# Cambois Connection Onshore Scheme

# Environmental Statement Volume 2

# Chapter 13: Noise and Vibration

sse Renewables

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| **Kerrie Craig** |  | **30/10/2023** |
| Prepared by: | **SLR Consulting Ltd.** | |
| Prepared for: | **SSE Renewables** | |
| Checked by: | **Ashley Leiper** | |
| Accepted by: | **Kate Elliott** | |
| Approved by: | **Kerrie Craig** | |

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# Acronyms

| Acronym | Description |
|---|---|
| AAWT | Annual Average Weekday Traffic |
| aOD | above Ordnance Datum |
| AQTAG09 | Air Quality Technical Advisory Group 09 |
| BNL | Basic Noise Level |
| BS | British Standard |
| CEA | Cumulative Effects Assessment |
| CoCP | Code of Construction Practice |
| CoPA | Control of Pollution Act 1974 |
| dB | Decibel |
| DEFRA | Department for Environment Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges |
| EA | Environment Agency |
| EIA | Environmental Impact Assessment |
| EPA | Environmental Protection Act 1990 |
| ES | Environmental Statement |
| HGV | Heavy Goods Vehicle |
| HVDC | High Voltage Direct Current |
| HVAC | High Voltage Alternating Current |
| IEMA | Institute of Environmental Management and Assessment |
| IoA | Institute of Acoustics |
| Km | Kilometre |
| LOAEL | Lowest Observed Adverse Effect Level |
| m | Metre |
| MDS | Maximum Design Scenario |
| MLWS | Mean Low Water Springs |
| NCC | Northumberland County Council |
| NE | Natural England |
| NOEL | No Observed Effect Level |

| Acronym | Description |
|---|---|
| NOAEL | No Observed Adverse Effect Level |
| NPPF | National Policy Planning Framework |
| NPS | National Policy Statement |
| NSIP | Nationally Significant Infrastructure Project |
| NSR | Noise Sensitive Receptor |
| NTS | Non Technical Summary |
| NVMP | Noise and Vibration Management Plan |
| OS | Ordinance Survey |
| PDE | Project Design Envelope |
| PPC | Pollution Prevention and Control |
| PPV | Peak Particle Velocity |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SWL | Sound Power Level |
| SSSI | Site of Special Scientific Interest |
| TCC | Temporary Construction Compound |
| VSR | Vibration Sensitive Receptor |
| WHO | World Health Organisation |

# 13. Noise and Vibration

## 13.1. Introduction

1. This Chapter presents the assessment of the likely significant effects (as per the 'EIA Regulations'[1]) on the environment arising from the Cambois Connection Onshore Scheme on onshore noise and vibration receptors. Specifically, this Chapter considers the potential impact of the Onshore Scheme landward of Mean Low Water Springs (MLWS) during the construction, operational and maintenance, and decommissioning phases.

2. This assessment is informed by the following technical Chapters:

   - Chapter 9: Terrestrial Ecology and Ornithology; and
   - Chapter 12: Transport, Traffic and Access.

3. This Chapter summarises information contained within the following appendices:

   - Volume 3, Technical Appendix 13.1: Baseline Noise Assessment; and
   - Volume 3, Technical Appendix 13.2: Construction Plant Sound Levels.

## 13.2. Purpose of this Chapter

4. This Chapter:

   - Presents the existing environmental baseline established from desk studies, site-specific surveys and feedback obtained during technical engagement with stakeholders;
   - Identifies any assumptions and limitations encountered in compiling the environmental information;
   - Presents the potential environmental impacts from onshore noise arising from the Onshore Scheme, and reaches a conclusion on the likely significant effects from onshore noise based on the information gathered and the analysis and assessments undertaken; and
   - Highlights any necessary monitoring and/or mitigation measures recommended to prevent, minimise, reduce or offset the likely significant adverse environmental effects of onshore noise generated by the Onshore Scheme.

## 13.3. Study Area

5. The Onshore Scheme is located at Cambois, Blyth, south of the River Wansbeck and north of the River Blyth and encompasses around 188 ha of land.

6. The red line boundary for this area (hereafter referred to as 'the Site') is shown on Figure 1.2 and the Indicative Zones of Infrastructure are shown on Figure 5.1 (Volume 4).

[1] For the Onshore Scheme, these are Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). For the Marine Scheme, this includes: The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended), The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, and The Marine Works (Environmental Impact Assessment) Regulations 2007.

7. The Onshore Noise and Vibration Study Area has been defined as the extents of the Onshore Scheme plus a 2 km buffer. This definition was set out in section 9.5 of the Scoping Report (BBWFL, 2022); the Scoping Opinion accepted the proposed approach and no further comments were made. The Study Area is shown on Figure 13.1 (Volume 4).

8. This Study Area has been based on previous experience gained in projects with similar scopes: noise-sensitive receptors (NSRs) located further away would experience negligible effects of noise and vibration from the Onshore Scheme and therefore the assessment at the nearest receptors within a 2 km buffer is considered sufficiently representative and takes a conservative approach to identifying receptors.

## 13.4. Policy and Legislative Context

9. A summary of the policy and legislative provisions relevant to onshore noise and vibration are provided in Table 13-1 and Table 13-2

10. Where draft versions of the National Policy Statements overlap with existing versions, the revisions are shown with the ~~text replaced struck through~~ and the **new text in bold**. It should be noted that the draft NPSs do not hold the same legal status as the extant NPSs, however they provide additional clarity on the intent of the extant NPSs.

**Table 13-1 Summary of National Policy Statements and Planning Practice Guidance relevant to Onshore Acoustics**

| Relevant Policy | Summary of Relevant Policy Framework | How and Where Considered in the ES |
|---|---|---|
| **National Policy Statements** | | |
| EN-1 [2,3] *Overarching National Policy Statement for Energy* Paragraph 5.11.4<br>**Draft EN-1 Paragraph 5.12.6** | Paragraph 5.11.4 of EN-1 is reproduced below:<br>*'Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:*<br>• *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* ***or temporal*** *characteristics of the noise;*<br>• *identification of noise sensitive premises and noise sensitive areas that may be affected;*<br>• *the characteristics of the existing noise environment;*<br>• *a prediction of how the noise environment will change with the proposed development;*<br>• *in the shorter term such as during the construction period;*<br>• *in the longer term during the operating life of the infrastructure;*<br>• *at particular times of the day, evening and night* ***(and weekends)*** *as appropriate**, and at different times of year**.*<br>• *an assessment of the effect of predicted changes in the noise environment on any noise sensitive* ~~*premises and noise sensitive areas; and*~~ ***receptors, including an assessment of any likely impact on health and well-being where appropriate, and noise-sensitive areas;***<br>• ***if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise;***<br>• *measures to be employed in mitigating noise* ***using best available techniques to reduce noise impacts****'.* | The assessment has considered all the aspects identified, as detailed in section 13.12 of this Chapter. |

[2] Whilst it is acknowledged that the Onshore Scheme does not comprise or form part of an NSIP (please see Volume 2, Chapter 2: Policy and Legislative Context), NPSs are however a statement of government intention relating, in this case, to renewable energy projects, therefore can be taken into consideration during the preparation of the Onshore Scheme ES.
[3] A suite of draft revised Energy NPSs were published and consulted on by the UK Government in March 2023, and consultation closed on 23rd June. The consultation responses will be subject to consideration and the draft revised NPSs may now be revised before the NPSs are formally adopted. There is currently no date for the next stage of the review process and therefore this ES presents the extant adopted NPSs which have been considered during the preparation of this ES. It is however noted by the Applicant that the new draft NPSs state that they may be material considerations in other applications which are not considered under the Planning Act 2008, including the Onshore Scheme. Further detail on the consideration of the draft NPSs in this ES is provided in Volume 2, Chapter 2 Policy and Legislation.

| Relevant Policy | Summary of Relevant Policy Framework | How and Where Considered in the ES |
|---|---|---|
| EN-1 Paragraph 5.11.5<br>**Draft EN-1 Paragraph 5.12.8** | ~~The~~ **Applicants should consider 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~~. | Sections 13.12.1.26 to 13.12.1.30 consider the noise impact of increased construction traffic levels on receptors. |
| EN-1 Paragraph 5.11.6<br>**Draft EN-1 Paragraph 5.12.9** | Operational noise, with respect to human receptors, should be assessed using the principles of the relevant guidance and British Standards **and other guidance. Further information on assessment of particular noise sources may be contained in the technology specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies**. 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~~, for example BS 5228~~. | The assessment has been undertaken in accordance with the principles in the relevant technical guidance and British Standards as outlined in section 13.5. |
| EN-1 Paragraph 5.11.7<br>**Draft EN-1 Paragraph 5.12.10** | **Some noise impacts will be controlled through environmental permits and parallel tracking is encouraged where noise impacts determined by an environmental permit interface with planning issues (i.e., physical design and location of development).** The applicant should consult the ~~Environment Agency~~ **EA** and**/or the SNCB** ~~Natural England~~, as necessary**,** and in particular ~~with~~ regard**ing** ~~to~~ assessment of noise on protected species or other wildlife. The results of any noise surveys and predictions may inform the ecological assessment. The seasonality of potentially affected species in nearby sites may also need to be ~~taken into account~~ **considered**. | Sections 13.12.1.6 to 13.12.1.10 considers the potential noise impacts on ecological receptors. |
| Draft EN-1 Paragraph 5.12.12 | Applicants should submit a detailed impact assessment and mitigation plan as part of any development plan, including the use of noise mitigation and noise abatement technologies during construction and operation. | The siting of the proposed Onshore Converter Station has taken into account the locations of the nearest sensitive receptors. The embedded measures adopted to avoid and mitigate effects are set out in section 13.12.2.5<br><br>The siting and design of the Onshore Converter Station and mitigation adopted reduces the potential adverse impacts (see section 13.12).<br><br>It should be noted that the mitigation specified within this Chapter is within the design envelope assessed within other Chapters, e.g. Chapter 7: Landscape and Visual Amenity. |
| EN-1 Paragraph 5.11.11<br>**Draft EN-1 Paragraph 5.12.13** | The ~~IPC~~ **Secretary of State** should consider whether mitigation measures are needed both for operational and construction noise over and above any which may form part of the project application. In doing so the ~~IPC~~ **Secretary of State** may wish to impose ~~requirements~~ **mitigation measures**. Any such requirements should take account of the ~~guidance set out in Circular 11/95 (see Section 4.1)~~ **NPPF** or any successor to it **and planning practice guidance on noise**. | |
| EN-1 Paragraph 5.11.12<br>**Draft EN-1 Paragraph 5.12.14** | Mitigation measures may include one or more of the following:<br>• engineering: reduction of noise at point of generation and **/ or** ~~containment of~~ **containing the** noise generated;<br>• lay-out: ~~adequate~~ **where possible, optimising the** distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmission through **the use of** screening by natural **or purpose-built** barriers, or other buildings; ~~and~~<br>• administrative: restricting activities allowed on the site; specifying acceptable noise limits; and taking into account seasonality of wildlife in nearby designated sites~~.~~ | |

| Relevant Policy | Summary of Relevant Policy Framework | How and Where Considered in the ES |
|---|---|---|
| | • **insulation: mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building.** | |
| EN-1 Paragraph 5.11.13 | In certain situations, and only when all other forms of noise mitigation have been exhausted, it may be appropriate for the IPC to consider requiring noise mitigation through improved sound insulation to dwellings | |
| EN-1 Paragraph 5.11.8<br>**Draft EN-1 Paragraph 5.12.15** | The project should demonstrate good design through the selection of the quietest cost-effective plant available**; containment of noise within buildings wherever possible, taking into account any other adverse impact that such containment might cause e.g. on landscape and visual impacts; optimisation of plant layout to minimise noise emissions; and, where possible, the use of** ~~Measures should be taken to minimise noise, such as through~~ landscaping, bunds or noise barriers **to reduce noise transmission**. | |
| EN-1 Paragraph 5.11.9 | The proposal should avoid and mitigate adverse impacts on health and quality of life from noise and if possible, contribute to improvements in the above. | |
| EN-3 Paragraph 2.7.54 | The ES should include a noise assessment as set out in Section 5.11 of EN-1. However, the noise created by wind turbines in operation is related to wind speed and is different to general industrial noise and an additional assessment of this noise should be made. | As the Berwick Bank Wind Farm is outside the scope of the Cambois Connection project, wind turbine noise is outside the scope of this assessment. |
| EN-3 Paragraph 2.7.56 | The applicant's assessment of noise from the operation of the wind turbines should use ETSU-R-97, taking account of the latest industry good practice. This should include any guidance on best practice that the Government may from time to time publish. | |
| National Planning Policy Framework Paragraphs 174(e) and 185 | The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development. | The design of the Onshore Scheme has taken into account the locations of sensitive receptors. The embedded measures adopted to avoid and mitigate effects are set out in section 13.11. The methodology used to identify all effects is set out in section 13.10.<br><br>The operational and construction noise assessments have mitigated and reduced to a minimum the potential adverse impacts (see section 13.12). |
| Noise Policy Statement for England (NPSE) | The Noise Policy Statement for England (NPSE) sets out the long-term vision of government noise policy, which is fundamentally to: *'Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development'*. | While the NPSE is not directly referenced within the ES assessment, the concepts of NOEL, LOAEL, and SOAEL carry through to |

| Relevant Policy | Summary of Relevant Policy Framework | How and Where Considered in the ES |
|---|---|---|
| | | the significance of effects shown in Table 13-16. This is discussed in Section 13.5.3. |
| Northumberland Local Plan | The Northumberland Local Plan provides guidance on assessing applications in the Northumberland area. Several policies contained within the Local Plan are relevant to the Onshore Noise and Vibration, as listed below.<br>• Policy STP 5 – Health and wellbeing (Strategic Policy):<br>*'2. Development proposals will be required to demonstrate where relevant, and in a proportionate way, that they … do not have a negative impact upon … vibration … and noise pollution.'*<br>• Paragraph 12.15 and 12.16:<br>*'12.15 Noise is an important consideration for … uses which generate noise … Noise assessments, which should set out mitigation measures, and have regard to the Noise Policy Statement for England, will be required for any application for a development that will introduce a noise source … Assessing noise impacts can be complex, and regard must be given to the prevailing ambient conditions, and the cumulative impacts that may arise from multiple sources. In determining the significance and acceptability of the likely impacts, good practice guidance from the World Health Organisation will be a key factor.*<br>*'12.16 A noise assessment will be required to support proposals that raise issues of disturbance … They should outline the potential sources of noise generation, how these may have a negative effect on local amenity and environmental receptors, and detail what mitigation is intended to overcome these issues.'*<br>• Policy POL 2:<br>*'Development proposals in locations where they would cause … unacceptable risk of harm from … noise … will not be supported.'* | |
| **Planning Practice Guidance** | | |
| PPG Paragraph: 003 Reference ID: 30-003-20190722 | When determining noise impacts, PPG recommends identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level (LOAEL) for the given situation. | PPG hierarchy table is discussed in relation to EIA significance of effect in section 13.5.2 |
| PPG Paragraph: 005 Reference ID: 30-005-20190722 | Noise exposure hierarchy table is used in order to establish whether noise is likely to be a concern. This is based upon whether the noise causes any changes in behaviour and attitude, with consideration needing to be given to mitigating noise levels that cause an observable adverse effect. | |

**Table 13-2 Summary of the Environmental Protection Act 1990 and The Control of Pollution Act 1974 relevant to Onshore Noise**

| Relevant Legislation | Summary of Relevant Legislative Framework | How and Where Considered in the ES |
|---|---|---|
| | **Environmental Protection Act 1990** | |
| EPA | Part III of the EPA provides powers for Local Authorities to issue abatement notices where a statutory nuisance exists. | Statutory nuisance cannot be assessed at this stage of the development and therefore is not considered further in this Chapter. The mitigation and control of significant effects would be expected to minimise the risk of nuisance. |
| | **The Control of Pollution Act 1974** | |
| CoPA | Sections 60 and 61 of Part III of the CoPA provide powers to Local Authorities for controlling noise from construction activities. | Construction noise impacts are considered in section 13.12.1 of this Chapter. |

## 13.5. Standards and Guidance

11. A summary of the relevant British Standards and guidance utilised within this Chapter is given below.

### 13.5.1. British Standard 5228-1:2009 + A1:2014 Part 1: Noise

12. The effects of construction noise from sources, arising from the Onshore Scheme, upon residential receptors will be assessed with reference to British Standard 5228-1:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise' (BS 5228-1).

13. BS 5228-1 sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities and contains tables of sound pressure levels generated by a wide variety of mobile and fixed plant equipment.

14. Noise levels generated by construction operations and experienced at local receptors will depend upon a number of variables, the most significant of which are likely to be:

- The amount of noise generated by plant and equipment being used at the development site, generally expressed as a sound power level or a sound pressure level at a given distance;
- The periods of operation of the plant at the development site, known as the 'on-time';
- The distance between the noise source and the receptor, known as the 'stand-off';
- The attenuation due to ground absorption or barrier screening effects; and
- Reflections of noise due to the presence of hard vertical faces such as walls.

15. BS 5228-1 gives several examples of acceptable noise limits for construction or demolition noise. For this assessment, as baseline noise data is available, it is proposed that the ABC method will be used to determine the threshold value at the receptor locations.

16. Under the ABC method, a threshold value noise level is determined by establishing the existing ambient noise level at each location. This measured ambient noise level is then rounded to the nearest whole 5 dB(A), and the threshold noise value for each receptor is then established from

Table E.1 of BS 5228-1. This threshold value is the $L_{Aeq,T}$ noise level that should not be exceeded at the receptor location by operations at the Site.

17. If the threshold value is exceeded, then the effect of construction noise upon nearby receptors may be significant. BS 5228-1 states that the significance of the effect will depend upon *'other project-specific factors, such as the number of receptors affected and the duration and character of the impact'.* Professional judgement is to be used to determine whether an effect is considered to be significant, and commentary explaining the reasons for this judgement is to be provided. In accordance with this method, the threshold noise levels for a potentially significant effect are as detailed in Table 13-3.

**Table 13-3 Construction noise residential receptors – threshold values**

| Assessment Category and Threshold Value Period | Threshold Value in Decibels (dB) | | |
|---|---|---|---|
| | Category A[A)] | Category B[B)] | Category C[C)] |
| Night-time (23:00-07:00) | 45 | 50 | 55 |
| Evenings and weekends [D)] | 55 | 60 | 65 |
| Daytime (07:00-19:00) and Saturdays (07:00-13:00) | 65 | 70 | 75 |

[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 the 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 the 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.

18. Note that the threshold values in Table 13-3 above are considered to be guideline noise limits externally at the receptors within the Study Area; they are not considered as internal noise limits within buildings.

### 13.5.2. BRITISH STANDARD 5228-2:2009+A1:2014 PART 2: VIBRATION

19. The impact of vibration from onshore sources arising during construction of the Onshore Scheme upon residential receptors, is determined with reference to British Standard 5228-2:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration' (BS 5228-2).

20. BS 5228-2 provides recommendations for basic methods of vibration control, relating to construction and open sites where work activities/operations generate significant vibration levels.

21. The majority of people are known to be very sensitive to vibration, the threshold of perception being typically in the Peak Particle Velocity (PPV) range of between 0.14 mm/s and 0.30 mm/s. Vibration levels above these values can cause disturbance. BS 5228-2 provides guidance on the effects of vibration as shown in Table 13-4.

**Table 13-4: Risk of complaints from vibration levels**

| Vibration Level – PPV, mm/s | Effect |
|---|---|
| 0.14 | Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration. |
| 0.30 | Vibration might be just perceptible in residential environments. |
| 1.00 | It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents. |
| 10.00 | Vibration is likely to be intolerable for any more than a very brief exposure to this level. |

22. High vibration levels generally arise from 'heavy' construction works such as piling, deep excavation, dynamic ground compaction or drilling.

23. BS 5228-2 provides guidance on the thresholds of PPV above which cosmetic damage to buildings could occur, which are reproduced in Table 13-5.

**Table 13-5: Transient vibration guide values for cosmetic damage**

| Type of Building | Peak component particle velocity in frequency range of predominant pulse | |
|---|---|---|
| | 4 Hz to 15 Hz | 15 Hz and above |
| Reinforced or framed structures<br>Industrial and heavy commercial buildings | 50 mm/s at 4 Hz and above | |
| Unreinforced or light framed structures<br>Residential or light commercial buildings | 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz | 20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above |

For the second row, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

24. BS 5228-2 also states that minor damage to a building structure is possible at vibration magnitudes twice those in Table 13-5, and major damage at vibration magnitudes four times those in Table 13-5.

25. Annex E of BS 5228-2 contains empirical formulae derived by Hiller and Crabb (2000) from field measurements relating to resultant PPV, with a number of other parameters for vibratory compaction, dynamic compaction, percussive and vibratory piling, the vibration of stone columns and tunnel boring operations. These prediction equations are based on the energy approach. Use of these empirical formulae enables resultant PPV to be predicted and for some activities (vibratory compaction, vibratory piling and vibrated stone columns) they can provide an indicator of the probability of these levels of PPV being exceeded.

26. The empirical equations for predicting construction-related vibration provide estimates in terms of PPV. Therefore, the consequences of predicted levels in terms of human perception and disturbance can be established through direct comparison with the BS 5228 2:2009+A1:2014 guidance vibration levels shown in Table 13-4.

### 13.5.3. BRITISH STANDARD 4142:2014+A1:2019

27. The impact of operational noise from the Onshore Converter Station on residential receptors is determined with reference to British Standard 4142:2014+A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound' (BS 4142).

28. BS 4142 provides guidance on assessing the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.

29. Where the specific sound contains tonality, impulsivity and/or other sound characteristics, corrections should be applied depending on the perceptibility. For tonality, a correction of between 0 and 6 dB should be added; for impulsivity, a correction of between 0 and 9 dB should be added and if the sound contains identifiable operational and non-operational periods that are readily distinguishable against the existing sound environment (i.e., intermittency), a correction of 3 dB should be applied.

30. In addition, if the sound contains specific sound features which are neither tonal, impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a further correction of 3 dB should be added.

31. The assessment of impacts contained in BS 4142 is undertaken by comparing the rating level, i.e., the specific sound level of the source plus any character corrections, to the representative background sound level determined from measurements at a location representative of the ambient and residual sound at the assessment location(s). Consideration is then given to the context of the existing sound environment at the sensitive receptor location to assess the potential impact.

32. Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS 4142 states that the following should be considered:

- Typically, the greater the difference, the greater the magnitude of the impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact when the rating level does not exceed the background sound level, depending on the context.

33. BS 4142 outlines guidance for the consideration of the context of the potential impact, including consideration of the existing residual sound levels, location and/or absolute sound levels.

### 13.5.4. BRITISH STANDARD 7445-1:2003

34. The aim of British Standard 7445-1:2003 *Description and measurement of environmental noise – Part 1: Guide to quantities and procedures* (BS 7445-1) is to provide authorities with material for the description of noise in community environments. Based on the principles described in this

British Standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.

35. This British Standard does not specify limits for environmental noise but gives guidance on;

- the type of instrumentation which should be used to determine environmental sound levels;
- sound measurement positions both internal and external;
- the meteorological conditions which will affect the measurement of sound levels;
- the procedures necessary for determining acoustic metrics such as equivalent continuous sound pressure levels ($L_{Aeq,T}$) and percentile levels ($L_{AN,T}$) ; and
- the information which should be recorded during the sound surveys for reference purposes.

### 13.5.5. ISO 9613-2

36. This part of ISO 9613 is intended to enable noise levels in the community to be predicted from sources of known sound emission. The method described in this part of ISO 9613 is general in the sense that it may be applied to a wide variety of noise sources, including some mechanisms of attenuation.

37. ISO 9613-2 specifies an engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources. The method predicts the equivalent continuous A-weighted sound pressure level (as described in parts 1 to 3 of ISO 1996) under meteorological conditions favourable to propagation from sources of known sound emission.

38. To apply the method of this part of ISO 9613, several parameters need to be known with respect to the geometry of the source and of the environment, the ground surface characteristics, and the source strength in terms of octave-band sound power levels for directions relevant to the propagation.

### 13.5.6. GUIDELINES FOR ENVIRONMENTAL NOISE IMPACT

39. The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment', Version 1.2 published in November 2014, address the key principles of a noise impact assessment and are applicable to *'all development proposals where noise effects are likely to occur' and 'are relevant to all types of projects, regardless of size'.*

40. The guidelines provide specific support on how noise impact assessments fit within the EIA process but can also apply to developments which do not require an EIA. They cover:

- How to scope a noise assessment;
- Issues to be considered when defining the baseline noise environment;
- Prediction of changes in noise levels as a result of implementing development proposals; and
- Definition and evaluation of the significance of the effect of changes in noise levels.

### 13.5.7. CALCULATION OF ROAD TRAFFIC NOISE (CRTN)

41. The former Department of Transport and Welsh Office memorandum Calculation of Road Traffic Noise (CRTN), published in 1988, sets out the UK standard methods and procedures to predict and measure road traffic noise. These procedures were primarily intended to enable entitlement

under the Noise Insulation Regulations, but they also provide guidance appropriate to the calculation of traffic noise for more general applications.

42. In the UK, road traffic noise is predicted and measured in terms of a statistical measure, equivalent to the 10th percentile. Termed the $L_{A10,T}$[4], this measure of noise is equivalent to the noise level exceeded for 10% of the measurement period. Most legislation that refers to road traffic noise uses this noise index over an 18-hour period, from 06:00 hours to 00:00 hours.

### 13.5.8. DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)

43. Construction traffic from the development proposals may temporarily alter noise levels near the affected local road network. A noise assessment has been undertaken in accordance with the DMRB Volume 11 Section 3 Part 7 'Noise and Vibration', considering the identified most affected links within Volume 2, Chapter 12: Transport, Traffic and Access of this ES.

44. It is noted that DMRB has since been superseded by LA 111 – Noise and Vibration; however, as the calculations associated with the assessment are being undertaken in conjunction with CRTN and the impact significance contained within LA 111 is identical to the one contained within DMRB, this method remains valid.

45. The impact magnitude for each assessment of each link is presented and the predicted changes in noise levels are compared to the relevant impact magnitude threshold limits.

### 13.5.9. AIR QUALITY TECHNICAL ADVISORY GROUP 09

46. Air Quality Technical Advisory Group 09 *Guidance on the effects of industrial noise on wildlife* (AQTAG09) provides guidance on the effects of industrial noise on wildlife and is intended to be used to assess the likely significant effects of sound of an industrial and/or commercial nature on wildlife. The guidance states that it is intended to assist officers involved with the determination of Pollution Prevention and Control (PPC) applications for installations with relevant noise emissions and relate these to the requirements of the Habitats Regulations; however, in practice it is also used to by consultants to provide guidance on whether a noise impact on ecological receptors is unlikely, or that further assessment is required.

47. The guidance specifies that, where specific noise from industry, measured at the habitat is below the levels in Table 13-6 it is considered unlikely that it will have an adverse impact on designated species. Where noise levels are exceeded further, more detailed assessment will be required.

[4] If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The $L_{An,T}$ indices are used for this purpose, and the term refers to the level exceeded for n% of the time period T.

**Table 13-6 AQTAG Specific Noise Levels**

| Parameter | Noise Level, dB |
|---|---|
| $L_{Amax,F}$[5] | 80 |
| $L_{Aeq,1hr}$[6] | 55 |

### 13.5.1. NATIONAL PLANNING POLICY FRAMEWORK

48. The National Planning Policy Framework (NPPF) was introduced by The Department for Communities and Local Government in March 2012, with latest revision dated July 2021. It acknowledges that there is a host of existing sources of national and international guidance which can be used, in conjunction with the Framework, to inform the production of Local Plans and decision making.

49. The NPPF defines the Government's planning policies for England and sets out the framework, within which local authorities must prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities. The Government's stated purpose in producing the NPPF was to streamline policy so the planning process is less restrictive, to give a more easily understood framework for delivering sustainable development.

50. Under the heading of conserving and enhancing the natural environment and Paragraph 174 e), one aim of the NPPF is *'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of … noise pollution…'*.

51. Paragraph 185 requires planning policies and decision to ensure that new development is appropriate for its location. It stipulates a need to account for the likely effects of pollution on health and other matters, requiring the planning process to *'mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life'*.

### 13.5.2. NOISE POLICY STATEMENT FOR ENGLAND

52. The Noise Policy Statement for England (NPSE) was published in March 2010. It sets out the long-term vision of government noise policy, which is fundamentally to: *'Promote good health and good quality of life through the effective management and control of noise within the context of Government policy on sustainable development'*. The vision is supported by three key aims:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and reduce to a minimum, other adverse impacts on health; and
- Where possible, contribute to the improvement of health and quality of life.

53. The NPSE should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The NPSE has adopted the

[5] $L_{Amax,F}$ is the maximum A-weighted sound pressure level recorded over the period stated, using the 'fast' sound level meter response.
[6] $L_{Aeq,T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

following concepts, to help consider whether noise is likely to have *'significant adverse'* or *'adverse'* effects on health and quality of life:

- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.
- 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.

54. The Department of Farming and Rural Affairs notes that the level of noise which causes adverse effect is not consistent between different situations, reflecting the requirements in BS 5228-1 and BS 4142 for monitoring of the pre-existing sound environment. *'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times… (Defra, 2010).'*

### 13.5.3. NATIONAL PLANNING PRACTICE GUIDANCE

55. Revised Planning Practice Guidance was released in March 2014 to support the NPPF and last updated in July 2019. The Guidance stipulates that Local Planning Authorities' plan making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

56. The guidance has also provided a noise exposure hierarchy table *'when noise could be a concern'*, which is summarised below.

- NOEL – No Observed Effect Level. No effect; no specific measures required. Considered to match Negligible level of effect with regards to the EIA Regulations.
- NOAEL – No Observed Adverse Effect Level. Noise can be heard but does not cause any change in behaviour or attitude; no specific measures required. Considered to match Negligible level of effect with regards to the EIA Regulations.
- LOAEL – Lowest Observed Adverse Effect Level. Noise can be heard and causes small changes in behaviour and / or attitude; mitigate and reduce to a minimum. Considered to match Minor level of effect with regards to the EIA Regulations.
- SOAEL – Significant Observed Adverse Effect Level. Noise causes a material change in behaviour and / or attitude; avoid. Considered to match Moderate and above level of effect with regards to the EIA Regulations.

## 13.6. Consultation and Technical Engagement

57. A summary of the key issues raised during consultation and technical engagement activities undertaken to date specific to noise and vibration is presented in It should be noted that the Scoping Opinion accepted many elements of the proposed methodology without comment, such as the proposed noise sensitive receptors, survey protocols and assessment methodologies, and as such, are not referenced in Table 13-7.

58. Table 13-7, together with how these issues have been considered in the production of this Chapter. Further detail is presented within Volume 1, Chapter 6 of the ES: Stakeholder Consultation and Engagement.

59. It should be noted that the Scoping Opinion accepted many elements of the proposed methodology without comment, such as the proposed noise sensitive receptors, survey protocols and assessment methodologies, and as such, are not referenced in Table 13-7.

**Table 13-7 Summary of key consultation and technical engagement undertaken for the Onshore Scheme relevant to Noise and Vibration**

| Date | Consultee and Type of Consultation | Issue(s) Raised | Response to Issue Raised and/or Where Considered in this Chapter |
|---|---|---|---|
| **Consultation on the Onshore Scheme** | | | |
| 04/11/22 | NCC Ecologist – Scoping Opinion | *'Further impacts [to those identified in the Scoping Report] may be required once the development has been refined and once initial surveys have been undertaken and we can't predict all impacts to ecology at this stage.*<br>*Our experience of EcIAs and HRAs on coastal sites is that noise levels may need to be assessed for ecological receptors (especially, but not necessarily exclusively for birds), not just for human receptors. Disturbance by noise is scoped into the Ornithological section 7 of the Scoping Document but not specifically within the Terrestrial ecology and I wanted to specifically highlight this potentially important impact for this development.'* | Impact on ecological receptors has been considered in section 13.12. |
| 04/04/23 | NCC Environmental Protection Team - Pre-App Response | Noise impact assessments must be undertaken by a suitably qualified acoustician. Must take account of relevant guidance and minimise potential for disturbance from construction noise. | All the noise assessments have been undertaken by a qualified acoustician with over five years relevant experience and who is a corporate member of the of the Institute of Acoustics (IoA).<br>The noise assessments have also been reviewed by a qualified acoustician with over 13 years relevant experience and who is a corporate member of the of the IoA.<br>The assessments have been completed in conjunction with all the relevant guidance and section 13.12.1 considers noise and vibration from construction operations. |
| 26/04/23 | NCC Ecologist – Pre-App Response. | *'Until the location of specific elements of the scheme are established, it is accepted that it would not be possible to undertake meaningful noise modelling for ecological receptors. However, once scheme design is finalised, it will need to be demonstrated that measures are in place to either avoid or mitigate disturbance of sensitive ecological receptors – notably the wintering bird interest of the Northumbria Coast Special Protection Area (SPA) and Northumberland Shore Site of Special Scientific Interest (SSSI). Appropriate avoidance measures would include undertaking works at the Landfall site (and within the zone of influence of any other functionally linked areas) outside of the wintering bird period (October to March inclusive).If any works are proposed during the wintering period, appropriate mitigation measures (informed by sufficient survey to clearly demonstrate an understanding of wintering bird use of the site) will be required. At that stage, there may be a need for noise modelling to assess the extent to which construction activities may disturb the wintering bird interest of the site and any functionally linked areas and inform the development of an appropriate mitigation scheme (for example, if found to be necessary, the use of acoustic barriers; timing restrictions; restriction on when particularly disturbing activities i.e., piling can proceed)'* | As the location of all the specific elements of the Onshore Scheme are not yet known, high-level modelling for ecological receptors has been undertaken in section 13.12.<br>During detailed design, it is anticipated that further assessments will be undertaken to establish the extent of mitigation that will be required to ensure no significant level of effect on ecological receptors. |

## 13.7. Methodology to Inform Baseline

60. The existing baseline noise environment has been determined by a number of attended and unattended baseline sound surveys (refer to Volume 3, Technical Appendix 13.1). Baseline sound levels were proposed to be measured at seven locations which are considered representative of the receptors closest to the proposed Onshore Scheme. The locations are described in Table 13-8 and identified in Figure 13.2: Baseline Sound Survey Measurement Locations (Volume 4).

**Table 13-8 Baseline sound monitoring locations – Landfall**

| Location ID | Description | OS Grid Ref | |
|---|---|---|---|
| LF001 | Located in a lay-by to the north of Mawburn house. Representative of residential properties to the north of Landfall area. | 430433 | 584104 |
| LF002 | Located in the front garden of No. 13 Unity Terrace. Representative of residential properties to the south of Landfall area. | 430600 | 583670 |
| CS001 | Located in the rear garden of No. 4 Wembley Terrace. Representative of residential properties to the north of Site boundary. | 429977 | 584753 |
| CS002 | Within the garden of No. 7 Sandfield Road. Representative of residential properties to the east of the proposed Onshore Converter Station Zone. | 429744 | 583514 |
| CS003 | Located in the rear garden of No. 3 Havelock Mews. Representative of residential properties to the south of the proposed Onshore Converter Station Zone. | 428999 | 583471 |
| CS004 | In the garden of Winning Park Cottage. Representative of properties to the north-west of the proposed Onshore Converter Station Zone. | 428188 | 584539 |
| CS005 | Located in a field to the east of High Brocklands. Representative of residential properties to the north-west of the Site boundary. | 428808 | 584784 |

61. The full methodology of the surveys is described in Technical Appendix 13-1 (Volume 3), and makes reference to BS 7445-1, BS 5228-1, and BS 4142.

62. The noise monitoring locations and methodology were proposed within the Scoping Report submitted to NCC (ref. 22/04118/SCOPE) in November 2022. No additional survey locations or methodologies were requested in the NCC Scoping Opinion to those detailed within Technical Appendix 13.1 (Volume 3).

## 13.8. Baseline Environment

### 13.8.1. ACOUSTIC ENVIRONMENT

63. The acoustic environment at the measurement locations was subjectively observed during equipment installation and collection and is shown in Table 13-9.

**Table 13-9 Acoustic environment**

| Location | Acoustic Environment |
|---|---|
| LF001 | Wave action described as 'swooshing', bird song and occasional passing traffic (approx. 15-20 mph, 3-4 cars per minute) noted to be dominant noise sources. Area overall peaceful. High-altitude aircraft overhead and sound of sheet metal occasionally blowing in wind nearby. |
| LF002 | Bird song dominant, waves audible but low. Occasional passing traffic (approx. 20 mph), high-altitude aircraft, and vegetation rustling in the wind. Neighbours talking, walking past and opening / closing doors. |
| CS001 | Birdsong and vegetation rustling in the wind dominant. Small water feature in garden next door audible. Distant road traffic noise, occasional high-altitude aircraft. |
| CS002 | Road traffic noise from main road to south dominant (approx. 30-40 mph). Occasional banging from neighbouring garden and dog barking. |
| CS003 | Bird song dominant, with construction noise and distant road traffic audible. Occasional high-altitude aircraft. |
| CS004 | Bird song dominant, with noise from industrial estate (predominantly scrap yard) to north audible (banging, crashing, reversing alarms). Distant road traffic noise and wind through vegetation. |
| CS005 | Road traffic noise dominant: non-steady local road traffic passing at approx. 40-50 mph and distant road traffic on A189. Bird song, occasional high-altitude aircraft, vegetation rustling in the wind, and nearby horses also audible. |

### 13.8.2. BS 5228-1:2014 CONSTRUCTION NOISE LEVEL LIMITS

64. The NSRs situated close to the construction areas for the Landfall, cable corridor (high voltage direct current (HVDC) and high voltage alternating current (HVAC)) and Onshore Converter Station would potentially be impacted by noise during construction operations; therefore, it is necessary to evaluate the measured baseline levels in conjunction with the ABC Method contained in BS 5228-1 to calculate the construction noise threshold limits.

65. The lowest measured average ambient level at each location during each time period and the calculated threshold limits are shown in Table 13-10.

**Table 13-10 Calculated construction noise threshold limits, dB**

| Location | Period | Lowest Measured Average Ambient Level $L_{Aeq,T}$ | Calculated Threshold Value $L_{Aeq,T}$ |
|---|---|---|---|
| Noise sensitive receptors represented by LF001 & LF002 | Daytime[1] | 50 | 65 |
| | Weekend / Evening[2] | 47 | 55 |
| | Night-time[3] | 44 | 50 |
| Noise sensitive receptors represented by CS001 | Daytime | 48 | 65 |
| | Weekend / Evening | 43 | 55 |
| | Night-time | 49 | 55 |
| Noise sensitive receptors represented by CS002 | Daytime | 48 | 65 |
| | Weekend / Evening | 44 | 55 |
| | Night-time | 42 | 45 |
| Noise sensitive receptors represented by CS003 | Daytime | 49 | 65 |
| | Weekend / Evening | 44 | 55 |
| | Night-time | 46 | 50 |
| Noise sensitive receptors represented by CS004 | Daytime | 52 | 65 |
| | Weekend / Evening | 49 | 55 |
| | Night-time | 49 | 55 |
| Noise sensitive receptors represented by CS005 | Daytime | 59 | 65 |
| | Weekend / Evening | 53 | 60 |
| | Night-time | 52 | 55 |

[1] 07:00-19:00 Monday-Friday and 07:00-13:00 Saturday
[2] 19:00-23:00 Monday-Friday, 13:00-23:00 on a Saturday, and 07:00-23:00 Sunday.
[3] 23:00-07:00 Monday-Sunday

### 13.8.3. BS 4142:2014+A1:2019 OPERATIONAL NOISE LEVEL LIMITS

66. The representative daytime and night-time background sound levels ($L_{A90,T}$) which will be utilised as the bases for the operational noise assessment of the Onshore Converter Station on the residential receptors are shown in Table 13-11, along with the lowest measured average residual

sound level for day- and night-time periods. Representative background sound levels for the receptor locations have been determined from the histograms in Figures 4.2 to Figure 4.7 (Volume 4) in Technical Appendix 13.1 (Volume 3).

**Table 13-11 Representative background sound levels, dB**

| Location | Period | Lowest Measured Average Ambient Level $L_{Aeq,T}$ | Representative Background Sound Level $L_{A90,T}$ |
|---|---|---|---|
| Noise sensitive receptors represented by LF001 & LF002 | Daytime[1] | 48 | 34 |
| | Night-time[2] | 44 | 31 |
| Noise sensitive receptors represented by CS001 | Daytime | 49 | 39 |
| | Night-time | 49 | 38 |
| Noise sensitive receptors represented by CS002 | Daytime | 47 | 37 |
| | Night-time | 42 | 32 |
| Noise sensitive receptors represented by CS003 | Daytime | 48 | 39 |
| | Night-time | 46 | 33 |
| Noise sensitive receptors represented by CS004 | Daytime | 51 | 40 |
| | Night-time | 47 | 32 |
| Noise sensitive receptors represented by CS005 | Daytime | 62 | 44 |
| | Night-time | 58 | 31 |

[1] 07:00-23:00 Monday-Sunday
[2] 23:00-07:00 Monday-Sunday

### 13.8.4. FUTURE BASELINE SCENARIO

67. It is not envisaged that the baseline sound environment will decrease over the lifetime of the Onshore Scheme. Likely changes to the baseline sound environment include the development of the former Britishvolt site, the consented subsea cable factory, and changes in the Volume of traffic on the A189 (which are only likely to increase).

68. The Noise Impact Assessment undertaken by Hoare Lea for the consented Britishvolt development includes proposed plant noise level limits that are set at 5 dB above the background sound levels (dB $L_{A90,T}$); should plant associated with the Britishvolt development generate noise at these levels, the future baseline sound environment would be raised.

69. In contrast, for the subsea cable factory, the Noise Impact Assessment set the fixed plant noise limits for that development to be 10 dB below the modal dB $L_{A90,T}$ that was measured for that Noise Impact Assessment, to a lower limit of 35 dB $L_{Ar,T}$. However, Table 12 of the Noise Impact

Assessment (Comparative noise assessment results) highlights that there is predicted to be a change of +0.3 to +1.0 dB in prevailing ambient sound levels ($L_{Aeq,1hr}$) at the two NSRs assessed across all time periods, the impact of which was assessed to be negligible.

70. It is widely accepted that traffic numbers nationwide will increase in future years. The transition to electric vehicles gives potential for engine noise to reduce; however, due to the traffic speeds on the A189, the road traffic noise is produced predominantly by tyre rolling. Therefore, it is anticipated that, in future years, the baseline sound level due to road traffic on the A189 would increase.

71. With consideration to the above, the baseline sound environment in the absence of the Onshore Scheme is expected to only increase, which would decrease any adverse impacts of noise from the Onshore Scheme.

### 13.8.5. DATA ASSUMPTIONS AND LIMITATIONS

72. BS 4142:2014+A1:2019, provides advice on the areas of uncertainty associated with the measurement of baseline sound levels which are applicable to the baseline sound surveys associated with the Onshore Scheme, these include:

- The complexity and level of variability of the residual acoustic environment;
- The location(s) selected for taking the measurements;
- The distance between sources of sound and the measurement location and intervening ground conditions;
- The number of measurements taken;
- The measurement time intervals;
- The range of times when the measurements have been taken;
- The range of suitable weather conditions during which measurements have been taken;
- The measurement method and variability between different practitioners in the way the method is applied;
- The level of rounding of each measurement recorded; and
- The instrumentation used.

73. With reference to the above, the measurement uncertainty was minimised during the baseline sound survey as follows:

- Baseline sound measurements were taken at positions representative of the NSRs to the Onshore Scheme;
- The measurement positions were located away from reflecting surfaces and leafy vegetation as far as reasonably practicable, with appropriate corrections where necessary;
- The long-term measurements included daytime, evening, and night-time periods for typical midweek and weekend periods;
- A weather station was installed at a location representative of the long-term monitoring locations so that the weather conditions during the survey period could be determined to ensure suitable monitoring conditions; and
- The instrumentation was suitable according to BS EN 61672-1. Further details on the equipment used are contained within Technical Appendix 13.1.

74. Further to the above, and following the completion of the baseline monitoring, the following has been noted regarding the baseline data limitations and uncertainty:

- NCC agreed on the baseline sound measurement locations as part of their pre-application response;
- The sound level meters were field calibrated before the start of relevant measurement period and at the end of the measurement and no significant drifts in calibration were observed;
- All the sound level meters utilised for the measurements operated normally throughout the survey period with no evidence that the equipment was interfered with; and
- Following analysis of the data, it is considered that the measured baseline sound levels throughout the survey were representative of the prevailing sound climate at the nearest NSRs to the Landfall area and Onshore Converter Station Zone.

75. With reference to the above, it is therefore considered that the uncertainty and limitations regarding the baseline data were kept to a minimum as far as reasonably practicable.

## 13.9. Key Parameters for Assessment

### 13.9.1. MAXIMUM DESIGN SCENARIO

76. The maximum design scenario(s) (MDS) summarised here have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the Chapter 5: Project Description of this ES. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the PDE (e.g., different infrastructure layout), to that assessed here, be taken forward in the final design scheme.

77. Given that the MDS is based on the design option (or combination of options) that represents the greatest potential for change, confidence can be held that development of any alternative options within the design parameters will give rise to no worse effects than assessed in this impact assessment. Table 13-12 presents the MDS for potential impacts on noise and vibration receptors during construction, operation and decommissioning.

78. The boundary and extent of the Onshore Scheme have been the subject of discussions with NCC. There are some design details related to the Onshore Scheme that are still to be finalised due to further ground investigations required, ongoing engineering design work and the procurement of cable and converter station suppliers which will define the final specification. The Site boundary has been chosen to allow flexibility to accommodate design details which will be subject to future Reserved Matters application(s) to NCC.

79. Of particular note for this assessment, construction works will primarily be undertaken between 07:00 and 19:00 hours; the exception to this being trenchless drilling works, which may be necessary on a 24-hours, 7 days per week basis. This is in order to maintain integrity of the borehole (i.e., reduce risk of collapse) and to ensure the trenchless operations can be continuously monitored to ensure no agreed settlement limits are exceeded.

**Table 13-12 Maximum design scenario specific to noise impact assessment**

| Potential Impact | Maximum Design Scenario | Justification |
|---|---|---|
| **Construction** | | |
| Baseline sound environment | Lowest ambient sound levels measured at the relevant locations have been selected for the construction noise threshold levels. | In practice, a higher construction noise threshold may be justifiable, however a lower threshold gives a more precautionary target for construction noise. |
| Temporary noise effects of construction of Landfall | Assumed all elements of plant used in each activity operating in the same location at the same time. Resultant noise level for each activity compared and the noisiest selected.<br>Area source of the combined sound power level for the noisiest activity (site preparation works) positioned at the extents of the Site boundary. | No defined Landfall area available at outline design; construction activities operating at the extents of the Site boundary which will result in greater noise impacts. |
| | Trenchless drilling works modelled as an area source in a drilling compound. The area source would generate the total noise level from all trenchless drilling operations at the extents of the Site boundary. | No defined trenchless drilling area provided, activities operating at the extents of the Site boundary which will result in greater noise impacts. |
| | Daytime, weekend, and night-time assessments undertaken for Landfall construction operations (night-time trenchless drilling only). | 24-hour works are proposed for trenchless drilling construction operations, 07:00 to 19:00 hours for other construction operations. |
| Temporary noise effects of construction of the onshore cable corridor (HVDC and HVAC) | Assumed all elements of plant used in each activity operating in the same location at the same time. Resultant noise level for each activity compared and the noisiest selected.<br>Area source measuring 100 m long by 40 m wide generating the combined sound power level for the noisiest activity placed at the extents of the Site boundary. | Considered an MDS as plant associated with the nosiest phase (site preparation) of onshore cable route (HVDC or HVAC) construction works operating within a relatively small area.<br>Onshore cable route (HVDC or HVAC) not defined for outline planning: construction activities operating at the extents of the Site boundary which will result in greater noise impacts. |
| | Daytime, weekend, and night-time assessments undertaken for HVDC/HVAC cable corridor construction operations (night-time trenchless drilling only). | 24-hour works are proposed for trenchless drilling construction operations; 07:00 to 19:00 hours for other construction operations. |
| | Trenchless drilling works modelled as an area source in a drilling compound measuring 40 m by 40 m. The area source would generate the total noise level from all trenchless drilling operations at the extents of the Site boundary. | No defined trenchless drilling area provided, so activities operating at the extents of the Site boundary will result in greater noise impacts. |
| Temporary noise effects of construction of Onshore Converter Station | Assumed all elements of plant used in each phase operating in the same location at the same time. Resultant noise level for each phase compared and the noisiest phase for each workflow selected.<br>Area source of the combined sound power level for the noisiest phase placed at the extents of the Onshore Converter Station Zone. Each area source approximately 25% of the total area of the Onshore Converter Station Zone. | No defined Onshore Converter Station footprints available at outline design stage so activities operating at the extents of the Onshore Converter Station Zone will result in greater noise impacts. |

| Potential Impact | Maximum Design Scenario | Justification |
|---|---|---|
| | Daytime and weekend assessments undertaken for Onshore Converter Station construction operations. | 07:00 to 19:00 hours works are proposed for construction operations. |
| | The construction noise and vibration assessments assume that impact piling will be required to construct the Onshore Converter Station foundations. | Impact piling is likely to generate relatively high levels of noise and vibration compared to other types of foundation construction methods. |
| Temporary noise effects of construction traffic | Maximum flows expected on each link within the Study Area assessed. | The values presented will result in the highest noise impact which would occur during the busiest month for each link.<br>During the majority of the period of the construction works the noise impacts will therefore be lower. |
| Temporary vibration effects of trenchless drilling | Trenchless drilling and vibratory piling will be carried out at the Landfall and various locations along the onshore cable route.<br>Assessment assumes drilling and piling rig will be positioned at the extents of the Site boundary. | No defined Landfall area or cable route available at outline design stage (HVDC or HVAC); drilling activities at the extents of the Site boundary which will result in greater noise impacts. |
| Temporary vibration effects of the construction of the Onshore Converter Station foundations | Impact piling will be required for the Onshore Converter Station foundations at each boundary of the Converter Station Zone closest to each Vibration Sensitive Receptor (VSR). | Impact piling is likely to generate relatively high levels of vibration compared to other types of foundation construction methods.<br>No defined Onshore Converter Station footprint available at concept design stage; closest approach will lead to greater vibration impacts. |
| **Operation and Maintenance** | | |
| Baseline sound environment | Conservative representative background sound levels were determined in order to set a robust operational noise level limit. | Conservative representative background sound levels from the survey period are more likely to provide a robust assessment for a longer time period. |
| Operational noise effects of the Onshore Converter Station | Initial predictions assume all the equipment is operating within an indicative Onshore Converter Station footprint area (250 m by 250 m). The footprint area has then been positioned at the extents of the Onshore Converter Station Zone at its closest approach to each Noise Sensitive Receptor (NSR) for the Onshore Converter Station. | No detailed Onshore Converter Station design available at this stage of the design, placing all the plant within the footprint area at the extents of the Onshore Converter Station Zone at its closest approach to each NSR, within the smallest likely area, will lead to greater noise impacts. |
| **Decommissioning** | | |

| Potential Impact | Maximum Design Scenario | Justification |
|---|---|---|
| Noise and vibration effects of all decommissioning activities | At the end of the operational lifetime of the Onshore Scheme, the operator of the Onshore Scheme will develop and agree a solution for the onward handling of the onshore infrastructure with the regulator. This decision will be based on the advice from the regulator at the time and informed by the prevailing environmental regulatory requirements at that time, and relevant good practice.<br>Decommissioning of the Onshore Converter Station would involve the main components being dismantled and removed for recycling or disposal in accordance with the relevant waste disposal regulations. Decommissioning of underground cables would involve disconnection from operational cable, with options for leaving redundant cable in-situ or removal. Removal would involve similar activities to installation.<br>The approach to decommissioning will align with regulatory guidance, requirements, and industry best practices at the time of decommissioning and will be agreed with the relevant stakeholder and regulatory bodies.<br>A decommissioning plan and supporting decommissioning environmental management plan will be prepared prior to commencement of decommissioning and will be subject to its own environmental assessment.<br>Decommissioning activities are not anticipated to exceed the construction phase worst-case criteria assessed. In addition, it is also recognised that policy, legislation and local sensitivities constantly evolve, which will limit the relevance of undertaking an assessment at this stage. Leaving the cables in situ would see a reduction in impacts and resulting level of effect and significance in comparison to the assessment of construction effects, however it should be noted that the decommissioning assessment assumes total removal of infrastructure. | To represent a realistic worst-case scenario at decommissioning, while the decommissioning solution is developed by the Applicant. Decommissioning considered less intense than construction operations.<br>Assumed that no night-time or piling operations would be associated with decommissioning works. |
| **Cumulative Effects** | | |
| Cumulative noise and vibration effects from temporary concurrent construction activities | Maximum design parameters / extents of any proposed construction areas have been used for the purposes of defining potential noise and vibration impacts | This ensures that all potential scenarios and associated impacts have been assessed for the purposes of providing a worst-case cumulative assessment |
| Cumulative noise and vibration effects from the concurrent operational developments | Maximum design parameters / extents of any proposed operational developments have been used for the purposes of defining potential noise and vibration impacts | |

80. The construction traffic noise assessment has been informed by Chapter 12: Transport, Traffic and Access, which will set out the number of vehicle movements that will be used in the construction traffic noise assessment.

81. The construction noise assessment on ecological receptors makes reference to Chapter 9: Terrestrial Ecology & Ornithology to identify designated ecological sites.

### 13.9.2. IMPACTS SCOPED IN AND OUT OF THE ASSESSMENT

**82.** Impacts scoped in and out of the assessment were agreed with key stakeholders through consultation following receipt of the Scoping Opinion from NCC in December 2022 (22/04118/SCOPE). These, together with a justification, are presented in Table 13-13.

**Table 13-13 Impacts scoped in and out of the assessment for Noise and Vibration**

| Potential Impact | Justification | Scoped In / Out |
|---|---|---|
| **Construction / Decommissioning** | | |
| Noise associated with construction of onshore components | Due to the localised nature of the onshore cable construction / decommissioning process, temporary noise generated is likely to be concentrated to areas immediately adjacent to the chosen cable route. Notwithstanding, installation of the Onshore Converter Station may give rise to more prolonged sources of noise and vibration. Similarly, depending on the chosen methodology, the installation of cables at the Landfall location may give rise to sources of noise and vibration during construction. Further study is required to understand effects of noise on sensitive receptors. | Scoped in |
| Ground-borne vibration associated with construction of onshore components | Due to the localised nature of the onshore cable construction / decommissioning process, temporary noise generated is likely to be concentrated to areas immediately adjacent to the chosen cable route. Notwithstanding, installation of the Onshore Converter Station may give rise to more prolonged sources of vibration.<br>Further study is required to understand effects of vibration on sensitive receptors. Due to the short term and localised nature of the onshore construction / decommissioning process, any temporary vibration generated is likely to be minimal and concentrated to the Noise and Vibration Study Area. | Scoped in |
| Onshore noise associated with vehicle use | Use of construction machinery, plant equipment, haulage / freight and other vehicles has the potential to give rise to local noise issues. Further study required to understand the effects on sensitive receptors, which would include construction related traffic movements on the local road network. | Scoped in |
| Ground-borne vibration associated with vehicle use | Ground-borne vibration impacts arising from vehicle use during construction are likely to be minimal. Any impacts will be short-term and concentrated at the construction site, and unlikely to give rise to significant impacts at any receptor. In addition, it is considered that the construction related traffic movements on the local road network would not cause any significant vibration impacts. | Scoped out |
| **Operation and Maintenance** | | |
| Onshore noise associated with operation and maintenance of onshore components | Noise impacts related to the onshore operation and maintenance activities will be limited to noise from the Onshore Converter Station. | Scoped in |
| Ground-borne vibration associated with operation and maintenance of onshore components | The HVDC and HVAC cables will not cause discernible vibrations due to the nature of the electricity transmission process.<br>The nature of the Onshore Converter Station means that the extent of any vibration arising from day-to-day routine operation will be minimal and likely to be undiscernible beyond the main compound described above. Furthermore, the nature of the Onshore Converter Station and the largely unmanned operation means that vehicle access, which could give rise to some vibration, will be minimal. When there is vehicular access to the Onshore Converter Station, this is likely to be via personnel cars rather than HGVs. Sporadic access with larger vehicles will be very infrequent and associated with deliveries of spare components / equipment. | Scoped out |

## 13.10. Methodology for Assessment of Effects

### 13.10.1. Overview

83. The assessment of effects on noise and vibration receptors has followed the methodology set out in Chapter 3: EIA Methodology. Specific to the assessment of noise and vibration, the following guidance documents have also been considered:

- British Standard 5228-1:2009+A1:2014 – 'Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise
- British Standard 5228-2:2009+A1:2014 – 'Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 2 Vibration'.
- British Standard 4142:2014+A1:2019 – 'Methods for Rating and Assessing Industrial and Commercial Sound'.
- Design Manual for Roads and Bridges (DMRB) and LA 111 – 'Noise and Vibration'.
- AQTAG09 (Air Quality Technical Advisory Group 09), 'Guidance on the Effects of Industrial Noise on Wildlife.

84. In addition, the assessment of Noise and Vibration has considered the legislative framework as defined by:

- The Environmental Protection Act 1990 where the control of significant noise and vibration effects would be expected to minimise the risk of nuisance; and
- Sections 60 and 61 of The Control of Pollution Act 1974 where construction noise and vibration impacts have been considered and mitigated to control any potential impacts.

### 13.10.2. Impact Assessment Criteria

85. Determining the significance of effects is a two-stage process that involves defining the magnitude of the potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 3 of this ES.

#### 13.10.2.1. MAGNITUDE OF IMPACT

86. The criteria for defining magnitude in this Chapter are outlined in Table 13-14.

87. The impact magnitude categories outlined below is used to inform the significance of effect, as shown in Table 13-16.

**Table 13-14 Definition of terms relating to the magnitude of an impact**

| Magnitude of Impact | Definition |
|---|---|
| High | Fundamental changes over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness. |
| Medium | Considerable changes over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness. |
| Low | Discernible change over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness. |
| Negligible | Discernible, or barely discernible, change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness. |

88. The criteria for defining sensitivity in this Chapter are outlined in Table 13-15. The sensitivity / importance of the receptor is a major consideration within the assessment and is used to inform the significance of effect, as shown in Table 13-16.

**Table 13-15 Definition of terms relating to the sensitivity of the receptor**

| Value (Sensitivity of the Receptor) | Description |
|---|---|
| High | Residential properties (night-time), schools and healthcare buildings (daytime). |
| Medium | Residential properties (daytime), leisure facilities, Designated Ecological Sites such as Special Areas of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI). |
| Low | Offices and other non-noise producing employment areas. |
| Negligible | Industrial areas. |

89. The significance of the effect upon onshore noise and vibration is determined by correlating the magnitude of the impact and the sensitivity of the receptor, as outlined in Table 13-16.

**Table 13-16 Matrix used for the assessment of the significance of the effect**

| | | Magnitude of Impact | | | | |
|---|---|---|---|---|---|---|
| | | **No Change** | **Negligible** | **Low** | **Medium** | **High** |
| **Sensitivity of Receptor** | **Negligible** | Negligible | Negligible | Negligible to Minor | Negligible to Minor | Minor |
| | **Low** | Negligible | Negligible to Minor | Negligible to Minor | Minor | Minor to Moderate |
| | **Medium** | Negligible | Negligible to Minor | Minor | Moderate | Moderate to Major |
| | **High** | Negligible | Minor | Minor to Moderate | Moderate to Major | Major |

90. With reference to Table 13-16 effects of 'moderate' or greater are defined as significant with regards to the EIA Regulations[7].

[7] The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

#### 13.10.2.2. CONSTRUCTION NOISE IMPACT MAGNITUDE

91. The impact of construction noise upon existing residential receptors is determined with reference to the ABC method presented in BS 5228-1:2009+A1:2014. The impact of construction noise upon existing residential receptors is as detailed in Table 13-17.

**Table 13-17 Construction noise impact magnitude**

| Impact Magnitude | Exceedance in the $L_{Aeq,T}$ Noise Level |
|---|---|
| High | Threshold value exceeded by 5 dB or more. |
| Medium | Threshold value exceeded by a maximum of 4 dB. |
| Low | Threshold value exceeded by a maximum of 2 dB. |
| Negligible | Threshold value not exceeded. |

#### 13.10.2.3. CONSTRUCTION TRAFFIC NOISE IMPACT MAGNITUDE

92. The impact of the change in noise level is determined with reference to the classification of magnitude of impacts used in short-term traffic noise assessments presented in the DMRB Volume 11 Section 3 Part 7 Noise and Vibration and is shown in Table 13-18.

**Table 13-18 Construction traffic noise impact magnitude**

| Impact Magnitude | Description |
|---|---|
| High | Change in $L_{A10,18hr}$ noise level of 5.0 dB or more. |
| Medium | Change in $L_{A10,18hr}$ noise level between 3.0 and 4.9 dB. |
| Low | Change in $L_{A10,18hr}$ noise level between 1.0 and 2.9 dB. |
| Negligible | Change in $L_{A10,18hr}$ noise level between 0.1 and 0.9 dB. |
| No change | No change in $L_{A10,18hr}$ noise level. |

#### 13.10.2.4. CONSTRUCTION VIBRATION IMPACT MAGNITUDE

93. The impact of construction vibration upon existing residential receptors is determined with reference to BS 5228-2:2009+A1:2014. The impact of construction vibration upon residential receptors is as detailed in Table 13-19.

**Table 13-19 Construction vibration impact magnitude**

| Impact Magnitude | Description |
|---|---|
| High | 10.00 mm/s or more |
| Medium | Between 1.0 to 9.9 mm/s |
| Low | Between 0.3 to 0.9 mm/s |
| Negligible | Less than 0.3 mm/s |

#### 13.10.2.5. OPERATIONAL NOISE IMPACT MAGNITUDE

##### 13.10.2.5.1. RESIDENTIAL RECEPTORS

94. The impact of operational noise from the Onshore Converter Station upon existing residential receptors is determined with reference to BS 4142:2014+A1:2019.

95. Based on the guidance presented in BS 4142:2014+A1:2019, the impact of operational noise upon existing residential receptors is detailed in Table 13-20. BS 4142 emphasises that the numerical assessment, to which Table 13-20 relates, should be considered within the context of the site. Should the context of the site (e.g., the absolute levels, the character and level of the residual sound, the sensitivity of the receptor) merit it, the impact magnitude of the specific sound can be changed to a different category.

**Table 13-20: Operational noise impact magnitude – residential receptors.**

| Impact Magnitude | Description |
|---|---|
| High | Rating level is 10 dB(A) or more above the background sound threshold level, or change in ambient noise level ($L_{Aeq,T}$) of 10 dB or more. |
| Medium | Rating level is between 6 and 9 dB(A) above the background sound threshold level, or change in ambient noise level ($L_{Aeq,T}$) of between 6 and 9 dB. |
| Low | Rating level is between 1 and 5 dB(A) above the background sound threshold level, or change in ambient noise level ($L_{Aeq,T}$) of between 1 and 5 dB. |
| Negligible | Rating level is equal to or below the background sound threshold level, or no change in ambient noise level ($L_{Aeq,T}$). |

#### 13.10.2.5.2. ECOLOGICAL RECEPTORS

96. The impact of construction and operational noise on ecological receptors is determined with reference to the AQTAG 09 guidance. The impact of construction noise upon ecological receptors is as detailed in Table 13-21.

97. In accordance with paragraph 47, exceeding the levels in Table 13-6 indicates that further assessments will be required, not necessarily that impacts are likely to occur. Therefore, the following are the maximum potential magnitude of impact should further assessments be required. This is inherently a very conservative methodology.

**Table 13-21 Construction and operational noise impact magnitude – ecological receptors**

| Impact Magnitude | Exceedance in the $L_{Aeq,T}$ Noise Level |
|---|---|
| High | Threshold value exceeded by 5 dB or more. |
| Medium | Threshold value exceeded by a maximum of 4 dB. |
| Low | Threshold value exceeded by a maximum of 2 dB. |
| Negligible | Threshold value not exceeded. |

### 13.10.3. Assumptions and Limitations

98. The main uncertainties and technical difficulties encountered during the completion of the noise and vibration assessment are outlined below. For the purposes of this Chapter, they have been divided into:

- Construction noise and vibration assessment; and
- Operational noise assessment

#### 13.10.3.1. CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

99. Construction noise and vibration predictions are based on the anticipated programme and construction methods at this stage in the design.

100. Where elements of the design are not fully developed, it has been necessary to make assumptions based on professional judgement and experience of other projects, regarding some aspects of the construction process. These are considered to be precautionary and reflect the Maximum Design Scenarios noted in Table 13-11.

101. In addition, the details of the nearest NSRs and VSRs to the Landfall, HVDC Zone, and HVAC Zone construction area have yet to be defined; consequently, the construction noise and vibration impacts have been based on calculated 'stand-off' distances from the extents of the Landfall, HVDC Zone, and HVAC Zone which define the area in which adverse noise and vibration impacts are likely to occur.

102. It understood that, primarily, construction works will be undertaken between 07:00 and 19:00 hours Monday to Saturday; the exception to this being trenchless drilling works, which may be necessary 24-hour, 7 days per week. Therefore, the assessments where stand-off distances have been considered are as follows:

- Daytime and weekend construction noise for the Landfall, HVDC Zone, and HVAC Zone; and
- Daytime, weekend, and night-time construction noise and vibration for trenchless drilling within the Landfall/HVDC Zone and HVAC Zone.

103. With regards to the Onshore Converter Station, the Onshore Converter Station Zone is more defined; as a consequence, the construction noise assessment has assumed that all the construction plant is working in an area equivalent to 25% of the defined Onshore Converter Station Zone.

104. Further information on the anticipated construction programme is provided in Chapter 5: Project Description.

105. Limitations of the assessment include the uncertainties inherent in the methodology. This includes uncertainties in the baseline sound survey, input noise levels, and the prediction methodology. Efforts have been made to reduce the uncertainty at each stage of the assessment:

- Uncertainties in the baseline sound survey have been minimised, with the sound levels measured over a significant period of time using Class 1 (as defined in IEC 61672-1:2013) equipment whose calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory.
- Input construction noise levels for the project have been taken from BS 5228-1 and the Applicant's previous experience.
- The prediction methodologies used are contained in the relevant British Standards and international equivalents.

#### 13.10.3.2. OPERATIONAL NOISE ASSESSMENTS

106. Initial operational noise predictions have been based on a reasonable worst-case scenario, where all the equipment is operating within the Onshore Converter Station footprint area (250 m by 250 m); the footprint area has then been positioned at the extents of the Onshore Converter Station Zone at its closest approach to each NSR to calculate a worst-case scenario for each receptor.

107. This approach of assuming a 250 m by 250 m platform has been adopted for the initial predictions while final Onshore Converter Station location and plant layouts are developed for the Onshore

Scheme. This differs from the 90,000 $m^2$ (e.g., 300 m x 300 m) platform size MDS which is the PDE described in Chapter 5: Project Description, as a smaller platform size groups the noise and vibration sources in the Onshore Converter Station closer to the NSRs, resulting in a higher (though not significantly) noise level at the receptors, demonstrating an MDS.

108. It also has to be assumed that the plant could operate anywhere within the Onshore Converter Station Zone. This represents an MDS from a noise and vibration perspective.

109. As part of the mitigation measures presented in section 13.12.2.5, example constraints on the layout of the Onshore Converter Station will be recommended in order to reduce the adverse level of effect from operational noise from the Onshore Converter Station below the threshold of significance.

110. It is considered that the above is a very worst-case scenario and reflects the level of information that is available at this stage in the development; as the Onshore Scheme develops further this can be refined, subsequently reducing the potential for adverse noise impacts from the operation of the Onshore Converter Station.

111. As with the construction assessment, there are uncertainties inherent in the methodology. These have been minimised in similar ways, with source levels for the operational Onshore Converter Station conservative estimates from the Applicant's library data. It should be noted that the modelling methodology used for the operational noise (ISO 9613-2) uses a conservative assumption of downwind propagation with a moderate temperature inversion.

## 13.11. Measures adopted as part of the Onshore Scheme

112. In order to minimise the potential for noise and vibration impact on the sensitive receptors, it is proposed that the detailed design stage will show that the project can be delivered with acceptable levels of adverse impact and that the following threshold values, as described in BS 5228-1, will be adhered to at the noise-sensitive receptors in the Onshore Scheme Study Area.

**Table 13-22 Proposed construction noise threshold values**

| Assessment Category and Threshold Value Period | Threshold Value in Decibels (dB) | | |
|---|---|---|---|
| | Category A[A)] | Category B[B)] | Category C[C)] |
| Night-time (23:00-07:00) | 45 | 50 | 55 |
| Evenings and weekends [D)] | 55 | 60 | 65 |
| Daytime (07:00-19:00) and Saturdays (07:00-13:00) | 65 | 70 | 75 |

[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 the 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 the 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.

113. It is considered that it would be acceptable for these thresholds to be exceeded for short-term works that will enable mitigation measures to be implemented, such as building screening embankments.

114. In order to ensure that these threshold levels are met, a Noise and Vibration Management Plan (NVMP) will be submitted to NCC as part of the final Code of Construction Practice (CoCP), which will detail the mitigation measures that will be implemented to this end.

## 13.12. Assessment of Likely Significant Effects

115. The potential impacts arising from the construction, operational and maintenance and decommissioning phases of the Onshore Scheme are listed in Table 13-12 along with the MDS against which each impact has been assessed.

116. An assessment of the likely significance of the effects of the Onshore Scheme on the nearest noise and vibration sensitive receptors caused by each identified impact is given below.

117. The impact of noise will be assessed for each Onshore Scheme Noise and Vibration issue and has been divided into the following:

- Construction Issue 1: Construction activity noise at Landfall, HVDC, and HVAC cable routes resulting in potential effect on Noise Sensitive Receptors;
- Construction Issue 2: Construction activity noise at the Onshore Converter Station resulting in potential effect on Noise Sensitive Receptors;
- Construction Issue 3: Construction activity noise at Landfall, HVDC, and HVAC cable routes resulting in potential effect on ecological receptors;
- Construction Issue 4: Construction activity noise at the Onshore Converter Station resulting in potential effect on ecological receptors;
- Construction Issue 5: Construction activity vibration at the Landfall, HVDC, and HVAC cable routes resulting in potential effect on Vibration Sensitive Receptors;
- Construction Issue 6: Construction activity vibration at the Onshore Converter Station resulting in potential effect on Vibration Sensitive Receptors;
- Construction Issue 7: Traffic noise from construction activity at the Landfall, HVDC, and HVAC Cable Routes and Onshore Converter Station resulting in potential effect on Noise Sensitive Receptors;
- Operation Issue 1: Operational activity noise at the Onshore Converter Station resulting in potential effect on Noise Sensitive Receptors; and
- Operation Issue 2: Operational activity noise of the Onshore Converter Station resulting in potential effect on Ecological Receptors.

### 13.12.1. Potential Effects During Construction

#### 13.12.1.1. OVERVIEW

118. A development of this nature has the potential to generate noise and vibration during the construction phases should appropriate mitigation not be employed. However, disruption due to construction-related noise and vibration is a localised phenomenon and is both temporary and intermittent in nature. The techniques available to predict the likely noise and vibration effects from construction sites are necessarily based on quite detailed information on the type and number of plant being used, their location within the Site and the length of time they are in operation.

119. During the construction of the Onshore Scheme, noise from construction activities will inevitably be generated and will, during certain phases of construction, be audible at residential receptors in the vicinity of construction activities. The purpose of this section of the Chapter is therefore to:

- Establish the distances within which differing magnitudes of impact from construction activities are likely to occur for human and ecological receptors;
- Provide comment as to the magnitude of the potential construction noise impacts, the resulting level of effect and whether this is significant in EIA terms; and
- Where relevant, identify those impacts that would require specific mitigation measures in order for the potential noise effects to be reduced to a level considered acceptable.

120. As noted in section 13.8.2, the assessment utilises construction noise thresholds calculated based on the measured sound levels at the receptor locations. To ensure an MDS, the lowest ambient sound levels for the daytime, evening / weekend and night-time periods have been used to set the construction noise thresholds. In addition, the construction noise has been predicted to be emitted at the extents of the potential area in which the construction activities might occur.

**ISSUE 1: CONSTRUCTION ACTIVITY NOISE AT LANDFALL, HVDC, AND HVAC CABLE ROUTES RESULTING IN POTENTIAL EFFECT ON NOISE SENSITIVE RECEPTORS**

#### 13.12.1.2. INTRODUCTION OF IMPACT

121. With the Onshore Scheme still at an early stage of design, a detailed list of construction plant, operational noise levels and associated on-times for all the construction activities / operations is not yet available. As such, this assessment has been undertaken utilising a list of indicative plant agreed between SLR Consulting and the Applicant. Based on this list, the combined sound power level (SWL) for construction of the Landfall, HVDC, and HVAC cable routes has been calculated for each construction phase considering the number of plant and associated on-times, as shown in Table 13-23.

122. For each construction phase, the plant sound power level has been calculated from the sound power levels of the individual items of plant, the number of each item, and the percentage on time anticipated for each item of plant. The resultant sound power levels of each type of plant in the phase are then logarithmically summed to give the resultant sound power level of the whole construction phase.

123. A list of indicative construction plant, operational noise levels and associated on-times for all the construction activities / operations have been provided within Volume 3, Technical Appendix 13.2: Construction Plant Sound Levels. These levels are considered an MDS as they are conservative in the number, percentage on time and individual sound power levels used.

**Table 13-23 Combined sound power levels – construction plant for cable route, dB**

| Activity | Combined Sound Power Level (SWL) |
|---|---|
| 1. Establish Access and Temporary Construction Compound (TCC) (including trenchless drilling compounds) | 120 |
| 2. Site Preparation, Including Fencing, Haul Road Construction and Topsoil Strip | 120 |
| 3. Transition Joint Bay Excavation | 116 |

| Activity | Combined Sound Power Level (SWL) |
|---|---|
| 4. Transition Joint Bay Wall and Base Construction | 114 |
| 5. Connection of Cables in Transition Bays | 115 |
| 6. Roof and Backfill over Transition Bay | 118 |
| 7. Trench Excavation and duct installation | 118 |
| 8. Trench Backfill | 119 |
| 9. Joint Bay Excavation | 116 |
| 10. Joint Bay Base Construction | 114 |
| 11. Pulling and Connection of Cables | 114 |
| 12. Backfill over Joint Bay | 118 |
| 13. Trench Route Reinstatement / Topsoil Reinstatement | 118 |
| 14. Haul Road Removal and Removal of fencing and Reinstatement | 119 |
| 15. TCC and Access Road Removal (including Trenchless Drilling compounds) | 119 |
| 16. Plant utilised in construction phase – Landfall Operations | 108 |
| 17. Plant utilised in construction phase – Unlicenced Works | 108 |
| 18. TCC Operations | 109 |
| 19. Trenchless Drilling Compound Operations – Daytime | 116 |
| 20. Trenchless Drilling Compound Operations – Night-Time | 114 |

124. Based on the above, the construction noise assessment for the cable route has considered 'normal' construction activities and trenchless drilling activities separately.

#### 13.12.1.3. MAGNITUDE OF IMPACT

##### 13.12.1.3.1. NORMAL CONSTRUCTION ACTIVITIES

125. As previously stated in section 13.10.3, the exact locations of the relevant construction areas with the Landfall, HVDC, and HVAC Zones are not yet defined; consequently, the predicted construction noise levels for the Landfall have therefore assumed the following:

- All the plant associated with the construction would be located on the extents of the Landfall, HVDC, and HVAC Zones; and
- All the plant would be operating in an area measuring 100 m long by 40 m wide. This is based on the construction might occur within half the typical construction working width (as described in Table 5.1 of Chapter 5: Project Description) and a reasonable assumption on the working length.

126. In order to assess an MDS, the assessment of construction noise has been undertaken utilising the loudest construction phase, which in this case is either Establish Access & Temporary Construction

Compound (TCC) or Site Preparation, both of which have a combined sound power level of 120 dB(A).

127. Based on the above, stand-off distances have been calculated where adverse noise impacts are likely to be experienced using the BS 5228-1 algorithms contained within the Cadna/A noise modelling software; the model has assumed and is based on the following:

- The operational construction plant area (100 m by 40 m) has been modelled as an area source which has a sound power level of 120 dB(A) (site preparation) at an average height of 2 m above ground level;
- Receptor height of 1.5 m for daytime and weekend assessments (a night-time assessment has not been considered for normal construction operations);
- Ground absorbency factor of 0.5 between the source and the receivers;
- Downwind propagation between the source and the receiver;
- Relative Humidity = 70%;
- Air Temperature = 10°C;
- Flat ground (i.e., no topography) between the source and the receiver; and
- No intervening structures between the source and the receiver; and
- The stand-off distances have been based on free-field predictions, so no façade corrections have been applied.

128. With reference to Table 13-17, the standoff distances have considered the following scenarios:

- A midweek daytime standoff distance showing the extents of a High magnitude of impact;
- A midweek daytime standoff distance showing the extents of a Medium magnitude of impact;
- A midweek daytime standoff distance showing the extents of a Low magnitude of impact;
- A weekend standoff distance showing the extents of a High magnitude of impact; and
- A weekend standoff distance showing the extents of a Medium magnitude of impact; and
- A weekend standoff distance showing the extents of a Low magnitude of impact.

129. Outside of these standoff distances, there would therefore be a Negligible magnitude of impact.

130. With reference to Table 13-16, a Negligible impact magnitude for receptors of all sensitivities, and a Low impact magnitude for receptors of Medium sensitivity and below, would result in a temporary minor adverse effect, which is not significant in terms of the EIA Regulations.

131. It must be noted that the standoff distances have been based on the lowest calculated threshold limits contained in Table 13-10. This is to ensure an MDS, as at receptors that have a higher threshold limit, the predicted construction noise level would lead to a smaller magnitude of impact.

132. The standoff distances are shown in Table 13-24.

**Table 13-24 Standoff Distances for Cable Route Construction Noise**

| Scenario | Noise Threshold Limit, dB $L_{Aeq,T}$ | Standoff Distance to Extent of Magnitude of Impact, metres | | |
|---|---|---|---|---|
| | | Low* | Medium** | High*** |
| Midweek Daytime Construction | 65 | 150 | 115 | 90 |
| Weekend Construction | 55 | 445 | 360 | 290 |

** Predicted noise level equal to the Threshold limit.*
*** Predicted noise level 2 dB above the Threshold limit.*
**** Predicted noise level 4 dB above the Threshold limit.*

133. Therefore, any NSRs located within the standoff distances shown in Table 13-24 are likely to be exposed to the corresponding magnitude of impact.

134. It must be noted, however, that the predictions and associated standoff distances have assumed a worst-case scenario where the loudest construction activity (site preparation) is being undertaken at the extents of the Landfall, HVDC, and HVAC Zones.

135. In reality, for much of the time, construction operations would be undertaken at greater distances away from NSRs. For most of the construction phase noise from construction would be lower and therefore would reduce the extents of the standoff distances.

#### 13.12.1.3.2. TRENCHLESS DRILLING

136. As previously stated in section 13.10.3, the exact location of the relevant trenchless drilling activities within the Landfall, HVDC, and HVAC Zones are not yet defined; consequently, the predicted trenchless drilling noise levels for the cable route have therefore assumed the following:

- All the plant associated with trenchless drilling activities would be located on the extents of the Landfall, HVDC, and HVAC Zones; and
- All the plant would be operating in an area measuring 40 m long by 40 m wide. These measurements have been utilised as a conservative HVDC/HVAC cable corridor width, and a conservative length. Using conservative dimensions is an MDS as it brings all construction plant closer to the NSRs.

137. Based on the above, standoff distances have been calculated where adverse noise impacts are likely to be experienced using the BS 5228-1 algorithms contained within the Cadna/A noise modelling software; the model has assumed and is based on the following:

- The trenchless drilling plant area has been modelled as an area source which emits a daytime, evening and weekend total noise level of 116 dB (to include piling) and a night-time total noise level of 114 at an average height of 2 m above ground level;
- Receptor height of 1.5 m for daytime and weekend assessments and 4 m height for night-time assessment;
- Ground absorbency factor of 0.5 between the source and the receivers;

- Downwind propagation between the source and the receiver;
- Relative Humidity = 70%;
- Air Temperature = 10°C;
- Flat ground (i.e., no topography) between the source and the receiver;
- No intervening structures between the source and the receiver; and
- The stand-off distances have been based on free-field predictions, so no façade corrections have been applied.

138. With reference to Table 13-17, the standoff distances have considered the following scenarios:

- A midweek daytime standoff distance showing the extents of a High magnitude of impact;
- A midweek daytime standoff distance showing the extents of a Medium magnitude of impact;
- A midweek daytime standoff distance showing the extents of a Low magnitude of impact;
- An evening / weekend standoff distance showing the extents of a High magnitude of impact;
- An evening / weekend standoff distance showing the extents of a Medium magnitude of impact;
- An evening / weekend standoff distance showing the extents of a Low magnitude of impact;
- A night-time standoff distance showing the extents of a High magnitude of impact;
- A night-time standoff distance showing the extents of a Medium magnitude of impact; and
- A night-time standoff distance showing the extents of a Low magnitude of impact.

139. Outside of these standoff distances, there would therefore be a Negligible magnitude of impact.

140. It must be noted that the standoff distances have been based on the lowest calculated threshold limits contained in Table 13-10.

141. The standoff distances are shown in Table 13-25.

**Table 13-25 Standoff Distances for Cable Route Trenchless Drilling**

| Scenario | Noise Threshold Limit, dB $L_{Aeq,T}$ | Standoff Distance to Extent of Magnitude of Impact, metres | | |
|---|---|---|---|---|
| | | Low* | Medium** | High*** |
| Midweek Daytime Drilling | 65 | 105 | 95 | 65 |
| Evening / Weekend Drilling | 55 | 330 | 270 | 215 |
| Night-Time Drilling | 45 | 900 | 800 | 580 |

** Predicted noise level equal to the Threshold limit.*
*** Predicted noise level 2 dB above the Threshold limit.*
**** Predicted noise level 4 dB above the Threshold limit.*

142. Therefore, any NSRs located within the standoff distances shown in Table 13-25 above are likely to be exposed to the corresponding magnitude of impact.

143. It must be noted, however, that the predictions and associated standoff distances have assumed a worst-case scenario where trenchless drilling is being undertaken at the extents of the Landfall, HVDC, and HVAC Zones.

144. In reality, for much of the time construction operations would be undertaken at greater distances away from NSRs. For most of the construction phase noise from construction would be lower and therefore would reduce the extents of the standoff distances.

MAGNITUDE OF IMPACT SUMMARY

145. The standoff distances outlined in Table 13-24 and Table 13-25 are based solely on the combined sound power levels for the noisiest construction phase relevant in Table 13-23 before consideration of the potential mitigation measures that will be included in the NVMP. The NVMP will identify which mitigation measures are most appropriate and cost effective for various parts of the Onshore Scheme. Examples of the potential mitigation measures that could be included in the NVMP include:

- Introducing localised acoustic screening close to source and/or receptor where necessary. If the screening blocks partial line of sight, approximately 5 dB of screening can be assumed; if the screening fully blocks line of sight, approximately 10 dB of screening can be assumed.
- Reducing the simultaneous use of plant as far as reasonably practicable. If the number of items of a type of plant can be halved, this will provide a 3 dB reduction from this activity.
- Re-positioning plant as far away from NSRs as reasonably practicable. Doubling the distance between a noise source and a receiver can provide up to a 6 dB reduction.
- Not using particularly noisy items of plant pieces at night and limiting or eliminating certain works during more sensitive periods (e.g., Sundays) as far as reasonably practicable. Doing so will eliminate the need to assess against more stringent criteria.
- Use of low noise, e.g., electric or hybrid, construction plant. The activity sound power levels provided in Table 13-23 are based on conservative selections of sound power levels for individual plant items. Should these reduce, the activity sound power levels will reduce.

146. However, the appropriate mitigation measures will be determined during detailed design once more details regarding the construction plant to be utilised and the exact location of the Landfall, HVDC and HVAC cable routes is finalised in order to provide cost-effective mitigation along the cable route, and will be detailed within the NVMP.

147. On this basis, it is considered likely that noise sensitive receptors within these standoff distances will be subject to lower magnitudes of impact than suggested by the standoff distances. A worked example is shown in Table 13-26.

**Table 13-26 Worked Example of Appropriate Mitigation**

| Scenario | Distance From Cable Route | BS 5228-1 Category A Construction Noise Threshold | Predicted Construction Noise Level, Activity, and Magnitude of Impact | Screening at source, completely hiding noise sources | Reduction of simultaneous use of plant | Selection of low-noise plant for close working | Screening at receptor, partially hiding noise sources | Resultant Construction Noise Level and Magnitude of Impact |
|---|---|---|---|---|---|---|---|---|
| Midweek Daytime Construction | 75 | 65 | 71<br>Site Preparation<br>High | -10 | N/A | N/A | N/A | 61<br><br>Negligible |
| Evening / Weekend Construction | | 55 | 71<br>Site Preparation<br>High | -10 | -3 | -5 | N/A | 53<br><br>Negligible |
| Night-Time Construction | | 45 | 67<br>HDD Operations (Night-time)<br>High | -10 | -3 | -5 | -5 | 44<br><br>Negligible |

148. It can be seen from Table 13-26 that significant reductions in noise levels can be achieved by specifying appropriate mitigation measures in the NVMP, which will be submitted to NCC as part of the CoCP. These mitigation measures would be informed by detailed design post consent.

149. Based on specifying appropriate mitigation measures in the NVMP, exemplified in Table 13-26, it is considered that construction noise magnitude of impacts can be reduced to Negligible at the NSRs. The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly.

#### 13.12.1.4. SENSITIVITY OF THE RECEPTOR

150. The receptors within the standoff distances include residential properties, a school, a medical centre, as well as offices and industrial premises.

151. With reference to the definitions of sensitivity summarised in Table 13-15, the impacts of cable route drilling noise have considered receptors of Negligible, Low, Medium and High sensitivity (industrial, commercial, residential, school and healthcare buildings, as described in Table 13-16).

#### 13.12.1.5. SIGNIFICANCE OF THE EFFECT

152. With reference to Table 13-16, for receptors of all sensitivities outside the standoff distances shown in Table 13-24 there would be a Negligible impact magnitude, which would result in a temporary **minor adverse** effect, which is **not significant** in terms of the EIA Regulations.

153. Within the standoff distances shown in Table 13-24, it is considered that, by specifying appropriate mitigation measures in the NVMP, the magnitude of impact at NSRs can be limited to Negligible where necessary. This is demonstrated in Table 13-26.

154. Overall, the magnitude of the impact is deemed to be Negligible, and the sensitivity of the receptor is considered to be up to High (educational and healthcare receptors). The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.12.1.6. SECONDARY MITIGATION AND RESIDUAL EFFECT

155. No secondary mitigation is considered necessary for construction noise from the Landfall, HVDC, and HVAC cable route because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### ISSUE 2: CONSTRUCTION ACTIVITY NOISE AT THE ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON NOISE SENSITIVE RECEPTORS

#### 13.12.1.1. INTRODUCTION OF IMPACT

156. With the Onshore Scheme still at an early stage of design, a detailed list of construction plant, operational noise levels and associated on-times for all the construction activities / operations is not yet available. As such, this preliminary assessment has been undertaken utilising a list of indicative plant produced by SLR Consulting and the Applicant. Based on this list, the combined sound power level (SWL) for construction of the Onshore Converter Station has been calculated

for each construction activity considering the number of plant and associated on-times, as shown in Table 13-27.

**Table 13-27 Combined sound power levels – construction plant for Onshore Converter Station, dB**

| Activity | Combined Sound Power Level (SWL) |
|---|---|
| 1. Ground Works | 123 |
| 2. Building Foundation | 119 |
| 3. Access Road and Carparks | 116 |
| 4. Building Fabric and High Voltage Plant | 118 |

157. A summary programme of the Onshore Converter Station construction works is described in Chapter 5: Project Description.

158. A summary of the construction works associated with the Onshore Converter Station is given below.

159. The likely sequence of activities at the Onshore Converter Station are:

- Site investigation works, pre-construction archaeological and ecological surveys and mitigation;
- Site preparation and establishment works, including:
  - vegetation clearance;
  - development of internal site access and the construction of temporary facilities including parking;
  - site offices, storage containers, welfare facilities;
  - construction/laydown areas, waste laydown / sorting areas;
  - a bunded fuelling area, and a double bunded chemical/fuel storage area;
  - the development of electricity, water supplies, drainage and electricity; and
  - the erection of security fencing.
- Earthworks, including clearing and levelling of the Site;
- Civil engineering works, including:
  - construction of foundations for structures and buildings;
  - building platforms on the piled foundations;
  - development of the site's permanent drainage system;
  - the construction of permanent access, internal roads, and car parking arrangements; and
  - the construction of all buildings, including the erection of steel frames and cladding.
- Mechanical and electrical works;
- Cable installation; and
- Commissioning and site reinstatement and landscape works.

160. With reference to the above, the predicted construction noise levels for the Onshore Converter Station have been calculated using the BS 5228-1 algorithms contained within the Cadna/A noise modelling software; the model has assumed the following:

- All the plant associated with Ground Works (noisiest activity, see Table 13-27) would be located within the nearest 25% of the Onshore Converter Station area closest to each NSR;
- Average source height of 2 m, receptor height of 1.5 m for daytime and weekend assessments (a night-time assessment has not been considered for substation construction operations);
- Ground absorbency factor of 0.5 between the source and the receivers;
- Downwind propagation between the source and the receiver
- Relative Humidity = 70%;
- Air Temperature = 10°C; and
- The predictions have been made in free-field conditions, so no façade corrections have been applied.

#### 13.12.1.2. MAGNITUDE OF IMPACT

161. Based on the above, the worst-case noise levels from construction operations associated with the Onshore Converter Station have been predicted at the nearest NSRs.

162. The NSRs considered for the Onshore Converter Station are shown in Table 13-28. The table also shows the grid co-ordinates and the distance from the receptor to the closest working area.

163. The receptors considered are those that are closest to the Onshore Converter Station Zone and therefore would be subject to the greatest potential impacts. It must be noted however that these receptors are considered representative of the worst-case impacts that would be experienced other residential properties in their vicinity.

**Table 13-28 NSRs Considered – Onshore Converter Station Construction Noise**

| NSR ID | Approximate Grid Reference X/Y | | Approximate Distance to Closest Working Area (m) |
|---|---|---|---|
| CS001 – 8 Wembley Gardens | 429831 | 584744 | 850 |
| CS002 – 20 Sandfield Road | 429708 | 583564 | 430 |
| CS003 – 2 Havelock Mews | 428994 | 583496 | 90 |
| CS004 – Winning Park Cottage | 428181 | 584579 | 880 |
| CS005 – High Brocklands | 428767 | 584765 | 610 |

164. The locations of the NSRs described above correspond to those utilised for the baseline sound survey and are shown on Figure 13.3 (Volume 4).

165. The predicted noise levels from worst-case daytime and weekend Onshore Converter Station construction operations are shown in Table 13-29. The table also compares the predicted noise levels to the threshold limits and with reference to Table 13-17 defines the magnitude of impact.

166. It must be noted that the assessment is based on the calculated threshold limits contained in Table 13-10 and the predicted noise levels have been rounded to the nearest decibel.

**Table 13-29 Onshore Converter Station predicted construction noise levels**

| NSR ID | Construction Activity | Predicted Noise Level, $L_{Aeq,T}$ | Period | Threshold Limit | Diff. | Impact Magnitude |
|---|---|---|---|---|---|---|
| CS001 | Groundworks | 52 | Daytime | 65 | -13 | Negligible |
| | | | Weekend | 55 | -3 | Negligible |
| CS002 | | 53 | Daytime | 65 | -12 | Negligible |
| | | | Weekend | 55 | -2 | Negligible |
| CS003 | | 68 | Daytime | 65 | +3 | Medium |
| | | | Weekend | 55 | +13 | High |
| CS004 | | 50 | Daytime | 65 | -15 | Negligible |
| | | | Weekend | 55 | -5 | Negligible |
| CS005 | | 53 | Daytime | 65 | -12 | Negligible |
| | | | Weekend | 60 | -7 | Negligible |

167. As described in paragraph 114, mitigation measures for construction noise will be detailed in the NVMP, with Table 13-26 providing a worked example of the effectiveness of the mitigation measures. It is therefore considered that construction noise levels can be reduced by at least the 11 dB required to reduce all impact magnitudes to a maximum of Low.

168. Final mitigation measures would be informed by detailed design post consent and included within the final NVMP which would be submitted to NCC as part of the final CoCP.

169. The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly.

#### 13.12.1.3. SENSITIVITY OF THE RECEPTOR

170. The receptors considered as part of this assessment are the nearest residential receptors to the Onshore Converter Station Zone.

171. Therefore, the sensitivity of the receptors considered during the daytime and weekend periods, based on the definitions of sensitivity summarised in Table 13-15, these receptors would be of Medium sensitivity.

#### 13.12.1.4. SIGNIFICANCE OF THE EFFECT

172. Based on the resultant construction noise levels shown in Table 13-29 and a suite of mitigation measures that will be specified in the NVMP, the NSRs listed in Table 13-28 would experience a maximum impact magnitude of Low.

173. Overall, the magnitude of the impact is deemed to be Low, and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.12.1.5. SECONDARY MITIGATION AND RESIDUAL EFFECT

174. No secondary mitigation is considered necessary for construction noise from the Onshore Converter Station because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### ISSUE 3: CONSTRUCTION ACTIVITY NOISE AT THE LANDFALL, HVDC, AND HVAC CABLE ROUTES RESULTING IN POTENTIAL EFFECT ON ECOLOGICAL RECEPTORS

#### 13.12.1.6. INTRODUCTION OF IMPACT

175. With reference to Volume 3, Chapter : Terrestrial Ecology and Ornithology, it is considered that the identified internationally and nationally designated ecological sites which have the potential to be impacted from Noise from the Onshore Scheme are as follows:

- Northumberland Shore SSSI; and
- Northumberland Marine SPA.

176. The locations of the above identified ecological sites are shown on Figure 9.1 within Volume 4 of this ES.

#### 13.12.1.7. MAGNITUDE OF IMPACT

177. The magnitude of impact on ecological receptors is defined by the same methodology as that for weekend construction of the Landfall, HVDC, and HVAC cable routes as outlined in section 13.12.1.3, as the noise thresholds contained in AQTAG 09 mirror those for Category A receptors during the weekend period. Therefore, the extents of the magnitude of impact of construction noise on ecological receptors mirrors those for weekend construction works as shown in Table 13-24 and the evening / weekend works in Table 13-25.

178. It must be noted, however, that the predictions and associated standoff distances have assumed a worst-case scenario where the loudest construction activity (site preparation or drilling) is being undertaken at the extents of the Landfall, HVDC, and HVAC Zones.

179. In reality, for much of the time construction operations would be undertaken at greater distances away from designated ecological sites. For most of the construction phase noise from construction would be lower and therefore would reduce the extents of the standoff distances.

180. Any identified adverse noise impacts will be reduced further through the use of the measures shown in **Error! Reference source not found.**. Additional mitigation measures would be determined once more details regarding the construction plant to be utilised and the exact location of the Landfall and HVDC/HVAC cable corridor is finalised. The worked example in Table 13-26 demonstrates the effectiveness of the mitigation measures.

181. Final mitigation measures would be informed by detailed design post consent and included within the final NVMP which would be submitted for approval by NCC as part of the final CoCP that is secured within the planning permission.

182. It is considered that, with the implementation of the measures set out in **Error! Reference source not found.**, the magnitude of impact will be reduced to Low. As noted in paragraph 97, this is an indication of the maximum magnitude of impact that would be shown should further assessments be required (dependant on species).

183. The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly.

#### 13.12.1.8. SENSITIVITY OF THE RECEPTOR

184. As stated in Table 13-15, ecological receptors have been defined as Medium sensitivity for all time periods.

#### 13.12.1.9. SIGNIFICANCE OF THE EFFECT

185. With reference to Table 13-21, for receptors of all sensitivities outside the relevant standoff distances shown in Table 13-24 and Table 13-25 there would be a Negligible impact magnitude, which would result in a temporary **minor adverse** effect, which is **not significant** in terms of the EIA Regulations.

186. Within the relevant standoff distances shown in Table 13-24 and Table 13-25, it is considered that, using the measures contained in **Error! Reference source not found.**, the magnitude of impact at the ecological can be limited to Low where necessary.

187. Overall, the magnitude of the impact is deemed to be Low and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.12.1.10. SECONDARY MITIGATION AND RESIDUAL EFFECT

188. No secondary mitigation is considered necessary for construction noise from the HVDC and HVAC cable routes because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### ISSUE 4: CONSTRUCTION ACTIVITY NOISE AT THE ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON ECOLOGICAL RECEPTORS

#### 13.12.1.11. INTRODUCTION OF IMPACT

189. With reference to Volume 3, Chapter 9: Terrestrial Ecology and Ornithology, it is considered that the identified internationally and nationally designated ecological sites which have the potential to be impacted from Noise from the Onshore Scheme are as follows:

- Northumberland Shore SSSI; and
- Northumberland Marine SPA.

190. The locations of the above identified ecological sites are shown on Figure 9.1within Volume 4 of this ES.

### 13.12.1.12. MAGNITUDE OF IMPACT

191. Section 13.12.1.2 outlines the predicted magnitude of impact at the nearest residential noise sensitive receptors to the Onshore Converter Station. This section outlines that construction noise levels will be mitigated to a maximum 57 dB $L_{Aeq,T}$ to ensure a maximum Low magnitude of impact during weekend periods.

192. The designated ecological sites are located at greater distances from the Onshore Converter Station Zone than the residential noise sensitive receptors. Therefore, the resultant construction noise level at the nearest designated ecological sites will be at most 57 dB $L_{Aeq,T}$, resulting in a maximum Low magnitude of impact.

193. As noted in paragraph 97, this is an indication of the maximum magnitude of impact that would be shown should further assessments be required (dependant on species).

### 13.12.1.13. SENSITIVITY OF THE RECEPTOR

194. As stated in Table 13-15, designated ecological sites have been defined as Medium sensitivity for all time periods.

### 13.12.1.14. SIGNIFICANCE OF THE EFFECT

195. Based on the resultant construction noise levels shown in Table 13-29 and the measures as outlined in Table 13-22, the ecological receptors would experience a maximum impact magnitude of Low.

196. Overall, the magnitude of the impact is deemed to be up to Low and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

### 13.12.1.15. SECONDARY MITIGATION AND RESIDUAL EFFECT

197. No secondary mitigation is considered necessary for construction noise from the Onshore Converter Station because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

## ISSUE 5: CONSTRUCTION ACTIVITY VIBRATION AT THE LANDFALL, HVDC, AND HVAC CABLE ROUTES RESULTING IN POTENTIAL EFFECT ON VIBRATION SENSITIVE RECEPTORS

### 13.12.1.16. INTRODUCTION OF IMPACT

198. Ground level plant is not considered to generate significant levels of vibration, with levels below those which would be likely to cause adverse human response.

199. However, the following construction vibration activities have been considered:

- The underground drilling activities associated with the trenchless drilling operations at the Landfall and along the Landfall, HVDC, and HVAC cable routes;
- The vibratory piling activities associated with the trenchless drilling operations at the Landfall/HVDC and HVAC cable routes; and
- Piling associated with the Onshore Converter Station foundations, which is considered separately in section 13.12.1.21.

200. The potential vibration impact of these working methods has been assessed upon the closest vibration sensitive receptors (VSRs) to each construction activity.

### 13.12.1.17. MAGNITUDE OF IMPACT

201. Underground drilling will be utilised at the Landfall and at a number of locations, used as an alternative methodology to open-cut trenching to cross significant environmental and physical features such as watercourses, utilities, and roads. As part of the trenchless drilling operations, it is expected that vibratory piling will be utilised to install sheet piles; should it prove necessary to utilise other construction methodologies, these will be assessed during detailed design.

202. Depending on the progress rates and techniques employed, vibration effects due to tunnelling, drilling, and piling installation are relatively short-lived; in addition, levels of vibration are found to decrease rapidly with distance.

203. Based on the above, standoff distances have been calculated where adverse vibration impacts are likely to be experienced using desktop predictions of ground borne vibration due to drilling works in accordance with calculation algorithms included in Table E.1 of BS 5228-2:2009+A1:2014 Part 2 Vibration.

204. The calculation for vibration for tunnelling has been used for underground drilling. For the calculation of vibratory piling, $k_v$ has been set to 266 for a 5% chance of exceedance has been chosen (as opposed to 50% or 33.3%), and $\delta$ set to 1.3 for all operations.

205. With reference to Table 13-19, the standoff distances have considered the following scenarios:

- A standoff distance showing the extents of a High magnitude of impact for underground drilling;
- A standoff distance showing the extents of a Medium magnitude of impact for underground drilling;
- A standoff distance showing the extents of a Low magnitude of impact for underground drilling;
- A standoff distance showing the extents of a High magnitude of impact for vibratory piling;
- A standoff distance showing the extents of a Medium magnitude of impact for vibratory piling; and
- A standoff distance showing the extents of a Low magnitude of impact for vibratory piling.

206. The standoff distances are shown in Table 13-30.

**Table 13-30 Standoff Distances for Cable Route Construction Vibration**

| Scenario | Standoff Distance to Extent of Magnitude of Impact, metres | | |
|---|---|---|---|
| | Low* | Medium** | High*** |
| Underground drilling | 140 | 55 | 9.25 |
| Vibratory piling | 190 | 75 | 12.5 |

** Predicted vibration level of 0.3 mm/s.*
*** Predicted vibration level of 0.9 mm/s.*
**** Predicted vibration level of 9.9 mm/s.*

207. Therefore, any VSRs located within the standoff distances shown in Table 13-30 are likely to be exposed to the corresponding magnitude of impact.

208. It must be noted, however, that the predictions and associated standoff distances have assumed a worst-case scenario where trenchless drilling activities are being undertaken at the extents of the Landfall, HVDC, and HVAC Zones.

209. In reality, for much of the time, trenchless drilling operations would be undertaken at greater distances away from VSRs, therefore for the majority of the construction phase vibration from trenchless drilling would be lower and therefore reducing the extents of the standoff distances.

210. It also should be noted that drilling would be temporary in nature, and a Medium magnitude of impact could be tolerated if warning has been given to the residents of the relevant VSRs prior to the commencement of the trenchless drilling operations; this is considered to effectively reduce the magnitude of impact to Low. Given the very short distances from the vibration sources required to exceed the extent of High impact magnitude, and Medium impact magnitude tolerable with prior warning, it is considered that the highest effective impact magnitude receptors will be subject to is Low.

211. The impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly.

### 13.12.1.18. SENSITIVITY OF THE RECEPTOR

212. The sensitive receptors within the standoff distances include residential properties, a school, a medical centre, as well as offices and industrial premises.

213. With reference to the definitions of sensitivity summarised in Table 13-15, the impacts of cable route drilling noise have considered receptors of Negligible, Low, Medium and High sensitivity (industrial, commercial, residential, school and healthcare buildings, as described in Table 13-16).

### 13.12.1.19. SIGNIFICANCE OF THE EFFECT

214. With reference to Table 13-30, for receptors of all sensitivities outside the standoff distances shown in Table 13-24 there would be a Negligible impact magnitude, which would result in a temporary **minor adverse** effect, which is **not significant** in terms of the EIA Regulations.

215. Within the standoff distances shown in Table 13-30, it is considered that, using the measures contained in table 13-12, the magnitude of impact at VSRs can be limited to Low where necessary, as described in paragraph 210.

216. Overall, the magnitude of the impact is deemed to Low, and the sensitivity of the receptor is considered to be up to High (educational and healthcare receptors). The effect will, therefore, be of **minor to moderate adverse significance**, which is **not significant** in EIA terms.

### 13.12.1.20. SECONDARY MITIGATION AND RESIDUAL EFFECT

217. No secondary mitigation is considered necessary for construction vibration from the HVDC and HVAC cable routes because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

## ISSUE 6: CONSTRUCTION ACTIVITY VIBRATION AT THE ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON VIBRATION SENSITIVE RECEPTORS

### 13.12.1.21. INTRODUCTION OF IMPACT

218. As previously stated, ground level plant is not considered to generate significant levels of vibration, with levels below those which would be likely to cause adverse human response.

219. Underground drilling and vibratory piling have been considered and assessed in section 13.12.1.16; in addition, this section considers the potential vibration impacts from percussive piling operations associated with the construction on the Onshore Converter Station.

### 13.12.1.22. MAGNITUDE OF IMPACT

220. The most substantial source of vibration during the construction works will be the potential for percussive piling operations associated with the Onshore Converter Station foundations.

221. However, depending on the progress rates and techniques employed, vibration effects due to piling installation are relatively short-lived; in addition, levels of vibration are found to decrease rapidly with distance.

222. Based on the above, standoff distances have been calculated where adverse vibration impacts are likely to be experienced using desktop predictions of ground borne vibration due to percussive piling operations in accordance with calculation algorithms included in Table E.1 of BS 5228 2:2009+A1:2014 Part 2: Vibration.

223. The predictions have also considered different hammer energies (200 kJ, 300 kJ and 500 kJ) and the following scenarios:

- A standoff distance showing the extents of a high magnitude of impact for percussive piling for each hammer energy;
- A standoff distance showing the extents of a medium magnitude of impact for percussive piling for each hammer energy; and

- A standoff distance showing the extents of a low magnitude of impact for percussive piling for each hammer energy.

224. The standoff distances are shown in Table 13-31.

**Table 13-31 Standoff Distances for Onshore Converter Station Construction Vibration**

| Scenario | Standoff Distance to Extent of Magnitude of Impact, metres for Hammer Energy | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low* | | | Medium** | | | High*** | | |
| | 200 kJ | 300 kJ | 500 kJ | 200 kJ | 300 kJ | 500 kJ | 200 kJ | 300 kJ | 500 kJ |
| Percussive Piling | 66 | 78 | 95 | 27 | 32 | 39 | 4.6 | 5.3 | 6.5 |

** Predicted vibration level of 0.3 mm/s.*
*** Predicted vibration level of 0.9 mm/s.*
**** Predicted vibration level of 9.9 mm/s.*
The standoff distances have been based on percussive piling 'at refusal'.

225. It must be noted, however, that the hammer energies utilised are out of the valid prediction range included within BS5228-2:2009+A1:2014 Part 2 which states that the limit of the equation utilises a maximum hammer energy of 85 kJ.

226. Therefore, the standoff distances shown should be treated with a large degree of caution. It also should be noted that trying to accurately predict the vibration levels generated from large hammer energies through predominately unknown ground conditions over distances over 100 m is extremely difficult.

227. Further to the above any VSRs located within the standoff distances shown in above are likely to be exposed to the corresponding magnitude of impact. Key VSRs to consider include the NSRs for the Onshore Converter Station construction, as detailed in Table 13-28.

228. It must be noted that the closest VSR to the Onshore Converter Station zone (CS003 Havelock Mews) is approximately 90 m from the Onshore Converter Station Zone. Based on the standoff distances shown in Table 13-31, this receptor could be subject to a Low magnitude of impact if a 500 kJ hammer is utilised; however it must be noted that this assumed a worst-case scenario where the piling operations are being undertaken at the extents of the Onshore Converter Station Zone.

229. In reality, piling operations would be undertaken at greater distances away from VSRs. Therefore, for the majority of the time of the construction phase vibration from the Onshore Converter Station piling operations would be lower and therefore reducing the extents of the standoff distances.

230. It also should be noted that piling would be temporary in nature, and worst-case vibration levels could be tolerated if warning has been given to the residents of the relevant VSRs prior to the commencement of the piling operations.

### 13.12.1.23. SENSITIVITY OF THE RECEPTOR

231. The receptors considered as part of this assessment are the nearest residential receptors to the Onshore Converter Station Zone.

232. Therefore, the sensitivity of the receptors considered during the daytime and weekend periods, based on the definitions of sensitivity summarised in Table 13-15 these receptors would be of Medium sensitivity.

### 13.12.1.24. SIGNIFICANCE OF THE EFFECT

233. As a worst-case if a 500 kJ hammer is utilised Receptor CS003 (Havelock Mews) could be subject to temporary **minor adverse** effect which is considered **not significant** in EIA terms.

234. However, it must be again noted that the hammer energies utilised are out of the valid prediction range included within BS 5228-2 which states that the limit of the equation utilises a maximum hammer energy of 85 kJ.

235. Therefore, the standoff distances shown in Table 13-31 should be treated with a large degree of caution. It also should be noted that trying to accurately predict the vibration levels generated from large hammer energies through predominately unknown ground conditions over distances over 100 m is extremely difficult.

236. The assessment presented is based on conservative values for hammer energies, and all likely significant effects have been identified. With the above stipulations in mind, it is still considered that vibration from construction of the Converter Station is unlikely to give rise to significant effects.

237. With reference to the above, vibration from impact piling during the Onshore Converter Station construction will be assessed in more detail in the NVMP once the design and location of the Onshore Converter Station is further refined.

### 13.12.1.25. SECONDARY MITIGATION AND RESIDUAL EFFECT

238. No secondary mitigation is considered necessary for construction vibration from the Onshore Converter Station because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will therefore remain as **minor adverse** effect and **not significant** in EIA terms.

## ISSUE 7: TRAFFIC NOISE FROM CONSTRUCTION ACTIVITY AT THE LANDALL, HVDC, AND HVAC CABLE ROUTES AND ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON NOISE SENSITIVE RECEPTORS

### 13.12.1.26. INTRODUCTION OF IMPACT

239. Construction traffic from the development proposals may temporarily alter noise levels near the affected local road network. In accordance with the DMRB Volume 11 Section 3 Part 7 Noise and Vibration, a noise assessment has been undertaken to include the identified affected links.

240. The most affected links have been identified within Chapter 12: Transport, Traffic and Access and shown on Figure 12.1 (Volume 4).

### 13.12.1.27. MAGNITUDE OF IMPACT

241. With reference to Chapter 12 of this ES for each link the Annual Average Weekday Traffic (AAWT) and percentage of Heavy Goods Vehicles (HGVs) have been determined 'With Scheme' (with the Onshore Scheme) and 'Without Scheme' (without the Onshore Scheme).

242. Based on the traffic numbers described above the BNL has been established for the 'With Scheme' and 'Without Scheme scenarios. Scenarios for the base year 2022 and base year including the Onshore Scheme have been assessed. The BNL is the dB LA10, 18hr noise level at 10 m from the kerb of the road assessed.

243. The impact magnitude for each assessment of each link is shown in Table 13-32. The table also compares the predicted changes in noise levels to the impact magnitude threshold limits contained in Table 13-18.

**Table 13-32 Construction traffic noise assessment**

| Link | Without Scheme | | | | With Scheme | | | | Change in BNL, dB | Impact Magnitude |
|---|---|---|---|---|---|---|---|---|---|---|
| | AAWT | % HGV | Average Speed km/h | BNL dB | AAWT | % HGV | Average Speed km/h | BNL dB | | |
| A189 (N)***** | 40391 | 3.4 | 97* | 78.1 | 40557 | 3.5 | 97* | 78.1 | 0.0 | No change |
| A189 (S)***** | 36405 | 2.9 | 97* | 77.6 | 36460 | 2.9 | 97* | 77.6 | 0.0 | No change |
| C404 Spine Road between A189 and Brock Lane | 2816 | 3.4 | 78 | 64.8 | 3038 | 5.7 | 78 | 65.6 | +0.8 | Negligible |
| Brock Lane****** | 1729 | 1.3 | 50* | 59.2 | 1766 | 2.3 | 50* | 59.7 | +0.5 | Negligible |
| Old Main Road****** | 507 | 0.0 | 50* | 53.4 | 507 | 0.0 | 50* | 53.4 | 0.0 | No change |
| C404/C415 Spine Road between AC1 and AC4 | 2955 | 3.4 | 78 | 65.0 | 3177 | 5.5 | 78 | 65.8 | +0.8 | Negligible |
| C404/C415 Spine Road between AC4 and AC5 | 2955 | 3.4 | 78** | 65.0 | 3040 | 4.1 | 78** | 65.3 | +0.3 | Negligible |
| C415 Spine Road between AC5 and AC6 | 2955**** | 3.4 | 50* | 62.3 | 3040 | 4.1 | 50* | 62.6 | +0.3 | Negligible |
| C415 Spine Road between AC6 and AC8 | 2955**** | 3.4 | 50* | 62.3 | 3040 | 4.1 | 50* | 62.6 | +0.3 | Negligible |
| C415 Spine Road east of AC8 | 2955**** | 3.4 | 50* | 62.3 | 3075 | 4.5 | 50* | 62.8 | +0.5 | Negligible |
| Unity Terrace*** | 804 | 1.6 | 45 | 55.5 | 924 | 6.1 | 45 | 57.6 | +2.1 | Low |

** Speeds suggested in paragraph 14.2 of CRTN as no speed data*
*** Estimate as not at the ATC location*
**** The impacts on this link would occur at a different time to the other links, due to the anticipated timing of the Landfall works*
***** Estimate as not at the ATC location*
****** 2019 Draft Data, used as an estimation for 2023 due to the reduction in traffic during the Covid-19 period.*
******* Estimated from 22/00879 data*

244. With reference to Table 13-32 it can be seen that the worst-case impact of magnitude from noise associated with construction traffic on the most affected links is Low.

#### 13.12.1.28. SENSITIVITY OF THE RECEPTOR

245. As the significant majority of receptors along the highway routes are residential receptors, and only daytime and weekend construction is proposed, the receptors along the traffic links have been categorised as Medium sensitivity.

#### 13.12.1.29. SIGNIFICANCE OF THE EFFECT

246. It can be seen from Table 13-32 that the worst-case impact of magnitude is Low, and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.12.1.30. SECONDARY MITIGATION AND RESIDUAL EFFECT

247. No secondary mitigation is considered necessary for construction traffic noise because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### 13.12.2. Potential Effects During Operation and Maintenance

**ISSUE 1: OPERATIONAL ACTIVITY NOISE AT THE ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON NOISE SENSITIVE RECEPTORS**

#### 13.12.2.1. INTRODUCTION OF IMPACT

248. An assessment has been made in accordance with the guidance contained in BS 4142:2014+A1:2019 to determine whether noise emissions associated with the operation of the proposed Onshore Converter Station are likely to give rise to adverse impacts at the closest residential receptors.

249. Noise levels from the Onshore Converter Station have been predicted at the nearest residential receptors, the location of which are identical to those considered for the construction of the Onshore Converter Station; details of these receptors can be found in Table 13-29. Industrial receptors in the area have not been considered as, as they are of negligible sensitivity (as shown in Table 13-15), and therefore the maximum level of effect to which they could be subject is Minor (as shown in Table 13-16), which is not considered significant in EIA terms.

250. The modelling has been undertaken on the basis of the type, quantity and size of plant that is likely to be required at the Onshore Converter Station, based on the Applicant's experience in delivering multiple similar sites. It should, however, be noted that the final design of the Onshore Converter Station has not been determined and, as such, an MDS has been assessed.

### 13.12.2.2. MAGNITUDE OF IMPACT

251. In conjunction with the MDS shown in Table 13-12, the initial modelling has assumed that all the equipment is operating within the Onshore Converter Station footprint area (250 m by 250 m); the footprint area has then been positioned at the extents of the Converters Station Zone at its closest approach to each NSR.

252. The operational noise levels of the plant associated with the Onshore Converter Station are shown in Table 13-33.

**Table 13-33: Operational plant associated with the Onshore Converter Station**

| Source Name | Octave Band A-weighted Sound Power Level Spectra | | | | | | | | $L_{wA}$ (dB) | Number |
|---|---|---|---|---|---|---|---|---|---|---|
| | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | | |
| Converter transformer | 98 | 110 | 106 | 105 | 98 | 100 | 99 | 97 | 113 | 6 |
| Air core reactors | 89 | 91 | 86 | 86 | 80 | 75 | 70 | 63 | 95 | 12 |
| Harmonic filter – capacitor | 90 | 100 | 91 | 89 | 91 | 89 | 88 | 86 | 102 | 12 |
| Harmonic filter – reactor | 94 | 104 | 95 | 93 | 95 | 93 | 92 | 90 | 106 | 12 |
| Cooling banks | 85 | 83 | 85 | 85 | 84 | 81 | 76 | 74 | 92 | 4 |
| Auxiliary transformer | 61 | 73 | 69 | 68 | 61 | 62 | 62 | 60 | 76 | 2 |

253. The provided sound power levels and spectra are focussed on the current understanding of the most likely primary noise generating plant inferred from provided Single Line Drawings of the circuits. The final design might include additional noise sources, for example air conditioning and air handling units associated with buildings. However, the number and location of these sources will not be known until a later stage. Additionally, the level associated with these sources is of negligible significance in relation to the primary items of plant, and if necessary quieter alternatives can readily be procured if necessary.

254. The provided sound power levels and spectra are indicative and based on the Applicant's experience in delivering multiple similar sites. Sound power levels and spectra are representative of worst-case values for each of the expected sources. As the detailed design of the Onshore Converter Station is not currently fixed, it is likely that the actual sources will differ from those presented here. Similarly, sound power levels and spectra from the installed plant will differ from those presented here and will not be understood until the design is fixed and the procurement process is well underway. However, this scenario represents a reasonable worst-case design.

255. The purpose of any mitigation presented in the ES is to show that any impact from noise can be adequately mitigated to result in acceptable magnitudes of noise impact. The actual mitigation required will be determined once the Onshore Converter Station layout is fixed and the source levels associated with each item of plant is known.

256. The predicted specific noise levels are shown in Table 13-34 and have been calculated using the ISO 9613-2 algorithms contained within the Cadna/A noise modelling software based on the following assumptions:

- All the plant is operating simultaneously 100% of the time;
- The plant has been modelled as an area source with a sound power level equal to the sum of the plant listed in Table 13-33 above.
- The area source modelled at a height of 8 m above ground level;
- G = 0 hard ground within the Onshore Converter Station area;
- G = 0.9 soft ground between the Onshore Converter Station area and each receptor;
- A daytime receiver height of 1.5 m and a night-time receiver height of 4 m, approximate height of a ground floor and first floor window respectively at all the NSRs considered;
- A reflection factor of 3; and
- Buildings given an absorption coefficient of 0.37.

257. The following meteorological inputs have also been used:

- Downwind propagation between the Onshore Converter Station and the NSRs;
- Relative Humidity = 70%; and
- Air Temperature = 10°C.

258. It must be noted that the NSRs described in Table 13-34 have previously been identified in Table 13-29, and are shown in Figure 13.2.

259. The predicted noise levels have been rounded to the nearest decibel.

**Table 13-34: Predicted specific sound level from Onshore Converter Station, dB**

| Receptor | Period | Predicted Specific Sound Level, dB $L_{Aeq,T}$ |
|---|---|---|
| CS001 | Daytime | 48 |
| | Night-time | 50 |
| CS002 | Daytime | 51 |
| | Night-time | 51 |
| CS003 | Daytime | 64 |
| | Night-time | 64 |
| CS004 | Daytime | 46 |
| | Night-time | 47 |
| CS005 | Daytime | 51 |
| | Night-time | 52 |

260. In conjunction with BS 4142:2014+A1:2019, the acoustic character of the sound being generated by the source needs to be considered at the nearest NSRs, which may require corrections for tonal, impulsive, or intermittent sounds to be added to the specific levels where required.

261. In the absence of third octave band operational data for the Onshore Converter Station, it is considered that a +6 dB character correction would need to be added to the specific sound levels to account for the potential tonal aspects of the sound being generated by the Onshore Converter Station.

262. However, it is considered that no further character corrections would apply as the sound being generated by the Onshore Converter Station is neither intermittent nor impulsive in nature.

263. With reference to the above, 6 dB has been added to the predicted specific sound level shown in Table 13-34 to calculate the rating level ($L_{Ar,T}$) at each NSR.

264. Background sound threshold levels (taking into account the representative background sound levels for the residential properties) have been established below for the residential properties to compare the rating levels to, and assessments undertaken in accordance with BS 4142:2014+A1:2019, which states in Section 11 *Assessment of the impacts*:

*'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.'*

265. The standard does not indicate at what level background and rating levels are low but the previous version of BS 4142:1997 stated in Section 1 *Scope*:

*'The method is not suitable for assessing the noise measured inside buildings or when the background and rating noise levels are both very low. NOTE. For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low.'*

266. In recognition of this, it is proposed to define a background sound threshold level, dB $L_{AT,T}$ for each NSR location, defined as whichever is higher of either the representative background sound level or 35 dB (noted as a *'very low'* rating level above), against which to assess the rating level.

267. The representative background sound levels and resulting proposed background sound threshold levels for the NSRs considered are shown in Table 13-35.

**Table 13-35 Representative background sound levels and background sound threshold levels, dB**

| Location | Period | Representative Background Sound Level, dB $L_{A90,T}$ | Background Sound Threshold Level, dB $L_{AT,T}$ |
|---|---|---|---|
| CS001 | Daytime[1] | 39 | 39 |
| | Night-time[2] | 38 | 38 |
| CS002 | Daytime | 37 | 37 |
| | Night-time | 32 | 35 |
| CS003 | Daytime | 39 | 39 |
| | Night-time | 33 | 35 |
| CS004 | Daytime | 40 | 40 |
| | Night-time | 32 | 35 |
| CS005 | Daytime | 44 | 44 |
| | Night-time | 31 | 35 |

[1] 07:00-23:00 Monday-Sunday
[2] 23:00-07:00 Monday-Sunday

268. In order to limit the level of effect from operational noise from the converter station to a maximum of 'minor to moderate', accounting for a sensitivity of High for a residential receptor during the night-time, the operational noise impact magnitude should be limited to a maximum of Low, as described in Table 13-20.

269. In order to limit the impact magnitude to Low, the rating level should be limited to a maximum of 5 dB above the background sound threshold levels set out in Table 13-35. It is therefore proposed to commit to ensuring that the rating levels from the Converter Station operational noise do not exceed the rating level limits set out in Table 13-36.

**Table 13-36 Proposed rating level limits for Converter Station operational noise, dB**

| Location | Period | Rating Level Limit, dB $L_{Ar,T}$ |
|---|---|---|
| CS001 | Daytime[1] | 44 |
| | Night-time[2] | 43 |
| CS002 | Daytime | 42 |
| | Night-time | 40 |
| CS003 | Daytime | 44 |
| | Night-time | 40 |
| CS004 | Daytime | 45 |
| | Night-time | 40 |
| CS005 | Daytime | 49 |
| | Night-time | 40 |

[1] 07:00-23:00 Monday-Sunday
[2] 23:00-07:00 Monday-Sunday

270. In view of the above and in addition to the rating level, as part of assessing the context of the assessment, the change in the absolute $L_{Aeq,T}$ sound level is also presented. For the assessment, to be robust, when undertaking the calculation, the lowest baseline ambient sound level as presented in Table 13-11 has been used.

271. The absolute $L_{Aeq,T}$ sound level has been calculated by logarithmically adding the predicted specific sound level from the Onshore Converter Station to the baseline ambient (residual $L_{Aeq,T}$) level at each NSR considered. The absolute level is then compared to the measured baseline ambient (residual $L_{Aeq,T}$) levels and any changes assessed accordingly.

272. The results of these assessments are shown in Table 13-37, where the predicted rating levels have been rounded to the nearest decibel.

**Table 13-37 BS 4142:2014+A1:2019 Onshore Converter Station operational assessment for residential receptors**

| Receptor | Period | Background Sound Threshold Level, dB $L_{AT,T}$ | Predicted Specific Sound Level, dB $L_{Aeq,T}$ | Rating Level, dB $L_{Ar,T}$ | Difference, dB $L_{Ar,T}$ – dB $L_{AT,T}$ | Measured Residual, dB $L_{Aeq,T}$ | Calculated Ambient, dB $L_{Aeq,T}$ | Change in dB $L_{Aeq,T}$ |
|---|---|---|---|---|---|---|---|---|
| CS001 | Daytime | 39 | 48 | 54 | +15 | 49 | 52 | +3 |
| | Night-time | 38 | 50 | 56 | +18 | 49 | 53 | +4 |
| CS002 | Daytime | 37 | 51 | 57 | +20 | 47 | 53 | +6 |
| | Night-time | 35 | 51 | 57 | +22 | 42 | 52 | +10 |
| CS003 | Daytime | 39 | 64 | 70 | +31 | 48 | 64 | +16 |
| | Night-time | 35 | 64 | 70 | +35 | 46 | 64 | +18 |
| CS004 | Daytime | 40 | 46 | 52 | +12 | 51 | 52 | +1 |
| | Night-time | 35 | 47 | 53 | +18 | 47 | 50 | +3 |
| CS005 | Daytime | 44 | 51 | 57 | +13 | 62 | 62 | +0 |
| | Night-time | 35 | 52 | 58 | +23 | 58 | 59 | +1 |

273. It can be seen from the sixth column of Table 13-37 that during the daytime and night-time the predicted rating levels are between 13 dB and 34 dB above the background sound threshold levels at the NSRs considered.

274. The rating levels from the Converter Station operational noise as shown in the fifth column of Table 13-37 are also compared against the rating level limits from Table 13-36 in **Table 13-38**.

**Table 13-38 Converter Station operational noise against rating level limits**

| Location | Period | Rating Level, dB $L_{Ar,T}$ | Rating Level Limit, dB $L_{Ar,T}$ | Difference |
|---|---|---|---|---|
| CS001 | Daytime | 54 | 44 | +10 |
| | Night-time | 56 | 43 | +13 |
| CS002 | Daytime | 57 | 42 | +15 |
| | Night-time | 57 | 40 | +17 |
| CS003 | Daytime | 70 | 44 | +26 |
| | Night-time | 70 | 40 | +30 |
| CS004 | Daytime | 52 | 45 | +7 |
| | Night-time | 53 | 40 | +13 |
| CS005 | Daytime | 57 | 49 | +8 |
| | Night-time | 58 | 40 | +18 |

275. Following the requirements of BS 4142, the results of the assessments as shown in Table 13-37 must be considered in context. The concept of 'context' has been notably emphasised in Section 11 of BS 4142 when considering numerical impacts established from applying the standard.

276. The most significant element of context is that the neighbouring premises is another converter station. This establishes the principle that this type of noise source is acceptable and that it is possible to achieve satisfactory rating levels at NSRs with equipment of the nature proposed. It is acknowledged that this is achieved with significant mitigation measures, proposals of which are discussed later. It should also be noted that there may well be tonal elements to the residual sound environment from the neighbouring Onshore Converter Station, which highlights that the 6 dB acoustic feature correction included in paragraph 263 is worst-case, as any tonal elements from the Onshore Scheme Onshore Converter Station may not be readily distinct from the existing environment, as would entail a 6 dB correction.

277. Other relevant points of consideration regarding the context of the Onshore Converter Station include:

- The assessment has been undertaken at the nearest and most affected residential receptors, the impact on all other residential properties will be lower due to distance / screening losses;

- The area (especially as measured at CS004 and CS005) has a relatively high residual sound level, being in close proximity to the A189 and the railway, implying a necessarily high tolerance to noise for residents; and
- The assessment has taken a robust view of the specific sound to present the worst-case scenario when in reality the specific sound level will likely be lower than the predictions.

278. With reference to Table 13-20 when referring to the difference between the operational rating level and the background sound threshold levels, this impact is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be High.

279. In addition when the when the specific $L_{Aeq,T}$ sound level of the Onshore Converter Station is added to the existing baseline ambient $L_{Aeq,T}$ sound level, as a worst-case the Onshore Converter Station is calculated to increase the baseline ambient $L_{Aeq,T}$ sound level by a maximum of 19 dB (as shown in the ninth column of Table 13-37.) This gives additional weight to an assessment outcome of High magnitude of impact.

#### 13.12.2.3. SENSITIVITY OF THE RECEPTOR

280. As the receptors considered in the assessment of operational noise from the Onshore Converter Station are residential properties, they are considered to be of Medium sensitivity during the daytime and High sensitivity during the night-time, as shown in Table 13-15.

#### 13.12.2.4. SIGNIFICANCE OF THE EFFECT

281. It can be seen from the sixth column of Table 13-37 that during the daytime and night-time the predicted rating levels are greater than 10 dB above the background sound threshold levels at the NSRs considered, which gives a High magnitude of impact.

282. Overall, the magnitude of the impact is deemed to be High, and the sensitivity of the receptor is considered to be Medium to High. The effect will, therefore, be of **major adverse significance**, which is **significant** in EIA terms.

#### 13.12.2.5. SECONDARY MITIGATION AND RESIDUAL EFFECT

**A number of mitigation measures are available for the sources contained within the Onshore Converter Station. It is recommended that a comprehensive suite of mitigation measures is utilised, as outlined in Table 13-39.**

**Table 13-39 Onshore Converter Station mitigation requirements, dB**

| Item of Plant | Mitigation Provided, dB(A) | Possible Measure |
|---|---|---|
| Converter transformer | 25 | Noise enclosure around equipment |
| Air core reactors | 20 | Equipment housed in a reactor hall |
| Harmonic filter – capacitor | 40 | Low noise equipment and housed in a building |
| Harmonic filter – reactor | 40 | Low noise equipment and housed in a building |
| Cooling banks | 10 | Low noise equipment |

283. This mitigation has been applied to the sources in Table 13-33 for each frequency band.

284. Additionally, in order to mitigate the noise from the transformers to the most affected receptor (CS003), it has been determined that the transformers would need to be located to the north of a building, based on the assumed worst case mitigated sound power levels. This has been modelled using the following parameters:

- An area source representing all plant items excluding the transformers has been calculated, and has been shortened by 50 metres at the north of the Onshore Converter Station Zone in the approximate direction of CS003 to allocate space for the transformers;
- The six transformers are modelled as point sources at a conservative 6 metre height, located 30 metres apart in a line approximately perpendicular to the direction of CS003 in the space created; and
- A barrier representing the leading edge of a building of 10 metre height has been included 10 metres from the transformers. It should be noted that a building would provide increased sound attenuation, as the other three sides of the building would also act as a sound barrier but have not been included in the model.

285. The transformers have been included at the further part of the Onshore Converter Station Zone from CS003 to give a conservative scenario as this means that the rest of the Onshore Converter Station does not benefit from the screening provided by the included barrier.

286. These are included as indicative methods of providing mitigation, rather than specifications for the design of the Onshore Converter Station. The final design of the Onshore Converter Station will be assessed at a later stage to ensure that it will not produce a significant adverse effect.

287. Table 13-40 repeats the operational assessment for the Onshore Converter Station assuming that the secondary mitigation measures shown in Table 13-39 have been implemented.

**Table 13-40 BS 4142:2014+A1:2019 Onshore Converter Station operational assessment for residential receptors, including mitigation**

| Receptor | Period | Background Sound Threshold Level, dB $L_{AT,T}$ | Predicted Specific Sound Level, dB $L_{Aeq,T}$ | Rating Level, dB $L_{Ar,T}$ | Difference, dB $L_{Ar,T}$ – dB $L_{AT,T}$ | Measured Residual, dB $L_{Aeq,T}$ | Calculated Ambient, dB $L_{Aeq,T}$ | Change in dB $L_{Aeq,T}$ |
|---|---|---|---|---|---|---|---|---|
| CS001 | Daytime | 39 | 24 | 30 | -9 | 49 | 49 | 0 |
| | Night-time | 38 | 26 | 32 | -6 | 49 | 49 | 0 |
| CS002 | Daytime | 37 | 23 | 29 | -8 | 47 | 47 | 0 |
| | Night-time | 35 | 23 | 29 | -6 | 42 | 42 | 0 |
| CS003 | Daytime | 39 | 33 | 39 | 0 | 48 | 48 | 0 |
| | Night-time | 35 | 34 | 40 | +5 | 46 | 46 | 0 |
| CS004 | Daytime | 40 | 20 | 26 | -14 | 51 | 51 | 0 |
| | Night-time | 35 | 21 | 27 | -8 | 47 | 47 | 0 |
| CS005 | Daytime | 44 | 26 | 32 | -12 | 62 | 62 | 0 |
| | Night-time | 35 | 27 | 33 | -2 | 58 | 58 | 0 |

288. It can be seen from Table 13-40 that the worst-case predicted mitigated rating levels are 5 dB(A) above the background sound threshold level at CS003 during the night-time, and at or below the background sound threshold level at CS003 during the daytime and all other receptors during the day- and night-time.

289. The rating levels from the Converter Station operational noise as shown in the fifth column of Table 13-40 are also compared against the rating level limits from Table 13-36 in Table 13-41.

**Table 13-41 Mitigated Converter Station operational noise against rating level limits**

| Location | Period | Rating Level, dB $L_{Ar,T}$ | Rating Level Limit, dB $L_{Ar,T}$ | Difference |
|---|---|---|---|---|
| CS001 | Daytime | 30 | 44 | -14 |
| | Night-time | 32 | 43 | -11 |
| CS002 | Daytime | 29 | 42 | -13 |
| | Night-time | 29 | 40 | -11 |
| CS003 | Daytime | 39 | 44 | -5 |
| | Night-time | 40 | 40 | 0 |
| CS004 | Daytime | 26 | 45 | -19 |
| | Night-time | 27 | 40 | -13 |
| CS005 | Daytime | 32 | 49 | -17 |
| | Night-time | 33 | 40 | -7 |

290. As with the unmitigated scenario, the context of the assessment must be taken into account. It can be seen from the ninth column of Table 13-40 that the ambient noise level at CS003 would not increase, a level that Table 13-21 would categorise as Negligible magnitude of impact. It should also be noted that the specific sound level is below the background sound level. In this case, the acoustic character correction of +6 dB seems particularly conservative, giving the potential for a lower rating level. Given these factors, it seems more appropriate to ascribe a Negligible (rather than Low) magnitude of impact to the mitigated operational noise from the Onshore Converter Station.

291. With reference to Table 13-20 when referring to the difference between the operational rating level and the background sound threshold levels, the impact shown in Table 13-40 is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. With the context for the BS 4142 assessment taken into account, the magnitude of impact is therefore considered to be Negligible.

292. As the receptors considered in the assessment of operational noise from the Onshore Converter Station are residential properties, they are considered to be of Medium sensitivity during the daytime and High sensitivity during the night-time, as shown in Table 13-15.

293. Overall, following mitigation, the residual magnitude of the impact is deemed to be Negligible, and the sensitivity of the receptor is considered to be Medium to High. The effect will, therefore, be of minor adverse significance, which is not significant in EIA terms.

294. This assessment comes with a high confidence. This is due to the uncertainties that still remain with respect to the final Onshore Converter Station position, layout, and construction being taken into account as part of the worst-case assumptions. It is considered that this assessment, therefore, is likely to be an overstatement compared to an assessment of the impacts that a further refined design would show.

295. It is considered that the level of effect can be reduced further still during the detailed design of the Onshore Converter Station, for example utilising construction materials that will effectively contain noise in any built elements.

296. A further noise impact assessment of the Onshore Converter Station will be undertaken at detailed design stage to ensure that no significant effects are predicted. It is envisaged that the outline application will be conditioned such that the detailed design stage assessment shows that the Converter Station operational noise will not exceed the rating level limits as set out in Table 13-36.

**ISSUE 2: OPERATIONAL ACTIVITY NOISE OF THE ONSHORE CONVERTER STATION RESULTING IN POTENTIAL EFFECT ON ECOLOGICAL RECEPTORS**

### 13.12.2.6. INTRODUCTION OF IMPACT

297. An assessment has been made in accordance with the guidance contained in AQTAG09 to determine whether noise emissions associated with the operation of the proposed Onshore Converter Station are likely to give rise to adverse impacts at the closest ecological receptors.

298. Noise levels from the Onshore Converter Station have been predicted at the nearest residential receptors in sections 13.12.2.1 to 13.12.2.5 above. It is noted that the residential receptors considered are closer to the Onshore Converter Station Zone than the designated ecological receptors.

### 13.12.2.7. MAGNITUDE OF IMPACT

299. As noted, the residential receptors at which the operational noise levels were predicted are closer to the Onshore Converter Station Zone than the designated ecological receptors. Therefore, the operational noise levels at the designated ecological receptors will be no higher than those at the residential receptors.

300. As shown in Table 13-34, the maximum predicted unmitigated specific sound level at a ground floor residential receptor is 64 dB $L_{Aeq,T}$. This has been used as a worst-case operational noise level at an ecological receptor at a height of 1.5 m.

301. Comparing this against the average noise level threshold for adverse impact at an ecological receptor of 55 dB $L_{Aeq,1hr}$ as shown in Table 13-6, it can be seen that the worst-case operational noise level at an ecological receptor is 9 dB(A) above the AQTAG09 limit.

302. The impact is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. With reference to the magnitude of impact thresholds as shown in Table 13-21, the magnitude is therefore considered to be High.

303. As noted in paragraph 97, this is an indication of the maximum magnitude of impact that would be shown should further assessments be required (dependant on species).

#### 13.12.2.8. SENSITIVITY OF THE RECEPTOR

304. As stated in Table 13-15, designated ecological sites have been defined as Medium sensitivity for all time periods.

#### 13.12.2.9. SIGNIFICANCE OF THE EFFECT

305. Overall, the magnitude of the impact is deemed to be High and the sensitivity of the receptor is considered to be up to Medium The effect will, therefore, be of **moderate to major adverse significance**, which is **significant** in EIA terms.

#### 13.12.2.10. SECONDARY MITIGATION AND RESIDUAL EFFECT

306. Details of the proposed mitigation measures for the Onshore Converter Station operational noise are given in section 13.12.2.5. With these mitigation measures in place, the maximum predicted mitigated specific sound level (as shown in Table 13-39) at a ground floor residential receptor is 33 dB $L_{Aeq,T}$ which is well below the AQTAG09 limit of 55 dB $L_{Aeq,T}$ for ecological receptors.

307. Based on the above, following mitigation, the residual magnitude of the impact is deemed to be negligible adverse, and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **negligible to minor adverse significance**, which is **not significant** in EIA terms.

### 13.12.3. Potential Effects During Decommissioning

**ISSUE 1: DECOMMISSIONING ACTIVITY NOISE RESULTING IN POTENTIAL EFFECT ON NOISE AND VIBRATION SENSITIVE RECEPTORS**

#### 13.12.3.1. INTRODUCTION OF IMPACT

308. Details surrounding the decommissioning phase are yet to be fully clarified. In addition, it is also recognised that policy, legislation and local sensitivities constantly evolve. Nevertheless, decommissioning activities are not anticipated to exceed the construction phase worst case criteria which have been assessed. In addition, whilst the assessment assumes total removal of all infrastructure, there is potential for onshore cables to remain in-situ which would see a reduction in impacts and resulting level of effect and significance in comparison to the assessment of construction effects.

309. Decommissioning activities will be driven primarily by offshore works and will be reviewed over the design life of the Project, and adapt to local sensitivities, policy, and legalisation.

310. The decommissioning methodology would be finalised nearer to the end of the lifetime of the Project, to be in line with current guidance, policy, and legislation. Any such methodology would be agreed with the relevant authorities and statutory consultees.

311. Therefore, considering that the level of effect will not exceed that of construction of the cable route and Onshore Converter Station, the magnitude of the impact is deemed to be Negligible, and the sensitivity of the receptor is considered to be High. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

## 13.13. Proposed Monitoring

### 13.13.1. Construction Monitoring

312. It is recommended that a programme of construction noise and vibration monitoring is undertaken during construction operations. The locations and exact protocol for the monitoring should be included within a NVMP for the Project.

313. The monitoring should focus on any particular sensitive periods of construction works i.e., trenchless drilling operations during the night-time or where noise and vibration levels are predicted to be close or above the threshold levels.

314. Proposed monitoring measures are outlined in Table 13-42.

**Table 13-42 Monitoring commitments for onshore noise and vibration**

| Potential Environmental Effect | Monitoring Commitment | Justification for Monitoring |
|---|---|---|
| Construction noise and vibration on nearby residential receptors | Monitoring to be undertaken during sensitive periods (i.e., trenchless drilling operations during the night-time or where noise and vibration levels are predicted to be close or above the threshold levels) and where predicted construction noise and vibration are predicted to be close to threshold limits. | Confirm a significant level of effect is not reached. |

## 13.14. Cumulative Effects Assessment

### 13.14.1. Methodology

315. The Cumulative Effects Assessment (CEA) assess the effects associated with Onshore Scheme together with other relevant plans, developments and activities. Cumulative effects are therefore the complete set of effects arising from the Onshore Scheme together with the effects from a number of different developments, on the same receptor or resource. Please see Volume 2, Chapter 3 of the ES for detail on CEA methodology.

316. The developments selected as relevant to the CEA presented within this Chapter are based upon the results of a screening exercise and the development of a ‘long list’ of cumulative developments relevant to the Onshore Scheme (see Volume 3, Technical Appendix 3.1). Each development has been considered on a case by case basis for screening in or out of this Chapter's assessment

based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved, to create the 'short list' as summarised in Table 13-43. This approach was agreed during Scoping and further consultation and technical engagement undertaken with consultees, as detailed in

317. The specific projects scoped into the CEA for onshore noise and vibration are outlined in Table 13-43.

**Table 13-43 List of other developments considered within the CEA for onshore noise and vibration**

| Development / Plan | Status | Distance from Study Area (km) | Description of Development /Plan | Dates of Construction | Dates of Operation | Overlap with the Onshore Scheme |
|---|---|---|---|---|---|---|
| Cambois Connection Marine Scheme | Application | 0 km | Offshore works (below MHWS therefore has overlap with the Onshore Scheme at the intertidal) associated with the Cambois Connection project (whilst subject to separate consents) is linked to the Onshore Scheme. | Construction 2025 onward | Anticipated to be operational from 2030 | Direct overlap of construction and operation. |
| Land At Former Power Station Site on Northern Side of Cambois | Consented | 0 km (adjacent to Site boundary) | Erection of battery manufacturing plant with ancillary offices, together with associated development and infrastructure works (including site preparation works, ground modelling, drainage, landscaping, vehicular assess, cycle and pedestrian access, parking provision, substation and other associated works). | Unknown | Unknown | Onshore Scheme construction and operation phases likely to overlap with construction or operation of this development. |
| Land To North of Spring Ville, East Sleekburn | Consented | c 0.1 km | Proposed residential development for 48 dwellings with associated access and an area of public open space. | Unknown | Unknown | Onshore Scheme construction and operation phases likely to overlap with occupation of development. |
| Former Vald Birn Foundry Cambois | Scoping Opinion Issued May 2023 | c 0.1 km | Screening Opinion under Environmental Impact Assessment Regulations. Residential development and associated infrastructure. | Unknown | Unknown | Onshore Scheme construction and operation phases likely to overlap with construction or occupation of this development. |
| Land North of Blyth Power Station Substation, East Sleekburn | Consented | 0 km (within Site boundary) | Erection of building for manufacturing of subsea cables, with ancillary offices and outdoor cable storage, together with associated development and infrastructure works including vehicular accesses off Brock Lane, landscaping and vehicular parking. | Unknown | Unknown | Onshore Scheme construction and operation phases likely to overlap with construction or operation of this development. |

### 13.14.2. Cumulative Effects Assessment

318. An assessment of the likely significance of the cumulative effects of the Onshore Scheme upon noise and vibration receptors arising from each identified impact is given below.

319. It should be noted that, due to the differing standards by which construction and decommissioning noise and operational noise are assessed, they cannot be assessed in combination with the other, i.e., construction noise from one development cannot be assessed in combination with operational noise from another. Additionally, the noise levels associated with construction and decommissioning activity have significantly higher thresholds for the onset of adverse impact, such that consented operational noise levels would be negligible compared to construction or decommissioning noise approaching adverse impacts.

#### 13.14.2.1. POTENTIAL EFFECTS DURING CONSTRUCTION

**CAMBOIS CONNECTION MARINE SCHEME**

320. The Marine Scheme includes everything from MHWS to the offshore wind farm, primarily the undersea cable route. Therefore, the construction noise impact from the Marine Scheme will be greatest when marine construction is in closest proximity to the Landfall area.

321. There is a potential for an increased magnitude of impact at the onshore NSRs when construction works as part of both the Marine and Onshore Schemes coincide. However, noise impact on onshore receptors is not considered within the Marine Scheme as significant enough to assess. As a result, likely significant cumulative effects are not anticipated.

**BRITISHVOLT GIGAFACTORY (LAND AT FORMER POWER STATION SITE ON NORTHERN SIDE OF CAMBOIS)**

##### 13.14.2.1.1. INTRODUCTION OF IMPACT

322. This consented scheme includes *'Erection of battery manufacturing plant with ancillary offices, together with associated development and infrastructure works (including site preparation works, ground modelling, drainage, landscaping, vehicular assess, cycle and pedestrian access, parking provision, substation and other associated works)*.'

323. It must be noted that, while this scheme is consented, the future of this scheme is uncertain, as since the consent, the applicant has entered administration and subsequently been acquired; it is currently unknown whether the new owner plans to proceed with the consented works, or a variation of them.

324. The application for the Britishvolt gigafactory included both a noise Chapter as part of the development's ES, and a standalone noise impact assessment produced by Hoare Lea. Within these, the receptors considered overlapping with this assessment were residences in the vicinity of CS001, CS002, and CS003.

325. As stated in Table 13-43, it is anticipated that the construction of the Britishvolt gigafactory is likely to overlap with the construction or operation of the Onshore Scheme.

13.14.2.1.2. MAGNITUDE OF IMPACT

326. There is potential for the construction phases of the Onshore Scheme and the Britishvolt gigafactory to overlap. The potential for cumulative impact at each receptor is considered below.

327. Residences in the vicinity of CS001, which are at a distance just over 290 m from the Onshore Scheme, will be subject to worst-case cable route construction noise levels from the Onshore Scheme at a level on the boundary of Medium to High magnitude of impact for weekend periods, i.e. noise levels of approximately of 59 dB $L_{Aeq,T}$ referencing Table 13-24, which is the worst-case predicted construction noise level in this area from the Onshore Scheme (compared to trenchless drilling noise and Onshore Converter Station construction noise). As noted in paragraph 145, these construction noise levels would be reduced to ensure a minor level of effect through mitigation measures that will be specified within the NVMP. Tables 10.20 and 10.21 in the Noise and Vibration Chapter of the ES for the Britishvolt development identify that the worst-case construction noise from their development would be 74 dB $L_{Aeq,working}$ for piling noise and 69 dB $L_{Aeq,working}$ for other construction activities. On this basis, with construction noise from the Britishvolt development in the order of 10 dB(A) above that from the Onshore Scheme, it is considered that the Onshore Scheme will contribute negligibly in comparison to the Britishvolt development to any cumulative construction noise impacts at residences in the vicinity of CS001.

328. At residences in the vicinity of CS002, section 13.12.1.5 identified that the magnitude of impact of noise from construction of the Onshore Scheme will be restricted to 'negligible' where necessary; this would equate to a worst-case construction noise level of 65 dB $L_{Aeq,1hr}$ for weekday daytime periods. Tables 10.20 and 10.21 in the Noise and Vibration Chapter of the ES for the Britishvolt gigafactory identifies that the worst-case construction noise from their development would be 75 dB $L_{Aeq,working}$ for piling noise and 85 dB $L_{Aeq,working}$ for other construction activities. On this basis, with construction noise from the Britishvolt gigafactory in the order of 10 dB(A) above that from the Onshore Scheme, it is considered that the Onshore Scheme will contribute negligibly in comparison to the Britishvolt development to any cumulative construction noise impacts at residences in the vicinity of CS002.

329. With regards to CS003, as stated in paragraph 172, construction noise levels from the Onshore Converter Station will be mitigated, with the appropriate measures to be identified in the NVMP, to ensure the NSRs listed in Table 13-28 would experience a maximum impact magnitude of Low during the weekend period, i.e. to a level of 57 dB $L_{Aeq,T}$, which is the worst-case predicted impact magnitude in this area from the Onshore Scheme (compared to cable route construction and trenchless drilling noise). Tables 10.20 and 10.21 in the Noise and Vibration Chapter of the ES for the Britishvolt gigafactory identifies that the worst-case construction noise from their development would be 61 dB $L_{Aeq,working}$ for piling noise and 63 dB $L_{Aeq,working}$ for other construction activities, with construction activities only during the daytime (including Saturday morning) periods. The total construction noise from the Britishvolt development at CS003 is therefore 65 dB $L_{Aeq,working}$ for the weekday periods. The worst-case cumulative level of the construction noise from the Onshore Scheme and the Britishvolt gigafactory therefore gives a worst-case construction noise level at residences in vicinity of CS003 of 66 dB $L_{Aeq,T}$ for daytime periods.

330. Further to the above it can therefore be concluded that the construction noise from the Onshore Scheme will increase the cumulative construction noise level at CS003 by +1 dB. With reference to Table 13-10 and Table 13-17, this would result in a magnitude of impact at the residences in vicinity of CS003 of Low during the daytime periods.

331. The cumulative impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore, considered to be Low during daytime periods. The weekend magnitude of impact of Low during the weekend periods is unaffected by the Britishvolt development as weekend construction activity is not detailed (Saturday morning work, which is identified within the Britishvolt application, falls within the same category as midweek daytime in BS 5228-1).

#### 13.14.2.1.3. SENSITIVITY OF RECEPTOR

332. The receptors considered as part of this assessment are the nearest residential receptors to the Onshore Converter Station Zone.

333. Therefore, the sensitivity of the receptors considered during the daytime periods, based on the definitions of sensitivity summarised in Table 13-15, is Medium sensitivity.

#### 13.14.2.1.4. SIGNIFICANCE OF EFFECT

334. Overall, the magnitude of the impact is deemed to be Low and the sensitivity of the receptor is considered to be Medium. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.14.2.1.5. SECONDARY MITIGATION AND RESIDUAL EFFECT

335. No secondary mitigation is considered necessary for construction noise from the Onshore Converter Station in combination with the construction of the Britishvolt gigafactory as the likely cumulative effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### SUBSEA CABLE FACTORY (LAND NORTH OF BLYTH POWER STATION SUBSTATION, EAST SLEEKBURN)

336. This consented scheme includes '*Erection of building for manufacturing of subsea cables, with ancillary offices and outdoor cable storage, together with associated development and infrastructure works including vehicular accesses off Brock Lane, landscaping and vehicular parkin"*.

337. The application for the subsea cable factory included a standalone noise impact assessment produced by Waterman. Within these, the receptors considered overlapping with this assessment were residences in the vicinity of CS002; it should be noted that the location of this development is on the opposite side of the housing estate containing CS002.

338. As stated in Table 13-43, it is anticipated that the construction of the subsea cable factory is likely to overlap with the construction or operation of the Onshore Scheme.

339. However, no construction noise impact assessment has been undertaken, and so no assessment of the cumulative construction noise is possible.

**PROPOSED RESIDENTIAL DEVELOPMENTS (LAND TO NORTH OF SPRING VILLE, EAST SLEEKBURN AND FORMER VALD BIRN FOUNDRY CAMBOIS)**

340. As well as considering the noise impact on existing sensitive receptors, it is important to consider the potential impact on known future sensitive receptors. The two nearby schemes include:

- *'Proposed residential development for 48 dwellings with associated access and an area of public open space'*; and
- *'Screening Opinion under Environmental Impact Assessment Regulations. Residential development and associated infrastructure'*.

341. As stated in Table 13-43, it is anticipated that the construction of the Onshore Scheme is likely to overlap with the occupation of these developments.

342. The *'Land to North of Spring Ville, East Sleekburn'* development is situated to the south-west of the Site, between Brick Lane and the A189. The 'Former Vald Birn Foundry' development is situated to the north-east of the Site, directly to the south and east of Wembley Terrace.

343. No details on construction noise were provided with these applications, and as such cumulative construction noise cannot be assessed.

13.14.2.1.6. MAGNITUDE OF IMPACT

344. At the closest elements of the proposed residential development locations (approximately 75 and 165 m respectively), the worked example of construction mitigation in Table 13-26 shows that worst-case cable route construction noise levels, when appropriate mitigation is specified within the NVMP, will result in a Negligible magnitude of impact. These additional mitigation measures would be informed by detailed design post consent and included within the final NVMP.

13.14.2.1.7. SENSITIVITY OF RECEPTOR

345. The proposed receptors are residential properties; with reference to the definitions of sensitivity summarised in Table 13-15, they are therefore of Medium sensitivity during the daytime and High sensitivity during the night-time.

13.14.2.1.8. SIGNIFICANCE OF EFFECT

346. Overall, the magnitude of the impact is deemed to be Negligible, and the sensitivity of the receptor is considered to be up to High (residential receptors during the night-time period). The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

13.14.2.1.9. SECONDARY MITIGATION AND RESIDUAL EFFECT

347. No secondary mitigation is considered necessary for construction noise from the cable route because the likely effect in the absence of secondary mitigation is not significant in EIA terms. The effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

## CUMULATIVE CONSTRUCTION TRAFFIC

348. Construction traffic from the development proposals and the other developments that may occur concurrently may temporarily alter noise levels near the affected local road network. Therefore, a cumulative noise assessment as in section 13.12.1 has been undertaken to include the identified affected links.

349. The most affected links have been identified within Chapter 12: Transport, Traffic and Access and shown on Figure 12.1 in Volume 4.

### 13.14.2.1.10. MAGNITUDE OF IMPACT

350. With Chapter 12, for each link the AAWT and percentage of HGVs have been determined 'With Scheme and Cumulative Developments' (with the Onshore Scheme and potential concurrent proposals) and 'Without Scheme' (without the Onshore Scheme). With reference to Chapter 12, for each link the AAWT and percentage of HGVs have been determined 'With Scheme and Cumulative Developments' (with the Onshore Scheme and potential concurrent proposals) and 'Without Scheme' (without the Onshore Scheme).

351. Based on the traffic numbers described above the BNL has been established for the 'With Scheme and Cumulative Developments' and 'Without Scheme'. Scenarios for the base year 2022 and base year including the Onshore Scheme have been assessed. The BNL is the dB $L_{A10,\ 18hr}$ noise level at 10 m from the kerb of the road assessed.

352. The impact magnitude for each assessment of each link is shown in Table 13-44. The table also compares the predicted changes in noise levels to the magnitude of impact threshold limits contained in Table 13-18.

**Table 13-44 Cumulative construction traffic noise assessment**

| Link | Without Scheme | | | | With Scheme and Cumulative Developments | | | | Change in BNL, dB | Impact Magnitude |
|---|---|---|---|---|---|---|---|---|---|---|
| | AAWT | % HGV | Average Speed km/h | BNL dB | AAWT | % HGV | Average Speed km/h | BNL dB | | |
| A189 (N)***** | 40391 | 3.4 | 97* | 78.1 | 42452 | 3.5 | 97* | 78.3 | +0.2 | Negligible |
| A189 (S)***** | 36405 | 2.9 | 97* | 77.6 | 36841 | 2.9 | 97* | 77.6 | +0.1 | Negligible |
| C404 Spine Road between A189 and Brock Lane | 2816 | 3.4 | 78 | 64.8 | 4507 | 5.9 | 78 | 67.4 | +2.6 | Low |
| Brock Lane****** | 1729 | 1.3 | 50* | 59.2 | 2072 | 2.0 | 50* | 60.2 | +1.0 | Low |
| Old Main Road****** | 507 | 0.0 | 50* | 53.4 | 507 | 0.0 | 50* | 53.4 | 0.0 | Negligible |
| C404/C415 Spine Road between AC1 and AC4 | 2955 | 3.4 | 78 | 65.0 | 4340 | 6.1 | 78 | 67.2 | +2.3 | Low |
| C404/C415 Spine Road between AC4 and AC5 | 2955 | 3.4 | 78** | 65.0 | 4203 | 5.2 | 78** | 66.9 | +1.9 | Low |
| C415 Spine Road between AC5 and AC6 | 2955**** | 3.4 | 50* | 62.3 | 4203 | 5.2 | 50* | 64.3 | +2.1 | Low |
| C415 Spine Road between AC6 and AC8 | 2955**** | 3.4 | 50* | 62.3 | 4203 | 5.2 | 50* | 64.3 | +2.1 | Low |
| C415 Spine Road east of AC8 | 2955**** | 3.4 | 50* | 62.3 | 3075 | 4.5 | 50* | 62.8 | +0.5 | Negligible |
| Unity Terrace*** | 804 | 1.6 | 45 | 55.5 | 924 | 6.1 | 45 | 57.6 | +2.1 | Low |

** Speeds suggested in paragraph 14.2 of CRTN as no speed data*
*** Estimate as not at the ATC location*
**** The impacts on this link would occur at a different time to the other links, due to the anticipated timing of the Landfall works*
***** Estimate as not at the ATC location*
****** 2019 Draft Data, used as an estimation for 2023 due to the reduction in traffic during the Covid-19 period.*
******* Estimated from 22/00879 data*

353. The cumulative impact is predicted to be of local spatial extent, medium term duration, intermittent and high reversibility. It is predicted that the impact will affect the receptor directly. With reference to Table 13-44, the magnitude is therefore considered to be Low.

#### 13.14.2.1.11. SENSITIVITY OF RECEPTOR

354. As the significant majority of receptors along the highway routes are residential receptors, and only daytime and weekend construction is proposed, the receptors along the traffic links have been categorised as Medium sensitivity.

#### 13.14.2.1.12. SIGNIFICANCE OF EFFECT

355. Overall, the magnitude of the cumulative effect is deemed to be Low and the sensitivity of the receptor is considered to be Medium. The cumulative effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

#### 13.14.2.1.13. SECONDARY MITIGATION AND RESIDUAL EFFECT

356. No secondary mitigation is considered necessary for cumulative construction traffic noise because the likely cumulative effect in the absence of secondary mitigation is not significant in EIA terms. The cumulative effect will, therefore, remain as **minor adverse significance**, which is **not significant** in EIA terms.

### 13.14.2.2. POTENTIAL EFFECTS DURING OPERATION

#### CAMBOIS CONNECTION MARINE SCHEME

357. The Marine Scheme includes everything from the MHWS up to the offshore wind farm. Operational noise from the Marine Scheme has not been considered in the Marine Scheme as there are no sources considered to have the potential to generate significant levels of operational noise. As a result, likely significant cumulative effects are not anticipated.

#### BRITISHVOLT GIGAFACTORY (LAND AT FORMER POWER STATION SITE ON NORTHERN SIDE OF CAMBOIS)

358. As stated in Table 13-43, it is anticipated that the operation of the Britishvolt gigafactory is likely to overlap with the operation of the Onshore Scheme.

#### 13.14.2.2.1. MAGNITUDE OF IMPACT

359. The noise impact assessment for the Britishvolt gigafactory has broken down the noise emissions into several categories. For the purposes of this cumulative assessment, the total noise levels from the Britishvolt gigafactory at each receptor has been calculated based on the values set out in the Hoare Lea noise impact assessment that accompanied the application, set out in Table 13-45.

**Table 13-45 Britishvolt gigafactory predicted specific sound levels, dB $L_{Aeq}$**

| Activity | CS001 | | CS002 | |
|---|---|---|---|---|
| | Daytime | Night-time | Daytime | Night-time |
| Building Breakout | 13 | 13 | 24 | 24 |
| HGV Movements | 28 | 31 | - | - |
| HGV Reversing Alarms | 17 | 20 | - | - |
| Loading / Unloading | 33 | 35 | - | - |
| Waste Compaction | 31 | 33 | - | - |
| Logistics Yard Access | 25 | 25 | 36 | 36 |
| Car Parking | - | - | 30 | 30 |
| Total Specific Sound Level, dB $L_{Aeq}$ | 36 | 38 | 37 | 37 |

360. At residences in the vicinity of CS001 and CS002, Table 13-40 shows that mitigated operational specific sound levels from the Onshore Converter Station will be 24 and 23 dB $L_{Aeq}$ during the daytime and 26 and 23 dB $L_{Aeq}$ during the night-time respectively.

361. Comparing these values to those shown in Table 13-45, it can be seen that operational specific sound levels from the Britishvolt gigafactory are in excess of 10 dB(A) above that from the Onshore Scheme. This is particularly relevant as the Britishvolt operational noise is presented at the closest edge of the residential receptors in the vicinity of CS001 and CS002 to the Britishvolt site, where the operational noise levels from the Onshore Scheme will be lower than those presented in Table 13-40 due to additional geometric attenuation and potentially additional screening from other residences.

362. Therefore, the predicted noise levels from the Onshore Scheme will not increase the predicted specific sound levels from the Britishvolt gigafactory at residences in the vicinity of CS001 and CS002 and subsequently the cumulative impact would be no greater than the impacts already identified within the ES for the Britishvolt gigafactory.

363. Operational noise levels at residential receptors in the vicinity of CS003, CS004, and CS005 are not considered within the ES for the Britishvolt gigafactory, therefore a cumulative noise magnitude of impact assessment has not been undertaken for these locations.

### SUBSEA CABLE FACTORY (LAND NORTH OF BLYTH POWER STATION SUBSTATION, EAST SLEEKBURN)

364. As stated in Table 13-43, it is anticipated that the operation of the subsea cable factory is likely to overlap with the operation of the Onshore Scheme.

13.14.2.2.2. MAGNITUDE OF IMPACT

365. The noise impact assessment for the subsea cable factory has broken down the noise emissions into breakout noise from the building and on-site operations. At residences in the vicinity of CS002, building breakout noise was predicted to have a specific sound level of 41 dB $L_{Aeq}$ during the daytime and evening periods and 24 dB $L_{Aeq}$ during the night-time, and on-site operations were predicted to have a specific sound level of 42 dB $L_{Aeq}$ during the daytime and evening periods and 39 dB $L_{Aeq}$ during the night-time.

366. The daytime period presented for the Onshore Scheme equates to the daytime and evening periods presented for this development. As the predicted specific sound levels for the daytime and evening periods are the same for this development, this results in the same specific sound level for the daytime period used in the assessment of the Onshore Scheme.

367. Combining the specific sound levels for the building breakout noise and on-site operations for the subsea cable factory gives total specific sound levels at CS002 of 45 dB $L_{Aeq}$ during the daytime and 39 dB $L_{Aeq}$ during the night-time.

368. Comparing these to the mitigated specific sound levels to the operational specific sound levels for the Onshore Scheme in Table 13-40, it can be seen that operational specific sound levels from the subsea cable factory are in excess of 10 dB(A) above that from the Onshore Scheme.

369. Therefore, the predicted noise levels from the Onshore Scheme will not increase the predicted specific sound levels from the subsea cable factory at residences in the vicinity of CS002 and subsequently the cumulative impact would be no greater than the impacts already identified within the standalone noise assessment for the subsea cable factory.

**PROPOSED RESIDENTIAL DEVELOPMENTS (LAND TO NORTH OF SPRING VILLE, EAST SLEEKBURN AND FORMER VALD BIRN FOUNDRY CAMBOIS)**

370. As stated in Table 13-43, it is anticipated that the operation of the Onshore Scheme is likely to overlap with the occupation of these developments.

13.14.2.2.3. MAGNITUDE OF IMPACT

371. It is considered that the measurements undertaken at CS001 will adequately represent the background sound level at the location of the '*Former Vald Birn Foundry'* development, and that the operational sound level from the Onshore Converter Station will be of the same order as that at CS001. On this basis, the operational rating level will be at least 5 dB below the representative background sound level and therefore of Negligible impact magnitude.

372. The '*Land to North of Spring Ville, East Sleekburn'* development will result in sensitive receptors an equivalent distance from a worst-case Onshore Converter Station location as CS003. Therefore, resultant operational rating levels at this development will be of the same order as at CS003.

373. However, the background sound level at this development is considered likely to be higher for the following reasons:

- The noise impact assessment for the development authored by Cundall was undertaken during Covid restrictions, and therefore the baseline sound level measurements were affected by reduced traffic movements. The background sound levels are not presented

within the assessment, however the ambient noise levels are a minimum of 6 and 1 dB higher during the day- and night-time periods respectively than measured for the Onshore Scheme; and

- The levels measured in 2013 by Wardell Armstrong are also presented in the Cundall assessment and are a minimum of 14 and 6 dB higher during the day- and night-time periods respectively than measured for the Onshore Scheme.

374. On this basis, it is considered that the magnitude of impact predicted at CS003 is a worst-case representation of the magnitude of impact at the '*Land to North of Spring Ville, East Sleekburn'* development.

375. Therefore, without the secondary mitigation described in section 13.12.2.5, the magnitude of impact for the '*Land to North of Spring Ville, East Sleekburn'* development is predicted to be of local spatial extent, long term duration, continuous and high reversibility. It is predicted that the impact will affect the receptor directly. The magnitude at this receptor is therefore considered to be High.

#### 13.14.2.2.4. SENSITIVITY OF RECEPTOR

376. As the receptors considered in the assessment of operational noise from the Onshore Converter Station are residential properties, they are considered to be of Medium sensitivity during the daytime and High sensitivity during the night-time, as shown in Table 13-15.

#### 13.14.2.2.5. SIGNIFICANCE OF EFFECT

377. The magnitude of the impact at the *'Former Vald Birn Foundry'* development is deemed to be Negligible, and the sensitivity of the receptor is considered to be High. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

378. Without the secondary mitigation described in section 13.12.2.5, the magnitude of the impact at the *'Land to North of Spring Ville, East Sleekburn'* development is deemed to be High, and the sensitivity of the receptor is considered to be High. The effect will, therefore, be of **major adverse significance**, which is **significant** in EIA terms.

#### 13.14.2.2.6. SECONDARY MITIGATION AND RESIDUAL EFFECT

379. However, with the secondary mitigation described in section 13.12.2.5 (the source sound level mitigations described in Table 13-39 and the design requirements outlined in paragraph 284), the magnitude of impact at the *'Land to North of Spring Ville, East Sleekburn'* development is predicted to be reduced to Negligible when considered in context, as described in paragraph 290.

380. As the receptors considered in the assessment of operational noise from the Onshore Converter Station are residential properties, they are considered to be of Medium sensitivity during the daytime and High sensitivity during the night-time, as shown in Table 13-15.

381. Overall, following mitigation, the magnitude of the impact at both proposed residential receptors is deemed to be Negligible, and the sensitivity of the receptor is considered to be High. The effect will, therefore, be of **minor adverse significance**, which is **not significant** in EIA terms.

### 13.14.3. Proposed Monitoring

382. No additional monitoring is proposed; however, it is recommended that the '*Land to North of Spring Ville, East Sleekburn*' development should be considered within the construction noise level monitoring.

## 13.15. Inter-Related Effects

383. Inter-related effects are considered to be the impacts and associated effects of different aspects of the Onshore Scheme on the same receptor. Inter-related effects are the potential effects of multiple impacts, affecting one receptor or a group of receptors. Inter-related effects include interactions between the impacts of the different stages of the Onshore Scheme (i.e., interaction of impacts across construction, operation and maintenance and decommissioning), as well as the interaction between impacts on a receptor within an Onshore Scheme stage. A description of the likely inter-related effects arising from the Onshore Scheme on noise and vibration is provided below.

384. For the onshore noise and vibration sensitive receptors, the following potential impacts have been considered within the inter-related assessment:

- Noise and vibration from construction of the Landfall, HVDC, and HVAC cable routes;
- Noise and vibration from construction of the Onshore Converter Station;
- Operational noise from the Onshore Converter Station; and
- Noise and vibration from decommissioning.

385. There is potential that construction of the cable route and Onshore Converter Station could happen simultaneously, and therefore a potential for inter-related effects. No other combination of impacts could occur simultaneously.

386. However, it is considered unlikely that the Onshore Converter Station construction phase considered as part of the worst-case assessment (ground works) would occur simultaneously with the Landfall, HVDC, and HVAC cable route construction phase considered as part of the worst-case assessment (establish access & TCC or site preparation), close to a location where Onshore Converter Station construction noise and vibration is significant, as it is considered that the same plant items would be required for both operations.

387. Therefore, these inter-related effects as described above are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phases. Therefore, these inter-related effects would not be significant in EIA terms.

## 13.16. Summary of Impacts, Mitigation Measures, Likely Significant Effects and Monitoring

Information on noise and vibration within the Onshore Noise and Vibration Study Area was collected through desktop review, on-site baseline surveys, and through the applicant's knowledge from previous projects of a similar nature.

388. Table 13-47 presents a summary of the potential impacts, mitigation measures and the conclusion of likely significant effects in EIA terms in respect to onshore noise and vibration. The impacts assessed include:

- Construction noise from the Landfall, HVDC, and HVAC cable routes;
- Construction noise from the Onshore Converter Station;
- Construction noise affecting ecological receptors;
- Construction vibration from the Landfall, HVDC, and HVAC cable routes;
- Construction vibration from the Onshore Converter Station;
- Noise from vehicles associated with construction;
- Operational noise from the Onshore Converter Station;
- Operational noise from the Onshore Converter Station affecting ecological receptors; and
- Potential effects due to noise and vibration during decommissioning.

389. Overall, it is concluded that there will be no likely significant effects arising from the Onshore Scheme during the construction, operation and maintenance or decommissioning phases provided the tertiary and secondary mitigation measures have been implemented.

390. Table 13-47 presents a summary of the potential cumulative impacts, mitigation measures and the conclusion of likely significant effects in EIA terms in respect to onshore noise and vibration. The cumulative effects assessed include:

- Construction and operational noise on proposed residential receptors; and
- Cumulative construction and operational noise with proposed noise sources on residential receptors.

391. Overall, it is concluded that there will be no likely significant cumulative effects from the Onshore Scheme alongside other developments / plans.

**Table 13-46 Summary of potential likely significant environmental effects, mitigation and monitoring**

| Description of Impact | Phase | | | Magnitude of Impact | Sensitivity of Receptor | Significance of Effect | Secondary Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | |
| Construction noise from the cable route | ✓ | × | ✓ | Negligible | Up to High | Minor adverse (not significant) | None | Minor adverse (not significant) | Monitoring to be undertaken during sensitive periods and where predicted construction noise and vibration are predicted to be close to threshold limits. |
| Construction noise from the Onshore Converter Station | ✓ | × | ✓ | Low | Medium | Minor adverse (not significant) | None | Minor adverse (not significant) | |
| Construction noise affecting ecological receptors | ✓ | × | ✓ | Low | Medium | Minor adverse (not significant) | None | Minor adverse (not significant) | |
| Construction vibration from the cable route | ✓ | × | ✓ | Negligible | Up to High | Minor adverse (not significant) | None | Minor adverse (not significant) | |
| Construction vibration from the Onshore Converter Station | ✓ | × | ✓ | Low | Medium | Minor adverse (not significant) | None | Minor adverse (not significant) | |
| Noise from vehicles associated with construction | ✓ | × | ✓ | Low | Medium | Minor adverse (not significant) | None | Minor adverse (not significant) | None |
| Operational noise from the Onshore Converter Station | × | ✓ | × | High | High | Major adverse (significant) | Mitigation of source noise levels and through good acoustic design of Onshore Converter Station layout. | Minor adverse (not significant) | None |
| Operational noise from the Onshore Converter Station affecting ecological receptors | × | ✓ | × | High | Medium | Major adverse (significant) | Mitigation of source noise levels and through good acoustic design of Onshore Converter Station layout. | Minor adverse (not significant) | None |

**Table 13-47 Summary of likely significant cumulative environment effects, mitigation and monitoring**

| Description of Impact | Phase | | | Magnitude of Impact | Sensitivity of Receptor | Significance of Effect | Secondary Mitigation | Residual Effect | Proposed Monitoring |
|---|---|---|---|---|---|---|---|---|---|
| | C | O | D | | | | | | |
| Cumulative impact with proposed Britishvolt Gigafactory | ✓ | ✓ | × | Construction – Low<br>Operation – High | Construction – Medium<br>Operation – High | Construction – Minor adverse (not significant)<br>Operation – Major adverse (significant) | Mitigation of source noise levels and through good acoustic design of Onshore Converter Station layout. | Minor adverse (not significant) | As in Table above. |
| Cumulative impact with proposed Subsea Cable Factory | × | ✓ | × | High | High | Major adverse (significant) | Mitigation of source noise levels and through good acoustic design of Onshore Converter Station layout. | Minor adverse (not significant) | As in Table above. |
| Impact on proposed residential receptors | ✓ | ✓ | ✓ | Construction – Negligible<br>Operation – High at one | Construction – Medium<br>Operation – High | Major adverse (significant) | Mitigation of source noise levels and through good acoustic design of Onshore Converter Station layout. | Minor adverse (not significant) | As in paragraph 382. |
| Cumulative construction traffic | ✓ | × | × | Low | Medium | Minor adverse (not significant) | None | Minor adverse (not significant) | None |

## 13.17. References

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