

# Rampion 2 Wind Farm

## Category 6: Environmental Statement

### Volume 2, Chapter 21: Noise and vibration

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# Executive Summary

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This chapter of the Rampion 2 Environmental Statement (ES) examines the likely significant effects that may be experienced as a result of noise and vibration due to the construction, operation and maintenance, and decommissioning of Rampion 2.

The assessment has considered the likely significant noise and vibration effects of Rampion 2 from the following sources: construction of the onshore elements of the Proposed Development (landfall, onshore cable corridor, onshore substation and extension to the existing National Grid Bolney substation) and associated construction traffic, and during the decommissioning phase the removal of equipment and reinstating sites, including associated traffic. The assessment also considers the construction of offshore wind turbines (WTGs), and operation of the onshore substation and WTGs.

The noise and vibration assessment considers the effects on: residential receptors (people in their homes including their gardens); and non-residential receptors (including schools, hospitals, places of worship, commercial buildings, and leisure areas).

The coastline is interspersed with villages largely backed by agricultural land with the A259 running east / west. Sound levels in the area are likely to be influenced by road and rail traffic and additional sources such as gardening activities, conversation, and music closer to areas of habitation, as well as the sea on approaching the coast. The largest settlement in the Study Area is Littlehampton. Sound levels here are principally likely to be influenced by local road traffic and rail traffic, as well as other sources of human activity. Inland from the coast, the Study Area is predominantly rural, comprising a mosaic of arable and livestock farming land with blocks of commercial forestry. There are various isolated dwellings and some small villages throughout.

On-site baseline noise surveys have been undertaken and an assessment has been carried out using criteria from industry standards and guidance.

The following organisations have been consulted: West Sussex County Council (WSSCC), South Downs National Park Authority (SDNPA), Highways England (HE), Arun District Council (ADC), East Sussex County Council (ESCC), Horsham District Council (HDC) and Mid Sussex District Council (MSDC).

## Embedded environmental measures

A range of environmental measures within the [Commitments Register](#) (Document Reference: 7.22) which relate to noise and vibration are embedded as part of the Rampion 2 design to remove or reduce significant environmental effects as far as possible.

Examples of these embedded environmental measures include the following:

- no blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods (C-10);
- Core working hours for construction of the onshore components will be 0700 to 1900 Monday to Friday, and 0800 to 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the Outline COCP (C-22);
- Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers and other suitable solutions will be applied (C-26);

- Implementation of noise mitigation and best practice techniques secured via the Outline CoCP, which sets out the standards and procedures to which a developer or contractor must adhere in order to manage the potential environmental impacts of construction works (C-33);
- Review of construction noise assessments during detailed design with potential updates to the Noise and Vibration Management Plan (NVMP) and Section 61 applications made to the relevant Local Planning Authority (C-263); and
- Rating Level limits for the operational substation based on identified receptors locations representing the nearest residential premises (C-231).

## **Likely significant effects**

### *Overview*

Significant effects were identified without mitigation from the operation of the substation and the potential for significant effects of vibration from heavy vehicular traffic associated with the construction. Mitigation has been identified reducing the level of effect such that no significant residual effects have been identified in relation to noise and vibration from construction, operation and maintenance and decommissioning of Rampion 2.

### *Cumulative effects*

No significant cumulative effects have been identified in relation to potential effects of Rampion 2 on noise and vibration from construction, operation and maintenance, and decommissioning of Rampion 2.

### *Inter-related effects*

No significant inter-related effects of greater significance compared to the effects considered alone were identified for noise and vibration receptors from the construction, operation and maintenance and decommissioning of Rampion 2.

### *Transboundary effects*

No significant transboundary effects have been identified at this stage in relation to Rampion 2 on noise and vibration receptors from construction, operation and maintenance, and decommissioning activities.



# 21. Noise and vibration

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## 21.1 Introduction

21.1.1 This chapter of the Environmental Statement (ES) presents the results of the assessment of the likely significant effects of Rampion 2 with respect to noise and vibration at onshore receptors. It should be read in conjunction with the project description provided in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4) and the relevant parts of the following chapters and appendices:

- **Chapter 11: Marine mammals, Volume 2** of the ES (Document Reference: 6.2.11) and **Appendix 11.3: Underwater noise assessment, Volume 4** of the ES (Document Reference: 6.4.11.3) which consider underwater noise effects on marine mammals;
- **Chapter 12: Offshore and intertidal ornithology, Volume 2** of the ES (Document Reference: 6.2.12) which considers noise and vibration effects on offshore ornithology;
- **Chapter 18: Landscape and visual impact, Volume 2** of the ES (Document Reference: 6.2.18) as embedded environmental measures required to reduce noise effects during both the construction phase and operation and maintenance phase potentially resulting in visual effects for sensitive receptors). This chapter also includes a discussion on tranquillity within which noise is a consideration;
- **Chapter 22: Terrestrial ecology and nature conservation, Volume 2** of the ES (Document Reference: 6.2.22) as all phases of the Proposed Development potentially resulting in noise and vibration effects on terrestrial ecology receptors;
- **Chapter 23: Transport, Volume 2** of the ES (Document Reference: 6.2.23) as the noise assessment relies on traffic flows to predict changes in traffic noise level; and
- **Chapter 25: Historic environment, Volume 2** of the ES (Document Reference: 6.2.25) as the historic environment is considered a sensitive resource that could potentially be affected by noise and vibration from the Proposed Development.

21.1.2 This chapter describes:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 21.2: Relevant legislation, planning policy, and other documentation**);
- the outcome of consultation and engagement that has been undertaken, including how matters relating to noise and vibration within the Statutory Consultation, have been addressed (**Section 21.3: Consultation and engagement**);

- the scope of the assessment for noise and vibration (**Section 21.4: Scope of the assessment**);
- the methods used for the baseline data gathering (**Section 21.5: Methodology for baseline data gathering**);
- the overall baseline (**Section 21.6: Baseline conditions**);
- embedded environmental measures relevant to noise and vibration and the relevant maximum design scenario (**Section 21.7: Basis for ES assessment**);
- the assessment methods used for the ES (**Section 21.8: Methodology for ES assessment**);
- the assessment of noise and vibration effects (**Section 21.9 - 21.11: Assessment of effects** and **Section 21.12: Assessment of cumulative effects**);
- consideration of transboundary effects (**Section 21.13: Transboundary effects**);
- inter-related effects (**Section 21.14: Inter-related effects**);
- a summary of residual effects for noise and vibration (**Section 21.15: Summary of residual effects**);
- a glossary of terms and abbreviations is provided in **Section 21.16: Glossary of terms and abbreviations**; and
- a references list is provided in **Section 21.17: References**.

21.1.3 The chapter is also supported by the following appendices:

- **Appendix 21.1: Baseline sound report, Volume 4** of the ES (Document Reference: 6.4.21.1);
- **Appendix 21.2: Construction plant list, Volume 4** of the ES (Document Reference: 6.4.21.2).; and
- **Appendix 21.3: Preliminary operational noise predictions, Volume 4** of the ES (Document Reference: 6.4.21.3).

## 21.2 Relevant legislation, planning policy and other documentation

### Introduction

21.2.1 This section identifies the legislation, policy and other documentation that has informed the assessment of effects with respect to noise and vibration. Further information on policies relevant to the EIA and their status is provided in **Chapter 2: Policy and legislative context, Volume 2** of the ES (Document Reference: 6.2.2) of this ES.

## Legislation and national planning policy

21.2.2 **Table 21-1** lists the legislation relevant to the assessment of the effects on noise and vibration receptors.

**Table 21-1 Legislation relevant to noise and vibration**

Legislation description	Relevance to assessment
<b>Environmental Protection Act 1990</b>	
<p>This Environmental Protection Act 1990 sets out the duty for local authorities to investigate and, where identified, take abatement action against noise nuisance. The Environmental Protection Act 1990 provides the definition of 'Best Practical Means' (BPM) to minimise noise (including vibration), the basis for defence against noise abatement action taken by local authorities (Section 80). The Environmental Protection Act 1990 also provides for individuals to seek for abatement action to be taken by a magistrate's court against noise nuisance (Section 82).</p>	<p>The Environmental Protection Act 1990 has been used to inform embedded noise control measures outlined in <b>Section 21.7</b>.</p>
<b>Control of Pollution Act 1974</b>	
<p>This Control of Pollution Act 1974 provides the definition of BPM to minimise construction noise (including vibration), the basis for defence against noise abatement action taken by a local authority (Section 60). The Control of Pollution Act 1974 also provides for, i) persons responsible to seek prior consent for works on construction sites including BPM steps to minimise noise and, ii) the basis for defining codes of practice (applies to British Standard (BS) 5228: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites, Part 1: Noise and Part 2: Vibration (British Standard Institute (BSI), 2014a; 2014b).</p>	<p>The Control of Pollution Act 1974 has been used to inform embedded noise control measures for construction outlined in <b>Section 21.7</b>.</p>
<b>Environmental Noise (England) Regulations 2006 (as amended)</b>	
<p>The Environmental Noise (England) Regulations 2006 (as amended) require regular noise mapping and the production of Noise Action Plans for the management of noise.</p>	<p>The Environmental Noise (England) Regulations 2006 (as amended) provide the legal means by which 'Quiet Areas' are defined and protected.</p>

21.2.3 **Table 21-2** lists the national planning policy relevant to the assessment of the effects on noise and vibration receptors.

**Table 21-2 National planning policy relevant to noise and vibration**

Policy description	Relevance to assessment
<p><b>Overarching National Policy Statement for Energy (NPS EN-1) (Department of Energy and Climate Change (DECC), 2011a)</b></p>	
<p>Paragraph 5.11.1: <i>“Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality. The Government’s policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings.”.</i></p>	<p><b>Section 21.8</b> describes how a set of the criteria for the assessment has been developed which has enabled the Proposed Development to be assessed against the principal aims of the Noise Policy Statement for England (NPSE) (Department for Environment, Food and Rural Affairs (Defra), 2010).</p>
<p>Paragraph 5.11.2: <i>“Noise resulting from a proposed development can also have adverse impacts on wildlife and biodiversity. Noise effects of the proposed development on ecological receptors should be assessed by the IPC in accordance with the Biodiversity and Geological Conservation section of this NPS”.</i></p>	<p>Consideration of noise impacts on terrestrial ecology receptors is provided in <b>Chapter 22: Terrestrial ecology and nature conservation, Volume 2</b> of the ES (Document Reference: 6.2.22).</p>
<p>Paragraph 5.11.3: <i>“Factors that will determine the likely noise impact include:</i></p> <ul style="list-style-type: none"> <li>• <i>the inherent operational noise from the proposed development, and its characteristics;</i></li> <li>• <i>the proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);</i></li> <li>• <i>the proximity of the proposed development to quiet places and other areas that are particularly valued for their acoustic environment or landscape quality; and</i></li> <li>• <i>the proximity of the proposed development to designated sites where noise may have an adverse impact on protected species or other wildlife.”</i></li> </ul>	<p>Consideration of these factors have been accounted for within this chapter:</p> <ul style="list-style-type: none"> <li>• Operational noise characteristics are considered in <b>Section 21.10</b>; and</li> <li>• Construction noise predictions have utilised distances between noise sources and noise sensitive receptors / areas (<b>Section 21.9</b>).</li> </ul> <p>Consideration of noise impacts on terrestrial ecology receptors is provided in <b>Chapter 22: Terrestrial ecology and nature conservation, Volume 2</b> of the ES (Document Reference: 6.2.22).</p>
<p>Paragraph 5.11.4: <i>“Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:</i></p>	<p>The factors included within Paragraph 5.11.4 of EN-1 (DECC, 2011a) are covered</p>

Policy description	Relevance to assessment
<ul style="list-style-type: none"> <li>• <i>a description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;</i></li> <li>• <i>identification of noise sensitive premises and noise sensitive areas that may be affected;</i></li> <li>• <i>the characteristics of the existing noise environment;</i></li> <li>• <i>a prediction of how the noise environment will change with the proposed development;</i></li> <li>• <i>in the shorter term such as during the construction period;</i></li> <li>• <i>in the longer term during the operating life of the infrastructure; at particular times of the day, evening and night as appropriate.</i></li> <li>• <i>an assessment of the effect of predicted changes in the noise environment on any noise sensitive premises and noise sensitive areas; and</i></li> <li>• <i>measures to be employed in mitigating noise.</i></li> </ul> <p><i>The nature and extent of the noise assessment should be proportionate to the likely noise impact.”</i></p>	<p>within the assessment in <b>Section 21.9</b>.</p>
<p>Paragraph 5.11.5: <i>“The noise impact of ancillary activities associated with the development, such as increased road and rail traffic movements, or other forms of transportation, should also be considered.”</i></p>	<p>The construction noise assessment within <b>Section 21.9</b> covers all ancillary activities that might result in a significant adverse noise effect.</p>
<p>Paragraph 5.11.6: <i>“Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. [...] For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies”.</i></p>	<p>The standards and guidance used to assess the Proposed Development are set out in this section. <b>Section 21.8</b> describes how these standards have been used to assess the noise and vibration effects.</p>
<p>Paragraph 5.11.7: <i>“The applicant should consult EA<sup>1</sup> and Natural England (NE), or the Countryside Council for Wales (CCW), as necessary and in particular with regard to assessment of noise on protected species or other wildlife. The results of any noise surveys and</i></p>	<p>Consideration of noise effects on terrestrial ecology receptors is provided in <b>Chapter 22: Terrestrial ecology and nature conservation, Volume 2</b> of the</p>

<sup>1</sup> Environment Agency (EA)

Policy description	Relevance to assessment
<p><i>predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be taken into account”.</i></p>	<p>ES (Document Reference: 6.2.22).</p>
<p>Paragraph 5.11.8: <i>“The project should demonstrate good design through selection of the quietest cost-effective plant available; containment of noise within buildings wherever possible; optimisation of plant layout to minimise noise emissions; and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission”.</i></p>	<p>The design of the proposed Development includes embedded environmental measures for reducing noise and vibration effects which are described in <b>Section 21.7</b>.</p>
<p>Paragraph 5.11.9: <i>“The IPC [now the Planning Inspectorate] should not grant development consent unless it is satisfied that the proposals will meet the following aims:</i></p> <ul style="list-style-type: none"> <li>• <i>avoid significant adverse impacts on health and quality of life from noise;</i></li> <li>• <i>mitigate and minimise other adverse impacts on health and quality of life from noise; and</i></li> <li>• <i>where possible, contribute to improvements to health and quality of life through the effective management and control of noise”.</i></li> </ul>	<p><b>Section 21.8</b> describes how a set of assessment criteria have been developed which has enabled the Proposed Development to be assessed against the principal aims of the NPSE (Defra, 2010) which are in accordance with the three aims set out in Paragraph 5.11.9 of NPS EN-1 (DECC, 2011a).</p>
<p>Paragraph 5.11.10: <i>“When preparing the development consent order, the IPC [now the Planning Inspectorate] should consider including measurable requirements or specifying the mitigation measures to be put in place to ensure that noise levels do not exceed any limits specified in the development consent”.</i></p>	<p>Embedded environmental measures for reducing noise and vibration effects are described in <b>Section 21.7</b>. The embedded environmental measures set out in <b>Section 21.7</b> are specified to ensure that the noise levels do not exceed any limits specified in the Development Consent Order (DCO).</p>
<p><b>National Policy Statement for Renewable Energy Infrastructure (NPS EN-3) (Department of Energy and Climate Change, 2011b)</b></p>	
<p>NPS EN-3 for Renewable Energy sets out guidance and requirements for nationally significant energy infrastructure projects. Section 2.4.2 <i>“Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology.”</i></p>	<p>The design of the Proposed Development is an iterative process that has sought to avoid sensitive features wherever possible. Embedded environmental measures are presented in <b>Table 21-20</b>.</p>
<p><b>Noise Policy Statement for England (NPSE), (Defra, 2010)</b></p>	

Policy description	Relevance to assessment
<p>NPSE sets out the vision and aims for dealing with noise (except for workplace / occupational noise), which are consistent with the aims for noise as presented in NPS EN-1 (DECC, 2011a).</p> <p>NPSE requires that noise and vibration assessments identify impacts that would result in significant adverse impacts on health and quality of life from a proposed development. The NPSE aims to:</p> <ul style="list-style-type: none"> <li>• “avoid significant adverse impacts on health and quality of life;</li> <li>• mitigate and minimise adverse impacts on health and quality of life; and</li> <li>• where possible, contribute to the improvement of health and quality of life”.</li> </ul>	<p><b>Section 21.8</b> describes how a set of assessment criteria have been developed which has enabled the Proposed Development to be assessed against the principal aims of the NPSE (Defra, 2010).</p> <p>Embedded environmental measures for reducing noise and vibration are described in <b>Table 21-20</b>.</p>
<p><b>National Planning Policy Framework (NPPF), (Ministry of Housing Communities and Local Government (MHCLG), 2021)</b></p>	
<p>The NPPF states that new development “<i>should contribute to and enhance the local environment by [...] preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] noise pollution</i>”.</p>	<p>Assessment of the noise and vibration effects of the Proposed Development are presented in <b>Section 21.9</b> to <b>Section 21.11</b>. Embedded environmental measures for reducing noise and vibration effects are described in <b>Table 21-20</b></p>
<p><b>Noise Planning Practice Guidance (NPPG) (MHCLG, 2019)</b></p>	
<p>The NPPG relates in terms of a noise hierarchy the levels of perception to noise exposure with expected outcomes and required actions.</p>	<p><b>Section 21.8</b> describes how the noise and vibration assessment follows the principles of the NPPG.</p>

- 21.2.4 The UK Government published draft NPS EN1-EN5 (Department for Energy Security and Net Zero (DESNZ), 2023) for consultation in September 2021 and subsequently in March 2023 with further amendments. The 2011 NPSs remain in force until the review is approved (designated) and under proposed transitional arrangements the 2023 amendments will only have effect in relation to applications for development consent accepted for examination after designation. However, the draft emerging NPSs can potentially be relevant planning considerations. Therefore, Rampion 2 has kept abreast of the potential changes to the energy NPSs and incorporated any updates where required in the ES.
- 21.2.5 The *Draft Overarching National Policy Statement for Energy (EN-1)*, (DESNZ, 2023) is relevant to the assessment of the effects on noise and vibration receptors. However, there are no emerging expectations or changes relevant to the

assessment of the effects on noise and vibration receptors from the current Overarching NPS EN1 for Energy (DECC, 2011a) listed in **Table 21-2**.

## Local planning policy

21.2.6 **Table 21-3** lists the local planning policy relevant to the assessment of the potential effects on noise and vibration receptors.

**Table 21-3 Local planning policy relevant to noise and vibration**

Policy description	Relevance to assessment
<b>Adopted Arun Local Plan 2011 – 2031 (Arun District Council, 2018)</b>	
<p>Policy QE DM1: <i>“Developers proposing new noise generating development must seek advice from an early stage to determine the level of noise assessment required. Proposals will need to be supported by:</i></p> <ul style="list-style-type: none"> <li>a) <i>Evidence to demonstrate that there are no suitable alternative locations for the development.</i></li> <li>b) <i>A noise report which provides accurate information about the existing noise environment, and the likely impact of the proposed development upon the noise environment. The report must also demonstrate that the development meets appropriate national and local standards for noise, as set out in Annex 1 of the Planning Noise Advice Document: Sussex, and any mitigation measures required to ensure noise is managed to an acceptable level.</i></li> <li>c) <i>Evidence to demonstrate that the development will not impact upon areas identified and valued for their tranquillity, including Gaps Between Settlements which are important to the enjoyment of Arun’s countryside, its habitats and biodiversity.”</i></li> </ul>	<p>In relation to point a), the discussion of alternatives is provided in <b>Chapter 3: Alternatives, Volume 2</b> of the ES (Document Reference: 6.2.3).</p> <p>In relation to point b), accurate information about the existing noise environment is detailed in <b>Section 21.6</b>.</p> <p><b>Section 21.2</b> outlines the national and local standards the noise assessment has considered.</p> <p>In relation to point c), Tranquillity is considered further within <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.4.18.3), <b>Appendix 18.3: Landscape assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.3) and <b>Appendix 18.4: Visual assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.4).</p>
<p>Policy ECC DM1 Renewable Energy: <i>“The Council will support proposals for appropriately located renewable energy development, and their ancillary development where they meet the following criteria:</i></p> <ul style="list-style-type: none"> <li>a) <i>The proposal is located and designed to minimise adverse impacts to landscape, habitats, the historic environment and</i></li> </ul>	<p>Embedded environmental measures for reducing noise and vibration effects during construction are described in <b>Table 21-20</b>. Assessment of the Proposed Development against this policy requirement in relation</p>



Policy description	Relevance to assessment
<p><i>residential amenity including visual, noise and odour impacts.”</i></p>	<p>to the operational aspects is provided in <b>Section 21.10</b>.</p>
<p><b>Horsham District Planning Framework (Horsham District Council, 2015)</b></p>	
<p>Policy 24 Strategic Policy: Environmental Protection addresses noise and states <i>“developments will be expected to minimise exposure to and the emission of pollutants including noise [...]”</i></p>	<p><b>Table 21-20</b> demonstrates the embedded environmental measures considered to minimise noise effects.</p>
<p>Policy 33 Development principles addresses noise and states <i>“developments shall be required to: [...] 2. Ensure that it is designed to avoid unacceptable harm to the amenity of occupiers/users of nearby property and land, for example overlooking or noise, whilst having regard to the sensitivities of surrounding development”</i>.</p>	<p><b>Section 21.7</b> provides guidance on how noise is assessed to identify potential noise effects.</p>
<p><b>Planning Noise Advice document: Sussex (West Sussex County Council et al., 2021)</b></p>	
<p>Provides advice for developers and their consultants when making planning applications which includes: guidance to developers on the level of information that will be required to be submitted with planning applications and seek to implement the aims of the NPSE (Defra, 2010, paragraph 1.7)</p> <ul style="list-style-type: none"> <li>• <i>“Avoid significant adverse impacts on health and quality of life;</i></li> <li>• <i>Mitigate and minimise adverse impacts on health and quality of life; and</i></li> <li>• <i>Where possible, contribute to the improvement of health and quality of life.”</i></li> </ul> <p>The document provides specific guidance for the assessment of planned industrial noise sources, including electrical plant.</p>	<p><b>Section 21.4</b> details the scope of the noise and vibration assessment.</p>
<p><b>Mid Sussex District Plan 2014 – 2031 (Mid Sussex District Council, 2018)</b></p>	
<p>DP26: Character and Design addresses noise and states <i>“All applicants will be required to demonstrate that development [...] does not cause significant harm to the amenities of existing nearby residents and future occupants of new dwellings, including taking account of the impact on [...] noise, air and light pollution”</i></p>	<p><b>Section 21.9, Section 21.10</b> and <b>Section 21.11</b> presents the potential noise effects from the Proposed Development.</p>

Policy description	Relevance to assessment
<p>DP29: Noise, Air and Light Pollution addresses noise and states <i>“The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people’s life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where:</i></p> <p><i>Noise pollution:</i></p> <ul style="list-style-type: none"> <li><i>• It is designed, located and controlled to minimise the impact of noise on health and quality of life, neighbouring properties and the surrounding area;</i></li> <li><i>• If it is likely to generate significant levels of noise it incorporates appropriate noise attenuation measures.</i></li> </ul> <p><i>Noise sensitive development, such as residential, will not be permitted in close proximity to existing or proposed development generating high levels of noise unless adequate sound insulation measures, as supported by a noise assessment are incorporated within the development.”</i></p>	<p><b>Table 21-20</b> outlines the embedded environmental measures considered to minimise noise effects.</p> <p><b>Section 21.8</b> provides guidance on how noise has been assessed to identify potential noise effects.</p>
<p><b>South Downs Local Plan Adopted 2 July 2019 (2014-33) (South Downs National Park Authority (SDNPA), 2019)</b></p> <p>Paragraph 5.45 <i>“The assessment of impacts on relative tranquillity is not the same as a noise assessment, and the assessment of zero noise impact for an application will not be taken necessarily as meaning that there would be a similar impact on relative tranquillity.”</i></p>	<p>Tranquillity is considered further within <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18), <b>Appendix 18.3: Landscape assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.3) and <b>Appendix 18.4: Visual assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.4).</p>
<p>SD7: Relative Tranquillity:  <i>“1. Development proposals will only be permitted where they conserve and enhance relative tranquillity and should consider the following impacts:</i></p> <p><i>a) Direct impacts that the proposals are likely to cause by changes in the visual and aural</i></p>	<p>Tranquillity is considered further within <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18), <b>Appendix 18.3: Landscape assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.4).</p>

Policy description	Relevance to assessment
<p><i>environment in the immediate vicinity of the proposals;</i></p> <p><i>b) Indirect impacts that may be caused within the National Park that are remote from the location of the proposals themselves such as vehicular movements; and</i></p> <p><i>c) Experience of users of the PRow<sup>2</sup> network and other publicly accessible locations.</i></p> <p><i>2. Development proposals in highly tranquil and intermediate tranquillity areas should conserve and enhance, and not cause harm to, relative tranquillity.</i></p> <p><i>3. Development proposals in poor tranquillity areas should take opportunities to enhance relative tranquillity where these exist.”</i></p>	<p>6.4.18.3) and <b>Appendix 18.4: Visual assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.4).</p>
<p>SD54: Pollution and Air Quality:  <i>“1. Development proposals will be permitted provided that levels of air, noise, vibration, light, water, odour or other pollutants do not have a significant negative affect on people and the natural environment now or in the foreseeable future, taking into account cumulative impacts and any mitigation.”</i></p>	<p>The significance of noise and vibration effects are assessed within <b>Sections 21.9 to 21.11</b>.</p>

21.2.7 **Table 21-4** lists the emerging local planning policy relevant to the assessment of the potential effects on noise and vibration receptors.

**Table 21-4 Emerging local planning policy relevant to noise and vibration**

Policy description	Relevance to assessment
<p><b>Draft Horsham District Local Plan 2019-2036 (Horsham District Council, 2019)</b></p>	
<p>Policy 25 – Strategic Policy: Environmental Protection; describes the requirements for noise impacts on noise sensitive receptors.  <i>“The high quality of the District’s environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to, and the</i></p>	<p><b>Table 21-20</b> outlines the embedded environmental measures considered to minimise noise effects.</p> <p><b>Section 21.8</b> provides guidance on how noise will be assessed to identify potential noise effects.</p>

<sup>2</sup> Public Rights of Way

Policy description	Relevance to assessment
<p><i>emission of, pollutants including noise, odour, vibration, air and light pollution arising from all stages of development. Development proposals must ensure that they:...</i></p> <p><i>Demonstrate that users of residential and other noise sensitive development will not be exposed to unacceptable noise disturbance from existing or future users. Development proposals which are known or suspected to be noise generators, or to be sensitive to noise from nearby sites, must be accompanied by a Noise Assessment; ...</i></p> <p><i>...Ensure that the cumulative impact of all relevant committed developments is appropriately assessed....”</i></p>	

## Other relevant information and guidance

- 21.2.8 A summary of other relevant information and guidance relevant to the assessment undertaken for noise and vibration is provided in **Table 21-5**.

**Table 21-5 Guidance and Standards relevant to noise and vibration**

Standard / guidance description	Relevance to assessment
<b>British Standards</b>	
<p><b><i>BS 7445:2003 Description and measurement of environmental noise (BSI, 2003)</i></b></p>	<p>BS 7445:2003 provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 a guide to the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits. The standard also refers to <i>BS EN 61672 Electroacoustics: Sound Level Meters Specifications</i> (BSI, 2013) which prescribes the equipment necessary for such measurements.</p>

Standard / guidance description	Relevance to assessment
<b><i>BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise (BSI, 2014a)</i></b>	<p>Provides a recommended scope for construction and demolition noise assessment. Annex E gives example threshold values for potential significant effects at noise sensitive receptors based upon the results of ambient sound monitoring.</p> <p>The assessment uses the 'ABC' method from BS 5228. This method uses absolute threshold levels to assess predicted construction noise at receptor locations. Threshold levels are based on existing ambient baseline levels, with a lowest threshold of 65 dB for daytime, 55 dB for evening (and Saturday afternoon and Sunday daytime) and 45 dB for night-time.</p>
<b><i>BS 5228-2:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration (BSI, 2014b)</i></b>	<p>Provides guidance on the assessment of ground-borne vibration associated with activities such as demolition and construction.</p>
<b><i>BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound (BSI, 2019)</i></b>	<p>Describes methods for rating and assessing sound of an industrial nature, such as from factories, industrial premises or fixed installations affecting people who might be inside or outside a dwelling.</p>
<b>Road Noise Standards</b>	
<b><i>Calculation of Road Traffic Noise (CRTN) (Department of Transport Welsh Office, 1988)</i></b>	<p>Provides a calculation methodology for road traffic noise.</p>
<b><i>Design Manual for Roads and Bridges LA111: Noise and Vibration (DMRB) (Standards for Highways, 2020)</i></b>	<p>Presents a methodology for determining impacts on noise sensitive receptors from changes in road traffic noise due to road projects.</p>
<b>Wind Farm Noise Guidance</b>	
<b><i>ETSU-R-97 The Assessment and Rating of Noise from Wind Farms (The Working Group on Noise from Wind Turbines, 1996)</i></b>	<p>ETSU-R-97 is used for the assessment of onshore wind farms; however it is also the most appropriate guidance for assessing noise from offshore wind turbine generators (WTGs) on onshore receptors.</p>

Standard / guidance description	Relevance to assessment
<p><b><i>A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise</i></b> (Institute of Acoustics, 2013) and associated <b><i>Supplementary Guidance Notes</i></b> (Institute of Acoustics, 2013 &amp; 2014).</p>	<p>Best practice guidance on undertaking measurements, noise modelling and assessments for wind farm noise.</p>
<p><b>Other Guidance or studies from Authorities, Institutes and Universities</b></p>	
<p><b><i>BS 4142:2014+A1:2019: Technical Note</i></b> (Association of Noise Consultants, 2020)</p>	<p>Provision of guidance and clarifications for British Standard.</p>
<p><b><i>Guidelines for Environmental Noise Impact Assessment</i></b> (Institute of Environmental Management and Assessment (IEMA), 2014)</p>	<p>Presents guidelines on how the assessment of noise effects should be presented within the EIA process. The IEMA guidelines cover aspects such as: scoping, baseline, prediction and example definitions of significance criteria.</p>
<p><b><i>Tranquillity Study</i></b> (SDNPA, 2017)</p>	<p>Defines tranquillity, sets out the procedure for scoring tranquillity and associated mapping. This does not have a criteria for assessing the effect of noise and vibration on tranquillity.</p>
<p><b>International Guidance and Standards</b></p>	
<p><b><i>International Standards Organisation (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation</i></b> (ISO, 1996)</p>	<p>Defines a method for calculating the attenuation of sound during propagation outdoors, in order to predict the levels of environmental noise at distances from a source.</p>
<p><b><i>Guidelines for Community Noise</i></b> (World Health Organisation (WHO), 1999)</p>	<p>Provides guidelines and recommendations for protecting health, giving internal and external guideline limits.</p>
<p><b><i>Night Noise Guidelines for Europe</i></b> (WHO, 2009)</p>	<p>Provides guidelines and recommendations for health protection during the night-time period.</p>

## 21.3 Consultation and engagement

### Overview

- 21.3.1 This section describes the stakeholder engagement undertaken for Rampion 2. This consists of early engagement, the outcome of, and response to, the Scoping Opinion (Planning Inspectorate, 2020a) in relation to the noise and vibration assessment, the Evidence Plan Process (EPP), non-statutory consultation and Rampion 2's statutory consultation. An overview of consultation and engagement undertaken for Rampion 2 relevant to the EIA is outlined in [Chapter 5: Approach to the EIA, Volume 2](#) of the ES (Document Reference: 6.2.5).
- 21.3.2 Given the social distancing restrictions which have been in place due to the COVID-19 pandemic from 2020 to 2022, technical consultation relating to noise and vibration has taken place online, primarily in the form of conference calls using Microsoft Teams.

### Scoping Opinion

- 21.3.3 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) on 2 July 2020. A Scoping Opinion was received on 11 August 2020 (the Planning Inspectorate, 2020a). The Scoping Report (RED, 2020) sets out the proposed noise and vibration assessment methodologies, outline of the baseline data collected to date and proposed, and the scope of the assessment. **Table 21-6** sets out the comments received in Section 5 of the Planning Inspectorate's Scoping Opinion (Planning Inspectorate, 2020a) 'Aspect based scoping tables – Onshore' and how these have been addressed in this ES. A full list of the Planning Inspectorate Scoping Opinion (2020) comments and responses is provided in [Appendix 5.2: Response to the Scoping Opinion, Volume 4](#) of the ES (Document Reference: 6.4.5.2). Regard has also been given to other stakeholder comments that were received in relation to the Scoping Report (RED, 2020).

**Table 21-6 Planning Inspectorate Scoping Opinion responses – noise and vibration**

Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
5.4.1	<p><i>“Based on the anticipated low levels of site traffic during operation and maintenance, the Inspectorate is content that there will be no significant noise emissions associated with the onshore cable or substation maintenance in terms of additional site traffic during operation.”</i></p>	<p>Acknowledged. Noise emissions associated with site traffic during operation and maintenance is scoped out of the assessment due to the very low numbers of vehicles expected for operation and maintenance.</p>
5.4.2	<p><i>“The Inspectorate agrees that noise effects of the offshore substation would not have significant effects for any onshore receptors.</i></p> <p><i>The Inspectorate is satisfied that the scope of the underwater noise assessment is sufficient to consider offshore substation noise effects on offshore and marine receptors where significant effects are likely to occur.”</i></p>	<p>Acknowledged. The noise effects from the operation of the offshore substations on onshore receptors are therefore scoped out of the noise assessment in this chapter due to the large distances between noise source and receptor. The underwater noise assessment is included in <b>Chapter 11: Marine mammals, Volume 2</b> of the ES (Document Reference: 6.2.11) and <b>Appendix 11.3: Underwater noise assessment technical report, Volume 4</b> of the ES (Document Reference: 6.4.11.3).</p>
5.4.3	<p><i>“The Inspectorate agrees that vibration effects to onshore receptors as a result of the offshore substations and wind turbine generators can be scoped out of further assessment.”</i></p>	<p>Acknowledged. The vibration effects to onshore receptors as a result of offshore substations and WTGs are scoped out of the assessment in this chapter due to the large</p>



Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
5.4.3	<p><i>“The Inspectorate does not agree that vibration effects from the onshore substation can be scoped out as insufficient justification has been provided at this time to support this approach (including operational design parameters of the proposed substation). The ES should assess these matters where significant effects are likely to occur.”</i></p>	<p>distances between vibration source and receptor.</p> <p>It is not possible to provide a quantitative assessment of vibration from the onshore substation as vibration will be negligible even very close to the equipment. There is no rotating or reciprocating machinery to give rise to vibration associated with out-of-balance forces. In addition, it is necessary to minimise vibration to maintain equipment integrity. Therefore, significant effects are unlikely to occur as outlined in <b>Table 21-12</b>.</p>
5.4.4	<p><i>“The Scoping Report has scoped out noise and vibration disturbance during decommissioning works on the basis that the effects of decommissioning will be lower than those experienced during construction. The Inspectorate does not agree that this can be scoped out at this stage as the noise and vibration effects and subsequent mitigation have not been quantified for the construction phase. Although the noise and vibration disturbance during decommissioning works are likely to be similar or potentially lower than during construction, the ES should assess these matters where significant effects are likely to occur.”</i></p>	<p>A decommissioning Assessment is included in <b>Section 21.11</b>.</p>
5.4.5	<p><i>“Paragraph 6.5.31 of the Scoping Report states that ‘Once the locations of the Proposed development have been decided upon, the existing data will be reviewed to ascertain its potential use in the assessment.’ The</i></p>	<p>A baseline noise survey has been developed with the methodology and noise receptors agreed with the relevant local</p>

Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
	<p><i>Inspectorate expects a project specific baseline survey, with the assessment methodology and choice of noise receptors agreed with the relevant local planning authorities.</i></p> <p><i>The Applicant's attention is directed to the Joint Guidance produced by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IoA) 'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound &amp; Noise Impact Assessments during the current COVID-19 Pandemic.'</i></p>	<p>planning authorities beforehand. The baseline noise survey was carried out in 2023 after restrictions associated with the COVID-19 pandemic had been removed. The results of the baseline noise survey have been incorporated into <b>Section 21.6</b>. It is noted that the guidance referred to in the scoping opinion is not considered relevant and so has not been included into the guidance section.</p>
5.4.6	<p><i>"Paragraph 6.5.4 of the Scoping Report states that the spatial scope of the construction noise assessment would be "a 1 km buffer zone around the cable route potential centreline and substation boundary". The Inspectorate expects further explanation and justification to be provided in the ES to support the study area used for the assessment with reference to specific receptors or groups of receptors."</i></p>	<p>Further explanation and justification for the Study Area has been provided in <b>Section 21.4</b>.</p>
5.4.7	<p><i>"Information should be provided on the types of vehicles and plant to be used during the construction phase. The assessment should consider a 'worst case' for receptors, i.e. that within the application site the vehicles and plant are located at the closest possible point to a receptor."</i></p>	<p>Information on the types of vehicles and plant to be used in the construction phase, along with percentage on times are provided in <b>Appendix 21.2: Construction plant list, Volume 4</b> of the ES (Document Reference: 6.4.21.2).</p>
5.4.8	<p><i>"The Inspectorate notes that there is little reference to other receptor types that may be sensitive to noise and vibration, such as ecological receptors. The Inspectorate welcomes consideration of noise impacts on nature conservation areas and other ecological</i></p>	<p>The assessments of noise and vibration on marine mammals, offshore ornithology, terrestrial ecology and heritage receptors are</p>

Planning Inspectorate ID number	Scoping Opinion comment	How this is addressed in this ES
	<p><i>receptors (e.g. protected species). The noise assessment should cross-refer to the findings of other relevant aspect chapters, such as terrestrial ecology and offshore ornithology. The ES should clearly explain any assumptions made regarding the assessment of likely significant effects arising from noise and vibration on sensitive ecological receptors.”</i></p>	<p>provided in <b>Chapter 11: Marine mammals, Volume 2</b> of the ES (Document Reference: 6.2.11), <b>Chapter 12: Offshore and intertidal ornithology, Volume 2</b> of the ES (Document Reference: 6.2.12), <b>Chapter 22: Terrestrial ecology and nature conservation, Volume 2</b> of the ES (Document Reference: 6.2.22) and <b>Chapter 25: Historic environment, Volume 2</b> of the ES (Document Reference: 6.2.25) respectively.</p>
5.4.9	<p><i>“The Scoping Report sets out that a COCP and decommissioning plan will be developed as part of the DCO application. No mention is made however of a noise mitigation plan. The Inspectorate expects that such a plan or specific noise mitigation measures would be set out and secured through the COCP or otherwise where they are relied upon in the assessment of significance of residual effects.”</i></p>	<p>Noise measures are included within the <b>Outline Code of Construction Practice (CoCP)</b> (Document Reference: 7.2).</p>

## Section 42

### Evidence Plan Process (EPP)

- 21.3.4 The Evidence Plan Process (EPP) has been set up to provide a formal, non-legally binding, independently chaired forum to agree the scope of the EIA and Habitats Regulations Assessment (HRA), and the evidence required to support the DCO Application. The EPP commenced in January 2020 and has continued throughout the EIA helping to inform the ES.
- 21.3.5 For noise and vibration, further engagement has been undertaken via the EPP Expert Topic Group (ETG) Traffic, Air Quality, Noise and Socio-economics ETG Meeting held by conference call on 27 October 2020. The conference call was attended by the following stakeholders:

- West Sussex Country Council (WSSC);
- South Downs National Park Authority (SDNPA);
- Highways England (HE);
- Arun District Council (ADC);
- East Sussex County Council (ESCC); and
- Mid Sussex District Council (MSDC).

- 21.3.6 The noise and vibration section of the ETG meeting covered the scope of the noise and vibration assessment, the proposed methodology and the key responses from the Planning Inspectorate's Scoping Opinion (2020a) (detailed in **Table 21-6**). This included discussion relating to site and traffic noise associated with the decommissioning phase.
- 21.3.7 It was requested by WSSC that the proposed baseline noise survey approach is consulted with the local authorities and this has taken place with relevant authorities dependent on whether the substation or cable route was within their jurisdiction.
- 21.3.8 MSDC raised concerns with the potential low frequency noise element at the onshore substation and how the tonal element will be dealt with in relation to BS 4142: 2014 + A1:2019 *Methods for rating and assessing industrial and commercial sound* (BSI, 2019). It was discussed that BS 4142 takes into account tonal noise and this will be considered in the assessment process. It was discussed that potentially the rating correction system in BS 4142 could be used to provide protection against low frequency noise.
- 21.3.9 MSDC also asked whether the noise baseline captured during the Rampion 1 project would be used for the onshore substation noise assessment. It was decided that this would be dependent on the final location of the Rampion 2 onshore substation. If the location was decided upon at the Wineham Lane site, the existing baseline data would be used in conjunction with new measurements for a more robust development of a representative baseline at noise sensitive receptors. A comparison between both baseline surveys will ensure consistency between levels whilst considering any new influential noise sources influencing the baseline. As the Oakendene substation site was chosen, the existing baseline data from Rampion 1 was not used within this assessment.

## March 2021

- 21.3.10 A second ETG meeting was held for Traffic, Air Quality, Noise and Socio-economics on 16 March 2021 with the same key stakeholders as the meeting in October 2020. The purpose of the meeting was to provide a progress update since the ETG meeting in October 2020, to provide an update in methodologies and outline the next steps. The main points from the meeting were as follows:
- confirmation that the baseline noise survey would be undertaken upon easing of COVID-19 pandemic restrictions (i.e. when baseline conditions would be more representative of pre COVID-19 pandemic levels) if possible;

- that the existing noise associated with the Rampion 1 and existing National Grid Bolney substations would form part of the baseline for the assessment for the proposed onshore substation, however existing substation noise would also be considered in terms of context for the assessment results;
- low frequency noise would be considered;
- confirmation that the noise survey and approach to low frequency noise from the onshore substation would be consulted with relevant local authority; and
- a request was made to consider a baseline survey for residences near to the main temporary construction compounds.

## October 2021

- 21.3.11 A third ETG meeting was held for Traffic, Air Quality, Noise and Socio-economics on 4 November 2021 with the same key stakeholders as the meeting in March 2021. The purpose of the meeting was to provide a progress update since the ETG meeting in October 2020, to provide an update in methodologies and outline the next steps. The main points from the meeting were as follows:
- clarification was requested from SDNPA as to the method for accessing tranquillity. At the time, further consultation on this matter was planned to be coordinated with SDNPA; and
  - clarification was requested by WSCC as to how the existing National Grid Bolney substation enabling works would be considered within the cumulative assessment.
- 21.3.12 A fourth ETG meeting was held for Air Quality and Noise on 17 November 2022 to provide an update to the meeting in October 2021. The main points from the meeting were as follows:
- agreement by Mid Sussex District Council that the proposed Significant Observed Adverse Effect Level (SOAEL), as used within this noise assessment was acceptable; and
  - whilst there was strict guidance on what should be considered temporary in terms of construction, it was requested to identify and appropriately include construction works that could be extended beyond the Proposed Development timescales as assessed.
- 21.3.13 Further information is provided in the [Evidence Plan](#) (Document Reference: 7.21).

## Non-statutory consultation

### Overview

- 21.3.14 Non-statutory consultation captures all consultation and engagement outside of statutory consultation and has been ongoing with a number of prescribed and non-prescribed consultation bodies and local authorities in relation to noise and vibration. A summary of the non-statutory consultation undertaken since completion of the Scoping Report (RED, 2020) is outlined in this section.

### Arun District Council (ADC)

- 21.3.15 Consultation with ADC was conducted via email in April 2023 regarding the monitoring and assessment methodologies for the construction and operational noise associated with the onshore substation site at Oakendene (to be assessed in accordance with BS 5228 – Part 1:2019+A1:2014 ‘Code of construction practice for noise and vibration control on open sites – Part 1: Noise).

### Horsham District Council (HDC)

- 21.3.16 Consultation with HDC was conducted via email between April 2022 and April 2023 regarding the monitoring and assessment methodologies for the construction and operational noise associated with the onshore substation site at Oakendene. This covered:
- temporary noise impacts during the construction phase to be assessed in accordance with BS 5228 – Part 1:2019+A1:2014 ‘Code of construction practice for noise and vibration control on open sites – Part 1: Noise’ (BSI, 2014a); and
  - permanent noise impacts during operation of the onshore substation to be assessed in accordance with BS 4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BSI, 2019).
- 21.3.17 Further discussion was undertaken with regard to low frequency noise. It was agreed with HDC that the assessment methodology within BS 4142:2019 (BSI, 2019) was sufficient to assess the effects of low frequency noise at the nearest noise sensitive receptors. HDC commented that BS 4142:2019 is not applicable to assess ground borne low frequency noise.

### Mid Sussex District Council (MSDC)

- 21.3.18 Initial consultation via conference call with MSDC was undertaken on 18 May 2020 to discuss methods and identify any potential key issues with the noise and vibration associated with the construction, and operation and maintenance of the onshore elements of the Proposed Development. The key comments from MSDC were as follows:
- issues on Rampion 1 were mainly focused on onshore substation construction and electrical hum;
  - the standard criterion from MSDC is for a specific noise level to be 5dB below background as a starting point. MSDC is flexible on this criterion where it can be demonstrated that all reasonable measures have been taken;
  - due to unrepresentative baseline conditions during the COVID-19 pandemic (2020 – 2021) it was suggested that a similar approach to establishing the background noise levels was followed to what was done for Rampion 1, where it was considered ‘very low’ in the previous iteration of BS 4142:2019 (BSI, 2019), and therefore, to use 35 dB as a noise rating limit;
  - low frequency noise issues from the existing National Grid Bolney substation were raised, and the protection of local residences from low frequency was highlighted as important; and

- MSDC received complaints relating to the night-time and weekend periods during the construction phase and these elements of works were more numerous than expected from the Rampion 1 ES.

21.3.19 Further consultation with MSDC was conducted via email between April 2022 and April 2023 with regard to the monitoring and assessment methodologies for the construction and operational noise associated with the onshore substation site at Oakendene. This covered:

- temporary noise impacts during the construction phase to be assessed in accordance with BS 5228 – Part 1:2019+A1:2014 '*Code of construction practice for noise and vibration control on open sites – Part 1: Noise*'; and
- permanent noise impacts during operation of the onshore substation to be assessed in accordance with BS 4142: 2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'.

21.3.20 Further discussion was undertaken with regard to low frequency noise. It was agreed with MSDC that the assessment methodology within BS 4142:2019 was sufficient to assess the effects of low frequency noise at the nearest noise sensitive receptors.

21.3.21 Furthermore, it was agreed with MSDC that, whilst not considered standard procedure, an additional indicative noise 'break-in' assessment would be undertaken to predict indoor noise at the nearest residential properties to further mitigate the risk of low frequency noise. The noise assessment would utilise Noise Rating (NR) curves, of which are an international standard for indicating acceptable sound levels within a space. They were initially developed to provide internal noise design criteria for building services noise where low-frequency components and high-level narrow-band components are considered within a singular value. Each curve depicts the acceptable dB level across a range of frequencies between 31.5 Hz and 8 kHz, where the 'loudest' narrow-band component determines the overall rating. Therefore, in this case where there is likely to be a relatively high low frequency component, this will be accounted for.

#### South Downs National Park Authority (SDNPA)

21.3.22 Consultation with SDNPA was conducted via email in April 2023 regarding the monitoring and assessment methodologies for the construction noise associated with the onshore cable route (to be assessed in accordance with BS 5228 – Part 1:2019+A1:2014 '*Code of construction practice for noise and vibration control on open sites – Part 1: Noise*').

#### West Sussex County Council (WSCC)

21.3.23 Consultation with WSCC was conducted via email between April 2022 and April 2023 regarding the monitoring and assessment methodologies for the construction and operational noise associated with the onshore substation site at Oakendene. This covered:

- temporary noise impacts during the construction phase to be assessed in accordance with BS 5228 – Part 1:2019+A1:2014 '*Code of construction practice for noise and vibration control on open sites – Part 1: Noise*'; and

- permanent noise impacts during operation of the onshore substation to be assessed in accordance with BS 4142: 2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'.

### Non-statutory consultation exercise – January / February 2021

- 21.3.24 RED carried out a non-statutory consultation exercise for a period of four weeks from 14 January 2021 to 11 February 2021. This non-statutory 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.
- 21.3.25 The key themes emerging from non-statutory consultation in January 2021 relating to noise and vibration are:
- concerns over the location of the Wineham Lane onshore substation search areas and their proximity to nearby properties in relation to noise in particular;
  - concerns over the use of Wineham Lane for construction traffic;
  - traffic management during construction;
  - details around construction programming and phasing;
  - onshore substation design and potential screening; and
  - limiting working hours onshore for noisy equipment.
- 21.3.26 Further detail about the results of the non-statutory Consultation exercise can be found in the [Consultation Report](#) (Document Reference: 5.1).

## Statutory Consultation exercises

### First Statutory Consultation exercise – July to September 2021

- 21.3.27 Rampion 2's first Statutory Consultation exercise ran from 14 July to 16 September 2021, a period of nine weeks. The Preliminary Environmental Information Report (PEIR) (RED, 2021) was published as part of the first Statutory Consultation exercise which provided preliminary information on noise and vibration within Chapter 21: Noise and vibration.
- 21.3.28 **Table 21-7** provides a summary of the key themes of the feedback received in relation in the first Statutory Consultation exercise in 2021 in relation to noise and vibration and outlines how the feedback has been considered in this ES chapter. A full list of all comments received during the first Statutory Consultation exercise in 2021 and the responses to those comments is provided in the [Consultation Report](#) (Document Reference: 5.1).



**Table 21-7 First Statutory Consultation exercise (July – September 2021) feedback**

<b>Stakeholder</b>	<b>Theme</b>	<b>How this is addressed in this ES</b>
<b>Arun District Council (ADC)</b>	ADC recommended “ <i>close liaison with Arun Planning Department to inform the careful selection of any survey position based around existing and proposed sites for noise sensitive development within and around the 5 years Rampion 2 development framework</i> ”.	Consultation regarding the noise survey has been undertaken with ADC (see <b>paragraph 21.3.15</b> ). A review of proposed monitoring sites has been conducted to ensure all future receptors are appropriately protected.
	“ <i>Typing error SOAEL +10dB?</i> ” [MRE: Reference to Paragraph 22.8.25]	A typing error was identified with regard to noise level increases above the SOAEL. The correct level increase considered within the ES chapter is +1 dB, not +10 dB. No further consultation required. More clarification is provided in <b>Section 21.9</b> .
	“ <i>The degree and extent to which residential sensitive receptors (within 20m, or 10m) may be exposed to unsatisfactory levels of noise needing careful evaluation, particularly in consideration of any evening or night-time working, or where evening/night-time working is continuous with day-time working and where noise screening has been evaluated as impractical for the works.</i> ”	BS 5228 (BSI, 2014a) provides a criteria for the assessment of noise over a period of time. There will be temporary periods of time where noise will be high outside residences. The effects on residences from temporary high noise levels will be minimised using best practice measures and an agreement to reevaluate noise once a contractor has been commissioned for the work (embedded environmental measure C-263). Embedded environmental measures (see <b>Table 21-20</b> ) have been reviewed, updated and included within the <b>Outline CoCP</b> (Document Reference: 7.2).
“ <i>Selected roads/lanes may be unsuitable for HGV<sup>3</sup> traffic, not only from the point of view of noise exposure to gardens and habitable rooms but given that houses/gardens may exit directly</i> ”	An assessment of effects from construction traffic noise is presented in <b>Section 21.9</b> . However, the traffic noise assessment has not identified significant effects. Haul routes	

<sup>3</sup> Heavy Goods Vehicle (HGV)

Stakeholder	Theme	How this is addressed in this ES
	<p><i>onto currently quiet roads, with no provision for pavements and pedestrian safety”.</i></p>	<p>which can affect residences farther from the road (or on quiet façades facing away from roads) or on roads with low traffic flows have been assessed differently using absolute level criteria.</p>
	<p><i>“Night-time noise exposure to be considered” [for Crossbush and Warningcamp] “depending on the decided route of cable laying and required access to project sites by vehicles, including HGVs.”</i></p>	<p>Night-time noise exposure is considered for those receptors where trenchless crossings could occur for 24 hours a day. Otherwise, the onshore cable corridor works would be undertaken during standard working times only. Any out of hours work beyond HDD sites will be covered by a Section 61 of the <i>Control of Pollution Act 1974</i> agreement backed by an appropriate level of assessment. The S61 requirement is secured via the <b>Outline CoCP</b> (Document Reference: 7.2).</p>
	<p>Requirement of “<i>map demonstrating the route of the proposed works in relation to the location of stated sensitive receptors was provided in this section.</i>”</p>	<p><b>Figure 21.2, Volume 3</b> of the ES (Document Reference: 6.3.21) show the locations of noise sensitive receptors in relation to the Proposed Development.</p>
	<p>Requirement to “<i>provide the current levels of noise experienced on relevant roads and for example, the Lyminster By-Pass may be complete before construction begins.</i>”</p>	<p>The current noise levels are provided for the relevant roads in <b>Section 21.6</b>. The future noise from the Lyminster By-pass has not been included in the assessment to provide a conservative (i.e. quieter) baseline.</p>
	<p><i>“Document refers to many work items as ‘temporary’; This may be for a period of months or even years and is unlikely to be viewed as acceptable by noise sensitive receptors”</i></p>	<p>The time period involved could increase the effect to one of significance based on BS 5228 (BSI, 2014a) methods. For instance, trenchless crossing (HDD) noise is considered not significant because of temporary duration based on a qualitative refinement to the assessment result. Further consultation with</p>

Stakeholder	Theme	How this is addressed in this ES
		ADC has been undertaken with respect to the use of BS 5228 (BSI, 2014a) temporal criteria.
	<i>“Concerns of construction effects (i.e. piling noise/vibration)”;</i>	A review of the potential effects from vibration has been considered and included <b>Section 21.9</b> .
<b>Chichester District Council (CDC)</b>	Chichester District Council’s Environmental Protection Team would request to be <i>“included in the dissemination of survey findings in relation to any assessments of noise and vibration.”</i>	Survey findings are included within <b>Section 21.6</b> .
<b>Highways England South East</b>	<i>“Chapter 22 Noise and Vibration considers the temporary noise effects from construction road traffic noise, which finds the effects on various receptors including those along the A27 would be minor adverse, and not considered significant. Any subsequent update of traffic modelling e.g. as a result of the proposed updated baseline will need to inform an updated noise assessment. The assessment does not appear to consider Noise Important Areas, of which there are several along the A27 in the vicinity of the scheme. These should be considered in the ES.”</i>	Noise Important Areas have been identified into the assessment in <b>Section 21.9</b> where these are affected by construction traffic noise.
	<i>“The applicant must ensure that Noise Important Areas along the A27 are considered as part of the noise assessment to ensure these areas are not significantly affected by the proposed scheme.”</i>	
<b>Horsham District Council</b>	<i>“Noise monitoring locations to sensitive receptors be identified and environmental measures embedded accordingly.”</i>	Consultation regarding the noise survey has been undertaken with HDC ( <b>Section 21.3</b> ). Embedded environmental measures are presented in <b>Table 21-20</b> .
<b>Mid Sussex District</b>	<i>“No significant effects have been identified in the PEIR but issues</i>	Whilst the assessment of noise in accordance with BS 5228 (BSI,

Stakeholder	Theme	How this is addressed in this ES
<p><b>Council (MSDC)</b></p>	<p><i>associated with excessive noise will be a sensitive issue for local residents.”</i></p>	<p>2014a) does not necessarily cover the sensitivity of a group to construction, the embedded environmental measures (see <b>Table 21-20</b>) have been reviewed to ensure that noise disturbance is minimised and managed proactively.</p>
	<p><i>“The Council recognises that the noise impacts for operation and maintenance of the onshore substation will not be submitted until further location and design details are known and we recognise and welcome that those details which have been submitted follow an accepted methodology and are in general accordance with the Planning Noise Advice Document: Sussex.”</i></p>	<p>Planning Noise Advice Document: Sussex (WSCC et al., 2021) has been reviewed and is incorporated accordingly into the assessment in <b>Section 21.9</b>.</p>
	<p><i>“[...] the Council has the following comments/queries on the proposed methodology:</i></p> <ul style="list-style-type: none"> <li><i>•Any new baseline noise data should be undertaken post any Covid-19 lockdown effects. The approach to including or excluding existing substation noise should be fully justified.</i></li> <li><i>•A Low Frequency Noise methodology for operational substation noise is yet to be agreed and the Council would welcome the opportunity to comment on any final methodology</i></li> <li><i>•The specified SOAEL external noise level for night-time noise from construction given in Table 22-16 of the Wood report is listed as 55dB LAeq 1hr. Even allowing for the full 15dB attenuation for a partially open window, this would equate to 40dB LAeq inside a bedroom; 10dB above the WHO derived figure usually used. Therefore, more detail regarding this level and how</i></li> </ul>	<p>Baseline data has been gathered sufficiently post the COVID-19 pandemic lockdown such that traffic was considered to be representative of normal conditions.</p> <p>The existing substations (Rampion 1 substation and existing National Grid Bolney substation) have been included as part of the existing baseline for construction assessments (<b>Section 21.6</b>). For the operational assessment of onshore substation noise, the existing substations (Rampion 1 substation and existing National Grid Bolney substation) are sufficiently distant at 1 – 1.5 km from the receptors identified that the noise from these sites would not form a notable contribution to the ambient noise environment.</p> <p>Consideration of low frequency is part of the assessment</p>

Stakeholder	Theme	How this is addressed in this ES
	<p><i>it can be mitigated and circumstances when this would be permitted.</i></p> <p><i>Mid Sussex wishes to be consulted upon these details as soon as they are available once the substation location is finalised.”</i></p>	<p>methodology agreed with MSDC (see <b>paragraph 21.3.18</b>).</p> <p>The use of WHO criteria for the SOAEL relates to noise exposure over a longer-term rather than short-term construction effects. The SOAEL established for night-time is well established in major infrastructure projects. This approach to SOAEL was agreed with MSDC following receipt of this feedback.</p>
	<p>Consideration of local residents with context of the construction of Rampion 1 where the effects of traffic and noise were a common complaint. The Council requests reassurance “<i>that construction activity and associated noise will be adequately managed so as to not be detrimental to local residents and that any agreed working hours would be properly adhered to</i>” through the DCO.</p>	<p>The <b>Outline Code of Construction Practice</b> (Document Reference: 7.2) and <b>Outline Construction Traffic Management Plan</b> (Document Reference: 7.6) provide a framework of working hours, access routes and restricted routes which have been submitted as part of the DCO Application and form a requirement of the DCO.</p>
	<p>The Council has referenced “<i>a difference between the hours of construction and operation between that proposed by you and the Council’s standard hours.</i>”</p>	<p>MSDC’s standard hours have been reviewed and the assessment methodology has been updated accordingly in <b>Section 21.8</b>.</p>
<b>SDNPA</b>	<p>The SDNPA with regards to tranquillity, and Seascape, Landscape and Visual Impact, as within the Landscape and Visual chapters.</p>	<p>Tranquillity is considered further within <b>Chapter 18: Landscape and visual impact, Volume 2</b> of the ES (Document Reference: 6.2.18), <b>Appendix 18.3: Landscape assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.3) and <b>Appendix 18.4: Visual assessment, Volume 4</b> of the ES (Document Reference: 6.4.18.4). However, the impacts of noise on the SDNP have also been considered within this chapter.</p>

Stakeholder	Theme	How this is addressed in this ES
<b>WSCC</b>	<p>West Sussex Council “<i>With regards the advance notification required for works undertaken outside of stated working hours</i>”. Request that “<i>any likely 24 hour or continuous construction activities (e.g. SGT deliveries and oil filling, concrete pours etc)</i>”, and the proportion of such works are included in the ES, and “<i>notification should be given to an agreed list of stakeholders</i>”.</p>	<p>The assessment considers construction activities likely to require 24 hour working (e.g. trenchless crossings) in <b>Section 21.9</b>.</p> <p>The <b>Outline Code of Construction Practice</b> (Document Reference: 7.2) specifies advanced notice requirements to be given to the relevant local authorities with respect to extended working hours.</p>
	<p>Request that “<i>The approach to the identification of Noise Sensitive Receptors (beyond those listed in Table 22-6) and monitoring locations for baseline surveys</i>” are agreed with all relevant stakeholders, including WSCC post formal consultation.</p>	<p>Identification of receptors discussed with stakeholders alongside the noise monitoring approach (<b>Section 21.3</b>).</p>
	<p>WSCC request of further description of the “<i>establishment of the baseline sound levels</i>”, and the impacts shown by Rampion 1. Request of further discussion of the methodology and scope for this, and reference to the operational noise reporting from Rampion 1.</p>	<p>The existing substations (Rampion 1 substation and existing National Grid Bolney substation) are included as part of the existing baseline for construction assessments, but are sufficiently distant from receptors identified for the purposes of assessing operational substation noise that they would not contribute to the noise environment at those locations.</p>
	<p>WSCC requests to ensure lessons learnt from the Rampion 1 process are implemented, and “<i>to ensure that modelling for construction noise was/will be accurate</i>”.</p>	<p>Construction noise monitoring has been reviewed to discern if this was useable for verification purposes in the noise predictions.</p>
	<p>WSCC request to see an “<i>outline presented in the ES of any likely 24 hour or continuous construction activities (e.g. SGT deliveries and oil filling, concrete pours etc), and notification should be given to an agreed list of stakeholders. The ES</i>”</p>	<p>Commitment has been discussed with WSCC and is considered within the ES Chapter regarding potential out of hours works.</p>

Stakeholder	Theme	How this is addressed in this ES
	<p><i>also requires taking account of a proportion of continuous works.”</i></p>	
	<p>WSCC request to see the impacts of over-running work schedules <i>“captured in assessments undertaken for the Proposed Development, and durations for certain activities should be reflected to take account for this.”</i></p>	<p>This can be considered in terms of temporal criteria within the BS 5228 (BSI, 2014a) assessment, which could make a difference in terms of significance within the assessment (for instance if the difference was between an aspect of works being for under a month and over a month). Assumptions in relation to overruns are included in the working time in which the noise assessment is based.</p>
	<p>WSCC requests to see, <i>“as part of the site selection process, consideration of the orientation of the substation in relation to the nearby PRowS and sensitive receptors, with the louder noise emitting plant sited away from these receptors.”</i></p>	<p>Public Rights of Way (PRowS) would have been considered without the presence of residences, however, in the case of the substation options, there were nearby residences in each direction and therefore the nearby residences are the determining factor in terms of assessment and mitigation.</p>
	<p>Request for RED to <i>“confirm how the construction/operation of the enabling works at the Bolney National Grid Substation have been taken into account”</i> in the assessment.</p>	<p>The construction of the enabling works at the existing National Grid Bolney substation (Bolney extension) have been considered in <b>Section 21.9</b>. An assumption has been made that there will be no audible noise outside of the site boundary from the operation of the Bolney extension.</p>
	<p><i>“Assessments undertaken as part of the EIA are required to reflect the construction locations where there will likely be a more prolonged impact [...] e.g. construction compounds, HDDs, landfall, substation, areas where access is only via haul route along the cable corridor.”</i></p>	<p>The temporal character of construction works has been noted within the assessment and considered when assessing significance in <b>Section 21.9</b>.</p>

Stakeholder	Theme	How this is addressed in this ES
	<p>WSCC request to further discuss the locations for baseline monitoring in relation to the cable route, noting the PEIR states <i>“It is not initially proposed to undertaken a sound monitoring survey to inform the assessment of the construction of the onshore cable, or construction of the offshore WTGs, as the extents of the study area are such that the noise environment at receptors will vary widely”</i>. WSCC request clarification if baseline monitoring will be undertaken in proximity to HDD crossing points, accesses and construction compounds, along with any other more sensitive locations required.</p>	<p>Baseline monitoring has been undertaken both at identified trenchless crossing sites (where relevant in terms of assessment results and likely baseline) and temporary construction access locations. All baseline monitoring is presented in <b>Section 21.6</b>.</p>
	<p>Reference to be made to the Oakendene Industrial Estate when referring to noise sources around the substation search areas.</p>	<p>Reference to Oakendene Industrial Estate has been made in <b>Appendix 21.1: Baseline sound report, Volume 4</b> of the ES (Document Reference: 6.4.21.1)</p>
	<p>Clarification on onshore substation piling activities considered.</p>	<p>Onshore piling activities have been assessed for the onshore substation (<b>Section 21.9</b>).</p>
	<p>WSCC require consultation over the detailed survey methods for all baseline monitoring locations along with other local authorities.</p>	<p>WSCC have been consulted with regards to the survey method and locations (<b>Section 21.3</b>).</p>
	<p>Based upon the characterisation of the receiving environment and the outcomes of the noise and vibration assessment, WSCC requests environmental measures required along the route at particularly noisy locations, as well as that required for the substation area are considered.</p>	<p>The embedded environmental measures have been reviewed as part of the iterative design process and during the preparation of this ES Chapter (see <b>Table 21-20</b>).</p>



## Second Statutory Consultation exercise – October to November 2022

- 21.3.29 The second Statutory Consultation exercise was undertaken from 18 October 2022 to 29 November 2022. This was a targeted consultation which focused on updates to the onshore cable route proposals which were being considered following feedback from consultation and further engineering and environmental works. As part of this second Statutory Consultation exercise, RED sought feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO application.
- 21.3.30 **Table 21-8** provides a summary of the key themes of the feedback received in the second Statutory Consultation exercise in 2022 in relation to noise and vibration and outlines how the feedback has been considered in this ES chapter. A full list of all comments received during the second Statutory Consultation exercise in 2022 and the responses to those comments is provided in the [Consultation Report](#) (Document Reference: 5.1).

**Table 21-8 Second Statutory Consultation exercise (October to November 2022) feedback**

Stakeholder	Theme	How this is addressed in the ES
<b>Arun District Council</b>	Increase in HDD could extend far beyond stated timescales and this overall impact of the process must be taken into account	The duration of trenchless crossing is included within the assessment ( <b>Table 21-29</b> ), using a worst case scenario of drilling throughout the period of the trenchless crossing works (despite there being long periods of preparation ancillary activities where drilling will not be taking place). Embedded environmental measure (C-263) includes for potential extensions to works to be covered by Section 61 process.
<b>Arun District Council</b>	Provide details of offshore works and how they would affect Climping Beach and environs and mitigation requirements	An assessment of piling noise has been undertaken for offshore works in <b>Section 21.9</b> . Otherwise associated offshore works not be considered to result in adverse effects onshore.
	Temporary nature of construction compounds to be clarified.	Timescales of different construction aspects have been clarified in <b>Section 21.9</b> .
<b>Arun District Council</b>	Operational access route through existing quiet housing at Benjamin Gray Drive, Wick, Littlehampton, would not appear to be ideal.	The operational traffic for operation and maintenance would be sufficiently low to make any impact on the residences of Benjamin Gray Drive negligible.

Stakeholder	Theme	How this is addressed in the ES
<b>Arun District Council</b>	Provide detail of the proposed method of piling and how these will affect sensitive receptors and any necessary proposed method of mitigation.	No piling is planned for within Arun DC. An assessment of offshore piling noise effects is presented in <b>Section 21.9</b> .

### Third Statutory Consultation exercise – February to March 2023

- 21.3.31 The third Statutory Consultation exercise was undertaken from 24 February 2023 to 27 March 2023. This was a targeted consultation which focused on a further single onshore cable route alternative being considered following feedback from consultation and further engineering and environmental works. As part of this third Statutory Consultation exercise, RED sought feedback on the potential changes to the onshore cable route proposals to inform the onshore design taken forward to DCO Application.
- 21.3.32 **Table 21-9** provides a summary of the key themes of the feedback received in the third Statutory Consultation exercise in 2023 in relation to noise and vibration and outlines how the feedback has been considered in this ES chapter. A full list of all comments received during the third Statutory Consultation exercise in 2023 and the responses to those comments is provided in the **Consultation Report** (Document Reference: 5.1).

**Table 21-9 Third Statutory Consultation exercise (February to March 2023) feedback**

Stakeholder	Theme	How this is addressed in the ES
<b>Arun District Council (ADC)</b>	Provide detail of how works to support offshore development (including transport, possible operation of the temporary construction compound, etc.) is likely to affect Noise Sensitive Receptors at Climping Beach and environs and mitigation measures to be applied.	Effects to noise sensitive receptors at or near to Climping Beach are considered where relevant to the assessment in <b>Section 21.9</b> .
	Documented reference to so called 'Temporary Construction Compounds,' would benefit from clarification that these units will remain in-situ for the whole of the building period, with potential for concomitant site and traffic noise,	Clarity has been added as to the estimated length of time temporary construction compounds and accesses will be in use. Traffic assessments are based on a construction traffic flow level for affected

Stakeholder	Theme	How this is addressed in the ES
	including from access roads, to adversely affect nearby Noise Sensitive Receptors over a number of years.	roads which is higher than the worst-case traffic week ( <b>Section 21.9</b> ).
	The provision of an operational access route through existing quiet housing at Benjamin Gray Drive, Wick, Littlehampton, would not appear to be ideal. (Targeted Onshore Work Plan 2/23)	Operational and maintenance traffic will be minimal ( indistinguishable with existing residential vehicular movements) and lower than the threshold numbers needed to be able to assess a change in traffic noise.
	Paragraph C-152 in outline Code of Construction Practice (CoCP). Onshore Piling Activities – Climping Beach and other possible locations. Please note that it will be necessary to provide written detail of the proposed method of piling; how predicted noise and vibration levels have been calculated and how these will affect (nearby) sensitive receptors and any necessary proposed method of mitigation, to Arun Planning Department/Arun Environmental Health Department for assessment /agreement.	Piling is only included within the construction of the substation, which is considered a worst case approach, as piling may not be required at that location. No piling is considered necessary at the landfall or other HDD sites.
<b>Washington Parish Council (WPC)</b>	We are concerned that noise from the continuous drilling installation across the recreation ground will have a detrimental impact on local residents and the operation of the village hall. So far we have not been provided with any information regarding the amount or duration of noise that they will experience. Whilst this is temporary it is still extremely important that acceptable limits are identified and agreed, and that appropriate and necessary measures are taken to ensure that these are complied with. Rampion should offer to compensate for any direct loss arising from noise interfering with the	The noise from drilling has been predicted and assessed for local residents and village hall and recreation ground, with the estimated duration of such impacts. The assessment process does not specifically have limits to noise (although the Unacceptable Observable Effect Level could be considered as such as mitigation should be applied such that this level is not exceeded). However, there are thresholds for different magnitudes of impact relating to different significant effect

Stakeholder	Theme	How this is addressed in the ES
	operation of the Memorial Hall or the recreation ground and consider making ex gratia payments to residents who are unavoidably disturbed where this is justified.	levels. Appropriate mitigation measures (such as screening, lower noise methods) have been identified to minimise impacts of noise. No significant effects have been identified at the locations within Washington parish Council.

#### Fourth Statutory Consultation exercise – April to May 2023

- 21.3.33 The fourth Statutory Consultation exercise was undertaken from 28 April 2023 to 30 May 2023. This was a targeted consultation which focused on the proposed extension works to the existing National Grid Bolney substation to facilitate the connection of the Rampion 2 onshore cable route into the national grid electricity infrastructure. As part of this fourth Statutory Consultation exercise, RED sought feedback on the proposed substation extension works to inform the onshore design taken forward to the DCO Application.
- 21.3.34 The only response received related to noise and vibration from Rampion 2's fourth Statutory Consultation exercise was from Horsham District Council (HDC) who agreed with the noise and vibration assessment conclusions with respect to the existing National Grid Bolney extension works. A full list of all comments received during the fourth Statutory Consultation exercise in 2023 and the responses to those comments is provided in the [Consultation Report](#) (Document Reference: 5.1)).

## 21.4 Scope of the assessment

### Overview

- 21.4.1 This section sets out the scope of the ES assessment for noise and vibration. This scope has been developed as Rampion 2 design has evolved and responds to feedback received to-date as set out in **Section 21.3**.

### Spatial scope and Study Area

- 21.4.2 The spatial scope of the noise and vibration assessment is defined as a 1.5km buffer zone around an indicative onshore cable corridor centreline and the boundary of the onshore substation site. The Study Area also includes 100m around the access routes and 10m around roads affected by changes in road traffic from construction. The Study Area, presented on [Figure 21.1, Volume 3](#) of the ES (Document Reference: 6.3.21) is considered sufficient to include any effects that might be possible from the worst-case noise emissions from the Proposed Development at the most sensitive times (for instance HDD at night).

This Study Area also includes a buffer for potential movement of the onshore cable corridor within the proposed DCO Order Limits.

- 21.4.3 The Study Area for scoping operational noise from the offshore WTGs and offshore substations is set at 20km from the onshore part of the proposed DCO Order Limits to cover onshore noise sensitive receptors on the coastal front from Selsey to Seaford in addition to developments considered for the cumulative assessment (see **Section 21.12**). The Study Area is outlined in **Figure 21.1, Volume 3** of the ES (Document Reference: 6.3.21)).

## Temporal scope

- 21.4.4 The temporal scope of the assessment of noise and vibration is the entire lifetime of Rampion 2, which therefore covers the construction, operation and maintenance, and decommissioning phases.
- 21.4.5 Construction noise and vibration for onshore elements of the Proposed Development are assessed at a point in time when the maximum plant is on use on site. Where there are different stages to the works, the maximum plant for each phase is taken into consideration in the assessment. Noise from construction traffic is assessed on the basis of traffic flows higher than the worst case week for each road link.
- 21.4.6 The operation and maintenance phase assessment is based on a point in time where the onshore substation and wind farm are operating to their maximum capacity (albeit the wind farm is assessed under a specific wind speed as a screening assessment and potential further wind speeds dependent on the result of that screening).
- 21.4.7 The decommissioning phase assessment is largely covered by comparing it with the construction as they are assumed to be very close in terms of noise and vibration emissions. Any significant differences relate to points in time when the maximum plant is used on site (traffic assumed to be the same).
- 21.4.8 Whilst the assessments focus on points in time, consideration is given to the duration of the effect as relevant to the different phases and activities within those phases (e.g. some construction effects last for only days whilst some might last for weeks).

## Potential receptors

- 21.4.9 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 type of receptors identified that may experience likely significant effects for noise and vibration are outlined in **Table 21-10**.

**Table 21-10 Receptors requiring assessment for noise and vibration**

Receptor group	Receptors included within group
<b>Residential</b>	Residences, including private gardens where appropriate.
<b>Community services</b>	Schools (during daytime periods), hospitals, places of worship.
<b>Commercial</b>	Offices, retail, entertainment venues and eateries, leisure facilities, animal husbandry
<b>Terrestrial ecology</b>	Designated sites including Special protection areas (SPA) and Sites of Special Scientific Interest (SSSI).
<b>Historic environment</b>	Scheduled monuments, listed buildings
<b>Leisure areas</b>	National parks, Public Rights of Way, coastline, local nature reserves <sup>4</sup>

21.4.10 Key receptors have been identified for each assessment for the purposes of predicting noise emissions. These receptors are based on their sensitivity and proximity to the various aspects which would result in noise and vibration effects. **Figure 21.2, Volume 3** of the ES (Document Reference: 6.3.21) present the receptor locations as included within each assessment except for the onshore cable open trenching. As the cable trenching activity will pass the nearest noise sensitive receptors at a rate which is significantly below the temporal criteria for the assessment, the assessment has been undertaken qualitatively, therefore it is considered unnecessary to present the receptors adjacent to the activity.

## Potential effects

21.4.11 Potential effects on noise and vibration receptors that have been scoped in for assessment are summarised in **Table 21-11**.

<sup>4</sup> There are no 'Quiet Areas' within the Study Area as identified in Action Plans in accordance with Environmental Noise (England) Regulations 2006, as amended.

**Table 21-11 Potential effects on noise and vibration receptors scoped in for further assessment**

Receptor	Activity or impact	Potential effect
<b>Construction</b>		
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Activities from cable trenching and onshore substation construction and the existing National Grid Bolney extension works resulting in noise from works and vibration from works if very close to sensitive receptors. Potential noise effects from offshore WTG piling (Construction).	<p>Potential for significant effect if the onshore cable corridor is located very close to sensitive receptors. The levels of noise and vibration could potentially result in a medium magnitude of change.</p> <p>Potential for significant noise effect from piling for the offshore substation and turbines at onshore receptors dependent on the piling equipment used and location / duration / times of work.</p>
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	HDD resulting in noise disturbance especially if required 24 hours a day. Potential vibration effects if very close to sensitive receptors (Construction).	Potential for significant effect if the HDD sites are very close to sensitive receptors levels of noise and vibration could potentially result in a medium magnitude of change. In particular a requirement for 24-hour working could result in significant disturbance during the night-time.
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Construction road traffic resulting in disturbance from increased traffic noise and vibration effects from poorly maintained roads (Construction).	Potential for significant effect should there be construction traffic on small roads with otherwise low flow traffic resulting in a potentially high magnitude of change in noise. Heavy goods vehicles (HGVs) on poorly maintained roads could result in vibration

Receptor	Activity or impact	Potential effect
<b>Operation and maintenance</b>		
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Noise disturbance as a result of the onshore substation (Operation and maintenance).	levels of medium magnitude.
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Noise disturbance from the operation of WTGs at onshore sensitive receptors (Operation and maintenance).	Potential for significant effect due to the proximity of the onshore substation and the quiet character of the existing noise environment will potentially result in large changes to the baseline noise environment.
<b>Decommissioning</b>		
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Noise and vibration disturbance from removal of equipment and reinstating sites, including associated traffic noise and vibration effects (Decommissioning).	Potential for significant effect, however, it is unlikely that the offshore wind farm will exceed criteria to result in a significant effect given the distances to the shoreline. However, the number of potentially affected receptors necessitates consideration even with a low risk.
Residential properties, educational, commercial, religious and medical premises, quiet or important outside leisure areas.	Noise and vibration disturbance from removal of equipment and reinstating sites, including associated traffic noise and vibration effects (Decommissioning).	Although it is anticipated that the effects of decommissioning activities will be similar or lower than those experienced during construction, a decommissioning assessment is included to cover key differences with the construction which could result in a different effect level.



## Activities or impacts scoped out of assessment

- 21.4.12 Several potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. 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 in **Table 21-12**.

**Table 21-12 Activities or impacts scoped out of assessment**

Activity or impact	Rationale for scoping out
<b>Operation and maintenance</b>	
Increases in noise from site traffic for substation and wind farm maintenance.	As outlined in <b>Table 21-6</b> , it has been agreed with the Planning Inspectorate (ID 5.4.1) that disturbance as a result of the maintenance of the onshore substation and wind farm can be scoped out of the EIA in the Scoping Opinion (Planning Inspectorate, 2020a). Operational road traffic will be minimal and will only have a negligible effect on existing road traffic flows, leading to no likely significant effect.
Noise effects as a result of the offshore substation.	As outlined in <b>Table 21-6</b> , it has been agreed with the Planning Inspectorate (ID 5.4.2) that noise effects as a result of the offshore substations can be scoped out of the EIA in the Scoping Opinion (Planning Inspectorate, 2020a). Noise would not be audible as a result of the sound attenuation from the large distance between the offshore substations and onshore receptors, leading to no likely significant effect.
Vibration effects from the operation of the onshore and offshore substations and offshore WTGs.	As outlined in <b>Table 21-6</b> , it has been agreed with the Planning Inspectorate (ID 5.4.3) that vibration effects as a result of vibration from the offshore substations and WTGs can be scoped out of the EIA in the Scoping Opinion (Planning Inspectorate, 2020a). All operational components of the Proposed Development are at a sufficient distance that resulting vibration at sensitive

Activity or impact	Rationale for scoping out
	<p>receptors would not be perceptible, leading to no likely significant effect.</p> <p>In response to the Planning Inspectorate's commentary in ID 5.4.3 (Planning Inspectorate, 2020a) in <b>Table 21-6</b> regarding vibration from the onshore Oakendene substation being scoped in, further justification has been given to scoping this out as follows. Within the onshore substation, there would not be any large items of rotating plant that could give rise to significant vibration outside of the onshore substation boundary. Anti-vibration pads would be used underneath reactive plant (e.g. transformers) to minimise the transfer of vibration to the ground. Any residual vibration is not likely to be perceptible beyond a few metres from these sources.</p> <p>Vibration measurements have been undertaken on an operating Super Grid Transformer (SGT) at a substation in the UK. The measurements showed that peak particle velocity (PPV) levels were 0.12mm/s 6m from the SGT, considered within BS 5228-2:2009+A1:2014 (BSI, 2014b) to be around the level which is just perceptible in the most sensitive situation.</p> <p>Given the closest residence is 50 metres from the proposed onshore substation site it is unlikely that plant within the onshore substation would give rise to a vibration impact. Therefore Vibration effects from the operation of the onshore and offshore substations and offshore WTGs are scoped out of this assessment.</p>

## 21.5 Methodology for baseline data gathering

### Overview

- 21.5.1 Baseline data collection has been undertaken to obtain information over the Study Areas described in **Section 21.4: Scope of the assessment**. The current

baseline conditions presented in **Section 21.6: Baseline conditions** sets out data currently available from the Study Area.

## Desk study

21.5.2 The data sources that have been collected and used to inform this noise and vibration assessment are summarised in **Table 21-13**.

**Table 21-13 Data sources used to inform the noise and vibration ES assessment**

Source	Date	Summary	Coverage of Study Area
<b>Google Earth Pro. Version 7.3.2.5776 and Ordnance Survey (OS) Mapping</b>	May 2023	Provides aerial photography resources	Entire Study Area
<b>WSP baseline sound surveys</b>	February - May 2023	Baseline data collected by WSP to inform the ES assessment	Entire Study Area
<b>BS 5228-1/2: 2009+A1:2014 (BSI, 2014a and 2014b)</b>	May 2023	Noise data for construction noise and vibration predictions	Project-wide

## Site surveys

21.5.3 In order to fully understand the potential noise and vibration effects from the Proposed Development, determining the existing environmental conditions is an essential step of the EIA. Baseline sound surveys have been conducted, which has established a clear understanding of the existing baseline.

21.5.4 Baseline sound surveys at the proposed onshore substation site were undertaken between February and May 2023.

21.5.5 **Table 21-14** below provides a summary of the site surveys undertaken. Details of the baseline sound survey procedures and results are provided in **Appendix 21.1: Baseline sound report, Volume 4** of the ES (Document Reference: 6.4.21.1).

**Table 21-14 Site surveys undertaken**

<b>Survey type</b>	<b>Scope of survey</b>	<b>Coverage of Study Area</b>
<b>Onshore Cable Route</b>		
<b>Partially attended surveys</b>	A suite of 24-hour partially attended surveys to collect baseline sound level data at locations representative of noise sensitive receptors along the onshore cable route that are near to trenchless crossing (HDD) compounds and temporary construction compounds.	Nearest noise sensitive receptors to the proposed trenchless crossing locations and temporary construction access locations.
<b>Attended surveys</b>	A suite of 1-hour attended surveys to collect baseline sound level data at locations representative of noise sensitive receptors near temporary construction access points.	Nearest noise sensitive receptors to relevant temporary construction access points.
<b>Onshore substation site</b>		
<b>Partially attended surveys</b>	A suite of 7-day partially attended surveys to collect baseline sound level data at locations representative of the nearest noise sensitive receptors to the proposed Oakendene substation.	Onshore substation site.

## Data limitations and assumptions

- 21.5.6 In the absence of detailed information from a construction contractor, assumptions have been made about the types of plant and equipment which are likely to be used for construction works. These assumptions are considered representative of a reasonably foreseeable worst-case.
- 21.5.7 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a short-time sample of the ambient levels. Every effort is made to ensure that measurements are undertaken in such a way to provide a representative sample of conditions, such as:
- avoiding periods of adverse weather conditions (rain, wind speeds above 5 m/s) and / or if adverse weather conditions take place during any sound level measurements, the contaminated data is omitted from the dataset; and
  - avoiding school holiday periods (which are often considered to result in atypical sound levels).

- 21.5.8 However, a small degree of uncertainty will always remain in the values taken from such a measurement survey.
- 21.5.9 Furthermore, due to land access restrictions, baseline noise data was not obtained at several representative noise sensitive receptors near to HDD compounds and temporary construction compounds. Consequently, a conservative approach has been used, utilising the lowest threshold category for the BS 5228-1 (BSI, 2014a) 'ABC method' at each of identified noise sensitive receptors where measurements were not obtained.
- 21.5.10 The plant equipment data used is an additional area of uncertainty. The data used is based on Rampion 1 substation information and therefore considered to be of low uncertainty, but there is a possibility that the final plant equipment will have either slightly lower or higher sound power levels of electrical plant. Within the noise modelling software, this uncertainty is compounded by the prediction method itself which, being based on a standard, is a simulation of physical processes and has an element of inaccuracy.
- 21.5.11 It is not possible to provide a value for the uncertainty of all the different factors discussed above, but instead the assessments within this chapter have sought to reduce the risk of such uncertainty with a precautionary approach, which is discussed further in the results sections.

## 21.6 Baseline conditions

### Current baseline

#### Overview

- 21.6.1 The following section provides an overview of the existing baseline conditions at locations likely to be affected by the Proposed Development for each phase of work and this overview has been based on Google Earth Pro. Version 7.3.2.5776 and OS Mapping. The established Study Area for the ES, based on the proposed DCO Order Limits, has been illustrated in **Figure 21.1, Volume 3** of the ES (Document Reference: 6.3.21).
- 21.6.2 As presented in **Figure 21.1, Volume 3** of the ES (Document Reference: 6.3.21), the onshore cable corridor, approximately 38.8 km in length, will pass through a large area, from landfall at Climping near Littlehampton through to the proposed onshore substation at Oakendene and then onto the existing National Grid Bolney substation. The onshore cable route and the onshore substation site are presented in **Figure 4.12, Volume 3** of the ES (Document Reference: 6.3.4).
- 21.6.3 The coastline is interspersed with villages largely backed by agricultural land with the A259 running east / west. Sound levels are likely influenced by road and rail traffic and additional anthropogenic sources (gardening activities, conversation, music) closer to areas of habitation, as well as the sea on approaching the coast. Intermittent noise would also be anticipated locally from recreational flights associated with Shoreham airport. Receptors close to the River Arun will experience boating noise, though this is likely to be of low sound level and irregular.

- 21.6.4 The largest settlement in the Study Area is Littlehampton. Sound levels here are principally likely to be influenced by local road traffic and rail traffic, as well as other anthropogenic sources.
- 21.6.5 Inland from the coast, the Study Area is predominantly rural, comprising a mosaic of arable and livestock farming land with blocks of commercial forestry. There are various isolated dwellings and some small villages throughout. Baseline sound levels are generally expected to be low and typical of a rural environment, being influenced by road traffic with additional anthropogenic sources closer to areas of habitation.
- 21.6.6 Baseline vibration levels are likely to vary widely with localised temporary events, such as construction works. Levels of elevated vibration might be measurable adjacent to railways or poorly maintained roads. Otherwise, vibration levels are likely to be negligible for most of the Study Area.
- 21.6.7 The onshore substation site at Oakendene is rural and baseline sound levels are generally expected to be low and typical of a rural environment, being influenced by road traffic (mainly from Cowfold Road and local roads) with additional anthropogenic sources closer to areas of habitation. The noise environment is also influenced by the Oakendene Industrial Estate. The onshore substation site is illustrated in **Figure 4.12, Volume 3** of the ES (Document Reference: 6.3.4). The existing National Grid Bolney substation and Rampion 1 substation contribute to the noise environment at receptor locations surrounding those sites.

## Future baseline

- 21.6.8 It is anticipated that there will be traffic growth based on regional or national trends. However, this is likely to be limited and traffic noise might generally decrease as a result of the increase in use of electric cars during the lifetime of the Proposed Development. Other projects could have a localised impact in relation to noise for specific receptors. Generally, however, it is anticipated that the baseline noise environment will remain consistent in the future. Due to the growth of housing, there are likely to be more residential receptors in closer proximity to the proposed DCO Order Limits in the future. Where these future residential developments are known and will be in existence at the same time as the Proposed Development, these have been incorporated into the assessment.

## Baseline sound survey results

- 21.6.9 The following section presents a summary of the baseline measurements undertaken in February, March and April 2023, consisting of both short-term attended measurements (1 hour), 24-hour measurements for the purposes of assessing trenchless crossing locations, and 5-day measurements for the purposes of assessing operational substation noise.

### Construction phase assessment

- 21.6.10 The baseline measurement results have been used to identify the threshold values for the identification of impact magnitude of change (see **Table 21-23**) based on Table E.1 from BS-5228-1 (BSI, 2014a) as replicated in **Table 21-16**.

**Table 21-15 BS 5228-1 Table E.1**

Assessment category and threshold value period	Threshold value, in decibels (dB, $L_{Aeq,T}$ )		
	Category A <sup>A)</sup>	Category B <sup>B)</sup>	Category C <sup>C)</sup>
Night-time (23:00-07:00)	45	50	55
Evenings and weekends <sup>D)</sup>	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

NOTE 1 A potential significant effect is indicated if the  $L_{Aeq, T}$  noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total  $L_{Aeq, T}$  noise level for the period increases by more than 3 dB due to site noise.

NOTE 3 Applied to residential receptors only.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

21.6.11 The results of the baseline sound surveys indicated that for construction noise, all receptors will be assessed on the basis of Category A during all time periods from the BS 5228-1 'ABC method' (BSI, 2014a), with the exception of the receptors identified in **Table 21-16** below. For these receptors, baseline noise levels for at least one of the time periods were sufficiently high to increase the category considered as the threshold level for assessment.

Table 21-16 Category B and C receptor locations

Receptor	'ABC method' category		
	Daytime (A: 65 dB, B: 70 dB, C:75 dB)	Evenings and weekends (A: 55 dB, B: 60 dB, C:65 dB)	Night-time (A: 45 dB, B: 50 dB, C:55 dB)
<b>SMALLWOOD HOUSE, STEYNING ROAD, BN44 3AN</b>	A	A	B
<b>SOUTHVIEW, WELLENS FARM, STEYNING ROAD, BN44 3AN</b>	A	A	B
<b>BERGEN-OP-ZOOM, HORSEBRIDGE COMMON, BN44 3AL</b>	A	A	B
<b>TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD</b>	A	A	B
<b>WESTRIDGE, KENT STREET, RH13 8BB</b>	A	A	B
<b>SOUTHLANDS, KENT STREET, RH13 8BA</b>	A	A	B
<b>OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ</b>	A	A	B
<b>EASTRIDGE LODGE, WINEHAM LANE, RH17 5SD</b>	A	A	B
<b>WESTRIDGE PLACE, WINEHAM LANE, RH17 5SD</b>	A	A	B
<b>DAWES FARM, WINEHAM LANE, RH17 5SD</b>	A	A	B
<b>OLD DOCTORS, WINEHAM LANE, BN5 9AZ</b>	A	A	B
<b>THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA</b>	B	C	C
<b>DOVER LANE, BN18 9PX</b>	B	C	C
<b>4, ELLA TERRACE, BN18 9QE</b>	B	C	C
<b>202, ARUNDEL ROAD, BN16 4ES</b>	B	C	C
<b>SOUTHVIEW, HAMMERPOT, BN16 4EU</b>	B	C	C



Receptor	'ABC method' category		
	Daytime (A: 65 dB, B: 70 dB, C:75 dB)	Evenings and weekends (A: 55 dB, B: 60 dB, C:65 dB)	Night-time (A: 45 dB, B: 50 dB, C:55 dB)
<b>1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX</b>	B	C	C
<b>COLT BUNGALOW, ANGMERING PARK, BN16 4EX</b>	B	C	C
<b>COLT BUNGALOW, ANGMERING PARK, BN16 4EX</b>	B	C	C
<b>THE OLD COTTAGE, HAMMERPOT, BN16 4EU</b>	B	C	C

21.6.12 Details of the baseline sound survey procedures and full results, including a summary of the 1-hr attended measurements are provided in [Appendix 21.1 Baseline sound report, Volume 4](#) of the ES (Document Reference: 6.4.21.1).

21.6.13 It is noted that baseline measurements were not feasible for the construction compounds as a result of access restrictions. Receptors represented by these locations would be assessed using the lowest threshold values in BS 5228, which is worst case and therefore the lack of these measurements is not an impairment to the assessment.

#### Operation and maintenance phase assessment

21.6.14 A summary of the baseline sound survey results used to inform the operational noise assessment of the onshore substation are provided in **Table 21-17** and **Table 21-18** below. The  $L_{A90, T}$  identified for each receptor and time period are based on the median values. Further information about the analysis process is found in [Appendix 21.1 Baseline sound report, Volume 4](#) of the ES (Document Reference: 6.4.21.1).

**Table 21-17 Summary of operational substation baseline ambient sound levels (equivalent continuous sound level)**

Receptor		$L_{Aeq,T}$ (dB)	
ID	Address	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
<b>SS1-NE</b>	SOUTHLANDS, KENT STREET, RH13 8BA	61	55
<b>SS2-SE</b>	WESTRIDGE, KENT STREET, RH13 8BB	47	40
<b>SS3-SW</b>	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	46	46
<b>SS4-NW</b>	OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ	50	46

**Table 21-18 Summary of operational substation baseline background sound levels (25<sup>th</sup> percentile)**

Receptor		$L_{A90,T}$ (dB)	
ID	Address	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
<b>SS1-NE</b>	SOUTHLANDS, KENT STREET, RH13 8BA	54	30
<b>SS2-SE</b>	WESTRIDGE, KENT STREET, RH13 8BB	38	28
<b>SS3-SW</b>	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	40	31
<b>SS4-NW</b>	OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ	45	30

## 21.7 Basis for ES assessment

### Maximum design scenario

- 21.7.1 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 design scenario for each receptor establishes the maximum potential adverse impact and, as a result, impacts of greater adverse significance would not arise should any other development scenario (as described in **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4) to that assessed within this Chapter be taken forward in the final design of the Proposed Development.
- 21.7.2 The maximum parameters and assessment assumptions that have been identified to be relevant to noise and vibration are outlined in **Table 21-19** and are in line with the Project Design Envelope (**Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4)).

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**Table 21-19 Maximum parameters and assessment assumptions for impacts on noise and vibration**

<b>Project phase and activity/impact</b>	<b>Maximum assessment assumptions</b>	<b>Justification</b>
<b>Construction phase</b>		
<b>Temporary noise and vibration from the construction and operation of temporary construction compound(s)</b>	<p><b>Temporary construction compounds (not including HDD):</b></p> <ul style="list-style-type: none"> <li>• five locations for temporary construction compounds have been identified including: <ul style="list-style-type: none"> <li>▶ Climping Compound – approximately 61,300m<sup>2</sup> (6.13ha) for the onshore cable installation temporary construction compound;</li> <li>▶ Washington Compound – approximately 39,100m<sup>2</sup> (3.91ha) for the onshore cable installation temporary construction compound;</li> <li>▶ Oakendene substation compound – approximately 25,000m<sup>2</sup> (2.5ha) for the onshore substation temporary construction compound;</li> <li>▶ Oakendene west compound – approximately 50,000m<sup>2</sup> (5ha) for the onshore cable installation temporary construction compound; and</li> <li>▶ National Grid Bolney substation compound – approximately 3,500m<sup>2</sup> for the existing National Grid Bolney substation extension temporary construction compound.</li> </ul> </li> <li>• the size of the temporary construction compounds will be approximately 4ha;</li> </ul>	The assumptions represent the maximum design scenario in terms of number of locations for proposed noise sources, the geographical extent and temporal extent.

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Temporary noise and vibration effects from landfall works and trenchless crossings (HDD)</b>	<p><b>Landfall and trenchless crossings (HDD):</b></p> <ul style="list-style-type: none"> <li>• core working hours are Monday to Friday 07:00 to 19:00 hours and Saturday 08:00 to 13:00 hours; and the</li> <li>• full equipment list, including sound power levels and percentage on-time are detailed in <a href="#">Appendix 21.2: Construction plant list, Volume 4</a> of the ES (Document Reference: 6.4.21.2).</li> </ul>	The duration of HDD will depend on ground conditions. As this will not be known until exploratory testing, this assumption provides a worst-case scenario.
<b>Temporary noise and vibration effects from the construction of the onshore substation</b>	<p><b>Onshore substation:</b></p> <ul style="list-style-type: none"> <li>• work will commence during core working hours only;</li> <li>• site works will not be within 60m of residences; and</li> <li>• the full equipment list, including sound power levels and percentage on-time are detailed in <a href="#">Appendix 21.2: Construction plant list, Volume 4</a> of the ES (Document Reference: 6.4.21.2).</li> </ul>	These assumptions cover for all notable work elements which could result in adverse noise or vibration effects.
<b>Temporary noise effects from</b>	<ul style="list-style-type: none"> <li>• work will be carried out during core working hours only; and</li> </ul>	These assumptions cover for all notable work elements which

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>extension works at the existing National Grid Bolney substation</b>	<ul style="list-style-type: none"> <li>the full equipment list, including sound power levels and percentage on-time are detailed in <b>Appendix 21.2: Construction plant list, Volume 4</b> of the ES (Document Reference: 6.4.21.2).</li> </ul>	could result in adverse noise or vibration effects.
<b>Temporary noise and vibration effects from cable trenching works</b>	<ul style="list-style-type: none"> <li>onshore cable construction work will commence during core working hours only; and</li> <li>the full equipment list, including sound power levels and percentage on-time are detailed in <b>Appendix 21.2: Construction plant list, Volume 4</b> of the ES (Document Reference: 6.4.21.2).</li> </ul>	The assumptions are based on a reasonable approach to the construction works allowing for predictions to be undertaken.
<b>Operation and maintenance phase</b>		
<b>Onshore substation operational noise</b>	<p><b>Onshore substation:</b></p> <ul style="list-style-type: none"> <li>the onshore substation to be located within the boundary as identified in <b>Figure 4.8, Volume 3</b> of the ES (Document Reference: 6.3.4).</li> <li>the full equipment list, including sound power levels and percentage on-time are detailed in <b>Table 21-37</b></li> </ul>	These assumptions are based upon the known constraints of the substation and the plant list is taken from a similar sites, taking into account standard mitigation techniques embedded into the design.

Project phase and activity/impact	Maximum assessment assumptions	Justification
<b>Extension to Existing Bolney substation</b>	<ul style="list-style-type: none"> <li>The operational plant of the existing National Grid Bolney substation extension (GIS or AIS) will not be audible outside of the extension site boundary.</li> </ul>	<p>GIS infrastructure is expected to be minimal as the equipment will be housed within a building. Although not enclosed within a building, the proposed AIS infrastructure does not include the larger noise generating equipment (transformers, shunt reactors or condenser) associated with onshore substation infrastructure and therefore would not be expected to increase noise from Bolney substation at receptor locations.</p>
<b>Decommissioning phase</b>		
<b>Onshore substation decommissioning noise</b>	<p><b>Onshore substation:</b></p> <p>It is anticipated that onshore substation will be removed during the decommissioning phase with similar activities outlined in construction onshore cables will be left buried <i>in-situ</i>.</p> <p>It is assumed that the majority of the activities associated with the decommissioning phase of the onshore substation construction will be similar to the activities associated with the onshore substation construction phase. For this reason, the noise and vibration effect of decommissioning will be largely</p>	<p>It is likely that many aspects of decommissioning will be similar to or result in less noise and vibration effects to the construction phase.</p>



Project phase and activity/impact	Maximum assessment assumptions	Justification
	<p>the same as construction. There will however be differences between the construction and decommissioning phases of the onshore substation, which will be:</p> <ul style="list-style-type: none"><li>• no concrete pouring (and therefore no overnight concrete floating at the onshore substation location); and</li></ul> <p>If concrete within the onshore substation location is not left in situ they may require breaking before removal, using a pneumatic hammer. The use of this plant would be noisier than many of the plant aspects assessed within the construction phase, and therefore has been considered specifically in this section in relation to noise from the onshore substation.</p>	

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## Embedded environmental measures

- 21.7.3 As part of the Rampion 2 design process, several embedded environmental measures have been adopted to reduce the potential for impacts on noise and vibration. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to consultation.
- 21.7.4 These embedded environmental measures also include those that have been identified as good or standard practice and include actions that would 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 ES.
- 21.7.5 **Table 21-20** sets out the relevant embedded environmental measures within the design and how these affect the noise and vibration assessment.

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**Table 21-20 Relevant noise and vibration embedded environmental measures**

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to noise and vibration assessment
<b>C-10</b>	No blasting is anticipated to be required and trenchless crossings will be undertaken by non-impact methods.	Scoping	<b>Outline Code of Construction Practice (CoCP)</b> (Document Reference: 7.2) and DCO requirement.	This measure ensures no noise effects associated with blasting will take place, and trenchless crossings will be undertaken using non-impact methods to reduce the potential for adverse impacts due to noise.
<b>C-22</b>	Core working hours for construction of the onshore components will be 0700 to 1900 Monday to Friday, and 0800 to 1300 on Saturdays, apart from specific circumstances to be set out and agreed in the Outline CoCP.	Scoping	<b>Outline CoCP</b> (Document Reference: 7.2) and DCO requirement.	Core working hours avoids the most noise sensitive time periods (i.e. night-time and weekends) when higher noise effects would be anticipated.  HDD activities are likely to be required outside of core working hours and have been assessed in <b>Section 21.9</b> .

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to noise and vibration assessment
<b>C-26</b>	<p>Where noisy activities are planned and may cause disturbance, the use of mufflers, acoustic barriers (or shrouds) and other suitable solutions will be applied.</p> <p>For HDD work sites near to noise sensitive receptors where predicted levels may exceed the BS 5228 thresholds of significance, mud pumps that operate overnight will be shrouded and the drill will be fitted with acoustic (i.e. high mass) panelling and louvres as well as engine silencers where diesel powered drills are used.</p>	ES	<p><b>Outline CoCP</b> (Document Reference: 7.2) and DCO requirement.</p>	<p>This measure reduces the adverse effects from construction noise.</p>
<b>C-33</b>	<p>An Outline CoCP will be adopted to minimise temporary disturbance to residential properties, recreational users and existing land users and will provide details of measures to protect environmental receptors.</p>	Scoping	<p><b>Outline CoCP</b> (Document Reference: 7.2) and DCO requirement.</p>	<p>Noise mitigation and best practice techniques in minimising noise will be secured via the <b>Outline CoCP</b> (Document Reference: 7.2).</p>

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to noise and vibration assessment
<b>C-160</b>	Highways condition surveys will be undertaken before, during and after the construction phase. Any damage to highways as a result of Rampion 2 construction heavy goods vehicles (HGVs) on the highways will be repaired. Further detail will be included within the Outline Construction Traffic Management Plan (CTMP).	PEIR	Proposed routing in agreed <b>Outline Construction Traffic Management Plan (CTMP)</b> (Document Reference: 7.6).	This measure will identify where there is a risk of significant effects from irregularities in the road adjacent to vibration sensitive receptors.
<b>C-263</b>	During detailed design the contractor will review the construction noise assessments. Where any significant deviation from the initial sound level predictions is identified, such that levels in excess of the BS 5228 thresholds of significance are likely over the required time period for significance, the Construction Noise Management Plan (CNMP) shall be updated and a Section 61 application will be made to the relevant Local Planning Authority.	ES	<b>Outline CoCP</b> (Document Reference: 7.2) and DCO requirement.	This measure reduces the adverse effects from construction noise.
<b>C-231</b>	The detailed substation design will be built and operated such that the Rating levels (noise emissions plus any character correction) do not exceed the following noise levels at the private amenity space associated with the closest residential receptors:	DCO requirement	This measure ensures whatever differences the final design might have in comparison with that modelled, there will be no	Provides a design limit upon which to base mitigation requirements to ensure no significant effects from substation operational noise.

ID	Environmental measure proposed	Project phase measure introduced	How the environmental measures will be secured	Relevance to noise and vibration assessment
	<ul style="list-style-type: none"> <li>- Southlands, Kent Street, RH13 8BA (assessment location at OSGB East 523168.9635, North 122661.931): Daytime limit of 38 dB(A), night-time limit of 35 dB(A);</li> <li>- Westridge, Kent Street, RH13 8BB (assessment location at OSGB East 523160.2987, North 121958.9533): Daytime limit of 35 dB(A), night-time limit of 35 dB(A);</li> <li>- Taintfield Farmhouse, Kings Lane, RH13 8BD (assessment location at OSGB East 522570.7123, North 122015.784): Daytime limit of 35 dB(A), night-time limit of 35 dB(A); and</li> <li>- Oakendene Manor, Bolney Road, RH13 8AZ (assessment location at OSGB East 522771.0714, North 122524.3422): Daytime limit of 39 dB(A), night-time limit of 35 dB(A).</li> </ul>		significant effects from the substation as built.	



- 21.7.6 Further detail on the embedded environmental measures in **Table 21-20** is provided in the **Commitments Register** (Document Reference: 7.22) which sets out how and where particular environmental measures will be implemented and secured.

## 21.8 Methodology for ES assessment

### Introduction

- 21.8.1 The project-wide generic approach to assessment is set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5). The assessment methodology for noise and vibration for the ES is consistent with that provided in the Scoping Report (RED, 2020) and no changes have been made since the scoping phase and PEIR (RED, 2021) provided alongside Statutory Consultation.
- 21.8.2 The noise and vibration assessment compares either current noise levels or acceptable threshold values at identified receptors with those noise levels that are predicted should Rampion 2 proceed. The results of this comparison are then assessed against a suite of criteria depending on the noise source. In addition, absolute levels of noise from the Proposed Development are assessed in relation to adverse effect levels as described within the NPSE (Defra, 2010).

### Assessment of effects

#### Construction phase

- 21.8.3 Noise has been predicted utilising SoundPLAN computer noise modelling software (version 8.2) incorporating BS 5228-1 (BSI, 2014a) calculation methodology based on anticipated construction plant and methodologies. A full listing of the plant assumptions is included within **Appendix 21.2 Construction plant list, Volume 4** of the ES (Document Reference: 6.4.21.2).
- 21.8.4 At this stage prior to detailed construction design, predictions have been based on area wide noise sources encompassing all plant locations to be used within the boundaries of each site, rather than specific locations for individual plant items. To account for a worst-case scenario the total sound power level from a site has been calculated from all plant working at the same time (but with level factored for on-times). The predicted noise at receptor locations have been based on this total sound coming from the closest point within the boundary to each receptor. Where the boundary of sites is close to receptors (<50 m), this approach gives an unrealistically high predicted noise level, which is identified within the text where this would lead to significant effects when in reality this would not occur. Where it is required to give a moderated picture of the noise from site work, an averaged approach to the construction noise has been included, taking the total sound power level across the area source representing the works boundary. This latter approach gives an estimation of how the site noise could be experienced over a longer period of time. The exception to this approach is the onshore cable route trenching, which would result in a sufficiently temporary noise disturbance that it would not result in exceedances of the temporal criteria outlined in **Table 21-23**.

- 21.8.5 The noise from offshore piling at onshore receptors has been predicted using Danish Statutory Order no. 1284 (2011), which is currently the most reliable prediction methodology for noise over water. Calculations have been based on two piles a day at the closest boundary of the wind farm area to the shoreline.
- 21.8.6 Construction traffic noise predictions have been undertaken using a spreadsheet incorporating CRTN (Department of Transport Welsh Office, 1988). This has been undertaken for a 'with' and 'without' (for the time of construction) construction traffic scenario which are then compared to provide the change in traffic noise as a result of the works. The difference between the 'with' and 'without' scenarios has been assessed using short-term criteria within the DMRB (Standards for Highways, 2020) updated noise assessment section (Volume 11, Section 3, Part 7, LA111). As it is only the difference in traffic noise that is being assessed it is possible to calculate the Basic Noise Level (as per CRTN method) at 10 m for each scenario and use this to represent changes at all receptor locations for a particular road link.
- 21.8.7 The estimation of traffic is based on access traffic flows of HGV and LGV. The following assumptions were applied to the access traffic flow data:
- Light construction routes were not included as the traffic flows of LGV in a day were very low;
  - A-roads with flows above 20,000 a day were not included in the assessment, as it would not be possible for the worst case flows to have a significant effect on the noise from these heavily trafficked roads;
  - The maximum weekly usage at each access occurs simultaneously for sections of the route (e.g. the traffic on Wineham Lane would not occur at the same time as that on Ferry Road, but traffic on Ferry Road and Lyminster Road would be at the same time);
  - The weekly traffic was divided by the 5 days Monday to Friday (conservatively removing Saturday from this averaging process); and
  - Routes were chosen based on traffic taking the path of least resistance going from smaller to larger roads to get to the main A-roads, but with consideration that this may not be the shortest route. For example whilst only traffic for access A-01 will be using Ferry Road, Ford Road traffic flows are based on A-01 (Ferry Road), A-05 (Church Lane) and A-09 (A259) accesses. Although it's unlikely A-09 will go this route, but instead on Lyminster Road (A284), the assumption that it might covers the possibility of Ford Road being used as a diversionary route in case Lyminster Road is experiencing heavy traffic.
- 21.8.8 The traffic flows used within the assessment are presented in **Table 21-21**. The traffic flows present a higher than maximum worst-case as the assessment assumes traffic using accesses are routed in each direction (when they would be spread over multiple roads) and traffic from accesses occurs at the same time (when there would either be a time separation between access use or the worst case flows would not happen at the same time). In reality, traffic flows on road links would be substantially lower than shown below. The purpose of the traffic noise assessment is to act as an assessment envelope to show whether there

would be any chance of a significant impact if any of the varied more realistic flow options were adopted.

**Table 21-21 Traffic Data Used Within The Noise Assessment**

Road Link	Accesses included in Link	Total Development Flow (18 hour AAWT)	HGV %
Ferry Road	A01	51	63
Church Lane	A01, A05, A09	420	32
Ford Road	A01, A05, A09	420	32
A259 West of Wick	A01, A05, A09, A12, A15, A16	594	42
A284 North of Wick	A01, A05, A09, A12, A15, A16	594	42
A284 Lyminster	A01, A05, A09, A12, A15, A16	594	42
A280 Long Furlong	A01, A05, A09, A12, A15, A16, A21, A22, A26	723	47
A283 East of A24	A26, A33, A35, A39, A40, A41, A42, A43	696	38
B2135, South of Ashurst	A39, A40, A41, A42, A43, A47, A48, A50, A51, A52, A56, A57	847	45
B2116 Partridge Green Road	A39, A40, A41, A42, A43, A47, A48, A50, A51, A52, A56, A57	847	45
A281, South Shermanbury	A52, A56, A57	159	73
A281, South of Cowfold	A39, A40, A41, A42, A43, A47, A48, A50, A51, A52, A56, A57	847	45
A272, Station Road, Cowfold	A01, A05, A09, A12, A15, A16, A21, A22, A26, A33, A35	810	50

Road Link	Accesses included in Link	Total Development Flow (18 hour AAWT)	HGV %
<b>Wineham Lane, South of A272</b>	A64, A68	100	52
<b>A272, West of A23</b>	A01, A05, A09, A12, A15, A16, A21, A22, A26, A33, A35, A61, A62, A63, A64, A67, A68	1390	48
<b>B2188, Sayers Common</b>	A52, A56, A57, A61, A62, A63, A64, A67, A68	739	52
<b>B2116, Henfield Road, Albourne</b>	A52, A56, A57, A61, A62, A63, A64, A67, A68	739	52

- 21.8.9 Construction traffic on access routes have been assessed using the haul route calculation method within BS 5228-1 (BSI, 2014a) and assessed using criteria within that document. The difference from traffic on established roads is that haul roads cannot be compared to existing traffic levels (i.e. either the haul roads do not exist in the baseline scenario or the traffic is such a low flow that this cannot be predicted within CRTN).
- 21.8.10 Due to the uncertainties regarding ground conditions and final plant equipment during the construction phase, the assessment of vibration from likely sources, has been undertaken qualitatively, but with consideration of empirical levels provided within BS 5228-2:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites Part 2 Vibration* (BSI, 2014b). BS 5228-2 also provides the criteria which has informed the identification of magnitude of impact.
- 21.8.11 Traffic induced vibration effects can be caused in two main ways: airborne vibration via the excitation of resonant frequencies in the shell of the building from the low frequency sound from large vehicles; and groundborne vibration from the tyre / road interface which is pronounced due to irregularities in the road surface.
- 21.8.12 Airborne vibration is sometimes detectable in buildings fronting high trafficked roads. On such roads that exist within the project area (for instance A-roads), the contribution of the project HGV to any existing vibration airborne vibration issues is likely to be negligible. In addition, the nuisance caused by vibration will be lower than that caused by noise and therefore any vibration effects would be screened by the effect of noise (Watts, 1990). Should the noise assessment identify significant effects, the potential for there also to be vibration effects from the airborne pathway would be considered in more detail. If there are no significant noise effects it will be assumed that there would be no significant airborne vibration effects.

- 21.8.13 Groundborne vibration effects experienced in buildings are likely to be negligible at locations where the road surface is free of irregularities, such as cracks, bumps and potholes. It is however not possible to predict in what state a road will be by the time of the construction. There are also a number of other unknown factors that would contribute to vibration effects, such as ground conditions, character and dimensions of irregularity and type of HGV. Any assessment therefore can only provide an indication of possible effects based on a number of reasonable assumptions and highlight receptors which would be at risk of high levels of ground borne vibration. Consequently, a review of all construction traffic road links has been undertaken and those links identified where there is the potential for significant effects. Predictions have then been made using formula within 'Research Report 246: Traffic Induced Vibrations In Buildings' (Watts, 1990) to identify properties which could experience significant effects if there are irregularities in the road.

#### Onshore operation and maintenance phase assessment

- 21.8.14 An assessment of operational noise generated by the onshore substation has been undertaken using prediction methodology within ISO 9613-2 (ISO, 1996) and assessed in accordance with BS 4142 (BSI, 2019).
- 21.8.15 To predict the operational noise from the onshore substation, SoundPLAN 3D noise modelling software was utilised. The noise model incorporated proposed buildings and fixed plant, residential dwellings and other buildings in the Study Area, and topographical data.
- 21.8.16 A tonal penalty from the onshore substation low frequency 'hum' has been applied to form a rating correction. No other corrections have been applied (i.e. impulsivity, intermittency or other sound characteristics).
- 21.8.17 In accordance with the Sussex Noise Guidance for developers (WSCC et al., 2021), the rating level of an industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound level, when measured in accordance with BS 4142 (BSI, 2019). However, it is also necessary to consider the context; of relevance to this assessment are the absolute sound levels. Regarding absolute sound levels, BS 4142 (BSI, 2019) states that
- “Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”*
- 21.8.18 BS 4142 (BSI, 2019) offers no guidance about what background and rating levels are considered low; however, the 1997 version of the standard stated that background sound levels below around 30 dB  $L_{A90}$ , and rating levels below around 35 dB  $L_{Ar,Tr}$ , were considered very low and therefore outside the scope of the assessment method. The Association of Noise Consultants (ANC) produced guidance on the application of BS 4142 (ANC, 2020) which states that *“similar values [i.e. background sound levels below around 30dB  $L_{A90}$ , and rating levels below around 35dB  $L_{Ar,Tr}$ ] would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate.”*
- 21.8.19 The World Health Organisation (WHO) Night Noise Guidance for Europe (NNG) (2009) found that below the level of 30dB  $L_{night,outside}$  there are no observed effects

on sleep. Furthermore, there is no evidence that biological effects observed at levels below 40dB  $L_{night, outside}$  are harmful to health. At levels above 55dB  $L_{night, outside}$ , the NNG detailed that adverse health effects occur frequently and there is limited evidence that the cardiovascular system is coming under stress.

Table 7-14 of the IEMA 2014 guidance (2014) refers to impacts from change in sound levels (sourcing HS2 Phase 1 ES as its origin). This table introduces the concept of long-term impact classification and short-term impact classification, with a daytime and night-time thresholds.

- 21.8.20 Low frequency noise is specifically not considered as part of BS 4142 (BSI, 2019) and the standard refers to a report by Moorhouse et al. (2011), which concludes with a reference curve for assessing low frequency noise down to 10 Hz. The ANC technical guidance on BS 4142 (ANC, 2020) clarifies that lower frequencies are not precluded from being part of a BS 4142 (BSI, 2019) assessment. It is considered that applying a rating correction for low frequency noise may not appropriately protect residential amenity and may unnecessarily affect mitigation design.
- 21.8.21 As requested by MSDC, an indicative noise break-in assessment has been undertaken to provide reassurance that low frequency would not be an issue from the onshore Oakendene substation. This is not standard assessment protocol and would not normally be undertaken for a substation assessment, but provides an indication of the likely low frequency acoustic energy likely to be experienced in noise sensitive rooms within the nearest noise sensitive receptors. The assessment utilises the Noise Rating (NR) curves as described within BS8233 (BSI, 2014c). NR curves are an international standard for indicating acceptable sound levels within a space. NR curves were initially developed to provide internal noise design criteria for building services noise where low-frequency components and high-level narrow-band components are considered within a singular value. Each NR curve depicts the acceptable dB level across a range of frequencies between the octave bands 31.5 Hz and 8 kHz, where the 'loudest' narrow-band component determines the overall rating.

#### Offshore wind farm operational noise assessment

- 21.8.22 Screening predictions<sup>5</sup> using SoundPLAN computer noise modelling software (version 8.2) have been undertaken to assess whether the proposed offshore wind farm would result in noise levels at residences of above  $L_{A90, 10 mins}$  35dB in conjunction with other wind farms (specifically Rampion 1) at a wind speed of 10m/s. This is the threshold within ETSU-R-97 (The Working Group on Noise from Wind Turbines, 1996) at which exceedances would necessitate detailed assessment, incorporating baseline surveys. The model was based on a worst case version of an early design for the wind farm; the numbers of turbines since reduced. The results of the assessment have shown that there are no residential receptors predicted to experience noise above 35dB and therefore a detailed noise assessment incorporating noise monitoring is not required. The full technical report associated with this screening exercise is presented in [Appendix 21.3](#):

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<sup>5</sup> Standard practice as per ETSU-R-97: The Assessment and Rating of Noise from Wind Farms (1996)

## Preliminary operational noise predictions, Volume 4 of the ES (Document Reference: 6.4.21.3).

### Decommissioning assessment

- 21.8.23 The decommissioning assessment has been informed by the onshore substation construction assessment as it will largely be similar to the noise and vibration from the construction but in reverse. It is not possible to predict what the future baseline will be, but the same threshold values are assumed for assessment purposes. The only difference that is considered notable, and therefore included in the assessment, is the potential use of pneumatic hammering for breaking concrete at the onshore substation to break the concrete foundations (though concrete is likely to be left in *situ*).

## Significance evaluation methodology

### Overview

- 21.8.24 Based on the method presented in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) the criteria for defining sensitivity and magnitude can be found in **Table 21-22** and **Table 21-23**. These criteria are defined and applied based on professional judgement, using recognised approaches to classification relevant to the receptor types, including BS 5228-1 (British Standard Institute, 2014a), BS 5228-2 (British Standard Institute, 2014b), BS 4142 (British Standard Institute, 2019) and DMRB (Standards for Highways, 2020), all of which represent good practice for noise and vibration within EIA.

### Sensitivity of receptor

- 21.8.25 Definitions of receptor sensitivity used in the assessment are provided in **Table 21-22**, with examples of receptors that would be assigned to each class.

**Table 21-22 Sensitivity of receptor / resource**

Sensitivity	Description	Examples
High	Where receptors will be particularly susceptible to noise or vibration disturbance.	<ul style="list-style-type: none"> <li>Designated areas of local or national importance which would be noise or vibration sensitive.</li> <li>Theatres/auditoria/studios.</li> <li>Schools during the daytime.</li> <li>Hospitals/residential care homes.</li> <li>Places of worship.</li> <li>South Downs National Park.</li> </ul>

Sensitivity	Description	Examples
<b>Medium</b>	Receptors moderately sensitive to noise or vibration, where it may cause some distraction or disturbance.	<ul style="list-style-type: none"> <li>Residences, including private gardens where appropriate.</li> <li>Offices.</li> <li>Outdoor leisure areas (not including designated quiet areas or those of regional or national importance which would be noise or vibration sensitive).</li> <li>Animal husbandry.</li> </ul>
<b>Low</b>	Receptors where distraction or disturbance from noise or vibration is minimal.	<ul style="list-style-type: none"> <li>Buildings not occupied during working hours.</li> <li>Factories and working environments with existing high noise levels.</li> <li>Sports grounds when spectator noise is a normal part of the event.</li> <li>Retail, entertainment venues and eateries.</li> </ul>

### Magnitude of change

- 21.8.26 **Table 21-23** provides how various magnitudes of change are determined with respect to noise and vibration for this assessment. **Table 21-23** focuses on negative changes, but positive changes may also occur and will be considered on a case-by-case basis as required.
- 21.8.27 Vibration from traffic is considered qualitatively rather than by numeric criteria and therefore does not have a delineated magnitude of change. In this case, the potential for impacts is based on professional judgement pertaining to proximity of receptors to construction traffic routes, likely pathway of vibration to the receptor and likely condition of road.
- 21.8.28 For non-residential receptors, the same magnitude of change will apply for temporary effects from construction noise, construction vibration and construction traffic as for residential. These are outlined in **Table 21-23**.



**Table 21-23 Magnitude of change**

<b>Magnitude</b>	<b>Site Construction and Access Noise</b>	<b>Site Construction and Traffic Vibration</b>	<b>Construction Traffic Noise</b>	<b>Operational Noise: Residential<sup>+</sup></b>	<b>Operational Noise: Non-Residential</b>
<b>High</b>	Exceeds BS 5228-1 threshold values* for one month or more by 10dB, or Trigger levels** by more than 9 days in a 15 day period by 10 dB.	$x \geq 10$ mm/s Peak Particle Velocity (PPV)	Increase in traffic noise***, $x \geq 5$ dB $L_{A10, 18h}$	Plant noise rating level ( $L_{Ar,T}$ ) difference with background ( $L_{A90,T}$ ), $x \geq 10$ dB;	Change in noise level ( $L_{Aeq, T}$ ) $x \geq 5$ dB
<b>Medium</b>	Exceeds BS 5228-1 threshold values for one month or more by 1 to 9 dB. or Trigger levels by more than 9 days in a 15 day period by 1 to 9 dB.	$0.3 \leq x < 10$ mm/s PPV	$3 \leq x < 5$ dB $L_{A10, 18h}$	$5 \leq x < 10$ dB	$3 \leq x < 5$ dB
<b>Low</b>	Exceeds BS 5228-1 threshold values or trigger levels but less than temporal criteria of significance.	$0.14 \leq x < 0.3$ mm/s PPV	$1 \leq x < 3$ dB $L_{A10, 18h}$	$0 \leq x < 5$ dB	$1 \leq x < 3$ dB
<b>Very Low</b>	Is within < 10 dB below BS 5228-1 threshold values or trigger levels.	$0.1 \leq x < 0.14$ mm/s PPV	$0 \leq x < 1$ dB $L_{A10, 18h}$	$-10 \leq x < 0$ dB	$0 \leq x < 1$ dB

+The BS 4142 assessment can be modified taking into account the context of noise levels, particularly the absolute noise level in relation to WHO NNG (2009) with  $L_{\text{night}}$  values of 40 dB being the considered low and 30 dB considered very low, irrespective of change in noise in comparison with background sound levels.

\*65 dB day, 07:00 – 23:00 Monday to Friday, 07:00 – 13:00 Saturday. 45 dB night-time 23:00-07:00. Assumes evening work would also necessitate night-time work, which would be the constraining time period.

\*\*75 dB daytime, 55 dB night-time.

\*\*\* Change in  $L_{A10, 18h}$ , construction traffic noise + baseline traffic noise minus baseline traffic noise in isolation.

## Significance of effect

- 21.8.29 The overall significance of effect rating is based on the evaluation of significance matrix presented in **Graphic 5.3** in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5), as presented in **Table 21-24**, however there are a few minor changes from **Graphic 5.3** in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) notably only having three sensitivities of receptors rather than four.

**Table 21-24 Significance of effect matrix for noise and vibration**

Level of significance to sensitivity of receptor / resource	Magnitude of change			
	High	Medium	Low	Very Low
High	Major (Significant)	Moderate / Major (Significant)	Minor / Moderate (Potentially Significant)	Minor (Not Significant)
Medium	Moderate / Major (Significant)	Minor / Moderate (Potentially Significant)	Minor (Not Significant)	Negligible / Minor (Not Significant)
Low	Minor / Moderate (Potentially Significant)	Minor (Not Significant)	Negligible / Minor (Not Significant)	Negligible (Not Significant)

- 21.8.30 The significance of effect matrix allows for the application of professional judgement in qualifying the effect with the rationale discussed. This will normally only be amendments of effect into adjacent descriptors (for example major to moderate) as shown in **Table 21-24**, but where necessary this could be a larger adjustment. Qualifying factors include timescales and absolute noise levels. Context is important in both the residential, as incorporated into BS4142 (BSI, 2019), and non-residential assessment of operational noise.
- 21.8.31 For residential receptors, context mainly applies to the existing levels and type of industrial noise. Residents near an industrial area are likely to be less sensitive to onshore substation noise during the operation and maintenance phase, which may also be masked by other existing industrial noise. Conversely, if an existing substation is the only source of industrial noise in an otherwise quiet rural area, residents could be more sensitive to any increase in onshore substation noise.
- 21.8.32 In addition, as discussed in **Section 21.8**, contextual consideration is also given to the absolute noise level from the onshore Oakendene substation. If the background sound level is low, such as 30 dB at night, a Rating Level of 35 dB would only be considered a minor effect as this level of noise would not be disturbing to sleep.

- 21.8.33 For non-residential receptors, the operational noise effect of changes is qualified as potentially significant if noise levels from the Proposed Development are above a threshold value. These threshold values, which are presented in **Table 21-25**, are based on WHO (1999) recommended limits for different premises.

**Table 21-25 Significance screening criteria for non-residential receptors**

Setting	Noise level (outdoors, free field)	
	Day (07:00-23:00), L <sub>Aeq</sub> , 16hr	Night (23:00-07:00), L <sub>Aeq</sub> , 8hr
Places of meeting for religious worship	50 dB	N/A
Hospitals and hotels	50 dB	40 dB
Schools, colleges and libraries	50 dB	N/A
Offices	55 dB	N/A
External amenity spaces	55 dB	N/A

#### Assessment of adverse effect levels on health

- 21.8.34 Separate from the assessment of significance based on sensitivity and magnitude of change, an assessment of significance has been undertaken in relation to the NPSE (Defra, 2010) and the impacts on health. This considers a set of absolute noise levels at which the following descriptions will apply:
- **NOEL – No Observed Effect Level.** This is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise.
  - **LOAEL – Lowest Observed Adverse Effect Level.** This is the level above which adverse effects on health and quality of life can be detected.
  - **SOAEL – Significant Observed Adverse Effect Level.** This is the level above which significant adverse effects on health and quality of life occur.
- 21.8.35 The aims of the NPSE (Defra, 2010) are to avoid significant adverse impacts on health and quality of life from noise and to mitigate and minimise adverse impacts. As such, where the Proposed Development would result in notable increases in absolute noise level above the LOAEL (considered to be +3 dB), reasonable steps should be taken to mitigate and minimise the adverse effects of noise. Where the Proposed Development would result in notable increases in absolute noise levels above SOAEL (considered to be +1 dB), mitigation should be applied to avoid this increase, whilst taking into account the guiding principles of sustainable development.

- 21.8.36 The absolute noise levels to identify the LOAEL and SOAEL for the various noise sources within the Proposed Development have been taken from recent Nationally Significant Infrastructure Projects (NSIPs) successfully taken through the infrastructure planning process.
- 21.8.37 **Table 21-26** summarises the key noise exposure levels (LOAEL and SOAEL) at the different phases of the Proposed Development and according to the nature of source in the assessment for residential receptors.
- 21.8.38 Thresholds presented in Appendix E of BS 5228-1 (BSI, 2014a) have been used to derive the SOAEL and LOAEL for noise exposure during the construction phase. The evening (weekday evening (19:00-23:00) and Saturday (13:00-23:00) and Sunday (07:00-23:00)) threshold within BS 5228-1 is not considered within this assessment, as it is assumed that any evening works (or terms associated with the evening BS 5228-1 criteria) would be less likely to see higher magnitude of change than the night-time works, which would occur in conjunction with the evening and as part of out-of-hours working. It should be noted that the toxicological effects of noise relate to long-term exposure. Therefore, it would not be appropriate to assess the very temporary noise impacts via the LOAEL and SOAEL thresholds (for example temporary construction compound construction, onshore cable trenching and HDD sites).
- 21.8.39 The SOAEL and LOAEL for vibration from the construction phase activities are based upon criteria within BS 5228-2 (BSI, 2014b).
- 21.8.40 The daytime SOAEL for construction road traffic noise is based on the threshold level (converted from a façade level of  $L_{A10, 18hr}$ ) at which the *Noise Insulation Regulations 1975* (as amended) requires provision of sound insulation. The World Health Organisation's (WHO) (2009) *Night Noise Guidelines For Europe* has been used to derive the SOAEL level for night-time, based on Europe Interim Target of 55 dB  $L_{Aeq, 8hr}$  (measured outdoors) on the basis that residential receptors exposed to noise levels above this are subject to a significant effect. The LOAEL for daytime is based on the onset of the lowest observed community noise effects during the day (annoyance) following from the WHO *Guidelines for Community Noise* (WHO, 1999). The night-time LOAEL for road traffic noise is based on the WHO night-time guidance (WHO, 2009), which indicates road traffic noise could be identified as associated with adverse effects on sleep when levels exceed 45 dB  $L_{Aeq, 8hr}$ .
- 21.8.41 As vibration from construction road traffic is considered qualitatively, a SOAEL and LOAEL have not been applied. Whether there is the potential for impacts is based on professional judgement pertaining to proximity of receptors to construction road traffic routes, likely pathway of vibration to the receptor and likely condition of road.
- 21.8.42 For operational noise sources, the LOAEL and SOAEL have been set with reference to BS 4142 (BSI, 2009), but also using the WHO NNG for night-time.

**Table 21-26 LOAEL and SOAEL criteria for different noise sources**

Noise Source	Assessment Period, Metric	LOAEL and SOAEL Criteria (outside for noise and inside for vibration)
		Period Noise or Vibration Level (location)
<b>Construction phase noise (fixed and mobile plant)</b>	Weekday Daytime (07:00-19:00) L <sub>Aeq</sub> , 12hr	LOAEL 65dB SOAEL 75dB (1m from building façade)
	Saturday morning (07:00-13:00) L <sub>Aeq</sub> , 8hr	
	Weekday evening (19:00-23:00) L <sub>Aeq</sub> , 1hr	LOAEL 55dB SOAEL 65dB (1m from building façade)
	Saturday (13:00-23:00) L <sub>Aeq</sub> , 1hr Sunday (07:00-23:00) L <sub>Aeq</sub> , 1hr	
	Night-time (23:00-07:00) L <sub>Aeq</sub> , 1hr	LOAEL 45dB SOAEL 55dB (1m from building façade)
<b>Construction phase vibration (fixed and mobile plant)</b>	All time periods	LOAEL 0.3 millimetres per second (mm/s) SOAEL 10mm/s
<b>Construction phases road traffic noise</b>	Daytime (07:00-23:00) L <sub>Aeq</sub> , 16hr	LOAEL 50dB SOAEL 63dB (free field)
	Night-time (23:00-07:00) L <sub>Aeq</sub> , 8hr	LOAEL 45dB SOAEL 55dB (free field)
<b>Operation and maintenance phase noise emissions (residential)</b>	<b>Excess of rating level over background sound level</b>	LOAEL +0 dB SOAEL +10 dB (free field)
	Daytime (07:00 – 23:00)	
	<b>WHO NNG Threshold (WHO, 2009)</b>	NOEL 30dB L <sub>night,outside</sub> LOAEL 40dB L <sub>night,outside</sub> SOAEL 55dB L <sub>night,outside</sub> (1m from building façade)
	Night-time (23:00-07:00)	

## 21.9 Assessment: Construction phase

### Introduction

- 21.9.1 This section outlines the assessment of significance for temporary noise and vibration effects from the construction of the onshore elements of the Proposed Development.
- 21.9.2 The assessment methodology set out in **Section 21.8** has been applied to predict indicative noise and vibration levels arising from the Proposed Development. The results (average rather than the maximum levels) of the construction noise assessments (except cable trenching and traffic) are illustrated **Figure 21.4, Volume 3** of the ES (Document Reference: 6.3.21).

### Construction noise

#### Overview

- 21.9.3 Separate assessments of temporary noise effects have been undertaken for the different elements of the construction phase, which include:
- temporary noise effects from the construction, deconstruction and operation of the temporary construction compounds (this assessment assumes that the construction of each will be up to 8 weeks, and the deconstruction will be up to 8 weeks. Each temporary construction compound will be in use for up to 3.5 years);
  - temporary noise effects from the construction works at the landfall and trenchless crossings at specific sections of the onshore cable route (drilling durations varied between 2 to 7 weeks for trenchless crossings and 18 weeks for landfall);
  - temporary noise effects from onshore substation construction (up to 3.5 years) at Oakendene;
  - temporary noise effects from the existing National Grid Bolney substation extension works (up to 3 years);
  - temporary noise effects from onshore cable installation, with the trenching quickly passing receptors (likely to be inaudible after an estimated duration of approximately 10 days);
  - temporary noise effects from the construction and use of temporary and permanent accesses (this assessment assumes this is likely to be for a duration of under a month for construction of each access with the temporary accesses used ranging from a month to almost a year);
  - temporary noise effects from construction road traffic noise (duration of roads used will be determined by the local requirements for access as the works progress);
  - temporary noise effects from the construction of the existing National Grid Bolney substation extension; and

- temporary noise effects from offshore piling noise.

- 21.9.4 The above effects have been assessed separately and also in combination with each other where there would be receptors affected over a period of time by multiple elements of the construction.
- 21.9.5 Noise levels at the sensitive receptors have been calculated according to the method presented within the BS 5228-1 (BSI, 2014a). Noise propagation is affected by several factors, including the distance between the source and receiver, influence from screening and the duration of the activity.

## Temporary noise effects from the construction, operation, and deconstruction of the temporary construction compounds

### Overview

- 21.9.6 In support of the onshore construction activities, five temporary construction compounds will be set-up for welfare and logistics purposes. The construction, operation and deconstruction of the temporary construction compounds will result in temporary noise effects (the Bolney extension compound is already in existence therefore no construction assessment of this has been undertaken). The noise from the construction and deconstruction are assumed to be the same for the purposes of noise prediction.
- 21.9.7 There are five temporary construction compound locations being considered as shown on **Figure 22.2a-m, Volume 3** of the ES (Document Reference: 6.3.22). As the assessment considers the duration of potential noise effects from the temporary construction compounds, reference has been made to **Table 4.20 of Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4), which specifies the duration of the temporary construction compounds construction and operation. The construction of the temporary construction compounds is anticipated to last up to 8 weeks, with the compounds in use up to a maximum of 3.5 years and then the deconstruction lasting approximately 8 weeks.
- 21.9.8 As per the embedded environmental measures outlined in **Table 21-17** (commitment C-26), screening will be applied where practicable and/or necessary to block line of sight between noise sensitive receptors and the main noise emitters on the compound construction where this is necessary for avoiding significant noise effects. At this stage, based on noise predictions, it is assumed that screening will be required and will be in the form of three metre hoarding at the boundary of the compounds.
- 21.9.9 As per **Table 21-19**, it is assumed that these operations will commence during daytime working hours only (Monday to Friday (07:00 to 19:00 hours) and Saturday (08:00 to 13:00 hours). The predicted noise levels have been calculated at a selection of key receptors (some receptors being representative of a number of receptors) within 300m of the potential construction compound boundary. The results are presented in **Table 21-28**.
- 21.9.10 The results show a comparison of levels against the BS 5228 (BSI, 2014a) threshold values, exceedance of which would be a medium to high impact if this level of noise continued for a month or more. Predictions have been presented for



both the maximum and average noise levels from the temporary construction compounds, noting the caveat in **paragraph 21.8.4** about those receptors in close proximity to the temporary construction compound where the maximum predictions would be considered unrealistically high.

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**Table 21-27 Noise predictions at noise sensitive receptors within 300m of each of the five temporary construction compound locations – worst-case noise levels during works**

Receptors		Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound - operational		Construction / deconstruction of Compound	Compound - operational
<b><i>Climping Compound</i></b>						
Clymping C of E Primary school,	Brookpit Lane, Littlehampton BN17 5QU	47	48	65	-18	-17
Compound 1 - E	4, Climping Park, Bognor Road, BN17 5DW	52	53	65	-13	-12
Compound 1 - N	Field Place, Church Lane, BN17 5RR	63	64	65	-2	-1
Compound 1 - S	Barn End, Brookpit Lane, BN17 5QT	61	62	65	-4	-3
Compound 1 - W	5, Cropthorne Drive, BN17 5GG	48	49	65	-17	-16
Compound 1 – W (Village Hall)	Crookthorn Lane, BN17 5SN	66	67	65	1	2

Receptors		Noise Level ( $L_{Aeq,1h}$ dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level ( $L_{Aeq,1h}$ dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound - operational		Construction / deconstruction of Compound	Compound - operational
<b>Washington Compound</b>						
Compound 2 - E	Green Farmhouse, The Pike, RH20 4AA	48	51	65	-17	-14
Compound 2 - N (Caravan Park)	Washington Paddocks, London Road, RH20 4AJ	66	69	65	1	4
Compound 2 - NW	Washington Paddocks, London Road, Pulborough, RH20 4AJ	55	58	65	-10	-7
Compound 2 - S	Tilleys Cottage, The Pike, RH20 4AA	51	54	65	-15	-12
Compound 2 - SW	3 Settatrees, London Road, RH20 4AL	53	56	65	-12	-9
<b>Oakendene West Compound</b>						
Compound 3 - NW	Allfrey House, Bolney Road, Horsham, RH13 8AZ	54	55	65	-11	-10

Receptors		Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound - operational		Construction / deconstruction of Compound	Compound - operational
Compound 3 - NE	1 Oakendene Farm Cottages, Bolney Road, Horsham, RH13 8AZ	88	89	65	23	24
Compound 3 - S	Bankfield Grange, Kings Lane, Horsham, RH13 8BD	57	58	65	-8	-7
Compound 3 - N	Coopers Cottage, Bolney Road, Horsham, RH13 8AZ	81	82	65	16	17
<b>Oakendene Substation Compound</b>						
Compound 4 - E	Southlands, Kent Street, RH13 8BA	67	68	65	2	3
Compound 4 - N	Barnfield Lodge, Picts Lane, RH13 8AT	44	45	65	-21	-20
Compound 4 - NW	Applecross, Bolney Road, RH13 8AZ	49	50	65	-16	-15
Compound 4 - W	Oakendene Manor, Bolney Road, RH13 8AZ	57	58	65	-13	-12

Receptors		Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound - operational		Construction / deconstruction of Compound	Compound - operational
<b>Bolney Substation Compound</b>						
Bolney Extension - W	Old Doctors Cottage, Wineham Lane, Twineham, BN5 9AZ	-	60	65	-	-5

**Table 21-28 Noise predictions at noise sensitive receptors within 300m of each of the five temporary construction compound locations – average noise across works**

Receptors		Average Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound operational		Construction / deconstruction of Compound	Compound operational
<b><i>Climping Compound</i></b>						
Clymping C of E Primary school,	Clymping C of E Primary school, Brookpit Lane, Littlehampton BN17 5QU	43	44	65	-22	-21

Receptors		Average Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound operational		Construction / deconstruction of Compound	Compound operational
Compound 1 - E	4, Climping Park, Bognor Road, BN17 5DW	47	48	65	-18	-17
Compound 1 - N	Field Place, Church Lane, BN17 5RR	51	52	65	-14	-13
Compound 1 - S	Barn End, Brookpit Lane, BN17 5QT	50	51	65	-15	-14
Compound 1 - W	5, Cropthorne Drive, BN17 5GG	41	42	65	-24	-23
Compound 1 – W (Village Hall)	Crookthorn Lane, BN17 5SN	55	56	65	-10	-9
<b>Washington Compound</b>						
Compound 2 - E	Green Farmhouse, The Pike, RH20 4AA	42	45	65	-23	-20
Compound 2 – N (Caravan Park)	Washington Paddocks, London Road, RH20 4AJ	54	57	65	-11	-8
Compound 2 - NW	Washington Paddocks, London Road, Pulborough, RH20 4AJ	52	55	65	-13	-10

Receptors		Average Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound operational		Construction / deconstruction of Compound	Compound operational
Compound 2 - S	Tilleys Cottage, The Pike, RH20 4AA	47	50	65	-18	-15
Compound 2 - SW	3 Settatrees, London Road, RH20 4AL	49	52	65	-16	-13
<b><i>Oakendene West Compound</i></b>						
Compound 3 - NW	Allfrey House, Bolney Road, Horsham, RH13 8AZ	48	49	65	-17	-16
Compound 3 - NE	1 Oakendene Farm Cottages, Bolney Road, Horsham, RH13 8AZ	62	63	65	-3	-2
Compound 3 - S	Bankfield Grange, Kings Lane, Horsham, RH13 8BD	49	50	65	-16	-15
Compound 3 - N	Coopers Cottage, Bolney Road, Horsham, RH13 8AZ	62	63	65	-3	-2
<b><i>Oakendene Substation Compound</i></b>						
Compound 4 - E	Southlands, Kent Street, RH13 8BA	57	58	65	-8	-7



Receptors		Average Noise Level (L <sub>Aeq,1h</sub> dB)		BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	
ID	Address	Construction / deconstruction of Compound	Compound operational		Construction / deconstruction of Compound	Compound operational
Compound 4 - N	Barnfield Lodge, Picts Lane, RH13 8AT	40	41	65	-25	-24
Compound 4 - NW	Applecross, Bolney Road, RH13 8AZ	44	45	65	-21	-20
Compound 4 - W	Oakendene Manor, Bolney Road, RH13 8AZ	52	53	65	-13	-12
<b>Existing National Grid Bolney Substation Compound</b>						
Bolney Extension - W	Old Doctors Cottage, Wineham Lane, Twineham, BN5 9AZ	-	56	65	-	-9

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### *Magnitude of change*

- 21.9.11 The results for the worst-case level shows exceedances of the BS 5228 threshold value of 65 dB would occur at 5 of the identified receptors (Crookthorn Lane, Washington Paddocks Caravan Park, Southlands, 1 Oakendene Farm and Coopers Cottage), with levels in excess of 20 dB over those levels at two locations. It is unlikely the noise from the works, either construction or operation of the temporary construction compound would be at such levels for more than one month. The results for the average noise level from the temporary construction compound construction and operation show that noise levels would not exceed the BS 5228 threshold value for daytime at any location. Therefore, for three of the identified receptors with worst-case levels above threshold values, this means that the magnitude of change would likely be **Low** (the predicted noise levels are below noise insulation trigger levels). However, given that the average noise from the site at 1 Oakendene Farm and Coopers Cottage is close to exceeding the 65 dB threshold value, it is considered that this noise impact is reflective of a **Medium** magnitude of change (the predicted high magnitude of impact is very unlikely to occur as only one plant item would be anticipated to work so closely to the receptor at any one time with noise levels likely to be in the region of 75 dB rather than >80dB (A). All other receptors would experience a **Very Low** magnitude of change.
- 21.9.12 There are no temporary construction compounds within the SDNP, although the Washington temporary construction compound is adjacent to the SDNP boundary. At this location next to the A283, the tranquillity of the SDNP is relatively low (SDNPA, 2017). Levels of noise from the activities during the construction are likely to be 70 dB at the highest during construction (but substantially lower for most of the works) of the temporary construction compound and 65 dB during operation of the compound. It is considered these levels would be a **low impact** on the nearest part of the SDNP.

### *Sensitivity of receptor*

- 21.9.13 With the exception of the SDNP and Clymping C of E School, of **High** sensitivity, identified receptors are residential and as such are of **Medium** sensitivity in line with **Table 21-22**.

### *Significance of effect*

- 21.9.14 The resulting significance of effect has been identified as negligible for the majority of receptors, with minor significance at Crookthorn Lane, Washington Paddocks Caravan Park and Southlands. Clymping C of E School would also be predicted to experience a minor effect on account of the higher sensitivity, even though the magnitude of impact would be very low. An effect of minor / moderate significance is predicted at 1 Oakendene Farm and Coopers Cottage. Whilst there will be an extended period of noise at the Oakendene temporary construction compound at the nearest residential receptors, the temporary construction compound area is sufficiently large to allow for a substantial reduction in noise at these properties via the CoCP commitment (C-33). Taking embedded measures into account it is considered that the effect would be of **Minor Adverse Significance**, and therefore **Not Significant** in terms of EIA.

- 21.9.15 The noise at the SDNP would be considered a **minor effect** due to the temporary nature of the disturbance and low tranquillity of the location and therefore **not significant in EIA terms**.
- 21.9.16 The daytime LOAEL of 65dB LAeq, 16hr is predicted to be exceeded at noise sensitive receptors. However, it is considered that the screening (commitment C-26) and best practice measures (detailed within commitment C-33) applied to works would be sufficient to accord with the requirements to minimise adverse impacts as per the Noise Policy Statement for England (Defra, 2010).

## Temporary noise effects from the landfall works and trenchless crossings

### Overview

- 21.9.17 The onshore temporary cable corridor will encounter areas where trenchless crossings will be required, tunnelling so that the onshore cable can pass under a road, river or other infrastructure as outlined in **Appendix 4.1: Crossing schedule, Volume 4**, of the ES (Document Reference: 6.4.4.1).
- 21.9.18 As per **Table 21-19**, trenchless crossing operations are unable to be temporarily halted and therefore, works will need to continue for 24 hours a day until completion. For this reason, the assessment has considered an assessment for both daytime and night-time periods.
- 21.9.19 **Table 21-29** and **Table 21-30** present the results of noise predictions from unmitigated trenchless crossing activities (from the limits of deviation associated with each trenchless crossing compound area) at the closest noise sensitive receptor to each trenchless crossing location, during the daytime and night-time respectively, as identified in **Appendix 4.1: Crossing schedule, Volume 4** of the ES (Document Reference: 6.4.4.1). It is assumed that the noise from the exit pit would not result in significant effect based on the limited equipment required there and shorter timescale. Due to the smaller size of the trenchless crossing compounds, an average noise level for the area source has not been used, and predictions are only based on a worst case boundary source noise level in the direction of each receptor.
- 21.9.20 As predictions have been undertaken for specific receptors the results show a comparison of levels against the BS 5228 (BSI, 2014a) threshold values, exceedance of which would be a medium to high impact.

**Table 21-29 Unmitigated Noise predictions at the closest noise sensitive receptors to the trenchless crossings – daytime**

<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Receptor Address</b>	<b>Drilling Duration, (Weeks)</b>	<b>Predicted noise level, (L<sub>Aeq,T</sub> dB)</b>	<b>BS 5228 threshold noise level relating to a medium Impact, (dB)</b>	<b>Noise Level difference with threshold, (L<sub>Aeq,T</sub> dB)</b>	<b>Magnitude of change</b>
<b>TC01</b>	HDD01-N	CROOKTHORN BYRE, BROOKPIT LANE, BN17 5QU	18.0	54	65	-11	Very Low
	HDD01-S	THE MILL, CLIMPING STREET, BN17 5RN	18.0	49	65	-16	Very Low
<b>TC01a</b>	HDD01A-S	THE MILL, CLIMPING STREET, BN17 5RN	18.0	56	65	-9	Very Low
<b>TC02</b>	HDD02-S	THE MILL, CLIMPING STREET, BN17 5RN	5.1	49	65	-16	Very Low
<b>TC03</b>	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	5.1	58	65	-7	Very Low
	HDD03-NE	6, BONIFACE AVENUE, BN17 7AD	5.1	52	65	-13	Very Low
	HDD03-S	FLAT 1, MARDEN HOUSE, HIGHFIELD, BN17 7EU	5.1	45	65	-20	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD03-S Industrial	UNIT 9, THORGATE ROAD, BN17 7LU	5.1	47	65	-18	Very Low
<b>TC03a</b>	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	5.1	48	65	-17	Very Low
	HDD03-S	FLAT 1, MARDEN HOUSE, HIGHFIELD, BN17 7EU	5.1	45	65	-20	Very Low
	HDD03-S Industrial	UNIT 9, THORGATE ROAD, BN17 7LU	5.1	48	65	-17	Very Low
<b>TC04</b>	HDD04-E (Farm buildind)	BROOK BARN HOUSE, COURTWICK LANE, BN17 7PE	2.3	49	65	-16	Very Low
	HDD04-S	32, BONIFACE AVENUE, BN17 7AD	2.3	56	65	-9	Very Low
<b>TC05</b>	HDD05-E	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	1.7	54	65	-11	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD05-N	KEYMERS, ORCHARD LANE, BN17 7GL	1.7	65	65	0	Low
	HDD05-S	PADDOCKS END, WOODCOTE LANE, BN17 7PT	1.7	53	65	-12	Very Low
	HDD05-SW	LYMINSTER ROAD, BN17 7QE	1.7	63	65	-2	Very Low
<b>TC06</b>	HDD06-N	THE OLD VICARAGE, LYMINSTER ROAD, BN17 7QF	2.3	60	65	-5	Very Low
	HDD06-W	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	2.3	56	65	-9	Very Low
	HDD06-S	12, NEAL CRESCENT, LITTLEHAMP, BN17 7TH	2.3	50	65	-15	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
TC06a	HDD06-N	THE OLD VICARAGE, LYMINSTER ROAD, BN17 7QF	1.7	54	65	-11	Very Low
	HDD06-W	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	1.7	49	65	-16	Very Low
	HDD06-S	12, NEAL CRESCENT, LITTLEHAMP, BN17 7TH	1.7	52	65	-14	Very Low
TC07	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	65	-4	Very Low
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	65	-3	Very Low
TC07a	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	1.7	60	65	-5	Very Low



Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	65	-3	Very Low
<b>TC08</b>	HDD08-N (Hospice)	DOVER LANE, BN18 9PX	1.7	54	70	-16	Very Low
	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	57	70	-13	Very Low
	HDD08-W	4, ELLA TERRACE, BN18 9QE	1.7	48	70	-22	Very Low
<b>TC08a</b>	HDD08-N (Hospice)	DOVER LANE, BN18 9PX	1.7	51	70	-19	Very Low
	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	51	70	-19	Very Low
	HDD08-W	4, ELLA TERRACE, BN18 9QE	1.7	52	70	-18	Very Low
<b>TC09</b>	HDD09-E	200, ARUNDEL ROAD, BN16 4ES	1.7	51	65	-14	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD09-N	CHESTNUT TREE HOUSE, DOVER LANE, ARUNDEL, BN18 9PX	1.7	53	65	-12	Very Low
	HDD09-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	58	65	-7	Very Low
<b>TC09a</b>	HDD09-E	200, ARUNDEL ROAD, BN16 4ES	1.7	55	65	-10	Very Low
	HDD09-N	CHESTNUT TREE HOUSE, DOVER LANE, ARUNDEL, BN18 9PX	1.7	51	65	-14	Very Low
	HDD09-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	53	65	-12	Very Low
<b>TC10</b>	HDD10-E	SOUTHVIEW, HAMMERPOT, BN16 4EU	2.3	50	70	-21	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD10-N	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	2.3	58	70	-12	Very Low
	HDD10-S	202, ARUNDEL ROAD, BN16 4ES	2.3	52	70	-18	Very Low
	HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	2.3	62	70	-8	Very Low
<b>TC10a</b>	HDD10-E	SOUTHVIEW, HAMMERPOT, BN16 4EU	2.3	47	70	-23	Very Low
	HDD10-N	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	2.3	49	70	-21	Very Low
	HDD10-S	202, ARUNDEL ROAD, BN16 4ES	2.3	61	70	-9	Very Low
	HDD10-W	1 ANGMERING PARK COTTAGES,	2.3	58	70	-12	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
		ANGMERING PARK, BN16 4EX					
TC11	HDD11-E	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	1.7	49	70	-21	Very Low
	HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	1.7	66	70	-4	Very Low
TC11a	HDD11-E	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	1.7	43	70	-27	Very Low
	HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	1.7	52	70	-18	Very Low
TC12	HDD12-E	DWELLING SOUTH OF MICHELGROVE HOUSE, MICHELGROVE LANE, PATCHING, ARUN, WEST	4.6	46	65	-19	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
		SUSSEX, ENGLAND, BN13 3XQ					
	HDD12-SE	MICHELGROVE HOUSE, MICHELGROVE LANE, PATCHING, ARUN, WEST SUSSEX, ENGLAND, BN13 3XQ	4.6	43	65	-22	Very Low
<b>TC16 &amp; TC17</b>	HDD16&17-N	WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	6.9	54	65	-11	Very Low
<b>TC17</b>	HDD16an d17-E	GREEN FARMHOUSE, THE PIKE, RH20 4AA	6.9	49	65	-16	Very Low
	HDD16an d17-S	WALNUT TREE COTTAGE, THE PIKE, RH20 4AA	6.9	55	65	-10	Very Low
<b>TC17a</b>	HDD16a-17-N	WASHINGTON PADDOCKS,	6.9	46	65	-19	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
		LONDON ROAD, RH20 4AJ					
	HDD16a-nd17-E	GREEN FARMHOUSE, THE PIKE, RH20 4AA	6.9	52	65	-13	Very Low
	HDD16a-nd17-S	WALNUT TREE COTTAGE, THE PIKE, RH20 4AA	6.9	62	65	-3	Very Low
<b>TC18</b>	HDD18-E	SHIRLEY HOUSE, STEYNING ROAD, BN44 3DD	2.9	62	65	-4	Very Low
<b>TC19</b>	HDD19-E	SCHOOL HOUSE, STEYNING ROAD, BN44 3DD	2.9	46	65	-19	Very Low
<b>TC19a</b>	HDD19-N	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	2.9	56	65	-10	Very Low
	HDD19-N (Church)	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	2.9	56	65	-9	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD19-S	BUNCTON MANOR FARM, STEYNING ROAD, BN44 3DD	2.9	51	65	-14	Very Low
	HDD19-SW	BUTCHERS FARM, WATER LANE, BN44 3DW	2.9	61	65	-4	Very Low
<b>TC20</b>	HDD20-W	DOVES FARM, SPITHANDLE LANE, BN44 3DY	4.6	50	65	-15	Very Low
	HDD20-N	BEGGARS BUSH, SPITHANDLE LANE, BN44 3DY	4.6	54	65	-11	Very Low
<b>TC21</b>	HDD21-E	SMALLWOOD HOUSE, STEYNING ROAD, BN44 3AN	2.9	62	65	-3	Very Low
	HDD21-N	SOUTHVIEW, WELLENS FARM, STEYNING ROAD, BN44 3AN	2.9	51	65	-14	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD21-S	BERGEN-OP-ZOOM, HORSEBRIDGE COMMON, BN44 3AL	2.9	48	65	-17	Very Low
<b>TC22</b>	HDD22-N	MERRION HOUSE, BINES GREEN, RH13 8EH	2.3	56	65	-9	Very Low
	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	2.3	61	65	-4	Very Low
	HDD22-W	LONG COTTAGE, BINES GREEN, RH13 8EH	2.3	52	65	-13	Very Low
<b>TC22a</b>	HDD22-N	MERRION HOUSE, BINES GREEN, RH13 8EH	2.3	49	65	-17	Very Low
	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	2.3	64	65	-1	Very Low



Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD22-W	LONG COTTAGE, BINES GREEN, RH13 8EH	2.3	52	65	-13	Very Low
<b>TC23</b>	HDD23-NW	MARTINSLAND FARM, BINES GREEN, RH13 8EH	4.6	53	65	-12	Very Low
	HDD23-S	MERRION HOUSE, BINES GREEN, RH13 8EH	4.6	54	65	-11	Very Low
	HDD23-W	HOLLY TREE COTTAGE, BINES GREEN, RH13 8EH	4.6	58	65	-7	Very Low
<b>TC24</b>	HDD24-E	MONKSWOOD, HANGERWOOD, RH13 8HJ	1.7	59	65	-6	Very Low
	HDD24-N	MARYLAND, HENFIELD ROAD, RH13 8HL	1.7	52	65	-13	Very Low
	HDD24-S	2 MORLEYS COTTAGES,	1.7	61	65	-4	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
		BRIGHTON ROAD, RH13 8HQ					
	HDD24-W	GREENTREES FARM, BRIGHTON ROAD, RH13 8HQ	1.7	51	65	-14	Very Low
<b>TC25</b>	HDD25-N	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	1.7	47	65	-18	Very Low
	HDD25-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	1.7	47	65	-18	Very Low
<b>TC25a</b>	HDD25-N	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	1.7	51	65	-14	Very Low
<b>TC26</b>	HDD26-E	MOATFIELD FARM, KINGS LANE, RH13 8BD	2.9	47	65	-18	Very Low
	HDD26-N	OAK COTTAGE, MOATFIELD LANE, RH13 8BF	2.9	50	65	-15	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	HDD26-W	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	2.9	54	65	-11	Very Low
<b>TC27</b>	HDD27-S	WESTRIDGE, KENT STREET, RH13 8BB	1.7	52	65	-13	Very Low
	HDD27-W	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	1.7	48	65	-17	Very Low
<b>TC27a</b>	HDD27-S	WESTRIDGE, KENT STREET, RH13 8BB	1.7	48	65	-17	Very Low
	HDD27-W	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	1.7	48	65	-18	Very Low
<b>TC28</b>	HDD28-N	SOUTHLANDS, KENT STREET, RH13 8BA	2.3	53	65	-12	Very Low
	HDD28-NW	OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ	2.3	48	65	-17	Very Low

Trenchless Crossing ID	Receptor ID	Receptor Address	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
TC29	HDD29-E	DAWES FARM, WINEHAM LANE, RH17 5SD	2.3	46	65	-19	Very Low
	HDD29-N	EASTRIDGE LODGE, WINEHAM LANE, RH17 5SD	2.3	51	65	-14	Very Low
	HDD29-S	OLD DOCTORS, WINEHAM LANE, BN5 9AZ	2.3	53	65	-12	Very Low
	HDD29-W	WESTRIDGE PLACE, WINEHAM LANE, RH17 5SD	2.3	56	65	-9	Very Low

**Table 21-30 Unmitigated Noise predictions at the closest noise sensitive receptors to the trenchless crossings – night-time**

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
TC01	HDD01-N	CROOKTHORN BYRE, BROOKPIT LANE, BN17 5QU	18.0	54	45	9	Medium
	HDD01-S	THE MILL, CLIMPING STREET, BN17 5RN	18.0	49	45	4	Medium
TC01a	HDD01A-S	THE MILL, CLIMPING STREET, BN17 5RN	18.0	56	55	1	Medium
TC02	HDD02-S	THE MILL, CLIMPING STREET, BN17 5RN	5.1	49	45	4	Medium
TC03	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	5.1	58	55	3	Medium
	HDD03-NE	6, BONIFACE AVENUE, BN17 7AD	5.1	52	45	7	Medium
	HDD03-S	FLAT 1, MARDEN HOUSE, HIGHFIELD, BN17 7EU	5.1	45	45	0	Very Low
	HDD03-S	UNIT 9, THORGATE ROAD, BN17 7LU	5.1	47	45	2	Medium

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	Industria I						
TC03a	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	5.1	48	45	3	Medium
	HDD03-S	FLAT 1, MARDEN HOUSE, HIGHFIELD, BN17 7EU	5.1	45	45	0	Medium
	HDD03-S Industria I	UNIT 9, THORGATE ROAD, BN17 7LU	5.1	48	45	3	Medium
TC04	HDD04-E (Farm buildind)	BROOK BARN HOUSE, COURTWICK LANE, BN17 7PE	2.3	49	45	4	Low
	HDD04-S	32, BONIFACE AVENUE, BN17 7AD	2.3	56	55	1	Medium
TC05	HDD05-E	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	1.7	54	45	9	Low

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD05-N	KEYMERS, ORCHARD LANE, BN17 7GL	1.7	65	55	10	High
	HDD05-S	PADDOCKS END, WOODCOTE LANE, BN17 7PT	1.7	53	45	8	Low
	HDD05-SW	LYMINSTER ROAD, BN17 7QE	1.7	63	55	8	Medium
TC06	HDD06-N	THE OLD VICARAGE, LYMINSTER ROAD, BN17 7QF	2.3	60	55	5	Medium
	HDD06-W	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	2.3	56	55	1	Medium
	HDD06-S	12, NEAL CRESCENT, LITTLEHAMP, BN17 7TH	2.3	50	45	5	Low
TC06a	HDD06-N	THE OLD VICARAGE, LYMINSTER ROAD, BN17 7QF	1.7	54	45	9	Low
	HDD06-W	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	1.7	49	45	4	Low

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD06-S	12, NEAL CRESCENT, LITTLEHAMP, BN17 7TH	1.7	52	45	7	Low
TC07	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	55	7	Medium
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	55	7	Medium
TC07a	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	1.7	60	55	5	Medium
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	1.7	62	55	7	Medium
TC08	HDD08-N (Hospice)	DOVER LANE, BN18 9PX	1.7	54	55	-1	Very Low
	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	57	55	2	Medium



Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD08-W	4, ELLA TERRACE, BN18 9QE	1.7	48	55	-7	Very Low
TC08a	HDD08-N (Hospice)	DOVER LANE, BN18 9PX	1.7	51	55	-4	Very Low
	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	51	55	-4	Very Low
	HDD08-W	4, ELLA TERRACE, BN18 9QE	1.7	52	55	-3	Very Low
TC09	HDD09-E	200, ARUNDEL ROAD, BN16 4ES	1.7	51	45	6	Low
	HDD09-N	CHESTNUT TREE HOUSE, DOVER LANE, ARUNDEL, BN18 9PX	1.7	53	45	8	Low
	HDD09-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	58	55	3	Medium

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
TC09a	HDD09-E	200, ARUNDEL ROAD, BN16 4ES	1.7	55	45	10	Low
	HDD09-N	CHESTNUT TREE HOUSE, DOVER LANE, ARUNDEL, BN18 9PX	1.7	51	45	6	Low
	HDD09-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	1.7	53	45	8	Low
TC10	HDD10-E	SOUTHVIEW, HAMMERPOT, BN16 4EU	2.3	50	55	-6	Very Low
	HDD10-N	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	2.3	58	55	3	Medium
	HDD10-S	202, ARUNDEL ROAD, BN16 4ES	2.3	52	55	-3	Very Low
	HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	2.3	62	55	7	Medium
TC10a	HDD10-E	SOUTHVIEW, HAMMERPOT, BN16 4EU	2.3	47	55	-8	Very Low

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD10-N	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	2.3	49	55	-6	Very Low
	HDD10-S	202, ARUNDEL ROAD, BN16 4ES	2.3	61	55	6	Medium
	HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	2.3	58	55	3	Medium
TC11	HDD11-E	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	1.7	49	55	-6	Very Low
	HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	1.7	66	55	11	High
TC11a	HDD11-E	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	1.7	43	55	-12	Very Low
	HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	1.7	52	55	-3	Very Low
TC12	HDD12-E	DWELLING SOUTH OF MICHELGROVE HOUSE, MICHELGROVE LANE, PATCHING,	4.6	46	50	-4	Very Low

Trenchless Crossing ID	Receptor	Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
ID	Address					
	ARUN, WEST SUSSEX, ENGLAND, BN13 3XQ					
	HDD12-SE MICHELGROVE HOUSE, MICHELGROVE LANE, PATCHING, ARUN, WEST SUSSEX, ENGLAND, BN13 3XQ	4.6	43	50	-7	Very Low
<b>TC16 &amp; TC17</b>	HDD16&17-N WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	6.9	54	45	9	Medium
<b>TC17</b>	HDD16a nd17-E GREEN FARMHOUSE, THE PIKE, RH20 4AA	6.9	49	45	4	Medium
	HDD16a nd17-S WALNUT TREE COTTAGE, THE PIKE, RH20 4AA	6.9	55	55	0	Medium
<b>TC17a</b>	HDD16a -17-N WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	6.9	46	45	1	Medium
	HDD16a -nd17-E GREEN FARMHOUSE, THE PIKE, RH20 4AA	6.9	52	45	7	Medium

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD16a-nd17-S	WALNUT TREE COTTAGE, THE PIKE, RH20 4AA	6.9	62	55	7	Medium
<b>TC18</b>	HDD18-E	SHIRLEY HOUSE, STEYNING ROAD, BN44 3DD	2.9	62	55	7	Medium
<b>TC19</b>	HDD19-E	SCHOOL HOUSE, STEYNING ROAD, BN44 3DD	2.9	46	45	1	Low
<b>TC19a</b>	HDD19-N	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	2.9	56	55	1	Medium
	HDD19-N (Church)	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	2.9	56	55	1	Medium
	HDD19-S	BUNCTON MANOR FARM, STEYNING ROAD, BN44 3DD	2.9	51	45	6	Low
	HDD19-SW	BUTCHERS FARM, WATER LANE, BN44 3DW	2.9	61	55	6	Medium
<b>TC20</b>	HDD20-W	DOVES FARM, SPITHANDLE LANE, BN44 3DY	4.6	50	45	5	Medium

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD20-N	BEGGARS BUSH, SPITHANDLE LANE, BN44 3DY	4.6	54	45	9	Medium
TC21	HDD21-E	SMALLWOOD HOUSE, STEYNING ROAD, BN44 3AN	2.9	62	55	7	Medium
	HDD21-N	SOUTHVIEW, WELLENS FARM, STEYNING ROAD, BN44 3AN	2.9	51	50	1	Low
	HDD21-S	BERGEN-OP-ZOOM, HORSEBRIDGE COMMON, BN44 3AL	2.9	48	50	-2	Very Low
TC22	HDD22-N	MERRION HOUSE, BINES GREEN, RH13 8EH	2.3	56	55	1	Medium
	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	2.3	61	55	6	Medium
	HDD22-W	LONG COTTAGE, BINES GREEN, RH13 8EH	2.3	52	50	2	Low
TC22a	HDD22-N	MERRION HOUSE, BINES GREEN, RH13 8EH	2.3	49	50	-2	Very Low

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	2.3	64	55	9	Medium
	HDD22-W	LONG COTTAGE, BINES GREEN, RH13 8EH	2.3	52	50	2	Low
<b>TC23</b>	HDD23-NW	MARTINSLAND FARM, BINES GREEN, RH13 8EH	4.6	53	45	8	Medium
	HDD23-S	MERRION HOUSE, BINES GREEN, RH13 8EH	4.6	54	45	9	Medium
	HDD23-W	HOLLY TREE COTTAGE, BINES GREEN, RH13 8EH	4.6	58	55	3	Medium
<b>TC24</b>	HDD24-E	MONKSWOOD, HANGERWOOD, RH13 8HJ	1.7	59	55	4	Medium
	HDD24-N	MARYLAND, HENFIELD ROAD, RH13 8HL	1.7	52	45	7	Low
	HDD24-S	2 MORLEYS COTTAGES, BRIGHTON ROAD, RH13 8HQ	1.7	61	55	6	Medium

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD24-W	GREENTREES FARM, BRIGHTON ROAD, RH13 8HQ	1.7	51	45	6	Low
TC25	HDD25-N	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	1.7	47	45	2	Low
	HDD25-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	1.7	47	45	2	Low
TC25a	HDD25-N	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	1.7	51	45	6	Low
TC26	HDD26-E	MOATFIELD FARM, KINGS LANE, RH13 8BD	2.9	47	45	2	Low
	HDD26-N	OAK COTTAGE, MOATFIELD LANE, RH13 8BF	2.9	50	45	5	Low
	HDD26-W	DRAGONS LANE, HENFIELD ROAD, RH13 8DX	2.9	54	45	9	Low
TC27	HDD27-S	WESTRIDGE, KENT STREET, RH13 8BB	1.7	52	45	7	Low



Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD27-W	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	1.7	48	45	3	Low
TC27a	HDD27-S	WESTRIDGE, KENT STREET, RH13 8BB	1.7	48	45	3	Low
	HDD27-W	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	1.7	48	45	3	Low
TC28	HDD28-N	SOUTHLANDS, KENT STREET, RH13 8BA	2.3	53	45	8	Low
	HDD28-NW	OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ	2.3	48	45	3	Low
TC29	HDD29-E	DAWES FARM, WINEHAM LANE, RH17 5SD	2.3	46	50	-4	Very Low
	HDD29-N	EASTRIDGE LODGE, WINEHAM LANE, RH17 5SD	2.3	51	50	1	Low
	HDD29-S	OLD DOCTORS, WINEHAM LANE, BN5 9AZ	2.3	53	50	3	Low

Trenchless Crossing ID	Receptor		Drilling Duration, (Weeks)	Predicted noise level, (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact, (dB)	Noise Level difference with threshold, (L <sub>Aeq,T</sub> dB)	Magnitude of change
	ID	Address					
	HDD29-W	WESTRIDGE PLACE, WINEHAM LANE, RH17 5SD	2.3	56	55	1	Medium

- 21.9.21 Trenchless crossings are to be located within the SDNP, near to footpaths and right to roam land in areas of high tranquillity. It is likely that noise levels will be between 55 dB and 75 dB at the boundary of the onshore cable corridor depending on the exact positioning of the drill rig.
- 21.9.22 The noise from the trenchless crossing (HDD) compound at landfall at the coastal promenade is likely to be approximately 50 dB dependent on the exact positioning of the drill rig.

### *Magnitude of change*

- 21.9.23 As identified within **Table 21-29**, it can be seen that the predicted noise levels due to trenchless crossing operations at the nearest noise sensitive receptors during the daytime will result in a **Low** to **Very Low** magnitude of change. The impact within the SDNP and coastal promenade would be considered **low**.
- 21.9.24 As identified within **Table 21-30**, it can be seen that the predicted noise levels due to trenchless crossing operations at the nearest noise sensitive receptors during the night-time will result in a **High** to **Very Low** magnitude of change.

### *Sensitivity of receptor*

- 21.9.25 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors and the coastal promenade and **High** for the SDNP, schools and places of worship in line with **Table 21-22**. There are no noise sensitive non-residential receptors that would be affected by the trenchless crossing works at night.

### *Significance of residual effect*

- 21.9.26 As per the embedded environmental measures outlined in **Table 21-20 (C-26)**, screening will be applied to block line of sight between noise sensitive receptors and the main noise emitters on the trenchless crossing compound where required to avoid significant noise effects.
- 21.9.27 **Table 21-31** below provides the likely mitigation required, in terms of a broadband insertion loss, in order to reduce the magnitude of change to low or very low. The insertion losses correspond to the following generic mitigation measures:
- **-5 dB insertion loss:** achievable by a well-constructed flexible acoustic barrier.
  - **-10 dB or more insertion loss:** achievable utilising heavier barrier types such as shipping containers and / or hay bales, with detailed design required specifically for the height of the barriers.



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**Table 21-31** Trenchless crossing mitigation

<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Address</b>	<b>Likely broadband insertion loss required in order to reduce the predicted noise levels to a low or very low magnitude of change</b>
<b>TC01</b>	HDD01-N	CROOKTHORN BYRE, BROOKPIT LANE, BN17 5QU	<b>-10 dB correction</b>
	HDD01-S	THE MILL, CLIMPING STREET, BN17 5RN	<b>-5 dB correction</b>
<b>TC01a</b>	HDD1A-S	THE MILL, CLIMPING STREET, BN17 5RN	<b>-5 dB correction</b>
<b>TC02</b>	HDD02-S	THE MILL, CLIMPING STREET, BN17 5RN	<b>-5 dB correction</b>
<b>TC03</b>	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	<b>-5 dB correction</b>
	HDD03-NE	6, BONIFACE AVENUE, BN17 7AD	<b>-10 dB correction</b>
	HDD03-S Industrial	UNIT 9, THORGATE ROAD, BN17 7LU	<b>-5 dB correction</b>
<b>TC03a</b>	HDD03-E	8, BENJAMIN GRAY DRIVE, BN17 7FA	<b>-5 dB correction</b>
	HDD03-S	FLAT 1, MARDEN HOUSE, HIGHFIELD, BN17 7EU	<b>-5 dB correction</b>

<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Address</b>	<b>Likely broadband insertion loss required in order to reduce the predicted noise levels to a low or very low magnitude of change</b>
	HDD03-S Industrial	UNIT 9, THORGATE ROAD, BN17 7LU	-5 dB correction
<b>TC04</b>	HDD04-S	32, BONIFACE AVENUE, BN17 7AD	-5 dB correction
<b>TC05</b>	HDD05-N	KEYMERS, ORCHARD LANE, BN17 7GL	-5 dB correction
	HDD05-E	LYMINSTER ROAD, BN17 7QE	-5 dB correction
<b>TC06</b>	HDD06a-N	THE OLD VICARAGE, LYMINSTER ROAD, BN17 7QF	-5 dB correction
	HDD06-W	LYMINSTER NURSERY, LYMINSTER ROAD, BN17 7QF	-5 dB correction
<b>TC07</b>	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	-5 dB correction
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	-5 dB correction
<b>TC07a</b>	HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	-5 dB correction
	HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	-5 dB correction
<b>TC08</b>	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	-5 dB correction

<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Address</b>	<b>Likely broadband insertion loss required in order to reduce the predicted noise levels to a low or very low magnitude of change</b>
<b>TC09</b>	HDD08-S	THE DECOY, DECOY LANE, ARUNDEL ROAD, BN18 9QA	<b>-5 dB correction</b>
<b>TC10</b>	HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	<b>-5 dB correction</b>
	HDD10-N	COLT BUNGALOW, ANGMERING PARK, BN16 4EX	<b>-5 dB correction</b>
<b>TC10a</b>	HDD10-S	202, ARUNDEL ROAD, BN16 4ES	<b>-5 dB correction</b>
	HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	<b>-5 dB correction</b>
<b>TC11</b>	HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	<b>-11 dB correction</b>
<b>TC16</b>	HDD16 -17N	WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	<b>-10 dB correction</b>
<b>TC17</b>	HDD16-17N	WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	<b>-5 dB correction</b>
	HDD16a-nd17-E	GREEN FARMHOUSE, THE PIKE, RH20 4AA	<b>-5 dB correction</b>
<b>TC17a</b>	HDD16a-nd17-S	WALN16-17UT TREE COTTAGE, THE PIKE, RH20 4AA	<b>-5 dB correction</b>
	HDD16a-17-N	WASHINGTON PADDOCKS, LONDON ROAD, RH20 4AJ	<b>-10 dB correction</b>
	HDD16and17-E	GREEN FARMHOUSE, THE PIKE, RH20 4AA	<b>-10 dB correction</b>

<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Address</b>	<b>Likely broadband insertion loss required in order to reduce the predicted noise levels to a low or very low magnitude of change</b>
<b>TC18</b>	HDD18-E	SHIRLEY HOUSE, STEYNING ROAD, BN44 3DD	<b>-5 dB correction</b>
<b>TC19a</b>	HDD19-N	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	<b>-5 dB correction</b>
	HDD19-N (Church)	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	<b>-5 dB correction</b>
	HDD19-SW	BUTCHERS FARM, WATER LANE, BN44 3DW	<b>-5 dB correction</b>
<b>TC20</b>	HDD20-W	DOVES FARM, SPITHANDLE LANE, BN44 3DY	<b>-10 dB correction</b>
	HDD20-N	BEGGARS BUSH, SPITHANDLE LANE, BN44 3DY	<b>-10 dB correction</b>
<b>TC21</b>	HDD21-E	SMALLWOOD HOUSE, STEYNING ROAD, BN44 3AN	<b>-5 dB correction</b>
<b>TC22</b>	HDD22-N	MERRION HOUSE, BINES GREEN, RH13 8EH	<b>-5 dB correction</b>
	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	<b>-5 dB correction</b>
<b>TC22a</b>	HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	<b>-5 dB correction</b>
<b>TC23</b>	HDD23-NW	MARTINSLAND FARM, BINES GREEN, RH13 8EH	<b>-10 dB correction</b>



<b>Trenchless Crossing ID</b>	<b>Receptor ID</b>	<b>Address</b>	<b>Likely broadband insertion loss required in order to reduce the predicted noise levels to a low or very low magnitude of change</b>
	HDD23-W	HOLLY TREE COTTAGE, BINES GREEN, RH13 8EH	<b>-5 dB correction</b>
	HDD23-S	MERRION HOUSE, BINES GREEN, RH13 8EH	<b>-10 dB correction</b>
<b>TC24</b>	HDD24-E	MONKSWOOD, HANGERWOOD, RH13 8HJ	<b>-5 dB correction</b>
	HDD24-S	2 MORLEYS COTTAGES, BRIGHTON ROAD, RH13 8HQ	<b>-5 dB correction</b>
<b>TC29</b>	HDD29-W	WESTRIDGE PLACE, WINEHAM LANE, RH17 5SD	<b>-5 dB correction</b>

- 21.9.28 Following implementation of the insertion losses, and consideration of the pertinent commitments (outlined in **Table 21-20**), for residential receptors the magnitude of change is defined as **Low** or **Very Low**, and the sensitivity of the receptor is defined as **Medium**. The residual effect is direct, temporary and of **Minor adverse significance** or **Negligible / Minor adverse significance**, and therefore **Not Significant** in EIA terms.
- 21.9.29 Following implementation of the insertion losses, and consideration of the pertinent commitments (outlined in **Table 21-20**), for non-residential receptors the magnitude of change is defined as **Low** or **Very Low**, and the sensitivity of the receptor is defined as **High**. The residual effect is direct, temporary and of **Minor adverse significance** =, and therefore **Not Significant** in EIA terms.
- 21.9.30 The daytime LOAEL of 65dB L<sub>Aeq, 16hr</sub> will not be exceeded at any of the identified noise sensitive receptors with the exception of two receptors. During night-time period, the LOAEL of 45dB L<sub>Aeq, 8hr</sub> will be exceeded. However, it is considered that the screening (commitment C-26) and best practice measures (to be detailed within commitment C-33) applied to works would be sufficient to accord with the requirements to minimise adverse impacts as per the Noise Policy Statement for England (Defra, 2010).
- 21.9.31 The noise on the SDNP and coastal promenade would be considered of **minor effect** and **not significant**.

## Temporary noise effects from onshore substation construction

### Overview

- 21.9.32 Noise predictions were undertaken assuming all construction plant is concurrently operating at the closest approach of the onshore substation site to the Noise Sensitive Receptors (NSRs). This approach considers the worst-case scenario for noise levels associated with construction of the onshore substation and assumes all plant is operating at the nearest location to each NSR. (BSI, 2014a). The approach to the assessment is outlined in **Section 21.8**.
- 21.9.33 Assumptions regarding construction plant for each activity and phase are provided in **Appendix 21.2 Construction plant list, Volume 4** of the ES (Document Reference: 6.4.21.2).
- 21.9.34 **Table 21-32** shows the predicted noise levels at each NSR and the respective magnitude of change.



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**Table 21-32 Predicted construction noise levels (daytime) – onshore substation**

Receptor		Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
ID	Address				
<b>Site preparation</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	53	65	-13	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	45	65	-20	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	44	65	-21	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	51	65	-14	Very Low
<b>Pre-earthwork drainage</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	56	65	-10	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	48	65	-17	Very Low

Receptor		Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
ID	Address				
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	47	65	-18	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	51	65	-14	Very Low
<b>Groundwork</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	56	65	-10	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	48	65	-17	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	47	65	-18	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	51	65	-14	Very Low
<b>Civils – piling</b>					

Receptor		Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
ID	Address				
SS1-NE	Southlands, Kent Street, RH13 8BA	46	65	-20	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	38	65	-27	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	37	65	-28	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	44	65	-21	Very Low
<b><i>Civils – trenching and foundations</i></b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	46	65	-20	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	38	65	-27	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	37	65	-28	Very Low

Receptor		Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
ID	Address				
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	44	65	-21	Very Low
<b>Civils – backfilling</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	61	65	-5	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	53	65	-12	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	52	65	-13	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	59	65	-6	Very Low
<b>Civils – pits, chambers, troughs, trays, and ducting</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	55	65	-11	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	47	65	-18	Very Low

Receptor		Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
ID	Address				
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	46	65	-19	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	53	65	-12	Very Low
<b>Finishing</b>					
SS1-NE	Southlands, Kent Street, RH13 8BA	53	65	-13	Very Low
SS2-SE	Westridge, Kent Street, RH12 8BB	45	65	-20	Very Low
SS3-SW	Taintfield Farmhouse, Kings Lane, RH12 8BD	44	65	-21	Very Low
SS4-NW	Oakendene Manor, Bolney Road, RH12 8AZ	51	65	-14	Very Low



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### *Magnitude of change*

- 21.9.35 The results outlined in **Table 21-32** show that a magnitude of change of **Very Low** has been predicted at all receptors for all phases.

### *Sensitivity of receptor*

- 21.9.36 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors. There are no noise sensitive non-residential receptors in close proximity to the onshore Oakendene substation.

### *Significance of residual effect*

- 21.9.37 The embedded environmental measures (as shown in **Table 21-20**) include C-22, C-26 and C-33 which will be implemented to minimise the disturbance of noise sensitive receptors.
- 21.9.38 The daytime SOAEL of 75dB L<sub>Aeq, 16hr</sub> will not be exceeded at any of the identified noise sensitive receptors. The LOAEL of 65dB L<sub>Aeq, 16hr</sub> will also not be exceeded. Best practice measures will be adopted in line with embedded environmental measure C-33. Therefore, predicted noise levels will be sufficient to accord with requirements of minimising noise impacts within the Noise Policy Statement for England (Defra, 2010). **Minor adverse significance** and **Not Significant** in EIA terms.

Temporary noise effects from extension works at the existing National Grid Bolney substation

### *Overview*

- 21.9.39 Whilst the extension to the existing Bolney substation will require substantially less time and plant equipment than the Rampion 2 substation, the type of equipment used will be similar for either GIS or AIS scenarios. Therefore the same plant list has been used as provided in **Appendix 21.2 Construction plant list, Volume 4** of the ES (Document Reference: 6.4.21.2).
- 21.9.40 The results of the noise predictions, based on a worst-case source positioning at the site boundary closest to each receptor is presented below.

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**Table 21-33 Predicted construction noise levels (daytime) – existing National Grid Bolney substation extension**

<b>Receptor</b>	<b>Predicted noise level (L<sub>Aeq,T</sub> dB)</b>	<b>BS 5228 threshold noise level relating to a medium Impact</b>	<b>Noise Level (L<sub>Aeq,1h</sub> dB) difference with threshold</b>	<b>Magnitude of change</b>
<b><i>Site preparation</i></b>				
Bolney Extension - E	53	65	-12	Very low
Bolney Extension - N	39	65	-26	Very low
Bolney Extension - S	44	65	-21	Very low
Bolney Extension - W	45	65	-20	Very low
<b><i>Pre-earthwork drainage</i></b>				
Bolney Extension - E	56	65	-9	Very low
Bolney Extension - N	42	65	-23	Very low
Bolney Extension - S	47	65	-18	Very low
Bolney Extension - W	48	65	-17	Very low
<b><i>Groundwork</i></b>				
Bolney Extension - E	56	65	-9	Very low

Receptor	Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
Bolney Extension - N	42	65	-23	Very low
Bolney Extension - S	47	65	-18	Very low
Bolney Extension - W	48	65	-17	Very low
<b><i>Civils – piling</i></b>				
Bolney Extension - E	46	65	-19	Very low
Bolney Extension - N	32	65	-33	Very low
Bolney Extension - S	37	65	-28	Very low
Bolney Extension - W	38	65	-27	Very low
<b><i>Civils – trenching and foundations</i></b>				
Bolney Extension - E	49	65	-16	Very low
Bolney Extension - N	35	65	-30	Very low
Bolney Extension - S	40	65	-25	Very low
Bolney Extension - W	41	65	-24	Very low
<b><i>Civils – backfilling</i></b>				

Receptor	Predicted noise level (L <sub>Aeq,T</sub> dB)	BS 5228 threshold noise level relating to a medium Impact	Noise Level (L <sub>Aeq,1h</sub> dB) difference with threshold	Magnitude of change
Bolney Extension - E	61	65	-4	Very low
Bolney Extension - N	47	65	-18	Very low
Bolney Extension - S	52	65	-13	Very low
Bolney Extension - W	53	65	-12	Very low
<b><i>Civils – pits, chambers, troughs, trays, and ducting</i></b>				
Bolney Extension - E	55	65	-10	Very low
Bolney Extension - N	41	65	-24	Very low
Bolney Extension - S	46	65	-19	Very low
Bolney Extension - W	47	65	-18	Very low
<b><i>Finishing</i></b>				
Bolney Extension - E	53	65	-12	Very low
Bolney Extension - N	39	65	-26	Very low
Bolney Extension - S	44	65	-21	Very low
Bolney Extension - W	45	65	-20	Very low

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### *Magnitude of change*

- 21.9.41 The results outlined in **Table 21-32** show that a magnitude of change of **Very Low** has been predicted at all receptors for all phases.

### *Sensitivity of receptor*

- 21.9.42 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors. There are no noise sensitive non-residential receptors in close proximity to the onshore substation.

### *Significance of residual effect*

- 21.9.43 The embedded environmental measures (as shown in **Table 21-20**) include C-22, C-26 and C-33 which will be implemented to minimise the disturbance of noise sensitive receptors.
- 21.9.44 The daytime SOAEL of 75dB  $L_{Aeq, 16hr}$  will not be exceeded at any of the identified noise sensitive receptors. The LOAEL of 65dB  $L_{Aeq, 16hr}$  will also not be exceeded. Best practice measures will be adopted in line with embedded environmental measure C-33. Therefore, predicted noise levels will be sufficient to accord with requirements of minimising noise impacts within the Noise Policy Statement for England (Defra, 2010). **Minor adverse significance** and **Not Significant** in EIA terms.
- 21.9.45 The daytime SOAEL of 75dB  $L_{Aeq, 16hr}$  will not be exceeded at any of the identified noise sensitive receptors. The LOAEL of 65dB  $L_{Aeq, 16hr}$  will also not be exceeded. Best practice measures will be adopted in line with embedded environmental measure C-33. Therefore, predicted noise levels will be sufficient to accord with requirements within the Noise Policy Statement for England (Defra, 2010).

### Temporary noise effects from onshore cable installation (trenched)

#### *Overview*

- 21.9.46 The onshore cable will extend for approximately 38.8km in length within a standard onshore temporary cable corridor of 40m (as outlined in **Table 4.17**, **Chapter 4: The Proposed Development, Volume 2** of the ES (Document Reference: 6.2.4)).
- 21.9.47 The onshore cable route will pass sensitive noise receptors resulting in temporary noise effects. It is currently anticipated that the entire temporary construction works will move at a speed of 35m per day, constituting the entire cable trenching process.

The noise impact from onshore cable construction at the nearest noise sensitive receptors would be for a duration less than the temporal factor within BS 5228 for significant impact (less than 10 days). Consequently, only a very low or low impact could be identified for these works. As per **Table 21-23** the magnitude of change is also determined based on the duration of construction activities.



### *Magnitude of change*

21.9.48 The onshore temporary cable corridor will be in sufficient proximity to result in noise levels of above 75dB at sensitive noise receptor locations. However, it is anticipated that the worst-case noise levels when the works are close to a sensitive noise receptor (within 50m) will be for a maximum of two days, of which is significantly below the relevant temporal factor within BS 5228 for significant impact. Consequently, the onshore cable corridor construction will result in a **Low** magnitude of change at residential receptors. This **Low** magnitude of change is also anticipated at the following noise sensitive non-residential receptors:

- South Downs National Park);
- Washington Village Memorial Hall;
- St Marys C Of E Primary School;
- Commercial premises without noise or vibration sensitivities.

### *Sensitivity of receptor*

21.9.49 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors, commercial premises (assumed with an office) and the village hall and **High** for schools and the SDNP in line with **Table 21-22**.

### *Significance of residual effect*

21.9.50 The Rampion 2 commitments (as shown in **Table 21-20**) include C-22, C-26 and C-33 which will be adopted to minimise the disturbance of noise sensitive receptors.

21.9.51 For residential receptors, the magnitude of change is defined as **Low** and the sensitivity of the receptors are classified as **Medium**. As this direct effect is temporary it is determined to be of **Minor adverse significance** and **Not Significant** in EIA terms.

21.9.52 For non-residential receptors, the magnitude of change is defined as **Low** and the sensitivity of the receptors are classified as **High**. With reference to **Table 21-24**, this is reflective of a **Moderate / Minor adverse significance** and **Potentially Significant** in EIA terms. However, due to works being undertaken for a maximum of two days in the vicinity of the receptors, which is significantly below the temporal criteria reflective of a **Low** magnitude of change, the effect is determined to be of **Minor adverse significance** and **Not Significant** in EIA terms.

21.9.53 The noise levels predicted at human receptors are above the SOAEL. However, these levels are for a very temporary period. The toxicological effects of noise as stated in WHO guidance, upon which the SOAEL is based, are relevant to a longer duration and therefore are not considered relevant.

## Temporary noise effects from construction and use of temporary and permanent accesses

### Overview

- 21.9.54 Access to the onshore temporary construction corridor will be afforded via construction accesses from existing roads. **Figure 4.10a-c, Volume 3** of the ES (Document Reference: 6.3.4) presents the locations of all the proposed access points along the onshore temporary cable corridor.
- 21.9.55 The construction of temporary and permanent accesses will result in temporary noise effects at noise sensitive receptors as the access works pass receptors within close proximity. It is anticipated that the worst-case noise levels when the works are very close to a sensitive noise receptor (within 20m) will be for a maximum of two days. Individual accesses are expected to be completed within one month of commencing work.
- 21.9.56 **Table 21-34** presents the results of noise predictions from access construction at the closest noise sensitive receptor. The noise predictions are representative of the average worst-case noise level at the relevant receptor, not a maximum worst-case scenario. A maximum worst-case scenario is not representative of the likely noise levels at the relevant receptors, as that predictions do not accurately cater for the irregularities of working and the different elements of noise from the construction equipment as it moves along the temporary construction access route. For example, the equipment included within the predictions, and which could be operating at different times could be far apart relative to the closest plant to the receptor. Very close works to receptors are also likely to be only for very short durations of time.
- 21.9.57 Noise screening has not been included as it is considered impractical for the works (given the proximity to residences and likely speed at which the works will occur in one place), as per the embedded environmental measures outlined in **Table 21-20** commitment C-26. The threshold level is not provided within the table as it is expected that notable noise levels (i.e. to result in significant effect) from access construction would be for a duration less than the temporal factor within BS 5228 (BSI, 2014a).

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**Table 21-34 Noise predictions at the closest noise sensitive receptors to the construction of temporary and permanent accesses**

Access Link ID	Receptor	Noise Level (L <sub>Aeq,1h</sub> dB)
A-02	LODGE 10, FERRY ROAD, LITTLEHAMPTON, BN17 5DS	44
A-03	BROOKPIT COTTAGE, BROOKPIT LANE, LITTLEHAMPTON, BN17 5QT	56
A-05 & A-06	FIELD PLACE, CHURCH LANE, LITTLEHAMPTON, BN17 5RR	60
A-08	1, HENRY LOCK WAY, LITTLEHAMPTON, BN17 7FB	47
A-09	1, HENRY LOCK WAY, LITTLEHAMPTON, BN17 7FB	54
A-11	55A, THORNLEA PARK, LITTLEHAMPTON, BN17 7QS	45
A-13	FAIRLANDS, ORCHARD LANE, LITTLEHAMPTON, BN17 7GL	58
A-15 & A-16	THE OLD VICARAGE, LYMINSTER ROAD, LITTLEHAMPTON, BN17 7QF	55
A-22	SOUTHVIEW, HAMMERPOT, LITTLEHAMPTON, BN16 4EU	59
A-26	SLEEPY HOLLOW, MICHELGROVE LANE, WORTHING, BN13 3XH	59
A-28	3 TOLMARE FARM COTTAGE, LONG FURLONG, WORTHING, BN14 0RJ	41

Access Link ID	Receptor	Noise Level (L <sub>Aeq,1h</sub> dB)
A-32 & A-33	CHANCTONBURY LODGE, WASHINGTON ROAD, PULBOROUGH, RH20 4AF	57
A-34 & A-35	EAST CLAYTON FARM, STORRINGTON ROAD, PULBOROUGH, RH20 4AG	62
A-39	3 SETTATREES, LONDON ROAD, PULBOROUGH, RH20 4AL	52
A-40	GREEN FARM BARN, THE PIKE, PULBOROUGH, RH20 4AA	58
A-41	LOWER CHANCTON FARM, STEYNING ROAD, STEYNING, BN44 3DD	52
A-42	SHIRLEY HOUSE, STEYNING ROAD, STEYNING, BN44 3DD	47
A-43	THE FORSTAL, STEYNING ROAD, STEYNING, BN44 3DD	49
A-46	DOVES FARM, SPITHANDLE LANE, STEYNING, BN44 3DY	44
A-47	HORSEBRIDGE HOUSE, HORSEBRIDGE COMMON, STEYNING, BN44 3AL	74
A-48	THE FOUNTAIN, THE VILLAGE, STEYNING, BN44 3AP	67
A-49	2 MERRION FARM COTTAGES, BINES GREEN, HORSHAM, RH13 8EH	64
A-49a	MERRION LODGE, BINES GREEN, HORSHAM, RH13 8EH	75

Access Link ID	Receptor	Noise Level (L <sub>Aeq,1h</sub> dB)
A-50	BINES FARM COTTAGE, BINES ROAD, HORSHAM, RH13 8EQ	59
A-50a	1 BRIGHTAMS COTTAGES, BINES ROAD, HORSHAM, RH13 8EQ	58
A-52	HAZELDENE, BRIGHTON ROAD, HORSHAM, RH13 8HD	55
A-53	DUNSTANS FARM, SHERMANBURY ROAD, HORSHAM, RH13 8EU	62
A-57	MARYLAND, HENFIELD ROAD, HORSHAM, RH13 8HL	70
A-57a	CRATEMANS FARM, DRAGONS LANE, HENFIELD ROAD, HORSHAM, RH13 8DX	41
A-61	WESTRIDGE, KENT STREET, HORSHAM, RH13 8BB	55
A-63 A-64	SOUTHLANDS, KENT STREET, HORSHAM, RH13 8BA	62
A-65	EASTRIDGE LODGE, WINEHAM LANE, HAYWARDS H, RH17 5SD	67
A-68 A-69	OLD DOCTORS COTTAGE, WINEHAM LANE, HENFIELD, BN5 9AZ	67

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- 21.9.58 Many of the temporary construction accesses are associated with the local road system, with A-roads and B-roads resulting in lower tranquillity ratings. Whilst A-26 and A28 are associated with small roads, they cross highly tranquil areas. The noise levels as predicted in **Table 21-34** for A-26 and A28 are representative of noise at publicly accessible areas of the SDNP.
- 21.9.59 During use of the accesses, based on proposed traffic volumes, it is currently estimated that peak flows on all accesses will not exceed 3 HGVs per hour. This correlates to an  $L_{Aeq, 1 \text{ hour}}$  of 61dB at 5m from the haul route, below the threshold of significance in BS 5228-1 (BSI, 2014a).

### *Magnitude of change*

- 21.9.60 The results presented in **Table 21-34** show that noise levels from the construction of temporary and permanent accesses at closest noise sensitive receptors will exceed the threshold values presented in **Table 21-23**. However, as it is likely that the noise thresholds will only be exceeded for 2 days maximum, the temporal criteria presented in **Table 21-23** will not be exceeded. For this reason, a **Low** magnitude of change has been identified for residential receptors and non-residential noise sensitive receptors.
- 21.9.61 The use of the access routes would result in a **Very Low** magnitude of change as noise thresholds are not predicted to be exceeded.

### *Sensitivity of receptor*

- 21.9.62 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors and **High** for non-residential receptors (such as the SDNP) in line with **Table 21-22**.

### *Significance of residual effect*

- 21.9.63 The Rampion 2 commitments (as shown in **Table 21-20**) include C-22, C-26 and C-33 which will be adopted to minimise the disturbance of noise sensitive receptors.
- 21.9.64 For residential receptors, the magnitude of change is defined as **Low** for construction and **Very Low** for use of the accesses and the sensitivity of the receptors are classified as **Medium**. As this direct effect is temporary it is determined to be of **Minor adverse significance** during the construction of the accesses and **Negligible significance** during use, both **Not Significant** in EIA terms.
- 21.9.65 For non-residential receptors, the magnitude of change is defined as **Low** for construction and **Very Low** for use of the accesses and the sensitivity of the receptors are classified as **High**. As this direct effect is temporary it is determined to be of **Minor adverse significance** during the construction of the accesses and during use, which would be **Not Significant** in EIA terms.
- 21.9.66 The noise levels predicted at human receptors are above the SOAEL identified in **Table 21-26**. However, these levels are for a very temporary period. The



toxicological effects of noise as stated in WHO guidance, upon which the SOAEL is based, are relevant to a longer duration and therefore are not considered relevant.

## Temporary noise effects from construction road traffic noise

### Overview

21.9.67 **Table 21-35** presents the results of the construction road traffic noise predictions, which have been calculated at 10m (in accordance with the CRTN (Department of Transport Welsh Office, 1988)) from the road based on 18-hour Annual Average Weekday Traffic (AAWT) road traffic for the flows estimated in **Table 21-21**. Whilst the premises affected by road traffic will be at varying distances from the road, the assessment is mainly based on the difference between the future baseline scenario and the future 'with development' scenario as shown in **Table 21-35**.

**Table 21-35 Noise predictions 10m from construction traffic routes**

Road Name	Future year 2026 (FY) (no development) LA <sub>10, 18h</sub> at 10m	FY (with development) LA <sub>10, 18h</sub> at 10m	FY (with development) – FY (no development) difference (dB)
Ferry Road	66.4	66.7	0.3
Church Lane	71.2	71.5	0.3
Ford Road	65.1	66.0	0.9
A259, West of Wick	71.2	71.7	0.5
A284, North of Wick	69.0	69.7	0.7
A284, Lyminster	71.2	71.8	0.6
A280, Long Furlong	74.8	75.1	0.3
A283, East of A24	74.4	74.8	0.4
B2135, South of Ashurst	65.9	68.3	2.4
B2116 Partridge Green Road	66.4	68.0	1.6
A281, South Shermanbury	68.6	69.0	0.4

Road Name	Future year 2026 (FY) (no development) LA <sub>10, 18h</sub> at 10m	FY (with development) LA <sub>10, 18h</sub> at 10m	FY (with development) – FY (no development) difference (dB)
A281, South of Cowfold	65.1	67.2	2.1
A272, Station Road, Cowfold	70.2	71.0	0.8
Wineham Lane, South of A272	53.2	55.6	2.4
A272, West of A23	71.7	72.8	1.1
B2188, Sayers Common	70.7	71.5	0.8
B2116, Henfield Road, Albourne	63.0	65.2	2.2

### *Magnitude of change*

- 21.9.68 The level difference in noise levels between scenarios for all road links is either a magnitude of change of **Very Low** (less than 1 dB change) or **Low** (2 to 2.9 dB change).

### *Sensitivity of receptor*

- 21.9.69 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors and **High** for non-residential receptors (places of worship and schools) in line with **Table 21-22**.

### *Significance of residual effect*

- 21.9.70 The embedded environmental measures (as shown in **Table 21-20**) include C-22 and C-33 which will be implemented to minimise the disturbance of noise sensitive receptors.
- 21.9.71 For residential receptors, the magnitude of change is up to **Low** and the sensitivity of the receptors are **Medium**. Therefore, there is a direct, temporary effect of **Minor adverse significance**, which is **Not Significant** in EIA terms.
- 21.9.72 For non-residential receptors, the magnitude of change is up to **Low** and the sensitivity of the receptors is **High**. Therefore, there is a direct, temporary effect of **Minor / Moderate adverse significance**. Given the conservative nature of predictions, it is very likely that noise level change would be substantially less than assessed above. Therefore, the effect is considered of **Minor adverse significance** and **Not Significant** in EIA terms.

## Temporary noise effects from offshore piling noise

### Overview

- 21.9.73 The offshore turbine array is located approximately 13 km from the nearest shoreline and corresponding noise sensitive receptors (as outlined in [Table 4.17](#), [Chapter 4: The Proposed Development, Volume 2](#) of the ES (Document Reference: 6.2.4).
- 21.9.74 Calculations of the noise emissions from the offshore piling noise at the nearest onshore noise sensitive receptors have been based on two piles a day at the closest boundary of the wind farm array area to the shoreline.

### Magnitude of change

- 21.9.75 The worst-case noise level predicted at the nearest onshore noise sensitive receptor to the offshore piling is 34 dB. This level is below the BS 5228-1 (BSI, 2019) thresholds representative of a **Very Low** magnitude of change for all time periods, in line with [Table 21-23](#).

### Sensitivity of receptor

- 21.9.76 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors in line with [Table 21-22](#).

### Significance of residual effect

- 21.9.77 The Rampion 2 commitments (as shown in [Table 21-20](#)) include C-22, C-26 and C-33 which will be adopted to minimise the disturbance of noise sensitive receptors.
- 21.9.78 For residential receptors, the magnitude of change is defined as **Very Low** and the sensitivity of the receptors are classified as **Medium**. As this direct effect is temporary it is determined to be of **Negligible / Minor significance** and **Not Significant** in EIA terms.
- 21.9.79 The daytime LOAEL of 65dB LAeq, 16hr will not be exceeded at any of the identified noise sensitive receptors. The night-time LOAEL of 45dB LAeq, 8hr will not be exceeded at any of the identified noise sensitive receptors. Therefore, the predicted noise levels would be sufficient to accord with the requirements to minimise adverse impacts as per the Noise Policy Statement for England (Defra, 2010).

## Construction vibration

### Overview

- 21.9.80 Separate assessments of temporary vibration effects have been undertaken for the following elements of the construction phase, which include:

- temporary vibration effects from the construction works at the landfall and trenchless crossings at specific sections of the cable route (durations varied between 2 to 7 weeks for major crossings and 26 weeks at landfall); and
- temporary vibration effects from construction road traffic.

- 21.9.81 The above effects have been assessed separately due to the difference in location, or where close to each other, the short duration of when the construction activities occur simultaneously within that area.
- 21.9.82 The construction and operation of the construction compounds, construction of the substation and cable trenching are unlikely to result in temporary vibration effects as it is unlikely that any activities associated with vibration levels except in very close proximity to the plant will be required. For this reason, vibration has not been assessed for these activities.

## Temporary vibration effects from the landworks and trenchless crossings

### *Overview*

- 21.9.83 There is potential for vibration effects from the landfall and trenchless crossing works due to the HDD. Therefore, predictions have been undertaken, utilising the empirical equations outlined in the BS 5228-2 (BSI, 2014b). Vibration propagation is affected by a number of factors, including the distance between the source and receiver, ground conditions and the nature of the vibration source. Predictions for sensitive receptors up to 100m have been assessed. There are no non-residential receptors within 100m of the trenchless crossings. The results are presented in **Table 21-36**.

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**Table 21-36 Vibration predictions at the closest sensitive receptors to the HDD crossings**

Receptor		Approximate distance to nearest receptor, (m)	Peak Particle Velocity (PPV) threshold of low impact, (mm/s)	Predicted PPV level, (mm/s)	Level difference, dB
ID	Address				
HDD05-N	KEYMERS, ORCHARD LANE, BN17 7GL	75	0.3	0.7	+0.4
HDD05-SW	LYMINSTER ROAD, BN17 7QE	65	0.3	0.8	+0.5
HDD07-N	HARVEST VIEW, POLING STREET, ARUNDEL, BN18 9PS	92	0.3	0.5	+0.2
HDD07-S	ROWANDENE, POLING STREET, ARUNDEL, BN18 9PS	78	0.3	0.6	+0.3
HDD10-S	202, ARUNDEL ROAD, BN16 4ES	90	0.3	0.5	+0.2
HDD10-W	1 ANGMERING PARK COTTAGES, ANGMERING PARK, BN16 4EX	100	0.3	0.5	+0.2
HDD11-S	THE OLD COTTAGE, HAMMERPOT, BN16 4EU	70	0.3	0.7	+0.4
HDD16and17-S	WALNUT TREE COTTAGE, THE PIKE, RH20 4AA	97	0.3	0.5	+0.2
HDD18-E	SHIRLEY HOUSE, STEYNING ROAD, BN44 3DD	100	0.3	0.5	+0.2

Receptor		Approximate distance to nearest receptor, (m)	Peak Particle Velocity (PPV) threshold of low impact, (mm/s)	Predicted PPV level, (mm/s)	Level difference, dB
ID	Address				
HDD19-N (church)	1 LONGBACK COTTAGES, WATER LANE, BN44 3DX	78	0.3	0.6	+0.3
HDD19-SW	BUTCHERS FARM, WATER LANE, BN44 3DW	86	0.3	0.6	+0.3
HDD21-E	SMALLWOOD HOUSE, STEYNING ROAD, BN44 3AN	75	0.3	0.7	+0.4
HDD22-S	1 MERRION FARM COTTAGES, BINES GREEN, RH13 8EH	80	0.3	0.6	+0.3
HDD24-E	MONKSWOOD, HANGERWOOD, RH13 8HJ	74	0.3	0.7	+0.4
HDD24-S	2 MORLEYS COTTAGES, BRIGHTON ROAD, RH13 8HQ	75	0.3	0.7	+0.4

### *Magnitude of change*

- 21.9.84 The results presented in **Table 21-36** show that an exceedance above the 0.3mm/s threshold of **Low** magnitude of change will occur at six sensitive receptors within 100m of the HDD works, which will experience a **Medium** magnitude of change.

### *Sensitivity of receptor*

- 21.9.85 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors in line with **Table 21-22**.

### *Significance of residual effect*

- 21.9.86 The Rampion 2 embedded environmental measures (as shown in **Table 21-20**) include C-22 and C-33 which will be adopted to minimise the disturbance to noise sensitive receptors.
- 21.9.87 For residential receptors, the magnitude of change is defined as **Low** to **Medium** and the sensitivity of the receptors are classified as **Medium**. Following implementation of the embedded environmental measures (C-22 and C-33) it is considered that the magnitude of change at all residential receptors would be a **Low** magnitude of change. Therefore, as this direct effect is temporary, it is determined to be of **Minor adverse significance** and **Not Significant** in EIA terms.
- 21.9.88 An exceedance of 0.3mm/s “vibration might be just perceptible in residential environments” (BSI, 2014b).
- 21.9.89 The LOAEL is predicted to be exceeded at receptor locations, the SOAEL is not. Best practical means will be applied via commitment C-33 (**Table 21-20**) reducing the impact at sensitive receptors.

### *Temporary vibration effects from construction road traffic*

- 21.9.90 The prediction of vibration from HGVs travelling over irregularities has assumed the following within the calculation: 30 mm depth of inconsistency, London clay soils used as an approximation. It is assumed that A and B roads would be in a good state of repair and would not have irregularities; as well as already having a high quantity of HGV flows, such that development traffic would not significantly contribute to any existing vibration issues if there were any. Whilst most small roads identified in the Study Area have national speed limits, given the small size of the roads (often single roads), it is unlikely that any large vehicle would reach 60 mph. Two speeds have been used for these roads; 30 mph (also for locations near junctions) and 50 mph as a precautionary maximum.
- 21.9.91 Predictions are unlikely to be accurate at large distances from the road and therefore the calculations have been used to identify those impacts of high magnitude of change on medium receptors, with a screening distance for high sensitivity receptors of 40 metres as a precautionary approach.



### *Magnitude of change*

- 21.9.92 The predictions show that at 30 mph, any residence within 2 m of the irregularity would experience an impact of high magnitude and any residence within 5 m of an HGV travelling over an irregularity at 50 mph would experience a **high impact**. On this basis, the following receptors have been identified as at risk of high impacts:
- Michaelgrove Lane: North Lodge (OSGB East 508647.052, North 107716.937) and opposite residence (OSGB East 508638.621, North 107705.97), Spearfield stud and livery (OSGB East 508918.26, North 107545.949);
  - Spithandle Lane residence (OSGB East 517965.969, North 114930.107);
  - Kent Street: 1, 2, 3 Barrack Cottages (OSGB East 522917.315, North 121264.19), Royal Oak Country Park (OSGB East 523580.049, North 120841.596), Two wooden outhouses (OSGB East 523093.346, North 120855.6), (OSGB East 522973.303, North 121121.773) associated with residences;
  - Fryland Lane: Seasons and associated wooden outbuilding (OSGB East 523618.855, North 119750.627); and
  - Wineham lane: The Cottage (OSGB East 523722.66, North 118309.41), Stable Cottage (OSGB East 523611.15, North 120003.001), Pool Cottage (OSGB East 523613.12, North 119976.346), 96 Wineham Lane and associated wooden out building (OSGB East 523580.076, North 120062.785), Caeburn (OSGB East 523576.868, North 120100.091), Russets (OSGB East 523557.64, North 120385.012), Old Doctors Cottage (OSGB East 523848.503, North 121300.831) and adjacent residences (OSGB East 523837.479, North 121277.203, OSGB East 523851.8, North 121306.918).
- 21.9.93 Other receptors farther from these roads could still experience vibration from HGVs travelling over irregularities, but no more than a **medium impact**.

### *Sensitivity of receptor*

- 21.9.94 The sensitivity of the vibration sensitive receptors identified is considered to be **Medium** for residential receptors and animal husbandry in line with **Table 21-22**.

### *Significance of effect*

- 21.9.95 The identified residences of high impacts on receptors of medium sensitivity would result in a **Moderate Adverse effect** which would be **Significant in EIA** terms.
- 21.9.96 A medium impact on medium receptors would be considered a **Minor effect** and **Not Significant** in EIA terms on the basis of the temporary nature of the vibration; both in terms of duration of works and also the transient nature of the HGV passing.

### Significance of Residual Effect

- 21.9.97 The commitment for checking roads (C-160) will identify if the above receptors are at risk of significant effects, with only those irregularities within 5 m of the property needing to be repaired. To ensure that significant effects do not occur identified irregularities should be repaired. With any repairs achieved the magnitude of change at all vibration sensitive receptors would be up to **Medium**, on receptors of **Medium sensitivity**, resulting in a **Minor effect**, but **Not Significant** in EIA terms.

## 21.10 Assessment: Operation and maintenance phase

- 21.10.1 An assessment of the operational noise generated by the onshore substation has been conducted using the prediction methodology within ISO 9613-2:1996 (ISO, 1996) and assessed in accordance with BS 4142:2014+A1:2019 (BSI, 2019). Broadband sound pressure levels have been provided for the proposed equipment and cooling plant. The assessment is based on knowledge of similar equipment and refers to baseline sound level measurements around the Oakendene onshore substation. The approach to the assessment is discussed in **Section 21.8**.
- 21.10.2 Any noise effects from maintenance activities have been scoped out of requiring an assessment due to the low levels of noise anticipated from any negligible associated road traffic and limited maintenance activities at the onshore substation.
- 21.10.3 The noise modelling has been undertaken on indicative locations of the noisiest equipment within the onshore substation. The equipment final locations may change relative to the modelled locations due to minor site layout changes during detailed design. However, this will not significantly alter the emission levels at receptors or have any corresponding change on the BS 4142 assessment (BSI, 2019) or significance outcomes as the maximum design scenario has been considered.
- 21.10.4 A three-dimensional model using SoundPLAN 3D modelling software was created using geo-referenced OS mapping data, topographical data (10 m terrain) of the local area incorporating buildings, plans and elevations of the onshore substation site. Daytime predictions were undertaken at the ground floor level and night times predictions were undertaken at first floor level, 1.5m and 4.0m respectively. Ground absorption was set to 0.5 for mixed ground.
- 21.10.5 A tonal penalty of +4 dB has been applied to the specific noise levels to account for the low frequency 'hum' at 100Hz, which is a characteristic of SGTs. No other corrections have been applied (i.e. noise will not be impulsive, intermittent or contain other sound characteristics).
- 21.10.6 The National Grid Technical Specification TS 2.03 defines the guaranteed maximum sound power level ( $L_w$ ) for SGTs for the Oakendene onshore substation site up to 950MVA. The assessment of operational sound generated by Oakendene onshore substation has been conducted using the worst-case sound power levels of the transformers of 83.5 dB(A) under design load.
- 21.10.7 BS 4142:2014+A1:2019 (BSI, 2019) states '*The standard is not applicable to the assessment of low frequency noise.*' However, the Association of Noise Consultants (ANC) (2020) technical guidance note on BS 4142:2014+A1:2019

states that ‘BS 4142 does not necessarily exclude such a wide range [10 – 160 Hz]. It would be reasonable to use BS 4142 down to 50 Hz and possibly lower as part of a tonality assessment, for example.’ The technical guidance note goes on to say that in connection to this:

- ‘where low frequency sound clearly arises from the assessment site it could be considered as part of an assessment (see Annexes C and D of BS 4142);
- where low frequency noise is the dominant component of the specific sound source, the applicability of BS 4142 should be considered and justified if necessary; and
- care should be taken when identifying sources (at Section 4) that low frequency sources are correctly apportioned.’

- 21.10.8 The 100 Hz components of acoustic energy are the most onerous when assessing operational substation noise, with relatively negligible acoustic energy below 50 Hz. Consequently, the issue of low frequency noise has been considered for noise modelling considerations, assessment of noise emission from the operational substations and in the design of mitigation (i.e. transformer enclosures with an insertion loss of 20 dB at 100 Hz).
- 21.10.9 As agreed with MSDC, an indicative noise break-in assessment has been undertaken and provided below to illustrate that expectant low frequency noise will not give rise to any adverse effects.

#### Operational noise sources – onshore substation

- 21.10.10 **Table 21-37** provides the operational noise sources associated with the onshore substation included within the 3D noise model. The layout of the noise model is presented in **Figure 21.3: Substation Model Layout, Volume 3** of the ES (Document Reference: 6.3.21).

**Table 21-37 Operational noise sources – onshore substation**

Component	Component Quantity	Sound power level, dBA	Height above ground level, (m)
Supergrid Transformer, 110MW	3	84	6.4
Supergrid Transformer Cooling Unit	3	65	6.4
STATCOM Heat Exchanger	9	71	1.5
Shunt Reactor	6	79	6.7
Harmonic Filter	2	87	5.8

### *Predicted operational noise levels*

- Predicted operational noise levels have been compared with the lowest most commonly occurring measured representative baseline sound levels for the daytime and night-time periods (outlined in **Appendix 21.1: Baseline sound report, Volume 4** of the ES (Document Reference: 6.4.21.1) for those receptors closest to the onshore substation at Oakendene. All receptors considered are residential and of **Medium** sensitivity.

21.10.11 **Table 21-38** outlines the predicted unmitigated noise levels and the respective magnitude of change at each NSR on the basis of the following three assessment methods as detailed in **Section 21.8**:

- the BS 4142:2014+A1:2019 (BSI, 2019) initial estimate of impact, where the difference between the onshore substation noise rating level and the representative background sound level at the corresponding NSR is calculated for the daytime and night-time periods;
- the IEMA (2014) sound change level assessment, where the predicted specific sound level of the onshore substation is added to the measured ambient sound level at the corresponding NSR for the daytime and night-time periods to identify the likely change in ambient sound level; and
- the WHO Night Noise Guidelines (NNG) (2009) assessment, where the predicted specific sound level of the onshore substation is compared with the LOAEL and SOAEL criteria in **Table 21-26**. As the onshore substation will operate continuously, with negligible fluctuation in its noise emissions, the predicted specific sound level (identified as an  $L_{Aeq,T}$ ) is considered equal to the  $L_{night,outside}$  parameter used in the WHO NNG (2009).

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**Table 21-38 Operational noise assessment – Onshore substation Unmitigated**

Receptor		BS 4142 Initial estimate of impact (2019)					IEMA Assessment (2014)		
ID	Address	Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category
<b>Daytime (0700 – 2300)</b>									
SS1 -NE	SOUTHLAND S, KENT STREET, RH13 8BA	32	54	36	-18	Very Low	0.0	Very Low	NOEL
SS2 -SE	WESTRIDGE, KENT STREET, RH13 8BB	29	38	33	-5	Very Low	0.0	Very Low	LOAEL
SS3 -SW	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	26	40	30	-10	Very Low	0.0	Very Low	LOAEL
SS4 -NW	OAKENDENE MANOR,	33	45	37	-8	Very Low	0.0	Very Low	LOAEL

Receptor		BS 4142 Initial estimate of impact (2019)					IEMA Assessment (2014)		
ID	Address	Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category
BOLNEY ROAD, RH13 8AZ									
<b>Night-time (2300 – 0700)</b>									
SS1-NE	SOUTHLAND S, KENT STREET, RH13 8BA	32	30	36	+6	Medium	0.0	Very Low	LOAEL
SS2-SE	WESTRIDGE, KENT STREET, RH13 8BB	29	28	33	+5	Medium	0.3	Very Low	LOAEL
SS3-SW	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	26	31	30	-1	Low	0.0	Very Low	LOAEL
SS4-NW	OAKENDENE MANOR,	33	30	37	+7	Medium	0.2	Very Low	LOAEL

Receptor		BS 4142 Initial estimate of impact (2019)				IEMA Assessment (2014)			
ID	Address	Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category
	BOLNEY ROAD, RH13 8AZ								



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### *Magnitude of change*

- 21.10.12 **Table 21-38** identifies a magnitude of change of **Very Low** at all NSRs during the daytime and **Medium to Low** for the night-time.
- 21.10.13 Using the IEMA (2014) noise level change criteria, a **Very Low** magnitude of change is predicted at all NSRs.

### *Sensitivity of receptor*

- 21.10.14 The sensitivity of the noise receptors identified are considered to be **Medium**, as all assessed receptors are residential.

### *Significance of residual effect*

- 21.10.15 For residential receptors during the daytime, the worst-case magnitude of change is defined as **Low** and the sensitivity of the receptors are classified as **Medium**. Therefore, there is direct, permanent, residual effect of **Minor adverse significance**, which is **Not Significant** in EIA terms, and satisfy the noise rating level limits as presented in the embedded environmental measures outlined in **Table 21-20** (C-231).
- 21.10.16 For residential receptors during the night-time, the worst-case magnitude of change is defined as **Medium** and the sensitivity of the receptors are classified as **Medium**. Therefore, there is direct, permanent, residual effect of **Minor / Moderate adverse significance**, which is **Potentially Significant** in EIA terms.
- 21.10.17 In order to reduce the effect of the noise levels to be not significant in terms of EIA, mitigation is required. As per the embedded environmental measures outlined in **Table 21-20** (C-231), daytime and night-time noise rating level limits have been set which are reflective of an effect with no significance.
- 21.10.18 The Sussex Noise Guidance for Developers (WSCC et al., 2021) states “*The rating level of the industrial or commercial sound source should, where practicable, achieve a level no greater than the representative background sound, where measured in accordance with BS 4142:2104+A1:2019*”. However, as described in **paragraph 21.8.18**, where background sound levels are less than about 30 dB  $L_{A90}$ , and rating levels are less than about 35 dB  $L_{Ar,Tr}$ , it would not be unreasonable to consider these levels as low in the context of the BS 4142 initial estimate of impact. Therefore, BS 4142 states that absolute levels may be as, or more impact than relative outcomes where background and rating levels are low.
- 21.10.19 As shown in **Table 21-38**, the representative background sound levels at each NSR range between 28 – 31 dB  $L_{A90,15mins}$  during the night-time, which on the basis of the above are considered low in the context of BS 4142. Therefore, the consideration of absolute levels to identify the appropriate magnitude of change is prudent in this case. Consequently, the night-time design limit noise rating level of 35 dB  $L_{Ar,Tr}$  has been set, as this is representative of a noise level between the NOEL (30 dB  $L_{night,outside}$ ) and LOAEL (40 dB  $L_{night,outside}$ ) in accordance with the WHO NNG (2009). In addition, being able to set the design limit at 35 dB(A) reduces the risk posed by uncertainty, though small, in the measurements.

- 21.10.20 In order to meet the design limit, the harmonic filters will require damping that achieves a broadband insertion loss of 4 dB. This can be achieved by a number of different techniques including: hybrid active filters; derating the harmonic generating equipment; and using reactors in series with the shunt power factor correction capacitors. Additional options exist if the plant equipment in the final design is higher than that used within predictions such as enclosures for transformers. This reduces the risk of the uncertainty previously discussed regarding the range of plant noise levels possible for the assessment.
- 21.10.21 **Table 21-39** outlines the predicted mitigated noise levels and the respective magnitude of change at each NSR. The associated noise contours are presented on **Figure 22.5: Substation Noise Mitigated, Volume 3** of the ES (Document Reference: 6.3.21).

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**Table 21-39 Operational noise assessment – Onshore substation Mitigated**

ID	Receptor	BS 4142 Initial estimate of impact (2019)					IEMA Assessment (2014)		
		Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category
<b>Daytime (0700 – 2300)</b>									
SS1-NE	SOUTHLANDS, KENT STREET, RH13 8BA	32	54	34	-20	Very Low	0.0	Very Low	NOEL
SS2-SE	WESTRIDGE, KENT STREET, RH13 8BB	29	38	32	-6	Very Low	0.0	Very Low	LOAEL
SS3-SW	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	26	40	29	-11	Very Low	0.0	Very Low	NOEL
SS4-NW	OAKENDENE MANOR, BOLNEY	33	45	35	-10	Very Low	0.0	Very Low	NOEL

ID	Receptor	BS 4142 Initial estimate of impact (2019)				IEMA Assessment (2014)				
		Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category	
	ROAD, RH13 8AZ									
	<b>Night-time (2300 – 0700)</b>									
SS1-NE	SOUTHLANDS, KENT STREET, RH13 8BA	32	30	34	+4	Low	0.0	Very Low	LOAEL	
SS2-SE	WESTRIDGE, KENT STREET, RH13 8BB	29	28	32	+4	Low	0.3	Very Low	LOAEL	
SS3-SW	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	26	31	30	0	Low	0.0	Very Low	LOAEL	
SS4-NW	OAKENDENE MANOR, BOLNEY	33	30	35	+5	Medium	0.1	Very Low	LOAEL	

ID	Receptor	BS 4142 Initial estimate of impact (2019)				IEMA Assessment (2014)			
		Predicted Specific Sound Level at Receiver, dB $L_s$	Representative Background Sound Level at Receiver, dB $L_{A90,15min}$	Rating Level, dB $L_{Ar,Tr}$	Level Difference (i.e. Rating Level – Background), dB	Magnitude of change	Change in Ambient Sound Level, dB $L_{Aeq,T}$	Magnitude of change	NPSE Category
	ROAD, RH13 8AZ								

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- 21.10.22 As the absolute noise level (i.e. the specific noise level from the onshore Oakendene substation) is not exceeding 35 dB  $L_{\text{night, outside}}$ , in line with the WHO NNG (2009), there would be no observed effects on sleep. On this basis, it is considered that the predicted noise emissions from the onshore substation would not constitute adverse impact in terms of BS 4142 during the night-time, and therefore satisfy the requirements of The Sussex Noise Guidance for Developers (WSCC et al., 2021), despite exceeding the level difference guidance. As a result the change in noise would be considered **low impact**, on receptors of **medium sensitivity** and therefore an effect of **minor adverse** and **not significant**.

*Indicative noise break-in assessment – Oakendene substation low frequency noise*

- 21.10.23 As agreed with MSDC, a supplementary indicative noise break-in assessment of the predicted operational substation noise has been undertaken to illustrate that low frequency noise will not give rise to any adverse effects. This does not form part of the assessment process and is included here for completeness in answering MSDC's concerns.
- 21.10.24 Calculations have been undertaken using the calculation methodology in Annex G.2.2 in BS 8233 (BSI, 2014c). The resultant internal noise levels have then been compared against NR curves to identify whether the low frequency content of the Oakendene substation operational noise is likely to be at an acceptable level.
- 21.10.25 The following assumptions have been made in order to ensure a worst-case assessment:
- worst-case room dimensions of 2 m (L) x 2 m (W) x 2.7 m (H) has been assumed with an external façade area of 5.4 m<sup>2</sup> and a window area of 2 m<sup>2</sup> (representative of a small bedroom);
  - the external wall is assumed to be brick and block (as per BS 8233 Annex G.2.2 example calculation); and
  - an open window has been assumed in line with the worst-case opening sound reduction values as provided in Table 5.6 of NANR116: 'Open/closed window research' (Waters-Fuller et al., 2007) with an opening size of 200k mm<sup>2</sup>.
- 21.10.26 As per **Table 21-38**, the worst-case predicted rating level at the nearest noise sensitive receptor is 35 dB  $L_{A,T,r}$ . The operational noise assessment was undertaken using broadband data as spectral data for the proposed Oakendene operational plant was not available. On this basis, to ensure a worst-case assessment, it has been assumed that each octave band level is 35 dB. This is reflective of a broadband level of 42 dBA and is hence an overestimation of the predicted operational level at the receptor.
- 21.10.27 On the above basis, the resultant internal spectrum is reflective of **NR25**. NR25 is the maximum noise rating level for concert halls, recording studios and churches (NR25), and below the maximum noise rating levels for private dwellings, hospitals, theatres and cinemas (NR30). Consequently, it is considered that low frequency noise from the operational noise emissions of Oakendene substation would be negligible inside sensitive spaces within the nearest noise sensitive receptors.

## 21.11 Assessment of effects: Decommissioning phase

### Overview

- 21.11.1 The assessment for the decommissioning phase considers potential significant effects from the decommissioning of the onshore substation only. As per [paragraph 4.9.29 of Chapter 4: The Proposed Development, Volume 2](#) of the ES (Document Reference: 6.2.4), it is anticipated that the onshore electrical cables will be left in-situ with ends cut, sealed and buried to minimise environmental effects associated with removal. For this reason, no decommissioning phase assessment has been made for the onshore cable route, as the electrical cables will be left in-situ.
- 21.11.2 It is assumed that the majority of the activities associated with the decommissioning phase of the onshore substation construction will be similar to the activities associated with the onshore substation construction phase. For this reason, the noise and vibration effect of decommissioning will be largely the same as construction. There will however be differences between the construction and decommissioning phases of the onshore substation, which will be:
- no concrete pouring (and therefore no overnight concrete floating at the onshore substation location); and
  - if concrete within the onshore substation location is not left in situ they may require breaking before removal, using a pneumatic hammer. The use of this plant would be noisier than many of the plant aspects assessed within the construction phase, and therefore has been considered specifically in this section in relation to noise from the onshore substation.
- 21.11.3 **Table 21-40** shows the predicted noise levels due to pneumatic hammering at the nearest noise sensitive receptors. It is assumed that the breaking of the concrete will not last more than a month but might last for up to 9 consecutive days within any 15. For this reason, the magnitude of change is based on the trigger levels from **Table 21-23**.

**Table 21-40 Noise levels due to onshore substation decommissioning**

Receptor		Distance from Boundary, m	Noise Level, dB L <sub>Aeq,T</sub>
ID	Address		
SS1-NE	SOUTHLANDS, KENT STREET, RH13 8BA	190	64
SS3-SE	WESTRIDGE, KENT STREET, RH13 8BB	220	63
SS4-SW	TAINTFIELD FARMHOUSE, KINGS LANE, RH13 8BD	450	57
SS4-NW	OAKENDENE MANOR, BOLNEY ROAD, RH13 8AZ	200	64

#### Magnitude of change

- 21.11.4 As shown in **Table 21-40**, noise from the breaking of concrete during the decommissioning phase will not exceed the 75dB threshold. However, the decommissioning works in total would be expected to be for a duration of more than a month. Given the predicted levels from the construction activities, it is likely that the magnitude of change for decommissioning will be as per the construction phase, being **Very Low**.

#### Sensitivity of receptor

- 21.11.5 The sensitivity of the noise sensitive receptors identified is considered to be **Medium** for residential receptors in line with **Table 21-22**. Any relevant noise sensitive non-residential receptors are not located in close proximity to the onshore substations.

#### Significance of residual effect

- 21.11.6 The Rampion 2 commitments (as shown in) **Table 21-20** include C-22, C-26 and C-33 which will be implemented to minimise the disturbance to noise sensitive receptors.
- 21.11.7 For residential receptors, the magnitude of change is defined as **Very Low** and the sensitivity of the receptors are classified as **Medium**. As this direct residual effect is temporary, it is determined to be of **Minor adverse significance** and **Not Significant** in EIA terms.

- 21.11.8 The daytime LOAEL of 65dB L<sub>Aeq, 16hr</sub> will not be exceeded at any of the identified noise sensitive receptors.

## 21.12 Assessment of cumulative effects

### Approach

- 21.12.1 A cumulative effects assessment (CEA) examines the combined impacts of Rampion 2 in combination with other developments on the same single receptor or resource and the contribution of Rampion 2 to those impacts. The overall method followed in identifying and assessing potential cumulative effects in relation to the environment is set out in **Chapter 5: Approach to the EIA, Volume 2** (Document Reference: 6.2.5 and **Appendix 5.4: Cumulative effects assessment detailed onshore search and screening criteria, Volume 4** of the ES (Document Reference: 6.4.5.4).
- 21.12.2 The onshore screening approach follows the Planning Inspectorate's Advice Note Seventeen (Planning Inspectorate, 2019) which is an accepted process for Nationally Significant Infrastructure Projects (NSIPs) and follows the four-stage approach set out in the guidance.

### Cumulative effects assessment

- 21.12.3 For noise and vibration, a Zone of Influence (ZOI) has been applied for the CEA to ensure direct and indirect cumulative effects can be appropriately identified and assessed as follows:
- construction phase – 500m from the temporary construction compounds, landfall, and onshore substation;
  - operation and maintenance phase (onshore substation) – 1km from the onshore substation boundary; and
  - operation and maintenance phase (WTGs) – 20km from the offshore WTGs.
- 21.12.4 The cable trenching and trenchless crossings would be sufficiently temporary that cumulative effects from other construction works would be very unlikely and therefore not considered further in the noise and vibration CEA.
- 21.12.5 Due to the distance of the wind farm piling to onshore receptors this would not likely have a cumulative effect with other onshore construction works. The offshore piling works are to be included in the ES construction noise assessment due to the duration of these works rather than because the anticipated noise level from piling would exceed BS 5228 threshold values. It is expected that piling noise levels would be sufficiently lower than the threshold levels such that there would be no contribution of the piling noise to exceedances of the BS 5228 threshold values from the construction of other developments.
- 21.12.6 A development needs to be of a certain type, size, and duration in order to be considered as potential to have a cumulative significant effect. For instance, a

single WTG 5km from the noise and vibration study area would be considered very unlikely to result in a significant cumulative effect for noise.

- 21.12.7 A short list of ‘other developments’ that may interact with the Rampion 2 ZOIs during their construction, operation and maintenance, or decommissioning is presented in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4)) and on **Figure 5.4.1 to Figure 5.4.4 of Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4). This list has been generated applying criteria set out in **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and **Appendix 5.3: Cumulative effects assessment detailed onshore search criteria, Volume 4** of the ES (Document Reference: 6.4.5.3) and has been collated up to the finalisation of the ES through desk study, consultation, and engagement.
- 21.12.8 Only those ‘other developments’ in the short list that fall within the noise and vibration ZOI have the potential to result in cumulative effects with the Proposed Development on noise and vibration. All ‘other developments’ falling outside the noise and vibration ZOI are excluded from this assessment. The following types of ‘other development’ have the potential to result in cumulative effects on noise and vibration.
- 21.12.9 The following types of development have the potential to result in cumulative effects on noise and vibration:
- any long term construction works expected to be undertaken within the ZOI at the same time as the Rampion 2 construction activities;
  - wind farms; and
  - infrastructure developments likely to have notable building service noise emissions.
- 21.12.10 A tiered approach to the CEA has been set out in **Table 5-6 in Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) and can be summarised as follows:
- Tier 1: developments under construction, permitted applications, and submitted applications;
  - Tier 2: Other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has been submitted; and
  - Tier 3: Other developments on the Planning Inspectorate Programme of Projects where a Scoping Report has not been submitted, or where developments are identified in Development Plans or other plans as appropriate.
- 21.12.11 On the basis of the above, the following specific other developments contained within the short list in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4) are considered in this CEA, are scoped into the noise and vibration CEA are outlined in **Table 21-41**.

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**Table 21-41 Developments considered as part of the noise and vibration CEA**

ID <sup>6</sup>	Development type	Development name	Application reference	Status	Confidence in assessment	Tier <sup>7</sup>	Distance to Rampion 2 (m)
13 / 14 / 63	Mixed Use 300 dwellings and ancillary infrastructure	Land at Climping  Arun Local Plan (2018) Reference Site SD10  Policy H SP2c	CM/48/21/RES / CM/1/17/OUT / Local Plan site (SD10)	Application pending a decision: submitted 31/08/2021 / Application approved (after appeal) 28/09/2018 / Allocated in Local Plan	High	1	Within proposed DCO Order Limits
60	Mixed use  Proposed site that could provide up to	Littlehampton	LEGA/SD4  Site at West Bank (Policy H SP2b)	Allocated in Local Plan – No application at present.	Low	3	552

<sup>6</sup> ID reference as stated in Table 2-1 in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4) and on **Figure 5.4.2 to 5.4.4, Volume 4** of the ES (Document Reference: 6.4.5.4).

<sup>7</sup> **Chapter 5: Approach to the EIA, Volume 2** of the ES (Document Reference: 6.2.5) sets out the full definitions of the tiers.

<b>ID<sup>6</sup></b>	<b>Development type</b>	<b>Development name</b>	<b>Application reference</b>	<b>Status</b>	<b>Confidence in assessment</b>	<b>Tier<sup>7</sup></b>	<b>Distance to Rampion 2 (m)</b>
	1,000 dwellings.						
<b>W48</b>	Offshore windfarm	Rampion Offshore Wind Farm (Rampion 1)	EN010032	Operational	High	1	Adjacent to offshore element of the proposed DCO Order Limits



21.12.12 The cumulative Project Design Envelope is described in **Table 21-42**.

**Table 21-42 Cumulative Project Design Envelope for noise and vibration**

Project phase and activity/impact	Scenario	Justification
<b>Construction</b>	Tier 1 and 3: Residential construction	Potential for construction to occur at the same time resulting in a continuous or elevated impact from works on noise sensitive receptors.
<b>Cumulative operational wind farm noise</b>	Tier 1: Rampion Wind Farm operation	Potential additive noise from existing Rampion 1 wind farm resulting in exceedances of screening criteria at onshore noise sensitive receptors.

21.12.13 The CEA for noise and vibration is set out in **Table 21-43**.

**Table 21-43 Cumulative effects assessment for noise and vibration**

ID <sup>8</sup>	Development name	Application reference	Assessment discussion	Environmental measures
<b>13 / 14 / 63</b>	Land at Climping  Arun Local Plan (2018) Reference Site SD10  Policy H SP2c	CM/1/17/OUT	Low certainty of construction overlap and little information on potential noise emissions from application. Likely that construction of residential scheme would not be significant, though potential for noise to add to that at receptor locations with that coming from Climping compound, particularly at Field Place on Church	CoCP to be updated with cumulative impact from this development if overlap. General construction best practice to be applied to Climping Compound construction and operation.

<sup>8</sup> ID reference as stated in Table 2-1 in **Appendix 5.4: Cumulative effects assessment shortlisted developments, Volume 4** of the ES (Document Reference: 6.4.5.4) and on **Figure 5.4.2 to 5.4.4, Volume 4** of the ES (Document Reference: 6.4.5.5).

ID <sup>8</sup>	Development name	Application reference	Assessment discussion	Environmental measures
60	Arun Local Plan - reference site SD4: Littlehampton - West Bank  Policy H SP2b	Allocated in Local Plan - no application at present. Allocated in Local Plan	Lane, Barn End on Brookthorn Lane and residence on Crookthorn Lane.  Low certainty of construction overlap and little information on potential noise emissions from application. Likely that construction of residential scheme would not be significant, though potential for noise to add to that at receptor locations with that coming from Climping compound, particularly at Field Place on Church Lane, Barn End on Brookthorn Lane and residence on Crookthorn Lane.	CoCP to be updated with cumulative impact from this development if overlap. General construction best practice to be applied to Climping Compound construction and operation.
W48	Rampion Offshore Wind Farm (Rampion 1)	Operational	Rampion 1 Wind Farm included within the assessment of offshore noise on onshore receptors. Screening assessment showed no exceedances of screening criteria with both Rampion 1 and Rampion 2 operating together.	No measures needed.

## 21.13 Transboundary effects

21.13.1 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). There is no potential for significant transboundary noise and vibration effects upon the interests of European Economic Area (EEA) states. For this reason, it is not discussed further as part of this chapter.

## 21.14 Inter-related effects

- 21.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and maintenance and decommissioning phases of Rampion 2 on the same receptor, or group of receptors.
- 21.14.2 Inter-related effects could potentially arise in one of two ways. The first type of inter-related effect is a Proposed Development lifetime effect, where multiple phases of the Proposed Development interact to create a potentially more significant effect on a receptor than in one phase alone. The phases for Rampion 2 are construction, operation and maintenance, and decommissioning. All Proposed Development lifetime effects are assessed in [Chapter 30: Inter-related effects, Volume 2](#) (Document Reference: 6.2.30).
- 21.14.3 The second type of inter-related effect is receptor-led effects. Receptor-led effects are where effects from different environmental aspects combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient, or longer-term. Receptor-led effects have been considered, where relevant, in this chapter. Full results of the receptor-led effects assessment can be found in [Chapter 30: Inter-related effects, Volume 2](#) of the ES (Document Reference: 6.2.30).

## 21.15 Summary of residual effects

- 21.15.1 **Table 21-44** presents a summary of the assessment of significant impacts, any relevant embedded environmental measures and residual effects on noise and vibration receptors. In each case, the impact and receptor combination is the one from the assessment which results in the highest adverse effect level.

**Table 21-44 Summary of assessment of residual effects**

Activity and impact	Magnitude of change	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
<b>Construction phase – noise</b>				
<b>Temporary noise effects from the construction, operation and deconstruction of</b>	Medium - Very Low	Medium (residential)/ High (non-residential)	C-22, C-26, C-33, C-263	Negligible to Minor adverse (Not Significant) (residential)

Activity and impact	Magnitude of change	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
the temporary construction compounds				Minor adverse (Not Significant) (non-residential)
Temporary noise effects from the landfall works and trenchless crossings	High - Very Low	Medium (residential)/ High (non-residential)	C-26, C-33, C-263	Negligible to Minor adverse (Not Significant) (residential)  Minor adverse (Not Significant) (non-residential)
Temporary noise effects from onshore substation construction	Very Low	Medium (residential)	C-22, C-26, C-33, C-263	Minor adverse (Not Significant)
Temporary noise effects from extension works at the existing National Grid Bolney substation	Very Low	Medium (residential)	C-22, C-26, C-33, C-263	Minor adverse (Not Significant)
Temporary noise effects from onshore cable installation (trenched)	Low	Medium (residential)/ High (non-residential)	C-22, C-26, C-33, C-263	Minor adverse (Not Significant) (residential)  Minor adverse (Not Significant) (non-residential)
Temporary noise effects from construction and use of temporary and permanent accesses	Very Low – Low	Medium (residential)/ High (non-residential)	C-22, C-26, C-33, C-263	Negligible to Minor adverse (Not Significant) (residential)  Minor adverse (Not Significant) (non-residential)

Activity and impact	Magnitude of change	Receptor and sensitivity or value	Embedded environmental measures	Assessment of residual effect (significance)
<b>Temporary noise effects from construction road traffic noise</b>	Very Low – Low	Medium (residential)/ High (non-residential)	C-160, C-263	Negligible / Minor adverse (Not Significant) (residential)  Minor adverse (Not Significant) (non-residential)
<b>Construction phase – vibration</b>				
<b>Temporary vibration effects from the landworks and trenchless crossings</b>	Low - Medium	Medium (residential)/	C-22, C-33, C-263	Minor adverse significance (Not Significant) (residential)
<b>Temporary vibration effects from construction road traffic</b>	Medium	Medium (residential)	C-160, C-263	Minor (Not Significant)
<b>Operational phase - Noise</b>				
<b>Onshore Substation noise</b>	Low	Medium (residential)	C-231	Minor (Not Significant)
<b>Decommissioning phase – noise</b>				
<b>Onshore substation decommissioning noise</b>	Very Low	Medium (residential)	C-22, C-26, C-33, C-263	Minor significance (not significant)

## 21.16 Glossary of terms and abbreviations

Table 21-45 Glossary of terms and abbreviations – noise and vibration

Term (acronym)	Definition
<b>ADC</b>	Arun District Council
<b>ANC</b>	Association of Noise Consultants
<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>BPM</b>	Best Practical Means
<b>BS</b>	British Standard
<b>CCW</b>	Countryside Council for Wales
<b>Code of Construction Practice (COCP)</b>	The code sets out the standards and procedures to which developers and contractors must adhere to when undertaking construction of major projects. This will assist with managing the environmental impacts and will identify the main responsibilities and requirements of developers and contractors in constructing their projects.
<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>CRTN</b>	Calculation of Road Traffic Noise
<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>Cumulative Effects Assessment (CEA)</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>Term (acronym)</b>	<b>Definition</b>
<b>Cumulative Zone of Influence</b>	The area in which other future developments within the planning regime have the potential to have effects in conjunction with the Proposed Development.
<b>dB</b>	Decibel
<b>Ministry of Housing, Communities and Local Governments (MHCLG)</b>	Ministerial department (now Department for Levelling Up, Housing and Communities). This department is responsible for driving growth, meeting housing demands and supporting communities.
<b>Decommissioning</b>	The activities through which a development and its associated processes are removed from active operation.
<b>Department for Energy Security and Net Zero (DESNZ)</b>	Department of His Majesty's Government responsible for securing our long-term energy supply.
<b>Department for Environment, Food and Rural Affairs (Defra)</b>	Department of His Majesty's Government responsible for the improvement and safeguarding of the environment, the expansion of a green economy and the development of rural and farming communities.
<b>Department of Energy and Climate Change (DECC)</b>	Department of His Majesty's Government (now Department for Business, Energy & Industrial Strategy) responsible for functions relating to energy and climate change.
<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>Development Consent Order 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>DMRB</b>	Design Manual for Roads and Bridges
<b>EA</b>	Environment Agency
<b>EEA</b>	European Economic Area
<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

Term (acronym)	Definition
	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>ESCC</b>	East Sussex County Council
<b>Evidence Plan Process (EPP)</b>	A voluntary consultation process with specialist stakeholders to agree the approach and the information required to support the EIA and HRA for certain aspects.
<b>Statutory consultation</b>	Statutory consultation refers to 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>FY</b>	Future Year
<b>GPG</b>	Good Practice Guidance
<b>HE</b>	Highways England
<b>HGV</b>	Heavy Goods Vehicle
<b>Horizontal Directional Drill (HDD)</b>	A trenchless crossing engineering technique using a drill steered underground without the requirement for open trenches. This technique is often employed when crossing environmentally sensitive areas, major water courses and highways. This method is able to carry out the underground installation of pipes and cables with minimal surface disruption.
<b>Impact</b>	The changes resulting from an action.
<b>Indirect effects</b>	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



Term (acronym)	Definition
	<p>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>Non-statutory consultation</b>	Non-statutory consultation refers to the voluntary consultation that RED undertake in addition to the formal consultation requirements.
<b>Institute of Environmental Management and Assessment (IEMA)</b>	International membership organisation for environment and sustainability professionals.
IoA	Institute of Acoustics
IPC	Infrastructure Planning Commission
LA <sub>10,T</sub>	A-weighted sound level exceeded for 10% of the measurement period. It is widely used as a descriptor of road traffic noise.
LA <sub>90,T</sub>	A-weighted sound level exceed for 90% of the measurement period. It is usually referred to as the background sound level.
L <sub>Aeq,T</sub>	A-weighted equivalent continuous sound level and is the same sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is considered the best general purpose index for environmental sound.
<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.
LOAEL	Lowest Observed Adverse Effect Level
<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 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.
MSDC	Mid Sussex District Council

<b>Term (acronym)</b>	<b>Definition</b>
<b>MVA</b>	Megavolt Amperes, a measurement of electrical load, different to Mw which relates to the power output.
<b>National Policy Statements (NPS)</b>	<p>"Part 2 of the Planning Act 2008 sets out the national policy against which NSIP applications are assessed. NPSs set out guidance to inform the decision-making process for NSIPs. NPSs relevant to energy generation include:</p> <p>Overarching National Policy Statement for Energy (EN-1) (DECC, 2011a);            National Policy Statement for Renewable Energy (EN-3) (DECC, 2011b); and            National Policy Statement for Electricity Networks (EN-5) (DECC, 2011c).</p>
<b>Nationally Significant Infrastructure Project (NSIP)</b>	Nationally Significant Infrastructure Projects are major infrastructure developments in England and Wales which are consented by DCO under the Planning Act 2008. These include proposals for offshore wind farms with an installed capacity over 100MW.
<b>NE</b>	Natural England
<b>NPPF</b>	National Planning Policy Framework
<b>NPPG</b>	National Planning Practice Guidance
<b>NPSE</b>	Noise Policy Statement for England
<b>NSR</b>	Noise Sensitive Receptor
<b>NWG</b>	Noise Working Group
<b>Onshore part of the PEIR Assessment Boundary</b>	An area that encompasses all planned onshore infrastructure.
<b>OS</b>	Ordnance Survey
<b>Planning Inspectorate</b>	The Planning Inspectorate is the government agency supervising the planning process for NSIPs under the Planning Act 2008. The purpose of the Planning Inspectorate is to provide expertise on planning appeals, national infrastructure planning applications, examinations of local plans and other planning-related and specialist casework in England and Wales.
<b>PPV</b>	Peak Particle Velocity

Term (acronym)	Definition
<b>Preliminary Environmental Information Report (PEIR)</b>	The written output of the Preliminary Environmental Impact Assessment as required under The Infrastructure Planning 'Environmental Impact Assessment' Regulations 2017. It is developed to support statutory 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, draw preliminary conclusions on the likely significant effects of the Proposed Development and environmental measures proposed.
<b>Preliminary Environmental Information Report Supplementary Information Report (PEIR SIR)</b>	The PEIR SIR was prepared to inform the second Statutory Consultation exercise held between 18 October 2022 to 19 November 2022.
<b>Preliminary Environmental Information Report Further Supplementary Information Report (PEIR FSIR)</b>	The PEIR Further Supplementary Information Report (FSIR) identified and provided further preliminary environmental information associated with the proposed alternative route option identified since the publication of the original PEIR and PEIR SIR in July 2021 and October 2022 respectively (RED, 2021; 2022).
<b>Proposed Development</b>	The development that is subject to the application for development consent, as described in <a href="#">Chapter 4: The Proposed Development, Volume 2</a> of the ES (Document Reference: 6.2.4).
<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 direct and indirect impacts as a result of the Proposed Development.
<b>RED</b>	Rampion Extension Development Limited
<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>SDNPA</b>	South Downs National Park Authority
<b>Secretary of State (SoS)</b>	The Minister for Department for Energy Security and Net Zero (DESNZ).

Term (acronym)	Definition
<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>	<p>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.</p> <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>Site of Special Scientific Interest (SSSI)</b>	Sites designated at the national level under the Wildlife & Countryside Act 1981 (as amended). They are a series of sites that are designated to protect the best examples of significant natural habitats and populations of species.
<b>SOAEL</b>	Significant Observed Adverse Effect Level
<b>Sound Pressure Level</b>	Is the change in the static pressure of any media as a sound wave passes through expressed in decibels to compress the wide range of pascals we hear into manageable numbers and is usually A-weighted to take into account the frequency response of our hearing mechanism. Typical sound levels are as follows:

Term (acronym)	Definition																		
	<table border="1"> <thead> <tr> <th>Approximate Noise Levels dB(A)</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Threshold of hearing for normal young people.</td> </tr> <tr> <td>20</td> <td>Recording studio, ambient level.</td> </tr> <tr> <td>40</td> <td>Quiet residential neighbourhood, ambient level.</td> </tr> <tr> <td>60</td> <td>Department store, restaurant, speech levels.</td> </tr> <tr> <td>80</td> <td>Next to busy highway, shouting</td> </tr> <tr> <td>100</td> <td>Textile mill; press room with presses running; punch press and wood planers, at operator's position.</td> </tr> <tr> <td>120</td> <td>Ship's engine room; rock concert, in front and close to speakers.</td> </tr> <tr> <td>140</td> <td>Moon launch at 100m; artillery fire, gunner's position.</td> </tr> </tbody> </table>	Approximate Noise Levels dB(A)	Example	0	Threshold of hearing for normal young people.	20	Recording studio, ambient level.	40	Quiet residential neighbourhood, ambient level.	60	Department store, restaurant, speech levels.	80	Next to busy highway, shouting	100	Textile mill; press room with presses running; punch press and wood planers, at operator's position.	120	Ship's engine room; rock concert, in front and close to speakers.	140	Moon launch at 100m; artillery fire, gunner's position.
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<b>Special Protection Area (SPA)</b>	Sites designated under EU Directive (79/409/EEC) to protect habitats of migratory birds and certain threatened birds under the Birds Directive.																		
<b>Temporal Scope</b>	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.																		
<b>Temporary or permanent effects</b>	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.																		
<b>The Applicant</b>	Rampion Extension Development Limited (RED)																		
<b>Threshold value</b>	A level at which noise above would trigger a requirement. For instance, a potential assessment of significance in relation to BS 5228 noise criteria.																		

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<b>Term (acronym)</b>	<b>Definition</b>
<b>WHO</b>	World Health Organisation
<b>WSCC</b>	West Sussex County Council
<b>WTG</b>	The components of a wind turbine, including the tower, nacelle, and rotor.
<b>Zone of Influence (ZOI)</b>	The area surrounding the Proposed Development which could result in likely significant effects.

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