this section.



## Civil aerodromes

- 15.4.4 CAP 764 states the distances from various types of aerodromes where consultation should take place. These distances include:
- aerodromes with a surveillance radar – 30km;
  - non-radar equipped licensed aerodromes with a runway of more than 1,100m – 17km;
  - non-radar equipped licensed aerodromes with a runway of less than 1,100m – 5km;
  - licensed aerodromes where the WTGs will lie within airspace coincidental with any published Instrument Flight Procedure (IFP);
  - unlicensed aerodromes with runways of more than 800m – 4km;
  - unlicensed aerodromes with runways of less than 800m – 3km;
  - gliding sites – 10km; and
  - other aviation activity such as parachute sites and microlight sites within 3km.
- 15.4.5 CAP 764 goes on to state that these distances are for guidance purposes only and do not represent ranges beyond which all WTG developments will be approved or within which they will always be objected to. These ranges are intended to delimit the study area and as a prompt for further discussion between RED and aviation stakeholders.
- 15.4.6 As well as examining the technical impact of WTGs on Air Traffic Control (ATC) facilities, it is also necessary to consider the physical safeguarding of ATC operations using the criteria laid down in CAP 168 to determine whether a proposed development will breach obstacle clearance criteria.

## Ministry of Defence

- 15.4.7 It is necessary to take into account the aviation and air defence activities of the MoD. This includes:
- MoD airfields, both radar and non-radar equipped;
  - MoD Air Defence (AD) radars; and
  - MoD Danger Areas.

## NERL facilities

- 15.4.8 It is necessary to take into account the possible effects of WTGs upon NERL radar systems – a network of primary and secondary radars and navigation facilities around the country.

## Other aviation activities

- general military low-flying training operations; and

- military and civilian ‘off-route’ fixed-wing and helicopter operations, including SAR missions.

## Temporal scope

15.4.9 The temporal scope of the assessment of civil and military aviation is consistent with the period over which Rampion 2 will be carried out and therefore covers the construction, operational and decommissioning periods.

## Potential receptors

15.4.10 The spatial and temporal scope of the assessment enables the identification of receptors which may experience a change as a result of Rampion 2. The receptors identified that may experience likely significant effects for civil and military aviation are outlined in **Table 15-4**.

Table 15-4 Receptors requiring assessment for civil and military aviation

Receptor group	Receptors included within group
<b>Civil aerodromes</b>	Farnborough Airport
	Gatwick Airport
	Shoreham Airport
	Southampton Airport
<b>MoD facilities</b>	Portsmouth Danger Areas
	RAF Odiham
	Portsmouth AD radar
	Trimingham AD radar
<b>NERL facilities</b>	Pease Pottage radar
	Air Traffic Services
<b>Other aviation activities</b>	Offshore fixed-wing and helicopter operations
	SAR operations
	Military low flying

15.4.11 The list of receptors will be kept under review during the EIA as more detailed information is obtained and will be reflected in the final ES.

## Potential effects

15.4.12 Potential effects on civil and military aviation receptors that have been scoped in for assessment are summarised in **Table 15-5**.

**Table 15-5** Potential effects on civil and military aviation receptors scoped in for further assessment

Receptor	Activity or impact	Potential effect
<b>Construction</b>		
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Creation of aviation obstacle environment.	Risk of collision.
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Increased air traffic in the area related to wind farm activities.	Mid-air collision.
<b>Operation and maintenance</b>		
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Creation of aviation obstacle environment.	Risk of collision.
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Increased air traffic in the area related to wind farm activities.	Mid-air collision.
Shoreham Airport	Physical presence and operation of the WTGs leading to impacts on licensed aerodromes where WTGs will be within airspace with published IFPs.	Revision of IFP subject to acceptance by Shoreham Airport.

Receptor	Activity or impact	Potential effect
NERL radar at Pease Pottage NERL ATS	Physical presence and operation of the WTGs leading to impacts on NERL radars.	WTGs in coverage areas of NERL radar systems could shield the radars from genuine targets of interest in clutter and a degree of 'shadowing' could be created behind detectable WTGs. Any of these potential effects could impact on the NERL provision of an ATS to aircraft. Whilst mitigation solutions may be agreed, impacts on the performance of this system mean that there is potential for a likely significant effect.
<b>Decommissioning</b>		
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Creation of aviation obstacle environment.	Risk of collision.
Offshore fixed-wing and helicopter operations SAR operations Military low flying	Increased air traffic in the area related to wind farm activities.	Mid-air collision.

## Activities or impacts scoped out of assessment

- 15.4.13 A number of potential effects have been scoped out from further assessment on the basis that there is no potential for a likely significant effect to arise. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely. The conclusions follow (in a site-based context) existing best practice. Each scoped out activity or impact is considered in turn below and an indication given of whether the scope has evolved since Scoping.

Table 15-6 Activities or impacts scoped out of assessment

Activity or impact	Rationale for scoping out
<b>Installation of the offshore cables offshore affecting aviation receptors (Construction, Operation and Decommissioning).</b>	<p>As all of the offshore cable corridor infrastructure will be below sea level, there is no potential source/receptor pathway for an impact to arise on aviation interests for any stage of Rampion 2. All offshore cable aspects are therefore proposed to be scoped out from consideration within the ES.</p> <p>PINS agreed that significant aviation effects are unlikely and can be scoped out of the EIA in the Scoping Opinion (PINS, 2020).</p>
<b>Construction and Decommissioning of the WTGs leading to impacts on civil and military radar systems (Construction and Decommissioning).</b>	<p>During construction (prior to commissioning) and during the decommissioning phases of Rampion 2, there will be no interference of any civil or military ATC or AD radar systems as the WTG rotors will remain static and will not, therefore, create clutter or affect automated tracking systems. On this basis there is no impact pathway identified during construction and decommissioning and hence this impact is proposed to be scoped out from the EIA.</p> <p>PINS agreed that impacts during construction and decommissioning can be scoped out of the EIA on this basis in the Scoping Opinion (PINS, 2020).</p>
<b>Physical presence and operation of the WTGs leading to impacts on Licensed Airfields with surveillance radar (Operation).</b>	<p>The closest radar equipped airfields are Gatwick, 49km to the north, Southampton, 61km to the north-west, and Farnborough, 68km to the north. RLoS modelling detailed in <a href="#">Appendix 15.1, Volume 4</a> shows that there is no possibility of their radars being affected by Rampion 2 and hence it is proposed to scope them out from the EIA.</p> <p>PINS did not consider it appropriate to agree to scoping this matter out on the basis of an arbitrary 30km distance and did not consider that sufficient justification had been provided to exclude effects beyond</p>

Activity or impact	Rationale for scoping out
	30km (PINS, 2020). The RLoS modelling provides the required justification for scoping out impacts on radar equipped airfields.
<p><b>Physical presence and operation of the WTGs leading to impacts on non-radar equipped licensed aerodromes (Operation).</b></p>	<p>There are no non-radar equipped licensed aerodromes with a runway of more than 1,100m within or close to the designated 17km consultation distance. On this basis assessment of these facilities will be scoped out of the EIA.</p> <p>Consultation distance for non-radar equipped licensed aerodromes with a runway of less than 1,100m is 5km. As the offshore part of the PEIR Assessment Boundary is at least 12km offshore, there will be no non-radar licensed aerodromes requiring consultation and this issue will therefore be scoped out of the EIA.</p> <p>PINS agreed that this matter can be scoped out of the EIA in the Scoping Opinion (PINS, 2020).</p>
<p><b>Physical presence and operation of the WTGs leading to impacts on other civil aviation activities (excluding SAR) (Operation).</b></p>	<p>Given the location of the WTGs at least 12km offshore, there will be no effects on light aircraft landing strips, gliding sites, microlight sites or parachute sites. Assessment of potential impacts on these facilities will therefore be scoped out of the EIA.</p> <p>PINS agreed that significant effects during operation are unlikely and can be scoped out of the EIA in the Scoping Opinion (PINS, 2020).</p>
<p><b>Physical presence and operation of the WTGs leading to impacts on meteorological radar (Operation).</b></p>	<p>The closest Met Office radar systems are located at Thurnham in Kent and Dean Hill in Wiltshire. Both are 84km from Rampion 2 and well in excess of the 20km safeguarded zone around each radar. Met Office radars will therefore be unaffected and thus scoped out of the EIA.</p> <p>PINS agreed that significant effects are not likely to occur and that this matter can be</p>

Activity or impact	Rationale for scoping out
	scoped out of the EIA in the Scoping Opinion (PINS,2020).

## 15.5 Methodology for baseline data gathering

### Overview

- 15.5.1 Baseline data collection has been undertaken to obtain information over the study areas described in **Section 15.4: Scope of the assessment**. The current baseline conditions presented in **Section 15.6: Baseline conditions** sets out data currently available information from the study area/s.

### Desk study

- 15.5.2 The data sources that have been collected and used to inform this civil and military aviation assessment are summarised in **Table 15-7**.

Table 15-7 Data sources used to inform the civil and military PEIR assessment

Source	Date	Summary	Coverage of study area
<b>CAP 032: UK AIP (CAA, 2021)</b>	February 2021	The main resource for information and flight procedures at all licensed UK airports as well as airspace, en route procedures, charts and other air navigation information.	Full coverage across the Rampion 2 civil and military aviation study area.
<b>UK Military AIP (MoD, 2021)</b>	February 2021	The main resource for information and flight procedures at all military aerodromes.	Full coverage across the Rampion 2 civil and military aviation study area.
<b>Raytheon equipment brochure</b>	November 2007	Data on the Raytheon ASR-23SS Primary Surveillance Radar	NERL Pease Pottage radar facility.

### Data limitations

- 15.5.3 There are no data limitations relating to civil and military aviation that affect the robustness of the assessment of this PEIR.

## 15.6 Baseline conditions

### Current baseline

#### Civil aviation

- 15.6.1 Rampion 2 is within the London Flight Information Region (FIR) for ATC, the airspace regulated by the UK CAA. The Proposed Development lies within uncontrolled Class G airspace with controlled, predominantly Class A, airspace above that. Class A controlled airspace is the most strictly regulated of the classes whereby aircraft are positively controlled by ATC. Compliance with ATC clearances is mandatory and aircraft are flown and navigated solely with reference to aircraft instruments. Certain onboard equipment is also a prerequisite. Flight in Class G airspace is generally visual, meaning that pilots fly and navigate with reference to the natural horizon and terrain features they see outside. Pilots are required to maintain minimum distances from notified obstacles, including WTGs, and may only fly within the minimum weather and visibility criteria.
- 15.6.2 The Class A airspace above Rampion 2 is designated as part of the Worthing Control Area (CTA) and the London Terminal Control Area (LTMA), with minimum base altitudes of between 5,500ft and Flight Level (FL) 85. An FL is an aircraft altitude expressed in hundreds of feet above a standard sea level pressure datum, so FL 85 equates to an altitude of approximately 8,500ft.
- 15.6.3 The controlled airspace above the extreme western edge of Rampion 2 is the Portsmouth CTA Class C airspace which extends upwards from a base of FL125 (approximately 12,500ft above mean sea level (amsl)).
- 15.6.4 NERL provides en route civil air traffic services within the London FIR from the London Area Control Centre at Swanwick, near Southampton. NERL's closest radar is based at Pease Pottage, 43km to the north of Rampion 2.
- 15.6.5 The nearest licensed aerodrome with a surveillance radar is Gatwick Airport, over 50km to the north. The next closest radar equipped aerodromes are Southampton Airport, over 61km to the north-west, and Farnborough Airport 68km to the north.
- 15.6.6 Shoreham Airport is a small non-radar equipped licensed aerodrome with a runway of less than 1,100m, located 17km to the north of Rampion 2. The airport has published an IFP for approaches to Runway 02 that commences approximately 2.5km to the north of the northern boundary of the Rampion 2 array area of the PEIR Assessment Boundary. At this point aircraft are required to be at a minimum altitude of 2,200ft and commencing a descent towards the runway down to 1,500ft.
- 15.6.7 The baseline civil aviation airspace and receptors within the study area are detailed in **Figure 15.1, Volume 3**.

#### Military aviation

- 15.6.8 The closest military airfield equipped with ATC radar facilities is RAF Odiham, over 66km to the north of Rampion 2.



- 15.6.9 The MoD safeguard a network of long range high powered AD radars used to provide the UK with airspace surveillance and security and to fulfil national and international obligations. The closest AD radars to Rampion 2 are located at Trimmingham, 267km to the north-east, and at Portreath, 329km to the west.
- 15.6.10 Immediately to the west of Rampion 2 are the Portsmouth Danger Areas, the closest of which, D037, overlaps the western boundary of the Proposed Development. These Danger Areas are activated by Notices to Airmen (NOTAMs) and have vertical limits from the sea surface up to a maximum of 55,000ft amsl. These danger areas are mainly utilised for ships operating out of Portsmouth and are used for radar calibration and tracking, helicopter training and gunnery against airborne towed targets.
- 15.6.11 Radar surveillance is either provided by the ship itself, or further to the west by the remote radar head at Portland, with the control facility located in Plymouth.
- 15.6.12 The baseline military aviation airspace and receptors within the study area are detailed in **Figure 15.1, Volume 3**.

### Helicopter Main Routes

- 15.6.13 Helicopter Main Routes (HMRs) are routes typically and routinely flown by helicopters operating to and from offshore destinations and are promulgated for the purpose of highlighting concentrations of helicopter traffic to other airspace users. HMR promulgation does not predicate the flow of helicopter traffic. Whilst HMRs have no airspace status and assume the background airspace classification within which they lie, they are used by the ANSP and helicopter operators for flight planning and management purposes. In summary, HMRs are recognised routes to assist in regularising routeings and effectively managing traffic safely and do not comprise controlled airspace.
- 15.6.14 There are no published HMRs in the vicinity of Rampion 2.

### Flight procedures and ATS provided

- 15.6.15 In Class G (uncontrolled) airspace, aircraft are not obliged to be in receipt of an ATS, although it is open to pilots to seek Air Traffic Services outside Controlled Airspace (ATSOCAS) from the designated ATS provider: the extent of the ATSOCAS supplied will depend on the Communication, Navigation and Surveillance (CNS) capability of the ATS provider, its workload and any regulatory provisions relating to the carriage of CNS equipment by aircraft (for example, transponders). All aircraft above FL100 (circa 10,000ft amsl) in the London FIR are required to carry and operate transponders in accordance with national regulations.
- 15.6.16 To gain access to controlled airspace, a pilot must comply with various mandatory requirements. This includes establishing two-way radio communications with the designated ATC authority for the specified airspace and obtaining permission to enter it. The pilot then has to comply with instructions received. In this way, the controllers know of all the air traffic in the defined airspace. The controllers can then take appropriate measures to ensure that standard separation minima are maintained between all known aircraft by using various techniques that may or may not include the use of Primary Surveillance Radar (PSR).

- 15.6.17 Flight procedures in the vicinity of Rampion 2 are conducted in accordance with national UK CAA and MoD SARPs as promulgated in the UK AIP.
- 15.6.18 Given that all aircraft operating above FL100 (circa 10,000ft amsl) are required to be equipped with and operate transponders, the significance of primary radar for the provision of an ATS is more acute in the lower airspace outside of controlled airspace and is especially relevant to helicopter operators.

### Other offshore wind farms

- 15.6.19 For the purposes of the cumulative effects assessment, the current baseline includes other offshore wind farms in the English Channel that could have potential effects on civil and military aviation stakeholders. The only existing offshore wind farm is Rampion 1, adjacent to the Proposed Development. There are no other forms of development (for example onshore wind farms) that need to be considered in a cumulative effects assessment.

### Future baseline

- 15.6.20 There is no expected change to airspace or airspace users. There are no schemes proposed that are considered to affect the future baseline.

## 15.7 Basis for PEIR assessment

### Maximum design scenario

- 15.7.1 Assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the DCO Application. The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse impact and as a result impacts of greater adverse significance will not arise should any other development scenario (as described in **Chapter 4: The Proposed Development**) to that assessed within this Chapter be taken forward in the final scheme design.
- 15.7.2 The design assessment assumptions that have been identified to be relevant to civil and military aviation are outlined in **Table 15-8** below and are in line with the Project Design Envelope (**Chapter 4**).

Table 15-8 Maximum assessment assumptions for impacts on civil and military aviation

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Construction</b>		
Creation of aviation obstacle environment.	75 WTGs with a maximum blade tip height of 325m	Maximum number of the tallest WTGs, or

Project phase and activity/impact	Maximum assessment assumptions	Justification
	<p>above Lowest Astronomical Tide (LAT), or</p> <p>116 WTGs with a maximum blade tip height of 210m above LAT.</p> <p>The final scenario is likely to be between 75 and 116 WTGs with tip heights between 210m and 325m above LAT. The assessment of impacts is robust for any combination of WTG parameters within these ranges.</p> <p>Maximum of three offshore substations, topside height (including lightning protection and ancillary structures) 115m above LAT.</p>	<p>Maximum number of WTGs for the Proposed Development.</p> <p>(Either of the above scenarios could be worst case and both have been assessed for all impacts).</p> <p>Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Rampion 2 array area of the PEIR Assessment Boundary.</p> <p>Impact starting from a point of zero infrastructure present to full presence over a 24-month period.</p>
<p>Increased air traffic in the area related to wind farm activities.</p>	<p>Maximum number of 500 helicopter return trips during WTG installation.</p> <p>Maximum number of 30 helicopter return trips during substation installation.</p>	<p>Helicopter trips as a result of being engaged in works on Rampion 2 causing increased likelihood of aircraft-to-aircraft collision.</p>
<p><b>Operation and Maintenance</b></p>		
<p>Creation of aviation obstacle environment.</p>	<p>75 WTGs with a maximum blade tip height of 325m above LAT, or</p> <p>116 WTGs with a maximum blade tip height of 210m above LAT.</p> <p>The final scenario is likely to be between 75 and 116 WTGs with tip heights between 210m and 325m above LAT. The</p>	<p>Maximum number of the tallest WTGs, or</p> <p>Maximum number of WTGs for the Proposed Development.</p> <p>(Either of the above scenarios could be worst case and both have been assessed for all impacts).</p> <p>Maximum physical obstruction to aviation</p>

Project phase and activity/impact	Maximum assessment assumptions	Justification
	<p>assessment of impacts is robust for any combination of WTG parameters within these ranges.</p> <p>Maximum of three offshore substations, topside height (including lightning protection and ancillary structures) 115m above LAT.</p>	<p>operations due to size and number of above sea level infrastructure within the Rampion 2 array area of the PEIR Assessment Boundary.</p> <p>Impact present for operational lifetime of a minimum of 30 years.</p>
<p>Increased air traffic in the area related to wind farm activities.</p>	<p>60 helicopter return trips per year required for offshore operation and maintenance activities.</p>	<p>Helicopter trips as a result of being engaged in works on Rampion 2 causing increased likelihood of aircraft-to-aircraft collision.</p>
<p>WTGs causing permanent interference on civil and military radars.</p>	<p>75 WTGs with a maximum blade tip height of 325m above LAT, or</p> <p>116 WTGs with a maximum blade tip height of 210m above LAT.</p> <p>The final scenario is likely to be between 75 and 116 WTGs with tip heights between 210m and 325m above LAT. The assessment of impacts is robust for any combination of WTG parameters within these ranges.</p>	<p>Maximum number of the tallest WTGs, or</p> <p>Maximum number of WTGs for the Proposed Development.</p> <p>(Either of the above scenarios could be worst case and both have been assessed for all impacts).</p> <p>ATC may be unable to provide an effective surveillance service due to interference on radar displays.</p> <p>UK AD detection capability and therefore national security could be compromised.</p> <p>Impact present for operational lifetime of a minimum of 30 years.</p>
<p><b>Decommissioning</b></p>		

Project phase and activity/impact	Maximum assessment assumptions	Justification
Removal of aviation obstacle environment.	<p>75 WTGs with a maximum blade tip height of 325m above Lowest Astronomical Tide (LAT), or</p> <p>116 WTGs with a maximum blade tip height of 210m above LAT.</p> <p>The final scenario is likely to be between 75 and 116 WTGs with tip heights between 210m and 325m above LAT. The assessment of impacts is robust for any combination of WTG parameters within these ranges.</p> <p>Maximum of three offshore substations, topside height (including lightning protection and ancillary structures) 115m above LAT.</p> <p>High crane installation vessels.</p>	<p>Maximum number of the tallest WTGs, or</p> <p>Maximum number of WTGs for the Proposed Development.</p> <p>(Either of the above scenarios could be worst case and both have been assessed for all impacts).</p> <p>Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Rampion 2 array area of the PEIR Assessment Boundary.</p> <p>Impact starting from a point of full presence of infrastructure to zero presence over the decommissioning period.</p>
Increased air traffic in the area related to wind farm activities.	<p>Maximum number of 500 helicopter return trips during WTG decommissioning.</p> <p>Maximum number of 30 helicopter return trips during substation decommissioning.</p>	<p>Helicopter trips as a result of being engaged in works on Rampion 2 causing increased likelihood of aircraft-to-aircraft collision.</p>

## Embedded environmental measures

### Overview

- 15.7.3 As part of the Rampion 2 design process, a number of embedded environmental measures have been adopted to reduce the potential for impacts on civil and military aviation. These embedded environmental measures will evolve over the

development process as the EIA progresses and in response to consultation. They will be fed iteratively into the assessment process.

- 15.7.4 These measures typically include those that have been identified as good or standard practice and include actions that will be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of Rampion 2 and are set out in this PEIR.
- 15.7.5 **Table 15-9** sets out the relevant embedded environmental measures within the design and how these affect the civil and military aviation assessment.

### Information, notifications and charting

- 15.7.6 Rampion 2 will create an obstacle environment which can effectively be mitigated by compliance with appropriate international and national requirements for the promulgation of the obstacle locations on charts and in aeronautical documentation, together with the permanent marking and lighting of obstacles.
- 15.7.7 Measures will be adopted at the commencement of works on Rampion 2 to ensure that the aviation sector is made aware of the creation of a further aviation obstacle environment in the English Channel, namely Rampion 2. These measures will include issuing Notices to Airmen (NOTAMs) and Aeronautical Information Circulars (AICs), warning of the establishment of obstacles within the Rampion 2 array area and publicity in such aviation publications as Safety Sense and General Aviation Safety Information Leaflet (GASIL).
- 15.7.8 At various points during the development details of the position, height (amsl) and lighting of each of the completed permanent structures will be forwarded to the CAA Aeronautical Information Service (AIS) for inclusion in the AIP and on relevant aeronautical charts, as notifiable permanent obstructions. This permanent information will replace the short-term NOTAMs that will continue to be issued to cover the Proposed Development until construction has been completed.
- 15.7.9 En route navigation charts will be updated as the site construction proceeds. All obstacles over 300ft amsl must be notified to the CAA for inclusion in the UK AIP (section ENR5.4) and on aeronautical maps and to Defence Geographic Centre for inclusion in MoD databases.

### Marking and lighting

- 15.7.10 The international marking and lighting requirement, set out in ICAO Annex 14, specifies that:
- “a wind turbine shall be marked and/or lighted if it is determined to be an obstacle”;*  
and
- “the rotor blades, nacelle and upper 2/3 of the supporting mast of wind turbines should be painted white, unless otherwise indicated by an aeronautical study.”*
- 15.7.11 UK regulations adopt ICAO Annex 14’s requirements as to lighting of WTGs but do not require that WTGs follow the ICAO recommendation as to paint colour, although CAP 764 does set out the ICAO recommendation by way of guidance. In

terms of marking the WTGs, in keeping with recent practice for offshore wind farms, it is anticipated that Trinity House will require all structures to be painted yellow from the level of Highest Astronomical Tide (HAT) to a height directed by Trinity House, and above the yellow section all WTGs will be painted submarine grey (colour code RAL 7035).

- 15.7.12 Rampion 2 will be lit in accordance with the ANO. ANO Article 222 defines an 'en route obstacle' as any building, structure or erection, the height of which is 150m or more above ground level (agl) and requires these to be lit. Article 223 modifies the Article 222 requirement with respect to offshore WTGs, requiring these to be lit where they exceed 60m above HAT with a medium intensity (2000 candela (cd)) steady red light mounted on the top of each nacelle and requires for limited downward spillage of light. Article 223 allows for the CAA to permit that not all WTGs are so lit. The CAA will require that all WTGs on the periphery of any wind farm need to be equipped with aviation warning lighting and such lighting, where achievable, shall be spaced at longitudinal intervals not exceeding 900m. There is no current routine requirement for offshore obstacles to be fitted with intermediate vertically spaced aviation lighting.
- 15.7.13 CAA guidance has been subject to coordination with maritime agencies to avoid confusion with maritime lighting. To that end, the CAA has indicated that the use of a flashing red Morse Code letter 'W' is likely to be approved to resolve potential issues for the maritime community.
- 15.7.14 The MCA is seeking that WTG blade tips are marked in red, together with markings down the blade, to provide a SAR helicopter pilot with a hover reference point as set out in the OREI SAR Requirements document. The MCA also seeks a lighting scheme comprising 200cd red / infra-red lights on the nacelles of non-Article 223 WTGs, to be operated on demand during SAR operations and a WTG shutdown protocol to be applied during rescue situations. An Emergency Response and Cooperation Plan (ERCOP) will be developed and implemented for all phases of the Proposed Development, based upon the MCA's standard template. Appropriate lighting will be utilised to facilitate heli-hoisting if undertaken within the Rampion 2 array area, as outlined in CAP 437.
- 15.7.15 To satisfy MoD requirements, the WTGs will also be required to be fitted with infra-red lighting in combination with the ANO Article 223 lights. MoD lighting guidance indicates that provided combination infra-red / 2000cd visible red lights are used to light the WTGs required to be lit under ANO Article 223, this satisfies the MoD operational requirement.

### Regulatory requirements

- 15.7.16 When construction is complete, given that Rampion 2 will occupy uncontrolled (Class G) airspace (below 5,500ft amsl), the responsibility for avoiding other traffic and obstacles rests with captains of civilian and military aircraft. Thus, logically a pilot will avoid the charted areas, and individually lit WTGs and any other obstacles, laterally or vertically, by the legislated standard minimum separation distance of 500ft.
- 15.7.17 Military operations are subject to separate rules sponsored by the MoD. Pilots of military aircraft will be required to ensure that a Minimum Separation Distance of 250ft from any person, vessel, vehicle, or structure exists whilst operating in the

vicinity of the Rampion 2 array area. The charting and lighting of Rampion 2 should also be taken into account by MoD low flying units and SAR operators.

- 15.7.18 It is assumed that aviation stakeholders will adhere to all relevant CAA and MoD safety guidance in the conduct of their specific operations to ensure safe operations for all users of the airspace above Rampion 2.
- 15.7.19 **Table 15-9** sets out the relevant embedded environmental measures within the design and how these affect the civil and military aviation assessment.



Table 15-9 Relevant civil and military aviation embedded environmental measures

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to civil and military aviation assessment
<b>C-108</b>	An Emergency Response and Cooperation Plan (ERCOP) will be developed.	Scoping - updated at PEIR	DCO requirements or DML conditions.	Rampion 2 will create an obstacle environment that may impact Search and Rescue (SAR) helicopter flight operations should SAR be required within or close to Rampion 2. The preparation of an ERCOP in cooperation with the Maritime and Coastguard Agency will mitigate the impact.
<b>C-109</b>	Aviation stakeholders will be notified of the location and height of all wind energy development and associated construction activities (all structures over 150ft).	Scoping - updated at PEIR	DCO requirements or DML conditions.	Rampion 2 will create an aviation obstacle environment that can be mitigated by warning the aviation sector through the issue of Notices to Airmen (NOTAMs) and Aeronautical Information Circulars. Permanent information on the Proposed Development will be forwarded to the CAA Aeronautical Information Service and Defence Geographic Centre so

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to civil and military aviation assessment
<b>C-110</b>	RED will agree a lighting scheme for the aviation lighting of structures (turbines and offshore support platforms) above 60m in height with the relevant authorities.	Scoping	DCO requirements or DML conditions.	that the obstructions can be included in the civil and military Aeronautical Information Publications and on relevant aeronautical charts.  To mitigate the impact of WTGs as aviation obstacles and make them for visible to pilots, WTGs must be suitably marked and lit. Requirements for the lighting of offshore WTGs are detailed in Article 223 of the Air Navigation Order and supplemented by additional MoD guidance.

## 15.8 Methodology for PEIR assessment

### Introduction

- 15.8.1 The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA**. The assessment methodology for civil and military aviation for the PEIR is consistent with that provided in the Scoping Report (RED, 2020) and no changes have been made since the scoping phase.
- 15.8.2 The assessment of potential impacts on civil and military aviation has been undertaken with specific reference to the relevant NPS guidance and the requirements and recommendations in the documentation listed in **paragraph 15.2.3**.

### Current baseline

- 15.8.3 An initial desktop study was undertaken to determine those aviation stakeholders that were likely to be affected by Rampion 2, including all radar systems within operational range.
- 15.8.4 The main issue identified is associated with potential WTG interference of Primary Surveillance Radars (PSRs). Due to the physical size of the WTGs proposed, there is also potential for the WTGs to become aviation obstacles or obstructions, particularly to helicopters engaged in offshore operations. This is considered within the impact assessment.
- 15.8.5 CAP 764 advises that WTG effects on Secondary Surveillance Radars (SSRs) can be caused due to the physical blanking and diffracting effects of the WTG towers depending on the size of the WTGs and the wind farm. However, CAP 764 goes on to say that these effects are only a consideration when the WTGs are located close to the SSR, i.e. less than 10km. As all known SSRs are outside the stipulated parameters by a significant margin they will not be affected by the WTGs and are therefore not considered further.
- 15.8.6 Similarly, there will be no measurable effects upon other terrestrial based aviation CNS systems as Rampion 2 is considerably outside applicable safeguarding limits pertaining to such CNS infrastructure. Therefore, terrestrial CNS infrastructure (other than PSR) is not considered further, as no sites will be affected.

### Radar modelling

- 15.8.7 Computer modelling using a contemporary software modelling tool (HTZ communications) has been undertaken to predict if RLoS exists between PSRs and WTGs within the Rampion 2 array area, of the PEIR Assessment Boundary and the likely Probability of Detection (Pd) of the rotating WTG blades. This exercise identifies those PSRs that could detect the WTGs and has been based

on WTGs with a maximum tip height of 325m amsl<sup>1</sup>. The data obtained from the modelling has been analysed and provides a key input into establishing the degree to which aviation and operations in the area of Rampion 2 could be affected and what additional mitigation processes could be employed.

- 15.8.8 The only radar potentially in RLoS of Rampion 2 is the NERL facility at Pease Pottage.
- 15.8.9 The RLoS/Pd modelling conducted for the Pease Pottage Raytheon ASR-23SS ATC PSR had to be based on generic data as the specific and detailed characteristics for this PSR are considered commercially sensitive by NERL. Therefore contemporary ATC PSR performance characteristics and publicly available ASR-23SS data have been used in lieu. It must be acknowledged that modelling by NERL sources with detailed configuration data may reveal marginally different Pd results for the ASR-23SS PSR. However, confidence is very high that the PSR performance characteristics used have a high level of compatibility with the ATC PSR performance.
- 15.8.10 **Appendix 15.1, Volume 4** details the computer modelling undertaken and uses the outputs of the modelling to determine potential mitigation strategies for inclusion in this document, where appropriate. Where appropriate, final mitigations will be agreed and implemented with aviation and radar stakeholders. Ongoing consultation with stakeholders will continue as part of the design process for Rampion 2.

## Impact assessment methodology

- 15.8.11 In assessing the significance of the effects from Rampion 2 it was necessary to identify whether or not there will be an impact on aviation operations. The aviation industry is highly regulated and subject to numerous mandatory standards, checks and safety requirements (for example CAP 670), many international in nature and requiring the issue of operating licences. In all cases, the sensitivity or magnitude of the impact on operations can only be identified by the appropriate aviation organisation conforming to the Risk Classification Scheme used to quantify and qualify the severity and likelihood of a hazard occurring. The Risk Classification Scheme is a fundamental element of an aviation organisation's Safety Management System (SMS), which must be acceptable to, and approved by, the UK CAA or the Military Aviation Authority (MAA), as appropriate. As such, for the purposes of this assessment, no detailed grading has been made of the magnitude of the impact or sensitivity of the receptor on the basis that any potential reduction in aviation safety cannot be tolerated. Instead, the following definitions of basic significance have been used as defined in **Table 15-10**. This represents a deviation from the standard methodology presented within **Chapter 5**.

---

<sup>1</sup> Radar modelling was based on tip heights amsl as opposed to LAT. As mean sea level is generally higher than LAT, amsl calculations incorporate an additional precautionary height buffer.

Table 15-10 Impact significance definitions

Potential significance	Definition
<b>Major Significant</b>	Receptor unable to continue safe operations or safe provision of air navigation services (radar) or effective air defence surveillance in the presence of the WTGs. Technical or operational mitigation of the impact is required.
<b>Moderate Significant</b>	Receptor able to continue safe operations but with some restrictions or non-standard mitigation measures in place.
<b>Not Significant</b>	The Proposed Development will have little impact on the aviation stakeholder, or the level of impact will be acceptable to the aviation stakeholder.
<b>No Change</b>	The Proposed Development will have no impact on the aviation stakeholder and will be acceptable to the aviation stakeholder.

## 15.9 Preliminary assessment: Construction phase

### Creation of an aviation obstacle environment

- 15.9.1 Construction of the wind farm will involve the installation of infrastructure above sea level which could pose a physical obstruction to aircraft utilising the airspace in the vicinity of Rampion 2.
- 15.9.2 From a starting point of no infrastructure within the Rampion 2 array area of the PEIR Assessment Boundary, the infrastructure outlined in **Table 15-8** will gradually be installed over a period of 24 months.
- 15.9.3 Specifically, for Rampion 2, permanent or temporary obstacles can increase risk to:
- general military low flying training and operations; and
  - offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the English Channel.
- 15.9.4 In compliance with international and national SARPs with respect to notification, marking and lighting, as outlined in **paragraphs 15.7.5 to 15.7.17** and embodied in C-108, C-109 and C-110, to make pilots aware of the addition of infrastructure to the site, the impact on the aviation sector during the construction of Rampion 2 will be reduced to an acceptable level. The impact has been assessed to be **Not Significant** in EIA terms.
- 15.9.5 There is potential for cumulative effect as a result of the creation of an aviation obstacle environment associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where the creation of

an aviation obstacle to aircraft operating offshore may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area of the PEIR Assessment Boundary.

- 15.9.6 There will be no cumulative effects from the construction of the wind farm, inclusive of the installation of WTGs, within the Rampion 2 array area of the PEIR Assessment Boundary.
- 15.9.7 The potential cumulative effect of maritime and aviation obstacle lighting creating confusing lighting configurations to both sectors has been addressed and CAA guidance has been subject to coordination with maritime agencies. There should be no cumulative effects on the impact of surface obstacles on aviation operations as compliant markings and lighting will be provided.
- 15.9.8 Through the use of embedded environmental measures such as effective lighting, reliance on pilot competence and consideration of charted obstacles, the cumulative effect from the creation of an obstacle environment is considered to be **Not Significant** in EIA terms.

### Increased air traffic in the area related to wind farm activities

- 15.9.9 The use of helicopters to support construction activities within the Rampion 2 array area of the PEIR Assessment Boundary, could impact on existing traffic in the area. It is possible that helicopters could be used for transferring people and/or equipment to the site on a daily basis for the construction period.
- 15.9.10 The possible increase in air traffic associated with construction support activities brings with it a potential increased risk of aircraft collision in the area of the Proposed Development.
- 15.9.11 The increase in air traffic will be managed by the existing ATS infrastructure, provided in accordance with national procedures, and pilots will be expected to operate in accordance with regulatory requirements.
- 15.9.12 Due to the predicted low number of movements caused by the construction of Rampion 2 and assuming compliance with regulatory requirements and national procedures, the impact to aircraft operators in the vicinity of the Rampion 2 site is considered to be **Not Significant** in EIA terms.
- 15.9.13 CAP 764 suggests that, for the purpose of transiting WTG developments under Visual Flight Rules and facilitating construction or maintenance flights within the boundaries of the wind farm, 'flight corridors' may be introduced within the design of the site. As the existing mitigation is deemed sufficient to reduce the potential impact to **Not Significant**, this additional mitigation is not considered necessary.
- 15.9.14 There is potential for cumulative effect as a result of increased air traffic in the area related to wind farm activities associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where a cumulative increase in air traffic may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area of the PEIR Assessment Boundary.

- 15.9.15 The predicted number of daily helicopter movements is considered to be low, and there are currently no helicopters engaged in activities associated with Rampion 1, however the cumulative effect of this activity and any similar activities associated with Rampion 1 will create a greater potential risk of mid-air collision between aircraft engaged in such operations and aircraft in transit across the study area.
- 15.9.16 The potential for such risks occurring is reduced through the implementation of the embedded environmental measures outlined in **paragraphs 15.7.3 to 15.7.18** and the reliance on pilots not engaged in works in direct relation to Rampion 2 to comply with civil aviation regulations, means that the cumulative impact to aircraft operators in the vicinity of Rampion 2 is considered to be **Not Significant** in EIA terms.

## 15.10 Preliminary assessment: Operation and maintenance phase

### Creation of an aviation obstacle environment

- 15.10.1 During the operation of the Proposed Development, the infrastructure outlined in **Table 15-8** will be present within the Rampion 2 array area. This could pose a physical obstruction to aircraft utilising the airspace in the vicinity of Rampion 2.
- 15.10.2 Specifically, for Rampion 2, permanent or temporary obstacles can increase risk to:
- general military low flying training and operations; and
  - offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the English Channel.
- 15.10.3 In compliance with international and national SARPs with respect to notification, marking and lighting, as outlined in **paragraphs 15.7.5 to 15.7.17** and embodied in C-108, C-109 and C-110, the impact on the aviation sector during the operation of Rampion 2 will be reduced to an acceptable level. The impact has been assessed to be **Not Significant** in EIA terms.
- 15.10.4 There is potential for cumulative effect as a result of the creation of an aviation obstacle environment associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where the creation of an aviation obstacle to aircraft operating offshore may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area of the PEIR Assessment Boundary.
- 15.10.5 There will be no cumulative effects from the construction of the wind farm, inclusive of the installation of WTGs, within the Rampion 2 array area of the PEIR Assessment Boundary.
- 15.10.6 The potential cumulative effect of maritime and aviation obstacle lighting creating confusing lighting configurations to both sectors has been addressed and CAA guidance has been subject to coordination with maritime agencies. There should be no cumulative effects on the impact of surface obstacles on aviation operations as compliant markings and lighting will be provided.

- 15.10.7 Through the use of embedded environmental measures such as effective lighting, reliance on pilot competence and consideration of charted obstacles, the cumulative effect from the creation of an obstacle environment is considered to be **Not Significant** in EIA terms.

### Increased air traffic in the area related to wind farm activities

- 15.10.8 The operation and maintenance phase of Rampion 2 will see an increase in helicopter air traffic above the current baseline level. It is possible that helicopters will be used for support operations to the site up to three or four times weekly during this period.
- 15.10.9 The possible increase in air traffic associated with support activities brings with it a potential increased risk of aircraft collision in the area of the Proposed Development.
- 15.10.10 The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew who will be expected to operate in accordance with regulatory requirements and who may request the provision of an ATS that will be provided in accordance with national procedures.
- 15.10.11 Due to the predicted low number of movements during the operational period of Rampion 2 and assuming compliance with regulatory requirements and national procedures, the impact to aircraft operators in the vicinity of the Rampion 2 site is considered to be **Not Significant** in EIA terms.
- 15.10.12 There is potential for cumulative effect as a result of increased air traffic in the area related to wind farm activities associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where a cumulative increase in air traffic may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area, of the PEIR Assessment Boundary.
- 15.10.13 The predicted number of daily helicopter movements is considered to be low, and there are currently no helicopters engaged in activities associated with Rampion 1, however the cumulative effect of this activity and any similar activities associated with Rampion 1 will create a greater potential risk of mid-air collision between aircraft engaged in such operations and aircraft in transit across the study area.
- 15.10.14 The potential for such risks occurring is reduced through the implementation of the embedded environmental measures outlined in **paragraphs 15.7.3 to 15.7.18** and the reliance on pilots not engaged in works in direct relation to Rampion 2 to comply with civil aviation regulations, means that the cumulative impact to aircraft operators in the vicinity of Rampion 2 is considered to be **Not Significant** in EIA terms.

### Physical presence of WTGs leading to impacts on published Instrument Flight Procedures

- 15.10.15 The maximum WTG tip height of 325m above LAT will infringe the minimum obstacle clearance for Shoreham Airport's published IFP for Runway 02. An



extract from the IFP chart is shown in **Appendix 15.1, Volume 4**, together with an explanation of the associated minimum altitude zones.

- 15.10.16 Without mitigation, the potential impact on safe operations at Shoreham Airport is considered to be major significant.
- 15.10.17 An assessment and revision of the IFP, subject to acceptance by Shoreham Airport, the residual impact will be **Not Significant** in EIA terms.

### WTGs causing permanent interference on civil and military radars

- 15.10.18 Rampion 2 will be within the operational range of radar systems serving both civil and military agencies, however modelling shows that WTGs within the Rampion 2 array area will only be in RLoS of the NERL PSR facility at Pease Pottage, as detailed in **Appendix 15.1, Volume 4**. The number of WTGs within RLoS of Pease Pottage PSR will depend on the maximum tip height of the individual WTGs and the detailed wind farm configuration selected.
- 15.10.19 When operational (in other words, with blades fitted and rotating), WTGs have the potential to generate ‘clutter’ (or false targets) upon radar displays, as current generation PSRs are unable to differentiate between the moving blades of WTGs and aircraft. As a consequence, radar operators can be unable to distinguish between primary radar returns generated by WTGs or by aircraft. As a general rule, controllers are required to provide five nautical miles lateral separation between traffic receiving an ATS and ‘unknown’ primary radar returns in Class G airspace. This may therefore produce an adverse impact on the provision of safe and effective ATS by those ANSPs that utilise the Pease Pottage ATC PSR.
- 15.10.20 Mitigation will be required if the wind farm design, based upon parameters outlined in **Table 15-8** shows a Pd of the WTGs above the system threshold levels that allows the WTG blades to be presented on PSR displays. Mitigation should only be required for so long as PSRs do not have the inherent capability to distinguish WTG returns from aircraft returns: increasingly, “next generation” PSRs are looking to provide this functionality. This interim additional mitigation for Pease Pottage ATC PSR could involve one or more of the following:
- blanking the relevant impacted areas of the Rampion 2 array area (either at the radar head or in the radar display system) so as to remove the PSR data containing the WTG returns from the radar data presented to controllers;
  - in addition to radar blanking, introducing a Transponder Mandatory Zone (TMZ). A TMZ requires all aircraft that wish to transit the TMZ to be equipped with SSR transponders to enable controllers to track aircraft through what will otherwise be a “black hole” in primary surveillance cover; or
  - using alternative PSRs (for example Gatwick Airport and NERL’s Bovingdon facility) to provide coverage for the provision of ATS in the Rampion 2 array area.
- 15.10.21 CAP 764 outlines other mitigation options which could be applied either singly or in combination to optimise the effectiveness of any mutually agreed solution. Due to the promising developments currently being advanced by industry in this area of technology, consultation on technical measures will continue as a development

might emerge that proves to be more suitable for adoption and implementation while Rampion 2 advances and matures.

- 15.10.22 **Appendix 15.1, Volume 4** sets out the radar modelling findings based on a supplied indicative WTG layout and concludes that mitigation measures are likely to be required for both 210m WTGs and 325m WTGs.
- 15.10.23 Potential mitigation measures including blanking of the radar in the impacted area, blanking combined with infill from an alternative radar feed, or blanking combined with the imposition of a Transponder Mandatory Zone. Engagement with NERL is required to determine and implement the optimal mitigation solution.
- 15.10.24 Without additional mitigation, the impacts on receptors receiving changes to their operational environment have been assessed to be major significant. However, it is anticipated that the potential risk posed to aviation operations could be wholly and successfully mitigated through various technical solutions applied to the current generation Pease Pottage PSR. It is anticipated that during the operational life of Rampion 2 NERL will procure “next generation” PSRs which should not require the application of mitigation measures to allow them to provide an appropriate surveillance picture in the presence of WTGs.
- 15.10.25 Following the application of additional mitigation, the residual impact is considered to be **Not Significant** in EIA terms.
- 15.10.26 There is potential for cumulative effect as a result of operational activities associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where aviation and radar cumulative effect may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area of the PEIR Assessment Boundary.
- 15.10.27 Rampion 1 is adjacent to Rampion 2 and therefore the potential for an adverse cumulative effect accruing between the two projects needs to be considered. The Rampion 1 ES indicates that no part of the existing Rampion 1 project is likely to be detected by any PSRs, and NERL and the MoD did not object to that development. As no radar interference is predicted for Rampion 1, this presents no cumulative effect with the Proposed Development, therefore the impact is considered to be **Not Significant** in EIA terms.

## 15.11 Preliminary assessment: Decommissioning phase

- 15.11.1 Offshore decommissioning will most likely involve removal of all of the WTG components, part of the WTG foundations (down to 1m below the seabed), platforms and associated foundations, and sections of inter-array and export cables.
- 15.11.2 For the decommissioning phase, the implementation of standard aviation safety management processes will be applicable and a risk assessment based on the appropriate aviation requirements pertinent at the time will be required.

## Creation of an aviation obstacle environment

- 15.11.3 During the decommissioning of Rampion 2, the above sea level infrastructure outlined in **Table 15-8** will be removed over a period of 12 months. This will gradually reduce the physical obstruction to aircraft utilising the airspace in the vicinity of Rampion 2.
- 15.11.4 Specifically, for Rampion 2, permanent or temporary obstacles can increase risk to:
- general military low flying training and operations; and
  - offshore fixed-wing and helicopter operations, including those undertaking SAR missions, over the English Channel.
- 15.11.5 The embedded environmental mitigation in the form of international and national SARPs with respect to notification, marking and lighting, as outlined in **paragraphs 15.7.5 to 15.7.17** and embodied in C-108, C-109 and C-110, will be retained until decommissioning has been completed. The impact on the aviation sector during the construction of Rampion 2 will be reduced to pre-development conditions. The impact has been assessed to be **No Change**.

## Increased air traffic in the area related to wind farm activities

- 15.11.6 The use of helicopters during the decommissioning phase of Rampion 2 could impact on existing traffic in the area. It is possible that helicopters could be used for transferring people and/or equipment to the site on a daily basis during the decommissioning of site infrastructure.
- 15.11.7 The possible increase in air traffic associated with decommissioning support activities brings with it a potential increased risk of aircraft collision in the area of the Proposed Development.
- 15.11.8 The safety of aircraft operating in uncontrolled airspace ultimately resides with the aircrew who will be expected to operate in accordance with regulatory requirements and who may request the provision of an ATS that will be provided in accordance with national procedures.
- 15.11.9 Due to the predicted low number of movements during the decommissioning period of Rampion 2 and assuming compliance with regulatory requirements and national procedures, the impact to aircraft operators in the vicinity of Rampion 2 is considered to be **Not Significant** in EIA terms.
- 15.11.10 There is potential for cumulative effect as a result of increased air traffic in the area related to wind farm activities associated with Rampion 2 and Rampion 1. For the purposes of this PEIR, this additive impact has been assessed within 50km of Rampion 2, which is considered to be the maximum range where a cumulative increase in air traffic may occur. It should be noted that some impacts will be anticipated to remain localised to the Rampion 2 array area.
- 15.11.11 The predicted number of daily helicopter movements is considered to be low, and there are currently no helicopters engaged in activities associated with Rampion 1, however the cumulative effect of this activity and any similar activities associated

with Rampion 1 will create a greater potential risk of mid-air collision between aircraft engaged in such operations and aircraft in transit across the study area.

- 15.11.12 The potential for such risks occurring is reduced through the implementation of the embedded environmental measures outlined in **paragraphs 15.7.3 to 15.7.18** and the reliance on pilots not engaged in works in direct relation to Rampion 2 to comply with civil aviation regulations, means that the cumulative impact to aircraft operators in the vicinity of Rampion 2 is considered to be **Not Significant** in EIA terms.

## 15.12 Preliminary assessment: Cumulative effects

### Approach

- 15.12.1 A preliminary cumulative effects assessment (CEA) has been carried out for Rampion 2 which examines the result from the combined impacts of Rampion 2 with other developments on the same single receptor or resource. The overall method followed in identifying and assessing potential cumulative effects in relation to the offshore environment is set out in **Chapter 5, Section 5.10**.

### Cumulative effects assessment

- 15.12.2 For civil and military aviation, the ZOI described in **Section 15.4** has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed.
- 15.12.3 A short list of 'other developments' that may interact with the Rampion 2 ZOIs during their construction, operation or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** and on **Figure 5.4.1, Volume 4**. This short list has been generated applying criteria set out in **Chapter 5** and has been collated up to the finalisation of the PEIR through desk study, consultation and engagement.
- 15.12.4 Only those developments in the short list that fall within the civil and military aviation ZOI have the potential to result in cumulative effects with the Proposed Development. The civil and military ZOI is shown in **Chapter 5, Figure 5.1, Volume 3**. All developments falling outside the civil and military aviation ZOI are excluded from this assessment.
- 15.12.5 On the basis of the above, no other developments have been scoped into the CEA. The adjacent Rampion 1 offshore wind farm is an existing operational project and is therefore considered as part of the existing baseline. Possible interrelated effects arising from the presence of Rampion 1 are considered in conjunction with parameters outlined in **Section 15.7** and assessed in **Sections 15.9, 15.10 and 15.11**.

## 15.13 Transboundary effects

- 15.13.1 Transboundary effects arise when impacts from a development within one European Economic Area (EEA) states affects the environment of another EEA

state(s). A screening of transboundary effects has been carried out and is presented in Appendix B of the Scoping Report (RED, 2020).

- 15.13.2 No significant transboundary impacts are predicted as any predicted effects upon civil or military aviation receptors are likely to be limited in extent, being related primarily to the Pease Pottage radar. There is therefore no pathway by which direct or indirect effects arising from Rampion 2 could significantly affect the civil or military aviation receptors of another EEA state.
- 15.13.3 The screening exercise has identified that, due to the localised nature of the potential impacts, significant transboundary effects on civil and military aviation are unlikely to occur and for this reason it is not discussed any further.

## 15.14 Inter-related effects

- 15.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and decommissioning of Rampion 2 on the same receptor, or group of receptors.
- 15.14.2 Aviation lighting fitted to offshore WTGs could cause confusion to the maritime community as the specification for the lighting to be displayed below the horizontal plane of the light fitment itself could cause mariners some confusion. This confusion could result in WTGs with conflicting warning lighting representing a collision risk to maritime surface vessels.
- 15.14.3 Work has been undertaken to develop an aviation warning lighting standard where, from the nature of the lighting, it will be apparent to mariners that the aviation lighting is clearly distinguishable from maritime lighting. Where it is evident that the default aviation warning lighting standard may generate issues for the maritime community a developer can make a case, that is likely to receive CAA approval, for the use of a flashing red Morse Code Letter 'W' instead. See CAP 764 paragraph 3.16.

## 15.15 Summary of residual effects

- 15.15.1 **Table 15-11** presents a summary of the preliminary assessment of significant impacts, any relevant embedded environmental measures and residual effects on civil and military aviation receptors.

Table 15-11 Summary of preliminary assessment of residual effects

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Preliminary assessment of residual effect (significance)
<b>Construction</b>				

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Preliminary assessment of residual effect (significance)
Creation of an aviation obstacle environment.	Not significant	Military low flying  Offshore fixed-wing and helicopter operations  SAR operations	C-108, C-109, C-100	<b>Not Significant</b>
Increased air traffic in the area related to wind farm activities.	Not significant	Military low flying  Offshore fixed-wing and helicopter operations  SAR operations		<b>Not Significant</b>
<b>Operation and maintenance</b>				
Creation of an aviation obstacle environment.	Not significant	Military low flying  Offshore fixed-wing and helicopter operations  SAR operations	C-108, C-109, C-100	<b>Not Significant</b>
Increased air traffic in the area related to wind farm activities.	Not significant	Military low flying  Offshore fixed-wing and helicopter operations  SAR operations		<b>Not Significant</b>
Physical presence of WTGs leading to	Major significant	Shoreham Airport	Assessment/revision of IFP	<b>Not Significant</b>

Activity and impact	Magnitude of impact	Receptor and sensitivity or value	Embedded environmental measures	Preliminary assessment of residual effect (significance)
impacts on published IFPs.				
WTGs causing permanent interference on civil and military radars.	Major significant	NERL Pease Pottage ATC PSR	Radar technical solution at source	<b>Not Significant</b>
<b>Decommissioning</b>				
Creation of an aviation obstacle environment.	No change	Military low flying Offshore fixed-wing and helicopter operations SAR operations	C-108, C-109, C-100	<b>No Change</b>
Increased air traffic in the area related to wind farm activities.	Not significant	Military low flying Offshore fixed-wing and helicopter operations SAR operations		<b>Not Significant</b>

## 15.16 Further work to be undertaken for ES

### Introduction

15.16.1 Further work that will be undertaken to support the civil and military aviation assessment and presented within the ES is set out below.

### Baseline

15.16.2 Data sources consulted when defining the baseline will be reviewed to capture any updates.

## Assessment

- 15.16.3 Refinements to the assessments undertaken will be made as necessary following further consultation with aspect stakeholders.

## Consultation and engagement

- 15.16.4 Formal consultation in relation to civil and military aviation is planned to be undertaken with relevant key stakeholders including NERL, the MoD and Shoreham Airport, and will make use of the PEIR as a means to do so. This approach is considered appropriate as it enables informed engagement with relevant stakeholders (i.e., once potential impacts have been set out in detail and suitable mitigations have been considered).
- 15.16.5 Further consultation and engagement that will be undertaken to inform the civil and military aviation assessment and presented within the ES is set out in **Table 15-12**.

Table 15-12 Further consultation and engagement

Consultee	Issues to be addressed	Relevance to assessment
NERL	Mitigation of WTG effects on Pease Pottage ATC PSR.	Engagement required to resolve impact.
MoD	Infringement of D037.	Engagement required to resolve impact.
Shoreham Airport	IFP to Runway 02.	Engagement to resolve infringement of minimum obstacle clearance.

## 15.17 Glossary of terms and abbreviations

Table 15-13 Glossary of terms – civil and military aviation

Term (acronym)	Definition
AD	Air Defence
agl	Above ground level
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication



<b>Term (acronym)</b>	<b>Definition</b>
<b>Air Navigation Service Provider (ANSP)</b>	A public or private entity managing air traffic on behalf of a company, region or country. NATS is the main ANSP in the UK.
<b>ALARP</b>	As low as reasonably practicable
<b>amsl</b>	Above mean sea level
<b>ANO</b>	Air Navigation Order
<b>ANSP</b>	Air Navigation Service Provider
<b>ATC</b>	Air Traffic Control
<b>ATS</b>	Air Traffic Service
<b>ATSOCAS</b>	Air Traffic Service outside Controlled Airspace
<b>Baseline</b>	Refers to existing conditions as represented by latest available survey and other data which is used as a benchmark for making comparisons to assess the impact of development.
<b>Baseline conditions</b>	The environment as it appears (or would appear) immediately prior to the implementation of the Proposed Development together with any known or foreseeable future changes that will take place before completion of the Proposed Development.
<b>CAA</b>	Civil Aviation Authority
<b>CAP</b>	Civil Aviation Publication
<b>CNS</b>	Communication, Navigation and Surveillance
<b>Construction effects</b>	Used to describe both temporary effects that arise during the construction phases as well as permanent existence effects that arise from the physical existence of development (for example new buildings).
<b>Controlled airspace</b>	Defined airspace within which pilots must follow Air Traffic Control instructions implicitly. In the UK, Classes A, C, D and E are areas of controlled airspace.
<b>CTA</b>	Control Area
<b>Cumulative effects</b>	Additional changes caused by a Proposed Development in conjunction with other similar developments or as a combined effect of a set of developments.

<b>Term (acronym)</b>	<b>Definition</b>
<b>Cumulative Effects Assessment</b>	Assessment of impacts as a result of the incremental changes caused by other past, present and reasonably foreseeable human activities and natural processes together with the Proposed Development.
<b>DCO Application</b>	An application for consent to undertake a Nationally Significant Infrastructure Project made to the Planning Inspectorate who will consider the application and make a recommendation to the Secretary of State, who will decide on whether development consent should be granted for the Proposed Development.
<b>Decommissioning</b>	The period during which a development and its associated processes are removed from active operation.
<b>Development Consent Order (DCO)</b>	This is the means of obtaining permission for developments categorised as Nationally Significant Infrastructure Projects, under the Planning Act 2008.
<b>Embedded environmental measures</b>	Equate to 'primary environmental measures' as defined by Institute of Environmental Management and Assessment (2016). They are measures to avoid or reduce environmental effects that are directly incorporated into the preferred masterplan for the Proposed Development.
<b>Environmental Impact Assessment (EIA)</b>	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
<b>Environmental Measures</b>	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible, remedy identified effects).
<b>Environmental Statement (ES)</b>	The written output presenting the full findings of the Environmental Impact Assessment.
<b>ERCOP</b>	Emergency Response and Cooperation Plan
<b>FIR</b>	Flight Information Region
<b>FL</b>	Flight Level
<b>Flight Information Region (FIR)</b>	Airspace managed by a controlling authority with responsibility for ensuring air traffic services are provided to aircraft flying within it.

<b>Term (acronym)</b>	<b>Definition</b>
<b>Flight Level (FL)</b>	An aircraft altitude expressed in hundreds of feet at a standard sea level pressure datum of 1013.25 hectopascals.
<b>Formal consultation</b>	Formal consultation refers to statutory consultation that is required under Section 42 and Section 47 of the Planning Act 2008 with the relevant consultation bodies and the public on the preliminary environmental information.
<b>Future baseline</b>	Refers to the situation in future years without the Proposed Development.
<b>GASIL</b>	General Aviation Safety Information Leaflet
<b>HAT</b>	Highest Astronomical Tide
<b>HMR</b>	Helicopter Main Route
<b>ICAO</b>	International Civil Aviation Organisation
<b>IFP</b>	Instrument Flight Procedure
<b>Impact</b>	The changes resulting from an action.
<b>Indirect effects</b>	<p>Effects that result indirectly from the Proposed Development as a consequence of the direct effects, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects.</p> <p>Often used to describe effects on landscape character that are not directly impacted by the Proposed Development such as effects on perceptual characteristics and qualities of the landscape.</p>
<b>LAT</b>	Lowest Astronomical Tide
<b>Likely Significant Effects</b>	It is a requirement of Environmental Impact Assessment Regulations to determine the likely significant effects of the Proposed Development on the environment which should relate to the level of an effect and the type of effect.
<b>LTMA</b>	London Terminal Control Area
<b>MAA</b>	Military Aviation Authority
<b>Magnitude (of change)</b>	A term that combines judgements about the size and scale of the effect, the extent of the area over which it

Term (acronym)	Definition
	occurs, whether it is reversible or irreversible and whether it is short term or long term in duration'. Also known as the 'degree' or 'nature' of change.
<b>MCA</b>	Maritime and Coastguard Agency
<b>MGN</b>	Marine Guidance Note
<b>MoD</b>	Ministry of Defence
<b>Nationally Significant Infrastructure Project (NSIP)</b>	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are consented by DCO. These include proposals for renewable energy projects with an installed capacity greater than 100MW.
<b>NERL</b>	NATS (En Route) plc
<b>NOTAM</b>	Notice to Airmen
<b>NSL</b>	NATS (Services) Limited
<b>OREI</b>	Offshore Renewable Energy Installation
<b>Pd</b>	Probability of Detection
<b>PEIR Assessment Boundary</b>	The PEIR Assessment Boundary combines the search areas for the offshore and onshore infrastructure associated with the Proposed Development. It is defined as the area within which the Proposed Development and associated infrastructure will be located, including the temporary and permanent construction and operational work areas.
<b>Planning Inspectorate (PINS)</b>	The Planning Inspectorate deals with planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
<b>Preliminary Environmental Information Report (PEIR)</b>	The written output of the Environmental Impact Assessment undertaken to date for the Proposed Development. It is developed to support formal consultation and presents the preliminary findings of the assessment to allow an informed view to be developed of the Proposed Development, the assessment approach that has been undertaken, and the preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.

Term (acronym)	Definition
<b>Primary Surveillance Radar (PSR)</b>	A radar system that measures the bearing and distance of targets using the detected reflections of radio signals.
<b>Proposed Development</b>	The development that is subject to the application for development consent, as described in <b>Chapter 4</b> .
<b>PSR</b>	Primary Surveillance Radar
<b>Receptor</b>	These are as defined in Regulation 5(2) of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and include population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape that may be at risk from exposure to pollutants which could potentially arise as a result of the Proposed Development.
<b>RLoS</b>	Radar Line of Sight
<b>SAR</b>	Search and Rescue
<b>SARPs</b>	Standards and Recommended Practices
<b>Scoping Opinion</b>	A Scoping Opinion is adopted by the Secretary of State for a Proposed Development.
<b>Scoping Report</b>	A report that presents the findings of an initial stage in the Environmental Impact Assessment process.
<b>Secondary Surveillance Radar (SSR)</b>	A radar system that transmits interrogation pulses and receives transmitted responses from suitably equipped targets.
<b>Secretary of State</b>	The body who makes the decision to grant development consent.
<b>Sensitivity</b>	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
<b>Significance</b>	A measure of the importance of the environmental effect, defined by criteria specific to the environmental aspect.
<b>Significant effects</b>	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated.

Term (acronym)	Definition
	<p>The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described.</p> <p>Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – ‘noteworthy, of considerable amount or effect or importance, not insignificant or negligible’.</p> <p>Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.</p>
<b>SMS</b>	Safety Management System
<b>SSR</b>	Secondary Surveillance Radar
<b>Temporal Scope</b>	<p>The temporal scope covers the time period over which changes to the environment and the resultant effects are predicted to occur and are typically defined as either being temporary or permanent.</p>
<b>Temporary or permanent effects</b>	<p>Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 30 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.</p>
<b>The Applicant</b>	Rampion Extension Development Limited (RED)
<b>The Proposed Development / Rampion 2</b>	<p>The onshore and offshore infrastructure associated with the offshore wind farm comprising of installed capacity of up to 1,200MW, located in the English Channel in off the south coast of England.</p>
<b>TMZ</b>	Transponder Mandatory Zone
<b>Uncontrolled Airspace</b>	<p>Defined airspace in which Air Traffic Control does not exercise exclusive authority but may provide basic information services to aircraft in radio contact. In the UK, Class G is uncontrolled airspace.</p>
<b>Zone of Influence (ZOI)</b>	<p>The area surrounding the Proposed Development which could result in likely significant effects.</p>

## 15.18 References

- Civil Aviation Authority, (2021). CAP 032 UK Aeronautical Information Publication. [Online]. [Accessed 10 March 2021]. Available from: <https://www.aurora.nats.co.uk/htmlAIP/Publications/2021-02-25-AIRAC/html/index-en-GB.html>
- Civil Aviation Authority, (2019). CAP 168 Licensing of Aerodromes. [Online]. [Accessed 10 March 2021]. Available from: [https://publicapps.caa.co.uk/docs/33/CAP%20168%20Issue11\\_Licensing%20of%20Aerodromes%2013032019.pdf](https://publicapps.caa.co.uk/docs/33/CAP%20168%20Issue11_Licensing%20of%20Aerodromes%2013032019.pdf)
- Civil Aviation Authority, (2018). CAP 437 Standards for offshore helicopter landing areas. [Online]. [Accessed 10 March 2021]. Available from: [https://publicapps.caa.co.uk/docs/33/CAP437\(SEP2018\)E8\\_A1.pdf](https://publicapps.caa.co.uk/docs/33/CAP437(SEP2018)E8_A1.pdf)
- Civil Aviation Authority, (2019). CAP 670 Air Traffic Services Safety Requirements. [Online]. [Accessed 10 March 2021]. Available from: [http://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019\(p\).pdf](http://publicapps.caa.co.uk/docs/33/CAP670%20Issue3%20Am%201%202019(p).pdf)
- Civil Aviation Authority, (2016). CAP 764 Policy and Guidelines on Wind Turbines. [Online]. [Accessed 10 March 2021]. Available from: <https://publicapps.caa.co.uk/docs/33/CAP764%20Issue6%20FINAL%20Feb.pdf>
- Civil Aviation Authority, (2021). CAP 1616 Airspace Change: Guidance on the regulatory process for changing the notified airspace design and planned and permanent redistribution of air traffic, and on providing airspace information. [Online]. [Accessed 10 March 2021]. Available from: [https://publicapps.caa.co.uk/docs/33/CAA\\_Airspace%20Change%20Doc\\_Mar2021.pdf](https://publicapps.caa.co.uk/docs/33/CAA_Airspace%20Change%20Doc_Mar2021.pdf)
- Civil Aviation Authority, (2021). CAP 2038A00 Air Navigation Order 2016. [Online]. [Accessed 10 March 2021]. Available from: [https://publicapps.caa.co.uk/docs/33/Law%202016\\_765%2015%20Jan%202021%20Version.pdf](https://publicapps.caa.co.uk/docs/33/Law%202016_765%2015%20Jan%202021%20Version.pdf)
- International Civil Aviation Organisation, (2018). Annex 14 Aerodrome Design and Operations.
- Maritime and Coastguard Agency, (2016). MGN 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response. [Online]. [Accessed 10 March 2021]. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/502021/MGN\\_543.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/502021/MGN_543.pdf)
- Maritime and Coastguard Agency, (2018). Offshore Renewable Energy Installations: Requirements, Guidance and Operational Considerations for Search and Rescue and Emergency Response. [Online]. [Accessed 10 March 2021]. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/762365/OREI\\_SAR\\_Requirements\\_v2.0.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/762365/OREI_SAR_Requirements_v2.0.pdf)
- Ministry of Defence, (2021). UK Military Aeronautical Information Publication. [Online]. [Accessed 10 March 2021]. Available from: <https://www.aidu.mod.uk/aip/aipVolumes.html>
- Ministry of Defence, (2017). Military Low Flying in the United Kingdom: The Essential Facts. [Online]. [Accessed 10 March 2021]. Available from:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/592342/20170215-Low\\_Flying\\_Leaflet\\_-\\_Master\\_v3\\_Final.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/592342/20170215-Low_Flying_Leaflet_-_Master_v3_Final.pdf)

Ministry of Defence, (2020). MoD Obstruction Lighting Guidance. [Online]. [Accessed 10 March 2021]. Available from:

[https://cdn.ymaws.com/www.renewableuk.com/resource/collection/0B792CF1-8B8A-474B-95B6-17886BF724A7/20190002-Windfarm\\_lighting\\_review\\_002\\_.pdf](https://cdn.ymaws.com/www.renewableuk.com/resource/collection/0B792CF1-8B8A-474B-95B6-17886BF724A7/20190002-Windfarm_lighting_review_002_.pdf)



**wood.**

